MAY 1973 / $2

AIR FORCE

PUBLISHED BY THE AIR FORCE ASSOCIATION

MAGAZINE

ANNUAL AIR FORCE ALMANAC 1973

Tiger.

It lives in another kind of jungle. Cold. Bright. Blue. It flies in the trees. Just above. Or way above.

Our new F-5E Tiger II was bred for it. The arena where most air combat happens. In the speed range between Mach 0.4 and 1.4 victory is to the agile. To the relentless. To the tigers.

Combine this air-to-air superiority with a significant boost in ground attack capability. Cap with a top speed of Mach 1.6. All together, Tiger II makes a lot of dollar sense.

Chosen after competition as the International Fighter, it is recognized as the most realistic answer to the self-defense needs of many nations: peace through security.

Northrop already has orders for over 300. They're no being built. At promised cost. Ahead of schedule. what has been termed the most completely automate and efficient production operation in the industry.

We expect great things from th tiger. Well, we should. It's a pa of the creative technology th spawned the F-5. The T-38. Th Cobra P-530. The USAF P-600.

The toughest family of ligh fighters in the entire world.

NORTHROI

Goodyear delivers on tactical weapon systems development.

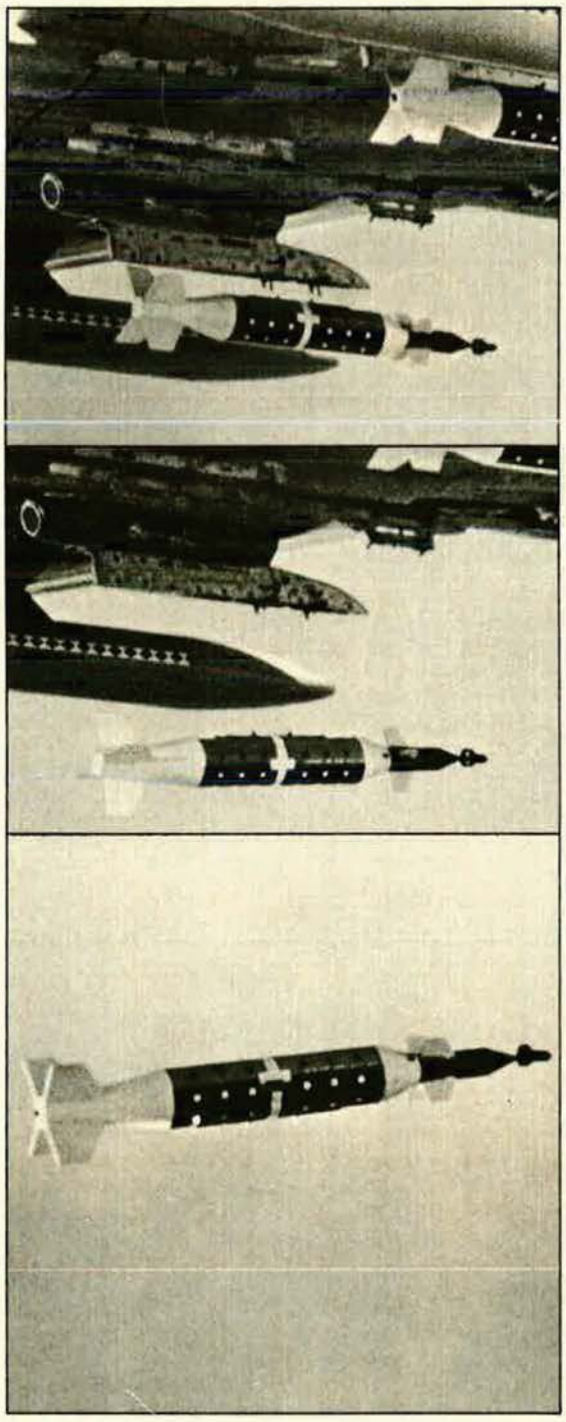
LGDM proves it.

LGDM, the Air Force's Laser-Guided Dispenser Munition, is the latest proof of Goodyear's capability to develop advanced tactical weapon systems.

The program has progressed through successful completion of captive, ballistic verification and guided accuracy flights.

We've been delivering weapon systems to the defense arsenal for the past 25 years, using off-the-shelf subsystem hardware, where possible, to minimize RDT&E cost.

Major examples of Goodyear's subsystem integration and system development include prime contracts involving both solid booster and cruise type missile systems such as MACE, REGULUS II, MMRBM, SOCM, and SUBROC.



Another current project is an air-to-ground munition with terminal homing to defeat hard-structure targets. In a realistic test just one of these devices demolished a giant reinforced concrete simulated bridge pier.

A wide spectrum of hard targets can be defeated with far fewer sorties when this munition is used. It's a prime candidate for further development.

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A classic in its own time

VOUGHT
SYSTEMS DIVISION

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AIR FORCE MAGAZINE
PUBLISHED BY THE AIR FORCE ASSOCIATION

VOLUME 56, NUMBER 5

MAY 1973

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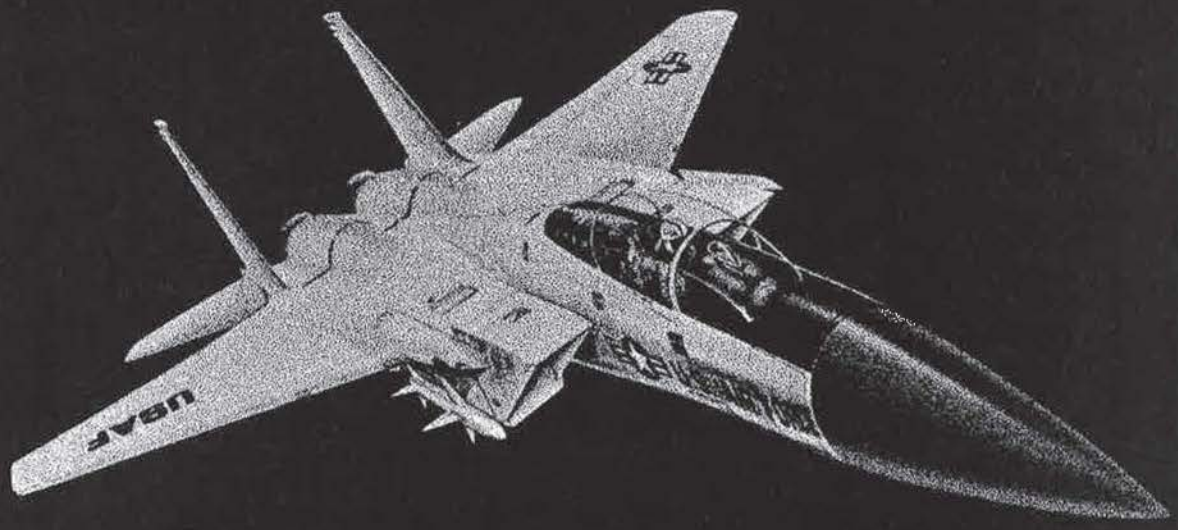
Four reasons why the F-15



1. Airframe by McDonnell Douglas, builder of more than 4,200 F-4 Phantoms, the great fighter for the U.S. Air Force, Navy and Marines – and the leading nations of the Free World. Just as the F-4 set a new standard of performance where it counts, so the new F-15 Eagle, incorporating quantum advances in technology and materials, will establish itself as the new air superiority fighter from America.

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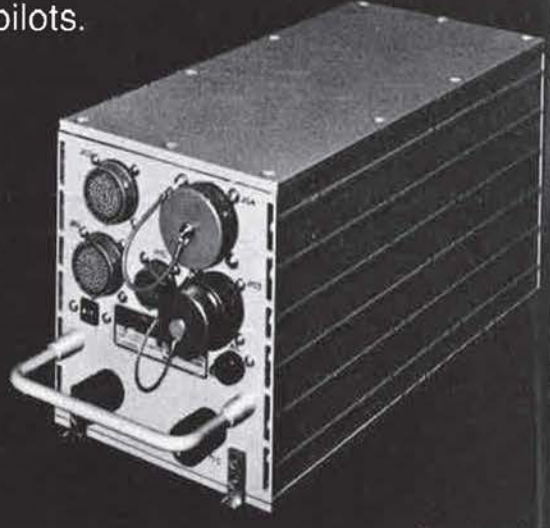
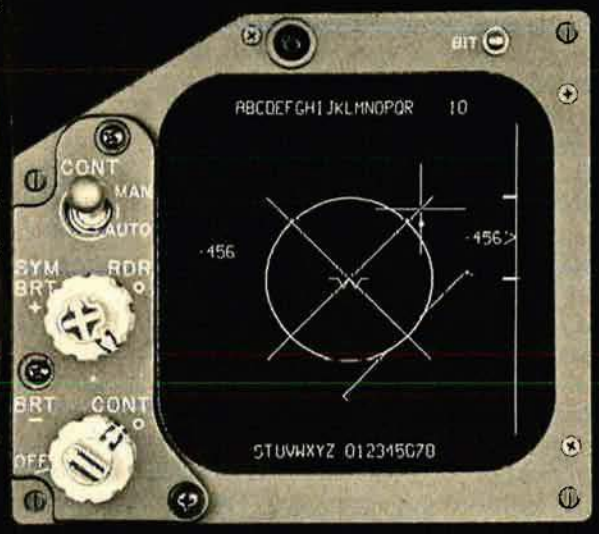


s a fighter pilot's fighter.



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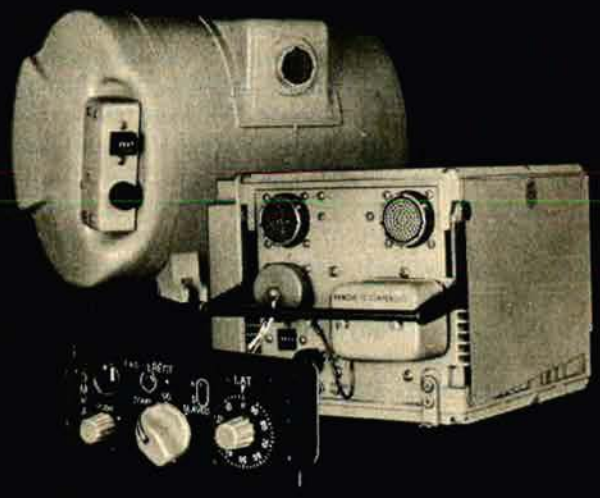

The F-15. Sperry's there with the latest avionics to help make it truly a fighter pilot's fighter. Sperry Flight Systems. Phoenix, Arizona 85036.

SPERRY

AN EDITORIAL

PUBLIC OPINION AND THE POWs

By John F. Loosbrock, EDITOR, AIR FORCE MAGAZINE

> "Colonel [Robinson] Risner named October 15, 1969, as the beginning of improvement in the prisoners' treatment."
> —*Time* Magazine, April 9, 1973.

NOTE that date, please—October 15, 1969. It has special, deep, and satisfying meaning for this magazine and for the Air Force Association. It is the essential, and heretofore missing, link in a chain of events that was set in motion some months earlier—in mid- or late summer of 1969. We don't recall exactly, and it is of no great matter.

What does matter is that then an astute and experienced writer on military affairs, Louis F. Stockstill, came to us with an idea that fitted perfectly with our editorial plans and aspirations. We could blow the lid off, Lou said, of the shameful way American prisoners of war were being treated in Southeast Asia. Up to then, the policy was the less said, the better, on the premise that, otherwise, Hanoi might carry out its threats to try and to execute prisoners as war criminals.

Well, the Stockstill article literally made history. We published it in our October '69 issue under the title "The Forgotten Americans of the Vietnam War." It laid out, in graphic and documented detail, the shameful ways in which American prisoners were being treated. A key part of the article was the suggestion that a letter-writing campaign be mounted in protest.

Whether such a campaign would sway the only people who could do anything for the prisoners—the North Vietnamese and their friends—seemed dubious, even to us. But no better suggestion had come along.

The reaction to the Stockstill article was electric. Roman C. Pucinski, then US Representative from Illinois, read the entire piece to his colleagues on the floor of the House—something that is very rarely done. In his introduction, the Congressman said:

"This article should shake the conscience of the whole free world."

The statement proved less hyperbolic than it might have sounded in delivery. *The Reader's Digest,* with its many millions of circulation, condensed the article, and it appeared in the *Digest's* November 1969 issue. Almost 800,000 reprints of the resulting *Digest* version were then distributed, in addition to 50,000 reprints of the full AIR FORCE Magazine treatment distributed by the Air Force Association. In all, the article was inserted into the *Congressional Record* six times by as many Senators and Representatives.

Nor did the matter rest there. Hundreds of thousands, eventually millions, of letters, as suggested, began to pour forth, not only from America but from around the world—each asking that Hanoi perform at least the minimum requirements for the humane treatment due prisoners of war under international law and agreement.

Here, indeed, was a cause in which all persons of goodwill could unite, regardless of their views on other aspects of the Vietnam War.

Farfetched as the thought seemed at the time, the pressure of world opinion, with the letters as solid evidence, had its effect on Hanoi. Until then, the North Vietnam leadership could not believe that the fate of a relative handful of men, captured in an unpopular war, could possibly be so important to Americans at home, much less to other peoples. They had worked hard, and with much success, to create a favorable world public image, and the image was being tarnished.

So to us, it is more than coincidence that, as returned prisoners have testified, conditions in the Hanoi Hilton and other places of detention began to improve in October of 1969.

This is not to say that credit is not due to hundreds of organizations and millions of individuals. The gallant wives, parents, and children of the League of Families have been consistently steadfast in their efforts over a span far antedating this magazine's exposé. AFA units across the land conducted, and spurred others to conduct, letter-writing campaigns. The VIVA bracelets were a stroke of public-relations genius. H. Ross Perot gave generously and imaginatively of his time and resources, as did many other less-publicized individuals and organizations.

But it is fair, we think, to say that Lou Stockstill and AIR FORCE Magazine started it all and that the Air Force Association, with its national campaign and with our monthly "MIA/POW Action Report," kept things moving. The prisoners are back, and in reasonably good condition, and that is the name of the game. The resolution of the fate of those missing in action and unaccounted for becomes the continuing issue.

Meanwhile, we take comfort and pride from our role in what has transpired, and are particularly grateful for the answers it provides to two questions sometimes raised by friends and often by critics:

What does AFA really do for the blue-suiter? and,

Isn't AIR FORCE Magazine only preaching to the choir? ■

Build a truck. Make it rugged. Then fly it.

What do you do when you have to fly men and equipment, trucks and tractors to remote areas where runways are dirt and bumpy? Where roads may not even go.

The big commercial cargo jets are no answer. They need paved runways 10,000 feet long. And elaborate hoists to draw cargo from their high side doors. Try driving a truck out of the side door of a plane.

What you do is build a plane with a cargo-shaped fuselage. With a floor strong enough to support a bulldozer or cargo weighing up to 45,000 pounds. With sturdy landing gear that can take the jolts and bumps of dirt fields. A plane able to land and takeoff on very short runways.

The U.S. Air Force did this. It had us build Hercules. And you can drive a truck out of its huge rear door. Today Hercules is this country's foremost tactical transport. A tanker, rescue plane; an airship of many missions.

On skis, Hercules is life itself to men at the South Pole. At the other end of the world, the commercial L-100 version is the same to oil drillers on the frozen North Slope. To victims of flood, famine and earthquake throughout the world, Hercules has been the difference between life and death, bringing food and supplies to places other planes can't.

Because Hercules can do so much that other planes can't, it has been bought by 28 nations, bringing this country more than $1 billion in foreign payments.

So far we've built more than 1200 Hercs in 45 different models.

Hercules, a great American success story from the airlift capital of the world.

Lockheed-Georgia

A Division of Lockheed Aircraft Corporation
Marietta, Georgia

Airmail

Kremlinology

Gentlemen: I just saw Col. William F. Scott's review, in the March '73 issue, of our book, *Science and Technology as an Instrument of Soviet Policy.* I believe this review will help greatly in increasing interest in a matter of great importance to our future as a nation. Our thanks to you and to Colonel Scott.

Incidentally, Colonel Scott's piece on Tupolev is excellent. I hardly need to add that in both Ambassador Kohler's and my estimation, Colonel Scott proved a tower of strength as US Air Attaché in Moscow and should be a monumental contributor to a better appreciation of the Soviets. I should say, further, that his wife, Harriet, is also the possessor of superb analytical talents that have been, and, I am sure, will continue to be, of great help to us all.

MOSE L. HARVEY
University of Miami
Center for Advanced
International Studies
Washington, D. C.

FB-111 Report

Gentlemen: In an attempt to add some glamour and excitement to the Corps Training periods this year, our cadets have organized themselves as a mock FB-111 wing. Because the operational FB-111s are all in the east, they have suffered from a scarcity of timely information on the bird.

Imagine my delight at seeing Capt. William Liggett's "FB-111 Pilot Report" in the March issue!

COL. JAMES E. BANKS
Professor of Aerospace Studies
Montana State University
Boseman, Mont.

Hats Off to . . .

Gentlemen: I would think that due to their outstanding performance throughout, and especially the Linebacker II ops, the B-52 deserves a few more pages in AIR FORCE Magazine. The recent editorial just touched upon the effectiveness of the awesome giant that everybody thought was being overrated and washed up.

Let us not forget, in this age of comparison and of immediate thoughts on the Soviet air defenses, that the most deadly version, the low-level, SRAM-firing, H model, was never used.

Hats off, too, to the F-111A/F Snoopy for flying its butt off no matter what it cost, the overall performance of the ECM hardware, the Navy's EA-6B Prowlers, and the USAF F-105Gs. These guys made the best antiwar demonstrations of all.

Peace and the Wild Blue!

EDWARD MCDONALD
Atlantic City, N. J.

• *Right on! See April's editorial, and watch for a great combat report on the F-111, which will appear in an early issue. We're not forgetting the ECM crews, either.*—THE EDITORS

Dissimilar ACT

Gentlemen: Re "Dissimilar Aerial Combat Tactics," by Capt. Donald D. Carson, appearing in the March issue, I was gratified to see a program on which so many of us worked so hard is still going strong. As a member of the 48th Fighter-Interceptor Squadron, I had the good fortune of participating in the original planning of the 48th FIS-COMFAIRNORFOLK joint ACT program, including the writing of the joint operations order and coordinating and conducting the first year's joint briefings, both at Langley AFB and at Naval Air Stations Oceana, Va., and Key West, Fla. Had it not been for the enthusiastic support of such individuals as Maj. (now Lt. Col.) Harry Birkner and Lt. Col. (now Col.) Ralph Bowersox, and Navy fighter pilots such as Lt. Cmdrs. Sam Leeds and Jack Ready, the program might never have gotten off the ground.

What distinguishes the program established between the 48th FIS and the fighter and attack squadrons at Oceana and Key West is that it was the first regularly scheduled joint service flying training program of its kind. . . . One distinctive feature of the program was that there was no high-level inertia to overcome; the commands backed the experiment from its inception. And the fantastic grassroots, squadron-level rapport that was achieved through this program was primarily a function of the shared belief that the value of a continuous, regularly scheduled joint service ACT program far outweighed any notions of petty interservice rivalries.

I had the opportunity to oversee the ACT training of many young pilots just going through the program (including the author of the article) and saw them progress from just good pilots to accomplished fighter pilots who knew their limitations and had confidence in their abilities. The degree to which these qualities were brought out by this program stood in sharp relief to the traditional ACT training concepts of like against like aircraft. Hats off to Aerospace Defense Command and Naval Aviation—and to AIR FORCE Magazine for reporting on a success story of which more than a few of us are proud.

CAPT. ROLLAND D. TRUITT
Gainesville, Fla.

Gentlemen: It was certainly a pleasure to see the Aerospace Defense Command Aerial Combat Tactics (ACT) program get some exposure in your outstanding magazine. We in ADC are extremely proud of this program. Its excellence is the direct result of the personal interest and support of the ADC Commander and many other senior staff officers.

It has been my good fortune to have been associated with the ADC ACT program since its inception, and I participated in the initial training at the USAF Fighter Weapons School at Nellis AFB, Nev. They are truly experts in ACT, and ADC has used that initial beginning as a basis for building our own ACT expertise. By coincidence, I was the Operations Officer at the 48th Fighter-Interceptor Squadron in 1970 when the 48th initiated dissimilar ACT with the Navy units at Oceana NAS, Va. Captain Carson was one of the outstanding young fighter pilots in the 48th at that time.

It is ironic that the maneuvering

capabilities of the F-106 had to wait so long to be recognized. The plan-view photo of the F-106 [p. 56] graphically illustrates one of the big reasons why "The way it turns is amazing!" Compare the size of the wing area to that of the other aircraft in the photo.

I am sure that the lessons we have learned (deltawing, clean configuration, smooth flight controls, etc.) will be applied to future fighter aircraft design. Also, the many advantages of dissimilar ACT, as pointed out by Captain Carson, have become apparent in the training of fighter pilots.

Once again, thanks for giving the F-106 and the ADC Act program the publicity that they deserve.

LT. COL. JOHN T. WOTRING
Commander
87th F-I Sqdn. (ADC)
K. I. Sawyer AFB, Mich.

Star Bright

Gentlemen: With reference to the caption with the picture in "The Bulletin Board," February issue, that Tom Stafford is the youngest flag officer in the armed forces—

Tain't so!

Brig. Gen. James R. Brickel is one day younger!

Incidentally, they are both members of the Naval Academy Class of 1952.

COL. G. H. DIMON, JR.
Albuquerque, N. M.

• *You're partly correct. General Brickel is one day younger. He was born September 18, 1930; Stafford on September 17, 1930. However, at the time General Stafford pinned on his stars (in the picture), he was the youngest flag officer. General Brickel had not then put on his new rank. General Stafford pinned on his stars December 1, 1972; General Brickel on February 1, 1973. Stafford's adjusted date of rank is November 24, 1972; Brickel's is January 30, 1973.*—THE EDITORS

Social Security and DoD

Gentlemen: I am writing in reference to the article, "What's in Prospect for Military Retirement," by Maj. Robert W. Hunter, in the December 1972 edition of AIR FORCE Magazine.

Although I am the Vance AFB Project Officer for the retirement briefings, my question is more personal than official.

I quote from one paragraph: "DoD sources told AIR FORCE Magazine that civilian business and industry implicitly recognize their Social Security contributions when setting up retirement benefits for employees, and adjust accordingly. DoD would simply begin to follow the same policy."

My question is: Which civilian industries and businesses do this?

2D LT. GEORGE NIGRO
Enid, Okla.

• *DoD sources inform us that, among others, the steel industry, the automotive industry, and the chemical/drug industry all take Social Security benefits into account when setting up retirement plans. However, not all use the same terminology, nor do they all define the benefits the same. Yet the end result is similar. For example, some companies that pay an early retirement benefit (before age sixty-two or sixty-five) may pay a "Social Security make-up benefit" until one is eligible to draw Social Security. Then the make-up benefit ceases. Other companies may "subtract off" one half of the primary Social Security insurance benefit, which is basically the same as DoD proposes; except, again, they may define the benefit differently. DoD, according to officials, used several studies to compare their plan. One was the* 1970 Study of Industrial Retirement Plans, *done by the Bankers Trust Co. of New York, and can be obtained from them.*—THE EDITORS

Integration Research

Gentlemen: I am currently conducting research for the Air Staff on the integration of blacks into the Air Force. I would like very much to establish correspondence with any black officer or airman who would be interested in writing to me or who would answer questions. Interested officers and airmen who remember the integration era in the Air Force, particularly the period between September 1945 and 1954, please contact me.

MAJ. ALAN L. GROPMAN
P. O. Box 166
USAF Academy, Colo. 80840

Authentic "Starfire"

Gentlemen: I am an amateur aeronautical historian and avid model airplane builder. I have recently purchased a rare model of an F-94C "Starfire," and would like to model it as closely as possible to a real prototype. I wish to model my kit after one of the F-94Cs based at the former New Castle County Airport, Wilmington, Del., during the 1955–57 period, and hope that some former members of the 96th and 97th Fighter-Interceptor Squadrons will send me photographs and/or other material that shows the markings of the jets, especially colors. All material will be returned in the same condition it is received.

ANDRE J. SWYGERT
Box 26
Ursinus College
Collegeville, Pa. 19426

RB-36/FICON Project

Gentlemen: I would very much appreciate hearing from anyone who was associated in any way with the SAC RB-36/FICON project back in the 1950s—particularly from pilots and crews who flew these missions.

Your mission descriptions, anecdotes, comments, or personal background data would be most helpful to a pro-Air Force publication effort. All loaned material will be carefully handled and returned in good condition.

ROYCE E. ECKWRIGHT
Hq. USAFE, Box 6565
APO New York 09633

99th Pursuit Squadron, WW II

Gentlemen: I am interested in obtaining documentary information, including film (if available), on the history and accomplishments of the 99th Pursuit Squadron. The squadron was composed of black personnel and operated in the European Theater during World War II.

Any help will be appreciated.

LT. COL. JAMES P. FERRELL, USAF (RET.)
Department of Ecology
State of Washington
Olympia, Wash. 98504

Search for Pilot's Identity

Gentlemen: I am currently serving with the Royal Australian Air Force on exchange from the USAF. My duties with the Headquarters Operational Command, RAAF, Penrith, New South Wales, have given me wide exposure to the RAAF operations, and, as a result, I am frequently asked to assist with a variety of requests. However, I received one the other day that I am unable to handle without some help from the States.

The Officer Commanding, RAAF Darwin, was recently presented

Airmail

with a desk memento that contains a brake shoe from a USAAF P-40 Kittyhawk [Warhawk], tail number 415181. The aircraft was shot down near Darwin, Northern Territory, during the first raid on Darwin, February 19, 1942. Group Captain Glassop is very desirous of finding out, if possible, the name of the pilot flying the P-40 at that time. Any additional information available would be very helpful. Many of the wartime airstrips were later named for American pilots lost in the fight for Darwin, but the name of this particular pilot is still a mystery.

Any help would be most appreciated.

MAJ. JOSEPH P. NICHOLS
Exchange Officer
RAAF Penrith
New South Wales
APO San Francisco 96209

UNIT REUNIONS

Missouri ANG
The 50th Anniversary Celebration of the Missouri Air National Guard will be held in St. Louis, Mo., June 30. An air show will feature USAF's "Thunderbirds." A banquet will be held at Stouffers Riverfront Inn. Please contact

Col. Wm. W. Cannon
Hq. 131st Tac Ftr. Group
Missouri ANG
P.O. Box 10038
St. Louis, Mo. 63145
Phone: (314) 426-7111

30th Tac Recon Squadron
The 30th Tactical Reconnaissance Squadron is celebrating the 30th anniversary of its formation with a reunion/open house at RAF Alconbury, England, August 31–September 2, 1973. All former members are invited. Former members are also encouraged to loan or donate any materials that may be of interest.

Capt. James A. Cummings
30th TRS, Box 308
APO New York 09238

36th Fighter-Bomber Wing
In the first week of August 1973, the second Bitburg reunion will be held at Barren Lake Park in Louisville, Ky. Anyone who served with the 36th stationed at Bitburg, Germany, is welcome. Please contact

Al Stachel
701 N. Easton Rd.
Willow Grove, Pa. 19090

56th Fighter Group
A reunion of the 56th Fighter Group, "Zemke's Wolfpack," and supporting units will be held June 23–24, 1973, at the Holiday Inn Chicago-West, 1900 N. Mannheim Rd. (U.S. 45), Melrose Park, Ill. Contact

Leo Lester
56th Fighter Group Assoc.
408 Advel Court
Kewanee, Ill. 61443

90th Bomb Group
A reunion of the 90th Bomb Group, WW II, will be held at Harlingen, Tex., July 26–28. For further information write to

Col. Loyde Adams
1208 New Hampshire
Lincoln, Neb. 68508
or
Glenn Bercot
Confederate Air Force
Harlingen, Tex. 78550

323d Bomb Group (M)
Anyone interested in a reunion of the 323d Bomb Group (M), World War II, (Valenciennes, France, and Maastricht, Holland), please contact

Lt. Col. R. J. Schuenke, USAF (Ret.)
415 Carissa Dr.
Satellite Beach, Fla. 32937

345th Bomb Group (M)
Members of the 345th Bomb Group (M) are having a get-together July 19. All members interested should get in touch with

Col. Bert S. Rosenbaum, USAF (Ret.)
3411 So. 90th St.
Tacoma, Wash. 98409
or
MSgt. Elbert Wardle, USAF (Ret.)
1309 So. 44th Ave.
Yakima, Wash. 98902

345th Fighter Squadron
The 1973 national reunion of the "Devil Hawks," World War II—1942–45—will be held in St. Louis, Mo., July 26–28. All those interested should write as soon as possible to

Warren (Jake) Kingsbury
2106 Wesley Ave.
Collinsville, Ill. 62234

362d Fighter Group
The 1973 reunion of the 362d Fighter Group Association will be held at the Holiday Inn-Scope Motel, Brambleton and Monticello Sts., Norfolk, Va., July 19–21. For further information contact

William K. Marles
2838 Blue Brick Dr.
Nashville, Tenn. 37214

485th Bomb Group (H)
The 9th annual reunion of the 485th Bomb Group (H), 15th Air Force, will be held August 3–5, in Rochester, N. Y. For details and annual newsletter, contact

Carl P. Gigowski
344 Eola St., S.E.
Grand Rapids, Mich. 49507

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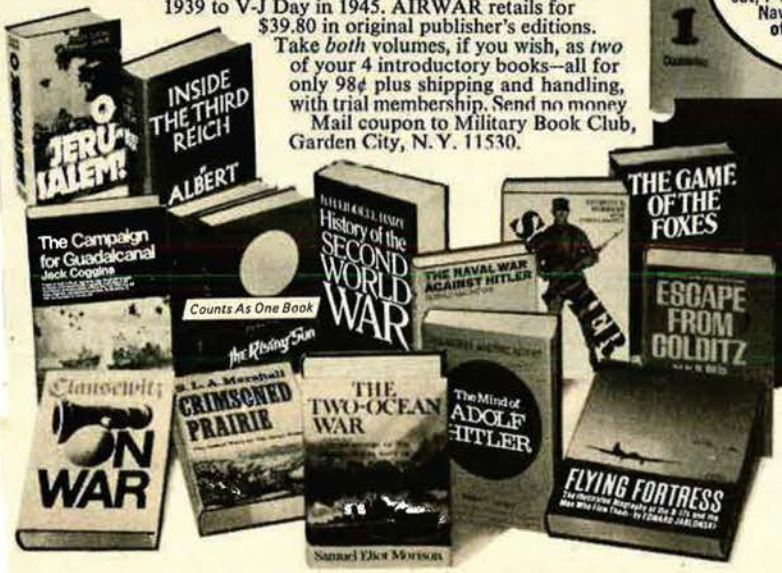

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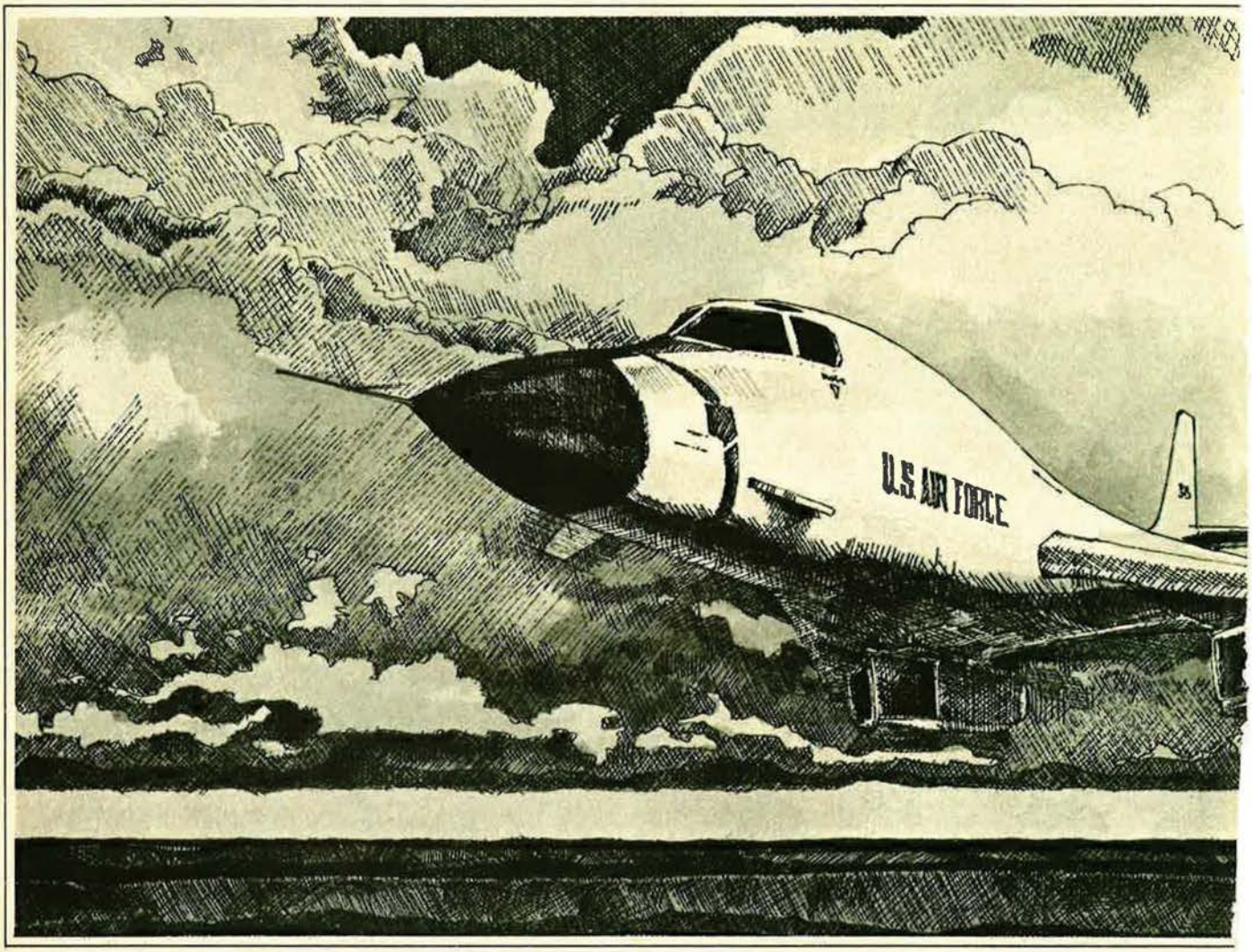

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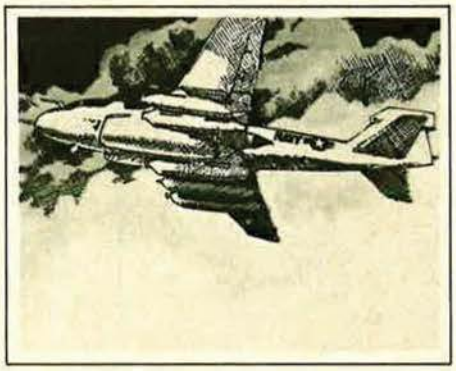

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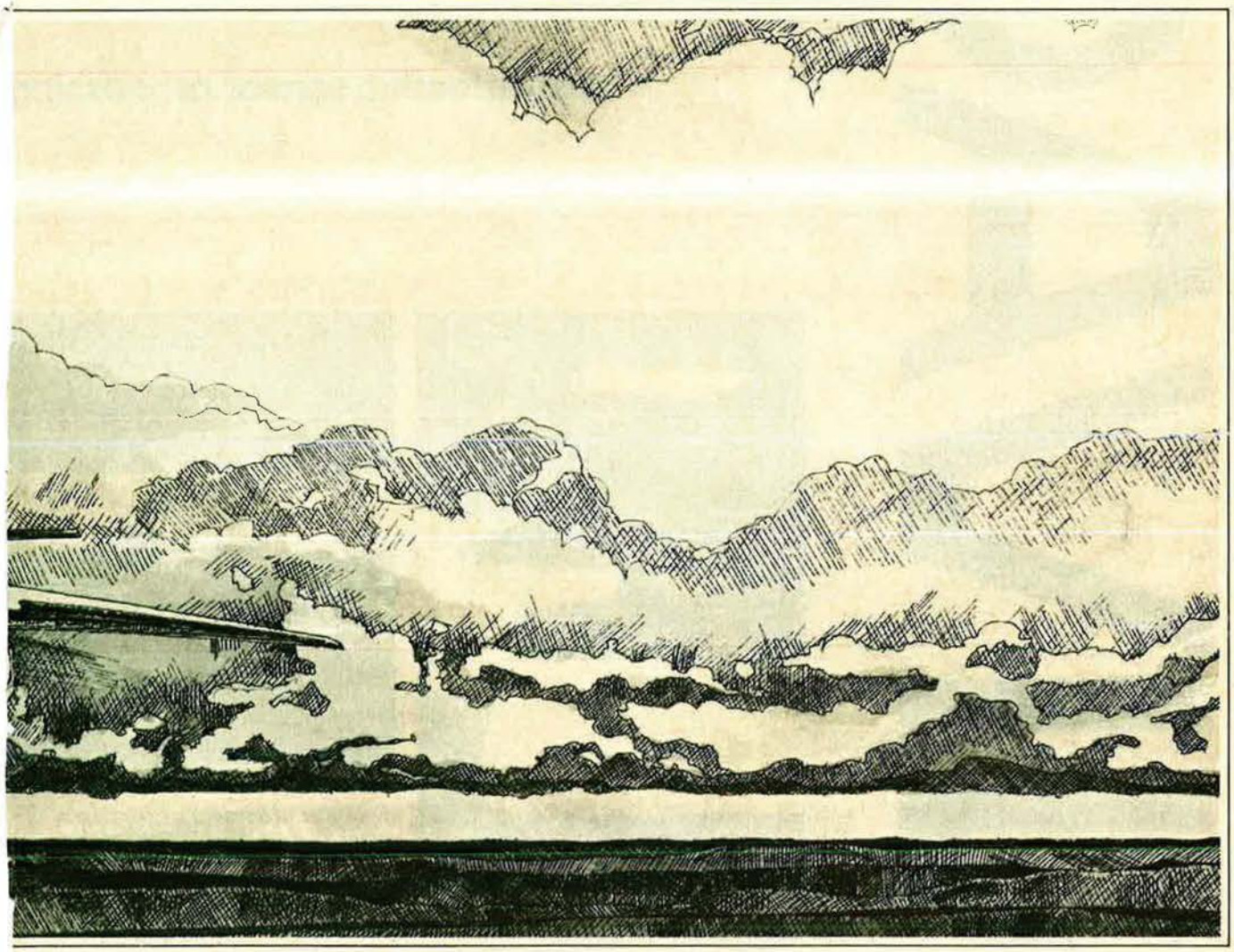

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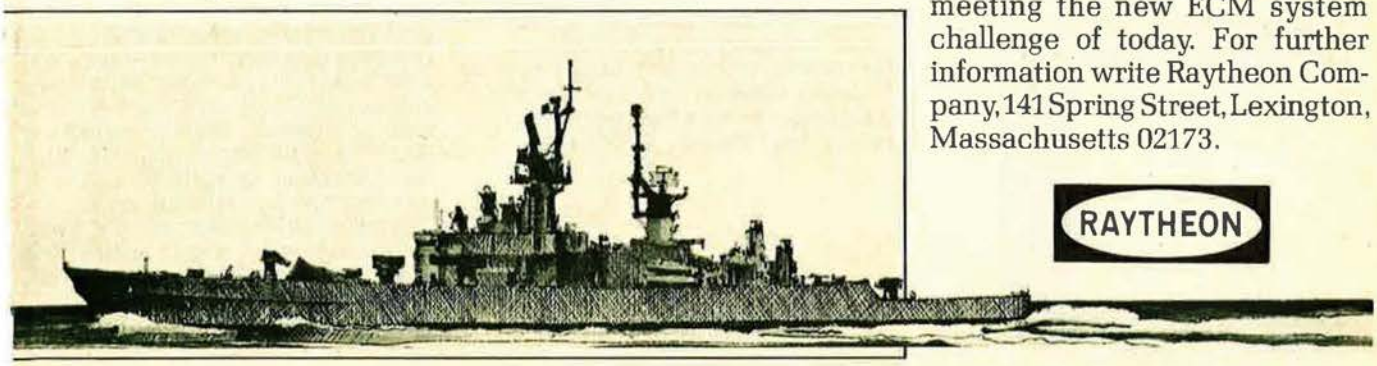
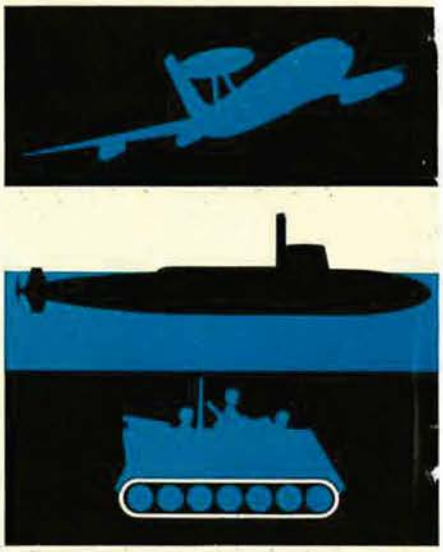


UNIVAC

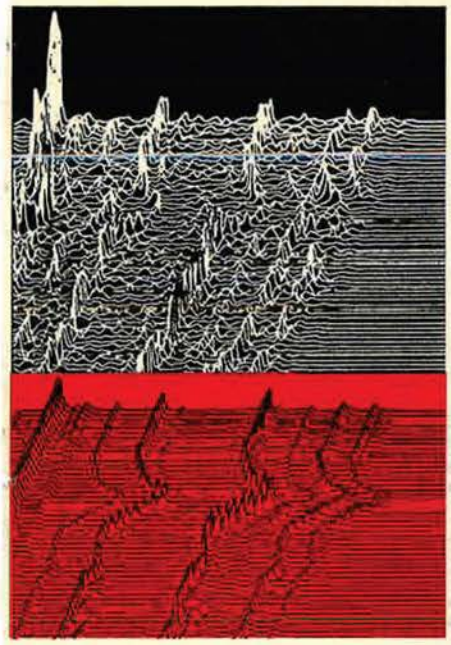
cost-effective sensor processing



During the critical days of the "blitz" in World War II, the British were able to locate and track each oncoming bomber raid and vector RAF fighters against it. This was accomplished through the use of Radar, which had been first demonstrated in 1886 by Heinrich Hertz, the discoverer of radio waves. The development of remote sensor data acquisition has been greatly accelerated since those early days. Radar, acoustical sensors such as sonar and sonobuoys, Inertial Measurement Units and Magnetic Anomaly Detection have all taken giant steps as effective means of reconnaissance and surveillance.

In sensor processing, operational areas include detection, location, identification, threat assessment, tracking, and guidance. To perform these functions, a tool is needed to extract the *information content* from the mountains of data generated by advanced sensors. That tool is now available: the low-cost, militarized data pre-processor. It is used to take the raw data from active or passive sensors and pre-condition it so that the central processor can be used to "work over" only the most vital information. Sperry Univac began building its expert knowledge over 20 years ago, in one of the first government-sponsored signal processing programs. We have continued to develop our expertise and recently have been involved in such programs as the Automated Radar Terminal Systems (ARTS III), being installed in some 60 U.S. airports; and in anti-submarine warfare programs such as P3C and S3A, in which a Univac® computer is used to analyze sensor inputs to find, classify, track, and guide attacks against multiple submarine targets.

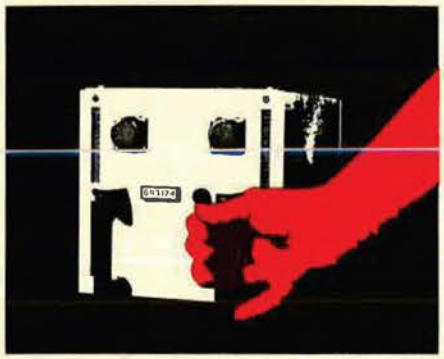
in a digital world . . . on time, on target



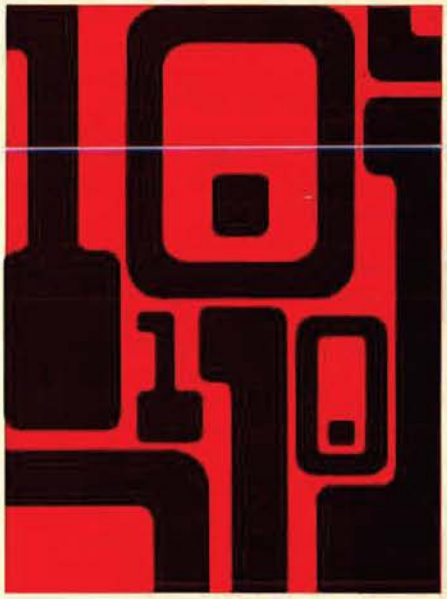
Re-inventing the wheel, from the sensor processing point of view, wastes both time and money. Yet, too often, it happens when new or upgraded sensors are added to the system. The initial investment in processor hardware and software is lost.

Sperry Univac has a solution in the application of micro-programmed control technology. Using this technique, one can upgrade the processor as improved sensors are added, with a minimum amount of modification to the hardware or software, thus protecting original equipment investments.

For example: by the design of a common, programmable acoustic signal processor, it is possible to separate the hardware and software modules in such a way that they can be combined for various applications on ship and submarine, aircraft and helicopter, depending on the specific system requirements.



Micro-programming by Sperry Univac adds considerable depth to the role of the ordinary pre-processor. This is of the highest priority, since no one can afford to provide a new signal processor every time a new sensor is developed or modified. Micro-programming permits the efficient handling of all inputs: it allows the building of special instruction repertoires without hardware modification to tailor the computer to the exact requirement; and it improves overall system efficiency by the addition and updating of CT modules. This technology can be applied to any special processing application. Micro-programming is a cost-effective solution for multiple applications, responsive to the need of such upcoming Navy programs as LAMPS, Sea Control Ship (SCS), and CV-Tactical Support Centers, as well as a number of U.S. Air Force and Army programs.



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MIA/POW Action Report

By William P. Schlitz
ASSISTANT MANAGING EDITOR, AIR FORCE MAGAZINE

On Behalf of MIA/POWs

The crossed fingers paid off, and by the last of March the remaining American POWs officially listed by the other side had come home to tumultuous welcomes by their fellow countrymen.

In the Pentagon, the formidable job of sifting through the returnees' debriefing interviews had begun. From this body of information will eventually emerge a broad mosaic of what life was like in the camps over the long and short stretches of internment. Of more immediate concern, however, will be clues to the fate of the 1,326 men still carried as missing in action.

As agreed under the cease-fire, the Joint Casualty Resolution Center established its headquarters at Nakhon Phanom Royal Thai AB, in eastern Thailand, with the overall responsibility of resolving the status of US MIAs and the recovery of the remains of those killed, wherever they may be in SEA.

Commander of the Center is Brig. Gen. Robert C. Kingston, USA. Reflecting the importance of the Center's mission, General Kingston told his men: "Ours is a unique and demanding responsibility. Other than 'Project Homecoming,' I know of no other organization in the armed services with such a crucial mission. We can expect much public, and therefore press, interest in our organization, as well we should, as our mission is one of vital concern to the loved ones of those who are still missing."

Casualty Center personnel have been drawn from all the services, and will make up teams of specialists. Presumably, they have extensive knowledge of the geographical areas in which they will search, and language and other skills are prerequisite. Trained personnel will help out in jungle areas, and where there are unexploded ordnance, mines, and booby-traps. The search teams won't have an easy time of it—especially in places where the cease-fire doesn't take hold.

For its part, the League of Families launched, in mid-March, a "missing-man" poster campaign, to keep the MIA issue in the public eye. The posters are composed state by state, with photos of several state MIAs appearing on each state's posters. Where possible, a number of the photos show the MIA in enemy hands, to emphasize that in fifty-three cases men believed captured have not been released and no explanation has been forthcoming as to their fate.

In setting up guidelines for creation of the posters, League headquarters cautioned against using either abusive or inflammatory language: "At this stage, we want to remind America about our men who are still missing, but we do not want to do so in a manner that could in any way jeopardize the release of any of our men who have not yet been repatriated, or that could jeopardize our chances of getting supplemental lists of POWs."

With more than a thousand men still carried as MIA, there is strong hope for supplemental lists, especially from such murky areas as Laos. The initial, and thus far only, Laos list contained just ten names (three civilians and seven military) of men to be released of the hundreds missing there. The return of so few was greeted with shock and disbelief.

The League's Identification and Discrepancies Committee, working closely with DoD officials, has undertaken a new program to create a detailed "Register of Missing Men," to include all MIAs, the fifty-three unrepatriated men mentioned above whose fate is unknown, and those formerly carried as POW or MIA but listed by North Vietnam, or the Viet Cong, as having died in captivity. "It is our intention to pursue all available information on each man in the above categories until the man is either repatriated or an official determination is made of his final status," the League said.

* * *

As directed by the President, DoD, in concert with an "Industry Committee on POW Employment," has announced a new program to help former POWs find jobs should they chose to leave the service. The industry committee consists of sixteen major companies, corporations, and associations. Industry representatives of the committee will contact interested returnees with the objective of finding them jobs. Other US companies that may wish to help should contact: The Department of Defense (M&RA), Room 2C-252 (POW Employment), The Pentagon, Washington, D. C. 20301. ■

One of the last to come out was Air Force Capt. William R. Schwertfeger, greeted by USAF Col. Richard Malone, left, and CMSgt. Harry Boles. Back in the States, previously released POWs waited until all were free before revealing details of torture and other inhumane treatment suffered while in captivity.

—Wide World Photos

Avionics Superiority For the F-15 Eagle

"Viable and competitive into the mid-1980's." That's the assessment of the Air Force on its new air superiority fighter — the F-15 Eagle. To meet this requirement, McDonnell Douglas has brought together the latest in aerodynamics, propulsion and materials technology.

That goes for avionics, too. Collins avionics will give the F-15 the most advanced capabilities available in:

Horizontal Situation Displays
Direction Finding Systems
Instrument Landing Systems
Communications

Besides providing sizeable jumps in performance, Collins has reduced size and weight to make room for other vital new capabilities. And it has extended reliability for greater assurance of trouble-free missions and lower maintenance costs.

These systems will contribute to the F-15 pilot's ability to out-fly any adversary in the sky for some time to come. Collins Radio Company, Cedar Rapids, Iowa 52406.

Horizontal Situation Indicator
First digital HSI. Interfaces with digital **computer, digital** nav.

Direction Finder
Electronically rotated antenna pattern.

Instrument Landing System
All ILS functions in 1 compact case.

Auxiliary UHF Receiver
Commonality with transceiver. Built-in **test.**

COLLINS

UHF Transceiver
High demonstrated mean-time-between-failures.

Do it yourself. You'll save.

You can save on out-of-state Long Distance phone calls if you'll keep this rate chart in mind.

For example, look at the column headed "Dial-it-Yourself." As you can see, you save any day of the week or time of the day if you dial the calls yourself without operator assistance.

Examples of Long Distance rates for coast to coast calls

		Station-to-Station Dial-it-Yourself	Station-to-Station Operator-Assisted	Person-to-Person
Weekends	8 a.m. to 11 p.m. Sat. and 8 a.m. to 5 p.m. Sun.	**70¢ first 3 minutes**	$1.40 first 3 minutes	$3.55 first 3 minutes
Evenings	5 p.m. to 11 p.m. Sun. through Fri.	**85¢ first 3 minutes**	$1.40 first 3 minutes	$3.55 first 3 minutes
Nights	11 p.m. to 8 a.m. daily	**35¢* first minute (minimum call)**	$1.40 minimum call (3 minutes)	$3.55 minimum call (3 minutes)
Weekdays	8 a.m. to 5 p.m. Mon. through Fri.	**$1.45 first 3 minutes**	$1.85 first 3 minutes	$3.55 first 3 minutes

Rates shown (tax is not included) are for the days, hours and durations indicated, and for the types of calls specified at the head of the columns. Rates may be even less, of course, on out-of-state calls for shorter distances.
Dial-it-yourself rates apply on all interstate calls (excluding Hawaii and Alaska) completed from a residence or business phone without operator assistance. They also apply on calls placed with an operator from a residence or business phone where direct dialing facilities are not available. Dial-direct rates do not apply to person-to-person, coin, hotel-guest, credit-card, or collect calls, or to calls charged to another number, because an operator must assist on such calls.
*One minute minimum calls available only at the times shown, and additional minutes are 20¢ each, coast to coast.

Here are the conditions under which the special low interstate rates apply:

1. The calls must be made without operator assistance. So the dial-direct rates do not apply to coin phone calls, person-to-person, collect, or credit card calls, calls from hotel or motel phones, or calls charged to another number—because an operator must get involved in all such calls.
2. The calls must be made from a home or business phone.
3. The rates do not apply on calls to or from Alaska or Hawaii.

The reason rates are less on dial-direct calls is that they cost less to handle.

Know when you can save on Long Distance calls and how much. Examine the rate chart above. Cut it out and keep it near your phone. Knowing is worth the effort.

Airpower in the News

By Claude Witze
SENIOR EDITOR, AIR FORCE MAGAZINE

Signs on the Road Ahead

WASHINGTON, D. C., APRIL 4

It is posture time again, and, with Vietnam behind it, our military establishment is more distressed than ever about its future capabilities.

Listen:

• From Elliot L. Richardson, Secretary of Defense: "We should have no illusions that the generation of peace is already upon us and that we can now beat our swords into plowshares. The new peace agreements in Vietnam and Laos are still very fragile, and the armed conflict in Cambodia has yet to be ended. The new approach to the People's Republic of China is still in its early phase, and full diplomatic relations have yet to be established. The current strategic arms limitation agreements with the Soviet Union constitute a major breakthrough, but not the culmination of our efforts to halt, and then reverse, the buildup of competitive strategic power."

• From Adm. Thomas H. Moorer, Chairman of the Joint Chiefs of Staff: "The military power of the United States, when compared to other nations of the world, has clearly peaked and is now declining. We no longer have that substantial strategic superiority that, in the past, provided us with such a clear-cut margin of overall military power so that we could, with confidence, ensure the protection of our own interests and those of our allies worldwide. . . . It is essential that we examine with the greatest care and understanding the current and planned United States military posture in relation to that of the Soviet Union and the People's Republic of China. In doing so, we should concern ourselves primarily with military capabilities rather than intentions."

• From Dr. John S. Foster, Jr., Director of Defense Research and Engineering: "The military forces we have in the field today are the product of research and development conducted in the 1950s and 1960s. Our current R&D efforts will determine the character and quality of our military forces in the 1980s and, in some cases, to the year 2000. We must be sure that these forces are adequate to meet our national policy objectives. During the past year, we have continued to study the technological efforts of the Soviet Union and other nations, as well as ours. A number of parallel studies have been refined, and some independent new approaches have been added. There is much uncertainty in each of these avenues of estimating and forecasting, but I find it very disturbing that no projection shows that we are holding our own against the Soviets' determined effort to wrest military technological superiority from us."

The posture reports, in support of the proposed defense budget for Fiscal 1974, have been presented in the past week before the Armed Services Committees and Defense Appropriations Subcommittees of the House and Senate. The three headliners quoted above were followed as witnesses by the Service Secretaries and Chiefs of Staff, with their supporting retinues. Top USAF spokesmen were Secretary Robert C. Seamans, Jr., and Chief of Staff Gen. John D. Ryan. The total defense budget, as offered by the Administration, totals $79 billion. That figure is for direct outlays. The requested total obligational authority comes to more than $85 billion.

In addition to the tenuousness of the situation in Vietnam, Laos, and Cambodia, our military leadership is apprehensive about other challenges. Mike Mansfield, the Senate Majority Leader, wants a cutback in our European troop commitment. Sen. J. W. Fulbright has introduced a bill designed to phase out foreign military grant aid and military assistance missions overseas. Without citing these efforts specifically, Secretary Richardson warns at the outset that the security assistance program is essential to future world peace. "Considering the issues at stake," he said in the posture statement, a cut "at this time would be a false economy and an undue risk."

The Secretary says it is not true "that the size of our conventional forces in Europe is irrelevant, that their numbers do not matter. We are now unmistakably in an age of approximate nuclear parity, and this means that strong conventional forces are more important, rather than less important, to the deterrence of war." The reason, of course, is that the alternative to constant conventional capability could be nuclear war, as the only way to respond to aggression.

"Significant cuts in the defense budget now would seriously weaken the US position in international negotiations—in which US military capabilities are an important factor," Secretary Richardson warned. "Significant cuts would require major unilateral force reductions, undermining our strength, and undercutting our efforts to build a more stable balance of forces at lower long-term cost to both sides. And it is these efforts which, one way or another, will determine our success in building a lasting structure of peace."

Like his predecessor, Melvin R. Laird, Secretary Richardson placed emphasis on the declining position of defense as a factor in public spending. The Fiscal 1974 proposal is the lowest in more than twenty years, measured as a share of all federal spending or all public spending. In the past ten years, other federal spending has grown more than four and a half times as much as defense spending. The Secretary speaks with authority in this area of changing priorities. He came to the Pentagon from the Department of Health, Education and Welfare, main beneficiary of the new emphasis.

Leaving the policy level, Admiral Moorer provided some news for Congress in the area of weaponry. While the US does not have any new intercontinental ballistic

missile systems under development, he said, this is not true of the Soviet Union. The Soviets are actively testing at least three new ICBMs, apparently successors to the SS-9, SS-11, and SS-13. Their goals, the Admiral believes, are to improve prelaunch survivability, accuracy, and reentry systems. There is no evidence that Russia has an operational MIRV system, but:

"The Soviet Union undoubtedly regards the achievement of a MIRV capability as an important political, as well as military, goal. The deployment of some 300 heavy MIRVed SS-9 follow-on ICBMs, which is permissible under the interim agreement, would greatly enhance the Soviet Union's hard target capabilities, particularly if the new missile turned out to be significantly more accurate than the SS-9."

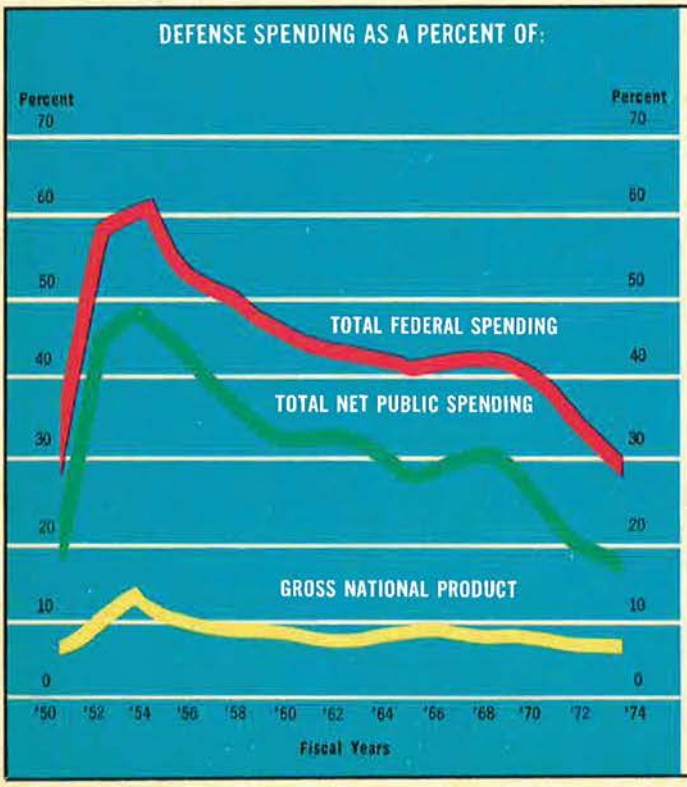
Admiral Moorer had almost nothing to say about the Navy's request for $1.7 billion to press on with the Trident submarine-launched missile program. As Chief of Naval Operations four years ago, he is the man who launched the project. This year, Trident is the most expensive thing on the shopping list, and a heated battle—comparable to the one over the antiballistic missile system—is anticipated in Congress. Other Navy spokesmen will be heard, but, so far, the case for Trident has been outlined only by Dr. Foster.

The threat is a Soviet breakthrough that will vastly improve their antisubmarine warfare (ASW) capability. Much of the case against a Trident speedup in Congress is based on the fact that this breakthrough has not been reached, and a delay in Trident is being promoted. Dr. Foster's case is that the long lead time makes a delay risky. If the first Trident is to be operational in Fiscal 1979, the contract must be signed this year. Cost, of course, is the heavy argument against Trident. Dr. Foster's arguments seem to center on its cost-effectiveness, although he does not compare it, in this respect, to land-based or airborne launching systems:

Secretary Richardson *Dr. John S. Foster, Jr.*

- Trident technology will include the best possible hedges against Soviet ASW advances. It will be less detectable by sensors.
- Trident design will increase the alert rate. The significance of this results from the interim SALT agreement that limits the total number of SLBM launchers.
- Trident's missiles' range—4,500 miles at the outset, then 6,000 miles—will permit them to be based in US waters. There will be a threefold increase in the area from which they can be launched.
- The Trident has growth potential.

Dr. Foster also stated the case for USAF's B-1 bomber, for which $473.5 million is requested. He stressed survivability, both before launch and in the air, against enemy defenses. The design already has



US AND USSR STRATEGIC OFFENSIVE MISSILE LAUNCHERS ASSOCIATED WITH INTERIM SAL AGREEMENT *

UNITED STATES		SOVIET UNION	
TITAN II	54	SS-7/8	209
MINUTEMAN I	260	SS-9 (PLUS NEW SILOS)	313
MINUTEMAN II	510	SS-11/13 (PLUS NEW SILOS)	1,096
MINUTEMAN III	230	TOTAL ICBMs	1,618 (1,409)
TOTAL ICBMs	1,054 (1,000)		
POLARIS A-2	128	SLBMs ON MODERN SSBNs	710
POLARIS A-3	208	SLBMs ON OLDER SSBNs	30
POSEIDON	320	TOTAL SLBMs	740
TOTAL SLBMs	656	SAL SLBM CEILING	(950)
SAL SLBM CEILING	(710)	TOTAL (LAUNCHER CEILING)	2,358 (2,359)
TOTAL (LAUNCHER CEILING)	1,710 (1,710)		

* OPERATIONAL AND UNDER CONSTRUCTION OR CONVERSION

As indicated by the chart on the left, defense outlays in terms of the federal budget have decreased in percentage to the lowest figure in twenty years. Above is a breakdown of the strategic missile strengths of the US and USSR permissible under the interim strategic arms limitation (SAL) agreement.

Conversation Pieces

Technically intriguing items from TRW, guaranteed to add luster to your conversation and amaze your friends.

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NILS is a short-range guidance system which provides highly accurate aircraft position information during the last phases of descent, touchdown and rollout (see Fig. 1). Two NILS beacons give the aircraft position information while it is on the final portion of the approach, and two others as it lands and rolls down the runway. Each beacon contains a collimated radioactive source which emits high frequency radiation. Mechanical shutters within each beacon modulate this signal into two overlapping beams of radiation (see Fig. 2). On board the descending plane is a radiation detector. The radiation pattern of the pairs of beacons is such that when the plane is exactly on-course, it receives equal amplitudes of all four frequencies.

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Fig. 1 NILS System

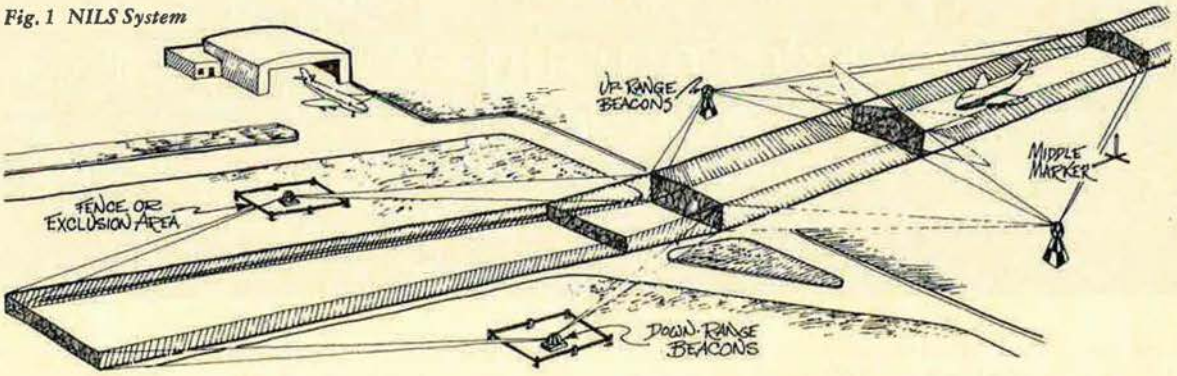
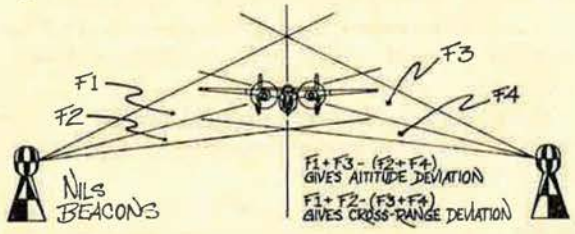


Fig. 2 NILS Beam Formation



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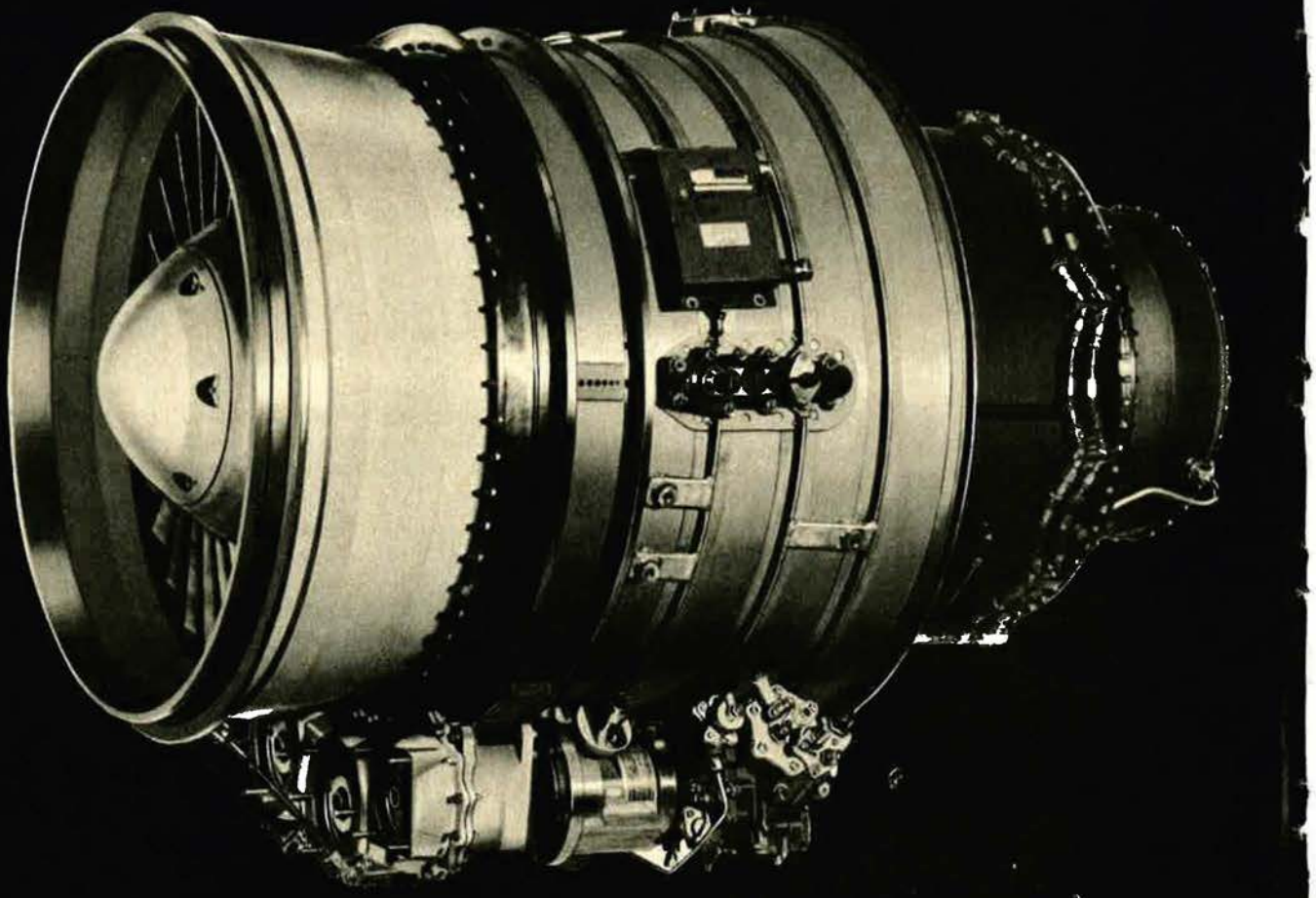

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Airpower in the News

been modified to conform to cost limits. Gross weight has gone up 1.5 percent, 500 feet were added to the takeoff roll, supersonic cruise range has been slightly reduced, and the air-refueling altitude lowered by 500 feet.

There is no reference in the posture statements to any proposal for new US land-based ICBM systems. Dr. Foster, in fact, stressed the survivability of what we have. Silo hardening and site defense nearly exhaust the technological options. The remaining possibility, one that was considered and rejected a decade ago, is mobility. The Secretary says it still is a "viable option" and requests $6 million for work on subsystem technology. The figure is small compared to the proposed expenditure of $99.8 million for Minuteman improvements, including the Command Data Buffer, which would speed retargeting when necessary.

The presentation by Dr. Foster on research and development to support tactical war systems was the most elaborate part of his discussion. For the Army, he seeks funding to work on new combat vehicles, armor, firepower, surveillance and target acquisition, and air mobility and logistics. For tactical Navy forces, improvements will be sought in fleet offensive weapons, air defense of the fleet, ASW, and ocean surveillance.

R&D for our tactical Air Forces covers both the F-15 Eagle and the lightweight fighter program, aimed primarily at the world market. Money is sought to improve the reliability and lethality of air weapons.

The statements offered by Dr. Seamans and General Ryan are strictly factual. The Secretary's tabulation of funding requested for aircraft procurement shows USAF will buy only 154 aircraft for its own use. Another 522 will be purchased for the Army or our allies. The total sought for aircraft procurement is $2,912.8 million, which includes more than $69 million for airplanes already given to the Vietnamese Air Force.

Dr. Seamans reported success in USAF's effort to cut down on the headquarters structure. About 6,900 military and civilian jobs have been eliminated in three years. USAF has exceeded the $9.8 million reduction in headquarters management costs for Fiscal 1973, ordered by Congress.

General Ryan provided figures on the overall size of USAF. By the end of Fiscal 1974, he said, the Air Force will have cut its active-duty level more than twenty-six percent below the 1968 peak of 905,000. The new figure will be 666,000. In the same time period, there have been eliminated twelve squadrons of strategic bombers, nineteen squadrons of interceptors, fourteen tactical airlift squadrons, fifteen strategic airlift squadrons, and sixteen special operations squadrons, and flying hours have been cut for remaining combat crews.

If there are further cuts, they will have to come from the combat structure. ■

The Wayward Press

It is not the purpose of this department to provide book reports, but for this annual Almanac Issue of AIR FORCE Magazine, an exception is warranted. In the past four years, we have collected a groaning shelf of volumes about the current performance and stature of the nation's press. It may be that Spiro Agnew's renowned outburst of 1969 stimulated some of it, but he is not wholly responsible any more than he is to blame for the Harris poll finding that only eighteen percent of the American people have confidence in the media.

Particular attention should be paid to two recent volumes. One was published in 1972. It is called *Political Power and the Press* and was written by William J. Small, who has had long experience as the boss of the CBS news operation in Washington, D. C. W. W. Norton is the publisher. A more recent and more scholarly effort, put on the stands only a few weeks ago, is *News From Nowhere*, by Edward Jay Epstein, published by Random House. Mr. Epstein is a skilled researcher who does not hesitate to embarrass journalists. Much of his writing appears in the *New Yorker* magazine, where he has documented examples of sloppy reporting in the past.

Bill Small's book is a defense of television reporting, and a fine defense. Small says he always is impressed by the courage of people in journalism. They stand tough, he says, and there is no argument with this. The trouble is, they stay tough even when they are wrong. One of the problems in Washington, as Small points out, is that the press is irresistible to politicians. The opposite also is true. A lot of stories get in the paper, or on TV, because reporters believe things they are told by politicians.

Small defends the system, but it may be that his most important contribution is his survey of history. They say, these days, that Richard M. Nixon has started what Walter Cronkite calls a "conspiracy" to discredit the press. Well, Mr. Small, who also works for CBS, demolishes the conspiracy.

The message of the Epstein book is that TV is largely a fraud in the news area. The camera, they tell us, is a mirror. Well, now, is it, really? The truth is that the mirror is limited by the capability of the camera crews, what news tips they get out of the wire services and the New York *Times*, and the location of their home offices. The newspapers, God bless 'em, can cover a spot story in Wetumpka, Ala. How can it be done by a network?

Of more interest to us, in view of the paste-and-clip techniques used in "The Selling of the Pentagon" in 1971, is the opportunity for outright fraud. Author Epstein, who started this project as a doctoral dissertation at Harvard in 1968, before Spiro Agnew appeared in Des Moines, Iowa, shows how TV coverage of a riot, like the 1968 Czech resistance to the Soviet invasion, was faked. The NBC producer illustrated the cameraman's claims with shots of broken windows "selected and spliced together with shots of the surging crowd."

Epstein reviews all of the ingredients that help mold TV network news and keep it from being the mirror of reality it pretends to be. One of the most important ingredients is the network's relations with affiliate stations, a relation that is undergoing heavy strain at this time. Network radio has been dead for a good many years. Can it be that network television is going down the same path?

Aerospace World

News, Views & Comments

By William P. Schlitz

ASSISTANT MANAGING EDITOR, AIR FORCE MAGAZINE

WASHINGTON, D. C., APRIL 6

Despite isolation from other ranks most of the time, senior officer POWs were able to overcome the obstacles and establish functioning command structures within the confines of Hanoi's prisons.

In the tradition of "now it can be told," details of POW life began to emerge as the last of the American POWs came home (*see p. 18*). Out of the returnees' testimony came many tales of torture and other inhumane treatment at the hands of their captors, and of the deaths of other prisoners resulting from it.

In the main, the POWs' resistance to this brutal behavior—and to despair—was simply extraordinary. (Returnees related that conditions began to ease somewhat late in 1969, when world attention became focused on the POWs' plight.)

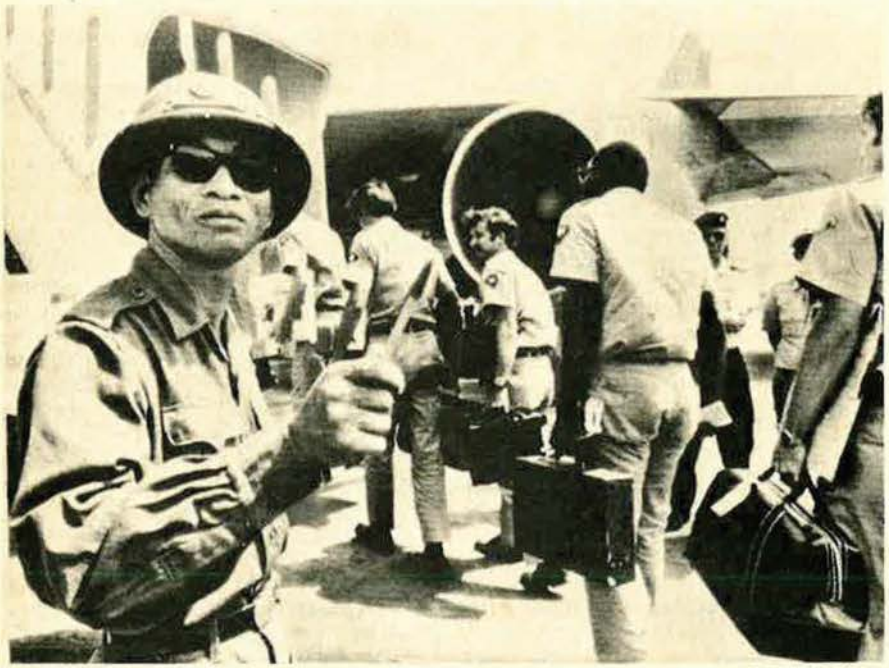
How the POWs organized their resistance is exemplified by Air Force Col. John P. Flynn, shot down and captured in 1967. At a place called HaLo in Hanoi, Colonel Flynn "commanded" the "Fourth Combined POW Wing," composed of US, Thai, and Vietnamese captives. Another high-ranking USAF officer there was Col. David W. Winn. Both have been selected for promotion to star rank.

The officers maintained control of their "wing" through an elaborate system of wall knocking in "tap" code, surreptitious exchange of written messages, and other ingenious means. A chain of command prevailed to the extent that individual commanders—the senior officers in each communal room—established "squadrons" of men under them. The commanders were backed up by "deputy commanders" and even "flight leaders."

Self-determined military order was so extensive at HaLo that authority was assumed for the award of medals and decorations. (The promotions by Colonel Flynn of three NCO POWs to officer rank have been approved. One of the NCOs declined in favor of continuing his education under Air Force auspices.)

Among policies set by their prison leaders, the prisoners were ordered to refuse to be released individually to peace groups, because of the detrimental effect on the morale of those remaining behind.

Colonel Flynn waited for the last group of POWs to be released before he came out.



—Wide World Photos

A Viet Cong member of the Joint Military Commission keeps count as the last US servicemen in South Vietnam board planes at Saigon's Tan Son Nhut Airport for the flight out. The withdrawal coincided with the release of American POWs. In early April, despite the cease-fire agreement and the inspection teams, fighting continued in South Vietnam, leading to apprehension about a lasting peace.

☆

With the return of the POWs and the withdrawal of US forces from South Vietnam, two of the three phases of US disengagement have been completed. The third—"End Sweep"—is being conducted by the US Navy in conjunction with the North Vietnamese.

It is a tricky operation requiring the clearing of some 11,000 mines from North Vietnam's coastal waters, harbors, and inland waterways. If the North Vietnamese cooperate, the Navy expects to complete the demining by summer's end, with Haiphong harbor itself clear by mid-April.

North Vietnam's inland waters are being cleared by North Vietnamese, a number trained by the US Navy for the job and, in some cases, using equipment loaned by the US.

☆

NASA has under way a project that eventually may prove of immeasurable importance to mankind.

The project—the High Energy Astronomy Observatory (HEAO)—will entail launching, between 1977 and 1979, a series of three

—Wide World Photos

—Wide World Photos

March was a disastrous month for the US military's aerial demonstration teams. On March 7, the US Army suffered a tragedy when sixteen paratroopers—an entire team of the Golden Knights demonstration jumpers—were killed in a C-47 crash in North Carolina (photo at right). The same day, two USAF KC-135 tankers collided while taxiing at Lockbourne AFB, Ohio. Two were killed (photo above), and one plane was totally destroyed. Also on March 7, three Navy F-4 Phantoms of the Navy's Blue Angels collided in midair; three planes were lost, no lives. And, on March 17 at Holloman AFB, N. M., two USAF Thunderbird Phantoms collided; one plane crashed, but no lives were lost.

unmanned space observatories to study what scientists regard as "some of the most intriguing mysteries of the universe." Scientists believe that the study of stellar phenomena may lead to the development of new sources of energy, a moderately urgent undertaking considering the dwindling supplies of the earth's fossil fuels and the problems involved in the production of clean, safe nuclear energy.

To the layman, these astral puzzles, which can't be observed from the earth because of the obstruction of the atmosphere, have a science-fiction sound to them: pulsars, neutron stars, black holes, supernovas, quasars.

Pulsars, discovered in 1967, generate very precise radio-beam-like

Using a back issue of AIR FORCE *Magazine to illustrate a point, Maj. Gerald W. Musselman has TSgt. Gerald Racz convinced of the benefits of joining AFA. The Major is Chairman of the AFA membership drive at Zweibrucken AB, Germany. The Sergeant said that being an AFA member was "too tempting to pass up."*

Marking its Golden Anniversary on March 5, the Sikorsky Division of United Aircraft Corp. unveiled a sculpture of the company's founder, Igor I. Sikorsky, who died last October 26. Presiding at the ceremony was Lt. Gen. James H. "Jimmy" Doolittle, USAF (Ret.), shown here with the bust and the widow of the aviation pioneer. The statue is the work of Connecticut artist David Kintzler, and stands in the lobby of the Sikorsky plant at Stratford, Conn.

signals. It is theorized that pulsars may be fast-spinning neutron stars —densely packed bodies created when stars burn up and collapse. So tightly concentrated is their matter that a spoonful taken from a neutron star's center would weigh *a billion tons* on earth, scientists say.

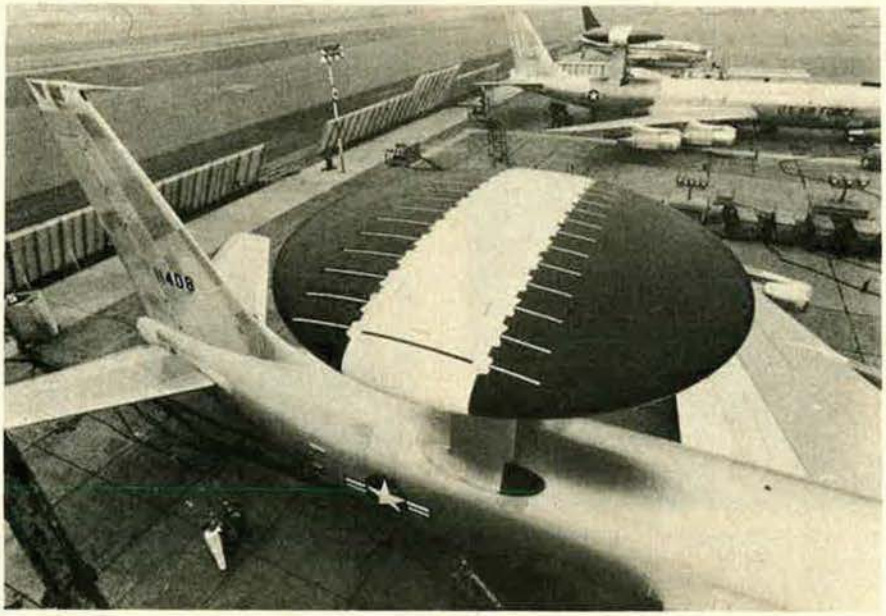
Black holes, on the other hand, are believed to be neutron stars even more compact—so much so, in fact, that even lightwaves can't escape from their surface because of the tremendous grip of gravity. As with other universal question marks, black holes constitute a hypothesis; they have never been seen by man.

Quasars are interesting to scientists because of the immense energy they emit in radio frequency form, each more than the most powerful galaxies known. Star-like in appearance when viewed through an optical telescope, a quasar releases enough energy in one second to supply all of earth's electrical energy needs for a billion years, scientists calculate.

A supernova is the gigantic explosion of a large star, releasing enormous energy. It is believed that our sun and our entire solar system, in fact, are simply the debris that resulted from such a cataclysmic happening.

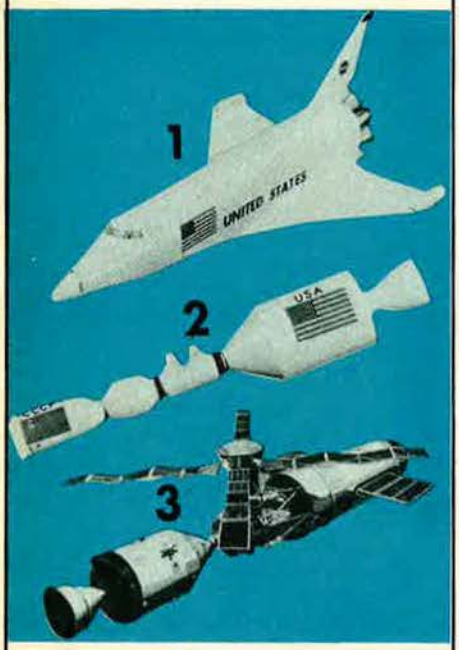
Despite its great promise, NASA's HEAO project earlier this year was nearly canceled for budgetary reasons, but the decision was

Two pilots renewed a long-standing friendship at McClellan AFB, Calif., recently. Maj. Gerald B. Hurst, TDY from Langley AFB, Va., and his F-106 Delta Dart got together with Joe Hitch and his restored Stearman. Mr. Hitch, of Sacramento, Calif., and Major Hurst, assigned to the 48th Fighter-Interceptor Squadron, both served together in the same unit in the early 1960s.



Under the Airborne Warning and Control System (AWACS) program, Boeing Co. has awarded a contract worth some $70 million to Westinghouse Electric Corp. for the design and development of preproduction radar subsystems. The Westinghouse design was picked after a recent competitive flyoff series of demonstration flights. The new radar uses the latest in solid-state and digital electronics.

CORRECTION



This illustration of space vehicles that appeared on page 54 of the April issue was captioned incorrectly. The caption should have read: "NASA's major upcoming programs are shown on the facing page: (1) the single most important program — Space Shuttle — which should be fully operational in 1979; (2) Apollo-Soyuz linkup for 1975; and (3) Skylab, to be launched next month." We regret the inadvertent reversal of numbers (1) and (3).

Astronaut Paul J. Weitz trains on the Maneuvering Unit Simulator at Martin Marietta Aerospace Corp. near Denver, Colo. He and fellow astronauts Conrad and Kerwin are finishing training in preparation for the first Skylab mission, set for mid-May launch (see below). The maneuvering unit is a jet-powered backpack worn over normal clothing or spacesuit.

made to go forward with it, although on a level scaled down from original plans.

In any event, whether or not we currently face a real "energy crisis," there is plenty of energy around. The trick is to harness it.

☆

In early April, final preparations were well along for the twin launches in May of the Skylab space station and its first crew of three astronauts.

Major components of the space station—the docking, airlock, and crew compartment sections—had been put through integrated mission simulation and flight-readiness tests. Only minor adjustments were required, but the testing program was to continue almost right up to launch.

The Saturn V launch vehicle that will carry the space station aloft also came through preliminary tests in good shape, as did the crew-carrying Saturn 1B vehicle.

Barring the unexpected, the twenty-eight-day initial mission beginning in mid-May will be commanded by veteran astronaut Capt. Charles Conrad, Jr., USN. Aboard also will be Science Pilot Dr. (M.D.) Josep P. Kerwin and Pilot Paul J. Weitz, both Navy Commanders.

In all, three Skylab missions are scheduled. USAF's Lt. Col. William R. Pogue will act as Pilot aboard the third mission, to last fifty-six days and currently set for launch in October. Colonel Pogue is the only Air Force member assigned as a Skylab astronaut.

☆

The Air Force has begun a program to train dogs and their civilian police handlers to search out hidden explosives.

A total of forty civilian officers from metropolitan police forces around the country is slated to take the twenty-one-week Air Force course; the trained teams would then be available for duty at major airports near their cities. When not needed for airport search work, the dog and handler teams will be qualified to perform regular patrol duties.

The program is being sponsored by the FAA, while the officers' expenses and cost of the dogs are being funded by the Justice Department's Law Enforcement Assistance Administration.

During the first twelve weeks of the course, German shepherd dogs progress from basic obedience training to a variety of law-enforcement duties.

During the subsequent nine-week part of the course, the dogs are exposed to the scent of explosives, first in large amounts and then in diminishing amounts until the dogs learn to distinguish minute quantities of individual explosives odors from other scents. (The same technique is used to teach dogs to sniff out drugs.)

"They learn to search for these odors in different environments, to ignore distractions in crowded areas, and to alert their handlers when they find explosives," the Air Force said.

About sixty military teams, funded by DoD, will also be trained

(Text continues on p. 32)

Maj. Larry Sundholm, a fighter pilot and Vietnam veteran of F-4 Phantom combat missions, gets some ground experience as a USAFE forward air controller calling in simulated air strikes during an exercise in Germany. The Major, attached to the 3d Brigade, 1st Armored Division, in Bamberg, helps train other USAFE fighter pilots as FACs. Major Sundholm was among the 26,000 American, Canadian, and German troops participating in Reforger IV, the annual training exercise that this year required the airlift of 10,000 "dual-based" troops from the US to Europe.

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A 1973 National Workshop on Aerospace Education will be conducted in Colorado June 11–29.

The workshop is being sponsored jointly by Colorado's AFA, the Civil Air Patrol of the Rocky Mountain Region, Adams State College, Metropolitan State College, Colorado State University, and the University of Northern Colorado.

The workshop has been designated as AFA's national aerospace education project for 1973, and will be managed by Noel A. Bullock, Director of Aerospace Education for Colorado's AFA. The workshop will convene at the Logistics Auditorium at Lowry AFB.

The workshop will be accredited by Adams State College, Metropolitan State College, and the University of Northern Colorado for nine quarter hours of graduate credit and upper division credit.

Ed Gates . . . Speaking of People

REVAMPING RETIREMENT PAY

How much of a monetary obligation does the government have to career service members who separate, voluntarily or involuntarily, before they complete enough service for retirement?

A rather substantial obligation, according to the Defense Department, which wants to overhaul existing separation pay provisions and include, for the first time, enlisted personnel. Plans to do all this are part of the Pentagon's large-scale proposal to revamp the military retirement system.

On the separation pay issue, Defense wants the following:

- For careerists departing voluntarily with ten to twenty years' service, a "deferred" retirement, starting at age sixty and based on two and a half percent of basic pay for each year served. (The amount of retired pay would be adjusted for increases in the Consumer Price Index [CPI] between separation and age sixty.)
- For careerists leaving involuntarily after five but less than twenty years' service, a lump-sum readjustment payment, figured at five percent of final annual rate of basic pay times years served; and the deferred retirement cited above. (An option proviso allows the person to elect a second readjustment payment in lieu of the deferred retirement.)

If a member eligible for the deferred retired pay died before age sixty, his survivor would receive the lump-sum payment increased by the CPI adjustment.

The Pentagon has long felt that careerists separating before retirement should receive the equity they have built up in retirement; hence, its endorsement of the deferred pension plan.

Numerous civilian companies have a somewhat similar "vesting" policy for employees who leave before normal retirement. It seems likely that Congress, in examining the Department's retirement-separation overhaul package, will endorse the deferred retirement request, even though in many individual cases it will mean a substantial outlay on Uncle Sam's part.

Take a fourteen-year major, for instance. Under DoD's plan, at age sixty he would come into an annual retirement income of about $5,500, based on today's pay rates. If he lived fifteen years, the total he received would add up to $82,500. An E-7 separating with similar service would, at sixty, receive about $2,900 a year under today's rates, or $43,000 if he lived fifteen years. The actual outlays, of course, would be much greater, because pay rates almost certainly will have to be increased substantially in the years ahead.

Presumably, the age-sixty retirees would also pick up traditional retiree benefits such as exchange and commissary privileges.

Now, what about Defense's requests pertaining to involuntarily separated members? Remember, the Pentagon wants to give this group a lump-sum payment, in addition to the retirement starting at age sixty. The lump sum would be equal to five percent of a person's final annual rate of basic pay, times years of service.

Here are some examples of what it would amount to, based on today's pay rates: E-5 with six years' service, $1,750; E-7 with sixteen years' service, $6,883; O-3 with ten years' service, $6,788; and an O-5 with sixteen years' service, $14,328.

The lump sums involuntarily separated people would draw are, in most cases, considerably less than the readjustment payments now provided for officers only. However, when the deferred retirement is added on, as the Pentagon requests, total individual payments could soar.

Should they be so juicy? Should involuntarily separated members receive a better deal than careerists who depart voluntarily? Defense authorities say they expect to be questioned closely on these and related points when the Armed Services Committees take up the Defense package.

Basically, Defense argues that involuntarily separated members deserve a modest lump-sum readjustment payment to help in their transition to civilian life. Part of the rationale for denying readjustment pay to voluntarily separating members is that they have good jobs waiting and, therefore, immediate exit pay is not warranted.

The case for the deferred retirement payments, for all career separatees, goes like this. Civil servants contribute seven percent of their pay to their retirement fund, and on separation they get it back. Although service people don't contribute directly to their own retirement, there is an "imputed" or theoretical deduction of about seven percent from their pay for eventual retirement purposes. They would, in effect, recover this under the age-sixty formula.

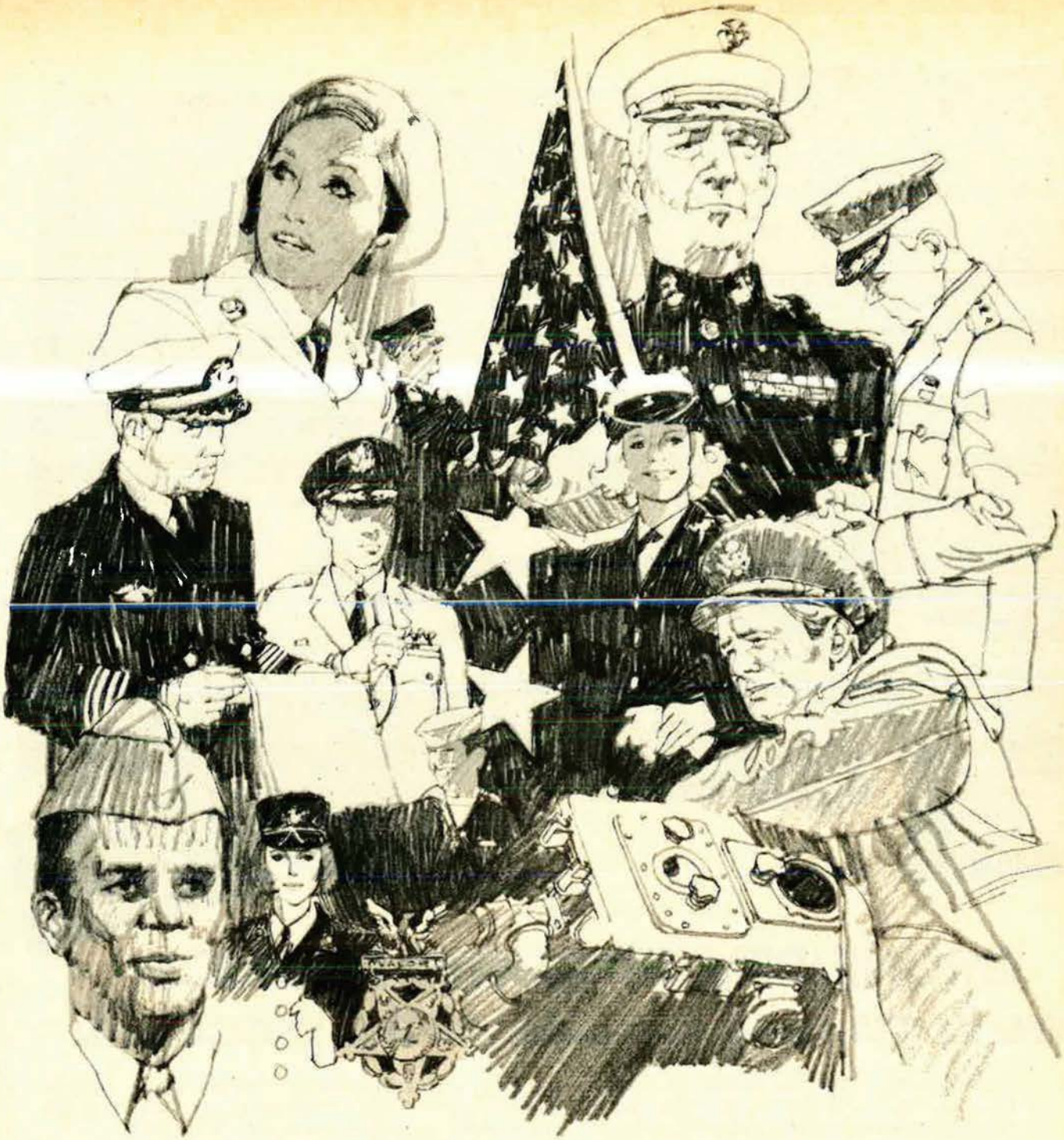
There is an allied item in Defense's proposal that seems certain to draw close attention when Congress takes up the legislation. It's the Pentagon's plan to give the same separation payoffs—the readjustment payment and the deferred retirement—to all involuntarily exited people, regardless of the reason for their departure. Thus, persons removed for such reasons as moral turpitude, in the interests of national security, or for substandard performance of duty, would be treated just as members caught in a RIF or suffering promotion passovers. It is going to be difficult for many military commanders and perhaps numerous congressmen, too, to accept this recommendation.

Defense's legislation does, however, contain language authorizing the Service Secretaries to withhold separation benefits when they judge the benefits to be unwarranted.

Existing readjustment and separation payment provisions, which apply only to officers and in many cases provide $15,000 in lump-sum payments, would be erased under the new legislation.

Until recently, involuntary force-outs have not been that numerous in the Air Force; but times are changing. Personnel strength continues to drop, and the services are becoming more selective about whom they retain. This indicates that involuntary releases will be increasing.

The Pentagon's new readjustment-annuity plans, therefore, shift to center stage. And the spotlight focuses on many questions dealing with the size of separation payments, the age-sixty retirement, and who should—and should not—receive them.



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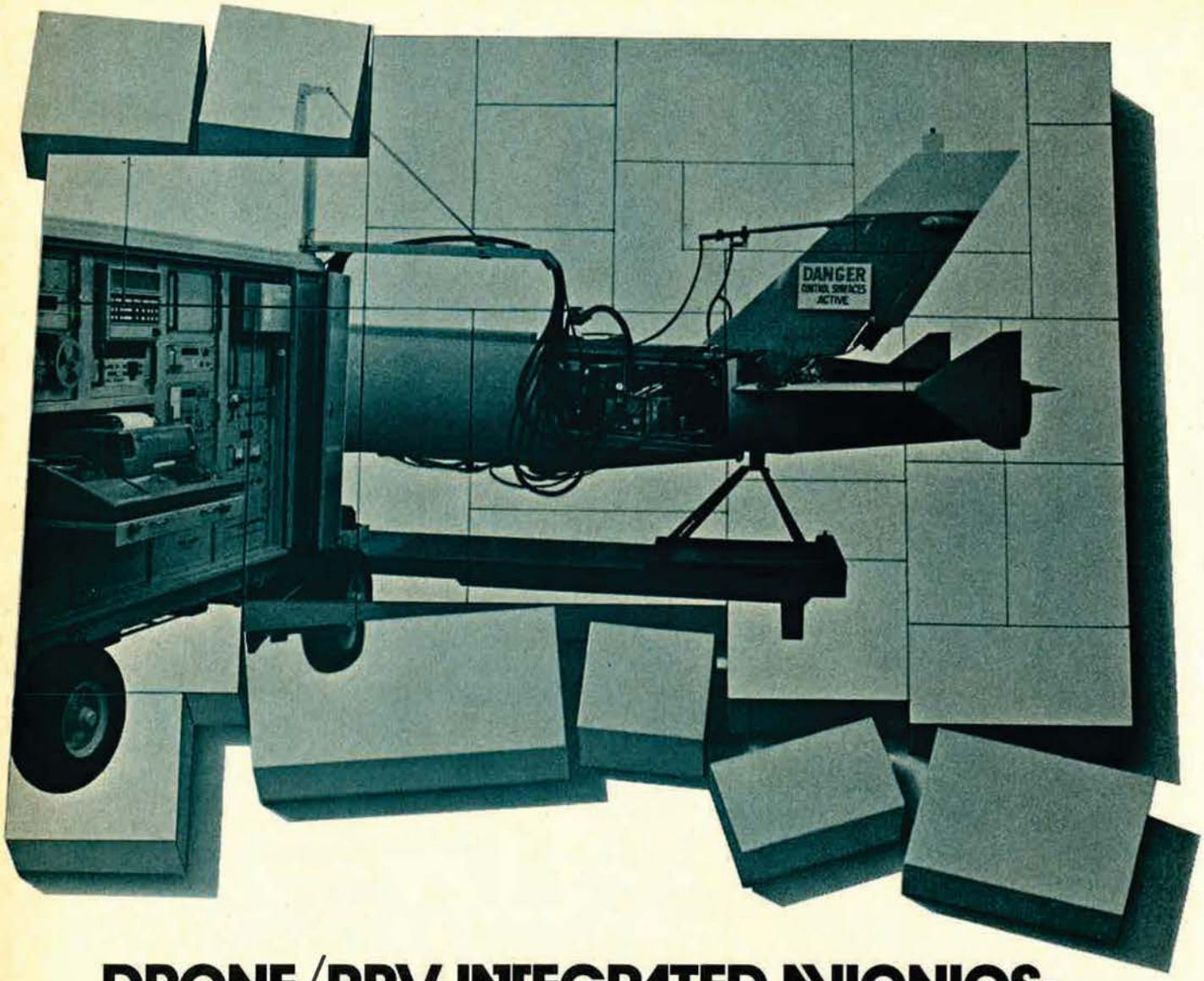

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Aerospace World

Colorado State University will accredit the workshop for six quarter hours' upper division or graduate credit. Tuition fee is $15.00 per quarter hour for each student who registers for credit.

The basic objective of the 1973 workshop is to inform teachers, counselors, school administrators, and the general public of the role of aerospace in present-day curriculums and of the part it must play in future curriculums.

The workshop, of the general-survey type, will consist of twelve units of study and sixteen field trips to aerospace facilities located in the Front Range area in Colorado. Included will be trips to the Air Force Academy, Fixed Base Operations, FAA Flight Service Station, FAA Airport Traffic Control, FAA Air Route Traffic Control, United Air Lines Air University, Buckley Field, Fort Carson, National Center for Atmospheric Research, Lowry Altitude Chambers, and others.

The workshop will cover many topics, historical and international, and will provide the opportunity for actual flight experiences in both general aviation aircraft and gliders.

Senior Staff Changes

B/G Thomas A. Aldrich, from Cmdr., US Forces, Azores, and Cmdr., 1605th AB Wg., MAC, Lajes AB, Azores, to Cmdr., AWS, Hq. MAC, Scott AFB, Ill., replacing retiring B/G William H. Best, Jr. . . . **M/G Lew Allen, Jr.,** from C/S, Hq. AFSC, Andrews AFB, Md., to Dep. to the Dir., Central Intelligence for Intelligence Community, Washington, D. C. . . . **Col. (B/G selectee) Benjamin R. Baker,** from Dep. Surgeon, to Surgeon, USAFE, Lindsey AS, Germany . . . **B/G Robert S. Berg,** from Sp. Asst., to Dep. ACS/Intelligence, Hq. USAF . . . **Col. (B/G selectee) James L. Brown,** from Dir. of Threat Application, ACS/Intelligence, Hq. USAF, to DCS/Intelligence, Hq. SAC, Offutt AFB, Neb., replacing retiring B/G Harry N. Cordes . . . **Col. (B/G selectee) Daniel L. Burkett,** from Dir., Mgmt. Analysis, AF Comptroller, Hq. USAF, to Dep. Cmdr., Army-AF Exchange Svc., Dallas, Tex.

M/G Kenneth R. Chapman, from DCS/Dev. Plans, Hq. AFSC, Andrews AFB, Md., to Cmdr., AF Eastern Test Range, AFSC, Patrick AFB, Fla., replacing retiring M/G David M. Jones . . . **M/G Levi R. Chase,** from V/C, to Cmdr., 9th AF, TAC, Shaw AFB, S. C., replacing retiring M/G Roger K. Rhodarmer . . . **B/G William P. Comstock,** from Dep. Dir., Joint Continental Defense Systems Integration Planning Staff, Washington, D. C., to Cmdr., US Forces, Azores, and Cmdr., 1605th AF Wg., MAC, Lajes AB, Azores, replacing B/G Thomas A. Aldrich . . . **Col. (B/G selectee) Theodore P. Crichton,** from Cmdr., 316th TAW, Hq. TAC, Langley AFB, Va., to Cmdr., 839th Air Div., TAC, Pope AFB, N. C. . . . **B/G Walter F. Daniel,** from IG, Hq. AFSC, Andrews AFB, Md., to Asst. Dir. (Tac Systems Test & Evaluation), ODDR&E, Hq. USAF, replacing B/G George H. Sylvester . . . **Col. (B/G selectee) Bohdan Danyliw,** from Dep. Staff Judge Advocate, to Staff Judge Advocate, Hq. AFSC, Andrews AFB, Md., replacing retiring B/G Samuel M. Thomasson, Jr.

B/G Lawrence A. Fowler, from IG, Hq. AFLC, Wright-Patterson AFB, Ohio, to Cmdr., Defense General Supply Center, DSA, Richmond, Va., replacing retiring B/G James D. Kemp . . . **B/G (M/G selectee) Raymond B. Furlong,** from Military Asst., Office, Dep. Sec. of Def., Washington, D. C., to Vice Cmdr., 9th AF, TAC, Shaw AFB, S. C., replacing M/G Levi R. Chase . . . **B/G William F. Georgi,** from Cmdr., 86th TFW, USAFE, Ramstein AB, Germany, to Chief, International Negotiations Div., J-5, Joint Staff, OJCS . . . **B/G Lawrence N. Gordon,** from Cmdr., 39th ARRS, MAC, Eglin AFB, Fla., to Cmdr., AFTAC, and Cmdr., 1035th Tech. Ops Gp., Patrick AFB, Fla., replacing B/G William R. Goade . . . **B/G Frank O. House,** from Dir., Civil Law, OJAG, Hq. USAF, to Staff Judge Advocate, Hq. PACAF, Hickam AFB, Hawaii, replacing retiring B/G Morton J. Gold.

Col. (B/G selectee) William J. Kelly, from General Counsel, Army-AF Exchange Svc., Dallas, Tex., to Staff Judge Advocate, Hq. AFLC, Wright-Patterson AFB, Ohio . . . **B/G (M/G selectee) James A. Knight, Jr.,** from Asst. DCS/Ops for Ops & Tng., to DCS/Ops, Hq. TAC, Langley AFB, Va., replacing retiring M/G William P. McBride . . . **B/G Robert T. Marsh,** from Dep., Recon/Strike/Elect Warfare, ASD, Wright-Patterson AFB, Ohio, to DCS/Dev. Plans, Hq. AFSC, Andrews AFB, Md., replacing M/G Kenneth R. Chapman . . . **Col. (B/G selectee) Billy M. Minter,** from Chief, F-111 Sys. Mgmt. Div., SMAMA, AFLC, McClellan AFB, Calif., to IG, Hq. AFLC, Wright-Patterson AFB, Ohio, replacing B/G Lawrence A. Fowler . . . **L/G Timothy F. O'Keefe,** from Vice CINC, Hq. PACAF, Hickam AFB, Hawaii, to Dep. CINC, US Readiness Cmd., MacDill AFB, Fla., replacing retiring L/G James V. Edmundson.

Col. (B/G selectee) Gerald J. Post, from Dir., Materiel Mgmt., SAAMA, AFLC, Kelly AFB, Tex., to Asst. DCS/M Mgmt., Hq. AFLC, Wright-Patterson AFB, Ohio . . . **Col. (B/G selectee) Thomas F. Rew,** from Cmdr., 97th Bomb Wg., SAC, Blytheville AFB, Ark., to C/S, 2d AF, SAC, Barksdale AFB, La. . . . **Col. (B/G selectee) Thomas M. Ryan, Jr.,** from Cmdr., 379th Bomb Wg., SAC, Wurtsmith AFB, Mich., to Cmdr., 47th Air Div., SAC, Fairchild AFB, Wash., replacing retiring B/G Donald E. Stout . . . **B/G (M/G selectee) William M. Schoning,** from Dep. Dir., Plans for Plans & Policy, DCS/P&O, Hq. USAF, to Dir., Policy Plans & NSC Affairs, OSD (ISA), Washington, D. C. . . . **B/G George H. Sylvester,** from Asst. Dir. (Tac Systems Test & Evaluation), ODDR&E, Hq. USAF, to Dep., Systems Mgmt., ASD, AFSC, Wright-Patterson AFB, Ohio.

B/G Floyd H. Trogdon, from Asst. C/S, J-6, USMACV, Saigon, Vietnam, to IG, Hq. AFSC, Andrews AFB, Md., replacing B/G Walter F. Daniel . . . **Col. (B/G selectee) William R. Yost,** from DCS/Engineering & Programs, to C/S, Hq. AFCS, Richards-Gebaur AFB, Mo., replacing M/G Lew Allen, Jr. . . . **Col. (B/G selectee) Charles D. Youree, Jr.,** from Cmdr., 456th Bomb Wg., SAC, Beale AFB, Calif., to Dep. Dir., Plans for Plans & Policy, DCS/P&O, Hq. USAF, replacing B/G (M/G selectee) William M. Schoning.

PROMOTIONS: (Air Force Reserve) To be **Major General:** William H. **Bauer**; Stuart G. **Haynsworth**; Howard T. **Markey**; Alfred J. **Wood**, Jr.

(Air Force Reserve) To be **Brigadier General:** William C. **Banton, II**; Francis N. **Clemens**; Michael **Collins**; Bruce H. **Cooke**; Roger M. **Dreyer**; John W. **Huston**; Cecil T. **Jenkins**; Stephen T. **Keefe**, Jr.; Leonard **Marks**, Jr.; Roy M. **Marshall**; Robert M. **Martin**, Jr.; Sidney S. **Novaresi**; Pat **Sheehan**; Ted W. **Sorensen**; Edwin F. **Wenglar**.

RETIREMENTS: B/G William H. **Best**, Jr.; M/G William B. **Campbell**; B/G Harry N. **Cordes**; M/G Rexford H. **Dettre**, Jr.; M/G Joseph L. **Dickman**; L/G James V. **Edmundson**; B/G Morton J. **Gold**; M/G David M. **Jones**; B/G James D. **Kemp**; M/G William P. **McBride**; M/G Roger K. **Rhodarmer**; M/G Richard R. **Stewart**; B/G Donald E. **Stout**; B/G Samuel M. **Thomasson, Jr.** ■

Aerospace World

For additional information write to:

Director, Aerospace Education
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The Air Force is consolidating all flight screening of prospective pilots at Hondo Municipal Airport, Hondo, Tex. The program, due to begin May 17, replaces ten separate T-41 flying activities that had been conducted at Air Training Command bases around the country.

Air Force will supply a commercial company—Del Rio Flying Service, Inc.—with eighty T-41 Cessna-172 aircraft to conduct the screening and training (of undergraduate pilots) under a $600,000 annual contract. The contractor will provide qualified instructor pilots and will also be responsible for the maintenance, refueling, storage, and security of the T-41s in its care.

The centralization of flight screening will produce substantial dollar savings, Air Force officials said. Hondo was selected as the site because of proximity to the School of Military Sciences, Officer, at Lackland AFB, Tex. The school, which will supervise the T-41 program, graduates about 4,000 new officers a year, many of whom go on to pilot training. By the first year of operation, some 1,400 Air Force students and 300 personnel from allied countries are expected to complete the program. (Only the screening has been consolidated; the balance of undergraduate pilot training in T-37 and T-38 aircraft will continue at present ATC flying training bases.)

Retired Gen. Carl "Tooey" Spaatz, USAF's first Chief of Staff, receives a portrait of himself in honor of being chosen one of the first ten to enter Civil Air Patrol's Hall of Fame. Participating, from left, G. T. Weir, CAP executive director, Brig. Gen. L. J. Westberg, national commander, and CAP Col. W. M. Patterson.

☆

A highlight of the upcoming Paris Air Show, set for May 24 to June 3, promises to be a joint US/USSR exhibit featuring full-size models of the Apollo and Soyuz spacecraft currently under development for 1975's docking project. (*See April '73 issue, pp. 13 and 54.*) This exhibit will be housed in a special pavilion.

As far as the US aerospace industry is concerned, US commercial competitiveness will be emphasized by the seventy-seven US participants and the US Commerce Department, said Mr. M. van Gessel, of Commerce's Bureau of International Commerce.

The theme of the 1973 US pavilion, "Man in Flight: From Kitty Hawk to the Planets," commemo-

The 1972 Robert J. Collier Trophy

The nation's most prestigious aeronautical honor—the Collier Trophy—this year will go to the officers and men of USAF's Seventh and Eighth Air Forces and Task Force 77 of the US Navy.

The trophy, sponsored by the National Aeronautic Association and retained by the Smithsonian Institution, is presented annually. This year, it will be awarded in recognition of "successfully carrying out Operation Linebacker II, the air campaign against North Vietnam in December 1972 which through precise, accurate, and determined attacks on key military targets against unprecedented defenses brought about a cease-fire under terms which attained United States objectives in Southeast Asia."

For previous US Air Force winners of the Collier Trophy, see p. 155.

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rates the seventieth anniversary of the Wrights' first flight. On the other end of the time scale, the Skylab space station (*see p. 29 and February '73 issue, p. 25*), scheduled for launch in May, should be in orbit during the course of the Paris show.

Another exhibit at Paris expected to draw considerable attention will be a Boeing 747 cockpit section that simulates takeoffs, flying, and landings.

Mr. van Gessel anticipates that sales of the US industry participants should top the $56.6 million realized by the seventy-eight US exhibitors at the 1971 show.

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NEWS NOTES—Alexander P. Butterfield has taken over as **Administrator of FAA,** succeeding **John H. Shaffer,** who returned to private life. Colonel Butterfield, USAF (Ret.), is a command pilot who served twenty years in the Air Force before joining the White House staff in January 1969 as Deputy Assistant to the President. In November 1969, he also was named Secretary of the Cabinet.

Four **SAC B-52s** and their crews will participate in the **RAF Strike Command's Bombing and Navigation Competition** April 29–May 5 in England. Contributing aircraft will be the **5th Bomb Wing,** Minot AFB, N. D.; **17th Bomb Wing,** Wright-Patterson AFB, Ohio; **319th Bomb Wing,** Grand Forks AFB, N. D.; and **410th Bomb Wing,** K. I. Sawyer AFB, Mich.

On the President's list for promotion to **brigadier general** is USAFR **Col. William C. Banton II,** of St. Louis, Mo., who will be the first black in the Reserve to attain star rank.

Currently under way at **Ft. Hood, Tex.,** is **Exercise Gallant Hand '73,** in which more than 30,000 Army and Air Force personnel are participating under simulated combat conditions. ■

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AIR FORCE
MAY 1973 MAGAZINE

In spite of its remarkably trouble-free progression through the design and development cycle, the Air Force's unique close-air-support aircraft, the A-10, is under heavy congressional fire. The following report, based on interviews with Department of Defense and Air Force experts and on Air Force study and evaluation material, portrays . . .

THE A-10 APPROACH TO CLOSE AIR SUPPORT

By Edgar Ulsamer
SENIOR EDITOR, AIR FORCE MAGAZINE

EARLY in March, the Air Force moved its A-10 (formerly A-X) close-air-support aircraft program into preproduction and full engineering development, a broad and portentous action. In addition to signaling the successful conclusion of a key phase of the A-X development, this milestone also indicates, in the view of senior Department of Defense and Air Force officials, that the twin dangers of cost overruns and unforeseen technological difficulties can be minimized through innovative, disciplined management procedures.

The A-10 program is the first weapon development to be governed by the "design-to-cost" principles formulated by Dr. John S. Foster, Jr., Director of Defense Research and Engineering, and other ranking Pentagon officials. It also is the first military airplane program in more than fifteen years to undergo full-scale prototype development and competitive flyoff, the F-105 and F-107 competition having been the most recent.

Designing to cost and prototyping are the twin pillars of the Pentagon's new management

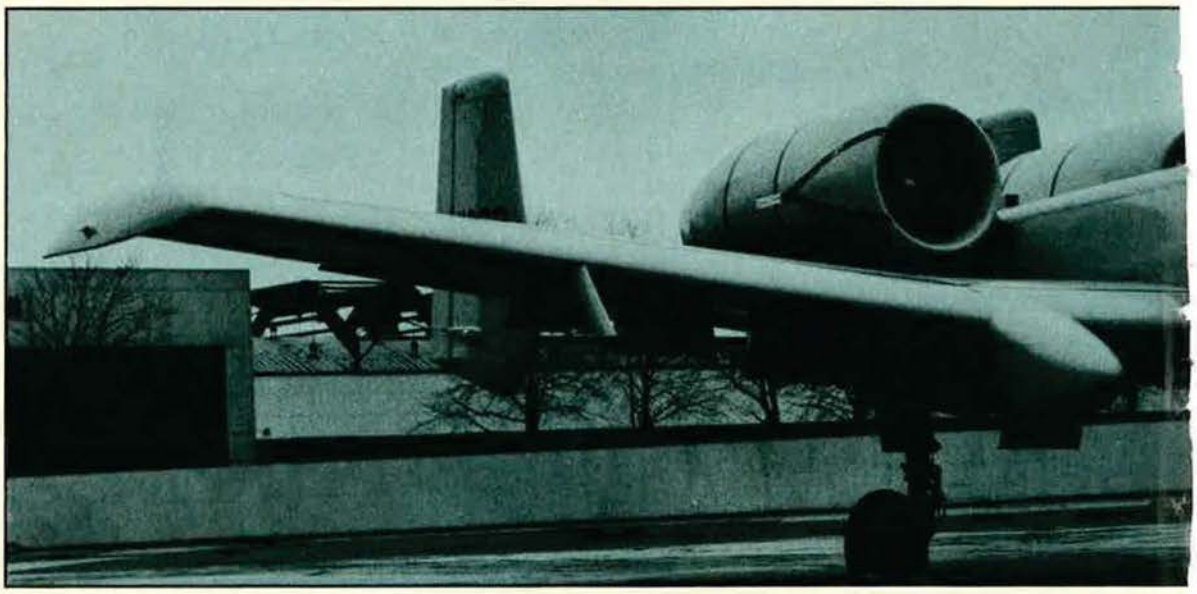
philosophy. The A-10 program, in the view of responsible defense officials, provides tangible evidence that "we can indeed produce a weapon system at a constant-dollar price and with performance as advertised. On both counts, the A-10 program is on a track that was plotted years ago."

Dr. Foster told AIR FORCE Magazine that "to date, the A-10 program has served as an excellent vehicle to implement the design-to-cost concept. From the outset of the program's validation phase, the production unit flyaway cost of the aircraft was the driving consideration for the contractors. The Air Force gave the contractors wide latitude in utilizing performance/cost trade-offs to meet design-to-cost and minimum performance goals. The trade-off process eliminated all but the essential features of the aircraft. As a result, for one of the few times in years, we have reversed the increasing cost trend. The A-10 will cost less than other available aircraft for the close-air-support mission, and, because it is designed specifically to do only close air support, it will be much more effective in this role as well."

The A-10, built by Fairchild Industries and winner of a stringent evaluation and flyoff against a competing prototype, Northrop's A-9, holds another distinction: It is this country's first aircraft designed exclusively for close air support. Almost from its inception, however, the program has been caught in a crossfire of congressional questions about its characteristics and need. The decision by Air Force Secretary Robert C. Seamans, Jr., on March 2, 1973, to award contracts to Fairchild Industries and the General Electric Co. (maker of the A-10's TF34 engines) to build ten preproduction aircraft and to proceed with full-scale development of the A-10 at a cost of about $187 million affirms the Air Force's conviction that the new aircraft will provide improved close air support at the lowest possible cost and risk.

Birth of the A-10

The idea of an aircraft designed exclusively for close air support was first suggested in 1966 by Gen. John P. McConnell, then Chief of Staff of the Air Force. After an inspection of Southeast Asian air war operations, he initiated plans to design and develop a weapon system "on the order of but better than the A-1 and cheaper than the A-7D," which at that time was still under development. Translated into specifics by the Air Staff, the modern close-air-support mission was deemed to require a rugged, economical, easy-to-maintain combat aircraft that is sufficiently accurate, maneuverable, and lethal to engage and destroy enemy ground forces—especially armor—without endangering friendly ground forces. *(See January '70 issue, p. 33, "A-X: Lethal, Accurate, Agile, and Cheap.")*



In addition, Air Force planners concluded that a close-air-support aircraft must be able to operate from short, rough airstrips if it is to serve as an optimally responsive element of the ground battle. It must be able to loiter for long periods and be agile enough to make frequent, rapid passes at its targets with minimum exposure to hostile ground fire. Above all, it must be more survivable in heavy ground fire than the present generation of combat aircraft and helicopters assigned to aerial fire-support roles.

change from turboprop to turbofan designs, the Air Force awarded prototype development contracts to Fairchild Industries and Northrop in December 1970. Two years later, the Air Force completed flight evaluation of the two aircraft, including maintainability assessments. Involving comprehensive tests of weapons delivery capabilities and survivability, the evaluation culminated in the selection for preproduction of the A-10, which, once the test cycle is completed, presumably will be entered into full production.

The A-10 has a range of 250 nautical miles with a 9,500-pound external ordnance payload and two hours of loiter time in the target area. It can take off (with reduced payload) using a 1,200-foot ground roll. Where 4,000-foot runways are available, the A-10 can carry a maximum ordnance payload of 16,000 pounds. The aircraft cruises at 300 knots at sea level, and its maximum speed is about 400 knots. Two fuselage-mounted GE TF34 engines, each with 9,000 pounds of thrust, power the A-10.

USAF's A-10 close-support aircraft, now in preproduction, is a single-seat, twin-engine design optimized for survivability, weapons delivery, and long loiter time.

The A-10 is designed to carry guided and unguided bombs, rockets, flares, and the electro-optically guided Maverick missile. The production model will be equipped with an internally mounted 30-mm Gatling gun, currently under competitive prototype development.

Combat Cost-Effectiveness

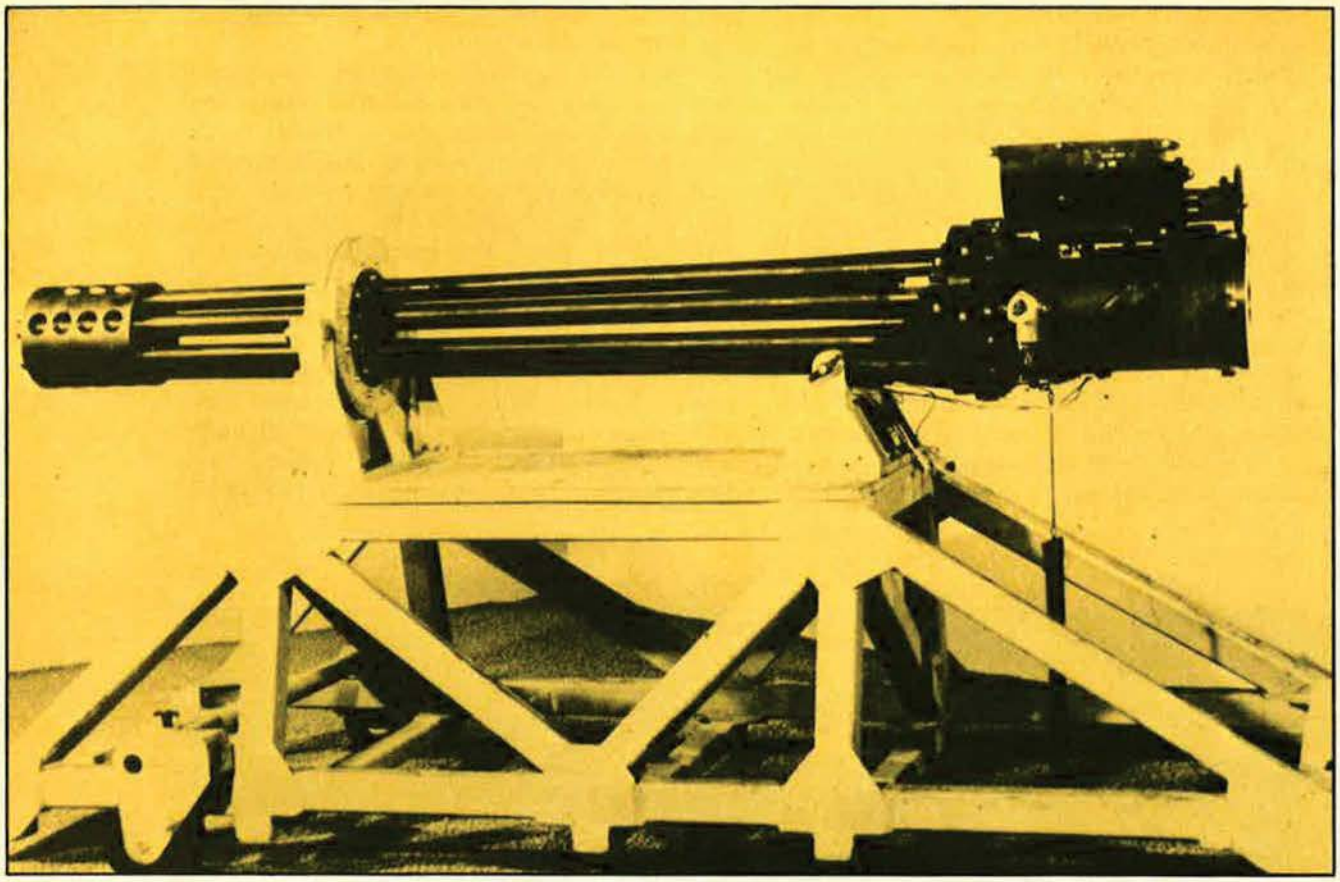
Recent Air Staff studies indicate how the A-10 would fare under a range of conventional war scenarios, compared to aircraft now in the inventory. The studies were completed before parisons with other aircraft were confined to close-air-support missions.

These computerized war games were predicated on classified order-of-battle information and included such scenarios as a friendly force in Western Europe resisting an attack from the east. Scenario variables ranged from no close support to massive use of the various aircraft types under study. The computer games also analyzed the performance of each aircraft in such specific areas as destroying tanks.

By examining many variables, the study produced a number of gradations within each of several findings. Among its broadly valid conclusions is one that Lt. Gen. Otto J. Glasser, USAF Deputy Chief of Staff for Research and Development, terms paramount: "The A-10 can deliver the same kind of force effectiveness in terms of close air support as the next best competitor for about forty percent of the latter's total cost." The term "total cost" encompasses all ownership costs over the full life cycle of the weapon system.

Other conclusions were that, under those war conditions the US is likely to face, and within the parameters laid down by USAF for the study, the A-10 came out as best tank killer by a factor of 1.9. Put another way, under severe combat conditions, it could kill almost twice as many tanks as its top competitor. When equal numbers of the candidate aircraft were compared on a force-effectiveness basis, the A-10 proved to be 1.7 times more effective in containing a tank breakthrough than its nearest competitor.

Other findings indicated that it will cost



An internally mounted, rapid-fire, 30-mm gun that can fire at the rate of 4,000 rounds per minute and which is currently undergoing test and evaluation is the key element to the A-10's lethality.

about twenty-five percent less to operate the A-10 than the next cheapest-to-operate aircraft. When allowance was made for both acquisition and operation of a like number of aircraft, without regard to force effectiveness, the A-10's costs were twenty-five percent less than any other aircraft under study. Other points examined involved the constant number of aircraft types needed to produce a given level of force effectiveness, as well as the constant amount of funds invested in such forces. All findings, General Glasser told AIR FORCE Magazine, demonstrated that "the A-10 is the way to go for the close-air-support mission."

These findings "are, of course, not surprising," according to General Glasser. "It is obvious that an aircraft designed for a single purpose should perform that task more cost-effectively than an aircraft that provides us with a range of capabilities."

A-10: Designed to Cost

The Air Force and its contractors have adhered with "religious fervor" to the ironclad rule laid down by the Defense Department that the A-10 must be designed to a flyaway cost of no more than $1.5 million expressed in 1970 dollars and premised on a "buy" of 600 aircraft, deliverable at a rate of twenty aircraft per month. Gen. William W. Momyer, Commander of the Tactical Air Command, told AIR FORCE Magazine that at a $1.5 million price tag, the A-10 "promises to be the most cost-effective and best weapon for close air support, not only for ourselves but for our allies."

There were many pressures from many quarters to add capabilities and components for the sake of versatility, but ascetic adherence to the single-purpose principle held down the aircraft's price. "I think we have delivered very credible proof that the 'design-to-cost' concept is sound and that it will work. And this extends from acquiring the aircraft to the cost of owning and operating it," according to General Glasser. (The price of the A-10 is sometimes given at about $1.4 million per unit. This figure is not based on flyaway cost but rather on unit recurring costs and does not include certain nonrecurring expenditures such as tooling.)

Survivability Paramount

Survivability is the paramount design criterion of the A-10. The close-air-support mission stands or falls with the ability to operate

in withering ground fire for long periods of time and at the low altitudes required for visual target identification. And this means protection of that most precious of components, the pilot. The Air Force ran some 250 materials tests before deciding to wrap him in a 1,700-pound titanium armor capsule that can defeat the 23-mm armor-piercing shells used by Soviet antiaircraft weapons. Special bullet-resisting glass is used in the A-10's windscreen.

Second only to the pilot in terms of vulnerability is the fuel system. The A-10 is protected to an unprecedented degree by use of self-sealing tanks, fire-inhibiting foam, and the location of the tanks themselves. A special test rig blew air over the critical structural components of the aircraft to simulate normal cruise speed while a 23-mm gun was fired at them from below. The test findings helped in optimal protection and placement of the A-10's fuel tanks. The aircraft is equipped with so-called "go-home" fuel, carried in self-sealing tanks inside the fuselage, and to be used only after the wing tanks are empty.

The A-10 is designed to absorb major battle damage, such as loss of a large chunk of wing or of ailerons, rudder, or elevators, without catastrophic consequence, because its structure is not only rugged but aerodynamically very stable. The hydraulic system is backed up by a mechanical cable system, so arranged that a high-explosive shell will not sever both control cables. The placement and design of the engines also enhance survivability.

The A-10 is, of course, not meant to engage in air combat or to outrun fighter aircraft. However, when matched against F-4 fighters one-on-one during recent flight evaluations at Edwards AFB, Calif., the A-10's high maneuverability enabled its pilot to keep outside of the attacking F-4's gun and missile envelope and came very close to "luring the F-4s into the ground." The A-10's high maneuverability more than makes up for its lower speed, according to the Air Force's flight-test evaluation. Overall, the A-10 is "almost an order of magnitude more survivable than any other aircraft in the Air Force inventory today," according to the evaluation report.

The A-10's Lethality

There have been exceptions, but the most effective close air support, especially against moving targets, must come through visual contact. The A-10 is designed to operate on a visual basis under extremely marginal weather conditions, down to 1,000-foot ceilings and one-mile visibility. Because of its short turn radius—about 1,000 feet—it remains close to its target and can attack it rapidly and frequently. A principal key to the A-10's lethality is the GAU-8 internally mounted 30-mm gun that is to fire at the rate of 4,000 rounds of ammunition per minute. The A-10 can carry up to 1,350 rounds.

Two competing gun designs, by General Electric and Philco-Ford, are undergoing a shoot-off evaluation at the Armament Development and Test Center at Eglin AFB, Fla. While some congressmen have claimed that the timing of the A-10 and the GAU-8 development is out of sync, General Glasser pointed out that the gun will be "available about five months before it is required by the A-10's development schedule. Because this is a competitive gun development effort, we will have a fall-back position."

Other weapons carried by the A-10 include up to twenty-four Mark 82 500-pound bombs, six AGM-65 Maverick electro-optical missiles, and rockets and flares. The avionics system of the A-10 permits the use of laser and electro-optically guided bombs.

Fire support of air rescue operations and helicopter escort are integral elements of the close-air-support mission. They were provided largely by A-1 Sandy aircraft in Southeast Asia. The A-10, according to General Glasser, "will be excellent—without peer—in such operations."

No Reason for Further Flyoffs

Some members of Congress have suggested that the Air Force arrange a flyoff among the A-10, the A-4, and the A-7. According to General Glasser, the idea behind such a "flyoff seems to be misunderstood. The Air Force is definitely not out to frustrate such a test but we simply don't know how to formulate such a flyoff," General Glasser told AIR FORCE Magazine. If the flyoff is based on the Air Force's criteria for close air support involving such key factors as time on station, lethality, payload, survivability, and maneuverability, "there simply is no contest."

If the contest is premised on such performance qualities as head-up display and bombing systems, "then we measure something other than close-air-support capabilities," he said.

For the time being, the Air Force believes there is no reason to hold another flyoff, but very good reason to state, in the words of General Glasser, that "the A-10 represents a breakthrough in the cost-effectiveness of close air support." As forecast three years ago, it is "lethal, accurate, agile, and cheap," to a degree not found in any other close-support aircraft. ■

Thirty percent of the Air Force budget goes for day-to-day operating expenses. Since manpower costs are fixed and the need for weapons modernization apparent, cost reductions that do not seriously weaken combat capability must come largely from the area of operating expenses. Here, the Secretary of the Air Force discusses current and planned programs for . . .

IMPROVING AIR FORCE OPERATING EFFICIENCY

By the Hon. Robert C. Seamans, Jr.
SECRETARY OF THE AIR FORCE

Air Force activities can be categorized in many ways. One rough breakdown shows budget slices of twenty-five percent for new weapons, forty-five percent for military and civilian manpower, and thirty percent for day-to-day operating expenses other than manpower costs. This discussion is about the thirty percent that provides the materials and services needed for the operation and maintenance of today's forces.

Current operating costs are dependent on earlier decisions concerning new weapons and on the effectiveness of our manpower and personnel policies. The tie-in with new weapons programs will be clear in the discussion of the importance of life-cycle cost analysis, which emphasizes reliability and maintainability in new systems.

The relationship of operating costs to personnel policy stems from the fact that all program improvements depend on the ability, performance, and organization of our Air Force people. In the March issue of AIR FORCE Magazine, I discussed the need for good people and a personnel structure that gives them full opportunity to contribute. We are working hard to provide streamlined organizations, challenging jobs, and an environment of mutual respect and understanding. As a result of these personnel policies, our people should be able to do a better job of analyzing and reducing costs in their day-to-day work.

The Air Force has taken a number of measures to cut operating costs, even at some risk to our combat effectiveness. For example, we have lowered crew-to-aircraft ratios, reduced the number of flying hours per month for our aircrews, and cut maintenance manpower. But further reductions of this nature could seriously weaken combat capability. For this reason, we are concentrating on improving the management and reducing the cost of personnel administration, supply, maintenance, and other support areas.

BETTER MANAGEMENT OF PERSONNEL FINANCE

We are devising new and improved methods to manage pay and leave records of Air Force military personnel. The Joint Uniform Military Pay System (JUMPS) is being

Through competitive bidding, USAF has drastically reduced the cost of contractor-operated facilities such as this DEW Line site.

implemented by the Air Force Accounting and Finance Center to provide accounting data, perform pay computations, and maintain individual pay and leave records for all military personnel. This system will become fully operational by July 1974. Although projected cost savings through JUMPS have not been fully validated, we anticipate an annual savings of approximately $4 million when the system is in full operation.

There are many additional applications of computer technology that can help further reduce our overall operating costs in the years ahead. Of course, automation requires increased communications networks, more expensive technical training, and technicians to handle complex equipment. Nevertheless, we believe that on balance new technology can improve effectiveness and reduce cost. To help ensure proper control of our computers, we have established a single manager with broad authority over all Air Force automatic data-processing programs.

USING AUTOMATION IN LOGISTICS

The Air Force will soon implement the first phase of the Advanced Logistics System, which will make use of a new generation of computers to integrate all of the depot-level purchasing, storage, maintenance, and distribution activities in the Air Force Logistics Command. This system is a major step forward in planning for materiel requirements and efficient distribution of supplies. We estimate that it will yield a saving of at least $250 million during the first seven years of operation.

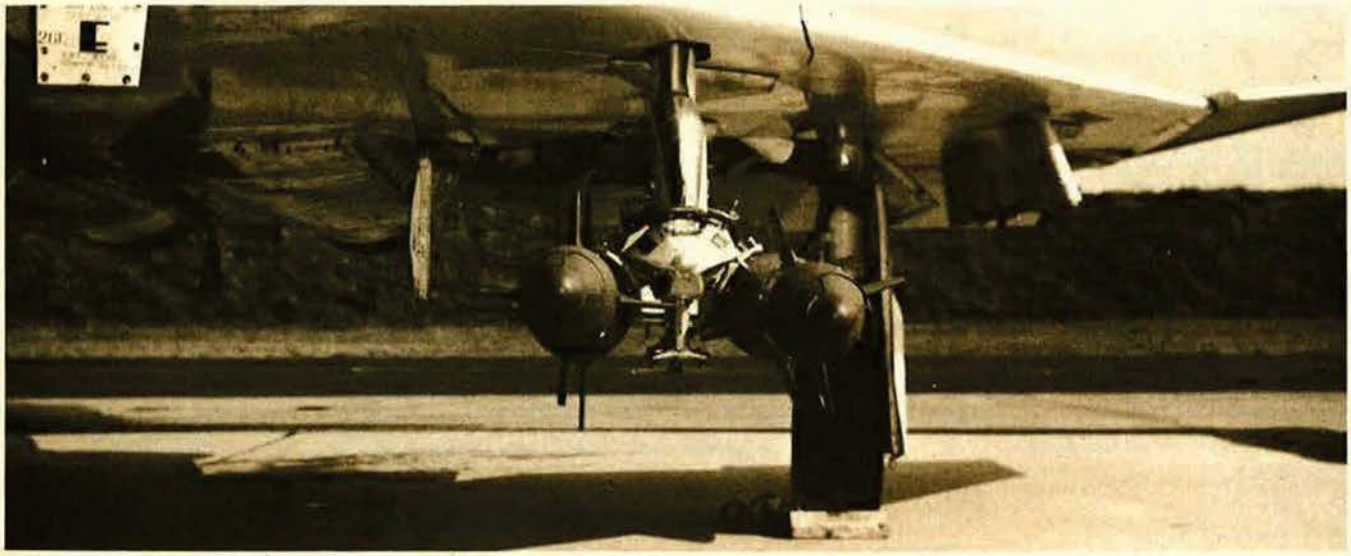
More reliance on computers has also enabled us to reduce stock levels and manpower requirements at the base level. Since 1965, base supply inventories have been reduced by one and one-half million

THE 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	

We have also begun a more effective system of cost accounting for maintenance activity. This program should help us identify major trouble spots in terms of both manpower and dollar costs. We have found that in recent years about one percent of some 72,000,000 annual aircraft-maintenance actions accounted for thirty percent of our costs. Data such as this allow us to change our procedures and make modifications in the design of new equipment.

The real expense of owning any system is a combination of its development, production, operations, and maintenance costs. If we can build more reliability and cheaper maintainability into a system, we can significantly reduce its total life-cycle cost. By the end of Fiscal Year 1972, life-cycle cost analysis had been applied to eighty-three procurements—mostly components and parts—with estimated savings or cost avoidance of about $30 million. This year, it has been applied to the A-10 close-support aircraft, inertial navigation sets, and other major subsystems.



This laser guidance unit can be used with a variety of currently stocked bombs—a step toward the economy of modular munitions.

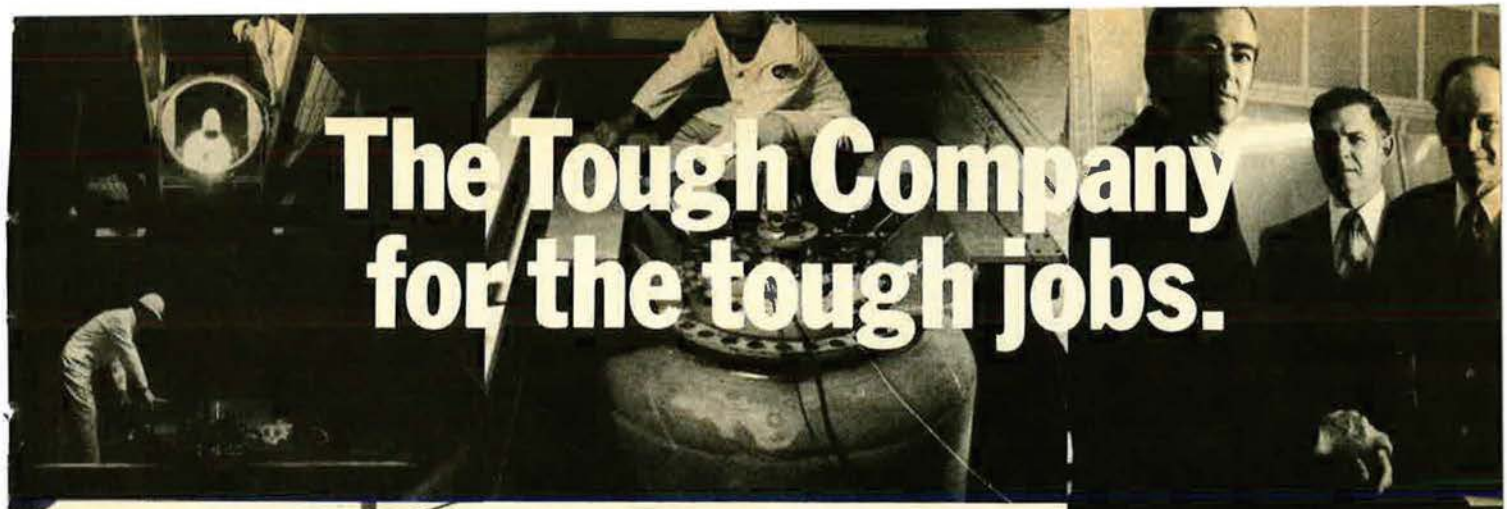
items, with a long-term savings of more than $450 million. Moreover, the most recent review of requirements resulted in a manpower savings of some 3,000 spaces in Fiscal Year 1973.

IMPROVED MAINTENANCE

In 1972, we began a project to improve maintenance management by centralizing and standardizing base-level maintenance organizations. The project affects the management of maintenance in such diverse areas as aircraft, intercontinental missiles, communications, electronics, munitions, and ground-support and training equipment. Improved procedures have reduced repair times and increased worker productivity. Maintenance forms, for example, have been reduced from 400 to forty.

RELIABILITY AND SIMPLICITY

Measures to improve reliability of the inertial navigation systems on the F-4D and -E aircraft show how life-cycle costs can be reduced through improved reliability. For an initial cost of less than $1 million, we



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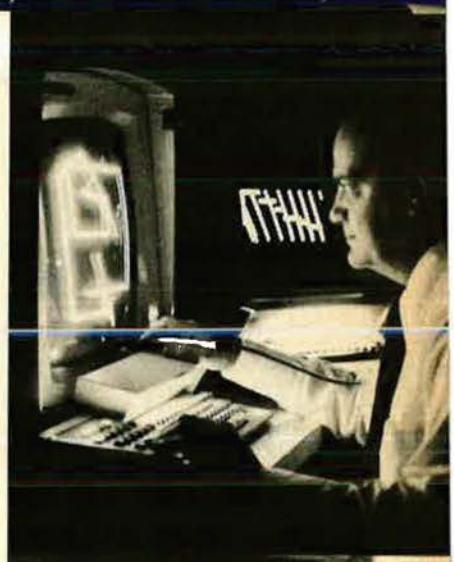

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expect to realize a saving of $2 to $5 million because of the longer mean time between failure of the inertial systems of these aircraft. In another program, we are replacing older radios in most of our aircraft with advanced solid-state equipment that increases reliability tenfold. The investment cost for this program will be approximately $40 million and should generate a savings of more than $10 million per year.

The guidance unit for the Minuteman III intercontinental missile is another illustration of savings through improvement in reliability. The contract for this equipment contained a cost-incentive provision to reward the contractor if operational reliability proved better than the minimum specified. The results were exceptional. After these guidance units completed 600,000 hours of operational use, the demonstrated reliability was twice as good as the required minimum. Thus, the contractor earned an incentive fee of $2.5 million, and the Air Force saved more than $78 million in reduced maintenance and spare-parts costs.

We are working to reverse the trend toward more complex, sophisticated, and expensive weapon systems. We need increased capability, but we will have to use technology to build systems that can do the job and still be as simple and inexpensive as possible. For instance, we are developing a family of modular munitions with interchangeable components for different tactical requirements. Instead of procuring a different type bomb for each specific mission, we could have modular bombs that would allow assembly of the proper warhead, guidance unit, or other component best suited for each mission. These weapons will give us the tactical flexibility we need at a significant savings in development, production, and training costs. We are also investigating the possibility of modular avionics for different weapon systems to reduce the cost of complex electronic units.

DEPOT MODERNIZATION

Just as we must modernize the systems for controlling supplies and maintenance, we also need to update the depots used to support these two functions. Two years ago, we began a $400 million program to provide modern equipment and facilities in our depots, many of which dated from World War II or before. We estimate that depot modernization will reduce manpower requirements by more than 4,000 people, and that total savings could exceed $1.5 billion over the twenty-five-year economic life of the new facilities and the ten-year life of associated new equipment. At the same time, this will improve our support of weapon systems in the field.

COMPETITIVE CONTRACTS FOR SERVICES

In yet another major effort to cut operating costs, we have extended a program begun in FY '69 to create competition in awarding and renewing contracts for running Air Force service facilities. The DEW Line and BMEWS radar warning systems were costing $47.1 million annually to operate in 1969. These contracts were renewed by competitive bidding, and the cost was reduced to $38 million in Fiscal Years 1970 through 1972, and $31.1 million for Fiscal Year 1973.

An even more dramatic example is the Eastern and Western Test Ranges in the South Atlantic and Pacific areas. In Fiscal 1972, the contract prices for their operation were $78.7 and $26.3 million, respectively. The costs this year, after competition, are $39.1 and $20.0 million.

Of course, not all of these reductions in price can be attributed to competition. There have been changes in the missions of these facilities and corresponding decreases and consolidations of personnel and equipment. Nevertheless, competition for service contracts has proved to be an effective tool.

The need for continued cost-reduction efforts in the future is clear. We will not only have to stress on-going programs, such as life-cycle cost analysis, but will also need to search for new ways to control defense costs. We have made a good deal of progress, but more must be done if our country is to achieve its domestic goals and still provide resources for maintaining national security.

Our objective must be adequate defense at minimal cost. We cannot accept less defense; we cannot afford more cost. ■

Dr. Robert C. Seamans, Jr., became the ninth Secretary of the Air Force in February 1969. He is a former faculty member of MIT, a senior executive in industry, and Deputy Administrator of NASA. The Secretary is a graduate of Harvard University and holds a doctorate in science from MIT.

The performance of USAF aircrews in Southeast Asia has been superb. They are the first to acknowledge that their success depended on the often-unsung work of USAF support people. Now, the Chief of Staff pays tribute to the thousands of Air Force men and women, worldwide, who for more than seven years stood behind USAF combat forces . . .

THE USAF SUPPORT TEAM: TONKIN TO LINEBACKER

By Gen. John D. Ryan, USAF
CHIEF OF STAFF, UNITED STATES AIR FORCE

One of the great achievements of the Vietnam War was the development of a rapid, computerized, airlifted logistics system.

In the early 1960s, US military forces were in the process of expanding from a primarily strategic retaliatory force to a flexible force that could engage in all levels of conflict. Nevertheless, as the Vietnam War intensified, our major direction, programs, and efforts were still oriented toward large-scale conventional and nuclear wars. The rapid reorientation of a significant segment of the Air Force to conduct counterinsurgency operations and to fight a limited war was a significant modern-day feat of management and leadership.

There can be little doubt that USAF airpower has had the major influence on the Southeast Asia conflict. The courage, dedication, and skill of our operational crews is a matter of record, which is generally well-known and acknowledged. These same aircrews, however, are the first to acknowledge that they were able to do their jobs only because of Air Force support people who kept things going throughout the war in Southeast Asia.

This is written in appreciation of and as a tribute to our Air Force support team around the world. While an account of their dedication, innovation, and just plain long hard hours of work would fill many volumes, only a few examples that typify the determination and ingenuity of our support people can be covered here.

THE SEA ENVIRONMENT

To our Air Force support people, the Southeast Asia conflict was a difficult challenge, technically and conceptually, but a challenge they met in the air and on the ground. Many unique factors contributed to the difficulty of supporting the forces in Southeast Asia. A brief mention of some of the more significant will help in appreciating the challenges that had to be overcome.

- There was practically nothing available in Southeast Asia to support large-scale military operations. Supplies, services, and people had to be delivered from the United States through a pipeline that averaged 10,000 miles in length.
- During the initial buildup, many things had to be done simultaneously and on a large scale. First and foremost, we had to support combat operations. At the same time, we had to build airfields, and maintenance, housing and messing, and communications facilities.
- The escalation in 1965 followed a three-year period in which the emphasis had been on a reduction of inventories—a "buy only what you need" program—enforced by vigorous budget controls. Consequently, mobilization reserves and inventories were low, and we had to turn to production by American industry to meet critical combat needs.
- The expanding demand of the Vietnam War had to be met with the least possible impact on worldwide Air Force deterrent commitments.
- By US standards, Vietnam was a long war. Supporting our forces was made increasingly difficult by fluctuating degrees of escalation and deescalation.

THE 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	

Considering these factors, and the list is by no means complete, how were our forces supported in Southeast Asia?

In terms of combat sorties and aircraft-ready rates, the Air Force met or exceeded all operational commitments. A significant factor in this achievement was the not operationally ready supply (NORS) rate, used to record the impact of supply shortages on operational readiness of weapon systems. In Southeast Asia, the NORS rate was consistently lower than the worldwide rate.

To fully appreciate the magnitude of supporting the operational commitments, one must realize that bombing operations in Southeast Asia since 1965 resulted in munition expenditures two and one-half times that of World War II and ten times that of Korea.

In contrast to the six to ten years usually required to develop a major weapon system from concept to acquisition, our technical community responded to urgent combat requirements with effective equipment in less than two years. More than 115 types of new equipment were designed, developed, and deployed to Southeast Asia. Major breakthroughs were achieved in weapon-delivery accuracy, sensor technology, electronic warfare, and munitions and communications—all of which will have a major impact on future plans and forces.

In sum, Southeast Asia proved beyond a doubt that the Air Force support team is made up of hard-core professionals who performed the improbable as a matter of routine, while the impossible took just a little longer.

THE LOGISTICS CHALLENGE

To appreciate how great a challenge supply support to Southeast Asia was, it is important to realize what the supply situation was as the buildup in Southeast Asia began.

During the '60s, the Air Force supply system was being converted from a manual to a computerized operation, jet cargo planes were entering the inventory, and an elaborate communication network expedited requisitioning and compressed pipeline requirements. Bases requisitioned supplies from CONUS depots as required to maintain minimum stock levels. Obviously, as the buildup began in Southeast Asia, there were no established bases with advanced computers and communication hookups; hence, the necessity to go back to using messages and mail for requisitioning supplies.

One of the truly significant advances in military retail supply systems was the Air Force Standard Base Supply System with its uniform UNIVAC 1050-II computers. In 1966, the first two supply computers were installed in Southeast Asia, then fourteen more in 1967, and another in 1969. They proved to be extremely effective.

Where, initially, it took days and even weeks to transmit a requisition from Vietnam to a Stateside depot, automatic data processing enabled our logisticians to do the job in minutes. Priority handling at the depots ensured that the requisitioned spare parts were in Vietnam within a few days. This responsiveness was possible because of remarkable technological advances in three areas—communications, electronic data processing, and rapid air transportation.

These advances enabled our logisticians to support the Air Force in Vietnam directly from our Stateside depots. Vietnam was the first major conflict in which this concept was employed over an extended time and to such a degree. The old method of stockpiling in overseas depots was slow and costly, and the storage sites were vulnerable to attack. Because it moved a lot faster, not as much material was kept in the pipelines as during past major conflicts. This kept supply and demand on a pretty even keel, and, as a bonus, the great surpluses that existed after past conflicts were avoided.

To illustrate how well the system worked, early in 1969, mortar shells completely destroyed a warehouse at the Da Nang Air Force Base, which contained 16,000 line items of supply. Five days later, seventy-eight percent of all the destroyed items were delivered from CONUS to Da Nang. Without the computerized supply system, assisted by the rapid communications and airlift developed and employed by our sup-

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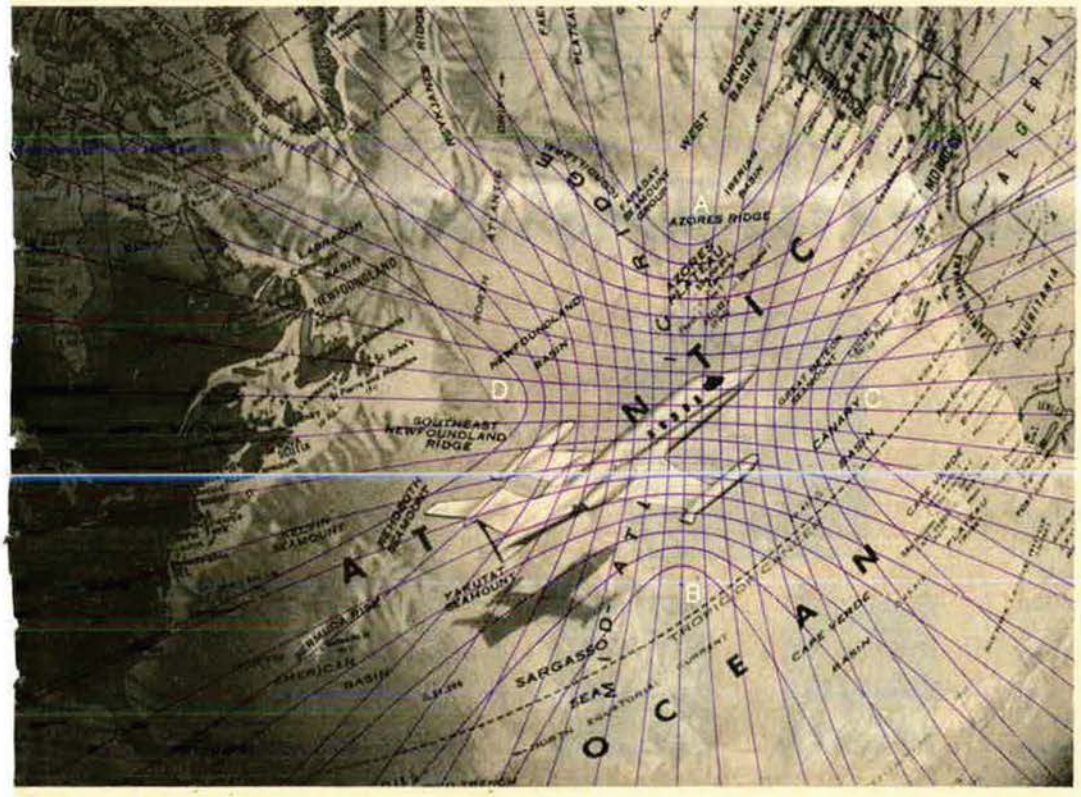

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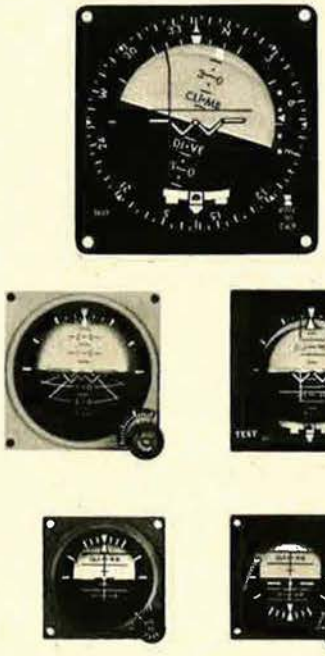

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Crew safety, not to mention the investment in aircraft, is too important to ignore that possibility. And if you've been reading maintenance bulletins or "incident" reports lately, you've probably noticed that total electrical system failures, although infrequent, happen often enough to cause concern.

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port team, this remarkable feat would have been impossible.

To protect against the destruction of one of the computers through enemy action or natural disaster, and to provide temporary replacement in the event of a computer breakdown, a mobile supply computer was designed and assembled. It is self-contained, has its own power and environmental controls, and can be delivered by plane, train, or truck and be operating within six hours.

From April 1969 through the spring of 1972, in response to varying needs, the mobile computer was deployed to bases throughout South Vietnam and Thailand and on Guam. In each deployment, the mobile supply computer proved its great value and led to approval of two more of these to accompany combat forces that may have to be deployed in future contingencies.

Rapid requisition and delivery of supplies into the theater was only part of the job. Our Air Force logisticians had to know what they had and where it was in order to service the users of all this material. Sometimes the volume got to be a little more than the average base could handle. When this occurred, Rapid Area Supply Support (RASS) teams, made up of Air Force civilians, with some military personnel, were flown in on short notice to help identify and "push" cargo. They were professionals with years of experience in supply and transportation. They did a first-rate job of helping keep a fast pipeline open from the United States to Southeast Asia.

MAINTENANCE MIRACLES

Maintenance was another area where our people overcame major obstacles—adverse weather conditions, hazardous environment, and often improper equipment. Consider also that more than fifty different types of aircraft, from the O-1 to the C-5, were used in Southeast Asia. A large share of the credit for our successful air operations must be given to the dedicated maintenance people in the operating units. Despite many adversities, they consistently provided top-quality maintenance and often worked around-the-clock to provide the turn-around times and meet the urgent requirements demanded by operations.

The big maintenance job was, of course, done by the men assigned to the fighting units, but when they needed help, especially in the repair of battle-damaged aircraft, AFLC stood ready to send highly specialized RAM (rapid area maintenance) teams into the theater. Composed of approximately forty percent military and sixty percent civilian personnel, RAM teams were ready to go within twelve to twenty-four hours after notification. These teams added a new dimension in returning combat-damaged aircraft to operational status. In the program's first six months, these ingenious and courageous teams returned to combat service the equivalent of one full squadron of aircraft every two months. To date, aircraft valued at more than $1 billion have been returned to service through RAM team efforts.

BUILDING THE BASES

Of parallel significance were accomplishments in civil engineering. As overall civil-engineering demands exceeded Department of Defense capabilities, the Air Force civil engineers developed two significant programs to augment our capability to cope with expanding Air Force demands. These became known as Prime BEEF and RED HORSE.

Mobile Prime BEEF (Base Emergency Engineering Force) teams were deployed to Southeast Asia to augment Base Civil Engineer units. These teams, equipped with light equipment, accomplished vital projects such as erection of aircraft revetments, cantonment areas, preengineered buildings, and installation of utility systems. In all, fifty teams totaling 1,500 personnel were deployed.

Although the mobile Prime BEEF teams proved to be a most valuable asset, they were neither manned nor equipped to completely fill the gap between Base Civil Engineer forces and construction agent capabilities. Thus, 400-man, self-sustaining, heavy repair squadrons, commonly known as RED HORSE (Rapid Engineering Deployable Heavy Operations Repair Squadron, Engineering), were deployed to Southeast Asia. Six squadrons were employed there from early 1966 to 1969. These squadrons, structured primarily to perform heavy airfield repairs, were, by necessity, rapidly pressed into light horizontal and vertical construction roles. The squadrons built airfield arresting systems, approach lighting systems, aircraft revetments, POL facilities, cantonment, and medical, admin-

Gen. John D. Ryan, USAF's seventh Chief of Staff, commanded a B-17 group in Europe during World War II. Much of his postwar career has been in SAC as a wing, division, and numbered air force commander, and as Vice CINC and CINC of SAC. General Ryan also has served as the Air Force Inspector General and as Commander in Chief, PACAF. Prior to his appointment as Air Force Chief of Staff in August 1969, he had served for a year as Vice Chief of Staff.

istrative, and maintenance facilities, in addition to repair of AM-2 runway and taxiway matting. One of the major achievements of the RED HORSE units was the completion of 392 hardened aircraft shelters. Constructed at a cost of $45,000 each, the shelters far more than amortized themselves by preventing in excess of $50 million in rocket and mortar damage to aircraft.

RIGHT MAN, RIGHT PLACE, RIGHT TIME

The Southeast Asia conflict presented constant challenges to USAF personnel managers at all levels in providing properly trained people at the right time and at the right place.

The USAF personnel system was called upon to replace all personnel in Southeast Asia within a twelve-month cycle; provide 100 percent manning with qualified personnel; support short-notice, high-priority requirements on a continuing basis; and, at the same time, maintain viable career programs for the total force. All of this had to be done within a policy that no individual would be sent on an involuntary second Southeast Asia tour until all similarly qualified personnel had served an initial tour.

Continuous changes in the personnel system were necessary to distribute and maintain critical manpower resources. To improve the system's reaction capability, a contingency manning office was established at the Air Force Military Personnel Center (AFMPC) early in 1965. During the course of the war, this office filled more than 125,000 critical, short-notice requirements with trained airmen. Beginning in 1968, a series of special programs helped to meet critical enlisted requirements on a voluntary basis. As a direct result of these programs, ninety percent of our enlisted aircrew requirements in Southeast Asia have been filled with volunteers and a significant reduction in training costs has been realized.

The changing nature of the war presented many unique flying training problems. Flying courses were streamlined. Undergraduate flying courses were structured to prepare newly rated flyers for easier transition to the weapon systems they would be using in Southeast Asia.

In January 1970, about 7,000 aircrew members were being trained for Southeast Asia duty each year. To improve the movement of aircrew personnel through the pipeline, a training Pipeline Management Division was activated at AFMPC. By December 1972, the resulting improvements had accounted for more than $9 million in pipeline savings, plus an array of benefits to those in training for SEA.

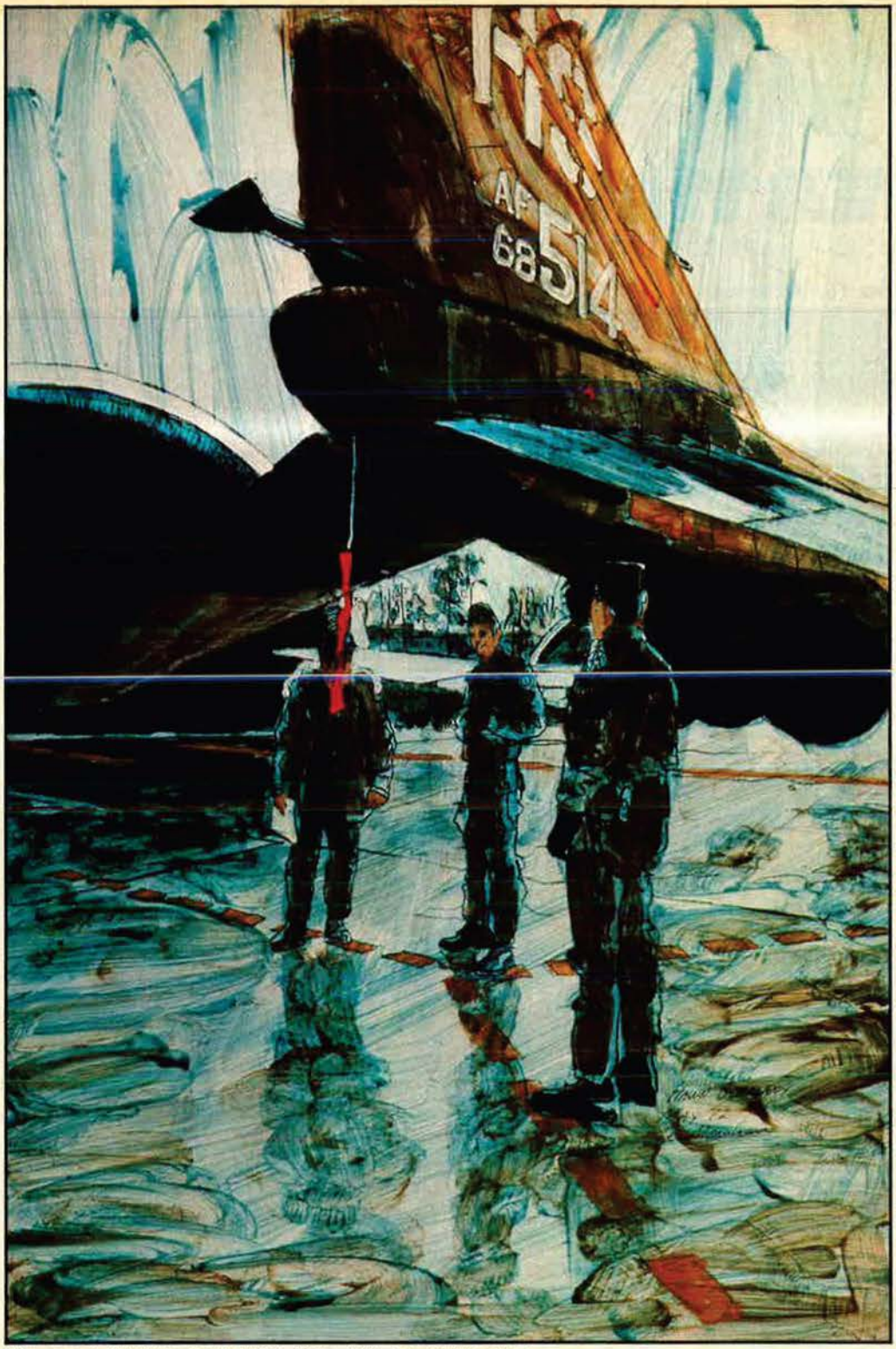
Unquestionably, the Consolidated Base Personnel Office (CBPO) played a key role in the support provided our SEA forces. In Southeast Asia, nine CBPOs were established. In most instances, they had to use outdated, manual procedures to do what CBPOs in other parts of the world were doing with sophisticated equipment. These organizations, and their counterparts worldwide, provided the backbone of a system that was responsive to both the mission and the individual throughout the war.

From 1965 through 1972, the Air Force recruited and trained better than a million people in more than 400 skills. Successful recruiting, innovative training programs, and improved methods for controlling Southeast Asia critical skills enabled the Air Force to meet its commitments while providing for the needs of its people. It is a tribute to personnel managers and technicians, at all levels, that fewer than 5,000 airmen and only a handful of officers were called on to serve involuntary second tours throughout this period.

Another group of people who provided outstanding support are those men and women responsible for the Air Force Casualty Assistant Program. Their dedicated efforts on behalf of the families of our deceased, MIA, POW, and seriously impaired personnel gave the term "Air Force Family" a new and special significance.

I want to reemphasize that the USAF support team has not only trained and supported our own Air Force, but has helped to build, train, and support the VNAF. Today, the VNAF stands as a well-trained, well-equipped, and effective air arm, determined to fulfill its role in deterring the takeover of the Republic of South Vietnam. But perhaps the greatest legacy the Air Force has left in Vietnam is the pool of skilled Vietnamese manpower that was developed during the years 1965–73.

Our support people—in the chapel, the hospital, and the dining hall, in supply, engineering, maintenance, R&D, munitions, personnel, finance, administration, transportation, security, and elsewhere—all of them were there doing their job before, during, and after every one of the 5,000,000 sorties the Air Force flew in Southeast Asia. Without them, there would have been no Air Force flying at all. With them, we are the best Air Force in the world today. ■



"Crew and Chief Under F-4 Tail, Hahn," by Leo F. Monahan

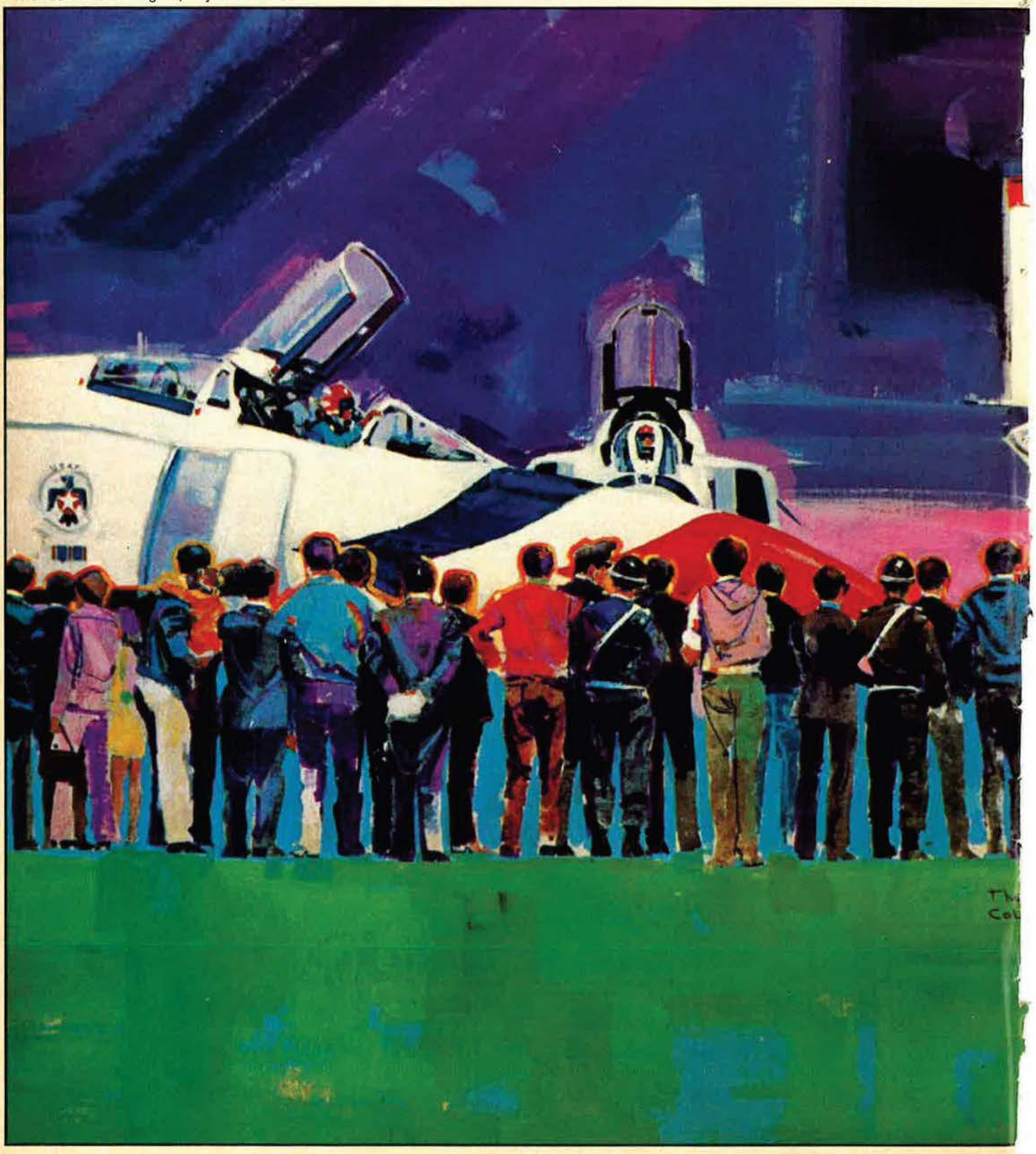
BETTER THAN WORDS

PAINTINGS FROM USAF'S ART COLLECTION

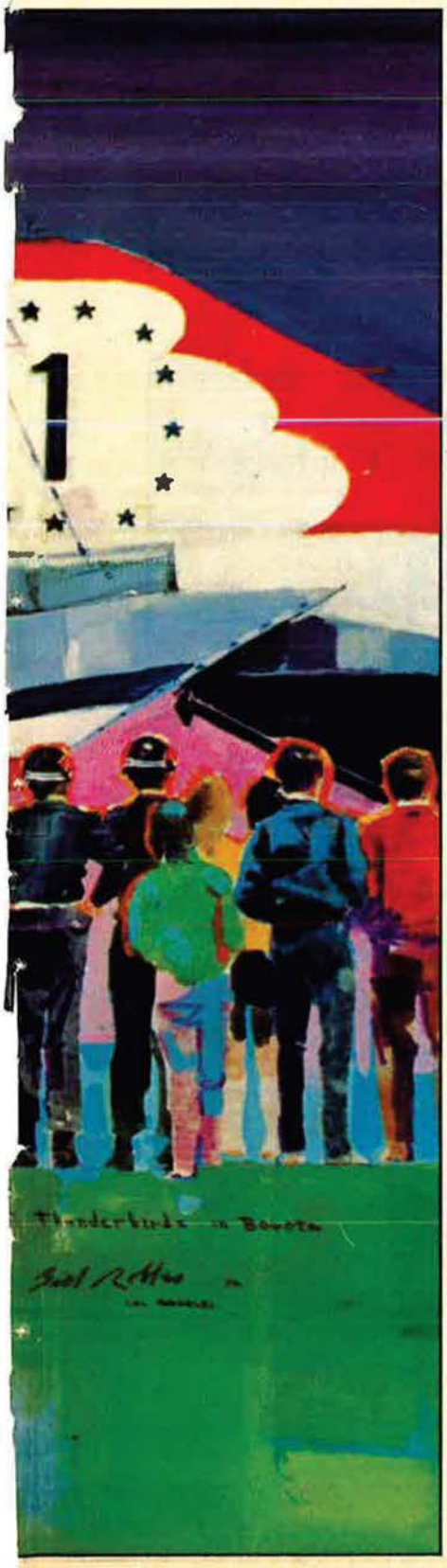
BETTER THAN WORDS

PAINTINGS FROM USAF'S ART COLLECTION

"Thunderbirds in Bogata," by Bill Robles



"A Helping Hand," by Earnie D. Kollar



In 1965, then Secretary of the Air Force Harold Brown accepted, with these words, a number of paintings contributed to the Air Force Art Collection by the Society of Illustrators of New York:

"You as artists have captured better than words can, the qualities and characteristics that set the military profession apart from others—dedication and drama; beauty and boredom; danger and death. I should add to this some qualities that aren't unique to the Air Force, but without which our people often would find their lives unbearable—humor in the face of hardship and compassion in the presence of suffering. Your paintings help us put the meaning of our own work—our own lives—in a little better perspective."

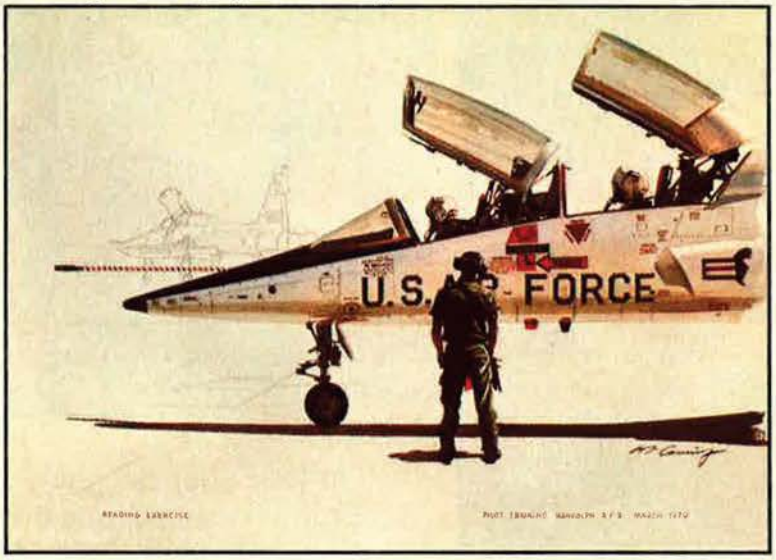
In the paintings on this and the preceding pages are some of the qualities Secretary Brown spoke of, portrayed with the special insights of the artist and presented here with thanks to the Art and Museum Branch of the Air Force Office of Information and to the artists who created them.

BETTER THAN WORDS

PAINTINGS FROM USAF'S ART COLLECTION

"Captain Steve Ritchie," by Bob Shaar

"Reading Exercise," by Merv Corning



"StarLifter," by Donna Finkbiner

AIR FORCE MAGAZINE'S ANNUAL AIR FORCE ALMANAC ISSUE

DEDICATION

This twenty-third Almanac Issue of AIR FORCE Magazine departs from tradition in several ways. It has, as always, articles by the Secretary of the Air Force and the Chief of Staff. But this year, the articles from the Commands and Separate Operating Agencies focus on the functions of those organizations and how they are carried out. They are arranged alphabetically, with the major command reports preceding those of the Separate Operating Agencies.

The 1973 Gallery of USAF Weapons, which begins on p. 122, has been prepared and edited by members of the staff of *Jane's All The World's Aircraft.* It is the most complete and authoritative, we believe, in the history of the Almanac Issue.

Next appears an expanded "almanac" section (pp. 146–158) including—among other things—often-needed statistical data on personnel, budgets, and procurement, and on the major wars of the past three decades. Also included are the Air Force aces of four wars, Medal of Honor winners, and Air Force winners of major aerospace awards.

We have added this year detailed information (pp. 159–163) on Air Force and NASA research and development facilities and on major USAF R&D projects. The Guide to USAF Bases (pp. 164–170) contains additional information and a complete listing of Air Force stations.

Organizational charts of the Office, Secretary of the Air Force and the USAF command and staff structure, listing by name all incumbents in key positions, have customarily appeared in the Almanac Issue. Henceforth, they will be found in the September issue of the magazine. Otherwise, the large number of personnel reassignments during the summer months too rapidly outdates the charts.

Finally, through many years, the Almanac Issue has been dedicated to the men and women of the United States Air Force. This year, we depart also from that tradition. The 1973 Almanac Issue is herewith dedicated to the airmen of all the services—Air Force, Navy, Marine Corps, and Army—and to the support teams that backed them up throughout the long course of the Vietnam War. It is dedicated especially to the memory of the men who did not come back, to those who will forever bear the scars of battle, and to the prisoners of war who have inspired the nation with their courage and patriotism.

We believe history will show that these men and women did not sacrifice, labor, and suffer in vain. ■

Weapons crew prepares to load a supersonic Falcon air-to-air missile aboard an ADC aircraft.

A MAJOR AIR COMMAND

AEROSPACE DEFENSE COMMAND

The 34,600 men and women of the Aerospace Defense Command (ADC) are responsible for the security of the airspace over the continental United States. ADC provides the majority of resources to support the North American Air Defense Command (NORAD).

ADC forces are spread around the world, manning diverse systems that provide warning and detection of attack by aircraft or missiles. These systems include the Ballistic Missile Early Warning System (BMEWS), Distant Early Warning (DEW) Line, sub-launched ballistic missile (SLBM) detection and warning network, Semi-Automatic Ground Environment (SAGE) and Backup Interceptor Control (BUIC) radar control centers, Over-the-Horizon (OTH) forward-scatter radar detection system, Airborne Early Warning and Control (AEW&C) aircraft, and active-duty and Air National Guard fighter-interceptor squadrons.

While ADC's force structure is smaller than in years past, the critical tasks of detection, identification, interception, and, if necessary, destruction are still performed capably.

To provide a responsive and capable air defense system in the future, ADC needs improved hardware. A new and advanced Airborne Warning and Control System (AWACS) is now undergoing development and operational testing. This aircraft will provide a survivable early warning and command and control center to detect and track enemy aircraft at all altitudes, and direct fighter-interceptors against them.

ADC is also looking for a replacement interceptor for the aging F-101, F-102, and F-106 force. ADC planners are studying the F-15 Eagle and other advanced aircraft to determine which will best meet the current and future needs of air defense.

ADC'S LEADERS THROUGH THE YEARS

Lt. Gen. George E. Stratemeyer	Mar. 21, 1946	Nov. 30, 1948
Maj. Gen. Gordon P. Saville	Dec. 1, 1948	Dec. 31, 1950
Lt. Gen. Ennis C. Whitehead	Jan. 1, 1951	Aug. 25, 1951
Gen. Benjamin W. Chidlaw	Aug. 25, 1951	May 31, 1955
Maj. Gen. Frederic H. Smith (acting)	May 31, 1955	July 19, 1955
Gen. Earle E. Partridge	July 20, 1955	Sept. 17, 1956
Lt. Gen. Joseph H. Atkinson	Sept. 17, 1956	Aug. 15, 1961
Lt. Gen. Robert M. Lee	Aug. 15, 1961	July 31, 1963
Lt. Gen. Herbert B. Thatcher	Aug. 1, 1963	July 31, 1967
Lt. Gen. Arthur C. Agan	Aug. 1, 1967	Feb. 28, 1970
Lt. Gen. Thomas K. McGehee	Mar. 1, 1970	

Formerly Air Defense Command.
Redesignated Aerospace Defense Command Jan. 1, 1968.

A newly developed Over-the-Horizon Backscatter (OTHB) radar is expected to greatly increase ADC's ability to counter an aerial attack. The OTHB will be able to detect objects at several times the range of currently operational radar systems, which are limited in range to line of sight. ADC expects to have OTHB systems operational by the mid-1970s. Used together, OTHB, AWACS, and a new interceptor can provide an effective air defense network well into the future.

ADC also has an active and increasingly important space mission. The Space Defense Center, located in the NORAD Cheyenne Mountain complex, is a unit of ADC's 14th Aerospace Force. The Space Defense Center is the nucleus of a global network of optical and electronic sensors that detect and identify man-made objects orbiting the earth.

There is no present weapon system to nullify an attack from space, just as there is no direct defense against an intercontinental ballistic missile (ICBM) or sub-launched ballistic missile (SLBM) attack. However, the surveillance functions performed by ADC provide our strategic offensive forces sufficient time to react to any attack.

Our Triad forces—ICBMs, SLBMs, and manned bombers—would guarantee unacceptable losses to an aggressor nation. So the actual defense of the United States depends on the credible deterrent effect of the Triad. The key to the deterrent effect of the Triad is warning time. That's where the Aerospace Defense Command fits into the picture. ADC can determine when an attack has been launched, what weapons were involved, where they were launched, and where they will impact. This information, provided almost instantaneously to the commanders of Triad forces, is the critical margin of time needed to launch our strategic forces against an aggressor.

As ADC's Commander, Lt. Gen. Thomas K. McGehee, has said, ". . . adequate deterrence to aggression consists of the Triad Plus 'One'—or strategic offensive *and* aerospace defensive forces." ■

Lt. Gen. Thomas K. McGehee has been Commander of Aerospace Defense Command for the last three years, coming to the command from his post as Commander, US Forces Japan, and Fifth Air Force. General McGehee has been a director of operations for both ADC and NORAD and a NORAD region commander. An Eighth Air Force bomb group commander during World War II, he is also a graduate of the Air War College, Maxwell AFB, Ala.

A bleak winter landscape at Clear, Alaska, one of three BMEWS facilities that stand guard against ICBM attack on the continent from the north.

AEROSPACE DEFENSE COMMAND

Headquarters, Ent AFB, Colo.

Commander
Lt. Gen. Thomas K. McGehee

14th Aerospace Force
Ent AFB, Colo.
Maj. Gen. Otis C. Moore
Commander

Air Defense Weapons Center
Tyndall AFB, Fla.
Col. (Brig. Gen. selectee)
Carl D. Peterson
Commander

20th Air Division
Ft. Lee AFS, Va.
Brig. Gen. James M. Fogle
Commander

21st Air Division
Hancock Field, N. Y.
Maj. Gen. James L. Price
Commander

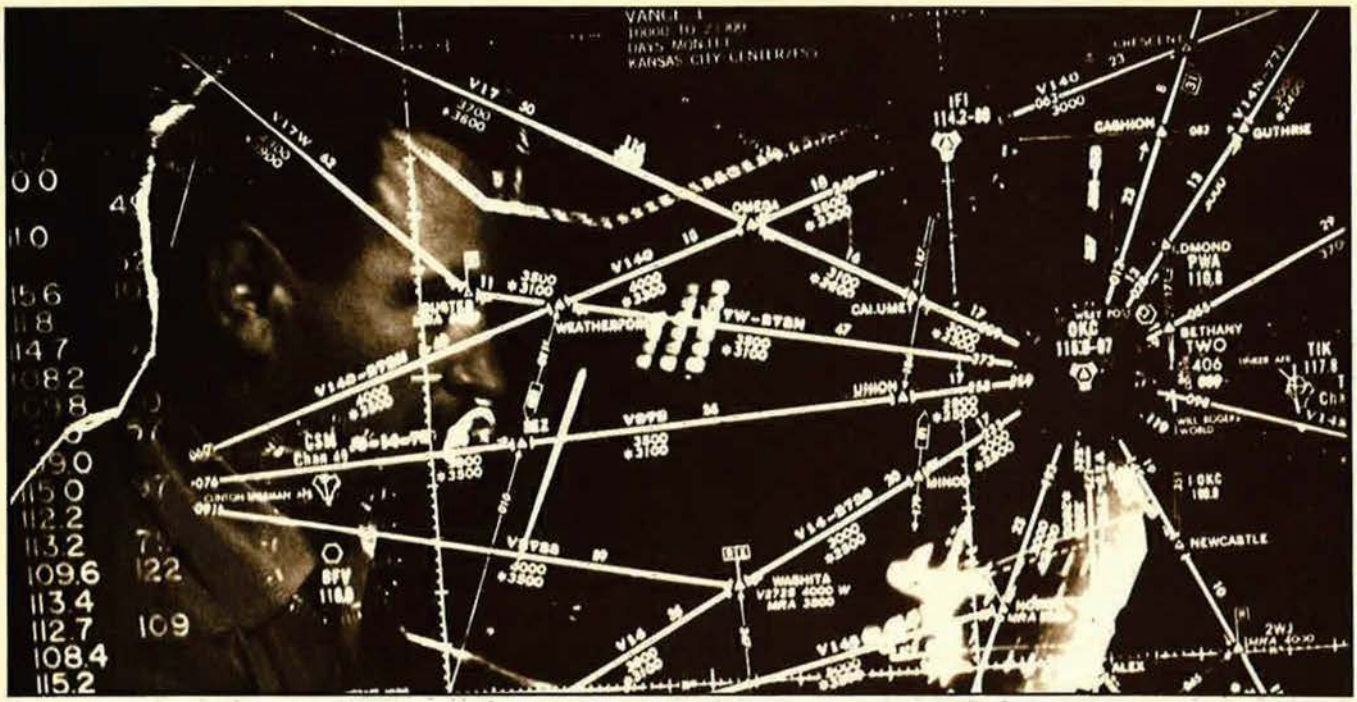
23d Air Division
Duluth IAP, Minn.
Brig. Gen. Louis G. Leiser
Commander

24th Air Division
Malmstrom AFB, Mont.
Brig. Gen. (Maj. Gen. selectee)
Lawrence J. Fleming
Commander

25th Air Division
McChord AFB, Wash.
Maj. Gen. Jack K. Gamble
Commander

26th Air Division
Luke AFB, Ariz.
Brig. Gen. (Maj. Gen. selectee)
James E. Paschall
Commander

First-rate communications are essential in a sky crowded with aircraft.



A MAJOR AIR COMMAND

AIR FORCE COMMUNICATIONS SERVICE

The Air Force Communications Service (AFCS) became a major command on July 1, 1961. It operates and maintains a worldwide system of on-base and long-haul communications, air traffic control, and navigational aid facilities and services for most of the Air Force. The responsibility to engineer and install communications-meteorological equipment was added in 1970 when the Ground Electronics Engineering Installation Agency (GEEIA) was merged into AFCS.

Air Force communications history began in 1910 when the first message was sent by radio-telegraph from a plane in the air to a receiver on the ground. From that small beginning, airpower and communications have grown to such a fine state of the art that they both now operate in outer space. But today, as in yesteryear, they must rely on one another for successful completion of the mission.

The impetus for a special communications system in support of air operations came in 1934, when Lt. Col. Henry H. "Hap" Arnold led a flight of ten Martin B-10 bombers from Bolling Field, Washington, D. C., to Alaska and back. A short time later, Arnold began a campaign for an integrated communications system. This resulted in the establishment of the Army Airways Communications System (AACS) in 1938, the forerunner of Airways and Air Communications Service (established in 1946), and ultimately AFCS as we know it today.

To fulfill its assigned mission, AFCS provides six principal services for its customers:

- On-base communications, such as telephones, intercoms, fire and crash alarms, security police alerting systems, and closed-circuit television.
- Long-line communications consisting of global radio, teletype, and telephone networks that link Air Force activities.
- Air navigational aids, such as nondirectional radio beacons, visual omnirange, tactical air navigation, and instrument landing systems.
- Air traffic control via airfield control towers, radar approach controls, and ground-controlled approach radars to permit aircraft landings and takeoffs under all conditions. (In eleven years of operation, AFCS's worldwide air traffic controllers are credited with having saved 4,582 crew members and passengers aboard 1,234 aircraft worth almost $1.34 billion.)
- Tactical emergency mission support that provides mobile communications and terminal naviga-

AFCS'S LEADERS THROUGH THE YEARS

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	

tional aids that can be transported quickly to any point on earth. The command has about 5,000 highly qualified personnel in five strategically located mobile communications groups to accomplish this phase of the mission.

• Engineering and installation of ground communications-electronics-meteorological systems.

The command's immediate subordinate units are five communications areas—comparable to numbered Air Forces—and three direct-reporting groups.

AFCS organizations vary from one-man operating locations through a four-man detachment maintaining a radio relay station atop a snow-capped mountain to a 1,000-man group maintaining the full spectrum of AFCS services at a large Air Force base.

Air National Guard and Air Force Reserve communicators in fifty states and the Commonwealth of Puerto Rico are an integral part of the AFCS team. Involved are 183 communications-electronics-meteorological units and one medical services flight—a total personnel strength of 14,500.

ANG/USAFR units are organized and equipped the same as their active-duty counterparts. Upon mobilization they may deploy anywhere in the world to augment AFCS active-duty forces.

The AFCS motto—"Providing the Reins of Command"—portrays the command as a vital member of the aerospace team. It is only through instantaneous and reliable communications and air traffic control that USAF commanders can command and control their globally dispersed forces. ■

For the last three years, Maj. Gen. Paul R. Stoney has commanded AFCS. His communications-electronics experience dates back to the 1940s. During the early '60s, he commanded several communications units, served on the staff of OSD-DDR&E, and held a number of SAC assignments, among them Chief of Communications-Electronics, Hq. SAC. General Stoney had been Vice Commander of AFCS for three years before assuming command.

AIR FORCE COMMUNICATIONS SERVICE

Headquarters, Richards-Gebaur AFB, Mo.

Commander
Maj. Gen. Paul R. Stoney

PACIFIC COMMUNICATIONS AREA

Hq., Wheeler AFB, Hawaii
Brig. Gen. George J. Iannacito
Commander

1st Mobile Communications Group
Clark AB, Luzon, P. I.

1867th Facility Checking Squadron
(Service Evaluation)
Clark AB, Luzon, P. I.

TACTICAL COMMUNICATIONS AREA

Hq., Langley AFB, Va.
Col. John M. Bolger
Commander

4th Mobile Communications Group
Altus AFB, Okla.

5th Mobile Communications Group
Robins AFB, Ga.

EUROPEAN COMMUNICATIONS AREA

Hq., Lindsey AS, Germany
Brig. Gen. William W. Gilbert
Commander

1868th Facility Checking Squadron
(Service Evaluation)
Wiesbaden AB, Germany

2d Mobile Communications Group
Sembach AB, Germany

NORTHERN COMMUNICATIONS AREA

Hq., Griffiss AFB, N. Y.
Brig. Gen. Kenneth P. Miles
Commander

1840th Air Base Wing
Richards-Gebaur AFB, Mo.
Col. Hewitt E. Lovelace
Commander

1866th Facility Checking Squadron
(Service Evaluation)
Richards-Gebaur AFB, Mo.

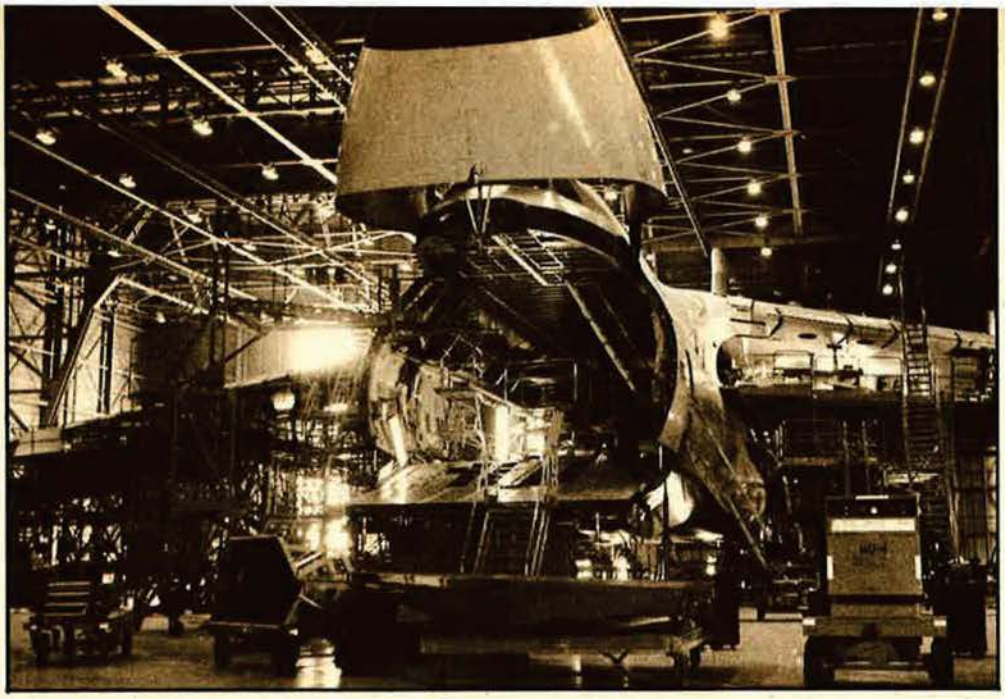
1931st Communications Group
Hq., Elmendorf AFB, Alaska
Col. Marvin J. Anderson
Commander

3d Mobile Communications Group
Tinker AFB, Okla.
Col. Robert W. Pool
Commander

SOUTHERN COMMUNICATIONS AREA

Hq., Oklahoma City AFS, Okla.
Brig. Gen. Rupert H. Burris
Commander

1978th Communications Group
Albrook AFB, Canal Zone
Lt. Col. Gerald B. Warton
Commander



A C-5 in depot maintenance at San Antonio AMA, Kelly AFB, Tex. SAAMA is logistics support manager for the Galaxy.

A MAJOR AIR COMMAND

AIR FORCE LOGISTICS COMMAND

The Air Force Logistics Command (AFLC) may be likened to a giant, worldwide wholesale organization that supplies its customers with a great variety of goods and services, maintains and improves their durable goods, and provides technical help when needed. To satisfy its customers, it must have the right things in the right places at the right times and also see that they work and keep on working.

AFLC's customers include all of the US Air Force's combat commands, the Air Force Reserve, the Air National Guard, and air forces of sixty foreign countries. In short, AFLC keeps the Air Force ready to defend freedom at a moment's notice. That's why it's called "The Lifeline of the Aerospace Team," the command's official motto.

AFLC's headquarters is at Wright-Patterson AFB, Ohio. It has five main field organizations (Air Materiel Areas), located at Robins AFB, Ga.; Kelly AFB, Tex.; Hill AFB, Utah; McClellan AFB, Calif.; and Tinker AFB, Okla. These depots supply and service Air Force units in their respective geographical areas, but more importantly, they are responsible for assigned equipment and commodities on a worldwide basis. For example, the depot at Tinker AFB supports, overhauls, and modifies the strategic frontline fleet of B-52 bombers and their supporting KC-135 tankers. In the commodity area, the depot at San Antonio manages all lubricants and fuels.

AFLC also has three specialized organizations. The Aerospace Guidance and Metrology Center at Newark, Ohio, maintains and overhauls all inertial guidance systems used in the Air Force aircraft and missiles. It also maintains the Air Force's calibration program, thus assuring that all measurements and measurement devices are precise and uniform.

The Military Aircraft Storage and Disposition Center at Tucson, Ariz., an outdoor desert installation, stores or disposes of all aircraft not currently needed by the Department of Defense and the Coast Guard.

The Air Force Contract Maintenance Center, located at Wright-Patterson AFB, administers hundreds of millions of dollars in contracts for maintenance work performed by commercial organizations.

All of this adds up to big business. Each of the Air Materiel Areas is either the largest or second largest employer in the state in which it is located. The command currently employs more than 111,000 people, about ninety percent of them civilians. It has a capital investment of

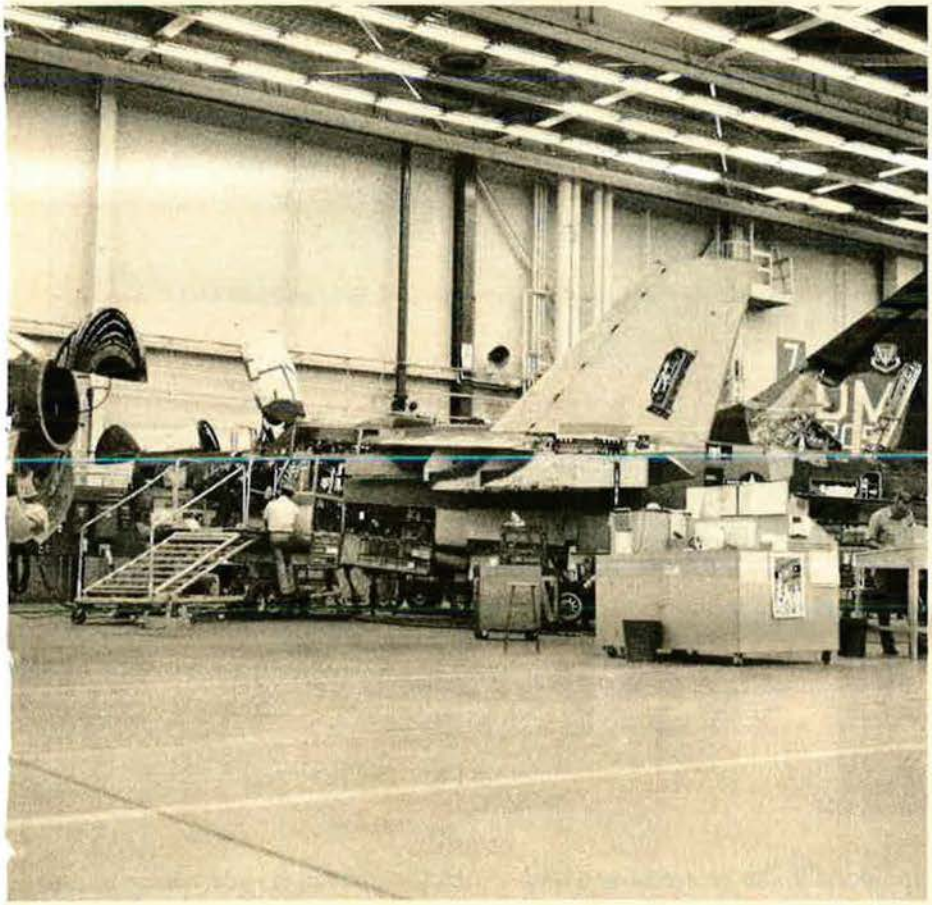
AFLC'S LEADERS THROUGH THE YEARS

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	

Formerly Air Materiel Command.
Redesignated as Air Force Logistics Command, Apr. 1, 1961.

some $42 billion. It stocks spare parts and supplies worth more than $12 billion, and manages 1,600,000 items. During the six months ending December 31, 1972, AFLC repaired about 4,000 aircraft and nearly 5,000 engines.

Through use of the latest management techniques, computer technology, and airlift, AFLC continues to carry out its worldwide functions with increasing efficiency to meet the great challenges that lie ahead, both in the air and in space. ■



Oklahoma City AMA supports the A-7D, here undergoing modification at OCAMA.

Gen. Jack J. Catton has been Commander of AFLC since September 1972. He flew the first B-29 across the Pacific in 1944 and participated in the first two atomic weapons tests in the Pacific. He is a former SAC bomb wing and division commander; DCS/P&R, Hq. USAF; and served as Commander, Fifteenth Air Force. He was Commander of MAC from 1969–72.

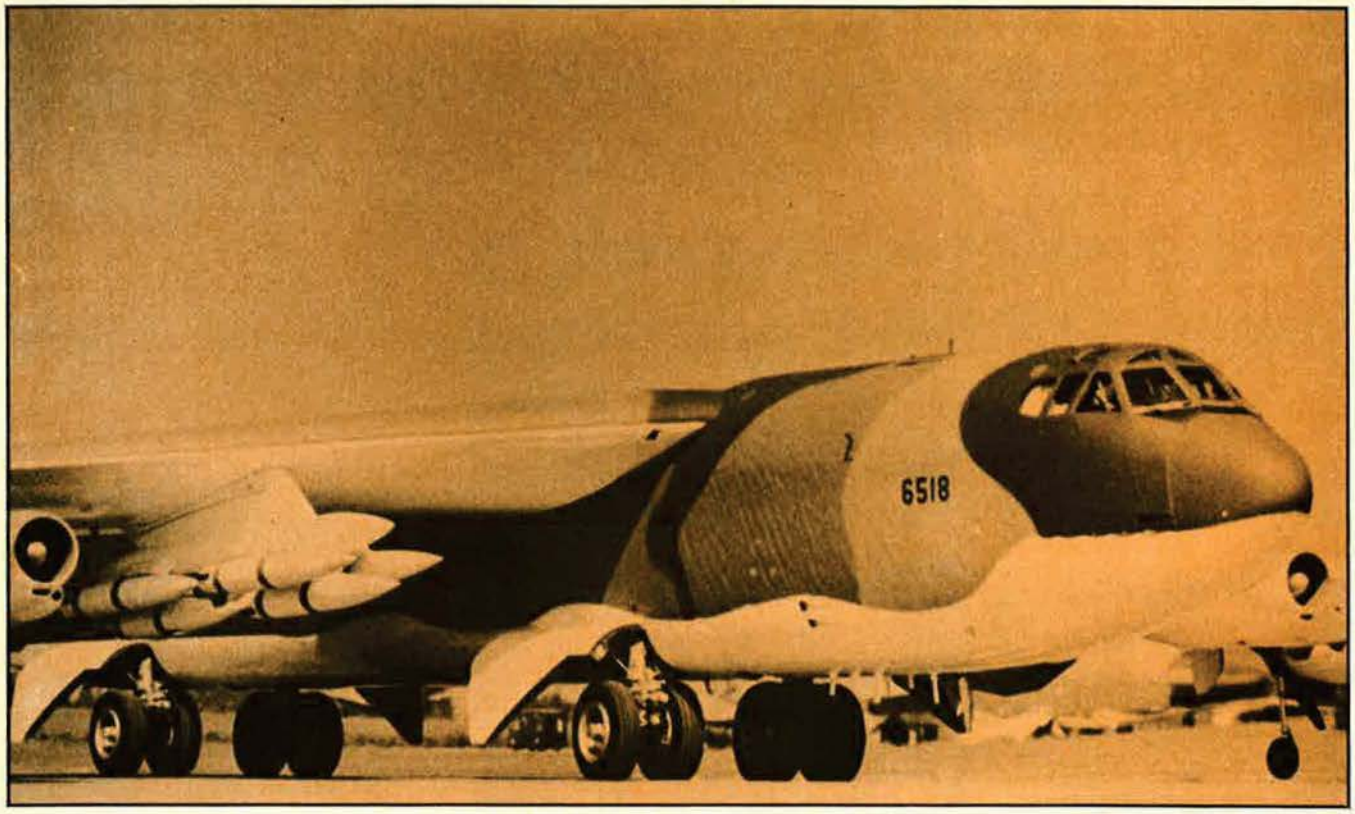
AIR FORCE LOGISTICS COMMAND

Headquarters, Wright-Patterson AFB, Ohio

Commander
Gen. Jack J. Catton

- **Ogden Air Materiel Area**, Hill AFB, Utah, Maj. Gen. Bryce Poe II
- **Oklahoma City Air Materiel Area**, Tinker AFB, Okla., Maj. Gen. W. Y. Smith
- **Sacramento Air Materiel Area**, McClellan AFB, Calif., Maj. Gen. George W. McLaughlin
- **San Antonio Air Materiel Area**, Kelly AFB, Tex., Maj. Gen. William A. Jack
- **Warner Robins Air Materiel Area**, Robins AFB, Ga., Maj. Gen. Robert E. Hails
- **Force Contract Maintenance Center**, Wright-Patterson AFB, Ohio, Col. Richard G. Schulz
- **Military Aircraft Storage and Disposition Center**, Davis-Monthan AFB, Ariz., Col. Jack K. Massie
- **Aerospace Guidance and Metrology Center**, Newark AFS, Ohio, Col. Albert R. Neville, Jr.
- **USAF Medical Center**, Wright-Patterson AFB, Ohio, Col. John R. Greene
- **2750th Air Base Wing**, Wright-Patterson AFB, Ohio, Brig. Gen. Irby B. Jarvis, Jr.

The old and the new—an aging but still potent B-52 Stratofortress armed with a cluster of SRAM weapons.



A MAJOR AIR COMMAND

AIR FORCE SYSTEMS COMMAND

The mission of the Air Force Systems Command (AFSC) is to advance aerospace technology—from scientific research through exploratory, advanced, and engineering development—and to adapt and incorporate these technological developments into operational systems for the Air Force.

It is a highly technical mission, grounded in the scientific and engineering disciplines; that is why ninety-nine percent of AFSC scientific and technical officers hold college degrees, with fifty-one percent of them having advanced degrees.

But it is also a mission in which a great deal of emphasis at all levels is necessarily upon *management.* After all, the annual budget of the command—for research, development, test, evaluation, and the actual procurement of Air Force systems, as well as operation and maintenance of AFSC's resources—is on the order of $7 to $8 billion. And, at any given time, Systems Command administers contracts with a total obligational value of some $48 billion.

The case for careful management was made by Gen. George S. Brown, AFSC Commander, in a recent speech outlining the sustained momentum of Soviet Union research and development devoted to military systems. "It *could* mean," he said, "that the weapon systems the Soviet Union produces and deploys over the next decade will be superior to anything we might develop —other things being equal. What we clearly have to do, then, is not to *allow* other things to be equal. Since we are apparently going to have fewer equivalent dollars to spend, we have to make each dollar

AFSC'S LEADERS THROUGH THE YEARS

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	

Formerly Air Research and Development Command (ARDC). Redesignated as Air Force Systems Command Apr. 1, 1961.

count for more. We are going to have to find ways to cut the costs of doing business."

That climate of highly advanced technological exploitation against a background of realistic fiscal constraint pervades the entire command—the "product divisions" (Aeronautical Systems Division, Electronic Systems Division, Space and Missile Systems Organization); the test centers and ranges; and the laboratories. All told, AFSC manages and controls about 200 installations valued at more than $2 billion, as well as other separate activities in the United States and overseas. To do the job, Systems Command has 9,800 officers, 17,500 airmen, and 29,500 civilians.

What are some of the results?

The F-15 Eagle air-superiority fighter, for one—the most maneuverable air-to-air combat fighter in the world, for which production was approved in February. The E-3A AWACS, an airborne tactical and air defense surveillance, warning, and control system that will undoubtedly be a vital national resource. The B-1 supersonic strategic bomber, well into development. The Maverick and SRAM missiles, both outstanding air-to-ground weapons for, respectively, tactical and strategic use. The A-10 close-air-support aircraft, developed from the competitive prototype A-X program. And many other aeronautical, space, missile, and electronic systems—from laboratory test to full production.

AFSC Commander since September 1970, Gen. George S. Brown was Seventh Air Force Commander and Deputy Commander for Air Operations, MACV, from August 1968–70. A WW II bomb group commander, he has held command assignments in TAC, ADC, MAC, and ATC, headed Joint Task Force-2, Sandia Base, N. M., and is a graduate of the National War College. He has served as military assistant to both the Deputy Secretary of Defense and the Secretary, and as the Assistant to the Chairman, JCS.

Management? Secretary of Defense Elliot L. Richardson summed it up this way during his confirmation hearings in January. "This has, I think," he said, "proved to be a protection against overruns . . . in the case of recent major Air Force procurements particularly, and I believe from what I have learned so far that these are examples of where the reforms initiated by Secretary [Melvin R.] Laird and Secretary [David] Packard have been most fully carried out."

With equal attention to the technical disciplines on the one hand and managerial and fiscal discipline on the other, Air Force Systems Command advances technology and builds it into superior weapons for the Air Force. ■

AIR FORCE SYSTEMS COMMAND

Headquarters, Andrews AFB, Md.

Commander
Gen. George S. Brown

Aeronautical Systems Division
Wright-Patterson AFB, Ohio
Lt. Gen. James T. Stewart
Commander

Electronic Systems Division
L. G. Hanscom Field, Mass.
Maj. Gen. Albert R. Shiely, Jr.
Commander

Space and Missile Systems Organization
Los Angeles AFS, Calif.
Lt. Gen. Kenneth W. Schultz
Commander

Aerospace Medical Division
Brooks AFB, Tex.
Brig. Gen. George E. Schafer
Commander

Air Force Flight Test Center
Edwards AFB, Calif.
Brig. Gen. Howard M. Lane
Commander

Air Force Contract Management Division
Kirtland AFB, N. M.
Maj. Gen. Donald G. Nunn
Commander

Space and Missile Test Center
Vandenberg AFB, Calif.
Maj. Gen. Jessup D. Lowe
Commander

Foreign Technology Division
Wright-Patterson AFB, Ohio
Col. George R. Weinbrenner
Commander

Air Force Eastern Test Range
Patrick AFB, Fla.
Maj. Gen. David M. Jones
Commander

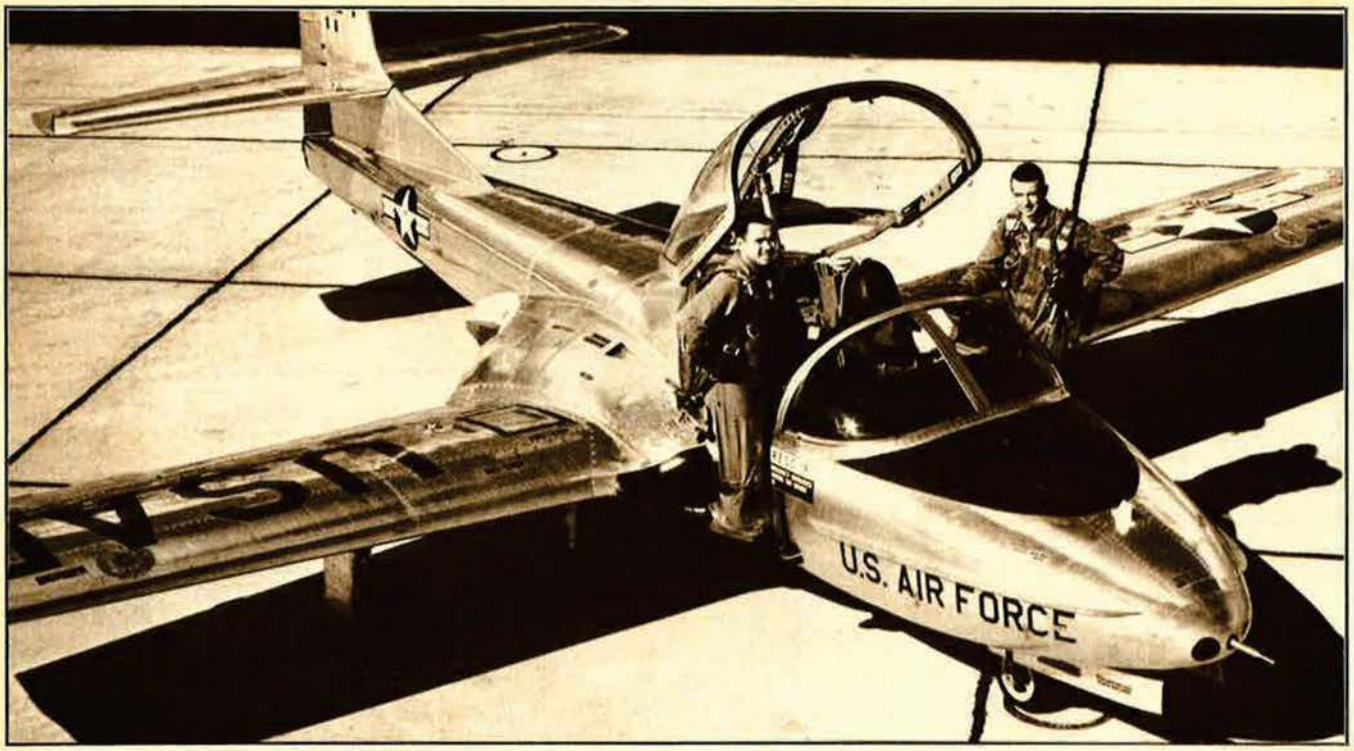
Arnold Engineering Development Center
Arnold AFS, Tenn.
Col. Ward E. Protsman
Commander

Armament Development and Test Center
Eglin AFB, Fla.
Maj. Gen. Henry B. Kucheman, Jr.
Commander

Air Force Civil Engineering Center
Tyndall AFB, Fla.
Col. Paul T. Hartung
Commander

Air Force Special Weapons Center
Kirtland AFB, N. M.
Maj. Gen. Thomas W. Morgan
Commander

Cessna's T-37 introduces all USAF student pilots to jet flying.



A MAJOR AIR COMMAND

AIR TRAINING COMMAND

It is in Air Training Command (ATC) that newcomers first meet the Air Force and first learn the manifold skills vital to a quality force.

ATC's primary function is to teach. In round numbers, 9,500 instructors conduct 4,000 technical training courses each year. To date, more than 9,000,000 ATC graduates have supplied the technical skills that are the lifeblood of the Air Force.

With an annual budget exceeding $1 billion, nearly 125,000 assigned personnel, and a programmed million-plus flying hours in more than 2,000 aircraft, ATC is the free world's largest training system.

Headquartered at Randolph AFB, Tex., ATC operates sixteen bases in the US and approximately eighty field training detachments worldwide.

Undergraduate pilot training is conducted at nine ATC bases. A recent innovation, the consolidation of T-41 flying training at Hondo, Tex., will facilitate early identification of candidates who are not pilot material.

Sophisticated T-43A aircraft and associated ground equipment recently acquired by the Undergraduate Navigator Training School at Mather AFB, Calif., will cut three weeks from present navigator schooling with no degradation in quality.

Another modern training technique used by ATC is Instructional Systems Development, which employs self-pacing, and study cubicles where students receive individualized instruction through multimedia facilities.

While building on the military cornerstones of discipline, teamwork, and respect for authority, ATC training has not ignored changing civilian mores. Through January 31, 1973, more than 224,000 personnel had taken pioneering ATC human-relations courses, now supplanted by the Defense Race Relations Institute Course.

The Community College of the Air Force (CCAF), headquartered at Randolph, is a training-related function assigned to ATC. CCAF issues transcripts that assign semester-hour credits to Air Force technical courses. A stipulated total will lead to a Career Education

ADC'S LEADERS THROUGH THE YEARS

Lt. Gen. John K. Cannon	Apr. 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	

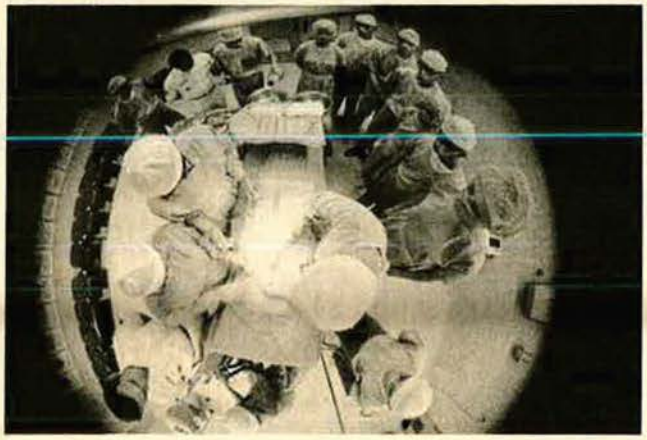
Certificate for a student airman, documenting his qualifications in the Air Force or later when he returns to the civilian work-world.

The Southern Association of Schools and Colleges has granted affiliate status to CCAF and has accredited five of its component schools. Additionally, professional civilian agencies have recognized or accredited many specific courses.

With headquarters also at Randolph, Recruiting Service is another USAF function assigned to ATC. It produces and distributes materials designed to attract the desired quality of men and women to the Air Force, recruiting up to 100,000 new members a year.

Other ATC functions include the USAF Skill Center at Forbes AFB, Kan., which teaches separating airmen skills salable in the civilian marketplace; the 3320th Retraining Group and the 3415th Special Training Group at Lowry AFB, Colo., which, respectively, rehabilitate personnel convicted of various offenses and those with administrative discharges pending; the USAF Special Treatment Center at Lackland AFB, Tex., also assigned to ATC, which handles two of the five phases of the Air Force Drug Rehabilitation Program; the USAF Military Assistance Program, operating within ATC as the Office of Foreign Affairs, which has trained more than 90,000 foreign students in the US; and the new ATC Non-commissioned Officer Academy, scheduled to open this fall, and which is to graduate 600 students a year.

Lt. Gen. William V. McBride has been Commander of Air Training Command since September 1972. Previously, he had been Vice Commander in Chief, USAFE. The General is a triple-rated officer, starting his career as a navigator-bombardier. Most of his post-World War II assignments have been in MAC as a group and wing commander, as DCS/Operations, and Chief of Staff, MAC. A graduate of the National War College, he has served as military assistant to the Secretary of the Air Force.



Future operating room assistants train in a surgical schoolroom at Sheppard AFB's School of Military Health Sciences.

A quality force presupposes skilled craftsmen. That, in turn, implies excellent training, which is what ATC supplies. ■

AIR TRAINING COMMAND

Headquarters, Randolph AFB, Tex.

Commander
Lt. Gen. William V. McBride

Technical Training Centers
Chanute AFB, Ill.
Keesler AFB, Miss.
Lowry AFB, Colo.
Sheppard AFB, Tex.

Flying Training Wings
Columbus AFB, Miss.
Craig AFB, Ala.
Laredo AFB, Tex.
Laughlin AFB, Tex.
Moody AFB, Ga.
Randolph AFB, Tex.
Reese AFB, Tex.
Sheppard AFB, Tex.
Vance AFB, Okla.
Webb AFB, Tex.
Williams AFB, Ariz.
Mather AFB, Calif. (Nav.)

Combat Crew Training Wings (Survival)
Fairchild AFB, Wash.*
Albrook AFB, C. Z.*
Clark AB, Philippines*
Eielson AFB, Alaska*
Homestead AFB, Fla.*

Military Training Center
Lackland AFB, Tex.

Specialized Flying Training Activities
Randolph AFB, Tex.
Peterson Field, Colo. (AF Academy)
Keesler AFB, Miss.
Sheppard AFB, Tex.

USAF Recruiting Service
Randolph AFB, Tex.

Community College of the Air Force
Randolph AFB, Tex.

*Tenant Units

Iranian officers and Air University faculty members discuss a research project.

A MAJOR AIR COMMAND

AIR UNIVERSITY

Air University's comprehensive academic program is a primary source of professional know-how in military leadership, doctrine, and research.

Today's Air Force career requires a new order of education, talent, and versatility. Basic to this requirement is a professional education system to develop leaders who can make maximum use of all our national resources. This system is the custody of Air University (AU).

Lt. Gen. Alvan C. Gillem II commands AU. Its headquarters and most of its major activities are located near Montgomery, Ala., at Maxwell AFB, an installation rich in aerospace history. A major command with no direct operational responsibility, AU is free to concentrate on its professional and technical educational programs, research, and doctrinal studies in designated fields.

AU's academic system encompasses four professional military education (PME) schools: Air War College, for senior officers; Air Command and Staff College, for mid-career officers; and Squadron Officer School, for junior officers, have operated since AU's establishment in 1946. Located on Maxwell's academic circle, they prepare officers for progressively more responsible positions normally associated with duties of staff officers and commanders. Their combined alumni total 73,000.

The fourth PME school, a first in the USAF, joined the AU family in 1972. The USAF Senior Noncommissioned Officer Academy conducted its pilot course at Gunter AFB earlier this year.

Specialized AU schools meet specific USAF educational requirements. The AU Institute for Professional Development operates personnel-management, comptroller, judge-advocate, chaplain, and electronic-warfare courses, along with a seminar for USAF commanders.

Academic Instructor and Allied Officer School (AIAOS) serves in two principal capacities. It conducts the USAF teachers' college for instructor personnel. AIAOS also prepares allied officers for attendance at USAF schools and provides ad-

AU'S LEADERS THROUGH THE YEARS

Maj. Gen. Muir S. Fairchild	Mar. 15, 1946	May 17, 1948
Maj. Gen. Orvil A. Anderson	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
Maj. Gen. John DeF. Barker (acting)	Mar. 1, 1953	Apr. 14, 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	

ministrative services for them during their stay at AU.

Extension Course Institute conducts approximately 375 courses in specialized and career-development fields of learning. Enrolling approximately 325,000 students annually, the Institute has served some 6,000,000 enrollees.

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

Air Force ROTC, another major element of the AU system, is the primary source of new USAF second lieutenants. It operates detachments at 184 colleges throughout the US and in Puerto Rico. The junior AFROTC program, started in 1966, is conducted at 235 high schools throughout the nation.

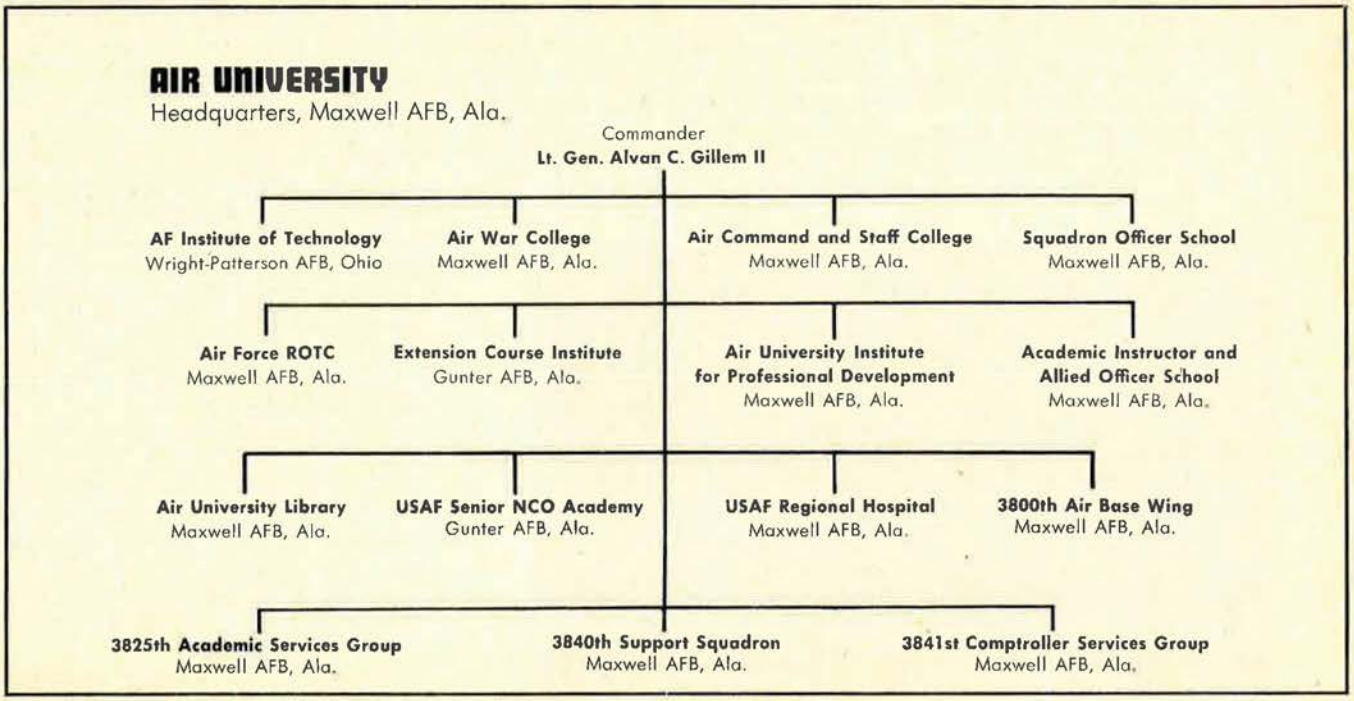
Focal point of AU's academic complex is its aerospace library, whose vast resources include bibliographic, documentary, and circulating reference facilities.

Throughout its twenty-seven-year operation, AU has geared its programs to the needs of the times. For example, curricula at all PME schools now include some exposure to computer technology and contemporary social problems.

Lt. Gen. Alvan C. Gillem II has commanded the Air University since August 1970. A World War II fighter pilot, he has served as Commandant of the Air Command and Staff College, a SAC bomb division commander, DCS/Operations at Hq. SAC, and commander of SAC's Eighth Air Force.

Members of each class of Air University's Squadron Officer School spend some 200 hours in seminar sessions.

So long as Air University fulfills its intended purpose, Air Force leadership will never lack an intellectual system to provide increased range to our national defense. Aptly phrasing the command's progressive educational concept is its motto: *Proficimus More Irretenti*—"We Progress Unhindered by Tradition." ■



Alaskan Air Command F-4E Phantoms participate in a winter exercise.

A MAJOR AIR COMMAND

ALASKAN AIR COMMAND

The Alaskan Air Command (AAC), commanded by Maj. Gen. Donavon F. Smith, has the primary mission of providing first-line aerial defense and warning of attack on Alaska and the entire North American continent.

The command relies on F-4E Phantoms, assigned to the 21st Composite Wing at Elmendorf AFB, for air defense and tactical air missions. They stand round-the-clock alert at Elmendorf and three forward locations.

To meet its defense needs, AAC supports a network of thirteen aircraft control and warning, communications, and radar surveillance stations. Nearly one-fifth of the command's population is stationed at these remote locations throughout the state. These people are responsible for getting the defense information needed by AAC — and subsequently by North American Air Defense Command (NORAD)— to carry out the readiness mission.

Although air defense is the primary AAC mission, the command has a major responsibility for support of many other organizations.

A major support mission AAC points to with particular pride is the resupply of two Distant Early Warning (DEW) communications stations on the Greenland ice cap. Support missions are flown by the 17th Tactical Airlift Squadron of the 21st Composite Wing. Using ski-equipped C-130 Hercules aircraft, staging from Sondrestrom Air Base, Greenland, the 17th supplies every gallon of fuel, piece of lumber, ration of food, and item of equipment used by the men operating the Greenland stations.

Many federal organizations, nonmilitary as well as US Army and Military Sea Transport Service, rely on AAC's support. At one time or another, every major command in the Air Force receives direct support from the Alaskan Air Command, and several obtain almost constant assistance.

Alaska's vast wilderness areas

AAC'S LEADERS THROUGH THE YEARS

Maj. Gen. Frank A. Armstrong, Jr.	Feb. 20, 1949	Jan. 9, 1951
Maj. Gen. William D. Old	Jan. 10, 1951	Nov. 30, 1952
Maj. Gen. George R. Acheson	Feb. 26, 1953	Feb. 14, 1955
Lt. Gen. Joseph H. Atkinson	Feb. 24, 1955	July 16, 1956
Lt. Gen. Frank A. Armstrong, Jr.	July 17, 1956	Oct. 24, 1956
Maj. Gen. James H. Davies	Oct. 24, 1956	June 27, 1957
Lt. Gen. Frank A. Armstrong, Jr.	June 27, 1957	Aug. 31, 1957
Brig. Gen. Kenneth H. Gibson	Sept. 1, 1957	Aug. 24, 1958
Maj. Gen. Conrad F. Necrason	Sept. 1, 1958	June 30, 1961
Maj. Gen. Wendell W. Bowman	Aug. 1, 1961	Aug. 1, 1963
Maj. Gen. James C. Jensen	Aug. 15, 1963	Nov. 14, 1966
Maj. Gen. Thomas E. Moore	Nov. 15, 1966	July 31, 1969
Maj. Gen. Joseph A. Cunningham	Aug. 1, 1969	July 31, 1972
Maj. Gen. Donavon F. Smith	Aug. 1, 1972	

Maj. Gen. Donavon F. Smith assumed command of Alaskan Air Command in August 1972. He came to the command from his assignment as Assistant DCS/P&O, Hq. USAF. General Smith is a fighter ace who served in a number of jobs in the Air Defense Command between 1950–56. He also has had key posts in SHAPE and NORAD. He is an alumnus of the National War College and the Advanced Management School at Harvard University. Following a tour as chief adviser to the Vietnamese Air Force, he became Vice Commander, Ninth Air Force in 1968 and Commander of the Nineteenth Air Force in 1969.

An HH-3 helicopter of the Alaskan Air Command refuels from an Air Rescue and Recovery Service HC-130 above the frozen landscape of the northland.

and climate make it an excellent testing ground for both men and equipment. Every newly developed Air Force aircraft comes to Alaska for cold-weather testing. AAC's Eielson AFB is near Fairbanks in the interior, where winter temperatures drop to fifty degrees below zero. Eielson has an ideal environment for operational testing of every type of equipment that will be subject to adverse conditions.

The command is directly involved in several joint-service training exercises that take place in Alaska each year. Many involve men and equipment from regular, Reserve, and National Guard units in the "Lower 48." These exercises require mass airlifts of troops and equipment, daily resupply, and tactical air support of troops in the field.

AAC's diversified mission makes it one of the most unusual of the major commands. The men and women who comprise it stand poised and ready on our nation's last frontier, providing "Top Cover for America." ■

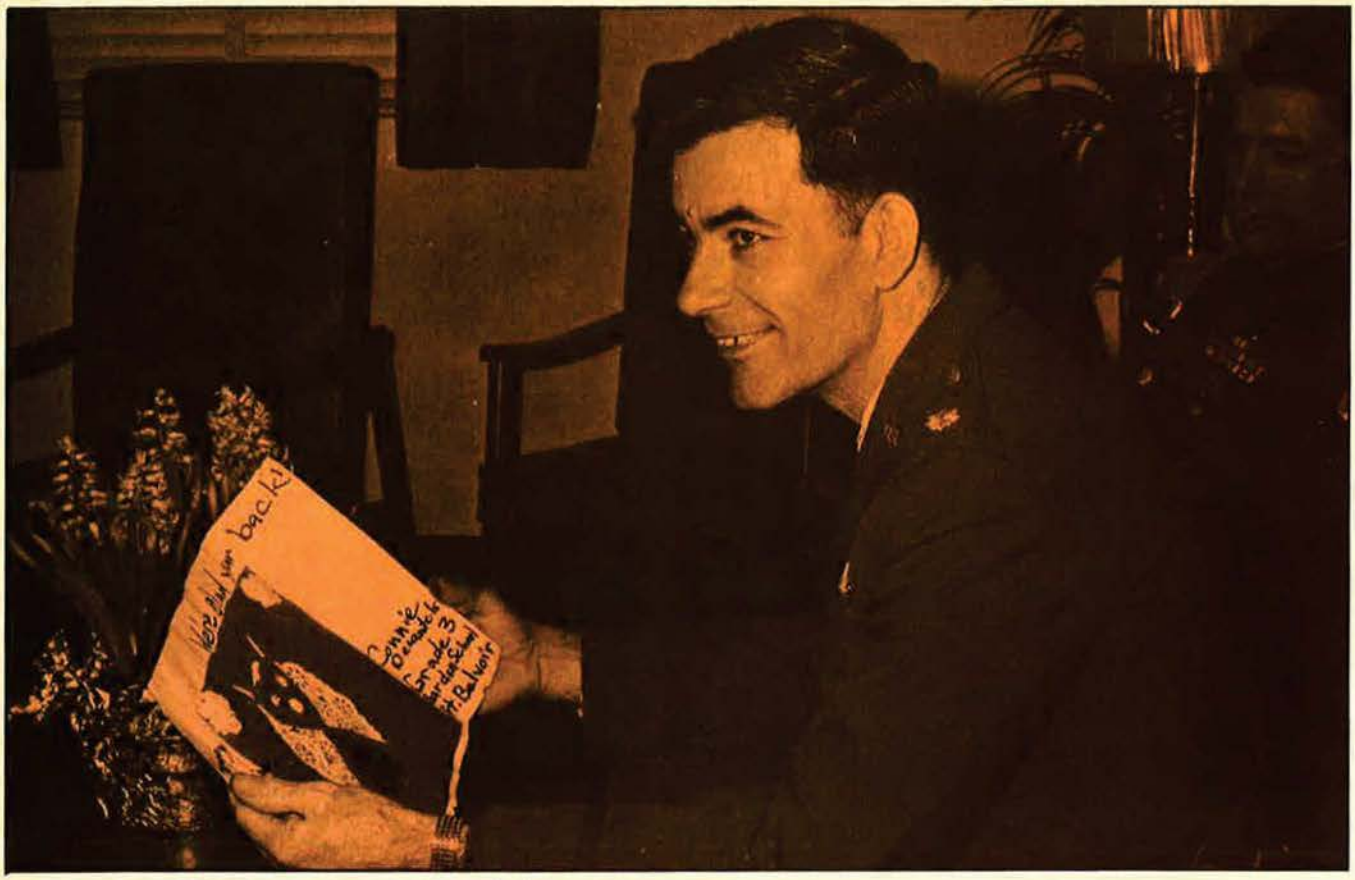
ALASKAN AIR COMMAND

Headquarters, Elmendorf AFB, Alaska

Commander
Maj. Gen. Donavon F. Smith

- 3 Air Base Squadrons & 13 ACW Squadrons located throughout Alaska
- **USAF Hospital Elmendorf** — Elmendorf AFB, Alaska — Col. Henry S. K. Willis, Jr., Commander
- **21st Composite Wing** — Elmendorf AFB, Alaska — Col. David T. Stockman, Commander
  - **43d Tactical Fighter Squadron** — Elmendorf AFB, Alaska — Lt. Col. Richard M. Desing, Commander
  - **17th Tactical Airlift Squadron** — Elmendorf AFB, Alaska — Lt. Col. Donald R. Gould, Commander
  - **21st Air Base Group** — Elmendorf AFB, Alaska — Col. Jack January, Jr., Commander
  - **5040th Helicopter Squadron** — Elmendorf AFB, Alaska — Lt. Col. Robert W. Bleier, Commander
  - **5041st Tactical Operations Squadron** — Elmendorf AFB, Alaska — Lt. Col. John F. Welch, Commander
- **5010th Combat Support Group** — Eielson AFB, Alaska — Col. Earl H. Ambrose, Commander
  - **25th Tactical Air Support Squadron** — Eielson AFB, Alaska — Lt. Col. James O. Swanson, Commander

At Andrews AFB, Md., former POW Maj. Arthur W. Burer reads a child's welcome-home card. Many returning POWs came through Andrews.



A MAJOR AIR COMMAND

HEADQUARTERS COMMAND, USAF

Headquarters Command, USAF (HQ COMD USAF), supports certain Air Force personnel in the Washington area, in designated separate operating agencies, joint and unified commands, international activities, and other government agencies worldwide.

In carrying out its worldwide responsibilities, the command's approximately 25,000 people, nearly one-third of them overseas, are assigned to more than 800 locations. Collectively, they represent the greatest variety of job specialties in the Air Force.

Organizationally, units of HQ COMD USAF are categorized as either "operational" or "special activities" units.

HQ COMD'S LEADERS THROUGH THE YEARS

Brig. Gen. Burton M. Hovey	Jan. 3, 1946	Dec. 13, 1948
Brig. Gen. Sydney D. Grubbs	Dec. 14, 1948	Oct. 1, 1950
Brig. Gen. Morris J. Lee	Oct. 2, 1950	June 13, 1952
Brig. Gen. Stoyte O. Ross	June 14, 1952	July 4, 1956
Maj. Gen. Reuben C. Hood, Jr.	Aug. 1, 1956	June 30, 1959
Maj. Gen. Brooke A. Allen	Aug. 3, 1959	Dec. 31, 1965
Maj. Gen. Rollen H. Anthis	Jan. 10, 1966	Nov. 30, 1967
Maj. Gen. Milton B. Adams	Dec. 1, 1967	June 30, 1968
Maj. Gen. Nils O. Ohman	July 5, 1968	Apr. 30, 1972
Maj. Gen. John L. Locke	May 1, 1972	

Formerly Bolling Field Command.
Redesignated as Headquarters Command Mar. 17, 1948.

Among the former are the 1100th Air Base Wing and 1st Composite Wing, which operate and maintain Bolling AFB, Washington, D. C., and Andrews AFB, Md., respectively. These units provide much of the support required by Headquarters USAF and Air Force personnel assigned to other agencies in Washington and the surrounding area. They also provide limited base-level support to people assigned to special activities units.

Other operational units of the command include the USAF Postal and Courier Service located in Virginia, Civil Air Patrol-USAF at Maxwell AFB, Ala., and the Malcolm Grow USAF Medical Center at Andrews AFB.

HQ COMD USAF special activities units provide administrative and limited logistical support for Air Force people on duty with joint and unified commands, international activities, and other specified government agencies around the world. Some of these are Supreme Headquarters Allied Powers Europe,

NATO, Pacific Command, US Readiness Command, FAA, and NASA.

Although "support" appears on the surface to be a simple enough mission, the complexities of function required to fulfill that mission are many and varied. To cite a few examples, the 1st Composite Wing hosts more than 12,000 distinguished visitors from around the world who arrive at Andrews AFB each year. The wing also provides administrative airlift for Headquarters USAF and other personnel designated by the Air Force Chief of Staff. It operates a national airborne command post for the Joint Chiefs of Staff and a quick-response airlift emergency evacuation capability in the Washington area.

The wing runs one of the largest flying proficiency programs in the Air Force and hosts more than twenty Air Force, Navy, and Marine Corps tenant organizations.

The Malcolm Grow USAF Medical Center serves the medical needs of the Air Force in this area. With clinics at both Bolling AFB and the Pentagon, the Center provides a full range of medical service to military personnel and dependents. It is also one of the major instructional hospitals in the Air Force, conducting both residency and internship programs.

The USAF Postal and Courier Service is responsible to the Command for the operation of post offices and courier stations around the globe. Personnel of the unit handle more than 157,000,000 pounds of mail annually.

The Civil Air Patrol (CAP), the civilian auxiliary of the Air Force with all-volunteer members, consists of eight geographical regions, fifty-two wings, and a membership of more than 63,000. CAP pilots, operating under the supervision of Aerospace Rescue and Recovery Service (ARRS), have flown more than 141,000 rescue sorties, saved more than 1,200 lives, and assisted some 16,000 Americans threatened by danger during natural disasters. CAP also operates a comprehensive aerospace education and youth motivation program for its 27,000 teenage cadet members.

The 1139th Comptroller Services Squadron at Bolling AFB provides major command and base-level data-automation, accounting, and finance support for Air Force people in the Washington area.

The central agency in the local area for ordering commercial supplies and services for the Air Force is the 1138th Procurement Squadron at Andrews AFB.

Perhaps those command functions that are most visible to the public are the functions performed by two other Bolling AFB units. The USAF Band serves as the Air Force musical goodwill ambassador around the world, and the USAF Honor Guard is the official USAF representative at public ceremonial events.

HQ COMD USAF, one of the most diverse organizations in the Air Force, is commanded by Maj. Gen. John L. Locke. ■

Commander of Headquarters Command since May 1972, Maj. Gen. John L. Locke was a fighter group commander in World War II. He has served in a variety of command and staff positions in ADC and TAC; as DCS/Technical Training, Hq. ATC; and as Assistant DCS/Personnel, Hq. USAF. He is a graduate of the Air War College.

HQ COMD USAF is the command authority for all of Civil Air Patrol's activities.

Also part of HQ COMD's far-flung responsibility is the USAF Postal and Courier Service.

A Military Airlift Command workhorse—the versatile C-141 StarLifter.

A MAJOR AIR COMMAND

MILITARY AIRLIFT COMMAND

The missions of the Military Airlift Command (MAC) are many, varied, and global in scope. Principal among them is the strategic airlift of US general-purpose forces and their support equipment, in response to any kind of contingency situation—anywhere in the world.

MAC also performs a secondary role of resupply for these deployed forces, assists tactical airlift units in providing airlift within and between theaters, and provides long-range aeromedical airlift from overseas areas to the United States, as well as aeromedical airlift within the US. MAC is also responsible for providing a global capability to search for and recover downed aircrew members and aerospace hardware; forecasting weather with timeliness and accuracy; maintaining an aerial cartographic capability; and providing audiovisual products and services to the entire Air Force.

While primarily designed to support the nation's defense requirements, one significant by-product has been MAC's tradition of humanitarian assistance—whether it be airlifting supplies to earthquake victims, evacuation of flood refugees, hurricane relief, or the speedy airlift of patients to the world's leading medical centers. For example, MAC continued its worldwide logistic supply role while providing an aerial lifeline of supplies and food for victims of the disastrous Nicaraguan earthquake in December 1972.

MAC's airlift force is manned by active-duty personnel and augmented by crew members and maintenance personnel participating in the Reserve Associate program. Flying and maintaining C-5 Galaxys and C-141 StarLifters of the active force, Reserve units are organized at the same locations as their active-duty "associated" units. Their mobilization would increase airlift capability by as much as one-third.

The active military force is further complemented by the modern jet aircraft of the Civil Reserve Air Fleet, or CRAF. These aircraft are predesignated by the commercial carriers and can be called into service in one of three stages, depending on the severity of an emergency.

A CRAF commitment allows the commercial carriers to participate in peacetime DoD contract airlift. At present, civil carriers fly more than ninety percent of all DoD passengers, as well as some cargo.

The flexibility of the airlift system was demonstrated as MAC sup-

MAC'S LEADERS THROUGH THE YEARS

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	

Formerly Military Air Transport Service (MATS).
Redesignated as Military Airlift Command Jan. 1, 1966.

ported US response to the 1972 Communist offensive in South Vietnam. Additional commercial augmentation enabled the command to continue its normal worldwide role, while C-141s and C-5s rushed much-needed equipment—including tanks—to blunt the invasion from the North.

In what proved to be the stiffest test for the C-5, six M-48 heavy tanks, each weighing 96,000 pounds, were airlifted into the war zone on three C-5 missions, followed by twenty-seven C-5 missions carrying eighty 48,000-pound M-41 light tanks.

More recently, under Operation Homecoming, MAC provided airlift from Hanoi to Stateside medical centers for returning prisoners of war. C-141s, especially configured for overseas aeromedical airlift, interfaced with C-9 Nightingales of MAC's 375th Aeromedical Airlift Wing.

Another of MAC's special wings, the 89th Military Airlift Wing, provides airlift for the President, top government officials, and foreign dignitaries.

In addition, three technical service organizations provide sophisticated and complex support activities for many DoD agencies:

Specially configured fixed- and rotary-wing aircraft of the **Aerospace Rescue and Recovery Service (ARRS)** are located around the world for the search, rescue, and recovery mission. ARRS crews are credited with more than 13,000 saves in the last quarter century.

Using an advanced computerized system, the **Air Weather Service (AWS)** operates a worldwide network of facilities that provides global weather information. AWS monitors solar activity to support the US space program, while specially equipped aircraft provide weather and storm reconnaissance as well as atmospheric sampling. Other AWS aircraft can provide cartographic and infrared photography for many purposes.

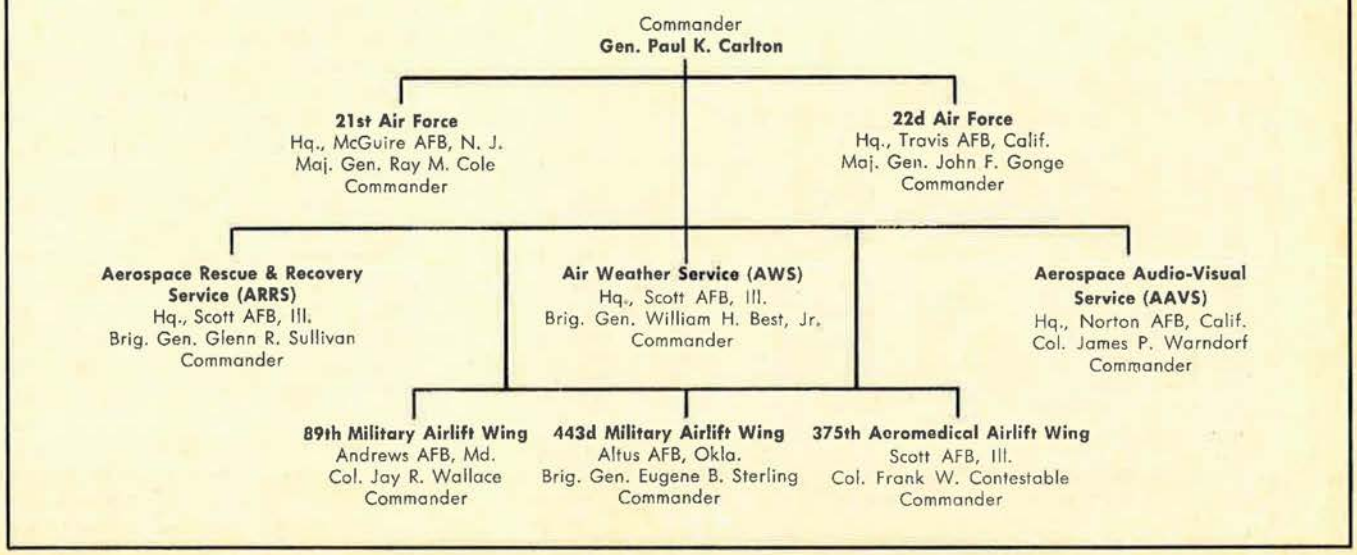
The **Aerospace Audio Visual Service (AAVS)** is responsible for Air Force photographic and video products and services including combat photography, photographic documentation of significant events, production of orientation and training films, operation of one of the largest motion-picture lending libraries in the world, and maintenance of the USAF Film Depository.

The worldwide strategic airlift and services mission is an integral portion of our nation's defense posture. MAC fulfills this mission by remaining ever responsive to its motto—"Global in Mission, Professional in Action." ■

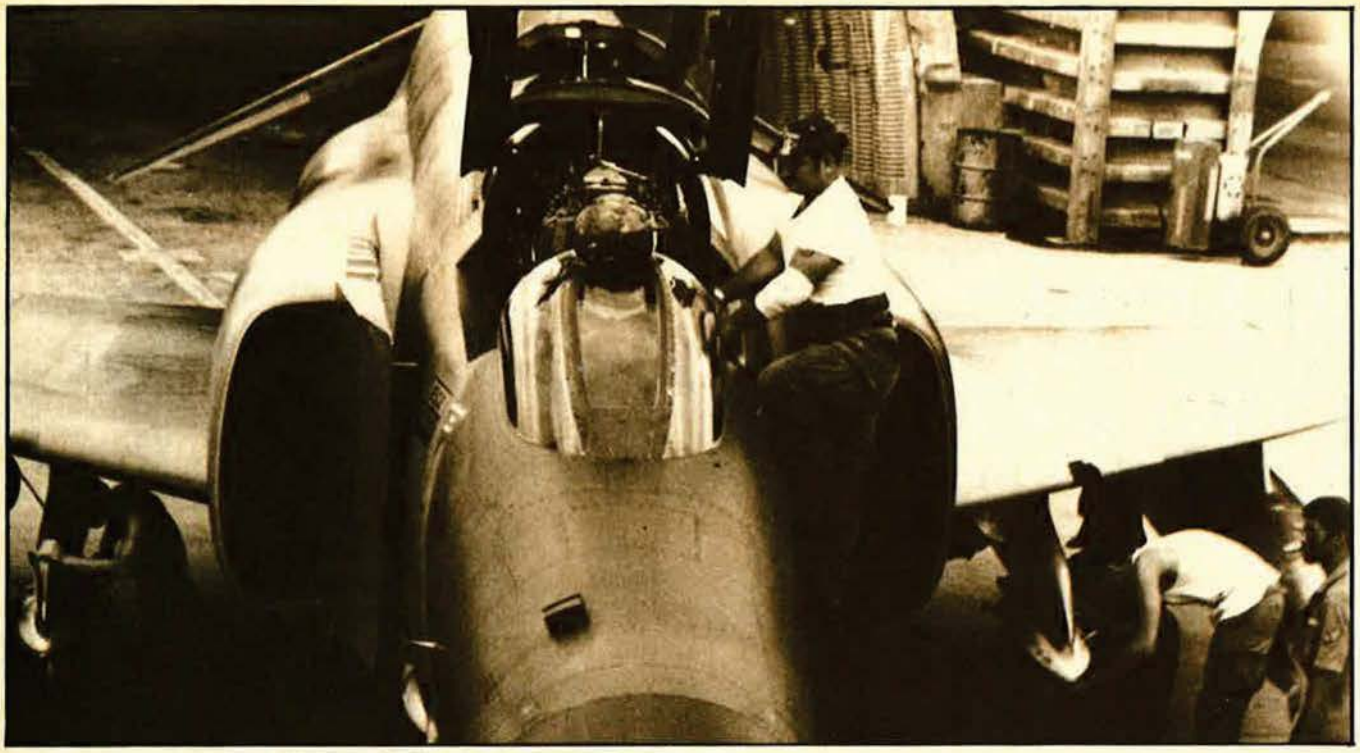
Gen. Paul K. Carlton assumed command of MAC in September 1972, following two years as commander of SAC's Fifteenth Air Force. A WW II B-29 pilot in the Pacific, most of his postwar duty has been with SAC as a bomb wing commander, in staff assignments, and as commander of the 1st Strategic Aerospace Division. He has served as Director of Operations at SAC Headquarters and is a graduate of the National War College.

MILITARY AIRLIFT COMMAND

Headquarters, Scott AFB, Ill.



Servicing an F-4 Phantom during Linebacker I, which broke the back of North Vietnam's spring 1972 invasion.



A MAJOR AIR COMMAND

PACIFIC AIR FORCES

Pacific Air Forces (PACAF) is the air component of the unified Pacific Command (PACOM) and is responsible for aerospace operations from Southeast Asia to Northeast Asia, the Indian Ocean, Bering Sea, and in the entire Pacific. PACOM is the largest of the seven US unified commands, covering an area of approximately 94,000,000 square miles—more than two-fifths of the earth's surface.

PACAF has about 61,000 military and civilian personnel serving in more than seventy strike, tactical, support, and air defense organizations that operate from air bases in Japan, Korea, Taiwan, Okinawa, Hawaii, Thailand, and the Republic of the Philippines.

PACAF is responsible for maintaining air superiority in the PACOM area by:

- Providing ready, mobile, tactical strike forces to meet any emergency.
- Assisting air forces of friendly nations in the defense of their homelands.
- Providing intratheater airlift and support for all services and for friendly foreign nations.
- Maintaining an air defense force in US-controlled areas.
- Supporting the air aspects of the US Military Assistance Program (MAP) in allied nations.
- Supporting US military and civilian space programs.

Pacific Air Forces had its origin before the Japanese bombing of Pearl Harbor when the United States air component in the Pacific was known as the Far East Air Forces (FEAF), with headquarters at Clark Field, P. I.

When the Philippines were occupied by Japanese forces in late 1941, the Far East Air Forces disbanded. FEAF was reactivated as a

PACAF'S LEADERS THROUGH THE YEARS

Lt. Gen. Ennis C. Whitehead	Dec. 1945	Apr. 25, 1949
Lt. Gen. George E. Stratemeyer	Apr. 26, 1949	May 20, 1951
Lt. Gen. Earle E. Partridge (acting)	May 20, 1951	June 9, 1951
Gen. O. P. Weyland	June 10, 1951	Mar. 31, 1954
Gen. Earle E. Partridge	Apr. 1, 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	

Formerly Far East Air Forces (FEAF).
Redesignated as Pacific Air Forces July 1, 1957.

major command on August 3, 1944, and included both the Fifth and Thirteenth Air Forces. FEAF had several organizational changes during the postwar years. Perhaps the single most important change was the designation of FEAF as the theater Air Force for the Far East Command.

On July 1, 1957, Far East Air Forces was reorganized as Pacific Air Forces (PACAF), the air component of the unified Pacific Command, which included Army and Navy forces. Until then, FEAF had been responsible as a separate Air Force command for the air defense of the Pacific.

Pacific Air Forces again took an active part in defense against aggression in October 1962 when the 2d Air Division was formed in the Republic of Vietnam. As Communist insurgency increased during the ensuing years, so did US airpower in that area. Communist attacks against US naval vessels in the Gulf of Tonkin led to a rapid buildup, and, by the end of 1965, the latest and most sophisticated strike aircraft in the USAF inventory were being used in Vietnam.

As Vietnamization was implemented and the Republic of Vietnam's Air Force became self-sufficient and capable of defending its own country, PACAF forces in Vietnam were steadily decreased.

Crewman of an HH-53 Super Jolly Green Giant lets loose with covering fire during a rescue mission.

Following the massive North Vietnamese offensive that began on March 30, 1972, PACAF airpower, augmented by Tactical Air Command and Strategic Air Command aircraft deployed from the continental US, contributed a decisive role in stopping the enemy invaders. Airpower was a major determining factor in bringing about a cease-fire in Vietnam.

Major PACAF units are: Thirteenth Air Force, Clark AB, Republic of the Philippines; Fifth Air Force, Fuchu AS, Japan; 326th Air Division, Wheeler AFB, Hawaii; and the 15th Air Base Wing, Hickam AFB, Hawaii.

Thirteenth Air Force's area of defense-tactical-support responsibility covers an area three times as large as the United States, populated by more than 250,000,000 people. During the Southeast Asia conflict, Thirteenth's personnel provided logistical and maintenance support to US Air Force units in that area. Since its birth in 1943, it has been known as the "Jungle Air Force."

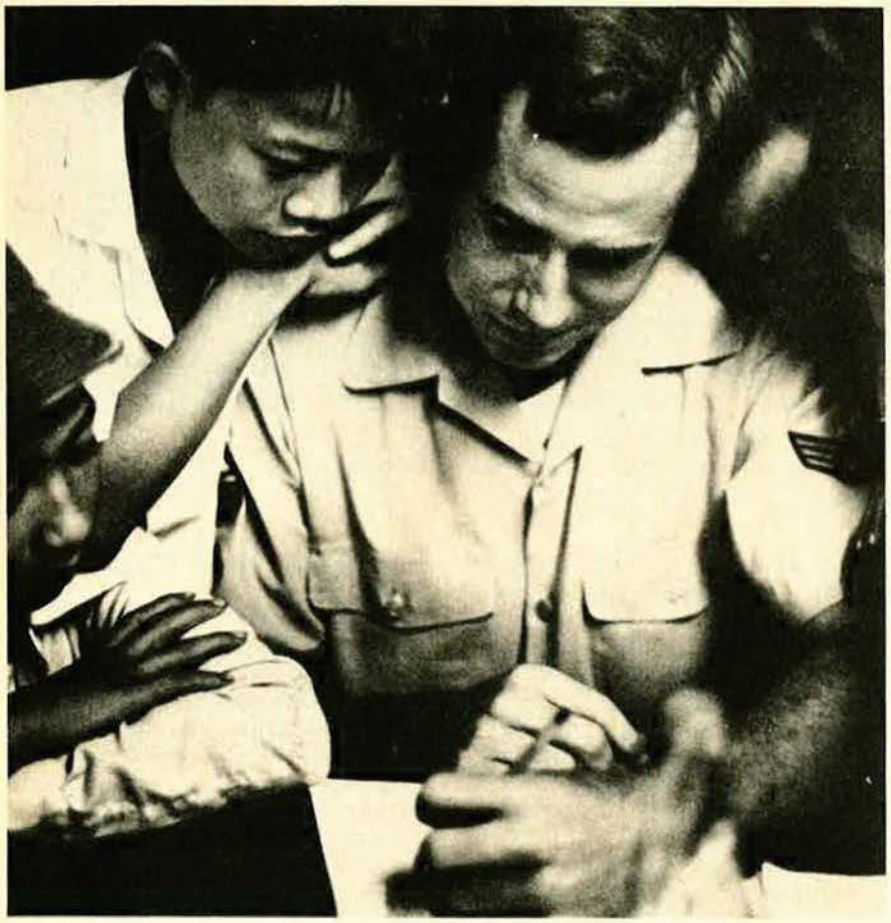
Fifth Air Force serves as PACAF's first line of defense in the Far East.

THE MAJOR UNITS OF PACIFIC AIR FORCES (PACAF)

UNIT	LOCATION	AIRCRAFT
15th Air Base Wing	Hickam AFB, Hawaii	EC-135, O-2
326th Air Division	Wheeler AFB, Hawaii	
Fifth Air Force, Hq. Fuchu AS, Japan		
3d Tac Fighter Wing	Kunsan AB, Korea	F-4
18th Tac Fighter Wing	Kadena AB, Okinawa	F-4
51st Air Base Wing	Osan AB, Korea	
313th Air Division	Kadena AB, Okinawa	
314th Air Division	Osan AB, Korea	
475th Air Base Wing	Yokota AB, Japan	
Thirteenth Air Force, Hq. Clark AB, P. I.		
8th Tac Fighter Wing	Ubon RTAFB, Thailand	AC-130, F-4, OV-10
56th Special Opns Wing	Nakhon Phanom RTAFB, Thailand	C-130, CH-53, EC-47, OV-10
327th Air Division	Taipei AS, Taiwan	
354th Tac Fighter Wing*	Korat RTAFB, Thailand	A-7
374th Tac Airlift Wing	Ching Chuan Kang AB, Taiwan	C-130
388th Tac Fighter Wing	Korat RTAFB, Thailand	C-130, EB-66, F-4, F-105
405th Fighter Wing	Clark AB, P. I.	F-4, C-9
432d Tac Recon Wing	Udorn RTAFB, Thailand	RF-4, F-4
474th Tac Fighter Wing*	Takhli RTAFB, Thailand	F-111
635th CS Group	U-Tapao Royal Thai Afld, Thailand	
6214th Air Base Group	Tainan ROCAB, Taiwan	

* Units deployed temporarily from Tactical Air Command (TAC) under PACAF operational control.

In August 1971, Gen. Lucius D. Clay, Jr., came to his present assignment as Commander, PACAF, from duty as Commander, Seventh Air Force and Deputy Commander of MACV. A World War II bomb group commander, he later served in SAC and TAC in both command and staff assignments, on the Joint Staff, and as DCS/Plans and Operations, Hq. USAF. He is a graduate of the Air War College.



During off-duty hours prior to US withdrawal, USAF Sgt. Robert W. Blakenship taught English to Vietnamese children.

Its area of responsibility is nearly as large as the continental United States and includes Japan, Korea, Okinawa, and the seas surrounding them.

Prior to the Vietnam cease-fire, Seventh Air Force, headquartered at Tan Son Nhut Air Base, RVN, furnished tactical air support, including close air support, reconnaissance, and tactical airlift, in performing its task of conducting and coordinating combat air operations in Southeast Asia.

Tactical and support airlift for the Unified Pacific Command is controlled by the Directorate of Airlift (DOL), operating at Hq. Pacific Air Forces. DOL responds to airlift needs of Army, Navy, and Air Force units in the Pacific Command. It also directs intratheater air terminals and airlift operations for the movement of cargo, patients, and passengers, as well as airborne assault and resupply of tactical units.

The 15th Air Base Wing's mission includes logistics support for the Pacific Air Forces Headquarters and more than 150 tenant units. The wing also provides support for an airborne command post system for the Commander in Chief, Pacific.

Since August 1, 1971, Pacific Air Forces has been commanded by Gen. Lucius D. Clay, Jr. ■

PACIFIC AIR FORCES

Headquarters, Hickam AFB, Hawaii

Commander in Chief
Gen. Lucius D. Clay, Jr.

5th Air Force
Hq., Fuchu AS, Japan
Lt. Gen. Robert E. Pursley
Commander

US Support Activities Group*
Hq., Nakhon Phanom RTAB, Thailand
Gen. John W. Vogt, Jr.
Commander

13th Air Force
Hq., Clark AB, Luzon, P. I.
Lt. Gen. William G. Moore, Jr.
Commander

313th Air Division
Hq., Kadena AB, Okinawa
Maj. Gen. Lawrence F. Tanberg
Commander

314th Air Division
Hq., Osan AB, Korea
Brig. Gen. Travis R. McNeil
Commander

327th Air Division
Hq., Taipei, Taiwan
Brig. Gen. Donald H. Ross
Commander

15th Air Base Wing
Hq., Hickam AFB, Hawaii
Col. Wilmot E. Y. Paxton
Commander

326th Air Division
Hq., Wheeler AFB, Hawaii
Col. James R. Hopkins
Commander

Attached Units
Weather Wing
Photo Squadron Detachment
Hq., Pacific Communications Area
USAF Pacific Postal & Courier Region
Pacific Air Rescue Center

* Formerly 7th Air Force, headquartered at Tan Son Nhut AB, Vietnam.

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You're keeping low, real low — flying the contours. Up ahead everything looks the same. No landmarks. And worse, it's getting dark.

But you're not worried because in one glance at your Projected Map Display you know exactly where you are, how far your target is, and the steering data to get you there.

Air Force pilots who've flown with our AN/ASN 99A Projected Map Systems aboard the A-7 consider it the most reliably effective navigation display system ever devised for tactical aircraft. In fact they tell us, "We feel lost without it." Computing Devices of Canada Limited, Avionics Marketing, P.O. Box 8508, Ottawa, Canada KIG 3M9, (613) 829-1800.

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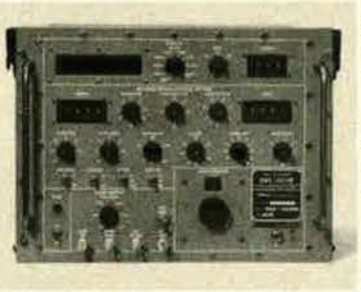

Ideal for intermediate and depot level support of modern state-of-the-art Micro-TACAN systems, as well as tube-type TACAN systems, the BMS-1003 provides the capability for testing all modes, including the new Air-to-Air Bearing, Data Link, and Inverse Modes.

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Our Beacon Simulator features readily understood controls, easy-to-use thumbwheel Range, Bearing and Channel switches, and a convenient control that selects the desired signal for display.

Simple, rugged and reliable you can depend on Hoffman's BMS-1003 to perform. Why? We warrant it!

Our Tacan Beacon Simulator is the one with the failure free warranty.

NavCom Systems, a Division of Hoffman Electronics Corporation / 4323 Arden Dr., El Monte, Calif. 91734 U.S.A. / Telephone (213) 442-0123 Telex 677487

A familiar sight until the cease-fire: a B-52 taking off from Guam.

A MAJOR AIR COMMAND

STRATEGIC AIR COMMAND

The Strategic Air Command (SAC) exists to deter nuclear aggression. With the following assets, the command deters through its capability to deliver weapons to strategic military targets anywhere in the world:

- 1,054 intercontinental ballistic missiles (ICBMs), in hardened silos, ready to go if the need arises.
- 460 manned bombers, dispersed across the country, in varying stages of alert, tailored to the international situation and the world scene.
- More than 600 tankers as well as reconnaissance aircraft and airborne command posts—all of which contribute to the readiness that spells nuclear deterrence.
- 159,000 people, who are the most important element of SAC's business, making sure that no would-be attacker miscalculates the strategic readiness of the United States to retaliate swiftly and decisively.

This is SAC's contribution to the strategic deterrence Triad of manned bombers and land-launched and sea-launched missiles. Together, they provide a flexible and reliable deterrent force.

SAC's role in Southeast Asia added another dimension to the application of strategic airpower, demonstrating that SAC has the versatility and flexibility to provide the President with some important options—options that are effective in less than nuclear war.

The B-52 has proven itself a truly formidable and versatile weapon system in support of ground commanders and against military tar-

SAC'S LEADERS THROUGH THE YEARS

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	

gets in very heavily defended areas. The North Vietnamese invasion of South Vietnam in April 1972 was in large part blunted by B-52 close-air-support strikes. In December 1972, the B-52 carried out high-level strategic bombing of military targets in the Hanoi/Haiphong area of North Vietnam. During this period, the B-52s flew more than 700 sorties against military targets. The North Vietnamese launched 1,000 or more surface-to-air missiles at the aircraft and threatened the force with heavy concentrations of antiaircraft fire and MIG interceptors. More than ninety-nine percent of the missions launched reached their targets and accurately delivered large tonnages of conventional weapons.

SAC's KC-135 tankers have been in Southeast Asia since June 1964. Since then, they have offloaded some 7,500,000,000 pounds of fuel and flown more than 160,000 sorties. The KC-135s are also the key

Gen. John C. Meyer became Commander in Chief of SAC in May 1972, after serving as Vice Chief of Staff, Hq. USAF, from 1969–72. Other top Pentagon positions have included Deputy Director and Vice Director, the Joint Staff; and Director for Operations, J-3, the Joint Staff. A leading World War II fighter ace, General Meyer had previously served as a SAC division commander; as Deputy Director of Plans, Hq. SAC; and as Commander of TAC's Twelfth Air Force.

STRATEGIC AIR COMMAND

Headquarters, Offutt AFB, Neb.

Commander in Chief
Gen. John C. Meyer

2d Air Force
Hq., Barksdale AFB, La.
Lt. Gen. James M. Keck
Commander

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

8th Air Force
Hq., Andersen AFB, Guam
Lt. Gen. Gerald W. Johnson
Commander

15th Air Force
Hq., March AFB, Calif.
Lt. Gen. William F. Pitts
Commander

12th Strategic Missile Division
14th Air Division
4th Strategic Missile Division
47th Air Division

1st Strategic Aerospace Division
Hq., Vandenberg AFB, Calif.
Maj. Gen. Salvador E. Felices
Commander

to rapidly deploying a composite strike force of fighters and bombers to any trouble spot in the world.

Just as there are changes in the role of SAC as a defender of peace, so there are changes in its deterrent forces.

The older B-52s are being technologically outclassed, and that is why the B-1 is so vital. The B-1 will be able to launch in retaliation to an attack on the US, penetrate the defenses of the 1980s, survive in that future environment, and strike its targets.

The Minuteman missile force also is changing. Minuteman IIIs, which provide increased accuracy and an independently targeted reentry vehicles, are replacing Minuteman Is.

A new Short Range Attack Missile (SRAM) is operational. It can be used from a standoff distance that puts the manned bomber outside the expected range of enemy terminal defenses.

A new decoy missile—the SCAD—is being developed to replace the present B-52 decoy missile—the Quail.

With the B-1 and other force improvements at the end of this decade, SAC will be able to continue its role in the Triad as the major element of our nuclear deterrence. It is also a deterrent against conventional war. This added dimension will help make SAC an even greater force for peace. ■

SECOND AIR FORCE (SAC)

Headquarters, Barksdale AFB, La.

Lt. Gen. James M. Kock
Commander

19th Air Division Carswell AFB, Tex.	45th Air Division Pease AFB, N. H.	40th Air Division Wurtsmith AFB, Mich.	42d Air Division McCoy AFB, Fla.
11th Air Refueling Squadron * Altus AFB, Okla. (KC-135)	95th Strategic Wing Gooso AB, Labrador (KC-135)	17th Bomb Wing * Wright-Patterson AFB, Ohio (B-52/KC-135)	19th Bomb Wing * Robins AFB, Ga. (B-52/KC-135)
2d Bomb Wing Barksdale AFB, La. (B-52/KC-135)	99th Bomb Wing Westover AFB, Mass. (B-52/KC-135)	379th Bomb Wing Wurtsmith AFB, Mich. (B-52/KC-135)	68th Bomb Wing * Seymour Johnson AFB, N. C. (B-52/KC-135)
7th Bomb Wing Carswell AFB, Tex. (B-52/KC-135)	380th Bomb Wing (M) Plattsburgh AFB, N. Y. (FB-111/KC-135)	410th Bomb Wing K. I. Sawyer AFB, Mich. (B-52/KC-135)	306th Bomb Wing McCoy AFB, Fla. (B-52/KC-135)
96th Bomb Wing Dyess AFB, Tex. (B-52/KC-135)	509th Bomb Wing (M) Pease AFB, N. H. (FB-111/KC-135)	416th Bomb Wing Griffiss AFB, N. Y. (B-52/KC-135)	301st Air Refueling Wing Lockbourne AFB, Ohio (KC-135)
97th Bomb Wing Blytheville AFB, Ark. (B-52/KC-135)	42d Bomb Wing Loring AFB, Me. (B-52/KC-135)	449th Bomb Wing Kincheloe AFB, Mich. (B-52/KC-135)	305th Air Refueling Wing Grissom AFB, Ind. (KC-135)

*Tenant Unit

FIFTEENTH AIR FORCE (SAC)

Headquarters, March AFB, Calif.

Lt. Gen. William F. Pitts
Commander

12th Strategic Missile Division Davis-Monthan AFB, Ariz.	14th Air Division Beale AFB, Calif.	4th Strategic Missile Division F. E. Warren AFB, Wyo.	47th Air Division Fairchild AFB, Wash.
100th Strategic Reconnaissance Wing Davis-Monthan AFB, Ariz. (U-2, DC-130)	6th Strategic Wing * Eielson AFB, Alaska (RC-135)	28th Bomb Wing Ellsworth AFB, S. D. (B-52/KC-135)	92d Bomb Wing Fairchild AFB, Wash. (B-52/KC-135)
390th Strategic Missile Wing Davis-Monthan AFB, Ariz. (Titan II)	9th Strategic Reconnaissance Wing Beale AFB, Calif. (SR-71)	44th Strategic Missile Wing Ellsworth AFB, S. D. (Minuteman)	341st Strategic Missile Wing Malmstrom AFB, Mont. (Minuteman)
22d Bomb Wing March AFB, Calif. (B-52/KC-135)	456th Bomb Wing Beale AFB, Calif. (B-52/KC-135)	90th Strategic Missile Wing F. E. Warren AFB, Wyo. (Minuteman)	5th Bomb Wing Minot AFB, N. D. (B-52/KC-135)
381st Strategic Missile Wing McConnell AFB, Kan. (Titan II)	55th Strategic Reconnaissance Wing Offutt AFB, Neb. (RC/EC-135)	319th Bomb Wing Grand Forks AFB, N. D. (B-52/KC-135)	91st Strategic Missile Wing Minot AFB, N. D. (Minuteman)
384th Air Refueling Wing McConnell AFB, Kan. (KC-135)	916th Air Refueling Squadron * Travis AFB, Calif. (KC-135)	321st Strategic Missile Wing Grand Forks AFB, N. D. (Minuteman)	
308th Strategic Missile Wing * Little Rock AFB, Ark. (Titan II)	320th Bomb Wing * Mather AFB, Calif. (B-52/KC-135)	351st Strategic Missile Wing Whiteman AFB, Mo. (Minuteman)	

*Tenant Unit

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

A TAC F-4 arrives at Bitburg AB, Germany, for a NATO exercise.

A MAJOR AIR COMMAND

TACTICAL AIR COMMAND

As the US involvement in Vietnam drew to a close, a new sense of urgency was felt throughout the Tactical Air Command (TAC). The men and women of TAC realize the vital part they played during the conflict, and, if they are to help prevent similar events in the future, they must do their utmost to assure that TAC maintains its unique rapid and mobile response capability.

For more than twenty-seven years, TAC has been building this capability and has served as the driving force for developing new tactics and techniques, doctrine, and weapon systems for tactical airpower. In addition to these responsibilities, TAC is the prime training agency for providing combat-ready personnel to support US tactical air forces around the world.

In testimony to its multiple-response capability, TAC's fighter, reconnaissance, special operations, and airlift forces logged more than 700,000 flying hours this past year. TAC forces are engaged in a wide range of activities that include a worldwide security role, participation in training exercises, disaster-relief operations, and pollution eradication.

As an example of its responsiveness, during the crisis in the spring of 1972 when the North Vietnamese invaded South Vietnam, TAC reacted quickly to deploy 250 aircraft and 7,000 people. It was a remarkable demonstration of the flexibility of land-based tactical airpower, a feat that has significant bearing on future American military capabilities in a world climate that is undergoing subtle and important changes. Gen. William W. Momyer, TAC's Commander, has noted that this deployment exemplified the highest standards of performance by all TAC people. He termed the deployments "a hallmark of USAF performance and clear demonstration of the responsiveness of tactical airpower."

In support of humanitarian requirements, a major operation took place when TAC C-130 airlift forces assisted in flood rescue operations during June 1972 in the coastal areas struck by Tropical Storm

TAC'S LEADERS THROUGH THE YEARS

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	

Gen. William W. Momyer has commanded TAC since August 1968. He is a fighter ace who has Tactical Air Command experience dating back to the 1940s. He is a graduate of the Air War College and the National War College, has served in senior posts on the Air Staff; as Commander, ATC; Commander, Seventh Air Force; and Deputy Commander, Air Operations, MACV.

TAC C-130s head for Iceland to assist in evacuation of nearby Heimaei Island, scene of an erupting volcano.

TACTICAL AIR COMMAND

Headquarters, Langley AFB, Va.

Commander
Gen. William W. Momyer

9th Air Force
Hq., Shaw AFB, S. C.
Maj. Gen. Roger K. Rhodarmer
Commander

19th Air Force
Hq., Seymour Johnson AFB, N. C.
Maj. Gen. Woodard E. Davis, Jr.
Commander

12th Air Force
Hq., Bergstrom AFB, Tex.
Maj. Gen. Gordon F. Blood
Commander

Langley AFB, Va.
4500th Air Base Wing
1st Aerial Port Gp.
2d Aircraft Delivery Gp.
480th Recon Technical Gp.

Pope AFB, N. C.
1st Aeromedical Evacuation Gp.

Nellis AFB, Nev.
USAF Tactical Fighter Weapons Center
57th Fighter Weapons Wing
F-4, F-111A/E, F-105
USAF Aerial Demonstration Sqdn.

England AFB, La.
4410th Special Operations Training Gp.

Eglin AAF, No. 9, Fla.
(Hurlburt Field)
USAF Air-Ground Operations School

Eglin AFB, Fla.
*USAF Special Operations Force

Eglin AFB, Fla.
*USAF Tactical Air Warfare Center

Eglin AAF, No. 9, Fla.
(Hurlburt Field)
1st Special Operations Wing
O-2, OV-10, T-28, UH-1, C-123, C-130, AC-130
USAF Special Operations School

*Tenant Unit

Agnes. TAC crews flew some sixty sorties during this operation, delivering more than 117 tons of food, medical supplies, and equipment.

In another operation in late December, TAC C-130s, loaded with relief supplies, were the first US military aircraft to land in Managua, Nicaragua, within hours after an earthquake had devastated the city. A TAC Air Transport Hospital, complete with medical staff, also was airlifted to Managua. This past February, exceptionally heavy snows blanketed much of the south, and TAC helicopters from Shaw AFB, S. C., rescued 716 citizens and delivered 21,000 pounds of relief supplies during the emergency.

TAC's responsibility to maintain sufficient tactical airpower in position to meet all contingencies requires heavy emphasis on training. During this past year, thousands of

TAC personnel participated in a score of major exercises, providing joint training in tactical airlift, fighter tactics, reconnaissance, close air support, interdiction, air defense, special operations, and electronic warfare.

TAC operations are conducted with emphasis on efficiency, safety, and economy, with an active cost-reduction program in effect throughout the command. Benefits from this program exceeded $23.8 million this past year alone.

Progress also is being made in the development of future weapon systems for TAC: the Airborne Warning and Control System (AWACS) aircraft made its first flight in 1972, as did the A-10 (the aircraft designed to provide a much needed close air support weapon system; *see also p. 41)*, and the F-15 air-superiority fighter. Plans have also been announced to replace the C-130 medium transport with an Advanced Medium Short Takeoff and Landing Transport (AMST). Competitive prototype production contracts have been awarded to both Boeing Co. and McDonnell Douglas Corp.

The men and women of TAC continue to respond globally in support of national objectives—with pride and enthusiasm. ■

NINTH AIR FORCE (TAC)

Headquarters, Shaw AFB, S. C.

Commander
Maj. Gen. Roger K. Rhodarmer

Pope AFB, N. C.
839th Air Div.
317th Tactical Airlift Wing (839th AD)
C-130E

MacDill AFB, Fla.
1st Tactical Fighter Wing
F-4E

Shaw AFB, S. C.
363d Tactical Recon Wing
RF-4C, EB-66C/E
507th Tactical Control Gp.
68th Tactical Air Support Gp.

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

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

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

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

Langley AFB, Va.
*316th Tactical Airlift Wing (839th AD)
C-130E

Eglin AFB, Fla.
*33d Tactical Fighter Wing
F-4E

Eglin AAF, No. 9, Fla.
(Hurlburt Field)
823d Civil Engineering Sqdn.

*Tenant Unit

TWELFTH AIR FORCE (TAC)

Headquarters, Bergstrom AFB, Tex.

Commander
Maj. Gen. Gordon F. Blood

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

McConnell AFB, Kan.
*561st Tactical Fighter Sqdn. (SAC)
F-105G

Cannon AFB, N. M.
832d Air Div.
27th Tactical Fighter Wing (832d AD)
F-111D, T/AT-33A

Bergstrom AFB, Tex.
67th Tactical Recon Wing
RF-4C
602d Tactical Control Gp.
71st Tactical Air Support Gp.

Nellis AFB, Nev.
474th Tactical Fighter Wing
F-111A
820th Civil Engineering Sqdn.

Little Rock AFB, Ark.
834th Air Div.
314th Tactical Airlift Wing (834th AD)
C-130E

Forbes AFB, Kan.
313th Tactical Airlift Wing (834th AD)
C-130E

Luke AFB, Ariz.
58th Tactical Fighter Training Wing
F-4C, F-104G

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

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

Dyess AFB, Tex.
*463d Tactical Airlift Wing (SAC)
(834th AD)
C-130E

Davis-Monthan AFB, Ariz.
*355th Tactical Fighter Wing
A-7D, DC-130A, CH-3

Holloman AFB, N. M.
49th Tactical Fighter Wing
F-4D

*Tenant Unit

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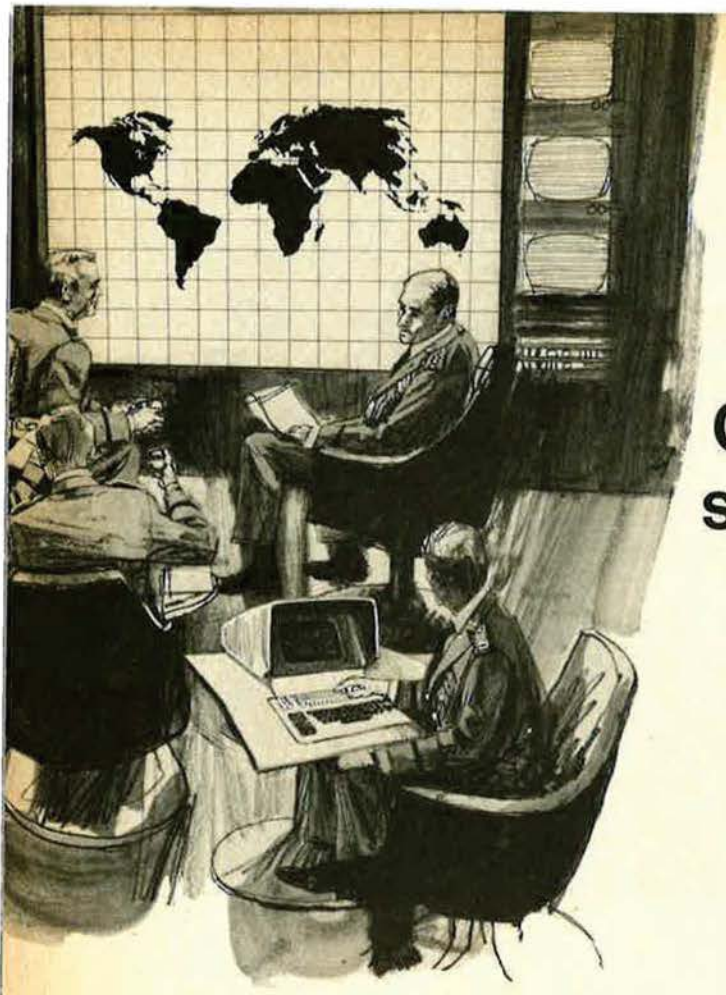

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A MAJOR AIR COMMAND

UNITED STATES AIR FORCES IN EUROPE

With more than ninety-seven percent of its forces now concentrated in combat units, the United States Air Forces in Europe (USAFE) continues to streamline and improve its operations.

Commanded by Gen. David C. Jones, USAFE has cut its numbered air force staffs to a fraction of their former manning. Third Air Force, which commands the units in the United Kingdom, is now located on a tactical air base at RAF Mildenhall. Seventeenth Air Force has completed its move to Sembach AB, Germany, and controls the units in central Europe. Sixteenth Air Force, also a tightly knit operational element, continues to operate from Torrejon AB, Spain, to administer in the Mediterranean.

The USAFE Headquarters itself has relocated from the city of Wiesbaden to Ramstein AB, collocating there with Fourth Allied Tactical Air Force, also commanded by General Jones. In wartime, most USAFE forces in Europe would become part of the North Atlantic Treaty Organization. The collocation of USAFE and Fourth ATAF headquarters at Ramstein provides better command and control of both organizations and closer cooperation on a day-to-day basis.

Equipment has been upgraded during the last year to give the command the instant response necessary for deterrence. At RAF Lakenheath, F-4 Phantoms have replaced the F-100 Super Sabres of the 48th Tactical Fighter Wing. USAFE now has only F-4s or swing-wing F-111 fighter-bombers in the tactical fighter and reconnaissance

USAFE'S LEADERS THROUGH THE YEARS

Lt. Gen. John K. Cannon	Aug. 16, 1945	Mar. 2, 1946
Maj. Gen. Idwal H. Edwards	Mar. 2, 1946	Aug. 14, 1947
Brig. Gen. John F. McBlain	Aug. 15, 1947	Oct. 20, 1947
Lt. Gen. Curtis E. LeMay	Oct. 20, 1947	Oct. 15, 1948
Lt. Gen. John K. Cannon	Oct. 16, 1948	Jan. 20, 1951
Gen. Lauris Norstad	Jan. 21, 1951	July 26, 1953
Lt. Gen. William H. Tunner	July 27, 1953	June 30, 1957
Gen. Frank F. Everest	July 1, 1957	July 31, 1959
Gen. Frederic H. Smith, Jr.	Aug. 1, 1959	June 30, 1961
Gen. Truman H. Landon	July 1, 1961	July 31, 1963
Gen. Gabriel P. Disosway	Aug. 1, 1963	July 31, 1965
Gen. Bruce K. Holloway	Aug. 1, 1965	July 31, 1966
Gen. Maurice A. Preston	Aug. 1, 1966	July 31, 1968
Gen. Horace M. Wade	Aug. 1, 1968	Jan. 31, 1969
Gen. Joseph R. Holzapple	Feb. 1, 1969	Aug. 31, 1971
Gen. David C. Jones	Sept. 1, 1971	

inventory. The F-111s are combat ready, with seventy-two authorized to the 20th Tactical Fighter Wing at RAF Upper Heyford, England.

The F-111s have shown their extended capability with nonstop flights to Tehran, Iran, where the Shah viewed the Air Force's newest fighter. Other flights have taken the F-111 to Norway, Turkey, Greece, and Spain to show its impressive capability.

Other developments include the start of the USAFE Tactical Forces Employment School at Zaragoza AB, Spain, and the upgrading of the 406th Tactical Fighter Training Group to wing status. Giving crew members a detailed analysis of Warsaw Pact capabilities and tactical employment concepts, the school also outlines NATO's capability to counter the posed threat.

In other actions, guided bombs, used with great success in Vietnam, add new punch to the USAFE weapon inventory.

To keep air crews sharp, they regularly deploy to the weapons ranges near Zaragoza or Aviano AB, Italy. Another operational plus was a realistic test in October when the first USAFE Radar Bomb Scoring/Electronic Warfare Competition was held at Ramstein AB. Both F-4 and F-111 aircraft flew low-level, all-weather navigation and bomb-delivery simulated missions. The highly successful meet will become an annual event in USAFE.

The 601st Tactical Control Wing at Sembach AB is being beefed up to provide better mobile communications and tactical air control in the field. Forward air controllers regularly join the US Army to direct the close air support provided by USAFE.

Just completed is the fourth annual test of the dual-basing concept. The 49th Tactical Fighter Wing from Holloman AFB, N. M., deployed to Hahn and Bitburg ABs in Germany to provide additional firepower to NATO. The exercise, called Crested Cap IV, was conducted during a sixty-day period in February and March 1973. USAFE units regularly participate in many NATO exercises. The permanently assigned tactical fighter wings provided tactical air support during the Army's Reforger IV, NATO Strong Express, and Deep Furrow '72, to name a few.

Because people are the most important part of USAFE, programs designed to improve their lives are continually active. From married first-term airmen, to men living in the dormitories, to minority groups, projects designed to enhance all are established.

For the married first-termer, MAST (Married Airmen Survival Training) has been developed to help these lower-ranking men better help themselves in the high-cost living areas in Europe.

Gen. David C. Jones has been CINCUSAFE since September 1971. General Jones has had previous USAFE experience, serving as USAFE IG, DCS/Plans and Operations, and Chief of Staff, as well as Vice CINC. Other key positions included assignments as DCS/Operations, Seventh Air Force; Vice Commander, Seventh Air Force; and Commander, Second Air Force. As CINCUSAFE, General Jones, who is a National War College graduate, also commands the Fourth Allied Tactical Air Force.

UNITED STATES AIR FORCES IN EUROPE

Headquarters, Ramstein AB, Germany

Commander in Chief
Gen. David C. Jones

3d Air Force	16th Air Force	17th Air Force
Hq., RAF Mildenhall, England	Hq., Torrejon AB, Spain	Hq., Sembach AB, Germany
Maj. Gen. James E. Hill	Maj. Gen. Sanford K. Moats	Maj. Gen. Robert W. Maloy
Commander	Commander	Commander

MAJOR OPERATIONAL UNITS AND MISSION AIRCRAFT OF USAFE

UNIT	LOCATION	AIRCRAFT
10th Tac Recon Wing	RAF Alconbury, England	RF-4C
48th Tac Fighter Wing	RAF Lakenheath, England	F-4D
20th Tac Fighter Wing	RAF Upper Heyford, England	F-111E
81st Tac Fighter Wing	RAF Bentwaters/Woodbridge, England	F-4C, F-4D
67th Air Rescue & Recovery Sqdn.	RAF Woodbridge, England	HC-130H, HH-53
513th Tac Airlift Wing	RAF Mildenhall, England	TAC Rotational C-130, Rotational KC-135/RC-135
401st Tac Fighter Wing	Torrejon AB, Spain	F-4E
86th Tac Fighter Wing	Ramstein AB, Germany	F-4E
322d Tac Airlift Wing	Rhein-Main AB, Germany	TAC Rotational C-130, C-9, ANG KC-97 Rotational
26th Tac Recon Wing	Zweibrucken AB, Germany	RF-4C
36th Tac Fighter Wing	Bitburg AB, Germany	F-4E, F-4D
50th Tac Fighter Wing	Hahn AB, Germany	F-4E, F-4D
32d Tac Fighter Sqdn.	Camp New Amsterdam, Netherlands	F-4E
52d Tac Fighter Wing	Spangdahlem AB, Germany	F-4C, F-4D

On-base dormitory living conditions are being improved through funds provided by the Federal Republic of Germany. The money is used to improve rooms, sanitation facilities, and community areas.

More than 20,000 command members have completed the race-relations program to foster better understanding between majority and minority racial and ethnic groups. A command-wide sickle cell testing program is in progress.

These are just a few of the many command people programs. Alcoholic rehabilitation centers are now in operation at two USAFE bases, and a new drug urinalysis laboratory to handle all tests is now processing some 2,000 specimens monthly for all US forces in Europe.

Another USAFE innovation is the Career Advancement Program (CAP), which provides on-base, on-duty education to young under-educated airmen to improve basic skills.

People programs in USAFE carry a priority equal to the tactical mission. In both areas, progress has been significant. Living conditions have improved despite budget austerity, and, operationally, USAFE streamlining and modernization have provided greater combat capability in support of NATO and US interests. ■

Sgt. Russell J. Benoit, left, and A1C Richard J. Carbonell guard F-4 Phantom. These airmen deployed to Europe for Crested Cap IV exercise in February 1973.

Deputy Supreme Allied Commander Europe, British Army Gen. Sir Desmond Fitzpatrick, talks with USAF Lt. Col. R. P. Pearson.

Relationship of Major USAFE Units to NATO Chain of Command for Air

Supreme Headquarters Allied Powers, Europe
Gen. Andrew J. Goodpaster
Supreme Allied Commander, Europe

Allied Forces Central Europe
Gen. Juergen Bennecke, G.A.
Commander in Chief

4th Allied Tactical Air Force
Gen. David C. Jones
Commander

1st Canadian Air Group
Brig. Gen. K. E. Lewis
Commander

1st German Air Force Div.
Maj. Gen. C. H. Greve
Commander

2d German Air Force Div.
Brig. Gen. Klaus Eschenbach
Commander

3d Air Force (USAFE)
Maj. Gen. James E. Hill
Commander

17th Air Force (USAFE)
Maj. Gen. Robert W. Maloy
Commander

32d Army Air Defense Command (USA)
Maj. Gen. C. J. Le Van
Commander

Transcribing a communication—part of USAFSS's monitoring process.

A MAJOR AIR COMMAND

USAF SECURITY SERVICE

In its twenty-five years of existence, the United States Air Force Security Service (USAFSS) has grown from a small cadre of eleven officers and a handful of enlisted men on loan from the Army to a full-fledged member of the aerospace community.

USAFSS was activated October 20, 1948, at Arlington Hall Station, Va., charged with a cryptologic mission and the task of providing communications security for the relatively new Department of the Air Force.

During the years that followed, USAFSS—now headquartered at Kelly AFB, Tex.—continued to grow in strength and expand its operations throughout the world. It reached a peak strength of nearly 30,000 people in 1963. USAFSS strength remained relatively stable during the Vietnam conflict, at an average of 27,500. As the command entered a new decade, however, the personnel strength gradually declined as pressure to reduce operations and maintenance costs resulted in base closures and unit stand-downs.

In its Silver Anniversary year, USAFSS has slightly more than 20,000 people assigned to its more than fifty locations in twelve countries of the free world, and its total Fiscal Year 1973 budget is $248 million.

USAFSS has also undergone organizational and operational changes within the past year. It now functions as a major command within the policy constraints required by triservice relationships. It is the Air Force component of the Central Security Service (CSS), which also includes the Army Security Agency and Naval Security Group.

Besides its Signals Intelligence (SIGINT) mission performed for CSS, the command provides communications security (COMSEC) services for US Air Force commanders and maintains data and an analytic center for Air Force electronic-warfare planning and operations.

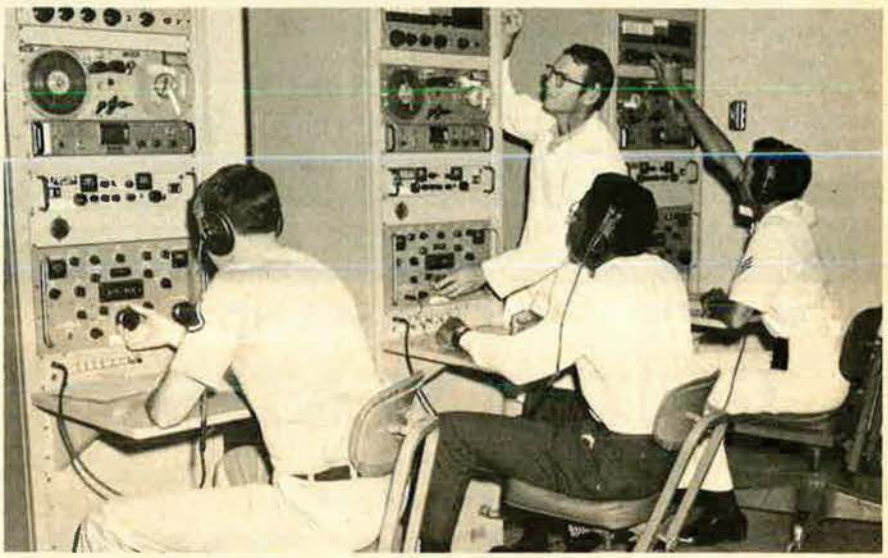
To perform its COMSEC mission successfully, USAFSS provides materials and services necessary to safeguard information of intelligence value that is transmitted electrically. This involves buying,

USAFSS'S LEADERS THROUGH THE YEARS

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	

Loose talk on the telephone—the greatest single security threat in Air Force communications—is constantly guarded against.

Maj. Gen. Walter T. Galligan has been Commander of the USAF Security Service since February 1973. He was Commandant of Cadets at the Air Force Academy prior to his present assignment. He has held assignments in the Office of the Secretary of the Air Force, as USAFE Director of Operations, and as Seventh Air Force Director of Combat Operations, and has commanded fighter wings in Europe and Vietnam.



Students at USAFSS's Technical School, Goodfellow AFB, Tex., include Army and Navy as well as USAF personnel.

storing, distributing, accounting for, and providing depot maintenance and technical assistance for cryptographic devices and materials required to make USAF communications networks secure. USAFSS also manages the Air Force COMSEC education program and provides advisory services and materials to support the major command education programs.

In providing these services to the major commands, USAFSS operators monitor and evaluate all vulnerable USAF communications systems to detect and correct improper transmission procedures and faulty COMSEC equipment, and to determine if classified information is being transmitted over unsecure systems.

The surveillance aspect of this COMSEC function is performed by units located in each major theater of Air Force operations. Specially equipped mobile teams often fly on aircraft of other commands to spot-check air-to-air and air-to-ground communications and provide on-the-spot technical assistance.

Current USAFSS missions dictate the use of the most sophisticated electronic and cryptographic equipment available. The USAFSS equipment inventory ranges from small, inexpensive cryptographic materials through modern data recorders and computers to specially designed high-frequency and very-high-frequency receivers and antenna systems. Some antennae cover acres of land and extend more than 100 feet into the air.

Because of the type of equipment used and the deployment pattern required to spot-check Air Force air-to-air and air-to-ground communications for security evaluation, USAFSS units also perform direction-finding and range-estimation functions in support of search and rescue operations.

Since 1948, USAFSS organizations have earned eighty-eight Air Force Outstanding Unit Awards, two Presidential Unit Citations, the Navy Meritorious Unit Commendation, and two special awards for outstanding contributions to the national cryptologic effort.

Maj. Gen. Walter T. Galligan assumed command of USAFSS in February 1973, the tenth man to head the globally dispersed organization. His vice commander is Brig. Gen. Erwin A. Hesse. ■

A USAF team directs relief air traffic following earthquake in Nicaragua.

A MAJOR AIR COMMAND

UNITED STATES AIR FORCES SOUTHERN COMMAND

The US Air Forces Southern Command (USAFSO), with headquarters in the Canal Zone, is the USAF major command in Latin America and the air component of the unified US Southern Command.

Commanded by Maj. Gen. Arthur G. Salisbury, USAFSO operates two Air Force bases in the Canal Zone —Albrook and Howard—and supports Air Force detachments in most of the Central and South American countries. In addition to its responsibility for providing the air element for defense of the Panama Canal area, USAFSO furnishes assistance and training to Latin American air forces and provides logistic and other support for US Military groups and their Air Force sections in fifteen of the twenty Latin American republics.

Headquarters of the command is at Albrook AFB, along with the Inter-American Air Forces Academy, the 1978th Communications Group (AFCS), and USAF Tropic Survival School (ATC). Air Force flying activity is conducted from Howard AFB, headquarters base for the command's 24th Special Operations Group and its assigned squadrons. Also operating out of Howard are Det. 2, 39th Aerospace Rescue and Recovery Wing (MAC), and rotational aircraft detachments from the Tactical Air Command and Air Force Reserve.

USAFSO'S LEADERS THROUGH THE YEARS

Maj. Gen. Willis H. Hale	Nov. 13, 1947	Oct. 19, 1949
Brig. Gen. Rosenham Beam	Oct. 20, 1949	Nov. 5, 1950
Brig. Gen. Emil C. Kiel	Nov. 6, 1950	June 10, 1953
Maj. Gen. Reuben C. Hood, Jr.	June 11, 1953	June 16, 1956
Maj. Gen. Truman H. Landon	June 20, 1956	June 1, 1959
Maj. Gen. Leland S. Stranathan	Aug. 3, 1959	Sept. 8, 1963
Maj. Gen. Robert A. Breitweiser	Sept. 11, 1963	July 9, 1966
Maj. Gen. Reginald J. Clizbe	Aug. 6, 1966	June 14, 1968
Maj. Gen. Kenneth O. Sanborn	June 14, 1968	Apr. 7, 1972
Maj. Gen. Arthur G. Salisbury	Apr. 7, 1972	

Formerly Caribbean Air Command.
Redesignated US Air Forces Southern Command July 8, 1963.

To carry out its air operations, USAFSO has operational control of C-130, C-123K, C-118, A-7D, O-2, UH-1N, and HH-3E aircraft. The C-130 and A-7D aircraft and personnel are on rotational duty from TAC. The C-123K Providers are flown by Air Force Reserve personnel on temporary duty, and the HH-3E helicopters are assigned to the Military Airlift Command's 39th Aerospace Rescue and Recovery Wing.

Most of the formal training offered by the command to officers and airmen of Latin American air forces is conducted by the Inter-American Air Forces Academy, which last year won Outstanding Unit Award recognition for its service in helping promote western hemisphere security and solidarity. Courses are conducted in Spanish by bilingual US and Latin American air force instructors.

Civic action, humanitarian, and disaster relief activities are an important part of the USAFSO mission. Cargo aircraft serving with USAFSO were the first to take relief supplies and personnel to Managua following the earthquake that devastated the Nicaraguan capital last December. Among other missions during the year, planes of the command airlifted food, clothing, and medical supplies to flood victims in Peru and supported civic-action missions by airlifting heavy equipment and materials for building roads, schools, and settlements in remote areas of Bolivia, Chile, Colombia, Costa Rica, and Panama.

USAFSO is also responsible for coordinating joint search and rescue operations of US air, sea, and ground forces in Latin America. During 1972, the USAFSO Rescue Coordination Center at Albrook, which is manned by personnel of MAC's Aerospace Rescue and Recovery Service, answered calls to aid more than 400 sick, injured, or lost persons and saved twenty-six lives. ■

Maj. Gen. Arthur G. Salisbury has been USAFSO Commander since April 7, 1972. A fighter group commander during WW II, he has many years of air defense experience, serving as Vice Commander, 29th Air Division; Commander, New York Air Defense Sector and New York NORAD Sector; J-3, NORAD/CONAD; DCS/Plans, Hq. ADC; and Chief of Staff, ADC, from 1970–72, among other key posts.

Checking pay and allotment records, the job of AFAFC personnel.

A SEPARATE OPERATING AGENCY

Air Force Accounting and Finance Center

When activated at Denver, Colo., in 1951, the then Air Force Finance Center's primary responsibility was to manage the allotment system for the Air Force. The passing years have seen the mission of the Center increase tenfold.

The first major change occurred in 1956 when the Center assumed the responsibility of accounting for all Air Force appropriations. Concurrent with this change, the Center was renamed the Air Force Accounting and Finance Center (AFAFC).

Today's AFAFC has three areas of responsibility: operation of a centralized pay system for active and retired military personnel; providing Air Force policy on all accounting and finance matters; and operation of a centralized accounting and reporting system for all Air Force appropriations and funds. Indicative of the proliferation of missions has been the increased responsibility placed upon the com-

mander. Not only does the current Commander, Brig. Gen. Larry M. Killpack, shoulder command responsibility for the Center, but also an Air Staff responsibility as the Assistant Comptroller of the Air Force for Accounting and Finance.

The fastest growing area of activity at the Center is in the Directorate of Military Pay Operations. Presently, the Center has on its IBM 360-65 computer pay records of all Air Force personnel stationed in Europe, Southeast Asia, Japan, Korea, Alaska, Southern Command, and various isolated areas outside the continental limits of the country. In addition, through the Directorate of Reserve and Retired Pay, the Center maintains the pay accounts and directly pays all Air National Guard officers and Reserve Forces as well as Air Force retirees.

As it did in 1951, the Center still manages the allotment system for Air Force personnel, active duty and retired. In December 1972, the Center deducted nearly $115 million from active-duty and retired paychecks for payment to dependents, insurance companies, deposit in banks, and other financial institutions, as well as the purchase of savings bonds.

The continuing centralization of pay remains of prime importance as the Center and the Air Force move toward full implementation of the Joint Uniform Military Pay System (JUMPS). Under JUMPS, pay and leave accounting for all active-duty Air Force personnel will be done by the Directorate of Military Pay Operations. The leave accounting portion of the system was put into effect Air Force-wide in October 1971, and, during the past year, the pay portion was implemented at Clark Air Base in the Philippines and Bergstrom AFB, Tex. When JUMPS is in full operation, more than 700,000 pay and leave accounts will be maintained at the Center.

One of the most formidable tasks at AFAFC is to provide full disclosure of the financial condition of the USAF. As the central focal point for the financial systems of the Air Force, the Center provides, through its Directorate of Accounting Systems, a continuous flow of accurate and timely financial data to the Air Staff, Department of Defense, Office of Management and Budget, and the Congress. This information, in turn, provides those agencies the data base from which the dollar resources required to support the Air Force mission are justified.

As Commander, Air Force Accounting and Finance Center, and Assistant Comptroller of the Air Force for Accounting and Finance, Brig. Gen. Larry M. Killpack has been on the job since September 1971. The General is a graduate of the Industrial College, with an M.B.A. and an M.A. in international affairs. He has commanded the 8th and 12th TAC Fighter Wings in SEA and served in a number of AFSC posts.

As the consolidation of accounting and finance within the Air Force develops, AFAFC will continue to fulfill its job in the total Air Force mission. Its own record of timeliness and accuracy is a standard to live up to. ■

A SEPARATE OPERATING AGENCY

Air Force Audit Agency

The Air Force Audit Agency (AFAA) is a Separate Operating Agency with sole responsibility for the Air Force's internal auditing. Its Commander, Brig. Gen. (Maj. Gen. selectee) Henry Simon, also wears two other hats: USAF Auditor General, and the Assistant Comptroller of the Air Force for Audit.

Headquarters for AFAA is at Norton AFB, Calif. The Auditor General, his civilian deputy, Trenton D. Boyd, and the staff are located there. The Associate Auditor General, another civilian, Orion Y. Row, and his staff (whose prime function is to represent and act for the Auditor General at Hq. USAF) are located at the Pentagon.

AFAA has consisted historically of an evenly mixed military and civilian work force that, in 1965, reached a peak of about 3,000 internal and contract auditors. That year, contract auditors were withdrawn from the individual service audit organizations and reorganized within the Department of Defense. Since then, the agency has decreased numerically to a worldwide total of approximately 1,120 people.

AFAA's mission is to provide all levels of Air Force management with an independent, objective, and constructive evaluation of the effectiveness and efficiency with which managerial responsibilities are being carried out in financial, operational, and support activities.

This broad mission is delineated by public law, the General Accounting Office, the Department of Defense, and Air Force regulations. Under public law, the responsibility for internal audit rests with the Comptroller of the Air Force. He, in turn, has delegated the authority and responsibility for accomplishing the audit mission to the Auditor General. Although General Simon reports directly to the Comptroller of the Air Force, he has a direct line of communication to the Assistant Secretary of the Air Force for Financial Management.

Air Force auditors examine policies, systems, and procedures related to the consumption of resources—men, money, and material. Particular audit emphasis is placed in areas having the bulk of the Air Force investment, as well as on assets susceptible to loss and/or misappropriation.

AFAA has auditors in resident offices at major USAF installations worldwide. The Auditor General controls and supervises these resident offices through geographic regions and functional divisions. By

having auditors "where the action is" continual contact is maintained with all levels of USAF management. This organizational posture permits instantaneous response to local management problems while permitting priority response to conditions that are Air Force-wide in scope.

Operationally, the organization has three major divisions and four regions. Each region has about twenty-five Auditor General Resident Offices (AGROs). Western Region headquarters is located at Norton AFB, Calif.; Central Region headquarters is at Carswell AFB, Tex.; Eastern Region, Langley AFB, Va., is responsible for installations in its area of the US and Puerto Rico, the Canal Zone, and Greenland. European Region is headquartered at Lindsey AS, Germany.

AFAA's audit divisions are set up according to function. For example, the Logistic Systems Division provides coverage to AFLC and supervises audits at the five Air Force Materiel Areas. Acquisition Systems Division serves AFSC and manages audit efforts at Air Force buying divisions. The Service-Wide Systems Division, located at Norton AFB, centrally directs and manages audits of standard Air Force-wide systems. In addition, this division supervises audit offices at three major centers: the Data Systems Design Center, the Accounting and Finance Center, and the Military Personnel Center.

The divisions and regions are composed of 124 audit offices—104 Auditor General Resident Offices (AGROs) and twenty operating locations. A typical region AGRO is staffed with five people, while an operating location normally has two or three auditors assigned. Each AGRO is headed by a military or civilian chief, called a resident auditor. The AGRO is organizationally independent of the base and reports directly to the Auditor General through its appropriate divisional or regional headquarters.

Each military and civilian auditor is encouraged to further his professional development. AFAA provides a balanced mixture of training and career development programs, including on-the-job and internal classroom training, and training available through Air Training Command, colleges, universities, and other federal agencies.

The Air Force Audit Agency is a service organization dedicated to providing quality audit assistance to all levels of Air Force management. ■

Brig. Gen. Henry Simon assumed command of the Air Force Audit Agency on March 1, 1973. During WW II, he was a pilot with the 1st Air Commando Group in the CBI. The new Auditor General holds an M.A. in management and an M.B.A. He has served as AFLC's IG and Assistant DCS/Materiel Management, as well as in other staff positions in the Defense Supply Agency and Hq. USAF.

Managing information: a computer program tape bank.

A SEPARATE OPERATING AGENCY

Air Force Data Automation Agency

The Air Force Data Automation Agency (AFDAA) was established as a Separate Operating Agency on February 29, 1972, to provide automatic data processing support to Hq. USAF, major commands, bases, the Office of the Secretary of Defense (OSD), and other federal and separate operating agencies.

Maj. Gen. Jack B. Robbins has been USAF's Director of Data Automation since 1971. A former troop carrier squadron commander, he has also served previously in the office of the Air Force Comptroller; as Director of Special Investigations, OSI; and as Chief of Staff, AFCS.

Computer programming: an essential function of the Air Force Data Automation Agency.

This mission is accomplished through AFDAA's three subordinate units: the Air Force Data Services Center, the Air Force Data Systems Design Center, and the Federal Automatic Data Processing Simulation Center.

The headquarters element of the Agency is located at Gunter AFB, Ala. The Agency commander is assigned to the Pentagon, where he serves in a second capacity as the Air Force Director of Data Automation.

The operating philosophy of AFDAA allows the three centers a high degree of operating autonomy in carrying out their assigned missions. Direct access to the centers by the activities they serve ensures prompt response to the users. Direct communication between the offices and agencies supported by the various centers without references to the AFDAA is the normal procedure on matters pertaining to support and services.

The oldest subelement of the AFDAA is the **Air Force Data Services Center.** It was formerly a field extension of the Air Staff and is located in the Pentagon. It provides automatic data processing, computing, and management science services to Hq. USAF, OSD, and other agencies. It also plans, designs, develops, and implements computer-based management information systems in support of these agencies.

The second subelement is the **Air Force Data Systems Design Center** at Gunter AFB. Its commander also serves as vice commander of the AFDAA. AFDSDC is responsible for designing and programming standard computer systems for management application throughout the Air Force. It is recognized as a technological leader in the development and maintenance of management information systems.

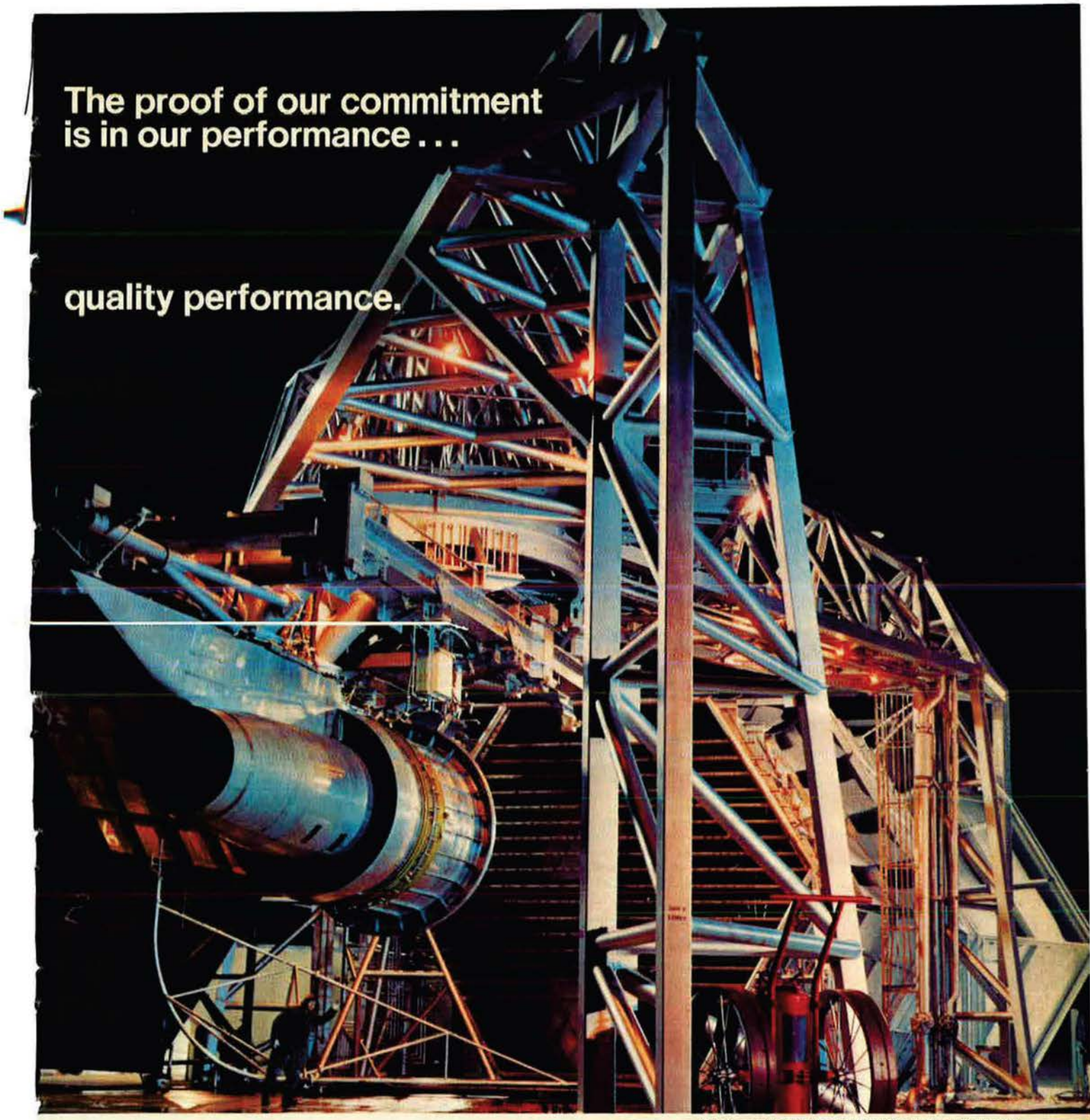
AFDSDC is continuously working on hundreds of projects, which include maintaining existing computer systems, refining them, and developing new systems. During the past fiscal year, the Center made nearly 2,000 computer program releases, produced more than 5,500,000 pages of documentation in support of these programs, and maintained more than 43,000 pages of formal Data Automation Support manuals.

The third subelement, the **Federal Automatic Data Processing Simulation Center,** is unique in the government. Located in the Washington, D. C., area, it was established in July 1972 by the General Services Administration (GSA) to provide computer performance-evaluation services to all agencies of the federal government. Because of its recognized expertise in this developing discipline, the Air Force was designated Executive Agent to operate this Center for the GSA.

The Center is financially underwritten by the Automatic Data Processing Revolving Fund to provide a source for advanced techniques of computer performance-evaluation services on a fully reimbursable basis. Projects include computer operations analysis work for such agencies as the Internal Revenue Service and the Atomic Energy Commission; computer network and work-load analyses for the GSA; design of special-purpose computers for the Navy; and computer program analysis and improvement for numerous civil agencies.

The Center has a full range of computer performance tools, including simulation languages and packages, hardware and software monitors, and analytical routines. New developments in the field are closely observed to ensure that the Center remains at the forefront of the state of the art in performance evaluation.

This Simulation Center is the first of several centers of government expertise planned by GSA. In addition to technical services, the Center is also delegated GSA's government-wide procurement authority for computer performance-evaluation products. ■



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ORIGINAL ARTISTS

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TITLE	1956	ARTIST
1.	Moonlight Gambler	Frankie Laine
2.	I Walk the Line	Johnny Cash
3.	Blue Suede Shoes	Elvis Presley
4.	Tutti Frutti	Elvis Presley
5.	Born to be With You	Cordettes
6.	Go Away Little Girl	Steve Lawrence
7.	I'm In Love Again	Fats Domino
8.	Blueberry Hill	Fats Domino
9.	Blue Monday	Fats Domino
10.	Just Walking in the Rain	Johnny Ray
11.	Since I Met You, Baby	Ivory Joe Hunter
12.	Long Tall Sally	Little Richard
13.	Love is Strange	Mickey & Sylvia
14.	Why Do Fools Fall in Love?	F. Lymon/Teenagers
15.	Canadian Sunset	Andy Williams
16.	The Fool	Sanford Clark

TITLE	1957	ARTIST
1.	Diana	Paul Anka
2.	That'll Be the Day	B. Holly/Crickets
3.	Oh, Boy	B. Holly/Crickets
4.	Come, Go With Me	Del-Vikings
5.	Whispering Bells	Del-Vikings
6.	Wonderful! Wonderful!	Johnny Mathis
7.	The Twelfth of Never	Johnny Mathis
8.	School Day	Chuck Berry
9.	Jamaica Farewell	Harry Belafonte
10.	Banana Boat Song	Harry Belafonte
11.	Bo Bop Baby	Ricky Nelson
12.	Stood Up	Ricky Nelson
13.	Butterfly	Charlie Gracie
14.	Party Doll	Buddy Knox
15.	Kisses Sweeter than Wine	Jimmie Rodgers
16.	Honey Comb	Jimmie Rodgers

TITLE	1958	ARTIST
1.	[illegible]	Buddy Holly
2.	Maybe Baby	B. Holly/Crickets
3.	Book of Love	Monotones
4.	Happy, Happy Birthday, Baby	Tune Weavers
5.	For Your Precious Love	Jerry Butler
6.	Susie Darlin'	Robin Luke
7.	Tears On My Pillow	Lit Anthony/Imperials
8.	Summertime, Summertime	Jamies
9.	Big Man	Four Preps
10.	Whole Lotta Lovin'	Fats Domino
11.	Sixteen Candles	Crests
12.	Summertime Blues	Eddie Cochran
13.	Johnny B. Goode	Chuck Berry
14.	A Lover's Question	Clyde McPhatter
15.	To Know Him is to Love Him	Teddy Bears
16.	Lonely Teardrops	Jackie Wilson

TITLE	1959	ARTIST
1.	There Goes My Baby	Drifters
2.	Lonely Boy	Paul Anka
3.	Put Your Head on my Shoulder	Paul Anka
4.	Teenager in Love	Dion
5.	Come Softly To Me	Fleetwoods
6.	Mr. Blue	Fleetwoods
7.	The Big Hurt	Tony Fischer
8.	Teen Angel	Mark Dinning
9.	Broken Hearted Melody	Sarah Vaugh
10.	We Got Love	Bobby Rydell
11.	Tragedy	Thomas Wayne
12.	M.T.A.	Kingston Trio
13.	Here Comes Summer	Jerry Keller
14.	Wonder	Stonewall Jackson
15.	It Doesn't Matter Anymore	B. Holly/Crickets
16.	Heartbeat	B. Holly/Crickets

TITLE	1960	ARTIST
1.	Blue Angel	Roy Orbison
2.	Lonely Teenager	Dion/Belmonts
3.	Where or When	Dion/Belmonts
4.	This Magic Moment	Drifters
5.	Harlem Nocturn	Viscounts
6.	Puppy Love	Paul Anka
7.	Georgia On My Mind	Ray Charles
8.	Chain Gang	Sam Cooke
9.	Walkin' to New Orleans	Fats Domino
10.	Mule Skinner Blues	Fender Men
11.	Tell Laura I Love Her	Ray Peterson
12.	Wild One	Bobby Rydell
13.	Calendar Girl	Neil Sedaka
14.	Devil or Angel?	Bobby Vee
15.	Rubber Ball	Bobby Vee
16.	Mr. Custer	Larry Verne

TITLE	1961	ARTIST
1.	Running Scared	Roy Orbison
2.	Candy Man	Roy Orbison
3.	Moody River	Pat Boone
4.	Spanish Harlem	Ben E. King
5.	Stand By Me	Ben E. King
6.	Some Kind of Wonderful	Drifters
7.	Twist	Chubby Checker
8.	Cupid	Sam Cooke
9.	The Mountain High	Dick & DeeDee
10.	Tonight	Ferrante & Teicher
11.	Gypsy Woman	Impressions
12.	This Time	Troy Shondell
13.	I've Told Every Little Star	Linda Scott
14.	A Hundred Pounds of Clay	Gene McDaniels
15.	Moon River	Henry Mancini
16.	Raindrops	Dee Clark

TITLE	1962	ARTIST
1.	Only Love Can Break a Heart	Gene Pitney
2.	If I Didn't Have a Dime	Gene Pitney
3.	She Cried	Jay & the Americans
4.	When My Little Girl is Smilin'	Drifters
5.	Up on the Roof	Drifters
6.	Twistin the Night Away	Sam Cook
7.	Shout	Joey Dee
8.	Sealed with a Kiss	Brian Hyland
9.	Torture	Kris Jensen
10.	Wolverton Mountain	Claude King
11.	Love Letters	Kasby Lester
12.	Let's Dance	Chris Montez
13.	Leah	Roy Orbison
14.	Any Day Now	Chuck Jackson
15.	The Night has a Thousand Eyes	Bobby Vee
16.	Shells	Tommy Roe

TITLE	1963	ARTIST
1.	Surfin USA	Beach Boys
2.	Hey, Baby	Bruce Channel
3.	Let Your Music Play	Drifters
4.	Ruby Baby	Dion
5.	Donna the Prima Donna	Dion
6.	Detroit City	Bobby Bare
7.	Rhythm of the Rain	Cascades
8.	Mean Women Blues	Roy Orbison
9.	Twenty Four Hours from Tulsa	Gene Pitney
10.	Man Who Shot Liberty Valance	Gene Pitney
11.	More	Kai Winding
12.	Silver Threads, Golden Needles	Springfields
13.	Since I Fell For You	Lenny Welch
14.	Puff the Magic Dragon	Peter, Paul, Mary
15.	If I had a Hammer	Peter, Paul, Mary
16.	Blowin in the Wind	Peter, Paul, Mary

TITLE	1964	ARTIST
1.	California Sun	Rivieras
2.	Fun, Fun, Fun	Beach Boys
3.	Needles and Pins	Searchers
4.	Comes A Little Bit Closer	Jay/Americans
5.	Oh, Pretty Woman	Roy Orbison
6.	Dawn	Four Seasons
7.	Glad All Over	Dave Clark 5
8.	Do You Love Me	Dave Clark 5
9.	She's About a Mover	Sir Douglas Quintet
10.	Wishin and Hopin	Dusty Springfield
11.	Suspicion	Terry Stafford
12.	Memphis	Johnny Rivers
13.	Don't Let Sun Catch You Cryin	Gerry/Pacemakers
14.	Under the Boardwalk	Drifters
15.	I Believe	Bachelors
16.	House of the Rising Sun	Animals

TITLE	1965	ARTIST
1.	It Was a Very Good Year	Frank Sinatra
2.	California Girls	Beach Boys
3.	Do You Wanna Dance	Beach Boys
4.	What the World Needs Now	Jackie DeShannon
5.	Mrs. Brown-Lovely Daughter	Herman's Hermits
6.	Baby the Rain Must Fall	Glen Yarborough
7.	Five O'Clock World	Vogues
8.	You Were On My Mind	We Five
9.	Spanish Eyes	Al Martino
10.	Down in the Boondocks	Billy Joe Royal
11.	Game of Love	Wayne Fontana
12.	You've Got Troubles/I've Got	Fortunes
13.	Keep on Dancin'	Gentrys
14.	Ferry Across the Mersey	Gerry/Pacemakers
15.	Cara Mia	Jay/Americans
16.	Some Enchanted Evening	Jay/Americans

TITLE	1966	ARTIST
1.	These Boots are Made for Walkin	Nancy Sinatra
2.	Soop John B	Beach Boys
3.	Bang Bang	Cher
4.	Red Rubber Ball	Cyrkle
5.	Cherry Cherry	Neil Diamond
6.	I Fought the Law	Bobby Fuller 4
7.	Love's Made a Fool of You	Bobby Fuller 4
8.	Elusive Butterfly	Bob Lind
9.	I Saw Her Again	Mamas & Papas
10.	Woman	Peter & Gordon
11.	Lady Godiva	Peter & Gordon
12.	Where Were You, Needed You	Grass Roots
13.	Georgia Girl	Seekers
14.	I'll Never Find Another You	Seekers
15.	A Place in the Sun	Stevie Wonder
16.	Quantanamera	The Sandpipers

TITLE	1967	ARTIST
1.	Baby I Need Your Lovin'	Johnny Rivers
2.	A Whiter Shade of Pale	Procol Harum
3.	San Francisco	Scott McKenzie
4.	Brown Eyed Girl	Van Morrison
5.	There's A Kind of Hush	Herman's Hermits
6.	Judy in Disguise	John Fred/Playboy Band
7.	To Love Somebody	Bee Gees
8.	San Francisco Nights	Animals
9.	Kentucky Woman	Neil Diamond
10.	Carrie-Anne	Hollies
11.	I'll Never Fall in Love Again	Tom Jones
12.	Jackson	N. Sinatra/L. Hazlewood
13.	Different Drum	Stone Poneys
14.	Silence is Golden	Tremeloes
15.	Somebody to Love	Jefferson Airplane
16.	White Rabbit	Jefferson Airplane

TITLE	1968	ARTIST
1.	Young Girl	G.Puckett/Union Gap
2.	This Magic Moment	Jay & Americans
3.	MacArthur Park	Richard Harris
4.	Abraham, Martin & John	Dion
5.	Words	Bee Gees
6.	The Unicorn	Irish Rovers
7.	The Look of Love	S. Mendes/Brazil '66
8.	Tuesday Afternoon	Moody Blues
9.	Hold Me Tight	Johnny Nash
10.	Simon Says	1910 Fruitgum Co.
11.	Rainblin', Gamblin' Man	Bob Seger System
12.	Born to be Wild	Steppenwolf
13.	Turn Around, Look at Me	Vogues
14.	My Special Angel	Vogues
15.	Master Jack	4 Jacks & a Jill
16.	She's a Heartbreaker	Gene Pitney

TITLE	1969	ARTIST
1.	Suspicious Minds	Elvis Presley
2.	In the Ghetto	Elvis Presley
3.	Everybody's Talkin'	Nilsson
4.	Good Morning Starshine	Oliver
5.	Jean	Oliver
6.	The Boxer	Simon & Garfunkel
7.	Games People Play	Joe South
8.	Traces	Classics IV
9.	Lodi	CCR
10.	Suite: Judy Blue Eyes	Crosby/Stills/Nash
11.	Sweet Caroline	Neil Diamond
12.	Laughing	Guess Who
13.	Ruby, Don't Take Love to Town	K. Rogers/1st Edition
14.	Baby, It's You	Smith
15.	Welcome Me Love	Brooklyn Bridge
16.	Ora	Three Dog Night

TITLE	1970	ARTIST
1.	Ride Captain Ride	Blue Image
2.	It Don't Matter to Me	Bread
3.	Ticket to Ride	Carpenters
4.	Make Me Smile	Chicago
5.	Knock Three Times	Dawn
6.	Your Song	Elton John
7.	Reflections of My Love	Marmalade
8.	Question	Moody Blues
9.	Big Yellow Taxie	Joe Neighborhood
10.	Mr. Bojangles	Nitty Gritty Dirt Band
11.	Band of Gold	Freddy Payne
12.	Black Magic Woman	Santana
13.	Celebrate	Three Dog Night
14.	Have You Ever Seen the Rain?	CCR
15.	For the Good Times	Ray Price
16.	Long, Long Time	Linda Ronstandt

TITLE	1971	ARTIST
1.	American Pie (Full Version)	Don McLean
2.	Superstar	Carpenters
3.	Joy to the World	Three Dog Night
4.	Colour My World	Chicago
5.	Night Drove Old Dixie Down	Joan Baez
6.	Stones	Neil Diamond
7.	She's a Lady	Tom Jones
8.	Me and Bobby McGee	Janis Joplin
9.	Me, You, a Dog Named Boo	Lobo
10.	Brand New Key	Melanie
11.	Without You	Nilson
12.	It's One of Those Nights	Partridge Family
13.	Moon Shadow	Cat Stevens
14.	Gypsies Tramps & Thieves	Cher
15.	I Don't Know How to Love Him	Yvonne Elliman
16.	Superstar (Jesus Christ)	M. Head/Trinidads

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A SEPARATE OPERATING AGENCY

Air Force Inspection and Safety Center

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But just *how* does the Air Force tick, scattered over the globe as it is?

Answering this seemingly impossible question is the challenging task assigned to a small, select group. Nearly 500 strong, they comprise the Air Force Inspection and Safety Center (AFISC), and their job is to provide the Chief of Staff, Gen. John D. Ryan, with a continuous sampling of the overall effectiveness of the Air Force. So armed, he, his staff members, and his commanders can then make intelligent, day-to-day management decisions to assure the combat readiness of the total forces.

A separate operating agency, the AFISC is tenanted at Norton AFB, a MAC aerial port facility located in the hub city of southern California, San Bernardino.

AFISC was one of four Pentagon field extensions redesignated as separate operating agencies of the Air Force on December 31, 1971. It is still a function of the Air Force Inspector General in Washington, D. C., and its Commander, Maj. Gen. Ernest C. Hardin, Jr., still carries the added Air Staff position of Deputy Inspector General for Inspection and Safety, Hq. USAF.

The Center superseded the 1002d Inspector General Group, which had been in existence since January 1950. At that time, Air Force flight safety functions located at Langley AFB, Hampton, Va., and readiness inspection activities headquartered at Kelly AFB, Tex., were brought together at Norton under the worldwide mantle of the IG.

Today, the Center has an authorized strength of 275 officers, fifty-five airmen, and 152 civilians, including fifty-three persons stationed at Kirtland AFB, N. M. Of sixteen attached personnel, seven are safety liaison representatives of major aerospace companies. Together, these people provide inspection and safety consultation services to Air Force management and monitor accident-prevention and investigation activities around the world.

AFISC is split into three primary mission directorates — Inspection, Aerospace Safety, and Nuclear Safety—and two support directorates—Programs and Requirements, and Data Automation. As Center Commander, General Hardin answers directly to the Inspector General, Lt. Gen. Louis L. Wilson, Jr., in Washington, D. C.

The Directorate of Inspection performs worldwide inspections of Air Force commands, separate operating activities, individual units, and Air Force contractor facilities. Its specialty and the backbone of the Air Force inspection program is the "no-notice unit effectiveness inspection," a concept inaugurated in July 1969 by General Ryan, himself a former Air Force IG. The Director of Inspection is Brig. Gen. (Maj. Gen. selectee) Evan W. Rosencrans, who leaves May 15 to become DCS/Plans at Hq. USAFE. His replacement will be Brig. Gen. Eugene B. Sterling.

The Directorate of Aerospace Safety has global responsibility for preventing and investigating explosives, flight, ground, missile, and space accidents. Its success in these endeavors annually saves the Air Force hundreds of millions of dollars in hardware and scores of lives. Brig. Gen. Robin Olds is the Director. On June 1, he will be succeeded by Brig. Gen. Charles E. Yeager, who, in 1947, became history's first man to fly faster than sound.

The directorate's Education Division publishes more than 300,000 pieces of literature monthly. Included are the Air Force's popular *Driver* and *Aerospace Safety* magazines, and the Safety Officer's Study Kits. The division also monitors college credit courses in flight, missile, ground, systems, and command safety at several of America's leading universities for USAF officers attending them, and flight safety courses for the personnel of forty-five allied nations.

The Reporting and Documents Division is the nation's only repository for all USAF accident records, its microfilmed files dating back to the first fatal military aircraft mishap in 1908.

The Directorate of Nuclear Safety is homogeneously situated in the nuclear community of Kirtland AFB. It develops and monitors Air Force policies, programs, standards, and procedures for preventing and investigating nuclear weapon system, reactor, and propulsion system accidents and incidents.

AFISC's members, each hand-picked, represent most functional specialties in the Air Force. Their jobs are tough, challenging, often frustrating, and sometimes unpopular. But the payoff is big: Air Force combat readiness in times of national emergency. ■

Maj. Gen. Ernest C. Hardin, Jr., has commanded the Air Force Inspection and Safety Center since March 1972. A World War II B-17 squadron commander, he has held command and staff assignments in SAC and TAC, has served on the Joint Staff, and as Military Assistant to the Secretary of Defense. A graduate of the Naval War College, he has been Vice Commander of Seventh Air Force and Chief of Staff, PACAF.

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A SEPARATE OPERATING AGENCY

United States Air Force Military Personnel Center

Although their normal duties don't involve flying airplanes, running worldwide communications networks, or standing alert at missile sites, the men and women of the United States Air Force Military Personnel Center (MPC) play a key role in all these activities. MPC's staffers seldom make the headlines, but they're in a big business—the "people" business.

The Center, the operating arm of the Air Force Deputy Chief of Staff Personnel, is located at Randolph AFB, Tex. It's the hub of all personnel actions for airmen and officers below the grade of colonel, and its goal is to "do things for people—not to them."

Since moving to Randolph in 1965, after outgrowing its former Pentagon facilities, MPC has devised and implemented a continuing series of people-oriented programs. These have been highlighted by improvements in personnel programs, personnel service, and data systems.

Examples of Air Force people programs that the Center has implemented include the Weighted Airman Promotion System (WAPS), which lets each airman know his relative standing in the promotion competition; the Officer Career Development Program, which allows officers to "road map" their careers; the PALACE FLICKS "instant info" super 8-mm program; Variable Reenlistment Bonuses for airmen holding critical skills; the Join Spouse Program; and the CBPO (Consolidated Base Personnel Office) Customer Service Center.

Under development are MICROFORM and the Advanced Personnel Data System (APDS), which will expedite MPC's service to its customers—the men and women of the Air Force. MICROFORM involves conversion of all paper personnel records to microfilm, while APDS features direct data flow between the Center, Major Command Personnel Offices, and the CBPOs.

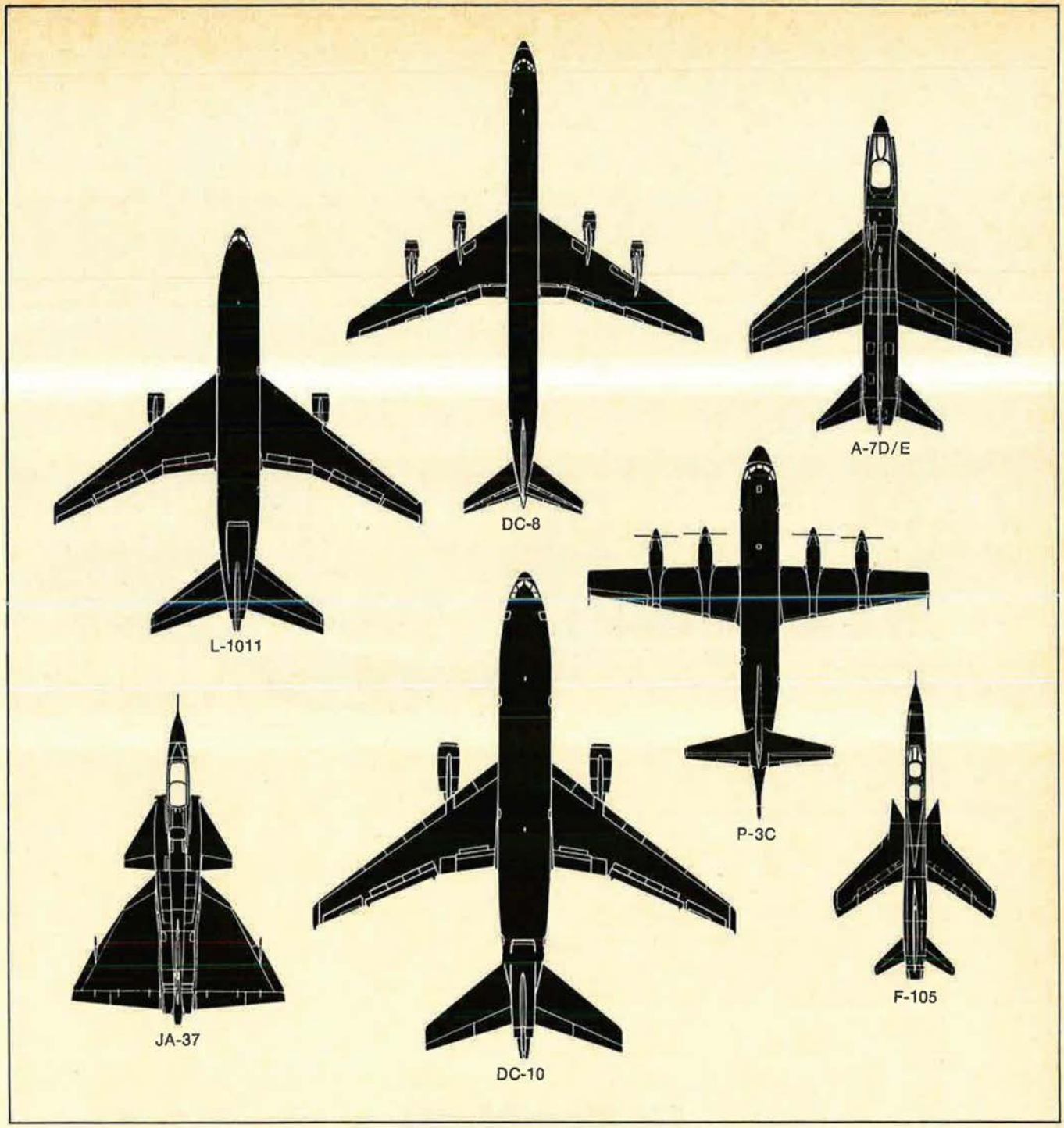
Most Air Force members will never visit the Personnel Center because they don't have to. In implementing Air Force's personnel programs, Maj. Gen. Kenneth L. Tallman, Assistant Deputy Chief of Staff, Personnel, for Military Personnel, works through the major command Directors of Personnel and 150 CBPOs around the world. These are the action offices for individual Air Force members. In fact, many of the queries received at the Center from individuals must be coordinated with the appropriate CBPO to obtain the requested information.

Although many airmen once thought of the Center as a "computerized mecca in the sky," this image has all but disappeared. Today's Air Force member knows MPC is run by people. When an airman or officer is assigned, promoted, retired, given pro-pay—regardless of the action—he knows the decision was made by people. The computer may have expedited the decision, but MPC people working for people make the decisions.

This new awareness of the Center is largely a result of MPC's efforts to get the word out, such as "Spread the Word Trips" led by the Center's top personnel experts, which provide first-hand explanations of personnel programs and policies at Air Force installations; Project PALACE FLICKS, which puts five- to ten-minute film explanations of personnel programs at the fingertips of every airman; and a close working relationship between Personnel and Information Offices at all levels.

This, then, is the "People Place," the United States Air Force Military Personnel Center. ■

In March 1972, Maj. Gen. Kenneth L. Tallman was named Assistant DCS/ Personnel, for Military Personnel, Hq. USAF, and Commander, Air Force Military Personnel Center. He is a fighter pilot and former TAC air division commander. General Tallman, a graduate of the National War College, also has served as Executive Assistant to the Commander, US Military Assistance Command, Vietnam.



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All AFOSI investigations are carefully examined at AFOSI headquarters.

A SEPARATE OPERATING AGENCY

Air Force Office of Special Investigations

A unique Separate Operating Agency, the Air Force Office of Special Investigations (AFOSI) has maintained sole responsibility for providing major Air Force investigative services since its inception in 1948. The Inspector General provides staff supervision for AFOSI while the AFOSI commander manages a centrally directed organization exercising operational control over all AFOSI districts, detachments, and operating locations worldwide.

AFOSI is specifically charged with the mission of providing professional investigative services in the areas of criminal investigation, fraud, counterintelligence, and special investigations, when so requested by commanders of all Air Force activities. In this regard, AFOSI functions primarily as a fact-finding agency.

To carry out its investigative task, AFOSI recruits, selects, and trains its own Special Agents from among the most highly qualified Air Force officers, NCOs, and civilians. Rigorous screening of applicants and limited selection, followed by comprehensive training at the USAF Special Investigations School in Washington, D. C., ensures the organization a motivated, dedicated, and professional force of investigators.

The criminal area, one of three major areas of investigation, encompasses investigations of criminal offenses committed against persons, their property, or the Air Force. Generally, jurisdiction is limited to crimes committed on US Air Force installations by persons subject to the Uniform Code of Military Justice and includes investigation of offenses ranging from housebreaking to homicide.

To aid in criminal fact-finding, AFOSI directs the USAF polygraph program, including the recruitment, training, and ultimate use of USAF polygraph examiners. AFOSI operates the USAF terminal to the FBI National Crime Information Center, and directs a criminal intelligence collections program. The collections program is used to determine possible patterns and trends in criminal activity of interest to Air Force commanders.

Brig. Gen. William A. Temple has been Commander of the Air Force Office of Special Investigations since April 1972. He has previously served as an Assistant Judge Advocate for Alaskan Air Command; in the Office of the Secretary of the Air Force, and in OSD; and at SAC Headquarters. Prior to joining OSI in 1971, he had been a SAC bomb wing commander. He is a graduate of the Air War College.

Fraud investigations involve criminal or serious administrative irregularities and violations of public trust dealing with Air Force procurement, disposal, nonappropriated fund activities, and finance matters. AFOSI also serves as an executive agency responsible for coordinating investigations involving irregularities within the Army and Air Force Exchange Service.

In the area of counterintelligence, AFOSI investigates all instances of espionage, sabotage, treason, sedition, and major security violations involving Air Force personnel or equipment. Moreover, AFOSI is the single Air Force agency charged with the responsibility of collecting and reporting information obtained from human sources that is pertinent to the security of Air Force installations overseas.

Finally, AFOSI conducts personnel background investigations overseas in support of the Defense Investigative Service (DIS) and provides investigative as well as staff support for the Air Force Personnel Security programs.

By the very nature of the AFOSI mission, the ramifications of investigation frequently extend beyond Air Force personnel or beyond the physical limits of any Air Force base, and thus beyond the jurisdiction of AFOSI. In these instances, AFOSI works closely with local, federal, and foreign investigative agencies to present a comprehensive and complete investigative result. ■

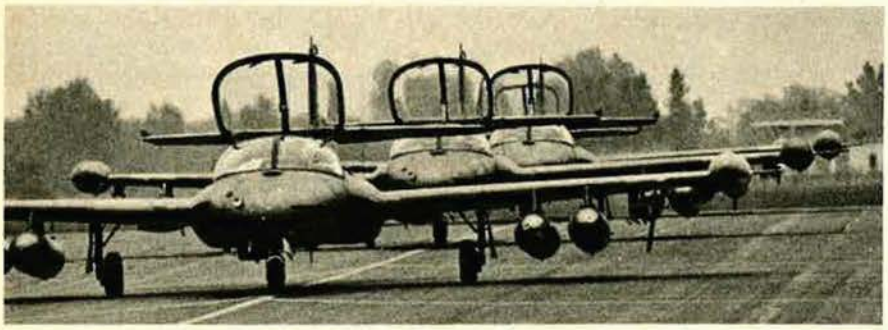
A SEPARATE OPERATING AGENCY

Air Force Reserve

The Air Force Reserve is an important segment of the total Air Force capability. Its mission is to provide immediately available, combat-ready units and trained individuals to augment the active Air Force in time of war or national emergency, or in the event of increased world tensions.

Its ability to fulfill its mission has been demonstrated during the Korean, Berlin, Cuban, and Dominican Republic crises. In those instances, and in the Vietnam conflict, the Air Force Reserve has performed outstandingly in concert with its active-duty counterpart.

The Air Force Reserve (AFRES) command is headquartered at Robins AFB, Ga., and administers a nationwide program with missions ranging from aeromedical evacuation to logistic support.



ANG A-37s at Selfridge AFB, Mich., during last September's AFRES airlift and gunnery meet.

Maj. Gen. Homer I. Lewis was named Chief of Air Force Reserve and Commander, Hq. Air Force Reserve, in April 1971 and March 1972, respectively. During World War II, he served with B-17 units in Europe. Leaving active duty in 1946, he has held command and staff positions in the Reserve. Prior to his present active-duty assignment, General Lewis was Reserve Deputy to the Commander, Headquarters Command.

Missions of Air Force Reserve flying units include military and tactical airlift, airborne early warning and control, aerospace rescue and recovery, special operations, and tactical fighter. Aircraft flown include the C-130 Hercules transport, A-37 Dragonfly attack aircraft, F-105 Thunderchief fighter-bomber, C-123 Provider, C-7 Caribou, HC-130 Rescue Hercules, EC-121 Constellation, and HH-34 rescue helicopter.

Nonflying units include all support elements of the flying units, such as supply, maintenance, communications, medical, and aerial port. Civil engineering units, mobile support units, wartime information and security units, mobility support flights, weapon system security flights, and medical service squadrons also have wartime assignments with one of the major commands and train in those roles.

Efforts to make training realistic by performing actual tasks result in significant peacetime augmentation of the active Air Force. For example, Air Force Reserve airlift wings carry defense cargo to all points of the globe in support of the Military Airlift Command (MAC) and perform mercy and special missions globally, supporting the Air Force.

Reservists also fly and maintain MAC's first-line C-141 StarLifter, C-5 Galaxy, and C-9 flying hospital aircraft under the Reserve's associate unit program—a program in which Reservists work with active-duty crews or form complete Reserve teams to perform these missions.

The Air Force Reserve regularly makes aeromedical evacuation flights, transporting patients to hospitals throughout the United States.

Under the Department of Defense Total Force Concept, the Air Force Reserve and other Reserve components are relied upon as the initial and primary augmentation for the active forces. To meet this objective, the Air Force Reserve is being modernized and transitioning into newer aircraft at the fastest rate in its history.

During 1972, AFRES flying units flew 7,558 missions, airlifting 71,017 passengers and 115,777 tons of cargo. In support of airborne training, 45,342 troops were air-dropped. AFRES units participated in a variety of domestic action projects, ranging from emergency construction following natural disasters to humanitarian airlift missions.

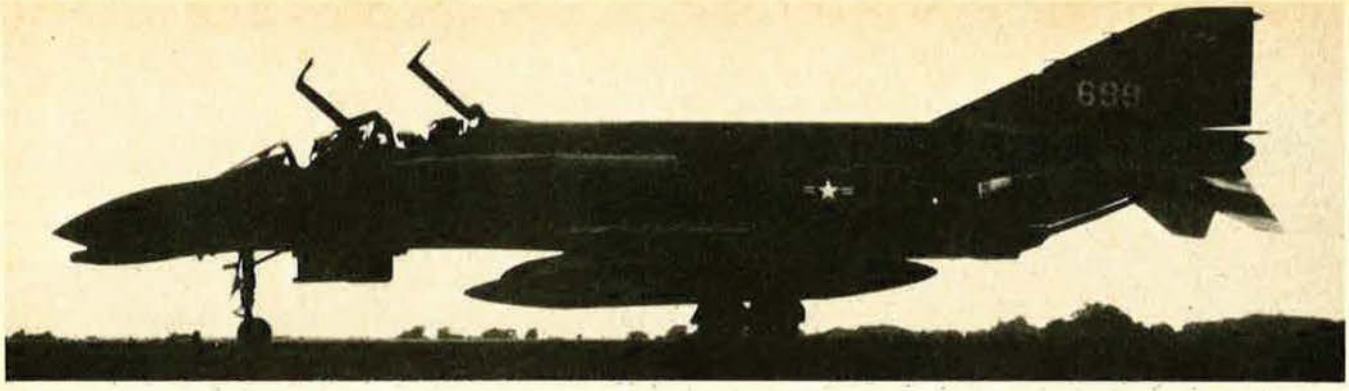
As citizen-airmen, members of the Air Force Reserve serve their country with pride and professionalism. They are indispensable members of the Air Force's aerospace team. ■

AIR FORCE RESERVE FLYING WINGS AND ASSIGNED UNITS

AIR FORCE RESERVE REGION	WING HQ.	GROUP	SQUADRON	TYPE AIRCRAFT	LOCATION
Eastern Region (Hq., Dobbins AFB, Ga.)			79th AEW&CS	C-121	Homestead AFB, Fla.
	94th TAW	918th TAG	700th TAS	C-7	Dobbins AFB, Ga.
		908th TAG	357th TAS	C-7	Maxwell AFB, Ala.
			1st TATS		Lockbourne AFB, Ohio
		901st TAG	731st TAS	C-123	Laurence G. Hanscom Field, Mass.
	302d TAW	906th TAG	355th TAS	C-123	Lockbourne AFB, Ohio
		907th TAG	356th TAS	C-119	Lockbourne AFB, Ohio
		911th TAG	758th TAS	C-123	Greater Pittsburgh AP, Pa.
		927th TAG	63d TAS	C-130	Selfridge AFB, Mich.
	403d TAW	913th TAG	327th TAS	C-130	Willow Grove NAS, Pa.
		914th TAG	328th TAS	C-130	Niagara Falls Int'l AP, N. Y.
		909th TAG	756th TAS	C-130	Andrews AFB, Md.
	459th TAW	905th TAG	337th TAS	C-130	Westover AFB, Mass.
		919th TAG	711th TAS	C-130	Eglin AFB, Fla. (Aux. 3)
		920th TAG	815th TAS	C-130	Keesler AFB, Miss.
		903d MAG (Assoc)	335th MAS (Assoc)	C-141	McGuire AFB, N. J.
			702d MAS (Assoc)	C-141	McGuire AFB, N. J.
			732d MAS (Assoc)	C-141	McGuire AFB, N. J.
	514th MAW (Assoc)	912th MAG (Assoc)	326th MAS (Assoc)	C-141	Dover AFB, Del.
		943d MAG (Assoc)	300th MAS (Assoc)	C-141	Charleston AFB, S. C.
			701st MAS (Assoc)	C-141	Charleston AFB, S. C.
			707th MAS (Assoc)	C-141	Charleston AFB, S. C.
Central Region (Hq., Ellington AFB, Tex.)		932d AMAG (Assoc)	73d AMAS (Assoc)	C-9	Scott AFB, Ill.
		506th TFG	457th TFS	F-105	Carswell AFB, Tex.
	301st TFW	507th TFG	465th TFS	F-105	Tinker AFB, Okla.
		508th TFG	466th TFS	F-105	Hill AFB, Utah
		921st TAG	67th TAS	C-130	Kelly AFB, Tex.
	433d TAW	922d TAG	68th TAS	C-130	Kelly AFB, Tex.
		924th TAG	704th TAS	C-130	Ellington AFB, Tex.
			705th TATS		Ellington AFB, Tex.
		930th SOG	71st SOS	A-37	Grissom AFB, Ind.
	434th SOW	931st SOG	72d SOS	A-37	Grissom AFB, Ind.
		910th SOG	757th SOS	A-37	Youngstown Municipal AP, Ohio
		917th SOG	78th SOS	A-37	Barksdale AFB, La.
		933d TAG	95th TAS	C-130	Gen. Billy Mitchell Field, Wis.
	440th TAW	928th TAG	64th TAS	C-130	O'Hare Int'l AP, Ill.
		934th TAG	96th TAS	C-130	Minneapolis-St. Paul Int'l AP, Minn.
		935th TAG	303d TAS	C-130	Richards-Gebaur AFB, Mo.
	442d TAW	936th TAG	304th TAS	C-130	Richards-Gebaur AFB, Mo.
		926th TAG	706th TAS	C-130	New Orleans NAS, La.
		938th MAG (Assoc)	301st MAS (Assoc)	C-141	Travis AFB, Calif.
			312th MAS (Assoc)	C-141	Travis AFB, Calif.
			708th MAS (Assoc)	C-141	Travis AFB, Calif.
	349th MAW (Assoc)	939th MAG (Assoc)	97th MAS (Assoc)	C-141	McChord AFB, Wash.
			313th MAS (Assoc)	C-141	McChord AFB, Wash.
		944th MAG (Assoc)	728th MAS (Assoc)	C-141	Norton AFB, Calif.
			729th MAS (Assoc)	C-141	Norton AFB, Calif.
			730th MAS (Assoc)	C-141	Norton AFB, Calif.
Western Region (Hq., Hamilton AFB, Calif.)	452d TAW	904th TAG	336th TAS	C-130	Hamilton AFB, Calif.
		940th TAG	314th TAS	C-130	McClellan AFB, Calif.
			301st ARRS	HU-16, HH-34	Homestead AFB, Fla.
			302d ARRS	HH-34	Luke AFB, Ariz.
			303d ARRS	HC-130	March AFB, Calif.
			304th ARRS	HH-34	Portland Int'l AP, Ore.
			305th ARRS	HC-130	Selfridge AFB, Mich.

AEW&CS	Airborne Early Warning & Control Squadron
AMAG (Assoc)	Aeromedical Airlift Group (Assoc)
ARRS	Aerospace Rescue & Recovery Squadron
MAW/G/S	Military Airlift Wing/Group/Squadron
SOW/G/S	Special Operations Wing/Group/Squadron
TATS	Tactical Airlift Training Squadron
TAW/G/S	Tactical Airlift Wing/Group/Squadron
TFW/G/S	Tactical Fighter Wing/Group/Squadron

An F-4C of the 183d Tac Fighter Group, Illinois ANG.



VITAL ADJUNCT TO THE ACTIVE-DUTY FORCE

Air National Guard

The primary mission of the Air National Guard (ANG) is to guarantee the immediate availability of trained, combat-ready units manned with qualified personnel for use by the Air Force whenever and wherever they are needed.

ANG also affords the individual states an organized military body for use in each state's behalf. This unique feature of the Air National Guard—a dual responsibility to the state and to the nation—is a requirement specified in the United States Constitution and Title 32, United States Code.

Under federal law, Air Guard units are organized, trained, and equipped in a nonmobilized, combat-ready status for immediate service as required. The Air National Guard is the first source of added strength and equipment to help the US Air Force in times of war or national emergency.

The Air Guard also helps the Air Force fulfill its peacetime mission. For example, the Air Guard provides a major portion of the round-the-clock air defense of the United States and Puerto Rico and the entire air defense of Hawaii.

In its secondary, state mission, the Air Guard uses its aircraft to carry victims of hurricanes, tornadoes, and floods to safety; to transport food, clothing, and medical supplies to disaster-stricken areas; and to provide communications to areas isolated by flood or other natural disaster.

The transition from state to federal status may be accomplished in several ways. Air Guard units are available for federal service by call or order of the President, upon declaration of war by Congress, or when otherwise authorized by law.

All Air Guard units are assigned, for mobilization purposes, to active Air Force major air commands that, during peacetime, supervise the Guard's training and provide standardization and inspection. Upon mobilization, Air Guard units take their place in the organizational structure of their respective gaining commands: TAC, ADC, MAC, AFCS, PACAF, and Alaskan Air Command. The Air Guard is involved in many Air Force mission areas, with prime emphasis placed on tactical, aerospace defense, and communications functions.

All Guardsmen, by statutory requirement, participate in forty-eight unit training assemblies per year and fifteen days annual training—a minimum requirement to assure that units and individuals are trained and available for active immediate service. Pilots and aircrews receive additional flying-training periods to maintain required proficiency.

The Air Guard force structure includes twenty-four wings, ninety-two flying squadrons, plus support units and 297 specialized ground-support organizations. The flying squadrons operate twenty-one different types of mission aircraft and six types of support aircraft.

The Air Guard maintains federal equipment and vehicles valued at $3.5 billion and has an annual federal appropriation of about $737 million. The states provide substantial additional support in both funds and facilities.

Air Guard personnel total more than 90,000 men and women, serving in more than 1,000 units in all fifty states, the District of Columbia, and Puerto Rico.

The Air National Guard's resources are devoted to these tasks: to train for and—whenever possible as a by-product of training—perform meaningful missions for the Department of Defense. ■

Maj. Gen. I. G. Brown has been head of the Air National Guard for the last ten years. During World War II, he was assigned to the Air Transport Command, separating from active duty in 1945. He was recalled during the Korean War to serve as Chief of Operations, Air Division, National Guard Bureau. Other posts have been with the Arkansas Air National Guard, ADC; and as Executive Secretary, Air Reserve Forces Policy Committee.

THE AIR NATIONAL GUARD BY MAJOR COMMAND ASSIGNMENT

(As of end of FY '73)

TACTICAL AIR COMMAND

F-100 Super Sabre

103rd Tac Fighter Gp.	Windsor Locks, Conn.
104th Tac Fighter Gp.	Westfield, Mass.
114th Tac Fighter Gp.	Sioux Falls, S. D.
121st Tac Fighter Gp.	*Lockbourne AFB, Ohio
122nd Tac Fighter Gp.	Fort Wayne, Ind.
127th Tac Fighter Gp.	***Selfridge ANGB, Mich.
131st Tac Fighter Gp.	St. Louis, Mo.
132nd Tac Fighter Gp.	Des Moines, Iowa
138th Tac Fighter Gp.	Tulsa, Okla.
140th Tac Fighter Gp.	***Denver, Colo. (Buckley ANGB)
149th Tac Fighter Gp.	San Antonio, Tex.
150th Tac Fighter Gp.	*Kirtland AFB, N. M.
159th Tac Fighter Gp.	**New Orleans, La.
178th Tac Fighter Gp.	Springfield, Ohio
179th Tac Fighter Gp.	Mansfield, Ohio
180th Tac Fighter Gp.	Toledo, Ohio
181st Tac Fighter Gp.	Terre Haute, Ind.
185th Tac Fighter Gp.	Sioux City, Iowa
188th Tac Fighter Gp.	Fort Smith, Ark.
116th Tac Fighter Gp.	*Dobbins AFB, Ga.
162nd Tac Fighter Tng. Gp.	Tucson, Ariz.

RF-101 Voodoo

123rd Tac Recon Gp.	Louisville, Ky.
152nd Tac Recon Gp.	Reno, Nev.
186th Tac Recon Gp.	Meridian, Miss.
189th Tac Recon Gp.	*Little Rock AFB, Ark.

F-104 Starfighter

156th Tac Fighter Gp.	San Juan, P. R.

F-105 Thunderchief

113th Tac Fighter Gp.	*Andrews AFB, Md.
177th Tac Fighter Gp.	*McGuire AFB, N. J.
192nd Tac Fighter Gp.	Sandston, Va.
184th Tac Fighter Tng. Gp.	*McConnell AFB, Kan.

F-4 Phantom

183rd Tac Fighter Gp.	Springfield, Ill.

RF-4 Phantom

117th Tac Recon Gp.	Birmingham, Ala.
155th Tac Recon Gp.	Lincoln, Neb.
187th Tac Recon Gp.	Montgomery, Ala.

A-37B

174th Tac Fighter Gp.	Syracuse, N. Y.
175th Tac Fighter Gp.	Baltimore, Md.

B-57G

190th Tac Bomb Gp.	*Forbes AFB, Kan.

KC-97L

171st Air Refueling Gp.	Pittsburgh, Pa.
126th Air Refueling Gp.	Chicago, Ill.
128th Air Refueling Gp.	Milwaukee, Wis.
134th Air Refueling Gp.	Knoxville, Tenn.
136th Air Refueling Gp.	**Dallas, Tex.
139th Air Refueling Gp.	St. Joseph, Mo.
151st Air Refueling Gp.	Salt Lake City, Utah
160th Air Refueling Gp.	*Lockbourne AFB, Ohio
161st Air Refueling Gp.	Phoenix, Ariz.

C-119/U-10D

129th Special Operations Gp.	Hayward, Calif.
130th Special Operations Gp.	Charleston, W. Va.
143rd Special Operations Gp.	Providence, R. I.

E/C-121

193rd Tac Electronic Warfare Gp.	Olmsted, Pa.

C-123J

176th Tac Airlift Gp.	Anchorage, Alaska

C-130

109th Tac Airlift Gp.	Schenectady, N. Y.
118th Tac Airlift Gp.	Nashville, Tenn.
133rd Tac Airlift Gp.	St. Paul, Minn.
145th Tac Airlift Gp.	Charlotte, N. C.
146th Tac Airlift Gp.	Van Nuys, Calif.
153rd Tac Airlift Gp.	Cheyenne, Wyo.
157th Tac Airlift Gp.	*Pease AFB, N. H.
166th Tac Airlift Gp.	Wilmington, Del.
167th Tac Airlift Gp.	Martinsburg, W. Va.
172nd Tac Airlift Gp.	Jackson, Miss.
195th Tac Airlift Gp.	Van Nuys, Calif.

C-7

170th Tac Airlift Gp.	*McGuire AFB, N. J.

O-2

105th Tac Air Support Gp.	White Plains, N. Y.
110th Tac Air Support Gp.	Battle Creek, Mich.
111th Tac Air Support Gp.	**Willow Grove, Pa.
135th Tac Air Support Gp.	Baltimore, Md.
182nd Tac Air Support Gp.	Peoria, Ill.

AEROSPACE DEFENSE COMMAND

F-101

101st F-I Gp.	Bangor, Me.
107th F-I Gp.	Niagara Falls, N. Y.
119th F-I Gp.	Fargo, N. D.
141st F-I Gp.	Spokane, Wash.
142nd F-I Gp.	Portland, Ore.
148th F-I Gp.	Duluth, Minn.

F-102

106th F-I Gp.	Suffolk County, N. Y.
112th F-I Gp.	Pittsburgh, Pa.
115th F-I Gp.	Madison, Wis.
124th F-I Gp.	Boise, Idaho
125th F-I Gp.	Jacksonville, Fla.
144th F-I Gp.	Fresno, Calif.
147th F-I Gp.	*Houston, Tex. (Ellington AFB)
154th F-I Gp.	*Hickam AFB, Hawaii
158th F-I Gp.	Burlington, Vt.
163rd F-I Gp.	Ontario, Calif.
169th F-I Gp.	***McEntire ANGB, S. C.

F-106

102nd F-I Gp.	***Otis AFB, Mass.
120th F-I Gp.	Great Falls, Mont.
177th F-I Gp.	Atlantic City, N. J.
191st F-I Gp.	***Selfridge ANGB, Mich.

MILITARY AIRLIFT COMMAND

C-124C

137th Military Airlift Gp.	Oklahoma City, Okla.
164th Military Airlift Gp.	Memphis, Tenn.
165th Military Airlift Gp.	Savannah, Ga.

*Tenant unit on active Air Force base
**Tenant unit on Naval Air station
***Operated by Air National Guard

Note: All other units collocated on state, county, or municipal airports.

A SEPARATE OPERATING AGENCY

Air Reserve Personnel Center

New ideas are the order of the day at the Air Reserve Personnel Center (ARPC) in Denver, Colo. Reflecting changes in the nature of today's Air Force Reserve toward greater readiness and a closer alignment with the active forces, the Center is moving steadily to increase its service to the individual Reservist and to streamline even further its procedures for its primary mission—mobilization.

Innovations include use of microfilm, an "ARPC Action Line" that allows Reservists to bypass switchboards and reach the man with answers to problems, evening hours, and airlifts to the Center to allow groups of Reservists to check and review their master personnel records. A policy council convened by ARPC considers recommendations from individual Reservists for policy changes, giving the individual more of a voice in his own program than he has ever had before.

Many of ARPC's personnel procedures and actions are being changed to parallel those in the active force and to provide smoother integration into the active organizations when necessary.

The Center is the "Manpower Bank of the Air Force," and its mission is vital to the Air Force. Its assets are approximately 552,000 Air Force Reservists and Air National Guardsmen not on active duty—equating to more than half of the total strength of the active Air Force.

The Center's Directorate of Individual Reserve Programs provides information and assistance to United States Air Force major commands in meeting their Reserve recruiting requirements. ARPC's Office of Information manages Air Reserve Information Squadrons and flights throughout the country. The ARPC Staff Judge Advocate is responsible for the Judge Advocate General Reserve program, and the Reserve Chaplain Program is the responsibility of the ARPC Chaplain. Through these programs, Reserve information experts, legal officers, and chaplains supplement active-duty information officers, lawyers, and chaplains in accomplishing the Air Force mission.

For these and other Reservists, ARPC performs all types of actions to provide mobilization capability: assignment, classification, promotion, discharge, and retirement. Medical records maintained at ARPC assure that each Reservist is phys-

Col. Benjamin S. Catlin III has commanded the Air Reserve Personnel Center since February 1970. A World War II B-24 and B-29 pilot, he later saw service in the then Military Air Transport Service. During the Cuban crisis he was Deputy Commander, 7th Tactical Airlift Wing. In Vietnam, he commanded Advisory Team No. 1, flying 169 combat hours in three major campaigns. Before his present command, he was Executive to the Chief of the Air Force Reserve.

ARPC's Personnel Mobilization Center works closely with AFMPC and the Personnel Readiness Center in the Pentagon.

ically fit for duty, and training records indicate his participation and skills. Classification actions ensure that each Reservist is assigned to a job for which he is qualified and that he can use his skill immediately if called to active duty.

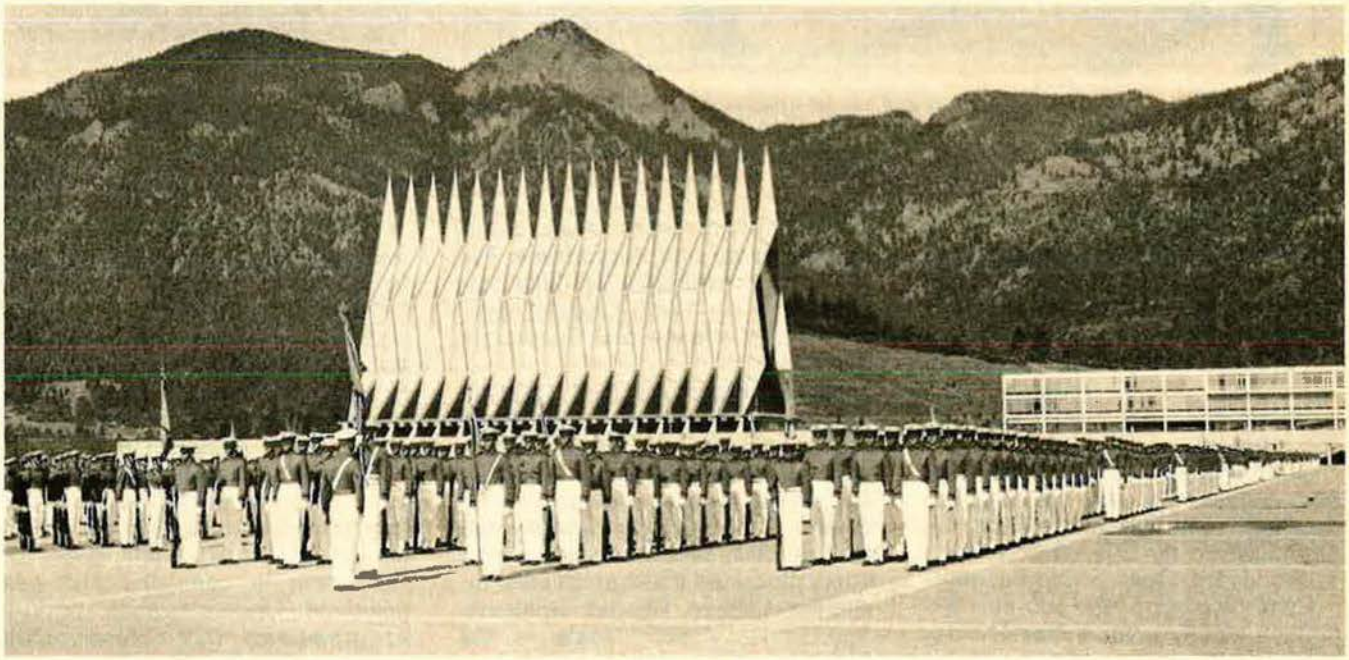
ARPC provides the largest single officer input to the active Air Force, placing about 4,500 officers on active duty each year through the Air Force Reserve Officers Training Corps (AFROTC).

ARPC conducts selection boards to consider Reserve and Guard officers for promotion, and administrative boards to determine qualifications of airmen and officers to retain their Reserve status. Officers no longer qualified in their skills are considered for discharge.

Several times in its nineteen-year history, the Center has been called upon to mobilize large numbers of Reserve personnel during national emergencies. The Berlin buildup of 1961, the Cuban crisis of 1962, and the *Pueblo* incident of 1968 are examples. Today, continuing mobilization tests check the efficiency and effectiveness of mobilization procedures and ensure that ARPC can respond rapidly during any national emergency.

In its constant search to provide more value for the Air Force dollar, ARPC has turned to automated procedures, microfilm to replace voluminous rosters, and numerous other new ideas to streamline and simplify its work. It has become a proving ground for innovations that could benefit the whole Air Force. More important, the changing nature of ARPC is providing greater benefits for the individual Reservist and making certain that the Air Force will always have a Manpower Bank of Reservists—trained, qualified, and ready—when mobilization is necessary. ■

The Air Force Academy Cadet Wing—4,000 strong.



A SEPARATE OPERATING AGENCY

United States Air Force Academy

The Air Force Academy (USAFA) mission is to educate and train career officers for the United States Air Force. Under the leadership of Lt. Gen. A. P. Clark, Superintendent, this is accomplished by providing instruction and experience to each cadet so that he graduates with the knowledge and character essential to leadership and with the motivation to become a career officer.

Lumps and bumps—mixing it up with the pugil sticks.

In August 1970, Lt. Gen. Albert P. Clark was appointed Superintendent of the Air Force Academy. He had previously been Commander of Air University. A World War II POW, General Clark saw postwar service with TAC, ADC, and Hq. USAF. He served as USAFE Chief of Staff from 1956–57; Director of Military Personnel, Hq. USAF, from 1959–63; and was Vice Commander of TAC from 1965–68. General Clark is a graduate of the Armed Forces Staff College and the National War College.

Upon completion of a four-year course in academics, military training, and physical education, each cadet graduates with a bachelor of science degree and a commission as a second lieutenant in the US Air Force. Social, religious, and extracurricular activities round out the program.

Academic instruction in the basic and engineering sciences, the humanities, and social sciences is administered by Brig. Gen. William T. Woodyard, Dean of the Faculty.

Each member of the 500-plus all-military faculty holds a master's degree and twenty-five percent of the faculty have earned doctorates.

Twenty-one academic majors are offered; each cadet must select and complete one to graduate. The academic curriculum is fully approved by the North Central Association of Colleges and Secondary Schools.

Three percent of each graduating class is selected to go to medical school to become Air Force doctors; two percent is sent to law school for judge-advocate education. In the eighteen years since the first class entered the Academy, it has produced 6,942 graduates, including sixteen Rhodes Scholars. Approximately 835 cadets in the Class of 1973 will graduate on June 6.

Military leadership training is directed by Brig. Gen. Hoyt S. Vandenberg, Commandant of Cadets. In addition to formal classes in professional military subjects, cadets gain leadership experience as cadet officers and noncommissioned officers at wing, group, squadron, and flight level. The Cadet Wing, expected to reach its authorized strength of 4,442 in July 1973, is organized into four groups of ten squadrons each. First classmen (seniors) hold cadet officer rank in command and staff positions. Underclassmen perform progressively more responsible tasks in NCO positions.

Cadets spend their first Academy summer in intensive military training and physical conditioning. Succeeding summers are spent on field trips, leave, and at the Academy in various upperclass leadership programs.

The cadets also participate in Operation Third Lieutenant, which is a three-week tour of duty with operational Air Force units at home and overseas.

Cadet airmanship experience comes in five parts. All pilot-quali-

SUPERINTENDENTS OF THE AIR FORCE ACADEMY THROUGH THE YEARS

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	

fied first classmen learn to fly in the T-41, a 210-hp version of the Cessna 172. Many cadets volunteer to fly sailplanes at the Academy airstrip and earn FAA private, commercial, and flight instructor glider ratings. Parachute training, popular with cadets, offers four advanced courses. The Cadet Parachute Team won its fifth National Intercollegiate Parachute Championship in 1972, a record achievement. Navigation courses give cadets a basic understanding of navigation as a career specialty. Orientation flights in various aircraft introduce them to aerial operations.

Each cadet participates in physical education courses and varsity or intramural athletics. Eighteen sports are included in intercollegiate competition. The falcon is the official mascot of the Cadet Wing, and Academy athletic teams are called the Falcons. Falcon athletes play a nationwide schedule, including other service academies. The Air Force Academy Athletic Association, a nonprofit, nongovernmental organization, gives financial support to all intercollegiate athletics.

The US Air Force Academy Preparatory School is located on the Academy grounds. Here selected Regular and Reserve Forces enlisted men spend a year of intensive study in math, English, and military training preparing for an Academy cadet appointment. The schooling enables cadet candidates to achieve high scores on the College Entrance Examination Board tests that are required for admission.

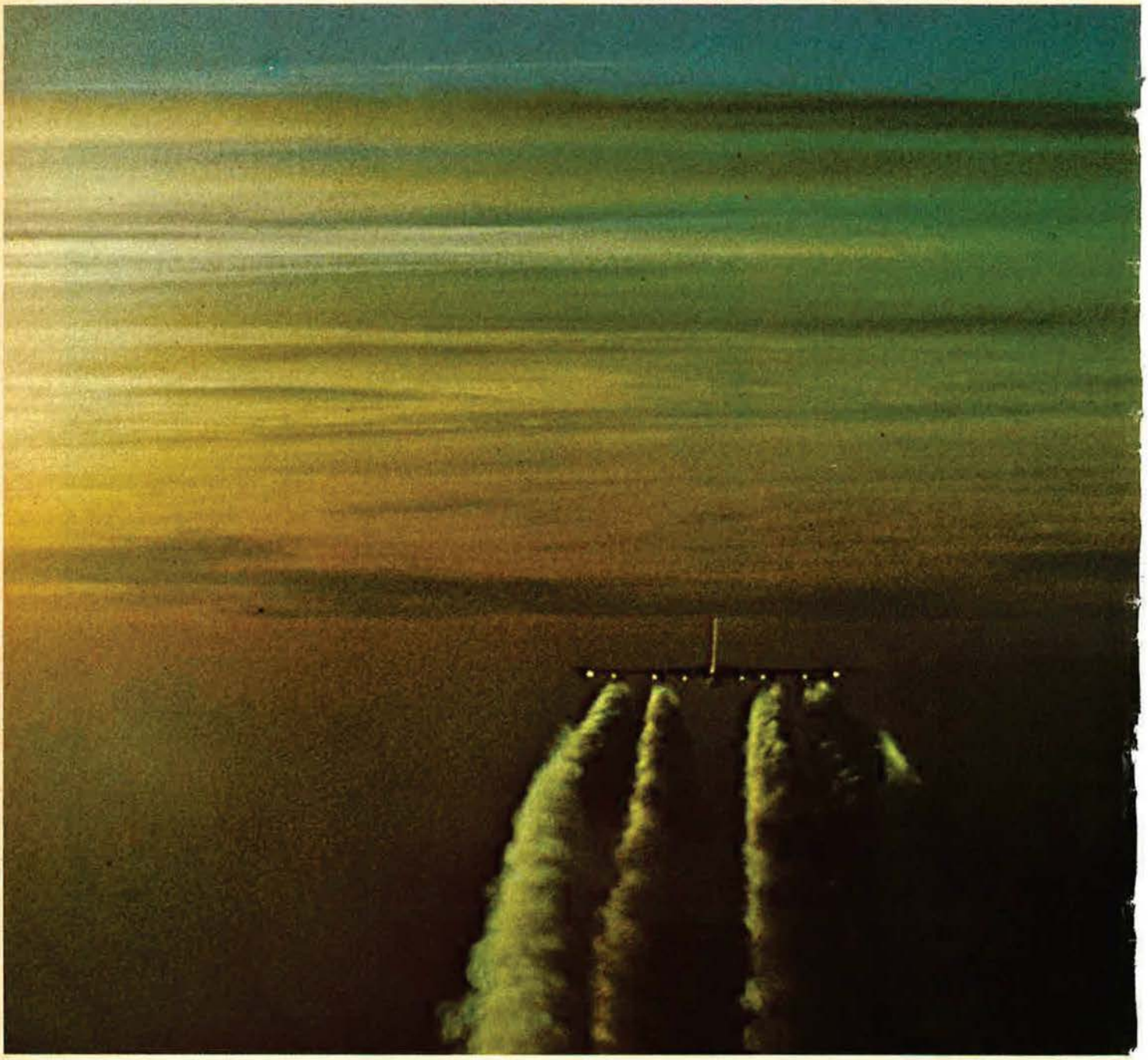
Academy admission requirements state that a young man must be seventeen and not yet twenty-two on July 1 of the year admitted. He must be a citizen of the US, unmarried, of good moral character, and in good physical condition. He must show adequate academic preparation, demonstrated leadership potential, and have a desire to be a cadet and pursue a military career. Nominations to the Academy come through congressional or other authorized channels. ■

Taking that first indoctrination flight in a T-33 jet trainer.

Bunsen burner and beaker—a mental workout in the chemistry lab.

Small-arms familiarization—a requirement of the Basic Cadet Training Program.

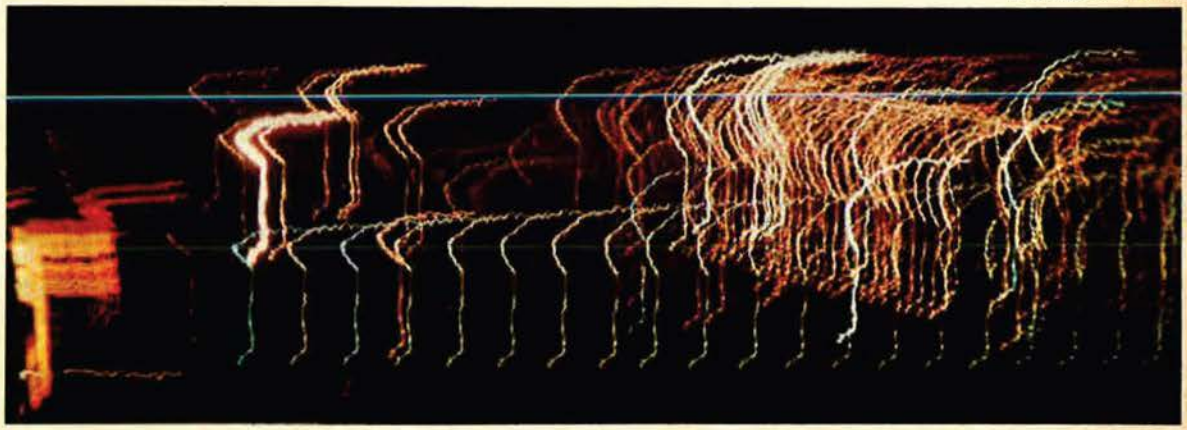
Sunrise over the Pacific. Captain Gilless used a Canon F-1 35-mm camera and Kodak Ektachrome film for all these photos.



BETWEEN THE DARK AND THE DAYLIGHT

The red-lighted cockpit gives a glimpse of the night world of a crew member on a B-52. The exposure was for eighteen seconds at f/ stop 2.8.

Time-lapse photo of final approach at U Tapao RTAFB, Thailand, thirty-five-second exposure at f/2.8 with a telephoto lens.

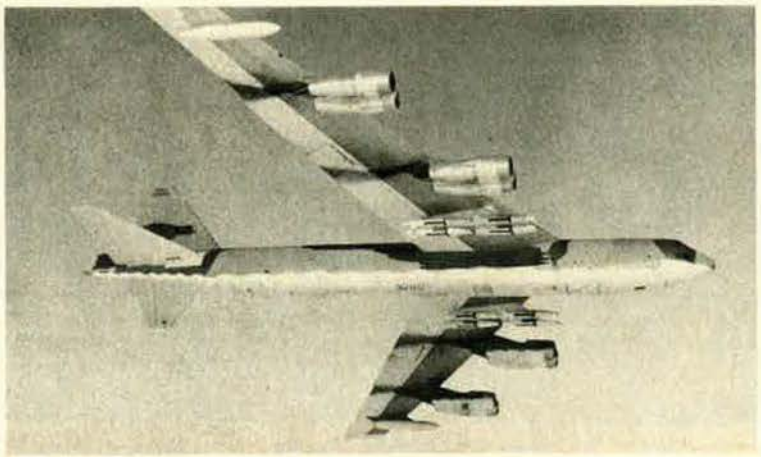


B-52s—"BUFs," as they're called by those who fly them—have been doing a job now for some seventeen years—the job of deterring nuclear war and making world peace possible. It has been tough and demanding, but those who fly the eight-engine giants believe in it. On these pages, Capt. Clyde Gilless, USAF, a B-52 navigator now based on Guam, has recorded on film some impressions of a night mission somewhere in Southeast Asia before the cease-fire. Those who know, will remember. Those who do not will find, in our judgment, a sense of how it was and how it continues to be.

Sunset? No, it's sunrise, and this photo was taken within minutes of the one on the opposite page. The effect was achieved by using a blue filter. The lead aircraft is about a half mile ahead, as seen through the 135-mm telephoto lens.

GALLERY OF US

B-1
(Artist's
concept)



B-52H
with
SRAM

BOMBERS

B-1

Development is continuing of this variable-geometry strategic bomber of blended-wing/body configuration which, it is hoped, will eventually replace the B-52 force. The B-1 is designed to cruise at least part of the way to its target at subsonic speed, then to make an over-the-target supersonic dash at high altitude or a high subsonic dash at low altitude. A unique Low Altitude Ride Control system is incorporated to minimise the effects of turbulence likely in high-speed low-level operations. Penetration aids include SRAMs, with protection afforded by electronic jamming equipment, infra-red countermeasures, and other devices. First flight is scheduled for Spring 1974. USAF orders could total about 250 aircraft.

Contractor: Rockwell International Corporation, North American Aerospace Group.
Power Plant: four General Electric F101 supersonic afterburning turbofan engines; each about 30,000 lb thrust.
Accommodation: four, in pairs.
Dimensions: span spread 137 ft 0 in, fully swept 78 ft 0 in, length overall 143 ft 0 in, height 34 ft 0 in.
Weight: gross 350,000–400,000 lb.
Performance: (approx): max speed at 50,000 ft Mach 2.2, max range without refuelling 6,100 miles.
Armament: nuclear and conventional weapons; SRAMs on rotary dispenser.

B-52 Stratofortress

About 450 of these eight-jet long-range bombers remain in the SAC inventory in the early 'seventies, of which most are G and H models. The prototype XB-52 flew more than 20 years ago, in October 1952, and a total of 744 production Stratofortresses were built between 1954 and 1962, continual refinement and introduction of new equipment and more powerful engines resulting in a succession of variants. Those still operational are: **B-52D,** total of 170 built with J57-P-29W turbojet engines, with delivery from December 1956. **B-52F,** with uprated J57-P-43W engines, first flown in May 1958; 89 built; those remaining in inventory now used for training purposes. **B-52G** introduced important changes including a redesigned wing containing integral fuel tankage, fixed underwing tanks, a new tail fin of reduced height and broader chord, a remotely-controlled tail turret which allowed the gunner to be repositioned with the rest of the crew, and the ability to carry two AGM-28 Hound Dog air-to-surface missiles on missions with a round-trip range of more than 10,000 miles. Deliveries of the B-52G began in February 1959, and 193 were built. **B-52H,** the final version, switched to TF33 turbofan engines and had improved defensive armament, including a Vulcan multi-barrel tail gun and underwing pods of penetration rockets; 102 were built, with deliveries starting in May 1961. Under a major USAF programme initiated in 1971, a total of 96 B-52Gs and Hs are each being modified to carry 20 AGM-69A SRAM short-range attack missiles, six under each wing and eight in the bomb-bay. (Data for B-52G.)

Contractor: The Boeing Aerospace Company.
Power Plant: eight Pratt & Whitney J57-P-43W turbojet engines; each 13,750 lb thrust.
Accommodation: two pilots, side-by-side, plus bombardier, radar-navigator, ECM operator, and tail gunner.
Dimensions: span 185 ft 0 in, length 157 ft 7 in, height 40 ft 8 in.
Weight: gross 480,000 lb.
Performance (approx): max speed 660 mph at 20,000 ft, service ceiling 55,000 ft, range 10,000 miles.
Armament: four 0.50 calibre guns in tail turret; two AGM-28 Hound Dog air-to-surface missiles under wings; bombs and Quail diversionary missiles internally. Alternative provision for 20 SRAM missiles.

FB-111A

Two-seat strategic bomber version of the basic F-111, developed for use by SAC and intended originally to replace the B-52C/F versions of the Stratofortress and the B-58A Hustler. Delivery of the first FB-111A was made to 340th Bomb Group in October 1969. Operational units equipped with this aircraft are the 380th and the 509th Bomb Wings. Production of the 76 FB-111As ordered has been completed.

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 over Mach 2, service ceiling over 60,000 ft, range 4,100 miles with external fuel.
Armament: up to six AGM-69A SRAM air-to-surface missiles on external wing pylons; provision for up to 37,500 lb of conventional bombs.

FB-111

AF WEAPONS

By S. H. H. Young
Associate Compiler,
Jane's All the World's Aircraft

Edited by John W. R. Taylor
Editor, Jane's All the World's Aircraft

F-4

superiority, close-support, and interdiction missions. A 20 mm Vulcan multi-barrel gun is fitted, together with an improved fire-control system in the nose of this version, 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. Several hundred have been built for the USAF. (Data for F-4E.)

Contractor: McDonnell Aircraft Company, division of McDonnell Douglas Corporation.
Power Plant: two General Electric J79-GE-17 turbojets; each 17,900 lb thrust with afterburning.
Accommodation: pilot and radar operator in tandem.
Dimensions: span 38 ft 5 in, length 62 ft 10 in, height 16 ft 3 in.
Weights: empty 30,425 lb, gross 60,630 lb.
Performance: max speed at 40,000 ft Mach 2.27, range with typical tactical load 1,300 miles.
Armament: one 20 mm M-61A1 multi-barrel cannon; provision for up to six AIM-7E Sparrow and four AIM-9D Sidewinder air-to-air missiles, or up to 16,000 lb of external stores.

F-5E Tiger II

Intended primarily to provide America's allies in Southeast Asia with an uncomplicated air-superiority tactical fighter, capable of comparatively inexpensive maintenance and operation, this advanced version of the F-5 export aircraft, first flown on 11 August 1972, is basically a VFR fighter, with only limited all-weather or night combat capability. Manoeuvring flaps are fitted to satisfy the need for manoeuvrability rather than high speed. TAC, assisted by ATC, will train pilots and technicians of user countries, and first deliveries of the F-5E to the 425th TF Squadron are due this month. Ten training aircraft are to be supplied to the USAF before deliveries to foreign governments begin.

Contractor: Northrop Corporation, Aircraft Division.
Power Plant: two General Electric J85-GE-21 turbojet engines; each 5,000 lb thrust with afterburning.
Accommodation: pilot only.
Dimensions: span 26 ft 8 in, length 48 ft 3¾ in, height 13 ft 4½ in.
Weights: empty 9,558 lb, gross 21,820 lb.
Performance (at 13,220 lb): max level speed at 36,000 ft Mach 1.6, service ceiling 54,000 ft, range with max fuel (with external tanks retained) 1,974 miles.
Armament: two AIM-9 Sidewinder missiles on wingtip launchers; two M-39A2 20 mm cannon in fuselage nose, with 280 rounds per gun; up to 7,000 lb of mixed ordnance can be carried on four underwing attachments and one under-fuselage station.

F-15 Eagle

Although designed for an air-superiority rôle, the F-15A single-seat fixed-wing all-weather fighter also has an air-to-surface attack capability. Specialised equipment includes a lightweight Hughes radar system for long-range detection and tracking of small high-speed objects operating at all heights down to treetop level, and for ensuring effective delivery of weapons, with a head-up display for close-in dogfights; a Teledyne transponder for the IFF system, to inform the pilot if an aircraft seen visually or on radar is friendly; and an inertial navigation system. The initial contract awarded in 1969 provided for 18 F-15As and 2 TF-15 two-seat training versions for development testing. The first F-15A flew on 27 July 1972. Production of the initial series of 30 aircraft for operational duties begins this year, with 77 more requested in the FY 1974 budget.

Contractor: McDonnell Aircraft Company, division of McDonnell Douglas Corporation.
Power Plant: two Pratt & Whitney F100-PW-101 turbofan engines; each in the 20,000 to 30,000 lb thrust range.
Accommodation: pilot only.
Dimensions: span 42 ft 9¾ in, length 63 ft 9¾ in, height 18 ft 7¼ in.
Weight: gross about 40,000 lb.
Performance: max speed over Mach 2, range short to medium.
Armament: one internally-mounted M-61 20 mm multi-barrel gun, to be replaced by a Philco-Ford 25 mm gun later; advanced-model Sidewinder and Sparrow air-to-air missiles carried externally.

F-5E

F-15

FIGHTERS

F-4 Phantom II

Several versions of this all-weather fighter have been acquired by the USAF since it was first developed in the mid-fifties. The **F-4C** is a two-seat tactical fighter, developed from the basic F-4B naval version, with provision for a large external weapon load. Modifications included dual controls, an inertial navigation system, improved weapon aiming system, and boom flight refuelling instead of drogue. First F-4C flew in May 1963. Deployed by TAC, PACAF, and USAFE for close-support, attack, and air-superiority duties, all 583 aircraft ordered were delivered by May 1966. The **F-4D** was developed from the F-4C and replaced it in production. This version incorporated 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. Most of the 825 F-4Ds built were for the USAF, but 32 were supplied to Iran and 18 were transferred from the USAF to the Republic of Korea. The **F-4E** is a multi-rôle fighter, used for air

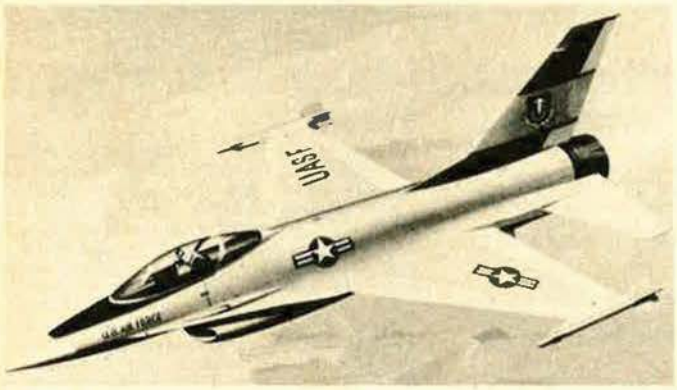
Model 401 and P-600 (YF-16 and YF-17)

To determine the feasibility of developing a small, lightweight, low-cost air-superiority fighter, the USAF has awarded contracts to General Dynamics Corporation and Northrop Aircraft to build prototypes for evaluation in 1974 under its Lightweight Fighter Prototype Program.

YF-16 (Model 401)

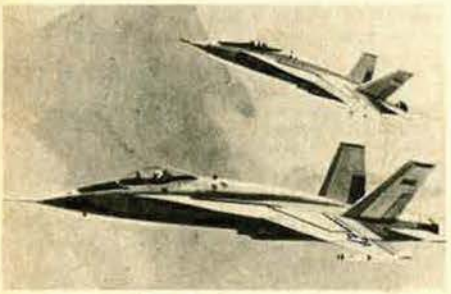
Key design features of this prototype include a single-engine configuration, which has led to emphasis on weight saving in order to maintain performance; fly-by-wire control system; an inclined pilot's seat to improve *g*-force tolerance; and provision of forebody strakes and automatically-variable wing leading-edges to maintain a high degree of lift during high angle of attack manoeuvres. The two prototypes will carry minimal avionics to keep down weight and costs, but space for such equipment will be available.

GALLERY OF USAF WEAPONS



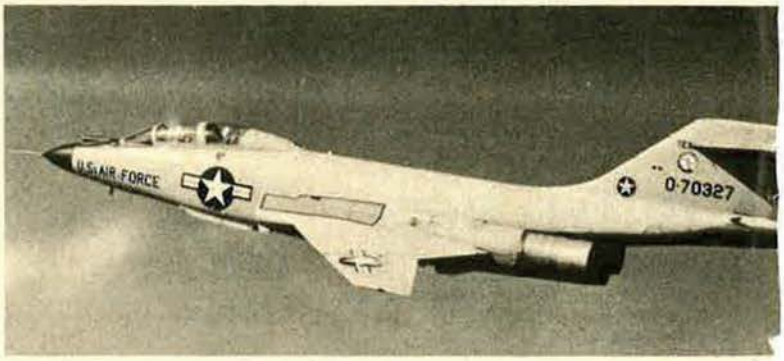
YF-16

F-105

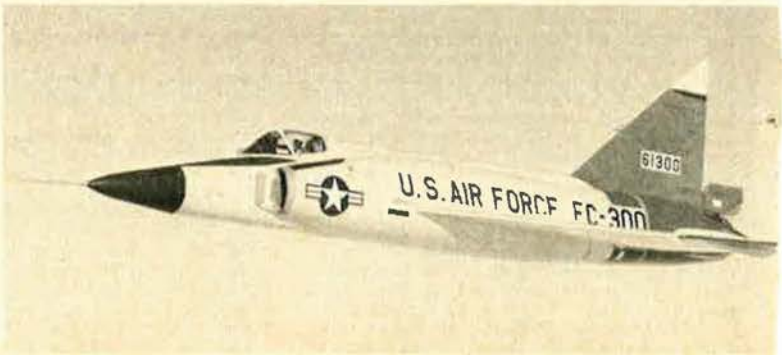


YF-17

F-100



F-101



F-102

Contractor: General Dynamics Corporation.
Power Plant: one Pratt & Whitney F100-PW-100 turbofan engine; about 25,000 lb thrust.
Accommodation: pilot only.
Dimensions: span 30 ft 0 in, length 47 ft 0 in, height 16 ft 3 in.
Weight: max gross 17,500 lb.
Armament (second prototype only): one M-61 20 mm multi-barrel cannon, with 500 rounds, mounted in fuselage; one infra-red missile mounted on each wingtip; underwing attachments for other stores.

YF-17 (P-600)

Several of the aerodynamic innovations planned for Northrop's P-530 Cobra fighter have been embodied in this somewhat smaller design, including a twin "V" tail to improve directional stability; underwing intakes for the twin engines; automatically-operated leading-edge and trailing-edge wing flaps, controlled by Mach number and angle of attack; and forebody strakes to enhance the airflow over the wing. Two prototypes are being built.

Contractor: Northrop Corporation, Aircraft Division.
Power Plant: two General Electric YJ101 turbojet engines; each approx 15,000 lb thrust.
Accommodation: pilot only.
Dimensions: span 35 ft 0 in, length 52 ft 0 in, height 12 ft 0 in.
Weight: gross 19,600 lb.
Armament: one M-39 20 mm aerial cannon and two infra-red air-to-air missiles.

F-100 Super Sabre

The F-100 was the world's first operational fighter capable of supersonic speed in level flight. The first of two YF-100A prototypes flew on 25 May 1953, and several versions were built subsequently for the USAF. The F-100A was the basic single-seat interceptor version, with J57-P-7 or -39 engine, of which 203 were delivered, some being converted

later to camera-carrying RF-100As. The **F-100C** (476 built) introduced a strengthened wing with four attachments for up to 6,000 lb of bombs, other weapons or drop-tanks, and could be flight refuelled by normal probe-and-drogue or buddy techniques. It was superseded in production in 1956 by the **F-100D**, with bomb-load increased to 7,500 lb, a Minneapolis Honeywell supersonic autopilot, larger vertical tail surfaces and flaps, tail-warning radar, and other refinements; 1,274 were built. Final version was the two-seat **F-100F**, for use as a fighter-bomber, air-superiority fighter, or trainer, which first flew in March 1957. A total of 339 was built in 1957–59, with full operational equipment except for having only two instead of the standard four guns. Some 400 F-100s continue in service with the ANG. Modifications to remaining aircraft have included provision for Sidewinder and Bullpup missiles, and installation of an All American lightweight spring tail hook for emergency use. (Data for F-100D.)

Contractor: North American Aviation Inc.
Power Plant: one Pratt & Whitney J57-P-21A turbojet engine; 17,000 lb thrust with afterburning.
Accommodation: pilot only.
Dimensions: span 38 ft 9 in, length 47 ft 0 in (F-100F 50 ft 0 in), height 15 ft 0 in.
Weights: empty 21,000 lb, gross 34,832 lb.
Performance: max speed Mach 1.3 at 35,000 ft, range with two external tanks 1,500 miles.
Armament: four 20 mm M-39E guns in fuselage; underwing pylons for six 1,000 lb bombs, two Sidewinder or Bullpup missiles, rockets, etc.

F-101B Voodoo

Developed from the basic F-101 single-seat tactical fighter-bomber for service with Aerospace Defense Command, the F-101B long-range all-weather two-seat interceptor was first flown in March 1957. About 100 are still operational with the ANG, and others with the Canadian Armed Forces under NORAD control. For reconnaissance versions, see p. 129.

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 Mach 1.85 at 40,000 ft, service ceiling 51,000 ft, max range 1,550 miles.
Armament: three AIM-4D Falcon air-to-air missiles carried internally, and two AIR-2A Genie nuclear-warhead unguided rockets under fuselage.

F-102 Delta Dagger

When it entered service with Air Defense Command (now Aerospace Defense Command) in 1956, this supersonic all-weather delta-wing interceptor was the first USAF operational fighter to be armed only with guided missiles and unguided rockets. The 875 single-seat F-102As, built between 1953 and 1958, were generally similar to the YF-102A (area-ruled) prototype, first flown in December 1954, which overcame the performance deficiencies of the original YF-102s. The production F-102As were subsequently updated to include external drop-tanks and flight refuelling equipment. Apart from one regular squadron in Iceland, the USAF's remaining F-102As are flown by the ANG; many were transferred to the Greek and Turkish Air Forces in 1969–70. The USAF also acquired 63 side-by-side two-seat **TF-102As** for training duties, and has two versions which have been converted into target drones, the manned **QF-102A** and unmanned **PQM-102A**, for use in the F-15A development programme. (Data for F-102A.)

Contractor: Convair Division of General Dynamics Corporation.
Power Plant: one Pratt & Whitney J57-P-23 or -25 turbojet engine; 17,000 lb thrust with afterburning.
Accommodation: pilot only.
Dimensions: span 38 ft 1½ in, length 68 ft 4½ in, height 21 ft 2½ in.
Weight: gross 28,000 lb (overload approx 32,000 lb).
Performance: max speed Mach 1.3 (825 mph) at 36,000 ft, service ceiling 54,000 ft, max range 1,350 miles.
Armament: three AIM-4C/D Falcon and one AIM-26A/B air-to-air missiles carried internally. Earlier provision for unguided rockets now deleted.

F-105 Thunderchief

Production of the F-105 ended in 1965, but subsequent contracts awarded by the USAF for modification and updating of the aircraft have enabled it to remain operationally effective. Current USAF versions are: **F-105D**, single-seat all-weather fighter-bomber, equipped with NASARR monopulse radar system for use in both high- and low-level missions, and Doppler for night or bad weather operations. First F-105D flew in June 1959, and deliveries to the 4th Tactical Fighter Wing began in May 1960. More than 600 were built, of which about 30 have since been modified to carry the T-Stick II system to improve all-weather bombing capability, with additional avionics housed in a "saddle-back" fairing above the fuselage. **F-105F**, two-seat dual-purpose trainer/tactical fighter version of F-105D, with lengthened fuselage and higher tail fin. First flew in June 1963; 143 built. **F-105G**, all-weather "Wild Weasel" version of the two-seat F-105, intended for the suppression of surface-to-air missile sites, with an electronic countermeasures pod mounted on the under-fuselage. 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.
Dimensions: span 34 ft 11¼ in, length 67 ft 0¼ in, height 19 ft 8 in.
Weights: empty 27,500 lb, gross 52,545 lb.
Performance: max speed Mach 2.1 (1,390 mph) at 38,000 ft, service ceiling 52,000 ft, max range over 2,000 miles.
Armament: one General Electric 20 mm Vulcan multi-barrel gun and more than 14,000 lb of stores under fuselage and wings.

F-106 Delta Dart

Continuous modernisation has extended the operational life of this all-weather interceptor, which has been in service with Aerospace Defense Command since 1959 and is still the mainstay of America's manned defensive fighter force. Developed from the F-102, two versions were produced. The **F-106A** single-seat interceptor with J75 engine first flew in December 1956; 277 were built, with deliveries beginning in July 1959. The **F-106B**, a tandem two-seat dual-purpose combat trainer, was ordered into parallel production with the F-106A and first flew in April 1958; 63 were built. The F-106's MA-1 electronic guidance and fire-control system, which operates in conjunction with NORAD's SAGE defence system, has been updated periodically; other modifications have included MEISR, which enhances the reliability of the on-board radar, and the introduction of new drop-tanks which can be refuelled in flight. Further improvements are being considered to permit operation in global rôles as well as for continental US defence in conjunction with the USAF E-3A AWACS aircraft. (Data for F-106A.)

F-106s

Contractor: Convair Division of General Dynamics Corporation.
Power Plant: one Pratt & Whitney J75-P-17 turbojet engine; 17,200 lb thrust (24,500 lb with afterburning).
Accommodation: pilot only.
Dimensions: span 38 ft 3½ in, length 70 ft 8¾ in, height 20 ft 3⅓ in.
Weights (approx): empty 23,650 lb, gross 35,500 lb.
Performance (approx): max speed Mach 2.3 (1,525 mph) at 40,000 ft, service ceiling 57,000 ft, range 1,200 miles.
Armament: one AIR-2A/B Genie unguided nuclear-warhead rocket and four AIM-4F/G Falcon air-to-air missiles carried internally; 20 mm gun scheduled to be added in near future.

F-111

The basic specification to which this tactical fighter was designed called for a maximum speed well above Mach 2 at altitude, supersonic dash at sea level, and good take-off and landing performance on rough airfields in forward areas; the variable-geometry wing was adopted to ensure an optimum combination of these conflicting requirements with good handling characteristics

F-111

throughout the speed range. The first of 18 development F-111As flew on 21 December 1964, and this aircraft demonstrated the full range of wing sweep during its second flight in the following month. Four versions have been manufactured subsequently for service with four USAF tactical fighter wings. The first **F-111A** delivered for service with the 4480th TF Wing, a training unit, in July 1967 was a development model. First operational wing was the 474th TFW, which began equipping in October 1967. A total of 141 production F-111As was built, of which six served briefly in 1968 with the 428th TF Squadron, based in Thailand, three being lost. In 1972, F-111As used in SEA appeared to do exceptionally well. The **F-111E** superseded the A in production, with modified engine air intakes to remove flight restrictions above Mach 2.2 and 60,000 ft. Ninety-four were built for deployment with the 20th TFW, based in the UK in support of NATO, and to supplement the As of the 474th Wing. The **F-111D** (96 built) has more advanced avionics, offering improvements in navigation and in air-to-air as well as air-to-surface weapon delivery, and equips the 27th TFW. The **F-111F**, of which 82 were ordered for the 374th TFW with uprated turbofans and simplified avionics, entered service initially with lower-rated TF30-P-9 engines, pending availability of the specified version. SAC has a strategic bomber version of the same basic aircraft, designated FB-111A (see p. 122). The Royal Australian Air Force is buying 24 F-111Cs for strike duties.

Contractor: General Dynamics Corporation.
Power Plant: F-111A/E: two Pratt & Whitney TF30-P-3 turbofan engines; each 21,000 lb thrust with afterburning. F-111D: two TF30-P-9 turbofan engines. F-111F: two TF30-P-100 turbofan engines; each approx 25,000 lb thrust with afterburning.
Accommodation: crew of two side-by-side in escape module.
Dimensions (F-111A): span spread 63 ft 0 in, fully swept 31 ft 11.4 in, length 73 ft 6 in, height 17 ft 1.4 in.
Weights (F-111A): empty 47,500 lb, gross 91,500 lb.
Performance (F-111A): max speed at S/L Mach 1.2, max speed at altitude Mach 2.5, service ceiling over 60,000 ft, range with max internal fuel over 3,800 miles.
Armament: one 20 mm M-61A1 multi-barrel cannon or two 750 lb bombs in internal weapon bay; four swivelling and four fixed wing pylons carrying total external load of up to 30,000 lb of bombs, missiles, rockets, or fuel tanks.

ATTACK AND OBSERVATION AIRCRAFT

A-7D Corsair II

A continuous-solution navigation and weapon delivery system, including all-weather radar bomb delivery, gives this single-seat tactical fighter outstanding target kill capability. First flight of a TF41-engined A-7D was made in September 1968; deliveries to the USAF began less than three months later, in December. Current programmes call for 387 aircraft. Many hundreds of A-7A, B, and E models have been bought by the USN, which flew the first combat sorties from the USS *Ranger* in the Gulf of Tonkin on 3 December 1967.

Contractor: Vought Aeronautics Company, a division of LTV Aerospace Corporation.
Power Plant: Allison TF41-A-1 non-afterburning turbofan; 14,250 lb thrust.
Accommodation: pilot only.

A-7D

Dimensions: span 38 ft 9 in, length 46 ft 1½ in, height 16 ft 0 in.
Weights: empty approx 19,500 lb, gross 42,000 lb.
Performance: max speed at S/L 698 mph, ferry range more than 3,340 miles.
Armament: one M-61A1 20 mm multi-barrel gun; more than 15,000 lb of air-to-air or air-to-ground missiles, bombs, rockets, or gun pods on 6 underwing and two fuselage attachments.

A-10A

Following competitive fly-off of prototypes of this close-support combat aircraft against the Northrop A-9A, it is planned to build ten pre-production A-10As with funds requested in FY 1974. The first of the two prototypes flew on 10 May 1972, and a total of 135 flying hours was logged by these aircraft during the competition in October–December 1972. Before the tenth pre-production A-10A is completed, in September 1975, a decision will be taken by the USAF on whether or not to proceed to full production of up to 600 aircraft. Equipment includes a head-up display, target penetration aids, and provision for carrying Maverick and Sidewinder missiles. Special emphasis was placed on survivability when designing the airframe.

Contractor: Fairchild Republic Division of Fairchild Industries.

Power Plant: two General Electric TF34-GE-2 turbofans; each 9,275 lb thrust.
Accommodation: pilot only.
Dimensions: span 55 ft 0 in, length 52 ft 7 in, height 15 ft 5 in.
Weights (estimated): operating weight empty 21,300 lb, gross 45,825 lb.
Performance (designed): max speed 460 mph, range with 9,500 lb of weapons and 2 hr loiter 290 miles.
Armament: one 30 mm GAU-8 gun; eleven hard points under wings and fuselage for up to 16,000 lb of ordnance, including various types of free-fall or guided bombs, gun pods, AGM-65 Maverick, or AIM-9 Sidewinder missiles.

A-10A

A-37B

Developed from the T-37 trainer, the A-37 light attack aircraft is intended for armed counter-insurgency (COIN) operations from short unimproved runways. The A-37B is the main production version, with more than 300 delivered since the first flight in September 1967, for use primarily in Southeast Asia. During 1970 the USAF began to transfer A-37Bs to the ANG. In addition, 164 had been delivered to South Vietnam by the beginning of this year.

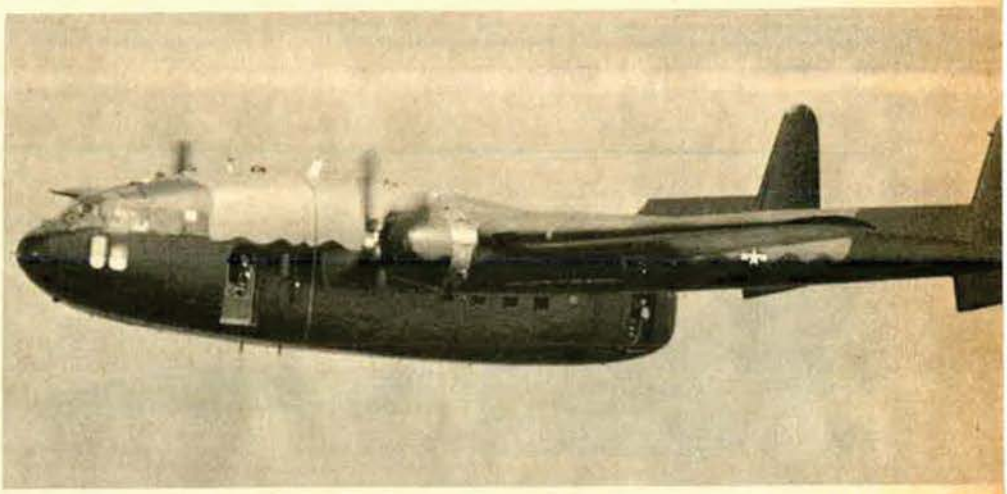
Contractor: Cessna Aircraft Company.
Power Plant: two General Electric J85-GE-17A turbojet engines; each 2,850 lb thrust.
Accommodation: two, side-by-side.
Dimensions: span over tip-tanks 35 ft 10½ in, length 29 ft 3½ in, height 8 ft 10½ in.
Weights: empty 6,211 lb, gross 14,000 lb.
Performance: max 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.

A-37B

AC-119G/K

To meet USAF requirements, 52 C-119s were modified into gunships with the designations AC-119G and AC-119K, and were subsequently used in Vietnam where they proved very effective for interdiction and suppression of enemy ground attack. The 26 AC-119Ks ("Stingers") have all the equipment of the 26 AC-119Gs ("Shadows") plus auxiliary J85 jet engines to improve performance and increase payload, a forward-looking infra-red sensor, side- and forward-looking radar, and more nav/com. Data similar to C-119 except:

Weights: empty 58,282 lb, gross 80,400 lb.
Performance: max level speed 250 mph at 10,000 ft, service ceiling (one engine out) 23,500 ft, range with max payload 1,980 miles.
Armament: four General Electric SUU-11 gun pods, each containing a six-barrel 7.62 mm GAU-2 Minigun; AC-119K also carries two SUU-16 gun pods each with a 20 mm M-61A1 gun.


AC-119G

AC-130E

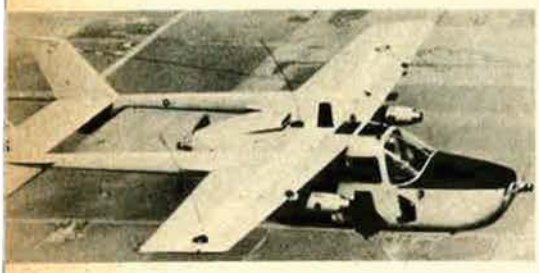
Following evaluation of a prototype at Wright-Patterson AFB, Ohio, in the Summer of 1967, seven of these gunship conversions of the Hercules were ordered and were used in Vietnam from 1970. Each was fitted with four 20 mm Vulcan cannon, four 7.62 mm Miniguns, searchlight, and sensors, including forward-looking infra-red target acquisition equipment and direct-view image intensification sights. Some aircraft carry a 105 mm gun.

Contractor: LTV Aerospace Corporation.
Other data basically as for C-130 (p. 132).


AC-130

O-2A/B

The O-2A military version of the "push-and-pull" Cessna 337 Skymaster was chosen by



O-2A

OV-10A

the USAF in 1966 to replace the Cessna O-1 in the forward air control rôle in Vietnam. Special equipment and electronics permit visual reconnaissance, target identification and marking, ground-air co-ordination, and damage assessment. A second military version, the **O-2B**, is equipped for psychological warfare missions, with an advanced communications system and high-power air-to-ground broadcasting system, as well as a leaflet dispenser. Unlike the "A", no provision is made for armament. The first O-2B was delivered in March 1967, and a total of 510 of the two versions had been built by the beginning of 1971. (Data for O-2A.)

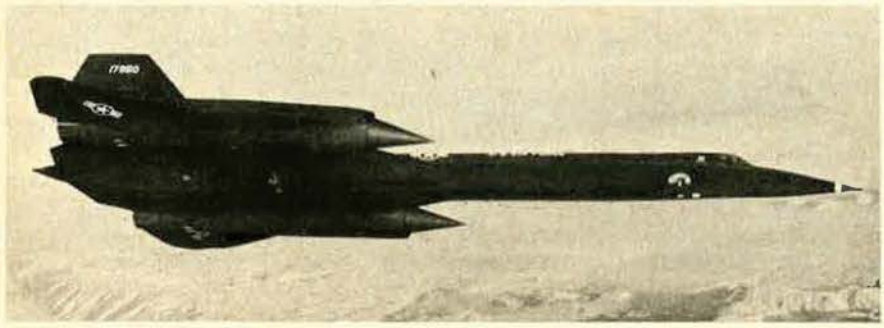
Contractor: Cessna Aircraft Company.
Power Plant: two Continental IO-360-C/D piston engines; each 210 hp.
Accommodation: pilot and observer side-by-side; two passengers optional.
Dimensions: span 38 ft 2 in, length 29 ft 9 in, height 9 ft 4 in.
Weights: empty 2,848 lb, gross 5,400 lb.
Performance: max 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

First flight of this initial production version of the OV-10 Bronco was made in August 1967, following modifications to the prototypes as a result of flight experience, which included uprating of the engines and increasing the wing span. A total of 157 OV-10As was delivered to the USAF for use both in the forward air control rôle and for limited quick-response ground support pending the arrival of tactical fighters. Eleven aircraft have since been modified by LTV Electrosystems under the USAF Pave Nail programme, with equipment including a combination laser rangefinder and target illuminator, to permit their use in a night forward air control and strike designation rôle. Versions of the OV-10 are also in service with the USN and US Marine Corps.

Contractor: Rockwell International Corporation, North American Aerospace Group.
Power Plant: two AiResearch T76-G-410/411 turboprop engines; each 715 hp.
Accommodation: two in tandem.
Dimensions: span 40 ft 0 in, length 41 ft 7 in, height 15 ft 2 in.
Weights: empty 6,969 lb, overload gross weight 14,466 lb.
Performance: max speed at S/L, without weapons 281 mph, service ceiling 28,800 ft, combat radius with max weapon load, no loiter 228 miles.
Armament: four fixed forward-firing M-60C 7.62 mm machine-guns; four external weapon attachment points under short sponsons, for up to 2,400 lb of rockets, bombs, etc; fifth point, capacity 1,200 lb, under centre fuselage. Provision for carrying one Sidewinder missile on each wing.

RECONNAISSANCE AIRCRAFT



SR-71

SR-71A/C

Development of a version of the Lockheed A-11 design capable of undertaking world-wide high-altitude reconnaissance missions began in February 1963, resulting in the **SR-71A.** First flight was made in December 1964. Equipment carried internally ranges from simple battlefield surveillance systems to multiple-sensor high-performance systems capable of specialised surveillance of up to 60,000 sq miles of territory in one hour. Deliveries of operational aircraft to the 9th Strategic Reconnaissance Wing, Beale AFB, Calif., began in January 1966. The **SR-71C** is a tandem two-seat training version. The SR-71 is the fastest military aircraft in service at the present time.

Contractor: Lockheed Aircraft Corporation.
Power Plant: two Pratt & Whitney JT11D-20B (J58) turbojet engines; each 32,500 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.
Weight: gross, estimated 170,000 lb.
Performance (estimated): range at Mach 3.0 (1,980 mph) at 78,740 ft 2,982 miles.
Armament: none.

U-2A/D

Developed originally for strategic reconnaissance over Communist territory, the U-2 was designed essentially as a powered glider, capable of operating at very high altitudes for long periods. A total of 55 aircraft are believed to have been built from 1954, 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, adapted to run on low-volatility fuel, in the **U-2B.** Several U-2s remain in service for special high-altitude reconnaissance and weather flights, with some of the weather reconnaissance aircraft redesignated WU-2. A number of U-2Bs have been converted to U-2D standard. Others are currently undergoing classified development. (Data for U-2B.)

Contractor: Lockheed Aircraft Corporation.
Power Plant: Pratt & Whitney J75-P-13 turbojet engine; 17,000 lb thrust.
Accommodation: pilot only.
Dimensions: span 80 ft 0 in, length 49 ft 7 in, height 13 ft 0 in.
Weight: gross, with slipper tanks 17,270 lb.
Performance: max speed 528 mph at 40,000 ft, operational ceiling about 80,000 ft, range about 4,000 miles.

U-2D

RB-57F

RC-130A

RB-57F

Capable of ultra-high-level reconnaissance missions, RB-57Fs are converted B-57s and RB-57Ds with greatly modified wing design, improved power plant, additional auxiliary turbojets, and many other changes producing increased operational capability. A great deal of special equipment is carried, including radar in the fuselage nose and unspecified electronics in the wingtips. Delivery of the first of 21 RB-57Fs was made to the 58th Weather Reconnaissance Squadron in June 1964. Duties include high-altitude sampling of air for radioactive particles.

Contractor (conversions): General Dynamics Corporation.
Power Plant: two Pratt & Whitney TF33-P-11 turbofan engines; each 18,000 lb thrust, and two Pratt & Whitney J60-P-9 turbojets; each 3,300 lb thrust, in underwing pods.
Accommodation: crew of two in tandem.
Dimensions: span 122 ft 5 in, length 69 ft 0 in, height 19 ft 0 in.
Weight: gross, estimated 50,000 lb.
Performance: 100,000 ft altitude capability.

RC-130A and WC-130E

Equipped for aerial survey duties, the RC-130A photographic version of the C-130A is used by MAC's 1st Aerospace Charting & Geodetic Sqdn. A contract for 16 aircraft, including the prototype, was completed in 1959. In addition, 17 modified C-130Es, designated **WC-130E,** are used for weather reconnaissance duties. Data similar to C-130.

RF-101G/H

During 1967 and 1968, many F-101As and Cs were converted into reconnaissance fighters, with nose-mounted cameras, for service with ANG squadrons. Designated RF-101G and RF-101H respectively, about 20 aircraft remain operational. Data similar to F-101B.

RF-4C

Developed to replace the RF-101, the RF-4C is a multi-sensor reconnaissance version of the F-4C Phantom II, with radar and photographic systems housed in a modified nose which increases the overall length by 33 inches. The three basic reconnaissance systems, operated from the rear seat, comprise side-looking radar, an infra-red detector, and forward- and side-looking cameras. More than 480 RF-4Cs have been delivered, with production continuing. Data similar to F-4.

EB-66

Only remaining operational aircraft of the Destroyer series, developed in the mid-fifties from the A-3D, the **EB-66B/C and Es** are converted B-66Bs, RB-66Cs, and RB-66Bs, respectively, with rear turrets removed. Each version is equipped with different standards of avionics for use in electronic countermeasures and reconnaissance rôles over Europe and, until recently, in Vietnam.

Contractor: Douglas Aircraft Company.
Power Plant: 2 Allison J71-A-13 turbojets; each 10,200 lb thrust.
Accommodation: crew EB-66C seven; EB-66E three.
Dimensions: span 72 ft 6 in, length 75 ft 2 in, height 23 ft 7 in.
Weight: gross, over 70,000 lb.
Performance: max speed 620 mph at 10,000 ft.
Armament: none.

EC-121

Derived from the C-121 (Super Constellation) transport, a few versions of the EC-121 early-warning, fighter control, and reconnaissance aircraft continue in service, distinguished by massive radomes above and below their fuselage. The **EC-121D** is a developed version of the EC-121C, with added wingtip fuel tanks, delivered initially in May 1954. Under subsequent modification programmes, some "Ds" became **EC-121Hs,** with additional electronics to feed data into NORAD's SAGE defence system; others became **EC-121Ts,** which remain operational on radar picket duties covering the seas east of Iceland. (Data for EC-121D.)

Contractor: Lockheed Aircraft Corporation.
Power Plant: four Wright R-3350-91 piston engines; each 3,250 hp.
Dimensions: span 126 ft 2 in, length 116 ft 2 in, height 27 ft 0 in.
Weights: empty 80,611 lb, gross 143,600 lb.
Performance: max speed 321 mph at 20,000 ft, service ceiling 20,600 ft, range 4,600 miles.
Armament: none.

EC-135 etc.

Originally designated KC-135B, the **EC-135C** is basically similar to the KC-135A tanker but with 18,000 lb st TF33 turbofans; 17 were built, equipped as Flying Command Posts in support of SAC's airborne alert rôle, and fitted with extensive communications equipment. As well as being able to refuel other aircraft in flight, EC-135Cs can themselves be refuelled by SAC tankers. Fourteen have been adapted to provide control of Minuteman ICBMs, and at least one aircraft is airborne at all times, accommodating a flight crew of 5, a general officer, and a staff of 18. Other variants used as Flying Command Posts and communications relay stations are; 4 **EC-135Gs** and 3 **EC-135Ls** with J57 turbojets; 5 turbojet **EC-135Hs** used by USAFE; one **EC-135K** used by TAC, and 5 **EC-135Ps** used by PACAF, also with turbojets; and 3 **EC-135Js** which are modified "Cs" with turbofan engines. Photo-reconnaissance versions of the C-135 series include: 4 **RC-135As,** supplied to MAC in the mid-sixties, and also performing mapping duties; and 10 turbofan **RC-135Bs,** equipped also for electronic reconnaissance with SAC. Other aircraft adapted for reconnaissance missions after initial delivery were: 4 **RC-135Ds,** originally KC-135As and later modified to "S" standard with special equipment; one **RC-135E,** formerly a C-135B; **RC-135Ms,** formerly C-135Bs; and **RC-135U,** all for electronic reconnaissance; and 10 **WC-135Bs,** converted C-135Bs, used by MAC for long-range weather reconnaissance missions. In addition 8 **EC-135Ns** were equipped as airborne radio and telemetry relay stations for the Apollo programme. Data basically as C-135 (p. 133).

EC-137D/E-3A

The first of two prototype EC-137Ds, developed under a contract awarded to Boeing in 1970, made its initial flight in February 1972. Design was based on the Model 707-320 airframe, with the addition of an extensive range of operational equipment to suit the aircraft's specialised rôle, including sensing, communications, display, and navigational systems. A downward-looking radar, housed in a 30-ft diameter rotating dorsal radome, is able to detect low-flying aircraft beneath

RF-101G

RF-4C

EB-66

E-3A

the heights covered by ground-based radar, and can discriminate between "clutter" and signals returned from moving targets. The primary use of such an aircraft by ADC will be as a survivable early-warning airborne command-and-control (AWACS) centre for the identification, surveillance, and tracking of airborne enemy forces, and for command and control of NORAD forces. Similar aircraft operated by TAC will be used as airborne command-and-control centres for quick-reaction deployment and tactical operations. The most recent information indicates that funds will be available to build the originally planned four pre-production E-3As, two of which will be based on the EC-137D airframes used for "brassboard" tests of competing AWACS radars. The E-3A will also have four Pratt & Whitney TF33-P-7 turbofans (each 21,000 lb thrust) instead of the intended eight General Electric TF34s. Up to 42 production E-3As will be requested in due course.

E-4A (AABNCP 747)

The FY 1973 budget provided funds for three Boeing 747s modified for use as Advanced Airborne National Command Posts and for Presidential transport; a fourth is requested under FY 1974 proposals. It is anticipated that these aircraft will replace the EC-135s currently used by the USAF in this rôle. (Data provisional.)

Contractor: The Boeing Aerospace Company.
Power Plant: Pratt & Whitney JT9D-7W turbofan engines.
Dimensions: span 195 ft 8 in, length 231 ft 4 in, height 63 ft 5 in.
Weight: gross 778,000 lb.

E-4A (AABNCP 747) (Artist's concept)

Transports and Tankers

C-5A Galaxy

Delivery of the first operational C-5A Galaxy was made to MAC in December 1969, after six years of design and development study for a very large logistics transport. Special equipment includes electronic MADAR for malfunction detection. Current contracts, almost completed, cover the manufacture of 81 aircraft; those already in service have been flying regular missions to Southeast Asia and Europe. They are the largest aircraft in service anywhere in the world, with a lower-deck volume of 34,795 cu ft.

Contractor: Lockheed-Georgia Company.
Power Plant: four General Electric TF39-GE-1 turbofan engines; each 41,000 lb thrust.
Accommodation: basic crew of five; rest area for 15 (relief crew, etc); 75 troops and 36 standard 463L pallets or assorted vehicles, or additional 270 troops.
Dimensions: span 222 ft 8½ in, length 247 ft 10 in, height 65 ft 1½ in.
Weights: empty 325,244 lb, gross (for 2.25 g) 764,500 lb.
Performance: max speed 571 mph at 25,000 ft, service ceiling (at 615,000 lb) 34,000 ft, range (with 220,000 lb payload at 507 mph) 3,512 miles.

C-5A

C-7A Caribou

The prototype of this Canadian-built STOL utility transport flew in July 1958. Most important customer was the US Army, which transferred a total of 134 Caribou to the USAF in January 1967. The ability of these aircraft to operate from short, unprepared runways in all weather conditions led to their widespread deployment in Southeast Asia. All C-7As have been transferred to the Reserve and ANG.

Contractor: de Havilland Aircraft of Canada Ltd.
Power Plant: two Pratt & Whitney R-2000-7M2 piston engines; each 1,450 hp.

C-7A

Accommodation: crew of two or three; 32 troops, 26 paratroops, or 14 litters.
Dimensions: span 96 ft 0 in, length 72 ft 7 in, height 31 ft 9 in.
Weights: empty 16,795 lb, gross 26,000 lb.
Performance: max speed 216 mph at 5,000 ft, service ceiling 27,700 ft, range 200–1,400 miles.

C-9A Nightingale

This aeromedical transport was ordered initially in August 1967, for operation by the 375th Aeromedical Wing of MAC. The C-9A is essentially an off-the-shelf DC-9 Series 30 commercial transport, modified to include a special-care compartment with separate atmospheric and ventilation controls. The first of 21 was delivered in August 1968.

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; 30–40 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 565 mph at 25,000 ft.

KC-97L, C-97G and K

Many variants of this transport development of the B-29 have been utilised by the USAF since initial production began in 1945. Those remaining in service are derived from the KC-97G, built between 1953 and 1956 and gradually replaced from 1957 by KC-135As. A total of 135 was converted to **C-97G** Stratofreighter cargo aircraft by the removal of the flight refuelling equipment; a further 26 became **C-97Ks,** in passenger configuration, for SAC mission support duties. A number were modified by the addition of J47-GE-25A jet pods for use by the ANG as tankers, for operation with TAC fighters, and were redesignated **KC-97L.** Another 28 were converted to **HC-97Gs** for air-sea search and rescue work, and now serve with the AF Reserve. (Data for KC-97G.)

Contractor: The Boeing Airplane Company.
Power Plant: four Pratt & Whitney R-4360-59 piston engines; each 3,500 hp.
Accommodation: crew of five; 96 combat troops or 69 litters.
Dimensions: span 141 ft 3 in, length 110 ft 4 in, height 38 ft 3 in.
Weights: empty 82,500 lb, gross 175,000 lb.
Performance: max speed 375 mph, service ceiling 35,000 ft, range 4,300 miles.

C-119 Flying Boxcar

Now serving with the AF Reserve, the **C-119G** was the final production version of the Flying Boxcar, with Aeroproducts propellers replacing the Hamilton Standards of the C-119F. The first C-119G was flown in October 1952, and all "Fs" were converted eventually to "G" standard. In turn, 68 C-119Fs and Gs were modified to **C-119J** standard with beaver-tail rear doors. These also continue in service. (Data for C-119G.)

Contractor: The Fairchild Engine and Airplane Corporation.
Power Plant: two Wright R-3350-85 piston engines; each 3,500 hp.
Accommodation: crew of four; 62 troops or 28,000 lb of cargo.
Dimensions: span 109 ft 3 in, length 86 ft 6 in, height 26 ft 3 in.
Weights: empty 39,982 lb, gross 74,400 lb.
Performance: cruising speed 200 mph, range 2,280 miles.

C-123 Provider

The basic **C-123B** entered service in 1955 as a troop and supply transport. Design modifications produced the **C-123J,** ten of which were built with additional wingtip J44 turbojets and provision for wheel-ski landing gear for use as support aircraft for the DEW-line radar chain in Alaska. Some are still used by the ANG. The **C-123K** is also a modified C-123B, with two underwing pylon-mounted auxiliary turbojets, improved landing gear, and a new stall warning system. The first "K" flew in May 1966, and this version was widely used during the Vietnam War for transport and special duties; 183 were delivered. (Data for C-123K.)

Contractor: The Fairchild Engine and Airplane Corporation.
Power Plant: two Pratt & Whitney R-2800-99W piston engines; each 2,300 hp; and two General Electric J85-GE-17 turbojet engines; each 2,850 lb thrust.
Accommodation: crew of two; 61 troops, 50 litters, or 24,000 lb of cargo.
Dimensions: span 110 ft 0 in, length 76 ft 3 in, height 34 ft 1 in.
Weights: empty 35,366 lb, gross 60,000 lb.
Performance: max speed 228 mph at 10,000 ft, service ceiling above 25,000 ft, range with 15,000 lb payload 1,035 miles.

C-124C Globemaster II

The Globemaster II was developed in the late 'forties from the earlier C-74 Globemaster I, with a much enlarged fuselage and


C-9A


KC-97L

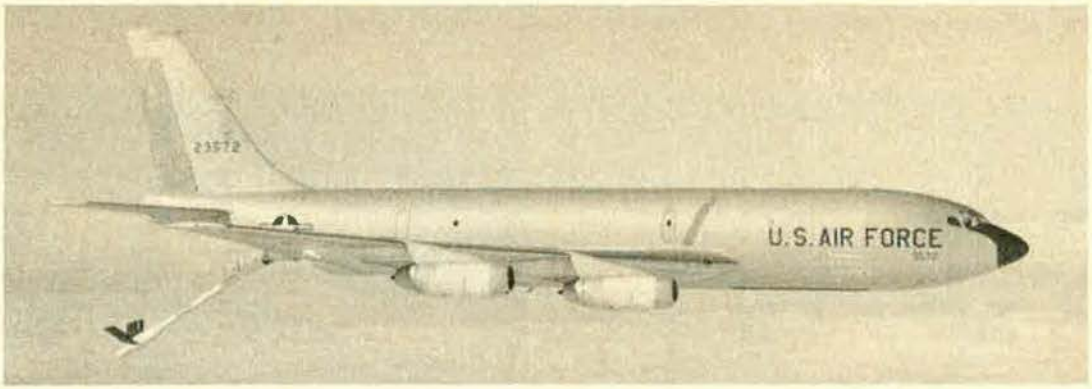

C-119


C-123

C-124

C-130

HC-130



KC-135

VC-137C

nose-loading doors. Final variant was the C-124C, which introduced uprated engines, combustion heaters in wingtip pods, and nose-mounted APS-42 weather radar. A total of 243 "Cs" was built, for operation by MAC and most operational USAF commands. Those remaining in service in the 'sixties were transferred gradually to the AF Reserve and the ANG.

Contractor: Douglas Aircraft Company.
Power Plant: four Pratt & Whitney R-4360-63A piston engines; each 3,800 hp.
Accommodation: crew of eight; 200 troops, 127 litters, or 68,500 lb of cargo.
Dimensions: span 174 ft 2 in, length 130 ft 5 in, height 48 ft 4 in.
Weights: empty 101,165 lb, gross 194,500 lb.
Performance: max speed 304 mph, service ceiling 18,400 ft, range 4,030 miles with 26,375 lb of cargo.

C-130 Hercules

Designed to a specification issued by TAC in 1951, many versions of the Hercules transport have entered USAF service. **C-130A** was the initial production version, with 3,750 eshp Allison T56-A-1A or -9 turboprops; first flown in April 1955, 219 were ordered with deliveries beginning in December 1956. Two **GC-130As** were special variants built as drone launcher/directors for ARDC, 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 im-

C-135

proved range and higher weights, powered by 4,050 eshp Allison T56-A-7 turboprops; the first of 134 entered USAF service in June 1959. 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 version of the C-130B, with larger underwing fuel tanks; 363 were ordered for MAC and TAC with deliveries beginning April 1962. Variants include 14 HC-130Es for the Aerospace Rescue and Recovery Service, and the separately-described AC-130E and WC-130E. (Data for C-130E.)

Contractor: Lockheed-Georgia Company.
Power Plant: four Allison T56-A-7A turboprop engines; each 4,050 eshp.
Accommodation: crew of four; up to 92 troops or 6 standard freight pallets, etc.
Dimensions: span 132 ft 7 in, length 97 ft 9 in, height 38 ft 3 in.
Weights: empty 72,892 lb, gross 175,000 lb.
Performance: max speed 384 mph, service ceiling 23,000 ft, range with max payload 2,420 miles.

HC-130

The **HC-130H** extended-range version of the C-130, with 4,910 eshp (limited to 4,500 eshp) Allison T56-A-15 turboprops, was ordered initially in 1963 for the Aerospace Rescue and Recovery Service. A folding nose-mounted recovery system makes possible repeated pick-ups from land or water of persons or objects weighing up to 500 lb, including the recoverable gear. Crew consists of 10 to 12 men. Total of 66 built, of which the first flew in December 1964. **HC-130N**, a further version for search and recovery of aircrew, and retrieval of space capsules after re-entry, using advanced direction-finding equipment; 15 ordered in 1969. **HC-130P,** 20 modified "Hs" capable of refuelling helicopters in flight and of retrieving parachute-borne payloads in mid-air. Other data similar to C-130 above, except length, which is 98 ft 9 in with recovery system folded.

C-131 Samaritan

Specialised military versions of the Convair 240/340/440 Series included several transports. MATS (now MAC) took delivery in 1954 of 26 **C-131A** Samaritans, based on the Model 240, for air evacuation duties; each could accommodate 37 passengers, 27 litters, or a combination of both, in a pressurised cabin. For testing electronic equipment, the USAF acquired 36 **C-131Bs**, based on the Model 340, which could also carry 48 passengers. Also evolved from the Model 340 and the Model 440, with improved sound-proofing, were the 44-passenger **C-131D** and the **VC-131D**, of which a total of 33 were delivered. They were followed in 1956–57 by 15 **C-131Es**, mainly for ECM training with SAC, of which seven became RC-131s. (Data for C-131B.)

Contractor: Convair Division of General Dynamics Corporation.
Power Plant: two Pratt & Whitney R-2800-99W piston engines; each 2,500 hp.
Accommodation: crew of four and 48 passengers.
Dimensions: span 105 ft 4 in, length 79 ft 2 in, height 28 ft 2 in.
Weights: empty 29,248 lb, gross 47,000 lb.
Performance: max speed 293 mph, service ceiling 24,500 ft, range 2,000 miles.

KC-135 Stratotanker

First flown in August 1956, the **KC-135A** was developed from the Model 367-80 (prototype for 707 Series) both as a standard flight refueiling tanker for SAC bombers, with high-speed and high-altitude capabilities, and as a long-range passenger and/or cargo transport; 732 were built. Variants include the **KC-135Q**, adapted to refuel Lockheed SR-71s; and **KC-135R** and **KC-135T** for special reconnaissance. (Data for KC-135A.)

Contractor: The Boeing Company.

C-140

C-141

Power Plant: four Pratt & Whitney J57-P-59W turbojet engines; each 13,750 lb thrust.
Accommodation: crew of four or five.
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 585 mph at 30,000 ft, service ceiling 50,000 ft, range 1,150 miles with 120,000 lb of transfer fuel; 9,200 miles ferry mission.

C-135 Stratolifter

Ordered by MATS (now MAC) as an interim jet passenger/cargo transport, pending delivery of the C-141, the Stratolifter was evolved from the KC-135A primarily by removing the tanker's refuelling equipment. Minor internal changes adapted the cabin for personnel transport, with other modifications to facilitate cargo handling. The first of three converted KC-135As, known as **C-135A** "Falsies", flew in May 1961. The 15 genuine production C-135As, with J57-P-59W turbojets, could be identified by their taller fin and rudder, as standardised for commercial 707s. They were followed by 30 **C-135Bs**, with Pratt & Whitney TF33-P-5 turbofans, the first of which flew in February 1962. Eleven "Bs" were converted subsequently 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 4,625 miles with 54,000 lb payload.

VC-137

Several modified Boeing 707 transports have been acquired by the USAF for VIP duties. Best-known is Air Force One, the **VC-137C** used by the President and operated by the 89th Military Airlift Wing from Andrews AFB, Md. It is basically a 707-320B with a special VIP interior for a crew of seven or eight and 49 passengers. A second, similar aircraft was ordered in 1972 and was recently delivered. Three of the smaller 707-120s, acquired as VC-137As but modified later to VC-137B standard by the installation of turbofan engines, are also in service with the 89th Wing.

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

The first of five **C-140A** JetStars was delivered to the Air Force Communications Service in mid-1962, for worldwide inspection of military navigation aids. Delivery of eleven **VC-140Bs** to the Special Air Missions Wing of MAC had begun late in the previous year, and these aircraft continue to operate out of Andrews AFB, Md.

Contractor: Lockheed-Georgia Company.
Power Plant: four Pratt & Whitney J60 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 550 mph at 20,000 ft, range with reserves 2,280 miles.

C-141A StarLifter

Initiated as the flying element of Logistics Support System 476L, with an all-weather landing system standard, the C-141A began squadron operations with MAC in April 1965 and was soon making virtually daily trans-Pacific flights to Southeast Asia. Production

totalled 284 aircraft, of which some were modified to carry Minuteman ICBMs, with local structural strengthening to accommodate this 86,207 lb load.

Contractor: Lockheed-Georgia Company.
Power Plant: four Pratt & Whitney TF33-P-7 turbofan engines; each 21,000 lb thrust.
Accommodation: crew of four; 154 troops, 123 paratroops, or 70,847 lb of freight.
Dimensions: span 159 ft 11 in, length 145 ft 0 in, height 39 ft 3 in.
Weights: empty 136,000 lb, gross 316,600 lb.
Performance: max speed 571 mph at 25,000 ft, service ceiling 41,600 ft, range 4,080 miles.

Boeing AMST (Artist's concept)

AMST

The FY 1973 budget provided $25 million for initial development of an advanced medium STOL transport (AMST) which might eventually replace the C-130 Hercules in USAF service. Subsequently, Boeing and McDonnell Douglas each received a contract for two prototypes of their competing designs, and a further $67.2 million is requested in FY 1974 to accelerate the programme.

Boeing AMST

Basically, the Boeing design utilises a conventional unswept high-wing T-tail airframe, with rear loading ramp, and fuselage-side fairings to house the main-wheel bogies when retracted. By contrast the power plant installation will be entirely unconventional. Two high by-pass ratio turbofans, in the 45,000–50,000 lb thrust class, will be mounted close to the fuselage, above and forward of the wing. High lift will be provided by upper-surface blowing, the use of slotless inboard Coanda flaps, and variable-camber leading-edge flaps. The fuselage diameter will be considerably greater than that of the C-130. Nominal AMST payload is 50,000 lb, including light tracked vehicles, to be carried over short to medium ranges from very short, rough airstrips. Gross weight is expected to be in the order of 150,000 lb, and cruising speed in the Mach 0.7 to 0.8 range. Boeing is aiming for a first flight in late 1975.

McDonnell Douglas AMST (Artist's concept)

McDonnell Douglas AMST

Conventional in configuration, the McDonnell Douglas AMST prototypes will be high-wing, T-tail aircraft, powered by four 15,500 lb thrust Pratt & Whitney JT8D turbofans and fitted with externally-blown flaps. Performance objectives include take-off from a 2,000 ft runway at a gross weight of 140,000 lb, including a 27,000 lb payload; and approach speeds down to 80 knots (92 mph).

Dimensions: span 110 ft 4 in, length 123 ft 6 in, height 42 ft 10 in.

UTILITY AND EXPERIMENTAL AIRCRAFT

U-3A

JC-130B

Six modified C-130Bs were delivered in 1961 to replace the C-119s of the 6593rd Test Squadron at Hickam AFB, Hawaii. Designated JC-130B, these aircraft are equipped for air-snatch recovery of classified USAF satellites. Data similar to C-130.

U-3A/B

The Cessna 310 has been in USAF service since 1957, when it won a competition for a light twin-engined administrative, liaison, and cargo aircraft. Initial orders for 160 "off-the-shelf", under the designation **U-3A**, were followed by a contract for 35 all-weather models, designated **U-3B**, with swept fin, more cabin windows, and a longer nose; these were delivered in 1960–61. The U-3 is popularly referred to as the "Blue Canoe". (Data for U-3A.)

Contractor: Cessna Aircraft Company.

Power Plant: two Continental O-470-M piston engines; each 240 hp.
Accommodation: five persons.
Dimensions: span 36 ft 0 in, length 27 ft 1 in.
Weight: gross 4,700 lb.
Performance: max speed 232 mph, range 850 miles.

QU-22A/B

Under the Pave Eagle programme, six QU-22A and 27 QU-22B aircraft were produced by conversion of Model 33 and Model A36 Bonanzas respectively, to replace the larger and more heavily manned EC-121Rs used previously to relay infiltration data transmitted by Igloo White acoustic sensors planted along trails used by the enemy in Laos and South Vietnam. The QU-22B (data below) differs from the commercial A36 in having a more powerful engine, driving a slow-turning, quiet, three-blade propeller, an 8kW belt-driven alternator to power the relay avionics, and extended-span wings with auxiliary tip-tanks. Equipment installed by Univac Division of Sperry Rand was designed to permit drone operation, but missions were always made with a pilot on board.

Contractor: Beech Aircraft Corporation.
Power Plant: Continental GTSIO-520 piston-engine; 375 hp.
Accommodation: Pilot/observer only.
Weight: estimated gross weight approx 5,200 lb.
Performance: endurance on station 18 hr at 3,300 ft.

X-24B

In July 1971, NASA announced that the USAF's X-24A air-launched experimental aircraft, used in lifting-body research, was to be rebuilt with completely new external lines, incorporating a double-delta configuration; the new version is designated X-24B. Current research is aimed towards the development of manoeuvring manned re-entry vehicles able to perform as spacecraft in orbit, fly in earth's atmosphere like aircraft, and land at conventional airports. The X-24B retains the power plant and systems of the "A", which attained a maximum speed of Mach 1.62 in 1971.

Contractor: Martin Marietta Corporation.
Power Plant: Thiokol XLR-11 turbo-rocket engine; 8,000 lb thrust; two Bell LLRV landing rockets; each 500 lb thrust.
Accommodation: pilot only.
Dimensions: width 19 ft 2 in, length 37 ft 6 in, height less landing gear 7 ft 3 in.
Weights: min weight, unfuelled 7,540 lb, max launching weight, fuelled 13,000 lb.

QU-22B

X-24A

HELICOPTERS

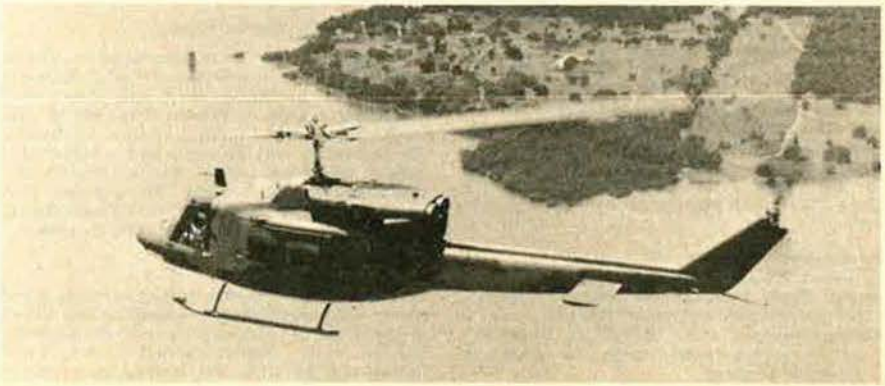
UH-1F

Power Plant: General Electric T58-GE-3 turboshaft engine; 1,272 shp (derated to 1,100 shp).
Accommodation: one pilot and ten passengers; or two crew and up to 4,000 lb of cargo.
Dimensions: rotor diameter 48 ft 0 in, length of fuselage 39 ft 7½ in.
Weight: gross 9,000 lb.
Performance: max speed 115 mph, service ceiling at mission gross weight 13,450 ft, max range, no allowances, at mission gross weight 347 miles.

UH-1N

Following approval given by the Canadian Government in 1968, a twin-engined version of the UH-1 utility helicopter was developed, with the ability to sustain cruising flight on

UH-1N



UH-1F/H

Following a design competition, a total of 146 UH-1Fs was built for the USAF between 1963 and 1967, for missile site support duties. Developed from the basic Bell Model 204 design, this version made its initial flight in February 1964; deliveries began to the 4486th Test Squadron in September of the same year. Designated **HH-1P,** a few UH-1Fs were modified for classified psychological warfare missions in Vietnam. **TH-1F** is a training version of the UH-1F. Production of these versions has been completed, but in November 1970 the USAF placed an initial order for 30 of the larger (12- to 15-seat) **HH-1H** helicopters to replace the HH-43 for local base rescue duties. (Data for UH-1F.)

Contractor: Bell Helicopter Company.

CH-3E

HH-3E

one engine. A total of 165 of these aircraft, all designated UH-1N, was subsequently ordered by the US services, 79 of them for the USAF. Simultaneous orders for 50 aircraft were placed by the Canadian Government, for the Canadian Armed Forces, with options on 20 more. Initial deliveries were made to the USAF in 1970.

Contractor: Bell Helicopter Company.
Power Plant: Pratt & Whitney (UACL) T400-CP-400 Turbo "Twin-Pac", consisting of two PT6 turboshaft engines coupled to a combining gearbox with a single output shaft; flat-rated to 1,250 shp for take-off.
Accommodation: pilot and 14 passengers or cargo.
Dimensions: rotor diameter (with tracking tips) 48 ft 2¼ in, length of fuselage 42 ft 4¾ in, height 14 ft 4¾ in.
Weight: gross 10,500 lb.
Performance: max speed 126 mph at S/L, service ceiling 15,000 ft, max range 248 miles, no reserves.

CH-3E

Although based on the Navy's SH-3A, this twin-engined amphibious transport helicopter introduced important design changes to speed cargo handling and ease maintenance, including built-in equipment for the removal and replacement of all major components in remote areas. The initial version was the CH-3C, of which 133 were ordered for the USAF. Introduction of uprated engines led to the new designation CH-3E in February 1966, applicable to both new production aircraft and re-engined CH-3Cs. A pod-mounted turret armament system developed for this version, with one pod on each sponson, achieves over 180° traverse on each side of the aircraft, to give complete 360° coverage with overlapping fire forward.

Contractor: Sikorsky Aircraft, Division of United Aircraft 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.

HH-43

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 162 mph at S/L, service ceiling 11,100 ft, max range 465 miles, with 10% reserve.
Armament: General Electric six-barrel 7.62 mm Minigun mounted in each turret.

HH-3E Jolly Green Giant

Variant of the CH-3E developed to enable the USAF Aerospace Rescue and Recovery Service to penetrate deep into North Vietnam on rescue missions. The HH-3E has self-sealing fuel tanks, armour, defensive armament, a rescue hoist, and a retractable flight refuelling probe. Some aircraft are modifications of CH-3Cs. An unarmed version (HH-3F) is used by the US Coast Guard. Other data basically as for CH-3E above.

HH-43B/F Huskie

Used at USAF bases throughout the world as a local crash rescue helicopter, the HH-43 Huskie is a turbine-powered development of an earlier piston-engined model. Small wheel-skis fitted to the landing gear permit operation from hard or soft surfaces. Two versions are in service: **HH-43B** was the initial production version, flying for the first time in December 1958; **HH-43F,** with more power and increased fuel capacity, was produced to replace the HH-43B in operations where optimum altitude performance under hot-weather conditions is required; the first "F" flew in August 1964. The HH-43s are being replaced by HH-1Hs.

Contractor: Kaman Aircraft Corporation.
Power Plant: HH-43B: Lycoming T53-L-1B turboshaft engine; 860 shp (derated to 825 shp). HH-43F: Lycoming T53-L-11A turboshaft engine; 1,150 shp (derated to 825 shp).
Accommodation: pilot, two fire-fighters, and rescue gear; or pilot, co-pilot, and 10 passengers; or pilot, medical attendant, and four litters.
Dimensions: diameter of each rotor 47 ft 0 in, length of fuselage 25 ft 2 in, height to top of rotor head 12 ft 7 in.
Weight: gross 9,150 lb.
Performance (HH-43F at 6,500 lb): max speed 120 mph at S/L, service ceiling 23,000 ft, range at 8,270 lb 504 miles, no reserve.

HH-53B

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 refuelling probe) 67 ft 2 in, height 24 ft 11 in.
Weights: empty 23,125 lb, gross 42,000 lb.
Performance: max speed 186 mph at S/L, service ceiling 18,400 ft, max range 540 miles, with 10% reserve.

HH-53C

An improved version of the HH-53B, powered by two 3,435 shp T64-GE-7 turboshaft engines; first delivered to the USAF in August 1968. Faster than the B model, with a maximum speed of 196 mph, the HH-53C 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 66 HH-53B/Cs was built.

HH-53B

First deliveries of this twin-turbine heavy-lift helicopter, ordered for the USAF to supplement the HH-3E, were made in June 1967. Although carrying the same general equipment as the Jolly Green Giant, including the flight refuelling probe, the HH-53B is faster and larger. It was used extensively for rescue operations in Southeast Asia.

Contractor: Sikorsky Aircraft, Division of United Aircraft Corporation.
Power Plant: two General Electric T64-GE-3 turboshaft engines; each 3,080 shp.

HH-53C

TRAINERS

T-29

Contractor: Convair Division of General Dynamics Corporation.
Power Plant: T-29A/B: two Pratt & Whitney R-2800-97W piston engines; each 2,400 hp. T-29C/D: two R-2800-99W piston engines; each 2,500 hp.
Accommodation: crew of three; 14 students and 2 instructors in T-29A/B/C; only 6 students in T-29D.
Dimensions: span 91 ft 9 in, length 74 ft 8 in, height 26 ft 11 in.
Weight: T-29A gross 40,500 lb, T-29B/D gross 43,575 lb.
Performance (T-29D): max speed 299 mph. service ceiling 24,000 ft, range 1,500 miles.

T-33A

Developed from the Shooting Star jet fighter, the T-33A was the USAF's standard

T-29

Military versions of the Convair-Liner have been in service with the USAF as aircrew trainers for more than two decades. Initial version was the unpressurised **T-29A,** first flown in September 1949 and used for navigation, bombardment, and radar training. Forty-eight were built, with late aircraft modified to have outer wing fuel tanks for increased range. The pressurised **T-29B** was developed from the "A", with increased fuel capacity, and with three astrodomes and one periscopic sextant on top of the fuselage instead of the four astrodomes of the earlier version. The first T-29B flew in July 1952, and 105 were built. A version with more powerful engines followed in July 1953, of which 119 were delivered under the designation **T-29C.** Similar to the T-29C but without astrodomes, the **T-29D,** first flown in August 1953, is equipped for advanced navigation and bombardment training, with a "K" system bombsight; 93 were built.

T-33

jet advanced trainer before the introduction of the T-38 and is still used widely for proficiency training. Its lengthened fuselage accommodates a second cockpit in tandem, with the canopy extended to cover both; the armament of the fighter version was replaced by an all-weather "navigational nose". Production ended in August 1959, with deliveries to the USAF having totalled more than 4,000.

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 543 mph at 25,000 ft, service ceiling 47,500 ft.
Armament: two 0.50 calibre machine-guns on some early aircraft only.

T-37B

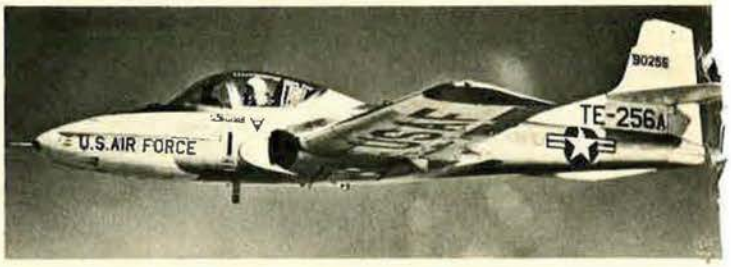
The T-37 was the first USAF jet trainer designed as such from the start, with deliveries of the current T-37B model beginning in late 1959. Employed for primary training, this version superseded the T-37As, all of which have since been converted to "B" standard. In addition to training, this aircraft can also be equipped to perform military surveillance and low-level attack duties. Well over a thousand T-37s have been built, with production of the T-37B and the T-37C armed export version continuing.

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 in.
Weights: empty 3,870 lb, gross 6,574 lb.
Performance: max speed 425 mph at 20,000 ft, service ceiling 39,200 ft, range at 360 mph, standard tankage 870 miles.

T-38A Talon

In continuous production from 1956 to 1972, this supersonic lightweight twin-jet advanced trainer has consistently maintained the best safety record of any USAF supersonic aircraft. The first T-38 flew in April 1959, with production models entering operational service in March 1961. The Talon is almost identical in structure to the F-5 tactical fighter, with which it was derived from Northrop's private-venture N-156 design. More than 1,100 of the total of 1,187 T-38As built were delivered to the USAF.

T-39



T-37B

T-38

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 more than Mach 1.23 (812 mph) at 36,000 ft, range 1,093 miles, with reserves.

T-39 Sabreliner

Built as a private venture to meet USAF "UTX" requirements for a combat readiness trainer and utility aircraft, the prototype Sabreliner made its first flight in September 1958, powered by two General Electric J85 turbojets. Subsequent production versions, all with J60 engines, utilised by the USAF are: the **T-39A,** a basic utility trainer of which 143 were delivered for service with Air Training Command, Strategic Air Command, Systems Command, USAF Headquarters, and Military Airlift Command; six **T-39Bs,** used by Tactical Air Command to train aircrew for F-105 Thunderchief squadrons, and equipped with Doppler radar and NASARR all-weather search and ranging radar; and a few **T-39F** conversions, equipped to train ECM operators for the F-105G aircraft. (Data for T-39A.)

Contractor: North American Rockwell 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 595 mph, range 1,950 miles.

T-41A Mescalero

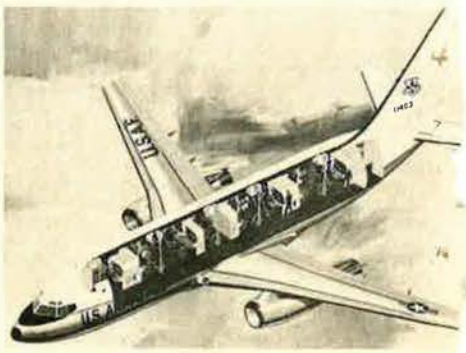
Training for a student USAF pilot begins with about thirty hours in a standard Cessna Model 172 light aircraft, bought by the USAF as a trainer under the designation T-41A. An initial order for 170 T-41As in 1964 was supplemented by a further 34 later. In October 1967, 45 T-41Cs, a more powerful version of the Model 172, were ordered for flight training at the USAF Academy. (Data for T-41A.)

Contractor: Cessna Aircraft Company.
Power Plant: 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.
Weight: gross 2,300 lb.
Performance: max speed 138 mph at S/L, range 720 miles.

T-43A

Selected by the USAF in May 1971 to replace the T-29 as a navigation trainer, the T-43A is a military version of the commercial Model 737-200. Design of the basic 737 began in 1964 and it incorporates many components and assemblies that were already in production for the 727. Deliveries of the nineteen T-43As initially ordered by the USAF are due to start to Mather AFB, Calif., this year.

Contractor: The Boeing Company.
Power Plant: two Pratt & Whitney JT8D turbofan engines.
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: max speed 586 mph, range more than 2,000 miles.



T-43A (Artist's concept)

STRATEGIC MISSILES

Titan II

LGM-25C Titan II

Despite original plans to withdraw all liquid-propellant ICBMs as the Minuteman force became operational, six squadrons of Titan IIs, each with nine missiles, remain in service, based at Davis-Monthan AFB, Ariz., McConnell AFB, Kan., and Little Rock AFB, Ark. Operational since 1963, a year after Titan I, this two-stage missile is fitted with a thermonuclear warhead having the largest yield of any yet carried by a US missile. Titan II is housed in an underground silo, and is held at instantaneous readiness for firing. During flight, the second stage shuts down once a speed of 17,000 mph is attained; four vernier nozzles then adjust the velocity and correct the trajectory for the proper ballistic delivery of the ablative-type re-entry vehicle, which finally separates from the burned-out second stage. Advanced penetration aids are carried to hinder detection and destruction by an ABM.

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 re-entry 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=Mach 25.75, max range 6,300 miles.

LGM-30F/G Minuteman

Designed as a simplified second-generation ICBM to supersede the liquid-propellant Atlas and Titan, Minuteman is a three-stage weapon built for launching from hardened underground silos. It is much smaller and lighter in weight than the earlier ICBMs, with a smaller payload, but its range is similar. The latest operational versions are:

LGM-30F Minuteman II: of similar configuration to the original Minuteman I, which is still used by Wings II and V, Minuteman II has increased range and azimuth to provide greater targeting coverage; also increased accuracy and larger payload capacity. Operational with Wing VI since 1966 and also with Wings I and IV.

LGM-30G Minuteman III: with further increased range and MIRV warhead, this version much increases the possibility of penetrating enemy defence systems. First, highly-successful test launch was made in 1968, and Minuteman III is now operational with Wing III.

Current plans provide for the entire force of 1,000 Minuteman missiles to consist eventually of LGM-30F and G models.

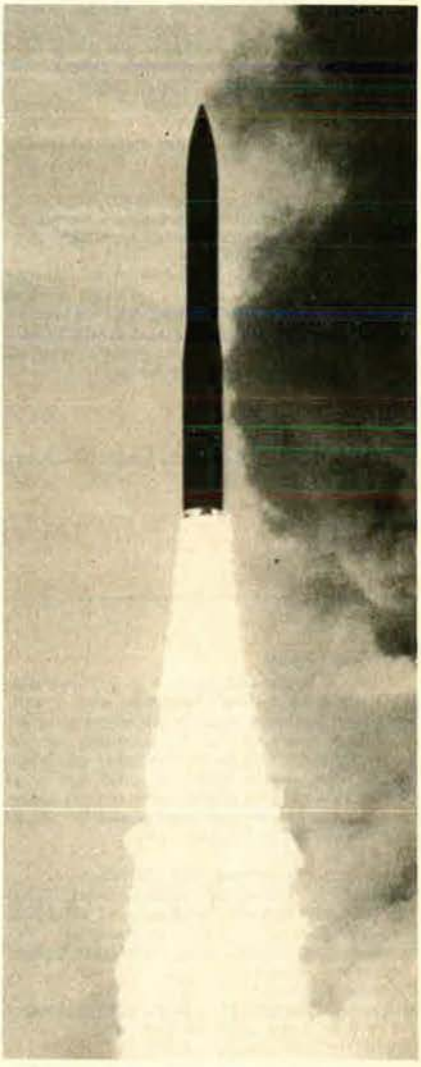
Contractor: The Boeing Company.
Power Plant: First stage: Thiokol M-55E solid-propellant motor; 200,000 lb thrust. Second stage: Aerojet-General SR19-AJ-1 solid-propellant motor; 60,600 lb thrust. Third stage: LGM-30F Hercules Inc. solid-propellant motor, LGM-30G Aerojet-General SR73-AJ-1 solid-propellant motor; 34,000 lb thrust.
Guidance: Autonetics Division of North American Rockwell inertial guidance system.
Warhead: LGM-30F thermonuclear warhead in a General Electric Mk 12 re-entry vehicle. LGM-30G thermonuclear warheads in multiple individually-targetable re-entry vehicles (MIRV).
Dimensions: length 59 ft 10 in, diameter of first stage 6 ft 0 in.
Weight: launch weight (approx) LGM-30F 70,000 lb, LGM-30G 76,000 lb.
Performance: speed at burnout over 15,000 mph=Mach 22.75, highest point of trajectory approx 700 miles, range with max operational load LGM-30F more than 7,000 miles, LGM-30G more than 8,000 miles.

AGM-28B Hound Dog

This air-to-surface strategic stand-off missile was developed to arm B-52G and H bombers. Each aircraft carries two Hound Dogs, one beneath each wing, on pylons which contain the astro-tracking system and launching equipment. Since the first of these missiles entered service in 1959, earlier versions of the B-52 have been adapted to carry Hound Dog, which is capable of attack at high or low level, of changing course and altitude, and of making dog-leg or feint runs. Most of the several hundred Hound Dogs still operational are of the AGM-28B version, modified to improve navigational accuracy.

Contractor: North American Aviation Inc.
Power Plant: Pratt & Whitney J52-P-3 turbojet; 7,500 lb thrust.
Guidance: North American Autonetics inertial guidance system, supplemented by a star-tracking system produced by Kollsman Instrument Company.

Hound Dog under B-52 wing



Minuteman III

GALLERY OF USAF WEAPONS

SRAM launched by FB-111A

Warhead: thermonuclear, with reported yield of 4 megatons.
Dimensions: length 42 ft 6 in, body diameter 2 ft 4½ in, wing span 12 ft 2 in.
Weight: launch weight 9,600 lb.
Performance: cruising speed Mach 2, max range 600 miles.

AGM-69A SRAM

Deployment of this supersonic short-range attack missile (SRAM) by Strategic Air Command began in 1972, six years after award of the first design and development contract. Each SAC B-52G and H can carry 20 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 SRAMs on swivelling underwing pylons and two internally. SRAM's radar signature is said to be no larger than that of a machine-gun bullet. Current contracts cover production of 945 missiles. Future carriers should include the B-1.

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 levels, and dog-leg courses, CEP stated to be well within lethal radius of warhead.
Warhead: nuclear, of similar yield to that of single Minuteman III warhead.

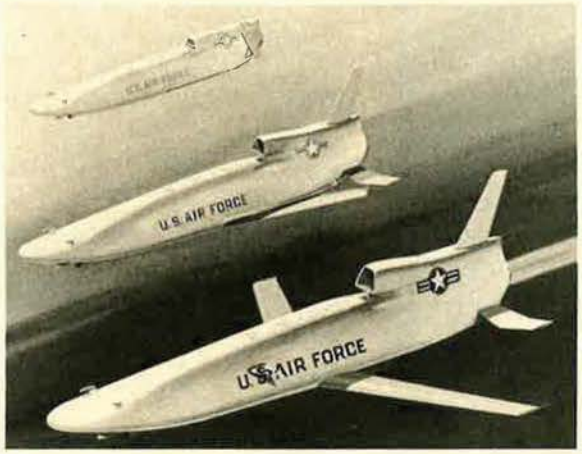
Dimensions: length 14 ft 0 in, body diameter 1 ft 5½ in.
Weight: launch weight approx 1,985 lb.
Performance: speed up to Mach 2.5, range 100 miles at high altitude, 35 miles at low altitude.

AGM-86A SCAD

The subsonic cruise armed decoy (SCAD) missile is intended as part of the ECM protection provided for the USAF's B-52 bombers. Models have revealed that it can be carried, with wings and tail folded, on the same eight-round rotary dispensers as SRAM. When dropped, its wings and tail deploy, its engine starts, and it flies preprogrammed high or low mission profiles over a distance of several hundred miles, giving the same radar return as the launch aircraft. Its effectiveness is much enhanced by the ability to carry a nuclear warhead. FY 1973 funding of $48.6 million has been increased to a requested $72.2 million in FY 1974. The decision whether or not to produce several hundred SCADs is expected to be taken after completion of test and evaluation in 1974-75.

Contractor: The Boeing Company.
Power Plant: Williams Research Corporation F107-WR-100 turbofan; more than 600 lb thrust, or Teledyne CAE Model 472 turbofan.
Guidance: Litton Systems inertial guidance.
Warhead: nuclear.
Dimensions: length 14 ft 0 in, span 8 ft 0 in, body diameter 1 ft 9 in.
Weight: launch weight approx 1,700 lb.

Artist's concept of SCAD sequence, from launch (top) to cruise configuration



GROUND-BASED, TACTICAL MISSILE

CGM-13C Mace

Mace, a surface-to-surface cruise missile, was developed in the mid-fifties with a self-contained guidance system designed to overcome the susceptibility to jamming of the earlier Matador's radio-navigational guidance system. Designated CGM-13C, the last missiles of this type in operational service equip PACAF on Okinawa and are housed in "hardened" underground launch sites.

Contractor: Martin Marietta Corporation.
Power Plant: Allison J33-A-41 turbojet; 5,200 lb thrust. Thiokol jettisonable solid-propellant booster; 100,000 lb thrust.
Guidance: AC Spark Plug AChiever inertial guidance system.
Warhead: nuclear.
Dimensions: length 44 ft 0 in, body diameter 4 ft 6 in, wing span 22 ft 11 in.
Weight: launch weight 18,000 lb.
Performance: max speed more than 650 mph, max range 1,200 miles.

Mace

AIRBORNE TACTICAL/DEFENSE MISSILES

Genie on F-101B

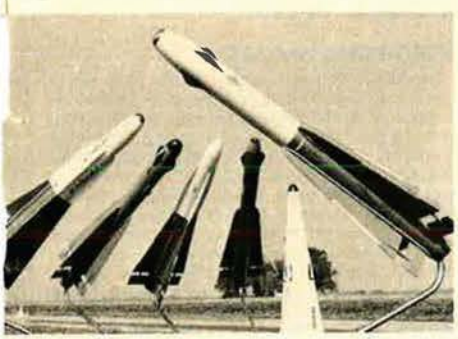
AIR-2A Genie

Genie became the first nuclear-tipped air-to-air missile ever tested in a live firing when, on 19 July 1957, it was launched from a F-89J Scorpion. It continues in first-line service, with thousands delivered for use by F-101B and F-106 squadrons of the USAF, as well as by the Canadian Armed Forces. Unguided in flight, Genie is normally fired automatically and detonated by the Hughes fire-control system fitted in the launching aircraft. A training version, without nuclear warhead, is also in service.

Contractor: McDonnell Douglas Astronautics Company.
Power Plant: Thiokol SR49-TC-1 solid-propellant rocket motor; 36,000 lb thrust.
Guidance: no guidance system.
Warhead: nuclear, with reported yield of 1.5 kilotons.
Dimensions: length 9 ft 7 in, body diameter 1 ft 5.35 in, fin span 3 ft 3½ in.
Weight: launch weight 820 lb.
Performance: max speed Mach 3, max range 6 miles.

AIM-4A/C/D Falcon

First air-to-air guided weapon adopted by the USAF, Falcon is standard armament on every US all-weather interceptor. Versions include:



Falcon family, from left: AIM-4G, AIM-4A, AIM-4E, AIM-4C, and AIM-26A, with AIM-4D in foreground

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 infra-red guidance system. About 9,500 were delivered simultaneously with the AIM-4As.

AIM-4D: "cross-bred" version, combining the improved infra-red homing head of the AIM-4G Super Falcon with the basic airframe of the AIM-4C. Used to arm F-4 fighters of Tactical Air Command and F-101 and F-102 fighters of ADC and later the Air National Guard. Thousands of older Falcons have been 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 semi-active radar homing system; AIM-4C/D: infra-red 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.
Weight: launch weight AIM-4A: 110 lb; AIM-4C: 122lb; AIM-4D: 134 lb.
Performance (AIM-4D): max speed Mach 4, range 6 miles.

AIM-4F/G Super Falcon

Less susceptible to enemy countermeasures and having a higher performance than the earlier Falcons, the Super Falcon air-to-air missile was developed from the AIM-4A/C Falcon to arm the F-106 Delta Dart. A mixed armament of four AIM-4F/Gs is carried internally. The two versions were introduced simultaneously in 1960, and superseded 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 semi-active radar homing guidance, AIM-4G: infra-red 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.
Weight: launch weight AIM-4F: 150 lb; AIM-4G: 145 lb.
Performance: max speed Mach 2.5, max range 7 miles.

AIM-7E/F Sparrow

A radar-homing long-range air-to-air missile, with all-weather, all-altitude operational capability, that can also be used against shipping targets from aircraft or ships. Sparrows are amongst the most important guided weapons currently in service with the NATO air forces and their allies. Up to six Sparrow missiles can be carried by the F-4 Phantom II, and they will equip the primary next-generation US fighters, including the USAF's McDonnell Douglas F-15 Eagle. The AIM-7F, advanced version of the Sparrow, is to supersede the current AIM-7E. (Data for AIM-7E.)

Contractor: Raytheon Company.
Power Plant: Rocketdyne Mk 38 solid-propellant rocket motor.
Guidance: Raytheon continuous-wave semi-active radar homing system.
Warhead: high-explosive, weighing 60 lb.
Dimensions: length 12 ft 0 in, body diameter 8 in, wing span 3 ft 4 in.
Weight: launch weight 450 lb.
Performance: max speed more than Mach 3.5, max range more than 8 miles.

AIM-9 Sidewinder

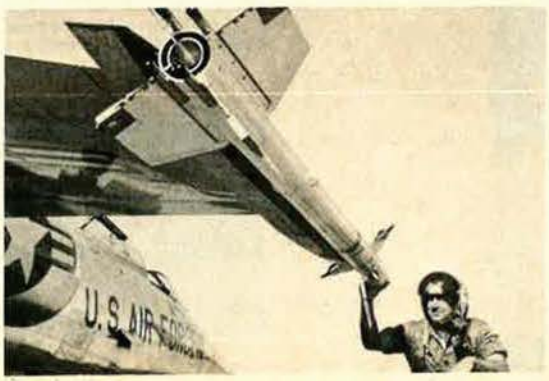
One of the simplest and cheapest guided weapons yet produced in quantity, the Sidewinder air-to-air missile is claimed to have fewer than two dozen moving parts and no more electronic components than a domestic radio. The standard AIM-9B, first fired successfully in 1953, was produced in very large numbers by Philco and General Electric for the USAF and the USN, and has been supplied to many foreign armed services, including those of nine NATO countries. New versions of Sidewinder reported to be under development for the USAF, or in service, are:

AIM-9E: an advanced version of AIM-9B produced by Philco for the USAF.

AIM-9J: an advanced version of AIM-9E with increased range, being developed by Philco-Ford to overcome limitations experienced during air fighting in Vietnam; to equip the F-15 and other types.

AIM-9L: new version with much-enhanced capability, under development jointly by USAF and USN. No details available. (Data for AIM-9B.)

Sparrow



Sidewinder

GALLERY OF USAF WEAPONS

Bullpup

Contractor: Naval Weapons Center.
Power Plant: Naval Propellant Plant solid-propellant rocket motor.
Guidance: infra-red homing guidance.
Warhead: high-explosive, weighing 25 lb.
Dimensions: length 9 ft 3½ in, body diameter 5 in, span of tail-fins 1 ft 10 in.
Weight: launch weight 159 lb.
Performance: max speed Mach 2.5, max range 2 miles.

AGM-12B/E Bullpup A

An air-to-surface tactical missile developed from the basic Bullpup conception of a guided weapon built around a standard 250 lb bomb. AGM-12E was the final version in this series, being built in limited numbers for the USAF and armed with an anti-personnel warhead for use in the Vietnam War. USAF aircraft carrying Bullpup A are the F-4, F-100, and F-105, with similar versions also in service with the USN and several foreign armed forces.

Contractors: Martin Marietta Corporation/ Maxson Electronics Corporation.
Power Plant: Thiokol LR58-2 storable liquid-propellant rocket motor; 12,000 lb thrust.
Guidance: radio command guidance, permitting attack from offset position.
Warhead: high-explosive, weighing 250 lb.
Dimensions: length 10 ft 6 in, body diameter 1 ft 0 in, wing span 3 ft 1 in.
Weight: launch weight 571 lb.
Performance: cruising speed Mach 1.8, max range 7 miles.

AGM-12D Bullpup B

As a result of the success of Bullpup A, this larger version with much extended capabilities was developed. The model supplied to the USAF, designated AGM-12D, has interchangeable nuclear and high-explosive warheads, unlike the naval version which is only high-explosive.

Contractors: Martin Marietta Corporation/ Maxson Electronics Corporation.
Power Plant: Thiokol LR62 storable liquid-propellant rocket motor.
Guidance: radio command guidance.
Warhead: alternative high-explosive or nuclear.
Dimensions: length 13 ft 7 in, body diameter 1 ft 6 in, wing span 4 ft 0 in.
Weight: launch weight 1,785 lb.
Performance: range 10 miles.

AIM-26 Nuclear Falcon

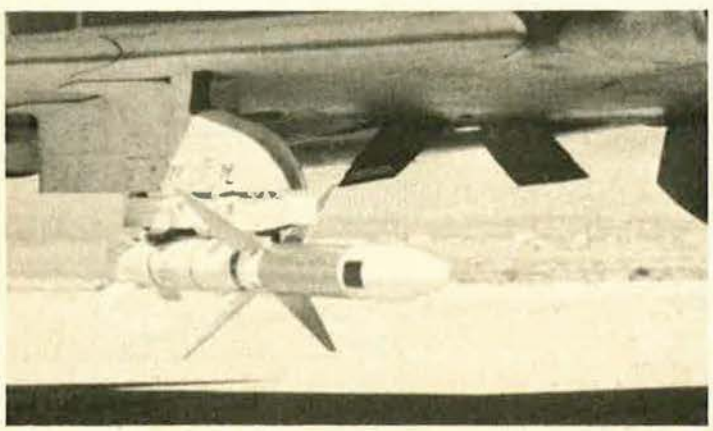
Introduced in 1960 and deployed subsequently with the F-102 Delta Dagger squadrons of Aerospace Defense Command, the AIM-26A was the first nuclear-tipped air-to-air guided missile to enter service. The basic radar homing guidance of the AIM-4A was fitted in this advanced version, as it provides better all-weather capability, longer acquisition range, and is more suitable for attack from any direction than infra-red systems. The AIM-26B version, which entered production in 1963, is generally similar to the AIM-26A but has a conventional warhead.

Contractor: Hughes Aircraft Company.
Power Plant: Thiokol M60 solid-propellant rocket motor.
Guidance: Hughes semi-active radar homing guidance.
Warhead: (AIM-26A) nuclear, with active proximity fuse; (AIM-26B) high-explosive.
Dimensions (AIM-26A): length 7 ft 0 in, max body diameter 11 in, wing span 1 ft 8 in.
Weight (AIM-26A): launch weight 203 lb.
Performance (AIM-26A): max speed Mach 2, max range 5 miles.

AGM-45A Shrike

Carried as a standard penetration aid by USAF tactical aircraft, this supersonic air-to-surface missile, designed to home on enemy radar installations, played a vital rôle during the US air offensive in Vietnam after it became operational there in 1965. Many subsequent improvements have increased Shrike's effectiveness, and it continues in production for both the USAF and the USN.

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.
Dimensions: length 10 ft 0 in, body diameter 8 in, wing span 3 ft 0 in.



Shrike on F-4D

Maverick on A-7D

Weight: launch weight 400 lb.
Performance: max range 10 miles.

AGM-65A Maverick

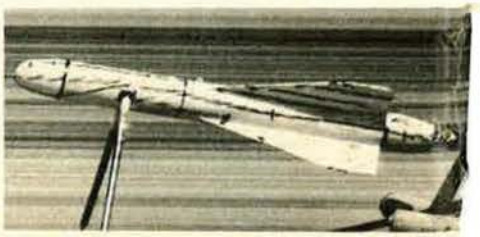
Smallest of the US TV-guided weapons currently being developed or in operational use, this tactical air-to-surface missile differs from earlier types in being self-homing. This enables the pilot of the launch aircraft to seek other targets or leave the target area once the missile has been launched. Production was initiated in 1971, under a $69.9 million contract, following the success of test launches over distances ranging from a few thousand feet to many miles, and from high altitudes down to treetop level. Maverick is carried by the A-7D, F-4D, and F-4E, normally in two three-round underwing clusters, and is intended for use against pinpoint targets such as tanks and columns of vehicles. It has also been test-launched successfully from RPVs.

Contractor: Hughes Aircraft Company.
Power Plant: Thiokol TX-481 solid-propellant rocket motor.
Guidance: self-homing electro-optical guidance system.
Warhead: high-explosive.
Dimensions: length 8 ft 1 in, body diameter 1 ft 0 in, wing span 2 ft 4 in.
Weight: launch weight under 500 lb.
Performance: classified.

AGM-78 Standard ARM

In full production since 1968, this air-to-surface anti-radiation missile was developed to provide a significant increase in capability over earlier weapons in countering the threat of enemy radar-controlled anti-aircraft guided missiles and guns. Several versions of Standard ARM have been scheduled for development. Current models differ from the initial version in having an improved seeker head, better target selection, and still greater attack range, and are more effective against target countermeasures, with the Target Identification and Acquisition System (TIAS) carried in the launch aircraft acting as a key item of support equipment. Standard ARM is deployed on the USAF's F-105 and also by the USN.

Contractor: General Dynamics Corporation, Electro Dynamic Division.
Power Plant: Aerojet-General Mk 27 Mod 4 dual-thrust solid-propellant rocket motor.
Guidance: passive homing guidance system,



Walleye

using seeker head which homes on enemy radar emissions.
Warhead: high-explosive.
Dimensions: length 15 ft 0 in, body diameter 1 ft 0 in.
Weight: launch weight 1,300 lb.
Performance: max speed Mach 2, max range 15.5 miles.

XAIM-97A Seekbat

Few details of this new air-to-air missile are yet available, although flight tests against target drones are already under way. Intended to deal with aircraft in the class of the Soviet MiG-25 ("Foxbat") at altitudes above 80,000 ft, Seekbat uses the basic airframe of the AGM-78 Standard ARM, with a larger power plant and an infra-red homing guidance system which is locked on to the target before launch. Prime contractor is the Electro Dynamic Division of General Dynamics Corporation.

HOBOS (HOming BOmb System)

HOBOS is a modular weapon system, in the form of a kit able to convert a variety of standard unpowered bombs into highly-accurate guided weapons, with moderate/long-range stand-off capability. Each kit consists of a forward guidance assembly, the warhead or interconnect section (including the bomb), and the aft control section (including an autopilot). When installed, it does not alter the conventional bomb suspension, release, or jettison functions. The effectiveness of the HOBOS bomb has been fully and successfully demonstrated in a large number of air drops.

Contractor: North American Rockwell Corporation.
Guidance: various types. Current HOBOS bombs utilise either a laser or electro-optical guidance system.
Warhead: current HOBOS missiles are built around standard Mk 84 (2,000 lb) and M118E1 (3,000 lb) bombs.

Walleye

Officially designated Guided Weapon Mark 1 Mod-0 (Walleye), this unpowered air-to-surface glide bomb proved an extremely accurate and effective weapon during operations in Vietnam. Production was initiated in 1966, and a wide variety of aircraft, including the A-7, F-4, F-105, and F-111, can carry Walleyes.

Contractor: Martin Marietta Corporation.
Guidance: self-homing electro-optical guidance system, enabling the pilot of the carrier aircraft to take any necessary evasive action once he has focused Walleye's TV camera on target and launched the bomb.
Warhead: high-explosive.
Dimensions: length 11 ft 3 in, body diameter 1 ft 3 in, wing span 3 ft 9 in.
Weight: launch weight 1,100 lb.

LAUNCH VEHICLES

Agena

Normally utilised as the upper stage of launchers such as Atlas, Thor, and Titan IIIB, the Agena has proved a versatile space vehicle, having a payload section able to accommodate a variety of earth-orbiting and space probes weighing up to several hundred pounds. The Agena system and attached payload have functioned longer than six months in some USAF missions. An Agena was the first to accomplish a rendezvous and docking by spacecraft in orbit. The three basic versions are: **Agena A,** first flown in 1959 and used in the Discoverer programme with a Thor launcher. **Agena B,** with new "restart" version of Bell Agena rocket engine to permit change of orbit; used in later Discoverer launchings and with the Atlas in the now-discontinued Midas programme. **Agena D,** tested successfully in June 1962 and able to accept various payloads, whereas Agena A and B had integrated payloads. Agena is used in most USAF reconnaissance satellite launches, except for the latest Big Bird missions.

Prime Contractor: Lockheed Missiles and Space Company Inc.
Power Plant: Bell Aerosystems 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-Agena: A general-purpose space vehicle, comprising the Atlas SLV standardised launcher with an Agena upper stage. Used for military satellite launchings by the USAF, and scientific launchings for NASA and the USAF. Atlas-Agena vehicles have successfully launched Ranger lunar probes, Mariner Mars and Venus probes, Vela nuclear detection satellites, and OAO, OGO, and ATS satellites.

Atlas SLV-3A: Although designed primarily for use with the Agena upper stage, this uprated version of the earlier SLV-3, with lengthened propellant tanks, could also serve as a direct-ascent vehicle or in conjunction with other upper stages. Seven of the fourteen SLV-3As produced under initial contracts were for the USAF, for use in classified missions.

Atlas SLV-3D: Intended primarily for use with the Centaur D-1A upper stage, the SLV-3D is standardised like the SLV-3A and can be used on other missions. In 1972 Pioneer 10 was launched on its flight path to Jupiter by an Atlas/Centaur, with the highest velocity ever imparted to a spacecraft.

Prime Contractor: General Dynamics Corporation, Convair Aerospace Division.
Power Plant: uprated Rocketdyne MA-5 propulsion system, comprising central sustainer motor and two boosters; total S/L thrust approx 431,000 lb (60,000 lb from the central sustainer motor, 370,000 lb total from the two boosters, 1,040 lb from two verniers).
Dimensions (Atlas SLV-3A-Agena): height 118 ft 0 in, body diameter 10 ft 0 in.
Launch Weight: SLV-3A 311,000 lb.
Performance (SLV-3A-Agena): capable of putting payload of 8,800 lb into a 100 nm (115 mile) circular orbit, or of launching 2,920 lb on synchronous transfer missions.

Burner II

A low-cost guided solid-propellant upper-stage booster which is able to inject small-to-medium payloads into orbit and then orient them precisely. Since the initial contract, covering one ground test and three flight vehicles, eleven flight vehicles have been ordered and delivered. Burner II is suitable for mating to the current range of standard launch vehicles, from Thor to Titan III. It was first used on 15 September 1966, in combination with a Thor vehicle, to put a secret USAF satellite into orbit. A developed version of Burner II, with a larger motor, has been considered in combination with Titan III/Centaur for outer planet exploration missions.

Prime Contractor: The Boeing Company.
Power Plant: Thiokol TE-M-364-2 rocket motor; 10,000 lb thrust.
Guidance: Honeywell system similar to that used on NASA Scout launch vehicle.
Dimensions: length overall 5 ft 8 in, diameter 5 ft 5 in.

Burner IIA

First commissioned in 1969 by the USAF's Space and Missile Systems Organization, Burner IIA is a two-stage development of Burner II. A second-stage solid-propellant Thiokol TE-M-442 motor, with a thrust of 8,800 lb, has been added to Burner II's first stage, and the latter's sub-systems are mounted on the new stage. Burner IIA can be utilised with virtually all USAF space boosters, on missions requiring high-velocity earth escape speeds or for placing satellites in synchronous equatorial orbit. The initial contract was for six Burner IIAs and one ground test unit.

Centaur

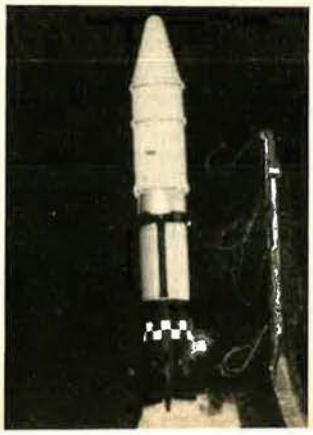
When used as an upper stage in combination with the Atlas SLV series of boosters, the Centaur is capable of putting 11,200 lb payloads into 100 nm (115 mile) circular satellite orbit, and of sending 1,300 lb instrumented probes into deep space. The nose section of the Atlas booster is modified to a constant 10 ft diameter when used with Centaur. The first use of Centaur in combination with a Titan rocket is planned for 1974, when a Titan IIIE-Centaur D-1T will **launch the German Helios sun probe. Titan-Centaur will be able to put 34,000 lb into a 100 nm (115 mile) circular orbit, or send 8,200 lb to a near planet.**

Prime Contractor: General Dynamics Corporation, Convair Aerospace Division.
Power Plant: two Pratt & Whitney RL10A-3 liquid hydrogen engines; each 15,000 lb thrust.
Guidance: inertial guidance system.
Dimensions: length of Atlas-Centaur 130 ft 11 in, diameter of both stages 10 ft 0 in.
Launch Weight (Centaur stage): approx 37,000 lb.

Scout

First ordered in 1959, this four/five-stage launch vehicle was designed to make possible space, orbital, and re-entry research by NASA and the Department of Defense at comparatively low cost, using "off-the-shelf" major components where available. A subsequent version with an improved fourth stage was launched successfully for the first time in August 1965. In addition to increasing the payload, this version can be ma-

Atlas-Agena



Centaur

Scout

GALLERY OF USAF WEAPONS

Long Tank Thor

noeuvred in yaw and can send a 100 lb payload more than 16,000 miles into space. Scouts can put 320 lb payloads (or approximately 425 lb payloads when the latest Algol III first-stage motor is used) into a 300 mile easterly orbit, and have been used to launch many unmanned spacecraft, including classified military satellites.

Prime Contractor: LTV Aerospace Corporation.
Power Plant: First stage: Aerojet-General Algol **IIB solid-propellant** motor; 115,000 lb thrust; or Algol III. Second stage: Thiokol Castor II solid-propellant motor; 60,000 lb thrust. Third stage: Hercules Antares II solid-propellant motor; 21,000 lb thrust. Fourth stage: UTC FW-4S solid-propellant motor; 6,000 lb thrust. Fifth stage under development.
Guidance: simplified Honeywell gyro guidance system.
Dimensions: height overall 72 ft 0 in, max body diameter 3 ft 3½ in.
Launch Weight: 37,600 lb.

Thor Launchers

Since the disbanding of the Thor IRBM force in 1963, Thors have continued in production for use as first-stage boosters for launch vehicles, while those missiles previously in service have been converted to space boosters. Versions currently in use are: **Thrust-Augmented Thor,** developed for the USAF Space Systems Division and consisting of a standard Thor with three rocket motors "strapped-on" to the lower part of the vehicle's body, making it nearly twice as powerful as the standard Thor booster. The strap-on motors are ignited on the ground when the main engine approaches lift-off thrust; after burn-out they are jettisoned. Despite an unsuccessful first launching in February 1963, the subsequent record of the Thrust-Augmented Thor has been outstanding, with 95 having been built for the USAF.

Thor-Agena uses a modified Thor (DSV-2A) as its first stage. Early firings were made with a Rocketdyne 150,000 lb thrust engine in a type DM1812-3 Thor, with an Agena second stage powered by an 8,500 lb thrust engine. The Thor's engine has since been uprated for use in conjunction with the improved Agena D. To increase this space vehicle's capabilities the USAF began to use **Thrust-Augmented Thor-Agena D** in mid-1963. This is capable of putting a 1,600 lb payload into a 300-mile orbit.

Long Tank Thor, an advanced version which made its debut in Summer 1966. The length of the liquid oxygen tank is increased and the upper section of the booster changed from its former conical shape to a cylinder of the same diameter as the rest of the airframe. This increased tankage permits longer burning time for the main engine, enabling Long Tank Thor to put 30% heavier payloads into space than the Thrust-Augmented Thor. The main propulsion system is supplemented by three strap-on motors. First launched in August 1966, putting a Department of Defense satellite into orbit, 72 Long Tank Thors have been acquired by the USAF for its own and NASA's space programmes.

Prime Contractor: McDonnell Douglas Corporation.
Power Plant: Rocketdyne MB-3-III liquid-propellant engine; 172,000 lb thrust, or Rocketdyne H-1; 205,000 lb thrust. Thrust-Augmented Thor also has three Thiokol solid-propellant strap-on rocket motors; total thrust for all engines approx 330,000 lb. Long Tank Thor: minor modification to Rocketdyne engine, and three Thiokol TX-354-5 Castor II solid-propellant strap-on rocket motors.
Dimensions: length overall Thor-Agena: 82 ft 0 in; Long Tank Thor: 70 ft 6 in; body diameter Long Tank Thor: 8 ft 0 in.
Launch Weight (Thor-Agena): approx 123,000 lb.

Titan III

Standardised heavy-duty space booster which can be modified to meet varying payload requirements. The basic core section consists of two booster stages evolved from the Titan II ICBM and an upper stage, known as Transtage, that can function both in the boost phase and as a restartable space propulsion vehicle. Principal configurations are:

Titan IIIB, basically the first two stages of the core section, able to accommodate various upper stages. First launched in July 1966 and used subsequently with Agena upper stages to launch classified USAF payloads.

Titan IIIC, comprising the core section with two five-segment strap-on motors acting as a booster stage before ignition of main engine. Payloads include USAF early warning satelilites.

Titan IIID, basically similar to IIIC but using only first two stages of the core section and able to accept a variety of upper stages. First used in June 1971 to orbit the first Lockheed Big Bird photo-reconnaissance spacecraft.

Titan IIIE-Centaur, basically similar to Titan IIID but modified to take a Centaur high-energy upper stage. Primary mission is to place two Viking spacecraft on Mars in 1976. Contracts made between 1964–73 cover production of more than a hundred Titan IIIs of all versions.

Prime Contractor: Martin Marietta Corporation.
Power Plant: First and second stages: Aerojet liquid-propellant engines; first stage 470,000 lb thrust, second stage 100,000 lb thrust. Transtage: Aerojet twin-chamber liquid-propellant engine; 16,000 lb thrust. IIIC/D also have two UTC five-segment solid-propellant booster rocket motors; each more than 1,200,000 lb thrust.
Dimensions: First and second stages of "core": height 108 ft 0 in, diameter 10 ft 0 in. Transtage: height 15 ft 0 in, diameter 10 ft 0 in.
Launch Weight (approx): core vehicle: 450,000 lb. Titan IIIC: 1,500,000 lb.
Performance (Titan IIIC, approx): speed at burn-out: solid-propellant boosters 4,100 mph, first stage 10,200 mph, second stage 17,100 mph, Transtage 17,500 mph.

Titan IIIC

REMOTELY PILOTED VEHICLES (RPVs)

YQM-94A

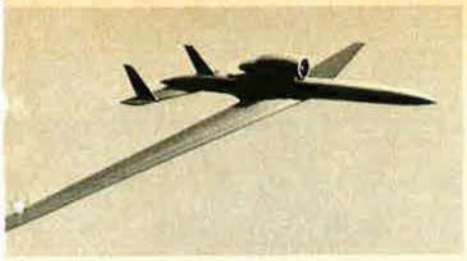
Boeing YQM-94A

Under a USAF contract awarded in July 1971, Boeing is developing a long-range high-altitude RPV known as Compass Cope B (YQM-94A) which will be able to carry many different payloads on a wide variety of missions. The first of two prototypes was rolled out on 30 November 1972 and was expected to begin flight demonstrations at Edwards AFB, Calif., in April of this year. The all-glassfibre fuselage permits use as a "flying radome" in which radar and other sensing equipment can be installed. A TV camera mounted in the nose enables a pilot to control the aircraft from a ground station, using advanced digital communications systems. Final choice of power plant for future production models has not been made; the prototypes have a J97 turbojet, pod-mounted above the fuselage to reduce vulnerability to infra-red missiles launched from below. The RPV has a design endurance of 24 hours carrying a 700 lb payload. Re-engined with a turbofan, it could offer more than double the endurance of the RC-135s used currently to collect electronic intelligence data. Unlike present RPVs, the YQM-94A takes off and lands from a conventional runway and so requires an all-weather landing capability, plus a main undercarriage track of 21 ft for maximum ground stability.

Contractor: Boeing Aerospace Company.
Power Plant: General Electric J97 turbojet engine; 5,200 lb thrust.
Dimensions: span 90 ft 0 in, length 42 ft 0 in.
Weight: gross approx 13,000 lb.
Performance (prototype): cruising speed Mach 0.5–0.6, service ceiling up to 70,000 ft, nominal endurance 24 hr.

Ryan YQM-98A

This long-range high-altitude surveillance RPV, produced for fly-off competition against



YQM-98A (model)

the Boeing YQM-94A, represents a third-generation vehicle to supersede the earlier Ryan AQM-34N(H) and AQM-91A. Known as Compass Cope R (YQM-98A), or Ryan Model 235, it is very similar to the AQM-91A in general configuration, with extremely high aspect ratio wings and an over-fuselage pod mounting for its power plant. This is a Garrett ATF-3 turbofan in the two prototypes, but no final decision has been taken on engines to power future production models, which might be twin-engined. Method of operation and applications are generally similar to those given above for the Boeing YQM-94A. Development is some months behind that of the latter type, which was ordered first.

Contractor: Teledyne Ryan Aeronautical, subsidiary of Teledyne Inc.
Power Plant: Garrett AiResearch XF104-GA-100 (ATF-3) turbofan; 5,000 lb design thrust.
Dimension: span 80 ft.
Weight and Performance: similar to YQM-94A.

Ryan AQM-34

This basic designation, and the Ryan Model number 147, encompass a large "family" of reconnaissance RPVs evolved from the subsonic BQM-34A Firebee target. The original 147A was no more than a modified Firebee, with a new guidance system and increased fuel capacity. Ryan has been permitted to identify a total of 21 variants on an officially-released diagram. Typical of these are: **AQM-34H(NC),** Ryan 147NC, a low-altitude vehicle with two underwing hard points for electronic warfare pods or ALE-2 chaff dispensing pods, and with self-contained Doppler guidance. Like the USAF's other tactical drones, this one is air-launched from DC-130s of the 11th Tactical Drone Squadron of TAC. **AQM-34L(SC),** Ryan 147SC, a low-altitude reconnaissance RPV with nose-mounted camera or other sensor. Long used for missions over North Vietnam, this RPV and the Lockheed SR-71 manned strategic reconnaissance aircraft were the only USAF reconnaissance types permitted to overfly that country after the 15 January 1973 bombing halt. Under the Lear Siegler Update programme, six AQM-34Ls are being fitted with new avionics to improve navigational accuracy. Redesignated **YAQM-34U,** these RPVs are also being equipped to carry Igloo White acoustic sensor dispensers on two underwing hard points. Testing was scheduled to begin early in the current year. **AQM-34M(SD),** Ryan 147SD, is very similar to the AQM-34L. **AQM-34Q/R,** medium-altitude surveillance drones (Ryan 147TE/TF respectively), with span extended from basic 12 ft 10 in to 27 ft. Used in electronic intelligence (elint) operations over Southeast Asia, with mid-air recovery by helicopter. (Data for AQM-34L(SC).)

Contractor: Teledyne Ryan Aeronautical, subsidiary of Teledyne Inc.
Power Plant: Teledyne CAE J69-T-41A turbojet engine; 1,920 lb thrust.
Weight: gross 3,287 lb.
Performance: range at low altitude variable from 177 miles at 645 mph to 748 miles at 485 mph.

Ryan AQM-91A

Known by the Ryan model number 154, this large high-altitude reconnaissance and electronic surveillance RPV was developed basically for operation under the now-inactive Compass Arrow programme. After a design competition in which North American also took part, Ryan received an initial R&D contract in 1966. The flattened undersurface of the airframe, with smooth curves elsewhere, and the over-fuselage mounting of the power plant, underline the care that was taken to reduce to a minimum radar reflectivity and susceptibility to lock-on by infra-red missiles, following the loss of a number of earlier drones to ground defences. Equipment includes a 325 lb Itek KA-80A opticai bar panoramic camera, with Raytheon electronic intelligence (elint) and HRB Singer infra-red sensors. Navigation is by a self-contained system based on a Ryan Doppler sensor, Teledyne inertial stabilised platform, and digital computer. Helicopter snatch recovery is made practicable by a Sperry Rand Univac UPQ-3 microwave command guidance system with a range of about 200 miles. Span of the AQM-91A is estimated at about 49 ft. Power plant is a J97 turbojet engine.

Ryan BGM-34

Although this RPV (Ryan model 234) shares the Firebee parentage of the AQM-34, its applications are more aggressive and reflect plans to evolve combat drones for a variety of missions now requiring manned aircraft. Following demonstrations of unarmed air-to-air combat against a piloted F-4 fighter, and the dropping of inert 500 lb bombs from a modified Firebee, Ryan has produced test batches of BGM-34A and BGM-34B vehicles to evaluate the capability of RPVs to deliver missiles and bombs for defence suppression under real-time control, by day and night respectively. Initial trials have involved the release from BGM-34As of Shrike anti-radiation missiles, Maverick TV-guided missiles, and HOBOS homing bombs, with good results. The RPVs themselves are directed from the DC-130 launch aircraft, via a TV camera mounted in their nose. For night operations with the BGM-34B, the USAF hopes to pack into the RPV target acquisition and designation equipment of the kind contained in the Philco-Ford Pave Knife pods carried by F-4D Phantoms for use with laser-guided "smart bombs". ■

AQM-91As slung under DC-130A

AQM-34s

BGM-34 with Shrike under its right wing and a Mk. IV bomb under the other

USAF ALMANAC

UNITED STATES AIR FORCE—FACTS AND FIGURES

The statistical and summary data that appear below and on the following twelve pages have been selected as representative of the kinds of information frequently of use to our readers. We welcome suggestions for additional information that might be included in subsequent Almanac issues of AIR FORCE Magazine.

A word of caution: Personnel figures that appear below in different forms will not always agree because of differing cutoff dates, rounding off, or categories of personnel (such as those serving outside the Air Force) that are excluded in some cases. These figures do illustrate trends, however, and may be helpful in placing force fluctuations in perspective.

The material for this almanac section was compiled by the staff of AIR FORCE Magazine from a variety of sources, and only unclassified information has been used.

—THE EDITORS

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UNITED STATES AIR FORCE PERSONNEL STRENGTH—1907 THROUGH 1974

YEAR	STRENGTH	YEAR	STRENGTH	YEAR	STRENGTH	YEAR	STRENGTH
1907	3	1924	10,547	1941	152,125	1958	871,156
1908	13	1925	9,670	1942	764,415	1959	840,028
1909	27	1926	9,674	1943	2,197,114	1960	814,213
1910	11	1927	10,078	1944	2,372,292	1961	820,490
1911	23	1928	10,549	1945	2,282,259	1962	883,330
1912	51	1929	12,131	1946	455,515	1963	868,644
1913	114	1930	13,531	1947	305,827	1964	855,802
1914	122	1931	14,780	1948	387,730	1965	823,633
1915	208	1932	15,028	1949	419,347	1966	886,350
1916	311	1933	15,099	1950	411,277	1967	897,426
1917	1,218	1934	15,861	1951	788,381	1968	904,759
1918	195,023	1935	16,247	1952	973,474	1969	862,062
1919	25,603	1936	17,233	1953	977,593	1970	791,078
1920	9,050	1937	19,147	1954	947,918	1971	755,107
1921	11,649	1938	21,089	1955	959,946	1972	725,635
1922	9,642	1939	23,455	1956	909,958	1973	692,334*
1923	9,441	1940	51,165	1957	919,835	1974	666,357*

* Projected

USAF NOW—BUT WHAT WAS IT THEN?

From Aug. 1, 1907—Aeronautical Div., US Signal Corps; from July 18, 1914—Aviation Section, US Signal Corps; from Apr. 6, 1917—Aeronautical Div., US Signal Corps; from May 21, 1918—Div. of Military Aeronautics, US Army; from June 4, 1920—Army Air Service; from July 2, 1926—Army Air Corps; from June 20, 1941—Army Air Forces; from Sept. 18, 1947—United States Air Force.

NOTE: During World War I, the air arm of the American Expeditionary Force (AEF) was designated Air Service, but this designation did not apply to the entire Aeronautical Div. of the Signal Corps.

AIR FORCE PERSONNEL BY CATEGORIES—1960–74

CATEGORY	FY 1960	FY 1964	FY 1968	FY 1972	FY 1973	FY 1974
TOTAL PERSONNEL (EXCLUDING AIR RESERVE FORCES)[1]	1,169,000	1,178,000	1,247,000	1,026,000	986,000	958,000
AIR FORCE MILITARY						
OFFICERS	129,000	133,000	140,000	122,000	115,000	113,000
AIRMEN	681,000	720,000	761,000	600,000	573,000	549,000
CADETS	4,000	3,000	4,000	4,000	4,000	4,000
TOTALS	814,000	856,000	905,000	726,000	692,000	666,000
CAREER REENLISTMENTS	42,000[2]	61,700	56,500	53,600	53,800	51,800
RATE	44%	86%	88%	94%	93%	92%
FIRST-TERM REENLISTMENTS		14,900	10,600	24,800	17,600	18,400
RATE		23%	18%	33%	22.5%	26%
CIVILIAN						
DIRECT HIRE	307,000	289,000	316,000	280,000	274,000	272,000
INDIRECT HIRE FOREIGN NATIONALS	48,000	33,000	26,000	20,000	20,000	20,000
TOTALS	355,000[3]	322,000[3]	342,000[3]	300,000	294,000	292,000
AIR RESERVE FORCES[4]						
ANG—Paid	71,000	73,000	75,000	89,000	89,000	92,000
AFRes—Paid	67,000	59,000	46,000	49,000	53,000	56,000
AFRes—Nonpaid	136,000	119,000	145,000	155,000	140,000	155,000
READY RESERVE	274,000	251,000	266,000	293,000	282,000	303,000
STANDBY	304,000	130,000	101,000	64,000	64,000	63,000
TOTALS	578,000	381,000	367,000	357,000	346,000	366,000

[1] All personnel data in FY 60–72 columns are actual. FY 73–74 data are programmed.
[2] FY '60 reenlistment data only reflect combined Career and First-Term performance.
[3] Excludes Air National Guard Technicians which were State Employees until FY '69, when they were changed to Federal Employees by Public Law.
[4] Excludes Retired AF Reserve.

UNITED STATES AIR FORCE—PERSONNEL STRENGTH BY COMMANDS AND AGENCIES

COMMAND	OFFICERS	AIRMEN	TOTAL MILITARY	CIVILIANS	TOTAL PERSONNEL
AEROSPACE DEFENSE COMMAND (ADC)	4,576	29,533	34,109	6,449	40,558
AIR FORCE COMMUNICATIONS SERVICE (AFCS)	2,728	40,632	43,360	5,897	49,257
AIR FORCE LOGISTICS COMMAND (AFLC)	2,808	8,025	10,833	100,043	110,876
AIR FORCE SYSTEMS COMMAND (AFSC)	9,649	18,569	28,218	28,544	56,762
AIR TRAINING COMMAND (ATC)	15,997	92,017	108,014	18,233	126,247
AIR UNIVERSITY (AU)	5,259	3,425	8,684	2,310	10,994
ALASKAN AIR COMMAND (AAC)	1,009	8,212	9,221	2,171	11,392
HEADQUARTERS COMMAND, USAF (HQ COMD)	6,271	15,165	21,436	3,695	25,131
MILITARY AIRLIFT COMMAND (MAC)	10,938	53,213	64,151	15,358	79,509
PACIFIC AIR FORCES (PACAF)	7,450	50,392	57,842	13,038	70,880
STRATEGIC AIR COMMAND (SAC)	23,951	118,077	142,028	19,614	161,642
TACTICAL AIR COMMAND (TAC)	12,779	77,344	90,123	10,414	100,537
UNITED STATES AIR FORCES IN EUROPE (USAFE)	6,266	41,330	47,596	3,009	50,605
UNITED STATES AIR FORCE SECURITY SERVICE (USAFSS)	1,256	18,463	19,719	1,684	21,403
UNITED STATES AIR FORCES SOUTHERN COMMAND (USAFSO)	242	1,429	1,671	848	2,519
TOTALS	111,179	558,826	670,005	231,307	918,312

SEPARATE OPERATING AGENCY	OFFICERS	AIRMEN	TOTAL MILITARY	CIVILIANS	TOTAL PERSONNEL
AIR FORCE ACCOUNTING AND FINANCE CENTER (AFAFA)	42	284	326	1,980	2,306
AIR FORCE AUDIT AGENCY (AFAA)	429	150	579	518	1,097
AIR FORCE DATA AUTOMATION AGENCY (AFDAA)	223	600	823	538	1,361
AIR FORCE INSPECTION AND SAFETY CENTER (AFISC)	198	56	254	147	401
AIR FORCE MILITARY PERSONNEL CENTER (AFMPC)	429	663	1,092	614	1,706
AIR FORCE OFFICE OF SPECIAL INVESTIGATIONS (AFOSI)	550	1,054	1,604	369	1,973
AIR FORCE RESERVE (AFRES)	219	659	878	9,196	10,074
AIR RESERVE PERSONNEL CENTER (ARPC)	49	92	141	725	866
UNITED STATES AIR FORCE ACADEMY (USAFA)	1,069	5,326	6,395	1,977	8,372
TOTALS	3,208	8,884	12,092	16,064	28,156

Military strength figures are current as of January 31, 1973. Figures are assigned strength. Civilian figures are current as of February 28, 1973, and represent "total chargeable employees," including 12,605 non-US citizens.

In addition, the Air National Guard (ANG), as of February 28, 1973, had an officer strength of 11,531, airmen 78,670 (for a total military strength of 90,201), plus 1,004 civilian non-Guard technicians.

As of December 31, 1972, the Air Force Reserve had a total strength of 55,347. This total included 248 active-duty officers and 968 airmen. Reserve personnel totals 44,533, of whom 7,460 are officers and 37,073 are airmen. These figures include Air Reserve Technicians (ARTs). The 9,196 civilians shown in the table above under AFRES include ARTs as well as nonmilitary Civil Service employees.

USAF TOTAL ACTIVE-DUTY STRENGTH BY GRADE

(As of February 28, 1973)

OFFICERS

GRADE	NUMBER
GENERAL	13
LIEUTENANT GENERAL	38
MAJOR GENERAL	135
BRIGADIER GENERAL	213
COLONEL	6,080
LIEUTENANT COLONEL	14,253
MAJOR	22,090
CAPTAIN	48,881
FIRST LIEUTENANT	14,765
SECOND LIEUTENANT	11,218
WARRANT OFFICER	151
TOTALS	117,837
CADETS	3,813
AIRMEN	579,206
TOTAL STRENGTH	700,856

AIRMEN

GRADE	NUMBER
CHIEF MASTER SERGEANT	5,825
SENIOR MASTER SERGEANT	11,582
MASTER SERGEANT	42,232
TECHNICAL SERGEANT	78,521
STAFF SERGEANT	131,061
SERGEANT	142,049
AIRMAN FIRST CLASS	94,431
AIRMAN	45,511
AIRMAN BASIC	27,994
	579,206

USAF MILITARY PERSONNEL BY GRADE AND RACE

(As of December 1, 1972)

OFFICERS

GRADE	WHITE	BLACK (%)	OTHER (%)	TOTAL
GENERAL	420	2 (0.5%)	(none)	422
COLONEL	6,112	45 (0.7%)	14 (0.2%)	6,171
LIEUTENANT COLONEL	14,230	205 (1.4%)	74 (0.5%)	14,509
MAJOR	22,195	366 (1.6%)	128 (0.6%)	22,689
CAPTAIN	47,778	1,045 (2.1%)	332 (0.7%)	49,155
1ST LIEUTENANT	13,222	246 (1.8%)	58 (0.4%)	13,526
2ND LIEUTENANT	12,091	244 (2.0%)	65 (0.5%)	12,400
WARRANT OFFICER	177	2 (1.1%)	1 (0.5%)	180
TOTALS	116,225	2,155 (1.8%)	672 (0.6%)	119,052

AIRMEN

GRADE	WHITE	BLACK (%)	OTHER (%)	TOTAL
CHIEF MASTER SERGEANT	5,713	232 (3.9%)	28 (0.5%)	5,973
SENIOR MASTER SERGEANT	11,202	654 (5.5%)	51 (0.4%)	11,907
MASTER SERGEANT	39,811	3,396 (7.8%)	227 (0.5%)	43,434
TECHNICAL SERGEANT	70,248	9,308 (11.6%)	479 (0.6%)	80,035
STAFF SERGEANT	117,620	18,706 (13.6%)	954 (0.7%)	137,280
SERGEANT	127,590	19,822 (13.3%)	1,392 (0.9%)	148,804
AIRMAN FIRST CLASS	77,422	13,677 (14.8%)	963 (1.0%)	92,062
AIRMAN	31,959	5,795 (15.2%)	449 (1.2%)	38,203
AIRMAN BASIC	27,004	4,844 (15.1%)	311 (1.0%)	32,159
TOTALS	508,569	76,434 (12.9%)	4,854 (0.8%)	589,857

Average age of active-duty military:
Officer 32.4 yrs.
Airman 26.9 yrs.

Number of Women in the Air Force (WAF) and percent of active duty they represent:
Officer 4,852 (4.09%)
Airman 12,963 (2.22%)

Number of retired military members:
Officer 88,466
Airman 222,592

AIR FORCE FULL-TIME CIVILIAN EMPLOYMENT BY GRADE *

(As of January 31, 1973)

GR*	GS POP	GR	WP POP	GR	WS POP	GR	WL POP	GR	WG POP
1	281	4	1	1	91	1	0	1	302
2	1,722	7	3	2	78	2	138	2	4,921
3	12,616	8	1	3	135	3	22	3	1,097
4	19,184	9	14	4	120	4	149	4	3,555
5	19,476	10	2	5	496	5	47	5	5,379
6	6,774	11	6	6	919	6	219	6	8,621
7	10,821	12	12	7	1,003	7	73	7	6,844
8	2,282	13	1	8	889	8	333	8	9,231
9	18,643	14	7	9	1,715	9	587	9	10,245
10	987	15	3	10	1,752	10	1,595	10	26,518
11	15,933	16	8	11	908	11	203	11	6,968
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	489	12	5	12	2,564
13	8,467	18	3	13	407	13	2	13	662
14	3,019	19	1	14	288			14	25
15	1,083	21	3	15	152				
16	128	23	1	16	85				
17	20	24	1	17	14				
18	7			18	28				
				19	21				
TOTALS	134,087		72		9,590		3,373		86,932

GR = Grade
GS = General Schedule
POP = Population
WP = Printing and Lithographic Pay Schedules
WS = Supervisory (Foreman) Pay Schedules
WL = Leader Pay Schedules
WG = Non-supervisory Pay Schedules

* Source: USAF Civilian Grade Trends Comparison by Month, RCS: RRAQ-0028. As of Jan. 31, 1973.

USAF MILITARY AND CIVILIAN STRENGTH BY BASES

(As of December 31, 1972)

BASE	MILITARY	CIVILIAN	TOTAL	BASE	MILITARY	CIVILIAN	TOTAL
ALTUS AFB, OKLA.	3,978	664	4,642	F. E. WARREN AFB, WYO.	3,869	539	4,408
ANDREWS AFB, MD.	7,316	2,982	10,298	GEORGE AFB, CALIF.	4,207	385	4,592
ARNOLD AFS, TENN.	109	147	256	GLASGOW AFB, MONT.	97	27	124
BARKSDALE AFB, LA.	5,401	1,019	6,420	GOODFELLOW AFB, TEX.	2,440	353	2,793
BEALE AFB, CALIF.	4,793	508	5,301	GRAND FORKS AFB, N. D.	6,012	497	6,509
BELLOWS AFS, HAWAII	61	2	63	GRIFFISS AFB, N. Y.	3,983	3,563	7,546
BERGSTROM AFB, TEX.	5,227	586	5,813	GRISSOM AFB, IND.	3,088	610	3,698
BLYTHEVILLE AFB, ARK.	1,964	364	2,328	GUNTER AFB, ALA.	974	754	1,728
BOLLING AFB, D. C.	2,080	920	3,000	HAMILTON AFB, CALIF.	2,503	1,072	3,575
BROOKS AFB, TEX.	1,362	876	2,238	HANCOCK FIELD, N. Y.	114	856	970
CANNON AFB, N. M.	4,480	396	4,876	HANSCOM FIELD, MASS.	1,885	2,926	4,811
CARSWELL AFB, TEX.	4,022	886	4,908	HICKAM AFB, HAWAII	6,561	2,437	8,998
CASTLE AFB, CALIF.	4,919	443	5,362	HILL AFB, UTAH	3,185	15,972	19,157
CHANUTE AFB, ILL.	10,231	1,874	12,105	HOLLOMAN AFB, N. M.	4,725	1,050	5,775
CHARLESTON AFB, S. C.	5,685	1,285	6,970	HOMESTEAD AFB, FLA.	4,497	81	4,578
COLUMBUS AFB, MISS.	2,794	1,990	4,784	HURLBURT FIELD, FLA.	4,165	299	4,464
CRAIG AFB, ALA.	2,032	553	2,585	INDIAN SPRINGS AF AUXILIARY FIELD, NEV.	208	20	228
DAVIS-MONTHAN AFB, ARIZ.	7,866	1,782	9,648	KEESLER AFB, MISS.	15,354	2,795	18,149
DOBBINS AFB, GA.	188	675	863	KELLY AFB, TEX.	4,490	22,481	26,971
DOVER AFB, DEL.	5,468	1,394	6,862	KINCHELOE AFB, MICH.	2,795	441	3,236
DULUTH INT'L AIRPORT, MINN.	1,517	428	1,945	KING SALMON AIRPORT, ALASKA	418	31	449
DYESS AFB, TEX.	3,736	467	4,203	KINGSLEY FIELD, ORE.	474	238	712
EDWARDS AFB, CALIF.	3,602	2,069	5,671	KIRTLAND AFB, N. M.	4,020	2,715	6,735
EGLIN AFB, FLA.	7,435	3,280	10,715	K. I. SAWYER AFB, MICH.	3,935	500	4,435
EIELSON AFB, ALASKA	2,747	506	3,253	LACKLAND AFB, TEX.	24,412	2,444	26,856
ELLINGTON AFB, TEX.	616	1,032	1,648	LANGLEY AFB, VA.	8,572	1,474	10,046
ELLSWORTH AFB, S. D.	5,782	634	6,416	LAREDO AFB, TEX.	2,377	506	2,883
ELMENDORF AFB, ALASKA	7,111	1,690	8,801	LAUGHLIN AFB, TEX.	2,476	601	3,077
ENGLAND AFB, LA.	3,681	472	4,153	LITTLE ROCK AFB, ARK.	5,587	589	6,176
ENT AFB, COLO.	3,177	1,328	4,505	LOCKBOURNE AFB, OHIO	2,228	739	2,967
FAIRCHILD AFB, WASH.	3,615	674	4,289	LORING AFB, ME.	3,681	608	4,289
FORBES AFB, KAN.	3,654	448	4,102				

BASE	MILITARY	CIVILIAN	TOTAL
LOS ANGELES AFS, CALIF.	1,292	918	2,210
LOWRY AFB, COLO.	10,361	1,626	11,987
LUKE AFB, ARIZ.	5,521	1,093	6,614
MACDILL AFB, FLA.	6,161	745	6,906
MALMSTROM AFB, MONT.	5,194	581	5,775
MARCH AFB, CALIF.	4,817	737	5,554
MATHER AFB, CALIF.	5,993	1,320	7,313
MAXWELL AFB, ALA.	4,087	1,887	5,974
MC CHORD AFB, WASH.	5,666	1,565	7,231
MC CLELLAN AFB, CALIF.	4,851	15,453	20,304
MC CONNELL AFB, KAN.	4,156	511	4,667
MC COY AFB, FLA.	2,851	456	3,307
MC GUIRE AFB, N. J.	6,489	1,709	8,198
MINOT AFB, N. D.	6,098	601	6,699
MOODY AFB, GA.	2,314	543	2,857
MOUNTAIN HOME AFB, IDAHO	3,546	404	3,950
MURPHY DOME AFS, ALASKA	151	24	175
MYRTLE BEACH AFB, S. C.	2,780	438	3,218
NELLIS AFB, NEV.	5,959	908	6,867
NIAGARA FALLS INT'L AP, N. Y.	53	343	396
NORTON AFB, CALIF.	6,609	3,256	9,865
OFFUTT AFB, NEB.	10,935	1,843	12,778
OTIS AFB, MASS.	884	541	1,425
PATRICK AFB, FLA.	2,971	2,076	5,047
PEASE AFB, N. H.	3,838	475	4,313
PETERSON FIELD, COLO.	2,366	482	2,848
PLATTSBURGH AFB, N. Y.	3,682	476	4,158
POPE AFB, N. C.	3,778	271	4,049
RANDOLPH AFB, TEX.	5,825	2,603	8,428
REESE AFB, TEX.	2,384	636	3,020
RICHARDS-GEBAUR AFB, MO.	2,999	1,702	4,701
ROBINS AFB, GA.	3,824	16,345	20,169
SCOTT AFB, ILL.	5,002	2,602	7,604
SELFRIDGE AFB, MICH.	297	315	612
SEYMOUR JOHNSON AFB, N. C.	4,926	558	5,484
SHAW AFB, S. C.	5,931	610	6,541
SHEMYA AFS, ALASKA	712	61	773
SHEPPARD AFB, TEX.	14,444	2,362	16,806
TINKER AFB, OKLA.	3,257	21,827	25,084
TRAVIS AFB, CALIF.	9,552	2,472	12,024
TRUAX FIELD, WIS.	893	219	1,112
TYNDALL AFB, FLA.	3,708	1,062	4,770
VANCE AFB, OKLA.	1,202	142	1,344
VANDENBERG AFB, CALIF.	5,532	1,636	7,168
WEBB AFB, TEX.	2,165	672	2,837
WESTOVER AFB, MASS.	4,138	846	4,984
WHEELER AFB, HAWAII	1,015	352	1,367
WHITEMAN AFB, MO.	3,170	380	3,550
WILLIAMS AFB, ARIZ.	2,984	707	3,691
WRIGHT-PATTERSON AFB, OHIO	5,884	8,864	14,748
WURTSMITH AFB, MICH.	3,419	394	3,813
TOTALS	**476,647**	**208,626**	**685,273**

AIR FORCE BUDGET AND FINANCE FY 1960–74

(Figures are millions of dollars)

	FY '60	FY '64	FY '68	FY '72	FY '73	FY '74
GROSS NATIONAL PRODUCT	495,200	612,200	826,100	1,096,000	1,208,000	1,313,000
Federal Budget, Outlays	92,223	118,584	178,833	231,900	249,800	268,700
DoD Budget, Outlays	42,823	50,786	78,027	75,957	74,800	79,000
DoD Percent of: GNP	8.6	8.3	9.4	6.9	6.2	6.0
Federal Budget	46.4	41.8	42.5	31.7	29.0	28.4
AIR FORCE BUDGET OUTLAYS						
Current Dollars	19,066	20,456	25,734	23,999	23,722	24,301
Constant FY '74 Prices	32,932	33,035	36,248	26,656	24,849	24,301
AF Percent of: GNP	3.8	3.3	3.1	2.2	2.0	1.8
Federal Budget	20.7	17.3	14.4	10.3	9.5	9.0
DoD Budget	44.5	40.3	33.0	31.6	31.7	31.2
TOTAL OBLIGATIONAL AUTHORITY						
Current Dollars	18,132	20,018	24,917	23,859	24,856	25,399
Constant FY '74 Prices	30,586	32,412	35,216	26,506	26,018	25,399
APPROPRIATIONS, TOA (CURRENT $)						
Aircraft Procurement (3010)	3,865	3,617	5,313	3,043	2,640	2,913
Missile Procurement (3020)	2,593	2,218	1,409	1,680	1,686	1,573
Other Procurement (3080)	1,021	928	2,358	1,574	2,080	2,005
Military Construction–AF (3300)	799	497	481	289	269	312
RDT&E (3600)	1,460	3,626	3,412	2,928	3,130	3,229
Operations & Maintenance (3400)	4,147	4,347	5,861	6,610	6,696	6,589
Military Personnel–AF (3500)	3,965	4,428	5,656	7,040	7,373	7,264
Reserve Personnel–AF (3700)	51	57	64	109	129	145
Military Construction–AFR (3730)	3	3	4	9	7	10
Operations & Maintenance–AFR (3740)	—	—	—	—	193	229
Military Construction–ANG (3830)	12	17	10	11	16	20
Operations & Maintenance–ANG (3840)	168	220	266	417	464	526
National Guard Personnel–AF (3850)	48	60	84	149	172	191
Undistributed (OSD Add On)	—	—	—	—	—	393
PROGRAMS, TOA (CURRENT $)						
I Strategic Forces		6,530	5,194	4,751	4,721	4,404
II General-Purpose Forces		3,096	7,256	5,347	5,402	5,148
III Intelligence & Communications		2,915	3,614	3,110	3,241	3,381
IV Airlift & Sealift Forces	NOT	1,010	1,737	1,100	849	733
V Reserve and Guard Forces	AVAILABLE	502	621	914	1,034	1,178
VI Research & Development	BY	2,119	1,563	2,178	2,432	2,665
VII Central Supply & Maintenance	PROGRAM	1,767	2,332	2,725	2,715	2,689
VIII Training, Medical, & Other Gen. Activities		1,726	2,079	2,734	2,970	3,120
IX Admin & Assoc Activities		342	348	509	486	499
X Support of Other Nations		11	173	491	1,005	1,189
Undistributed (OSD Add On)		—	—	—	—	393
TOTAL FUNDS AVAIL. FOR EXP. AIR FORCE	33,947	29,144	38,690	32,925	33,273	34,909
Expenditures (excludes MAP/FMS)	19,066	20,456	25,734	23,999	23,722	24,301
Unexpended Balance	14,881	8,688	12,956	8,927	9,551	10,608

USAF INSTALLATIONS

Major Installations	FY '60	FY '64	FY '68	FY '72
Total in Continental US	163	151	129	112
Total overseas (incl. Alaska and Hawaii)	90	65	69	49
TOTAL	253	216	198	161
By Function				
Operational	147	126	109	90
Operational Flying Support	16	12	10	10
Operational Nonflying Support	12	16	14	10
Operational Foreign Owned	7	5	18	8
Training	48	38	30	29
Research and Test	7	9	9	8
Logistical	16	10	8	6
TOTAL	253	216	198	161
Other Installations				
Ancillary	2,740	2,849	1,899	1,655
Ballistic Missile	(none)	1,083	1,158	1,157
Industrial	76	55	43	36
Radar	410	331	182	108
Air National Guard	(none)	103	107	109
Tenant, Non-Air Force	235	348	358	288
For Use in Wartime Only	22	49	44	44
TOTAL WORLDWIDE of which:	3,483	4,818	3,791	3,397
TOTAL Continental US	2,212	3,435	2,524	2,316
TOTAL Overseas	1,271	1,383	1,267	1,081
TOTAL INSTALLATIONS, Major & Other	3,736	5,034	3,989	3,558

COMPARISON OF DOD BUDGETS FOR FY '73 AND FY '74 BY MILITARY PROGRAMS

(BILLIONS OF CURRENT $)

MILITARY PROGRAM	TOTAL OBLIGATIONAL AUTHORITY FY '73	FY '74
Strategic Forces	$ 7.4	$ 7.4
General-Purpose Forces	25.7	26.4
Intelligence & Communications	5.7	6.0
Airlift & Sealift	.9	.8
Guard & Reserve Forces	4.0	4.4
Research & Development	6.5	7.4
Central Supply & Maintenance	8.7	8.4
Training, Medical, & General Personnel Activities	16.4	18.2
Administration	1.7	1.7
Support of Other Nations	3.9	4.2
TOTAL	$80.9	$85.0

AIRCRAFT PROCUREMENT

FIXED WING AIRCRAFT*	FY '60	FY '64	FY '68	FY '72	FY '73	FY '74
Total Budgeted	555	778	1,152	177	162	154
Accepted/Scheduled Acceptances	1,049	726	935	310	254	136
HELICOPTERS						
Total Budgeted	42	43	38	0	6	0
Accepted/Scheduled Acceptances	41	37	36	7	29	1

* Excludes MASF, Navy, NASA, MAP, and FMS funded aircraft. Data in FY '60–72 are actual; FY '73–74 data are programmed.

TOTAL ACTIVE AIRCRAFT IN THE INVENTORY

AIRCRAFT IN ACTIVE SERVICE, USAF	FY '60	FY '64	FY '68	FY '72	FY '73	FY '74
BOMBER						
STRATEGIC	1,941	1,364	714	528	503	502
OTHER	252	145	65	—	—	—
TANKER	1,230	998	667	661	660	659
FIGHTER/ATTACK	2,358	2,200	3,104	2,399	2,337	2,346
INTERCEPTOR	1,564	1,338	881	249	193	191
RECONNAISSANCE/ELECTRONIC WARFARE	685	595	1,009	794	717	652
AIRLIFT	941	1,043	1,096	622	604	604
OTHER TRANSPORTS	1,608	1,284	1,262	488	413	400
SEARCH & RESCUE (FIXED WING)	129	100	91	72	56	53
HELICOPTER (INCL RESCUE)	372	401	465	490	361	328
SPECIAL RESEARCH	2	3	5	—	—	—
TRAINER	3,914	2,873	2,584	2,616	2,418	2,402
UTILITY/OBSERVATION	316	345	663	316	222	176
USAF TOTAL	15,312	12,689	12,606	9,235	8,484	8,313
TOTAL, AIR FORCE RESERVE	770	719	426	388	434	444
TOTAL, AIR NATIONAL GUARD	2,269	1,806	1,438	1,962	1,857	1,816
TOTAL, SUPPORT OF OTHER NATIONS	(none)	(none)	692	1,913	2,129	2,072
EARMARKED	361	166	165	(none)	(none)	(none)
TOTAL ACTIVE AIRCRAFT	18,712	15,380	15,327	13,498	12,904	12,645

NOTE: Aircraft are categorized by modified mission category, e.g., if a C-130 is performing search and rescue function or mission, it is categorized as a search and rescue, rather than airlift aircraft.

Total actual inventory for FY '60, '64, and '68 include "Earmarked" aircraft (aircraft identified for MAP, Navy, and other non-Air Force agencies).

NUMBERS OF AIR FORCE SQUADRONS

MAJOR FORCE SQUADRONS	FY '60	FY '64	FY '68	FY '72	FY '73	FY '74
STRATEGIC FORCES						
BOMBERS	140	78	40	30	30	28
RECONNAISSANCE	6	2	3	1	1	1
TANKERS	59	55	41	38	38	38
INTERCEPTORS	65	40	26	9	7	7
GENERAL-PURPOSE FORCES						
TACTICAL FIGHTERS	55	79	92	73	70	67
OTHER FIGHTERS AND ATTACK	13	11	9	1	1	1
RECONNAISSANCE	14	14	21	13	13	13
SPECIAL OPERATIONS FORCE	—	6	22	11	7	6
TACTICAL ELECTRONIC WARFARE (TEWS)	—	—	2	2	1	1
TACTICAL MISSILES	5	8	2	—	—	—
DRONES	—	—	—	1	1	1
TACTICAL AIR CONTROL	—	—	5	11	10	12
TACTICAL AIRLIFT	24	28	33	19	17	17
AEROMEDICAL AIRLIFT	—	—	—	2	2	2
AIRLIFT FORCES						
INDUSTRIALLY FUNDED MILITARY AIRLIFT	31	33	30	17	17	17
AEROMEDICAL AIRLIFT	3	5	5	1	1	1
SPECIAL AIR MISSION	2	2	2	2	2	2
AIR NATIONAL GUARD, TOTAL	92	92	92	92	92	92
AIR FORCE RESERVE, TOTAL	45	50	43*	50*	53*	55*

* Includes Associate Squadrons. Also, AF Reserve total for FY '73 includes 3 units which activate in FY 4/73 but are unequipped until FY 1/74.

Data in FY '60–72 columns are actual; FY '73 and FY '74 data are programmed.

THE AAF IN WORLD WAR II—A STATISTICAL SUMMARY

AAF COMBAT SORTIES FLOWN, BY THEATER—WORLD WAR II

		Theaters vs. Germany			Theaters vs. Japan					
Year	Total	ETO	MTO	Total	POA	FEAF	CBI	ALASKA	20th AF	Total
1941 (Dec.)	212					212				212
1942	26,688	2,453	7,296	9,749	130	14,311	1,341	1,157		16,939
1943	365,940	63,929	169,594	233,523	1,413	103,147	23,151	4,706		132,417
1944	1,284,195	655,289	356,812	1,012,101	26,364	163,397	78,999	815	2,519	272,094
1945 (Jan.–Aug.)	685,765	312,381	125,811	438,192	31,194	134,912	44,538	640	36,289	247,573
TOTAL	2,362,800	1,034,052	659,513	1,693,565	59,101	415,979	148,029	7,318	38,808	669,235

ETO—European Theater of Operations
MTO—Mediterranean Theater of Operations
POA—Pacific Ocean Areas
FEAF—Far East Air Forces
CBI—China-Burma-India Theater of Operations
20th AF—Operated out of China and Marianas Islands

TONS OF BOMBS DROPPED BY AAF OVERSEAS, BY THEATER—WORLD WAR II

		Theaters vs. Germany			Theaters vs. Japan					
Year	Total	ETO	MTO	Total	POA	FEAF	CBI	ALASKA	20th AF	Total
1941 (Dec.)	36					36				36
1942	10,203	1,713	4,410	6,123	35	2,633	697	715		4,080
1943	198,800	55,655	98,462	154,117	1,309	29,705	10,841	2,828		44,683
1944	1,085,978	591,959	346,993	938,952	17,546	92,134	27,987	295	9,064	147,026
1945 (Jan.–Aug.)	762,277	322,435	132,836	455,271	13,843	107,988	22,636	493	161,996	306,956
TOTAL	2,057,244	971,762	582,701	1,554,463	32,733	232,496	62,161	4,331	171,060	502,781

AAF AIRPLANE LOSSES ON COMBAT MISSIONS, BY THEATER—WORLD WAR II*

		Theaters vs. Germany			Theaters vs. Japan					
Year	Total	ETO	MTO	Total	POA	FEAF	CBI	ALASKA	20th AF	Total
1942	482	55	86	141	13	275	35	17		341
1943	3,847	1,261	1,767	3,028	25	539	217	38		819
1944	13,289	7,749	3,869	11,618	116	910	532	18	95	1,671
1945 (Jan.–Aug.)	5,330	2,622	1,009	3,631	224	769	292	15	399	1,699
TOTAL	22,948	11,687	6,731	18,418	378	2,494	1,076	88	494	4,530

* Includes period January 1942 until V-J Day. Accurate statistics not available for month of December 1941.

ENEMY AIRCRAFT DESTROYED, BY THEATER—WORLD WAR II*

		Theaters vs. Germany			Theaters vs. Japan					
Year	Total	ETO	MTO	Total	POA	FEAF	CBI	ALASKA	20th AF	Total
1942 (Feb.–Dec.)	935	169	158	327		518	53	37		608
1943	10,837	3,865	3,740	7,605	96	2,466	636	34		3,232
1944	19,442	10,425	5,239	15,664	226	2,518	772	8	254	3,778
1945 (Jan.–Aug.)	8,477	5,960	291	6,251	472	416	361	6	971	2,226
TOTAL	40,259†	20,419	9,497†	29,916	794	26,298	1,913†	113†	1,225	10,343

* Includes period February 1942 until V-J Day. No accurate statistics available for period Dec. 7, 1941, to Jan. 31, 1942.
† Includes 568 enemy aircraft destroyed, whose destruction cannot be allocated to specific months; 69 in Theaters vs. Germany (MTO), 499 in Theaters vs. Japan.

US ARMED FORCES DURING THE KOREAN WAR

(July 1, 1950–July 31, 1953)

Estimated number who served, by area of assignment

Location and Component	Army	Navy	Air Force	Marine Corps	Total
In the Far East	1,153,000	265,000	241,000	130,000	1,789,000
Other overseas	711,000	735,000	262,000	35,000	1,743,000
Continental US only	970,000	177,000	782,000	259,000	2,188,000
TOTALS	2,834,000	1,177,000	1,285,000	424,000	5,720,000

Estimated number who entered on active duty, by component

Regulars	383,000	499,000	671,000	138,000	1,691,000
Reserves	384,000	297,000	203,000	128,000	1,012,000
Inductees	1,474,000	(none)	(none)	84,000	1,558,000
TOTALS	2,241,000	796,000	874,000	350,000	4,261,000

SORTIES AND DAMAGE SUMMARY, KOREAN WAR*

Items	USAF	Attached Units	Total
Sorties flown	716,979	119,898	836,877
Vehicles destroyed	74,589	8,331	82,920
Railcars destroyed	9,417	1,072	10,489
Bridges destroyed	869	341	1,210
Tanks destroyed	1,160	171	1,331
Troop casualties	145,416	39,392	184,808
Locomotives destroyed	869	94	963
Buildings destroyed	89,639	29,690	119,329
Gun positions destroyed (not broken down)			18,324
Barges and boats destroyed (not broken down)			592

* Reported figures for USAF and attached units from beginning of Korean War to and including 10:00 p.m., July 27, 1953, the hour of cease-fire.

FEAF STATISTICAL SUMMARY OF KOREAN AIR WAR

Enemy Aircraft Losses

Type	Destroyed	Prob. Destroyed	Damaged
MIG-15s	839	154	919
All types (incl. MIGs)	1,020	182	1,010

USAF Aircraft Losses

Type	Air-to-Air	Ground Fire	Other	Total
Jet	83	259	93	435
Conventional	21	285	60	366
TOTAL	104	544	153	801

SUMMARY OF DELIVERIES, USAF AND ATTACHED UNITS, DURING THE KOREAN WAR

(As of June 30, 1953)

Tons of bombs	448,366
Rounds of ammunition	182,829,400
Number of rockets	511,329
Gallons of napalm	9,596,798
Tons of personnel and freight	670,000
Passengers	2,700,000
Air evacuees	325,000

A STATISTICAL SUMMARY OF THE WAR IN VIETNAM

	1966	1967	1968	1969	1970	1971	1972
FRIENDLY MILITARY FORCES IN SOUTH VIETNAM							
United States	385,000	486,000	537,000	474,000	335,000	157,000	24,200 (Dec.)
Third Nation (a)	53,000	59,000	66,000	69,000	68,000	54,000	35,600 (Dec.)
CASUALTIES							
United States							
Deaths from hostile action (b)	5,008	9,378	14,592	9,414	4,221	1,380	300
Deaths from other causes	1,045	1,680	1,919	2,113	1,844	968	261
Wounded (c)	30,093	62,025	92,820	70,216	30,943	8,997	1,221
Hospital care required	16,526	32,371	46,799	32,940	15,511	4,817	587
Hospital care not required	13,567	29,654	46,021	37,276	15,432	4,180	634
SVN							
Deaths from hostile action	11,953	12,716	27,915	21,833	23,346	22,069	39,587
Wounded (d)	20,975	29,448	70,696	65,276	71,582	59,823	109,960
Missing	3,283	2,340	2,460	923	950	2,306	13,200
Third Nation							
Deaths from hostile action	566	1,105	979	866	704	525	443
Wounded (d)	1,591	2,318	1,997	2,218	1,830	1,148	739
Missing	15	3	9	1	12	2	12
Enemy							
Deaths from hostile action	55,524	88,104	181,149	156,954	103,638	98,094	131,949
SVN Civilian Casualties Resulting from VC Terrorism							
Assassinated	1,732	3,706	5,389	6,202	5,947	3,573	4,194
Abducted	3,810	5,369	8,759	6,289	6,931	5,006	12,837
Terrorist Incidents (e)	14,585	1,963	1,047	1,375	1,904	2,333	819
VC Armed Attacks	938	2,476	3,921	3,812	3,539	2,244	6,584
US AIR OPERATIONS IN SVN—SORTIES							
Fixed Wing							
Attack	129,050	176,437	221,755	169,022	81,398	18,622	97,088
Other Combat	41,730	49,719	59,931	88,187	50,066	20,835	59,084
Total	170,780	226,156	281,686	257,209	131,464	39,457	156,172
Helicopters							
Attack	331,777	627,418	862,732	915,341	798,976	417,167	89,808
Combat Assault	672,810	1,151,420	1,668,343	1,625,836	1,467,407	744,069	171,034
Combat Cargo	289,500	546,111	819,030	797,793	689,847	406,191	61,286
Other	1,700,650	3,192,676	4,050,438	4,902,519	4,607,596	2,646,408	739,314
Total	2,994,537	5,517,625	7,419,149	8,441,509	7,563,826	4,213,835	1,061,442
US AIRCRAFT LOSSES IN SEA							
Fixed Wing							
In NVN	280	326	141	2	4	6	150
In SVN	69	73	107	68	30	7	56
Subtotal	349	399	248	70	34	13	206
Other (f)	285	329	409	396	228	131	93
Total	634	728	657	466	262	144	299
Helicopters							
In NVN	1	4	2	—	—	—	1
In SVN	123	260	496	459	417	224	125
Subtotal	124	264	498	459	417	224	126
Other (g)	197	399	511	589	436	280	53
Total	321	663	1,009	1,048	853	504	179

NOTES:

(a) Includes forces of Australia, Korea, New Zealand, Philippines, Republic of China, Spain, and Thailand.
(b) Includes those who died of wounds and died while missing or captured.
(c) Approximately eighty-five percent of US military personnel wounded recover sufficiently for return to duty.
(d) Includes only those seriously wounded.
(e) Terrorism and Harassment incidents were reported as terrorism prior to July 1966.
(f) Combat-type aircraft lost to nonhostile action, support aircraft losses, and all other fixed-wing losses in connection with the war.
(g) Helicopters lost to nonhostile action, and all other helicopter losses in connection with the war.

US MILITARY PERSONNEL IN SOUTH VIETNAM—1960-73

DATE	ARMY	NAVY	AIR FORCE	MARINE CORPS	COAST GUARD	TOTAL
Dec. 31, 1960	800	15	68	2	(none)	About 900
Dec. 31, 1961	2,100	100	1,000	5	(none)	3,205
Dec. 31, 1962	7,900	500	2,400	500	(none)	11,300
Dec. 31, 1963	10,100	800	4,600	800	(none)	16,300
Dec. 31, 1964	14,700	1,100	6,600	900	(none)	23,300
Dec. 31, 1965	116,800	8,400	20,600	38,200	300	184,300
Dec. 31, 1966	239,400	23,300	52,900	69,200	500	385,300
Dec. 31, 1967	319,500	31,700	55,900	78,000	500	485,600
Dec. 31, 1968	359,800	36,100	58,400	81,400	400	536,100
June 30, 1969	360,500	35,800	60,500	81,500	400	538,700
June 30, 1970	298,600	25,700	50,500	39,900	200	414,900
June 30, 1971	190,500	10,700	37,400	500	100	239,200
June 30, 1972	31,800	2,200	11,500	1,400	100	47,000
Jan. 31, 1973	12,400	1,400	6,900	800	(none)	21,500
Mar. 16, 1973	4,081	*	1,828	*	*	6,308

* Combined total of 399.
By March 31, 1973, all US combat and combat-support troops had left South Vietnam.
Between 1954 and 1960, US military strength averaged about 650 advisors.

THE VIETNAM WAR—THE FINAL TOLL

Military Casualties	Killed	Wounded
United States	45,948	303,640
South Vietnam	184,546	495,931
Communist	927,124	(not available)

Civilian Casualties	Killed	Wounded
South Vietnam	451,000	935,000
North Vietnam	(not available)	(not available)

Refugees	
South Vietnam	More than 6,500,000
Cambodia	More than 2,000,000
Laos	More than 1,000,000
North Vietnam	(not available)

US expenditures since 1965, start of the military buildup: $109.5 billion.

UNITED STATES AIR FORCE MEDAL OF HONOR WINNERS—1918-1973

NAMES, ALPHABETICALLY BY WARS AND RANK AT TIME OF ACTION	HOME TOWN	DATE AND PLACE OF ACTION	DATE OF DEATH, OR PRESENT ADDRESS
WORLD WAR I			
Blackley, 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	Key Biscayne, Fla.
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, Liege, Belgium	KIA, Dec. 24, 1944
Cheli, Maj. Ralph	San Francisco, Calif.	Aug. 18, 1943, Wewak, New Guinea	Died as POW, Mar. 6, 1944
Craw, Col. Demas T.	Traverse City, Mich.	Nov. 8, 1942, Port Lyautey, French Morocco	KIA, Nov. 8, 1942
Doolittle, Lt. Col. James H.	Alameda, Calif.	Apr. 18, 1942, Tokyo, Japan	Santa Monica, Calif. (Ret. Lt. Gen.)
Erwin, SSgt. Henry E.	Adamsville, Ala.	Apr. 12, 1945, Koriyama, Japan	Birmingham, Ala.
Femoyer, 2d Lt. Robert E.	Huntington, W. Va.	Nov. 2, 1944, Merseburg, Germany	KIA, Nov. 2, 1944
Gott, 1st Lt. Donald J.	Arnett, Okla.	Nov. 9, 1944, Saarbrucken, Germany	KIA, Nov. 9, 1944
Hamilton, Maj. Pierpont M.	Tuxedo, N.Y.	Nov. 8, 1942, Port Lyautey, French Morocco	Santa Barbara, Calif. (Ret. Maj. Gen.)
Howard, Maj. James H.	Canton, China	Jan. 11, 1944, Oschersleben, Germany	Washington, D.C. (Ret. Brig. Gen.)
Hughes, 2d Lt. Lloyd H.	Alexandria, La.	Aug. 1, 1943, Ploesti, Romania	KIA, Aug. 1, 1943
Jerstad, Maj. John L.	Racine, Wis.	Aug. 1, 1943, Ploesti, Romania	KIA, Aug. 1, 1943
Johnson, Col. Leon W.	Columbia, Mo.	Aug. 1, 1943, Ploesti, Romania	McLean, Va. (Ret. Gen.)
Kane, Col. John R.	McGregor, Tex.	Aug. 1, 1943, Ploesti, Romania	Barber, Ark. (Ret. Col.)
Kearby, Col. Neel E.	Wichita Falls, Tex.	Oct. 11, 1943, Wewak, New Guinea	KIA, Mar. 5, 1944, Wewak, New Guinea
Kingsley, 2d Lt. David R.	Portland, Ore.	June 23, 1944, Ploesti, Romania	KIA, June 23, 1944
Knight, 1st Lt. Raymond L.	Houston, Tex.	Apr. 25, 1945, Po Valley, Italy	KIA, Apr. 25, 1945
Lawley, 1st Lt. William R., Jr.	Leeds, Ala.	Feb. 20, 1944, Leipzig, Germany	Montgomery, Ala. (Ret. Col.)
Lindsey, Capt. Darrell R.	Jefferson, Iowa	Aug. 9, 1944, Pontoise, France	KIA, Aug. 9, 1944
Mathies, SSgt. Archibald	Scotland	Feb. 20, 1944, Leipzig, Germany	KIA, Feb. 20, 1944
Mathis, 1st Lt. Jack W.	San Angelo, Tex.	Mar. 18, 1943, Vegesack, Germany	KIA, Mar. 18, 1943
McGuire, Maj. Thomas B., Jr.	Ridgewood, N.J.	Dec. 25-26, 1944, Luzon, P.I.	KIA, Jan. 7, 1945, Negros, P.I.
Metzger, 2d Lt. William E., Jr.	Lima, Ohio	Nov. 9, 1944, Saarbrucken, Germany	KIA, Nov. 9, 1944
Michael, 1st Lt. Edward S.	Chicago, Ill.	Apr. 11, 1944, Brunswick, Germany	Fairfield, Calif. (Ret. Col.)
Morgan, F/O John C.	Vernon, Tex.	July 28, 1943, Kiel, Germany	Santa Monica, 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, Capt. 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	Albany, N.Y.
Truemper, 2d Lt. Walter E.	Aurora, Ill.	Feb. 20, 1944, Leipzig, Germany	KIA, Feb. 20, 1944
Vance, Lt. Col. Leon R., Jr.	Enid, Okla.	June 5, 1944, Wimereaux, France	Killed July 26, 1944, near Iceland
Vosler, TSgt. Forrest L.	Lyndonville, N.Y.	Dec. 20, 1943, Bremen, Germany	Poland, N.Y.
Walker, Brig. Gen. Kenneth N.	Cerrillos, N.M.	Jan. 5, 1943, Rabaul, New Britain	KIA, Jan. 5, 1943
Wilkins, Maj. Raymond H.	Portsmouth, Va.	Nov. 2, 1943, Rabaul, New Britain	KIA, Nov. 2, 1943
Zeamer, Capt. Jay, Jr.	Carlisle, Pa.	June 16, 1943, Buka, Solomon Is.	Bedford, Mass. (Ret. Lt. Col.)
KOREA			
Davis, Lt. Col. 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			
Dethlefsen, Maj. Merlyn H.	Greenville, Iowa	Mar. 10, 1967, Thai Nguyen, No. Vietnam	Active duty, Lt. Col., Carlisle Barracks, Pa.
Fisher, Maj. Bernard F.	San Bernardino, Calif.	Mar. 10, 1966, A Shau Valley, So. Vietnam	Active duty, Boise IAP, Idaho
Fleming, 1st Lt. James P.	Sedalia, Mo.	Nov. 26, 1968, Duc Co, So. Vietnam	Active duty, Capt., USAF Academy, Colo.
Jackson, Lt. Col. Joe M.	Newnan, Ga.	May 12, 1968, Kham Duc, So. Vietnam	Active duty, Col., Maxwell AFB, Ala.
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	Plainville, Conn.
Wilbanks, Capt. Hilliard A.	Cornelia, Ga.	Feb. 24, 1967, Dalat, So. Vietnam	KIA, Feb. 24, 1967
Young, Capt. Gerald O.	Ancortes, Wash.	Nov. 9, 1967, Da Nang area, So. Vietnam	Active duty, Maj., APO N.Y.

USAF WINNERS OF NATIONAL AVIATION AND SPACE AWARDS

The Collier Trophy

The Collier Trophy, established in 1911 by Robert J. Collier, is the oldest continuously awarded aeronautical honor in the world. It is awarded for the greatest achievement in aeronautics, astronautics, or spaceflight in America, with respect to improving the performance, efficiency, or safety of air or space vehicles, the value of which has been thoroughly demonstrated by actual use during the preceding year. USAF recipients since 1947 include:

1947 Capt. Charles E. Yeager, with the developers of the Bell XS-1
1955 Gen. Nathan F. Twining and the aviation industry, for the B-52
1961 Maj. Robert M. White and the other X-15 pilots
1964 Gen. Curtis E. LeMay, for his leadership as USAF Chief of Staff
1968 Col. Frank Borman, Capt. James A. Lovell, Jr. (USN), and Lt. Col. William A. Anders, for the Apollo-8 moon-orbital flight
1969 Neil A. Armstrong and USAF Cols. Edwin E. Aldrin and Michael Collins, for the Apollo-11 moon landing
1971 USAF Col. David R. Scott, Lt. Col. James B. Irwin, and Maj. Alfred M. Worden, for the flight of Apollo-15
1972 USAF and US Navy participants in Linebacker II in the Vietnam War

The Mackay Trophy

The Mackay Trophy, established in 1912 by Clarence H. Mackay, a philanthropist and aviation enthusiast, is the oldest award intended exclusively for flying officers of the US Air Force. It is awarded annually "for the most meritorious flight of the year" by an Air Force person, persons, or organization. Recipients since 1947 are:

1947 Capt. Charles E. Yeager, for his supersonic XS-1 flight
1948 Lt. Col. Emil Beaudry, for a rescue mission to the Greenland ice cap
1949 Crew of *Lucky Lady II*, for their nonstop, round-the-world flight
1950 27th Fighter Escort Wing, for a transatlantic flight
1951 Col. Fred J. Ascani, for 100-km closed-course speed record of 635 mph in an F-86E Sabre
1952 Maj. L. H. Carrington, Maj. F. W. Shook, and Capt. W. D. Yancey, for a nonstop transpacific jet flight
1953 SAC's 40th Air Division, for jet fighter deployment techniques
1954 SAC's 308th Bomb Wing, for a B-47 deployment
1955 Col. Horace A. Hanes, for world's first official supersonic speed record, 822.135 mph in an F-100C Super Sabre
1956 Capt. Iven C. Kincheloe, Jr., for an altitude record of 126,200 feet in the Bell X-2 rocketplane
1957 SAC's 93d Bomb Wing, for round-the-world nonstop flights
1958 TAC's Composite Air Strike Force, for deployment to the Far East
1959 The Thunderbirds demonstration team, for a Far East goodwill trip
1960 The 6593d Test Squadron (Special), for in-flight recovery of space capsules
1961 Lt. Col. W. R. Payne, Maj. W. L. Polhemus, and Maj. R. R. Wagener, for a record-setting B-58 flight to Paris
1962 Maj. R. G. Sowers, Capt. Robert McDonald, and Capt. J. T. Walton, for new transcontinental speed records
1963 Capt. Warren P. Tomsett and his C-47 crew, for air-evac of wounded in Vietnam
1964 TAC's 464th Troop Carrier Wing, for airlift from the Congo
1965 Col. Robert L. Stephens and the test force of the YF-12A and SR-71 for nine world speed and altitude records
1966 Col. Albert R. Howarth, for airmanship on a combat mission in Vietnam
1967 Maj. John H. Casteel, Capt. Richard L. Trail, Capt. Dean L. Hoar, and MSgt. Nathan C. Campbell, for proficiency and heroism in a SAC KC-135 tanker
1968 Lt. Col. Daryl D. Cole, for airmanship in a C-130 in Vietnam
1969 TAC's 49th Tactical Fighter Wing, for redeployment of its F-4D Phantoms from Germany to New Mexico
1970 Capt. Alan D. Milacek and his nine-man crew, for valor and perseverance in returning their severely damaged aircraft to base
1971 Lt. Col. Thomas B. Estes and Maj. Dewain C. Vick, for setting distance and duration records in the SR-71
1972 Capt. Charles D. DeBellevue, Capt. Richard S. Ritchie, and Capt. Jeffrey S. Feinstein, the three USAF aces of the Vietnam War

The Cheney Award

The Cheney Award, established in 1927, recognizes acts of "valor, extreme fortitude, or self-sacrifice in a humanitarian interest performed in connection with aircraft." It is awarded annually to a member of the US Air Force or its Reserve components, selected by the Chief of Staff and approved by the donors (the mother and sister of 1st Lt. William A. Cheney, who died in a midair collision in January 1918, becoming the first American casualty in Italy in World War I). Recipients since 1948 are:

1948 Lt. Gail S. Halvorsen
1949 Capt. William E. Blair
1950 Sgt. Paul Ramineda
1951 Capt. Daniel J. Miller
1952 Capt. Kendrick U. Reeves
1953 Capt. Edward G. Sperry
1954 Lt. Col. John P. Stapp
1955 TSgt. William G. Sutherland
1956 MSgt. Leonard J. Bachetti
1957 Lt. Robert M. Kerr
1958 Lt. James E. Obenauf
1959 Capt. Herbert L. Mattox, Jr.
1960 Capt. Alfred S. Despres, Jr.
1961 Lt. William A. Luther and MSgt. Lawrence G. Seckley
1962 Maj. Rudolph Anderson, Jr.
1963 Maj. James R. O'Neill
1964 Capt. Albert L. Villaret
1965 Capt. Robert S. Henderson and Capt. James A. Darden, Jr.
1966 Maj. Bernard F. Fisher
1967 Sgt. Duane D. Hackney
1968 Sgt. Thomas A. Newman
1969 Sgt. Isidro Arroyo, Jr.
1970 Maj. Travis Wofford
1971 SSgt. James H. Moore

The Harmon International Trophies

Three trophies, established in 1926, are awarded annually to the world's outstanding aviator, aviatrix, and aeronaut or spherical balloonist. The original criteria for the aviator award demanded the "most outstanding international achievement in the art/science of aeronautics for the preceding year, with the art of flying receiving first consideration." This was broadened in 1969 to include pilot feats in earth-orbiting or other space vehicles controllable in some degree by the pilot. The trophies are named for pioneer aviator Clifford B. Harmon. Air Force recipients of the Harmon Aviation Trophy since 1949 are:

1949 Lt. Gen. James H. Doolittle
1950 Col. David C. Schilling
1951 Capt. Charles F. Blair
1952 Col. Bernt Balchen
1953 Maj. Charles E. Yeager
1956 Lt. Col. Frank K. Everest
1957 Gen. Curtis E. LeMay
1959 Capt. Joe B. Jordan
1960 Maj. Robert M. White
1961 Lt. Col. William R. Payne
1962 Maj. Fitzhugh L. Fulton, Jr.
1963 Maj. L. Gordon Cooper
1965 Col. Frank A. Borman and Lt. Col. Thomas P. Stafford
1966 Lt. Col. Edwin E. Aldrin, Jr.
1968 Maj. William J. Knight
1969 Col. Frank A. Borman, Lt. Col. William A. Anders, and Maj. Jerauld R. Gentry
1970 Col. Michael Collins and Col. Edwin E. Aldrin, Jr.
1971 Lt. Col. Thomas B. Estes and Maj. Dewain C. Vick

The General Thomas D. White USAF Space Trophy

The newest national award for Air Force personnel is the Gen. Thomas D. White Space Trophy, established in 1961 by Dr. Thomas W. McKnew, then executive vice president of the National Geographic Society. The award recognizes the "most outstanding contribution to the nation's progress in aerospace during the preceding calendar year by an Air Force military member, Civil Service employee, or organization." The trophy honors the memory of USAF's General White, who served as Chief of Staff from 1957 to 1961. Recipients include:

1961 Capt. Virgil I. Grissom, for his suborbital flight in the Mercury space program
1962 Maj. Robert M. White, for his record-setting flights in the X-15
1963 Maj. L. Gordon Cooper, for his flight in the Mercury program
1964 Air Force Systems Command, for contributions to space technology
1965 Lt. Col. Edward H. White, II, for his twenty-one-minute space walk during the flight of Gemini-4
1966 Hon. Alexander H. Flax, then Assistant Secretary of the Air Force (Research and Development)
1967 Gen. J. P. McConnell, USAF Chief of Staff
1968 Col. Frank Borman, Capt. James Lovell, Jr. (USN), and Lt. Col. William A. Anders, for the Apollo-8 moon-orbital flight
1969 Neil A. Armstrong and USAF Cols. Edwin E. Aldrin and Michael Collins, for the Apollo-11 moon-landing flight
1970 Brig. Gen. Robert A. Duffy, for his accomplishments as Vice Commander of SAMSO and Deputy for Reentry Systems
1971 Lt. Gen. Samuel C. Phillips, for his achievements as Commander of the Space and Missile Systems Organization (SAMSO)

WINNERS OF AFA'S AEROSPACE AWARDS

The Air Force Association's Aerospace Awards are presented annually to individuals or organizations contributing in some outstanding manner to furthering the development of various fields of aerospace power for the betterment of all mankind. In 1948, AFA established five national aerospace awards in the form of trophies. A sixth, the Thomas P. Gerrity Trophy, was added in 1968. The awards are made at AFA's annual National Convention, each September.

The **H. H. Arnold Trophy** goes to "Aerospace's Man of the Year" for the most outstanding contributions in the field of Aerospace Activity. The trophy is named for the wartime leader of the Army Air Forces. Winners include:

1948 Hon. W. Stuart Symington, Secretary of the Air Force
1949 Maj. Gen. William H. Tunner and the men of the Berlin Airlift
1950 Airmen of the United Nations in the Far East
1951 Lt. Gen. Curtis E. LeMay and the personnel of Strategic Air Command
1952 Senators Lyndon B. Johnson and Joseph C. O'Mahoney
1953 Gen. Hoyt S. Vandenberg, former Chief of Staff, USAF
1954 Hon. John Foster Dulles, Secretary of State
1955 Gen. Nathan F. Twining, Chief of Staff, USAF
1956 Sen. W. Stuart Symington
1957 Edward P. Curtis, Special Assistant to President Eisenhower
1958 Maj. Gen. Bernard A. Schriever, Commander, Ballistic Missile Div., ARDC
1959 Gen. Thomas S. Power, Commander in Chief, Strategic Air Command
1960 Gen. Thomas D. White, Chief of Staff, USAF
1961 Hon. Lyle S. Garlock, Assistant Secretary of the Air Force (FM)
1962 Dr. A. C. Dickieson and John R. Pierce, Bell Telephone Laboratories
1963 363d Tactical Reconnaissance Wing, TAC; 4080th Strategic Wing, SAC
1964 Gen. Curtis E. LeMay, Chief of Staff, USAF
1965 Second Air Division, PACAF, USAF
1966 8th, 12th, 355th, 366th, and 388th Tactical Fighter Wings; 432d and 460th Tactical Reconnaissance Wings
1967 Gen. William W. Momyer, Commander, 7th Air Force, PACAF
1968 Col. Frank Borman, Capt. James Lovell, Jr., and Lt. Col. William Anders—the Apollo-8 crew
1969 *(Not awarded)*
1970 Apollo-11 team (J. L. Atwood, Lt. Gen. Samuel C. Phillips, Neil Armstrong, Col. Edwin E. Aldrin, Jr., and Col. Michael Collins)
1971 Dr. John S. Foster, Jr., Director of Defense Research & Engineering
1972 Air Units of the Allied Forces in SEA (Air Force, Navy, Army, Marine Corps, and the Vietnamese Air Force)

The **Theodore von Kármán Trophy** is awarded for distinguished service in the field of Aerospace Science. Originally known as the Science Trophy, the award was renamed in honor of the late Dr. von Kármán, dean of US aeronautical scientists. Winners include:

1948 John Stack, NACA designer
1949 R. C. Sebold, R. H. Widmer, and Ray O. Ryan—contributors to the development of the B-36
1950 Dr. Theodore von Kármán, Chairman, Scientific Advisory Board, USAF
1951 Dr. George E. Valley, Department of Physics, MIT
1952 Dr. Edward Teller, Radiation Laboratory, University of California
1953 Dr. Mervin J. Kelly, Bell Telephone Laboratories
1954 Lt. Col. John Paul Stapp, USAF, for research into high-speed flight
1955 Dr. John F. von Neumann, Atomic Energy Commission
1956 Dr. Chalmers W. Sherwin, University of Illinois
1957 Dr. Charles Stark Draper, MIT
1958 Dr. H. Julian Allen, Ames Aeronautical Laboratory
1959 Dr. W. Randolph Lovelace II and Brig. Gen. Don D. Flickinger, USAF
1960 Dr. Louis N. Ridenour, Jr., Lockheed Aircraft Corp. *(posthumously)*
1961 Allen F. Donovan, Aerospace Corp.
1962 Dr. Charles H. Townes, Provost, MIT
1963 Clarence L. "Kelly" Johnson, Lockheed Aircraft Corp.
1964 Clarence L. "Kelly" Johnson, Lockheed Aircraft Corp.
1965 Capt. Robert M. Silva, USAF, developer of the first autonomous space sextant
1966 6555th Aerospace Test Wing, AFSC
1967 Col. Alterio Gallerani, Aerospace Audio Visual Service
1968 Lt. Col. Harry F. Rizzo, USAF, Air Force Weapons Laboratory, Kirtland AFB, N. M.
1969 *(Not awarded)*
1970 Maj. Gen. Kenneth W. Schultz, Deputy for Minuteman, SAMSO
1971 Fred D. Orazio, Sr., Scientific Director, Aeronautical Systems Div.
1972 Lt. Col. Donald G. Carpenter, USAF, for advancing the US space defense capability

The **David C. Schilling Trophy** is awarded for distinguished service in the field of Flight. Originally AFA's Flight Trophy, the award was renamed in 1957 in honor of the late Col. David C. Schilling. Winners include:

1948 Herbert H. Hoover, NACA test pilot
1949 Bill Odom, private pilot
1950 Capt. James Jabara, world's first jet ace
1951 Brig. Gen. Albert Boyd, Commanding General, Edwards AFB, Calif.
1952 Col. David C. Schilling, USAF, pioneer in long-distance flight of fighter aircraft
1953 Third Air Rescue Group, MATS
1954 Maj. Charles E. Yeager, USAF, research aircraft test pilot
1955 Maj. Stuart Childs, USAF, and George Welch *(posthumously)*, for contributions to USAF's first supersonic aircraft
1956 Lt. Col. Frank K. Everest, USAF, for flying the X-2 more than 1,900 mph
1957 Col. Patrick D. Fleming, USAF, *(posthumously)*, for contributions to B-52 training and tactics
1958 Capt. Iven C. Kincheloe, USAF *(posthumously)*, jet ace and test pilot
1959 Tactical Air Command
1960 Lt. Gen. Elwood R. Quesada, FAA Administrator
1961 Maj. Robert M. White, USAF; A. Scott Crossfield, North American Aviation, Inc.; and Joseph A. Walker, NASA, for the X-15 project
1962 Maj. Robert M. White, USAF, America's "First Winged Astronaut"
1963 Maj. L. Gordon Cooper, Jr., Mercury Astronaut
1964 Maj. Sidney J. Kubesch, B-58 pilot
1965 Col. Frank Borman, Gemini-7 Command Pilot
1966 Maj. Hallett P. Marston, 15th Tactical Reconnaissance Photo Squadron
1967 Col. Robin Olds, USAF, for outstanding contributions in the field of flight
1968 Capt. Albert R. Kaiser, USAF, for aerial recovery of space capsules
1969 *(Not awarded)*
1970 Maj. James M. Rhodes Jr., USAF, research test pilot at Edwards AFB
1971 Col. David R. Scott, Col. James B. Irwin, Lt. Col. Alfred M. Worden—the Apollo-15 crew
1972 1st Strategic Reconnaissance Squadron, SAC

The **Gill Robb Wilson Trophy** is awarded for distinguished service to aerospace in the field of Arts and Letters. Originally AFA's Arts and Letters Trophy, the award was renamed in 1966 in honor of the late Gill Robb Wilson, veteran aerospace journalist and editor. Winners include:

1948 William Wister Haines, author of *Command Decision*
1949 *(Not awarded)*
1950 Dr. J. L. Cate and Dr. W. F. Craven, authors of *The Army Air Forces in World War II*
1951 Maj. Alexander P. deSeversky, author of *Air Power: Key to Survival*
1952 Edward R. Murrow, Columbia Broadcasting System
1953 Milton Caniff, King Features ("Steve Canyon" comic strip)
1954 Charles J. V. Murphy, *Fortune* Magazine
1955 Vern Haugland, Associated Press
1956 Beirne Lay, Jr., Metro-Goldwyn-Mayer
1957 Joseph and Stewart Alsop, syndicated columnists
1958 Air Photographic & Charting Service, MATS
1959 Maj. James F. Sunderman, USAF, for contributions to the Air Force book program
1960 Walter Lippmann, syndicated columnist

1961	Maj. Gen. Orvil A. Anderson, USAF (Ret.), and Dr. Albert F. Simpson, Air Force Historical Foundation
1962	Bob Considine, syndicated columnist
1963	Lt. Col. George C. Bales, USAF, for contributions to the Air Force art program
1964	Mark S. Watson, Baltimore *Sun*
1965	Elton C. Fay, Associated Press
1966	Society of Illustrators of New York City, Los Angeles, and San Francisco
1967	Robert F. Engel, 1352d Photographic Group, MAC
1968	Dr. Edward C. Welsh, Executive Secretary, National Aeronautics and Space Council
1969	*(Not awarded)*
1970	Louis R. Stockstill, author of the magazine article "The Forgotten Americans of the Vietnam War"
1971	*Airman* Magazine
1972	Hanson W. Baldwin, veteran military writer and analyst

The **Hoyt S. Vandenberg Trophy** is awarded for distinguished service in the field of Aerospace Education. The trophy honors the late Gen. Hoyt S. Vandenberg, who served as USAF Chief of Staff from 1948 to 1953. Winners include:

1948	Jacqueline Cochran, aviatrix
1949	Capt. James Gallagher and the men behind the flight of *Lucky Lady II*
1950	D. W. Rentzel, Administrator, CAA
1951	Gen. Carl A. Spaatz, first Chief of Staff, USAF
1952	Gen. Hoyt S. Vandenberg, Chief of Staff, USAF
1953	Lt. Gen. James H. Doolittle, USAF (Ret.), pilot, soldier-scientist
1954	Gill Robb Wilson, Air Force Association
1955	Maj. Gen. Lucas V. Beau, Civil Air Patrol
1956	Arthur Godfrey, Columbia Broadcasting System
1957	Gen. George C. Kenney, USAF (Ret.)
1958	Ralph J. Cordiner, Chairman, Military Pay Study Committee
1959	Dr. Frank E. Sorenson, University of Nebraska
1960	Dr. Wayne O. Reed, Deputy Commissioner, US Office of Education
1961	Dr. Charles H. Boehm, Supt. of Public Instruction, Pennsylvania
1962	Dr. Lindley J. Stiles, Dean, School of Education, Univ. of Wisconsin
1963	Brig. Gen. Robert F. McDermott, Dean of Faculty, USAF Academy
1964	Aerospace Presentations Team, Air University
1965	Brig. Gen. William C. Lindley, Commandant, Air Force ROTC
1966	Dr. B. F. Skinner, Harvard University
1967	*(Not awarded)*
1968	Hon. Marion B. Folsom, former Secretary, HEW
1969	*(Not awarded)*
1970	Lt. Gen. Selmon W. Wells, Inspector General, USAF
1971	Hon. F. Edward Hébert, House of Representatives
1972	Maj. Richard L. Craft, Hq. Tactical Air Command

The **Thomas P. Gerrity Trophy** is awarded for outstanding accomplishment in the field of Aerospace Systems and Logistics. It was established in 1968 to honor the late Gen. Thomas P. Gerrity. Winners include:

1968	Maj. Gen. Charles G. Chandler, Jr., Deputy Chief of Staff for Materiel, Pacific Air Forces
1969	Maj. Gen. Frederick E. Morris, Jr., Director of Data Automation, Comptroller of the Air Force
1970	Col. Levin P. Tull, Deputy Director of Supply & Services, Air Force Deputy Chief of Staff, Systems and Logistics
1971	Col. Shirl M. Nelson, Director of Supply & Services, Hq. Tactical Air Command
1972	Col. Owen J. McGonnell, Asst. Deputy Chief of Staff/Logistics, Hq. Aerospace Defense Command

SELECTED OFFICIAL WORLD AIRCRAFT AND SPACE RECORDS HELD BY USAF PILOTS

DATE	CATEGORY	PILOT AND AIRCRAFT	RECORD SET
1/11/62	Distance in a Straight Line	Maj. Clyde P. Evely, Boeing B-52H, from Kadena, Okinawa, to Madrid, Spain	12,532.28 mi (20,168.78 km)
7/17/62	Altitude: Aircraft Launched from a Carrier Airplane	Maj. Robert M. White, North American X-15, Edwards AFB, Calif.	314,750 ft (95,935.99 m)
5/1/65	Altitude in Horizontal Flight	Col. R. L. Stephens, Lockheed YF-12A, Edwards AFB, Calif.	80,257.86 ft (24,462.596 m)
12/21-27/68	Altitude—Manned Spacecraft	Col. Frank Borman, Capt. James A. Lovell, Jr. (USN), and Lt. Col. William Anders, Apollo-8	234,672.5 mi (377,668.9 km)
4/20-23/72	Duration of Stay on Lunar Surface	Capt. John W. Young (USN), and Lt. Col. Charles M. Duke, Apollo-16 and LM Orion	71 hr, 2 min, 13 sec
7/31-8/2/71	Duration of Stay Outside a Spacecraft	Col. David R. Scott, Apollo-15 and LM Falcon	18 hr, 18 min, 26 sec
8/1/71	Distance Traveled on Lunar Surface	Col. David R. Scott and Lt. Col. James B. Irwin, Apollo-15, LM Falcon, and Lunar Rover	16,470 ft (5,020 m)
2/20/72	Distance in a Straight Line (Turboprop Aircraft Without Payload)	Lt. Col. Edgar L. Allison, Jr., Lockheed HC-130 Hercules, Ching Chuan Kang AB, Taiwan, to Scott AFB, Ill.	8,732.09 mi (14,052.95 km)
6/6-7/62	Distance in a Closed Circuit (Jet Aircraft Without Payload)	Capt. William Stevenson, Boeing B-52H; Seymour Johnson AFB, N. C.; Kindley, Bermuda; Sondrestrom, Greenland; Anchorage, Alaska; March AFB, Calif.; Key West, Fla.; Seymour Johnson AFB, N. C.	11,336.92 mi (18,245.05 km)
5/1/65	Sustained Altitude (Jet Aircraft Without Payload)	Col. R. L. Stephens, Lockheed YF-12A, Edwards AFB, Calif.	80,257.86 ft (24,462.566 m)
5/1/65	Speed Over a 15/25 km Course (Jet Aircraft Without Payload)	Col. R. L. Stephens, Lockheed YF-12A, Edwards AFB, Calif.	2,070.101 mph (3,331.407 km/h)
7/17/62	Altitude (Rocket Engine, Launched from a Carrier Aircraft)	Maj. Robert M. White, North American X-15, Edwards AFB, Calif.	314,750 ft (95,935.99 m)
3/5/62	Speed Over a Recognized Course (Los Angeles to New York)	Capt. Robert G. Sowers, Convair B-58 Hustler (elapsed time: 2 hr, 00 min, 58.71 sec)	1,214.65 mph (1,954.79 km/h)
5/31-6/1/67	Speed Over a Recognized Course (Helicopter—New York to London)	Maj. Donald B. Maurras, Sikorsky HH-3E (elapsed time: 29 hr, 13 min, 25 sec)	118.14 mph (190.12 km/h)
5/31-6/1/67	Speed Over a Recognized Course (Helicopter—New York to Paris)	Maj. Herbert Zehnder, Sikorsky HH-3E (elapsed time: 30 hr, 46 min, 10.8 sec)	118.03 mph (189.95 km/h)

—Selected from data compiled by National Aeronautic Association, US Representative for Federation Aeronautique International. Current as of March 1, 1973.

AIR FORCE MAGAZINE'S GUIDE TO ACES

In compiling this list of aces who flew with the USAF and its predecessor organizations (the Air Service and the Army Air Forces), AIR FORCE Magazine has used official USAF sources for conflicts since World War I. During World War I many Americans scored victories while 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 and Korea include only AAF/USAF airmen.

The USAF Historical Division of the Aerospace Studies Institute, Air University, Maxwell AFB, Ala., has completed a detailed accounting of USAF's Korean War aces. The list of Army Air Forces aces of World War II is now being reevaluated by the Historical Division. The final, documented list of all World War II combat scores will not be available for at least two years. In the meantime, some of the scores shown in the following lists may be open to debate, or even challenge.

All entries are for air-to-air victories, although some of the World War I totals (notably Frank Luke's) include balloons.

—The Editors

LEADING AMERICAN ACES OF WORLD WAR I

(Ten or more victories)

Rickenbacker, Capt. Edward V. (AEF)	26
Rosevear, Capt. S. C. (RFC)	23
Lambert, Capt. William C. (RFC)	22
Gillette, Capt. Frederick W. (RFC)	20
Malone, Capt. John J. (RN)	20
Wilkenson, Maj. Alan M. (RFC)	19
Hale, Capt. Frank L. (RFC)	18
Iaccaci, Capt. Paul T. (RFC)	18
Luke, 2d Lt. Frank, Jr. (AEF)	18
Lufbery, Maj. Raoul G. (FFC/LE)	17
Kullberg, Lt. Harold A. (RFC)	16
Rose, Capt. Oren J. (RFC)	16
Warman, Lt. C. T. (RFC)	15
Libby, Capt. Frederick (RFC)	14
Vaughn, 1st Lt. George A. (AEF)	13
Baylies, Lt. Frank L. (FFC/LE)	12
Bennett, 1st Lt. Louis B. (RFC)	12
Kindley, Capt. Field E. (AEF)	12
Springs, Capt. Elliott W. (AEF)	12
Iaccaci, Lt. Thayer A. (RFC)	11
Landis, Capt. Reed G. (AEF)	10
Putnam, 1st Lt. David E. (LE/AEF)	10
Swaab, Capt. Jacques M. (AEF)	10

AEF—American Expeditionary Force
FFC—French Flying Corps
RFC—Royal Flying Corps (British)
RN —Royal Navy (British)
LE —Lafayette Escadrille

LEADING ARMY AIR FORCES ACES OF WORLD WAR II

(Fifteen or more victories)

Bong, Maj. Richard T.	40
McGuire, Maj. Thomas B.	38
Gabreski, Col. Francis N.	31*
Johnson, Lt. Col. Robert S.	28
MacDonald, Col. Charles H.	27
Preddy, Maj. George E.	25.83
Meyer, Col. John C.	24*
Wetmore, Capt. Ray S.	22.59
Schilling, Col. David C.	22.50
Johnson, Lt. Col. Gerald R.	22
Kearby, Col. Neel E.	22
Mahurin, Lt. Col. Walker M.	22*
Robbins, Col. Jay T.	22
Christensen, Capt. Fred J.	21.50
Voll, Maj. John J.	21
Lynch, Lt. Col. Thomas J.	20
Westbrook, Lt. Col. Robert B.	20
Gentile, Capt. Donald S.	19.84
Beeson, Maj. Duane W.	19.33
Duncan, Col. Glenn E.	19
Carson, Maj. Leonard K.	18.50
Eagleston, Lt. Col. Glenn T.	18.50*
Older, Lt. Col. Charles H. (AVG/USAF)	18.25
Beckham, Col. Walter C.	18
Green, Col. Herschel H.	18
Zemke, Col. Hubert	17.75
England, Lt. Col. John B.	17.50
Reed, Maj. William N. (AVG/USAF)	17.50
Hill, Maj. David L. (AVG/USAF)	17.25
Thornell, Maj. John F., Jr.	17.25
Brown, Maj. Henry Wm.	17.20
Foy, Maj. Robert W.	17
Hampshire, Capt. John (AVG/USAF)	17
Johnson, Col. Gerald W.	17
Varnell, Capt. James S., Jr.	17
Hofer, 1st Lt. Ralph K.	16.50
Godfrey, Capt. John T.	16.33
Anderson, Lt. Col. Clarence E., Jr.	16.25
Dunham, Col. William D.	16
Harris, Lt. Col. Bill	16
Welch, Maj. George S.	16
Beerbower, Capt. Donald M.	15.50
Peterson, Maj. Richard A.	15.50
Whisner, Maj. William T., Jr.	15.50*
Blakeslee, Col. Donald J. M. (ES/USAF)	15
Bradley, Col. Jack T.	15
Brown, Capt. Samuel J.	15
Cragg, Maj. Edward	15
Goodson, Lt. Col. James A.	15
Herbst, Col. John C.	15
Homer, Maj. Cyril F.	15

*Aces who added to these scores by victories in Korean War.
AVG—American Volunteer Group
ES —Eagle Squadron

USAF ACES OF THE KOREAN WAR

McConnell, Capt. Joseph, Jr.	16*
Jabara, Lt. Col. James	15*
Fernandez, Capt. Manuel J., Jr.	14.5
Davis, Maj. George A., Jr.	14*
Baker, Col. Royal N.	13*
Blesse, Maj. Frederick C.	10
Fischer, Capt. Harold E.	10
Garrison, Lt. Col. Vermont	10*
Johnson, Col. James K.	10*
Moore, Capt. Lonnie R.	10
Parr, Capt. Ralph S., Jr.	10
Foster, Capt. Cecil G.	9
Low, 1st Lt. James F.	9
Hagerstrom, Maj. James P.	8.50*
Risner, Maj. Robinson	8
Ruddell, Lt. Col. George I.	8*
Buttlemann, 1st Lt. Henry	7
Jolley, Capt. Clifford D.	7
Lilley, Capt. Leonard W.	7
Adams, Maj. Donald E.	6.50*
Gabreski, Col. Francis S.	6.50*
Jones, Lt. Col. George L.	6.50
Marshall, Maj. Winton W.	6.50
Kasler, 1st Lt. James H.	6
Love, Capt. Robert J.	6
Whisner, Maj. William T., Jr.	5.50*
Baldwin, Col. Robert P.	5
Becker, Capt. Richard S.	5
Bettinger, Maj. Stephen L.	5
Creighton, Maj. Richard D.	5*
Curtin, Capt. Clyde A.	5
Gibson, Capt. Ralph D.	5
Kincheloe, Capt. Iven C., Jr.	5
Latshaw, Capt. Robert T., Jr.	5
Moore, Capt. Robert H.	5
Overton, Capt. Dolphin D., III	5
Thyng, Col. Harrison R.	5*
Westcott, Maj. William H.	5

*These are in addition to World War II victories.

ACES OF THE VIETNAM WAR

DeBellevue, Capt. Charles D.	
Cunningham, Lt. Randy (USN)	
Driscoll, Lt. William (USN)	
Feinstein, Capt. Jeffrey S.	
Ritchie, Capt. Richard S.	

USAF ACES WITH AIR COMBAT VICTORIES IN WORLD WAR II AND KOREA

(Official credit for air combat victories in Vietnam is not yet available.)

	World War II	Korea	Total
Gabreski, Col. Francis S.	31	6.50	37.50
Meyer, Col. John C.	24	2	26
Mahurin, Col. Walker M.	22	3.50	25.50
Davis, Maj. George A., Jr.	7	14	21
Whisner, Maj. William T., Jr.	15.50	5.50	21
Eagleston, Lt. Col. Glenn T.	18.50	2	20.50
Garrison, Lt. Col. Vermont	7.33	10	17.33
Baker, Col. Royal N.	3.50	13	16.50
Jabara, Maj. James	1.50	15	16.50
Mitchell, Col. John W.	11	4	15
Brueland, Maj. Lowell K.	12.50	2	14.50
Hagerstrom, Maj. James P.	6	8.50	14.50
Hovde, Lt. Col. William J.	10.50	1	11.50
Johnson, Col. James K.	1	10	11
Adams, Maj. Donald E.	4	6.50	10.50
Ruddell, Lt. Col. George I.	2.50	8	10.50
Thyng, Col. Harrison R.	5	5	10
Colman, Capt. Philip E.	5	4	9
Heller, Lt. Col. Edwin L.	5.50	3.50	9
Chandler, Maj. Van E.	5	3	8
Hockery, Maj. John J.	7	1	8
Creighton, Maj. Richard D.	2	5	7
Emmert, Lt. Col. Benjamin H., Jr.	6	1	7
Bettinger, Maj. Stephen L.	1	5	6
Visscher, Maj. Herman W.	5	1	6
Liles, Capt. Brooks J.	1	4	5
Mattson, Capt. Conrad E.	1	4	5

LEADING AIR SERVICE/ AAF/USAF ACES OF ALL WARS

Bong, Maj. Richard T.	40	WW II
McGuire, Maj. Thomas B.	38	WW II
Gabreski, Col. Francis S.	37.50	WW II, Korea
Johnson, Lt. Col. Robert S.	28	WW II
MacDonald, Col. Charles H.	27	WW II
Meyer, Col. John C.	26	WW II, Korea
Rickenbacker, Capt. Edward V.	26	WW I
Preddy, Maj. George E.	25.83	WW II
Mahurin, Lt. Col. Walker M.	25.50	WW II, Korea
Wetmore, Capt. Ray S.	22.59	WW II
Schilling, Col. David C.	22.50	WW II
Johnson, Lt. Col. Gerald R.	22	WW II
Kearby, Col. Neel E.	22	WW II
Robbins, Col. Jay T.	22	WW II
Christensen, Capt. Fred J.	21.50	WW II
Davis, Maj. George A., Jr.	21	WW II, Korea
Voll, Maj. John J.	21	WW II
Whisner, Maj. William T., Jr.	21	WW II, Korea
Eagleston, Lt. Col. Glenn T.	20.50	WW II, Korea
Lynch, Lt. Col. Thomas J.	20	WW II
Westbrook, Lt. Col. Robert B.	20	WW II

The Air Force carries out scientific and technological programs in its own facilities as well as with the help of outside contractors. Here, broken down by area of expertise, AIR FORCE Magazine presents . . .

A GUIDE TO USAF's R&D FACILITIES

The Air Force is the product of a technological breakthrough—the airplane. From its inception, USAF has been the nation's principal user as well as provider of aerospace technology. The Air Force's dependence on technology increases steadily and with it the importance of USAF's role as a catalyst of scientific and technological advance. The Air Force Systems Command (AFSC) and its many, diverse components formulate and manage USAF's scientific and technological activities and programs. On the following pages, AIR FORCE Magazine presents a guide, complete with thumbnail sketches of all key installations, to the AFSC divisions, centers, and laboratories.

Principal R&D Facilities

From AFSC headquarters at Andrews AFB, Md., Gen. George S. Brown, AFSC Commander, directs the operations of the Command's divisions, development and test centers, ranges, and laboratories. AFSC manages and controls approximately 200 installations, valued at more than $2 billion. Following is a descriptive listing of these organizations and facilities, accompanied by a map, showing the location of these installations.

Special AFSC Divisions

Foreign Technology Division (FTD), Wright-Patterson AFB, Ohio.—To prevent possible technological surprise by a potential enemy, the FTD acquires, evaluates, analyzes, and disseminates foreign aerospace technology, in concert with other divisions and centers. Information collected from a wide variety of sources undergoes screening and is processed in unique electronic data handling and laboratory processing equipment. Then, it is analyzed by scientific and technical specialists who prepare reports, studies, and technical findings and assessments of potential hostile, technological, or operational environs with which USAF weapon systems must cope.

Aerospace Medical Division (AMD), Brooks AFB, Tex.—Conducts biomedical and biotechnical research, development, and test programs necessary to explore the capabilities and limitations of man in aerospace operations and enhance his ability to function as an integral part of the Air Force systems and operations. The Division provides clinical medical services and specialized advanced training and education in aerospace medical and paramedical specialties. AMD units include:

Wilford Hall USAF Medical Center, Lackland AFB, Tex.—AMD's primary clinical facility has 1,100 beds and is the largest single-structure hospital in the Department of Defense. Postgraduate training in the form of internships, residencies, and fellowships is provided for medical, dental, administrative, and allied medical specialists.

6570th Aerospace Medical Research Laboratory, Wright-Patterson AFB, Ohio.—Specializes in theoretical and experimental medical research and development in the areas of biodynamics, human engineering, combined aerospace stress effects, and toxic hazards.

USAF School of Aerospace Medicine, Brooks AFB, Tex.—Is concerned with research directed at the selection, care, and retention of pilots and other aircrew members, and specialized Air Force personnel. The School specializes in research into the effects of electromagnetic and ionizing radiation, atmosphere composition, and control and development of medical equipment needed specifically for aerospace operations.

Product Organizations

Space and Missile Systems Organization (SAMSO), Los Angeles AFS, Calif.—Manages DoD space and ballistic missile systems. Its responsibility for space systems development encompasses engineering, test, program management, installation, on-orbit tracking, command and control, and evaluation. SAMSO manages development of space boosters and related aerospace ground equipment for the launch and tracking of a wide variety of DoD and NASA payloads.

The Air Force Satellite Control Facility (AFSCF), headquartered at Los Angeles AFS, conducts on-orbit, real-time tests of more than thirty DoD satellites a day.

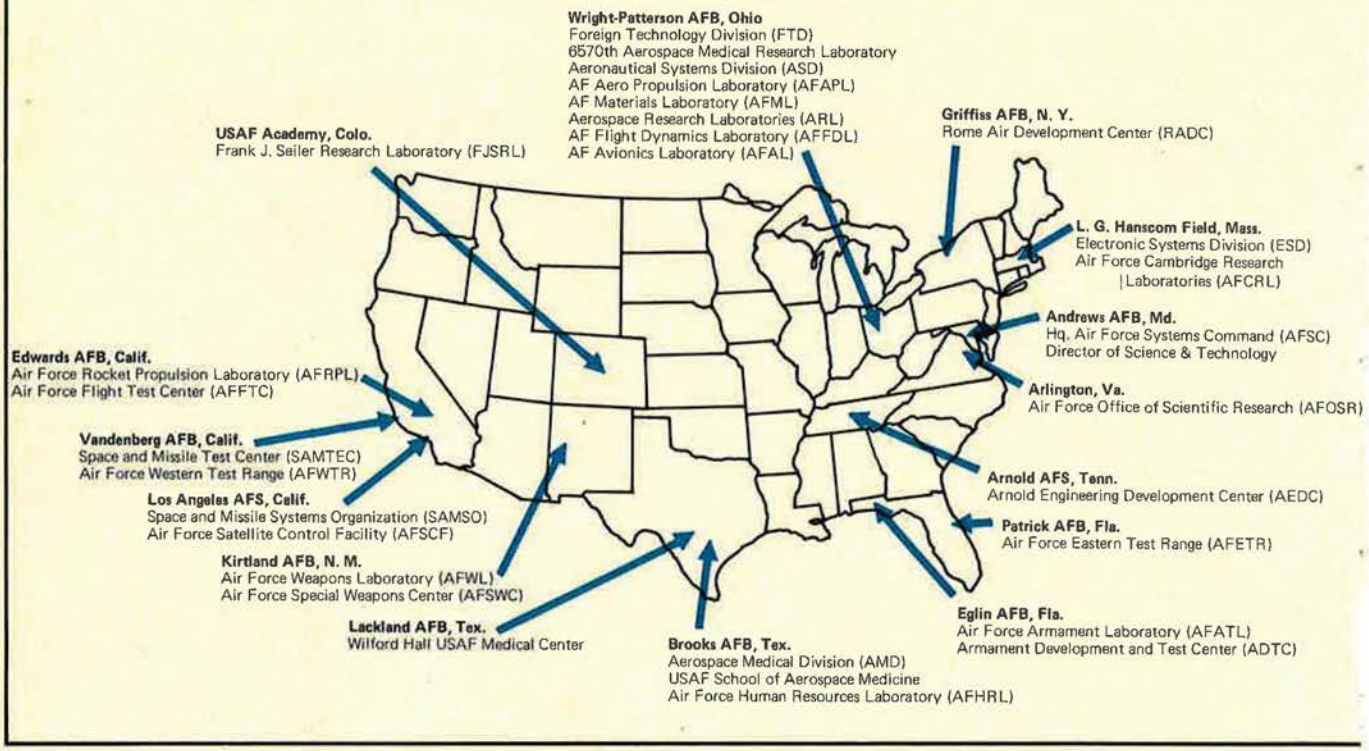
The Space and Missile Test Center (SAMTEC), headquartered at Vandenberg AFB, Calif., provides field test management for all DoD-directed ballistic and space programs. SAMTEC manages satellite launches from Vandenberg and Patrick AFB, Fla., as well as a variety of ICBM ballistic tests. The Test Center also operates the Western Test Range. SAMTEC launches are conducted by the Center's 6595th Aerospace Test Wing, composed of the 6595th Space Test Group and the 6595th Missile Test Group at Vandenberg AFB and the 6555th Aerospace Test Group at Patrick AFB.

Aeronautical Systems Division (ASD), Wright-Patterson AFB, Ohio.—Is responsible for the development and acquisition of aeronautical systems as well as for tactical warfare and reconnaissance systems, subsystems, and related equipment.

Typical of the wide range of systems presently under ASD management are the F-15 air-superiority fighter; the B-1 advanced strategic bomber; the International Fighter, or F-5E; the SRAM, a supersonic air-to-ground missile; and the Maverick, a television-guided, air-to-ground weapon.

Not only does ASD acquire new and advanced systems for the future, but it modernizes aircraft and nonballistic

KEY INSTALLATIONS IN USAF SCIENTIFIC AND TECHNOLOGICAL ACTIVITIES



All major Air Force research and development is carried out by the Air Force Systems Command. This map shows the location of AFSC's principal operations, including all laboratories and research centers.

missiles of the force-in-being. In recent years, ASD has been deeply involved in a tactical warfare modernization program. Old aircraft have been modified and new ones developed for this purpose. Noteworthy are the AC-47 and AC-130 gunships and the A-7D attack aircraft. A new A-10 close-support aircraft is now under development (see p. 41).

Electronic Systems Division (ESD), L. G. Hanscom Field, Mass.—Responsible for developing, acquiring, and delivering electronic systems and equipment for the command, control, and communications functions of aerospace forces.

These systems take many forms, such as undersea communications cables around the Indochina peninsula, line-of-sight and tropospheric scatter communications throughout the Mediterranean, the underground North American Air Defense Command (NORAD) combat operations center, long-range radars to warn of missile and aircraft attack, the air defense control net for the North American continent, equipment for improved weather forecasting, the free world's satellite detection and tracking network, and a new airborne radar-and-communications post which can give the Air Force an instant air defense and tactical control system anywhere in the world at jet speed.

ESD is heavily involved in the application of computers to command and control problems and is the Air Force's center for evaluating contract proposals by computer manufacturers.

Development Centers and Labs

Director of Science & Technology, Andrews AFB, Md.—Located at the Systems Command headquarters, the Director of Science & Technology manages the command's research and development laboratories' programs and developments. Laboratories under the Director of Science & Technology supervision and their respective functional areas are:

Air Force Weapons Laboratory (AFWL), Kirtland AFB, N. M.—Conducts research and development programs in weapon effects and safety, fuzing, civil engineering, laser technology, and nuclear survivability/vulnerability.

Rome Air Development Center (RADC), Griffiss AFB, N. Y.—Conducts research in electromagnetic energy conversion, signal detection and processing, computation and display, command and control, and test and evaluation. RADC furnishes research and development and engineering support of intelligence devices, ground communications hardware, ground environment equipment for surveillance, aircraft approach and landing, ground-based navigation aids, and electronic warfare.

Air Force Rocket Propulsion Laboratory (AFRPL), Edwards AFB, Calif.—AFRPL is responsible for conducting exploratory and advanced development programs in the areas of liquid rockets, solid rockets, hybrid rockets, advanced rocket propellants, and the development of ground support equipment. AFRPL carries out numerous system support programs for other units and divisions of AFSC, other branches of the armed services, and NASA.

Air Force Armament Laboratory (AFATL), Eglin AFB, Fla.—AFATL is the principal Air Force laboratory performing research and de-

velopment of free-fall and guided nonnuclear munitions and airborne targets and scorers. AFATL conducts exploratory and advanced developments of aircraft armaments and performs engineering developments to provide munitions products to operational forces. The wide span of interest includes chemical and fuel-air explosives, energy sources and conversions, electronic and mechanical devices, aerodynamics, terradynamics, etc., as well as the product lines such as bombs, dispensers, fuzes, flares, guns, and ammunition.

Air Force Human Resources Laboratory (AFHRL), Brooks AFB, Tex.—AFHRL has operating locations at Lackland AFB, Tex.; Williams AFB, Ariz.; Lowry AFB, Colo.; Wright-Patterson AFB, Ohio; Maxwell AFB, Ala.; the Air Force Academy; and in Alexandria, Va. AFHRL is the principal Air Force organization planning and executing development programs in the fields of manpower, personnel, training, and education. AFHRL provides technical and management assistance to Hq. USAF, USAF major commands, other US military services, other US governmental agencies, and to military services of allied countries.

Air Force Cambridge Research Laboratories (AFCRL), L. G. Hanscom Field, Mass.—AFCRL is the center for basic and exploratory research in the environmental and physical sciences. In electronics, programs are devoted to data processing and solid-state and microwave physics. Its geophysics programs include optical and radio solar astronomy, meteorology, physics and chemistry of the upper atmosphere, geodesy, and geology.

The Frank J. Seiler Research Laboratory (FJSRL), USAF Academy, Colo.—This in-house laboratory is engaged in basic research concerned with the physical and engineering sciences. The research usually centers around chemistry, applied mathematics, and gas dynamics. FJSRL sponsors related research conducted by the faculty and cadets of the USAF Academy.

Air Force Office of Scientific Research (AFOSR), Arlington, Va.—This unit serves as the liaison with universities and private research organizations. Liaison and research contacts with the scientific community, primarily educational institutions and individual scientists, cover most of the free world.

European Office of Aerospace Research (EOAR), London, England.—This unit is the link between the Air Force and the scientific communities in Europe, Africa, and the Near East.

Five laboratories are at Wright-Patterson AFB, Ohio:

Air Force Aero Propulsion Laboratory (AFAPL) works in the areas of air-breathing, electric and advanced propulsion, fuels and lubricants, and flight vehicle power.

Air Force Materials Laboratory (AFML) handles research in material sciences, metals and ceramics, nonmetallic materials, manufacturing technology, and materials application.

Aerospace Research Laboratories (ARL) conducts primarily in-house research programs in the physical and engineering sciences together with a wide scope of consulting and applications activities related to these programs. Among the program areas are those of mathematics, aerodynamics, general plasma and solid-state physics, chemistry, energy conversion, and metallurgy and ceramics.

Air Force Flight Dynamics Laboratory (AFFDL) is concerned with flight vehicle dynamics, performance, control, launching, alighting and structures, crew station environmental control and escape, and aerodynamic decelerators.

Air Force Avionics Laboratory (AFAL) conducts research and technology programs for electronic components, optics and photo materials, navigation and guidance, vehicle defense, electronic warfare, and communications.

Test and Evaluation Centers

Air Force Flight Test Center (AFFTC), Edwards AFB, Calif.—Responsible for test and evaluation of manned aircraft and aerospace vehicles. Conducts aircraft Category II testing. Provides facilities for Category I contractor tests and the final functional test and military demonstration intended to determine the capability and suitability of a complete system in meeting established USAF requirements and design objectives. The US Air Force Test Pilot School trains experimental test pilots to supervise and conduct flight tests of research, experimental, or production type aerospace vehicles.

Air Force Special Weapons Center (AFSWC), Kirtland AFB, N. M.—The Center is principally responsible for evaluating nuclear systems, airborne missiles, aircraft fire control, inertial guidance, drones, missile reentry vehicles and aids, and advanced weaponry.

AFSWC operates a fleet of high-performance test-bed aircraft for evaluation of weapon systems and subsystems, guidance devices, and sensors over White Sands and other ranges. With a detachment at Indian Springs, Nev., it flies air support for underground nuclear testing, both for

HQ. USAF, AFSC, AND SPO CONTACTS ON MAJOR USAF WEAPON SYSTEMS

PROJECT	HQ. USAF CONTACT OFFICE	TELEPHONE EXTENSION	HQ. AFSC SYSTEM OFFICE	TELEPHONE EXTENSION	DIVISION	PROGRAM/ PROJECT OFFICE	TELEPHONE EXTENSION
A-10	RDPN	(202) 695-4901	SDNS	(301) 981-5106	ASD	SDX	(513) 255-6151
B-1	RDPNB	(202) 695-3231	SDNI	(301) 981-3248	ASD	YH	(513) 255-3281
C-5A	RDPNC	(202) 695-4901	SDNZ	(301) 981-4926	ASD	YA	(513) 255-6305
F-15	RDPNA	(202) 697-4434	SDNJ	(301) 981-5175	ASD	YF	(513) 255-3111
FB-111A and F-111A/C/D/E/F	RDPNA	(202) 697-4434	SDNB	(301) 981-4373	ASD	YB	(513) 255-3474
F-5E (IFA)	RDPNC	(202) 697-5228	SDNS	(301) 981-5106	ASD	SD-5	(513) 255-3356
AGM-65A Maverick	RDPA	(202) 697-2093	SDWA	(301) 981-6411	ASD	SD65	(513) 255-2753
AGM-69A SRAM	RDPA	(202) 695-0765	SDWA	(301) 981-6411	ASD	YG	(513) 255-5811
AWACS	RDPE	(202) 695-2288	SDEY	(301) 981-5055	ESD	YW	(617) 274-4418
DoD AIMS	RDPE	(202) 695-2288	SDEC	(301) 981-7485	ESD	DCT	(617) 274-5425
Minuteman	RDPM	(202) 697-0405	SDSM	(301) 981-3214	SAMSO	MN	(213) 643-6014
Undergraduate Navigation Training System	RDPNC	(202) 695-4901	SDNZ	(301) 981-4926	ASD	SDU	(513) 255-4838
Space Shuttle	RDSA	(202) 697-1727	XRY	(301) 981-3266	SAMSO	XRZ	(213) 643-1480

military and peaceful purposes. At Holloman AFB near Alamogordo, AFSC's 6585th Test Group conducts aerospace fly-before-you-buy test operations.

AFSWC's facilities include a 35,588-foot precision rocket sled track where engineers and scientists evaluate aircraft crew escape capsules, guidance systems, reentry vehicles, fuzing devices, new missile concepts, and missile components in a dynamic environment, at speeds up to 4,000 mph.

The Center's Central Inertial Guidance Test Facility at Holloman evaluates the performance of inertial guidance systems for the Air Force and the other military services prior to procurement. The Radar Target Scatter Site provides radar cross-section signatures to make it easier to track aerospace vehicles, decoys, nose cones, and reentry bodies.

Armament Development and Test Center (ADTC), Eglin AFB, Fla.—The Center manages the Air Force nonnuclear munitions program. ADTC's primary mission is the development, testing, and initial purchase of all nonnuclear munitions. The Center also is responsible for the development and test of all nonnuclear munitions for the Air Force as well as the initial purchase of these munitions for the Air Force's inventory. Among the items developed and tested by ADTC are bombs, mines, dispensers, and fuzes. In addition, the Center conducts research and development testing of aeronautical systems, such as aircraft and their associated missiles and airborne electronic warfare devices.

Arnold Engineering Development Center (AEDC), Arnold AFS, Tenn.—This center is the largest complex of wind tunnels, high-altitude jet and rocket engine test cells, space environmental chambers, and hyperballistic ranges in the free world. The Center's mission is to ensure that aerospace hardware—aircraft, missiles, spacecraft, jet and rocket propulsion systems, and other components—will "work right the first time they fly." Tests are conducted for federal agencies, the Army, Navy, Air Force, and private companies. These customers reimburse AEDC for the costs of conducting their tests. Currently valued at more than $650 million, AEDC began its first tests in the early 1950s. ARO, Inc., is the operating contractor.

Among the Center's thirty-eight test units are some of the largest and most adaptable of their respective types currently available for testing. They subject aerospace systems to objective testing across a broad range of realistic and repeatable conditions—often with engines operating. Full-size hardware or scale models can be tested at Arnold under conditions precisely matching altitudes of up to 1,000 miles and velocities up to twenty-three times the speed of sound. ■

The cooperation between the Air Force and the National Aeronautics and Space Administration is close and involves the sharing of scientific facilities. In the following, AIR FORCE Magazine presents a descriptive . . .

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 which frequently participate in or coordinate their work with USAF R&D programs.

Following is a descriptive listing of key NASA installations:

Ames Research Center, Moffett Field, Calif.—Ames conducts laboratory and flight research such as atmospheric reentry, fundamental physics, materials, chemistry, life sciences, guidance and control, aircraft supersonic flight, aircraft operational problems, and V/STOL. It manages such spaceflight programs as Pioneer.

Flight Research Center, Edwards AFB, Calif.—Flight Research Center is concerned with manned flight within and outside the atmosphere, including low-speed, supersonic, hypersonic, and reentry flight, and aircraft operations. Examples of its studies are lifting bodies (wingless vehicles whose bodies provide lift in the atmosphere) and integration between man and technological systems and vehicles.

Goddard Space Flight Center, Greenbelt, Md.—Goddard Space Flight Center is responsible for a broad variety of unmanned earth-orbiting satellites and sounding-rocket projects. Among its projects are Orbiting Observatories, Explorers, Nimbus, Applications Technology satellites, and Earth Resources Technology satellites. Goddard is also the nerve center for the worldwide tracking and communications network for both manned and unmanned satellites.

Jet Propulsion Laboratory, Pasadena, Calif.—Jet Propulsion Laboratory is operated for NASA by the California Institute of Technology. The laboratory's primary role is investigation of the planets. It also designs and operates the Deep Space Network, which tracks, communicates with, and commands spacecraft on lunar, interplanetary, and planetary missions.

John F. Kennedy Space Center, Fla.—The Center makes preflight tests and prepares and launches manned and unmanned space vehicles for NASA. Launches from the Pacific Coast are conducted by the KSC Western Test Range Operations Division at Lompoc, Calif.

Langley Research Center, Hampton, Va.—Oldest of the NASA Centers, Langley has the task of providing technology for manned and unmanned exploration of space and for improvement and extension of performance, utility, and safety of aircraft. Langley devotes more than half its efforts to aeronautics. The Center is charged with overall project management for Viking.

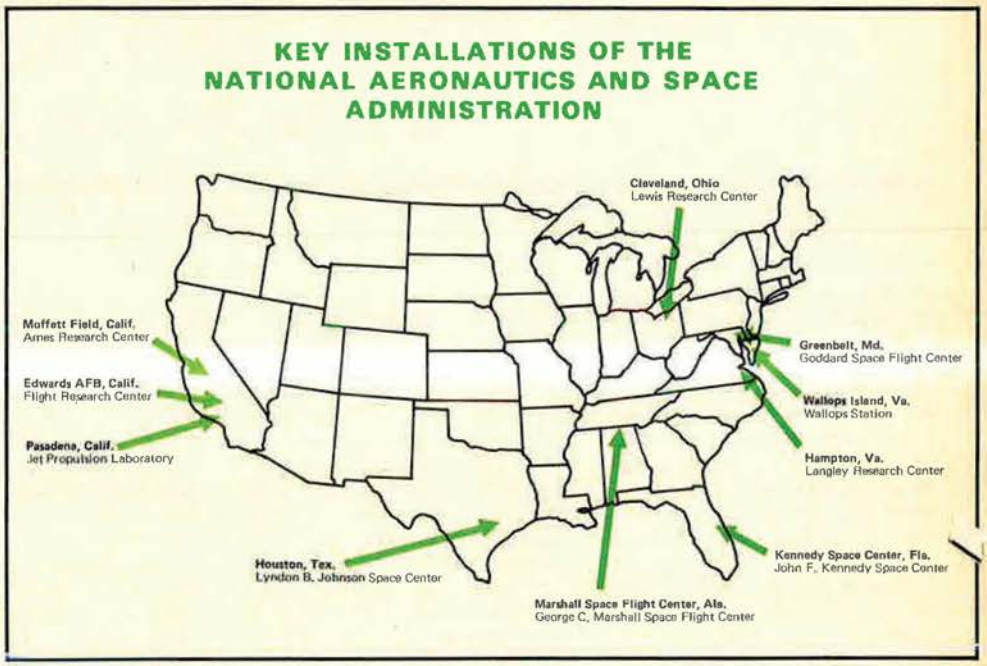
George C. Marshall Space Flight Center, Marshall Space Flight Center, Ala.—Launch vehicles for Apollo and other major missions are designed and developed by George C. Marshall Space Flight Center. The Center is concerned with launch vehicles of the Saturn

class, as well as payloads, related research, and studies of advanced space transportation. The Center is responsible for development of Skylab components.

Wallops Station, Wallops Island, Va.—Wallops Station is one of the oldest and busiest ranges in the world. Some 300 experiments are sent aloft each year on vehicles which vary in size from small meteorological rockets to the four-stage Scout with orbital capability. A sizable effort is devoted to aeronautical research and development.

Lewis Research Center, Cleveland, Ohio—Aircraft and rocket propulsion and electric power generation in space are among the major programs of Lewis. These take it into such studies as metallurgy, fuels and lubricants, magnetohydrodynamics, and ion propulsion. Lewis has technical management of the Agena and Centaur rocket stages.

Lyndon B. Johnson Space Center, Houston, Tex.—The Center designs, tests, and develops manned spacecraft and selects and trains astronauts. It directs the Apollo, Skylab, and Space Shuttle programs. Mission Control for manned spaceflights is located at the Center. ■



The National Aeronautics and Space Administration operates ten research and operational centers, including some that are collocated with Air Force installations. To some extent, all centers are involved in Air Force research activities.

USAF'S BASES AT HOME AND ABROAD

A CONCISE GUIDE

Altus AFB, Okla. 73521; 3 mi. NE of Altus. Phone: (405) 482-8100. AUTOVON: 866-1110. MAC base. 443d Military Airlift Training Wing; transition training for C-141 and C-5 crews. Formerly SAC base; SAC's 2d AF continues tanker operations as tenant. AFCS's 4th Mobile Communications Group has tenant status. Base activated Jan. 1943; inactivated May 1945; reactivated Jan. 1953. Area: 2,487 acres. Altitude: 1,376 ft.

Andrews AFB, Md. 20331; 11 mi. SE of Washington, D. C. Phone: (301) 981-9111. AUTOVON: 858-1110. Headquarters Command base. Hq. Air Force Systems Command; high-priority airlift for HQ COMD; also proficiency flying for HQ COMD, AFRES, ANG, Navy, Marines. Other units: 1st Composite Wing; 89th Military Airlift Special Mission Wing; 6th Weather Wing; 459th Tactical Airlift Wing, AFRES; 113th Tactical Fighter Wing, ANG. Base activated June 1943; named for Lt. Gen. Frank M. Andrews, military air pioneer, killed in an aircraft accident, May 3, 1943. Area: 4,279 acres. Altitude: 279 ft.

Arnold AFS, Tenn. 37389; 12 mi. E of Tullahoma. Phone: (615) 455-2611. AUTOVON: 882-1520. AFSC installation; site of Arnold Engineering Development Center, world's largest complex of wind tunnels, jet and rocket engine test cells, and hyperballistic ranges. Activated Jan. 1, 1950; named for Gen. H. H. "Hap" Arnold, wartime chief of the AAF. Area: 40,121 acres. Altitude: 950 to 1,150 ft.

Barksdale AFB, La. 71110; 4 mi. SE of Bossier City. Phone: (318) 456-2252. AUTOVON: 781-1110. SAC base. Hq. 2d Air Force; 2d Bomb Wing. Base is also site of AFRES special operations group. Base activated Feb. 2, 1933; named for Lt. Eugene H. Barksdale, WW I airman. Area: 22,000 acres (20,000 acres reserved for recreational area). Altitude: 167 ft.

Beale AFB, Calif. 95903; 13 mi. E of Marysville. Phone: (916) 634-3000. AUTOVON: 730-1450. SAC base. 14th Air Division; 9th Strategic Reconnaissance Wing; 456th Bomb Wing. Beale is the only USAF base having SR-71 strategic recce aircraft. Originally US Army's Camp Beale; became AF installation in Nov. 1948; became AFB in Dec. 1951; named for Brig. Gen. E. F. Beale, Indian agent in Calif. prior to Civil War. Area: 22,944 acres. Altitude: 113 ft.

Bellows AFS, Hawaii (APO San Francisco 96333); approximately 12 mi. NE of Honolulu. Phone: (808) 259-9469. PACAF base. It is a closed airfield presently used by the Marine Corps as a tactical maneuver area, by the Army for a Nike missile site, and by the Air Force as a radio-transmitter site. Activated in 1930 as Bellows Field in honor of 2d Lt. Franklin D. Bellows, killed in France during WW I. Became Bellows AFB on March 28, 1948. Area: 1,492 acres. Altitude: 15 ft.

Bergstrom AFB, Tex. 78743; 6 mi. SE of Austin. Phone: (512) 385-4100. AUTOVON: 685-1110. TAC base. Hq. 12th Air Force; 67th Tactical Reconnaissance Wing. Base activated Sept. 22, 1942; named for Capt. John A. E. Bergstrom, first Austin serviceman killed in WW II. Area: 3,147 acres. Altitude: 541 ft.

Blytheville AFB, Ark. 72315; 4 mi. NW of Blytheville. Phone: (501) 763-3931. AUTOVON: 435-1520. SAC base. 97th Bomb Wing. Base activated June 1942; inactivated Feb. 1947; reactivated Aug. 1955. Area: 3,067 acres. Altitude: 254 ft.

Bolling AFB, D. C. 20332; 3 mi. S of the US Capitol. Phone: (202) 574-5110. AUTOVON: 991-1110. Hq. Headquarters Command, USAF. Base activated Oct. 1917; named for Col. Raynal C. Bolling, Ass't Chief of Air Service, killed during WW I. Area: 604 acres. Altitude: 8 ft.

Brooks AFB, Tex. 78235; 7 mi. SE of San Antonio. Phone: (512) 536-1110. AUTOVON: 240-1110. AFSC base. Home of Aerospace Medical Division, USAF School of Aerospace Medicine, and USAF Human Resources Lab. Base activated Dec. 5, 1917; named for Cadet Sidney J. Brooks, Jr., killed Nov. 13, 1917, on his final solo flight before commissioning. Area: 1,352 acres. Altitude: 694 ft.

Cannon AFB, N. M. 88101; 7 mi. WSW of Clovis. Phone: (505) 784-3311. AUTOVON: 681-1110. TAC base. Hq. 832d Air Division; 27th Tactical Fighter Wing. Activated Aug. 1942; named for Gen. John K. Cannon, WW II Commander of all Allied Air Forces in Mediterranean. Area: 11,339 acres. Altitude: 4,295 ft.

Carswell AFB, Tex. 76127; 7 mi. WNW of downtown Fort Worth. Phone: (817) 738-3511. AUTOVON: 739-1110. SAC base. 19th Air Division; 7th Bomb Wing; 301st Tactical Fighter Wing (AFRES). Activated Aug. 1942; named Jan. 30, 1948, for Maj. Horace S. Carswell, Jr., native of Fort Worth; WW II B-24 pilot and posthumous Medal of Honor winner. Area: 2,000 acres. Altitude: 650 ft.

Castle AFB, Calif. 95342; 8 mi. NW of Merced. Phone: (209) 726-2011. AUTOVON: 730-3350. SAC base. 93d Bomb Wing. Conducts training of all SAC B-52 and KC-135 crews. Activated Sept. 1941; named for Brig. Gen. Frederick W. Castle, WW II B-17 pilot and posthumous Medal of Honor winner. Area: 2,700 acres. Altitude: 188 ft.

Chanute AFB, Ill. 61866; 1 mi. S of Rantoul; 14 mi. N of Champaign. Phone: (217) 495-1110. AUTOVON: 862-1110. ATC base. Provides technical training in missile and aircraft maintenance and weather school. Base has museum, Chanute Technical Training Display Center. Base activated May 21, 1917; named for Octave Chanute, aeronautical engineer and glider pioneer. Area: 2,100 acres. Altitude: 737 ft.

Charleston AFB, S. C. 29404; 10 mi. NW of Charleston. Phone: (803) 747-4111. AUTOVON: 630-1420. MAC base. 437th Military Airlift Wing; C-141 and C-5 associate AFRES squadrons. Base activated June 1942; inactivated Feb. 1946; reactivated Aug. 1953. Area: 3,500 acres. Altitude: 45 ft.

Columbus AFB, Miss. 39701; 10 mi. NNW of Columbus. Phone: (601) 434-7322. AUTOVON: 882-3630. ATC base. 14th Flying Training Wing, undergraduate pilot training. Base activated in 1941 for pilot training. Area: 4,606 acres. Altitude: 214 ft.

Craig AFB, Ala. 36701; 5 mi. SE of Selma. Phone: (205) 874-7431. AUTOVON: 436-3350. ATC base. 29th Flying Training Wing, undergraduate pilot training. Base activated Aug. 1940; named for Bruce K. Craig, flight engineer for B manufacturer, killed in 1941 cra Area: 2,064 acres. Altitude: 176 ft.

Davis-Monthan AFB, Ariz. 8570 4 mi. SE of Tucson. Phone: (602 793-3900. AUTOVON: 361-1110. SA base. 12th Strategic Missile Divi sion; 390th Strategic Missile W (Titan II); 100th Strategic Rec naissance Wing; 355th Tacti Fighter Wing. TAC A-7D coml crew training. Also site of AFLC Military Aircraft Storage and Disp sition Center. Base activated i 1927; named in 1928 for two Tuc sonan accident victims—1st Lt. Samuel H. Davis, killed Dec. 28, 1921; and 2d Lt. Oscar Monthan, killed Mar. 27, 1924. Area: 15,000 acres. Altitude: 2,705 ft.

Dobbins AFB, Ga. 30060; 2 mi. S of Marietta, 10 mi. NW of Atlanta. Phone: (404) 428-4461. AUTOVON: 925-1110. AFRES base. Hq. Eastern AFRES Region; 94th Tactical Airlift Wing (AFRES); 116th Military Airlift Wing (ANG). Also site of Naval Air Reserve. Base activated in 19 named for Capt. Charles Dobbi WW II pilot killed in action. Ar 2,095 acres. Altitude: 1,068 ft.

Dover AFB, Del. 19901; 4 mi of Dover. Phone: (302) 734-82 AUTOVON: 455-1110. MAC b 436th Military Airlift Wing; transport units; C-141 AFRES a ciate squadron. Dover is largest freight terminal on East Coast. B activated Dec. 1941; inactiva Sept. 1946; reactivated Feb. 19 Area: 3,600 acres. Altitude: 28

Duluth International Airport, Mi 55814; 4 mi. NW of Duluth. Pho (218) 727-8211. AUTOVON: 8 1510. ADC base. Hq. 23d Air D sion, ADC; ANG fighter-intercep squadron; SAGE region control c ter, NORAD. Activated Mar. 19 Area: 2,191 acres. Altitude: 60

Dyess AFB, Tex. 79607; 2 WSW of Abilene. Phone: (915) 69 0212. AUTOVON: 885-3400. S base. 96th Bomb Wing; 463d Ta cal Airlift Wing. Base activated A 1942; inactivated Dec. 1945; re tivated Sept. 1955; named for Col. William E. Dyess, WW II fig pilot killed in accident Dec. 194 Area: 5,186 acres. Altitude: 1,774

Edwards AFB, Calif. 93523; 2 n

E of Rosamond. Phone: (805) 277-1110. AUTOVON: 350-1110. AFSC base. AF Flight Test Center. Also trains aerospace test pilots, engineers, and project managers. Base houses NASA Flight Research Center, concerned with supersonic and transonic flight research, and is home for Army's Aviation Test Activity. Home of AF Rocket Propulsion Laboratory. Base activated Sept. 1933; named for Capt. Glen W. Edwards, killed June 5, 1948, in crash of a YB-49 "Flying Wing" experimental bomber. Area: 301,000 acres. Altitude: 2,302 ft.

Eglin AFB, Fla. 32542; 2 mi. SW of Valparaiso. Phone: (904) 881-6668. AUTOVON: 872-1110. AFSC base. Air Force Armament Development and Test Center; AF Armament Laboratory; 3246th Test Wing; 39th Aerospace Rescue & Recovery Wing; 33d Tactical Fighter Wing; Tactical Air Warfare Center; USAF Special Operations Force. 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.

Eielson AFB, Alaska (APO Seattle 98737); 26 mi. SE of Fairbanks. Phone: (907) 372-2181. AUTOVON: 317) 377-1292. AAC base. SAC tanker operations; MAC weather recon; air defense and search and rescue for AAC; communications for AFCS; 6th Strategic Wing. Activated Oct. 1944; named for Carl B. Eielson, Arctic aviation pioneer. Area: about 35,000 acres. Altitude: 534 ft.

Ellington AFB, Tex. 77030; 15 mi. SE of Houston. Phone: (713) 481-4000. AUTOVON: 954-2110. AFRES base. Hq. Central AFRES Region; AFRES and ANG training and operations; ARRS detachment; USCG air station; AWS detachment; Lunar Landing Training Vehicle (LLTV) facilities; facilities for NASA's Lyndon B. Johnson Space Center. Base activated Nov. 27, 1917; after several reactivations through the years, transferred to AFRES in 1958; named for Lt. Eric L. Ellington, killed in crash Nov. 24, 1913. Area: 2,200 acres. Altitude: 40 ft.

Ellsworth AFB, S. D. 57706; 11 mi. ENE of Rapid City. Phone: (605) 342-2400. AUTOVON: 823-1500. SAC base. 28th Bomb Wing; 44th Strategic Missile Wing; SAC post attack command and control system squadron. Activated July 1942; named for Brig. Gen. Richard E. Ellsworth, killed Mar. 18, 1953, in crash of B-36. Area: 5,675 acres. Altitude: 3,600 ft.

Elmendorf AFB, Alaska (APO Seattle 98742); 1 mi. NW of Anchorage. Phone: (506) 754-9125 or 754-9121. AUTOVON: (317) 754-9121. AAC base. Hq. Alaskan Command and Hq. Alaskan Air Command; detachment of Alaskan Communications System, a public utility; 1931st Communications Group, AFCS; 21st Composite Wing. Base activated July 1940; named for Capt. Hugh M. Elmendorf, killed in air accident Jan. 13, 1933. Area: 13,400 acres. Altitude: 118 ft.

England AFB, La. 71301; 5 mi. W of Alexandria. Phone: (318) 448-2100. AUTOVON: 683-1110. TAC base. 23d Tactical Fighter Wing; 4410th Special Operations Training Group. Base activated Oct. 1942; named for Lt. Col. John B. England, WW II ace, killed Nov. 17, 1954, in a crash. Area: 2,282 acres. Altitude: 89 ft.

Ent AFB, Colo. 80912; within Colorado Springs. Phone: (303) 635-8911. AUTOVON: 692-0111. ADC base. Though no flying operations (see Peterson Field), Ent is home of three major commands—North American Air Defense Command, Army Air Defense Command, Aerospace Defense Command, and Hq. 14th Aerospace Force (ADC). Ent also supports the Cheyenne Mountain complex where NORAD's Combat Operations Center is located. Base activated Jan. 1951; named for Maj. Gen. Uzal G. Ent, WW II leader, who died Mar. 5, 1948. Area: 36 acres. Altitude: about 6,000 ft.

Fairchild AFB, Wash. 99011; 12 mi. WSW of Spokane. Phone: (509) 247-1212. AUTOVON: 352-1110. SAC base. 47th Air Division; 92d Bomb Wing; 3636th Combat Crew Training Wing. Base activated Jan. 1942; named for Gen. Muir S. Fairchild, USAF Vice Chief of Staff at his death in 1950. Area: 5,450 acres. Altitude: 2,462 ft.

Forbes AFB, Kan. 66620; 6 mi. S of Topeka. Phone: (913) 862-1234. AUTOVON: 720-1110. TAC base. 313th Tactical Airlift Wing; USAF Skill Center operated by ATC and MAC's Aerospace Cartographic & Geodetic Squadron; ANG group. Base activated Aug. 22, 1942; named for Maj. Daniel H. Forbes, Jr., WW II recon pilot, killed June 5, 1948. Area: 6,502 acres. Altitude: 1,064 ft.

Francis E. Warren AFB, Wyo. 82001; adjacent to Cheyenne. Phone: (307) 775-2510. AUTOVON: 481-1110. SAC base. 4th Strategic Missile Division; 90th Strategic Missile Wing. Base activated July 4, 1867; under Army jurisdiction until 1947 when reassigned to USAF. Home of first Atlas-D ICBM missile wing (1960–65); named for Francis Emory Warren, Wyoming senator and early governor. Base has 7,600 acres, plus 200 missile sites distributed over some 8,300 sq. mi. Altitude: 6,000 ft.

George AFB, Calif. 92392; 6 mi. W of Victorville. Phone: (714) 269-1110. AUTOVON: 353-1110. TAC base. 35th Tactical Fighter Wing. Base activated in 1941; named for Brig. Gen. Harold H. George, WW I fighter ace largely responsible for adoption of "Off We Go" as official AF song, killed in Australia in aircraft accident Apr. 29, 1942. Area: 5,000 acres. Altitude: 2,875 ft.

Glasgow AFB, Mont. 59231; 19 mi. NW of Glasgow. Phone: (406) 524-6469. SAC base. Heavy bomber satellite operations; also houses Army Safeguard ABM depot. Base, deactivated in June 1968, was reopened Jan. 1972. Area: 5,595 acres. Altitude: 2,293 ft.

Goodfellow AFB, Tex. 76901; 2 mi. SE of San Angelo. Phone: (915) 653-3231. AUTOVON: 885-3450. USAF Security Service base. 6940th Security Wing; training for USAFSS. Base activated Jan. 1941; named for 2d Lt. John J. Goodfellow, Jr., WW I fighter pilot killed in combat Sept. 17, 1918, in France. Area: 1,127 acres. Altitude: 1,877 ft.

Grand Forks AFB, N. D. 58201; 16 mi. W of Grand Forks. Phone: (701) 594-6011. AUTOVON: 362-1110. SAC base. 319th Bomb Wing; 321st Strategic Missile Wing; also houses ADC fighter-interceptor squadron. Base activated in 1956. Area: 5,400 acres. Altitude: 911 ft.

Griffiss AFB, N. Y. 13440; 1 mi. SE of Rome. Phone: (315) 330-1110. AUTOVON: 587-1110. SAC base. 416th Bomb Wing. Major tenant is Rome Air Development Center (RADC), part of AFSC. Base also houses hq. of AFCS's Northern Communications Area and ADC fighter-interceptor operations. Base activated Feb. 1, 1942; named for Lt. Col. Townsend E. Griffiss, killed in aircraft accident Feb. 15, 1942. Area: 3,468 acres. Altitude: 515 ft.

Grissom AFB, Ind. 46970; 9 mi. S of Peru. Phone: (317) 689-2211. AUTOVON: 928-1110. SAC base. 305th Air Refueling Wing; 434th Special Operations Wing (AFRES). Base activated July 1942; named for Lt. Col. Virgil I. "Gus" Grissom, killed Jan. 27, 1967, with other Astronauts Edward White and Roger Chaffee, in Apollo capsule fire. Area: 2,810 acres. Altitude: 800 ft.

Gunter AFB, Ala. 36114; 4 mi. NE of Montgomery. Phone (205) 279-1110. AUTOVON: 921-1110. AU base. USAF Extension Course Institute; USAF Senior NCO Academy; Hq. Air Force Data Automation Agency and site of AF Data Systems Design Center. Base activated Aug. 27, 1940; named for William A. Gunter, former Mayor of Montgomery who died in 1940. Area: about 2 sq. mi. Altitude: 166 ft.

Hamilton AFB, Calif. 94934; 6 mi. NNE of San Rafael. Phone: (415) 838-1110. AUTOVON: 997-1110. ADC base. Fighter-interceptor operations; also houses Hq. Western AFRES Region, Western Aerospace Rescue and Recovery Center, MAC; 41st Aerospace Rescue and Recovery Squadron, MAC; 452d Tactical Airlift Wing (AFRES); and ADC's NCO Academy. Base activated 1933; named for 1st Lt. Lloyd A. Hamilton, first American in WW I to fly with Royal Flying Corps, killed in action Aug. 24, 1918. Area: 2,322 acres. Altitude: 60 ft.

Hancock Field, N. Y. 13225; 10 mi. NNE of Syracuse. Phone: (315) 458-5500. AUTOVON: 587-9110. ADC base. 21st Air Division, ADC; SAGE region control center, NORAD. Base activated Sept. 1941. Area: 1,125 acres. Altitude: 520 ft.

Hanscom Field (see Laurence G. Hanscom Field).

Hickam AFB, Hawaii (APO San Francisco 96553): 6 mi. W of Honolulu. Phone: (808) 422-0531. PACAF base. Hq. Pacific Air Forces; 15th Air Base Wing, support organization for Air Force units in Hawaii and throughout the Pacific; ANG fighter group (ADC); 41st Air Rescue and Recovery Wing, 1st Weather Wing; 61st Military Airlift Support Wing. Base activated Sept. 1937; named for Lt. Col. Horace M. Hickam, air pioneer killed Nov. 5, 1934. Area: 2,259 acres. Altitude: sea level.

Hill AFB, Utah 84401; 7 mi. S of Ogden. Phone: (801) 777-7221. AUTOVON: 929-1110. AFLC base. Hq. Ogden Air Materiel Area; furnishes logistic support for ICBMs; manager for F-101 and F-4 aircraft; also home of 1550th Aircrew Training Test Wing. Base activated Nov. 1940; named for Maj. Ployer P. Hill, killed Oct. 30, 1935, test-flying the first B-17. Area: 7,000 acres. Altitude 4,788 ft.

Holloman AFB, N. M. 88330; 6 mi. SW of Alamogordo. Phone: (505) 473-6511. AUTOVON: 867-1110. TAC base. 49th Tactical Fighter Wing. AFSC also conducts test and evaluation of airborne missiles, drones, recon systems, and missile reentry vehicles, and operates Central Inertial Guidance Test Facility, AFSC track facility, and Radar Target Scatter site (RATSCAT). Activated 1942; named for Col. George V. Holloman, guided-missile pioneer, killed in crash Mar. 19, 1946. Area: 97,877 acres. Altitude: 4,000 ft.

Homestead AFB, Fla. 33030; 5 mi. NNE of Homestead. Phone: (305) 257-8011. AUTOVON: 791-0111. TAC base. 31st Tactical Fighter Wing; site of ATC sea-survival school; AFRES early warning and control squadron; and aerospace rescue and recovery squadron. Base activated Apr. 1955. Area: 3,607 acres. Altitude: 7 ft.

Hurlburt Field, Fla. 32544 (Eglin AF Auxiliary Field #9); 6 mi. W of Ft. Walton Beach; part of Eglin AFB reservation. Phone: (904) 881-6668. AFSC base, operated by TAC. Home of 1st Special Operations Wing; Special Operations combat crew training; maintains combat-ready Special Operations squadrons. Also site of USAF Air-Ground Operations School and Special Operations School. Base activated in 1943;

named for 1st Lt. Donald W. Hurlburt, WW II bomber pilot killed Oct. 2, 1943, in crash near Hurlburt. Altitude: 35 ft.

Indian Springs AF Auxiliary Field, Nev. 89018; 45 mi. NW of Las Vegas. Phone: (702) 879-6268. TAC base. Provides range support for TAC operations from nearby Nellis AFB; supports the Las Vegas Bombing and Gunnery Range, with more than 3,000,000 acres, the largest reservation in the USAF inventory. Here the Atomic Energy Commission has conducted most of its tests, supported by a detachment of the AF Special Weapons Center. The base was activated in 1942. Altitude: 3,124 ft.

Keesler AFB, Miss. 39534; located in Biloxi. Phone: (601) 377-1110. AUTOVON: 868-1110. ATC base. Keesler Technical Training Center (communications and electronics training and personnel and administrative courses); Keesler USAF Medical Center; also provides pilot training under Military Assistance Program for foreign students. Base activated June 12, 1941; named for 2d Lt. Samuel R. Keesler, Jr., WW I aerial observer, killed in action Oct. 9, 1918. Area: 1,576 acres. Altitude: 26 ft.

Kelly AFB, Tex. 78241; 5 mi. SW of San Antonio. Phone: (512) 925-1110. AUTOVON: 945-1110. AFLC base. Hq. San Antonio Air Materiel Area; Hq. USAF Security Service; AF Communications Security Center; AF Special Communications Center; inland aerial port of embarkation, MAC; USAF Environmental Health Laboratory; 433d Tactical Airlift Wing; training operations, Texas ANG. Base activated May 7, 1917; named for 2d Lt. George E. M. Kelly, first Army pilot to lose his life in a military aircraft, killed May 10, 1911. Area: 3,924 acres. Altitude: 689 ft.

Kincheloe AFB, Mich. 49788; 20 mi. S of Sault Ste. Marie. Phone: (906) 495-5611. AUTOVON: 722-3320. SAC base. 449th Bomb Wing. Base first activated 1941 as Kinross AFB; later renamed for Capt. Iven C. Kincheloe, Jr., jet ace of Korean War and later X-2 test pilot, killed July 26, 1958, in F-104 crash. Area: 3,700 acres. Altitude: 799 ft.

King Salmon Airport, Alaska (APO Seattle 98713); 340 mi. SW of Anchorage. Phone: (907) 721-3550. AAC base. Furnishes air defense and aircraft warning for Alaskan Air Command. Activated in 1950. Area: 1,700 acres. Altitude: 57 ft.

Kingsley Field, Ore. 97601; 5 mi. SE of Klamath Falls. Phone: (503) 882-4411. AUTOVON: 620-1470. ADC base. Fighter-interceptor dispersed operating base. Formerly a naval air station, base was activated by AF in April 1956; named for 2d Lt. David R. Kingsley, WW II B-17 bombardier and Medal of Honor winner, killed in action June 23, 1944. Area: 1,799 acres. Altitude: 4,081 ft.

Kirtland AFB, N. M. 87117; 2 mi. SE of Albuquerque. Phone: (505) 247-1711. AUTOVON: 946-1110. AFSC base. Hq. AF Special Weapons Center and Air Force Weapons Laboratory, AFSC. Furnishes nuclear and civil engineering research, development, and testing for USAF. Base houses N. M. ANG fighter group, AFSC NCO Academy, 58th Weather Recon Squadron, USAF Directorate of Nuclear Safety, AF Contract Management Division. Base activated Jan. 1941; named for Col. Roy S. Kirtland, air pioneer who died in 1941. Area: 2,000 acres. Altitude: 5,352 ft.

K. I. Sawyer AFB, Mich. 49843; 16 mi. S of Marquette. Phone: (906) 346-6511. AUTOVON: 472-1110. SAC base. 410th Bomb Wing; ADC fighter-interceptor squadron. Base activated 1956; named for Kenneth I. Sawyer, who proposed site for a county airport, died in 1944. Area: 3,200 acres. Altitude: 1,220 ft.

Lackland AFB, Tex. 78236; 8 mi. WSW of San Antonio. Phone: (512) 671-1110. AUTOVON: 473-1110. ATC base. Provides basic military training for airmen, precommissioning training for officers; technical training of basic, advanced security police personnel; sentry dog/handler courses; training of instructors, recruiters, and career-motivation counselors; USAF marksmanship training and competitive teams; also site of USAF Epidemiological Lab; USAF Personnel Research Lab (AFSC); Defense Language Institute English Language School, under US Army; Wilford Hall Medical Center. Known as "The Gateway Base" for its role in providing basic training and indoctrination since activation in 1941; named for Brig. Gen. Frank D. Lackland, early commandant of Kelly Field flying school, died in 1943. Area: 6,835 acres, including 4,017 acres at Lackland Training Annex. Altitude: 787 ft.

Langley AFB, Va. 23365; 3 mi. N of Hampton. Phone: (703) 764-9990. AUTOVON: 432-1110. TAC base. Hq. Tactical Air Command; 316th Tactical Airlift Wing; 5th Weather Wing; also houses ADC fighter-interceptor unit and Hq. Tactical Communications Area, AFCS. Base, activated Dec. 30, 1916, is the oldest continuously active Air Force base in the US; named for aviation pioneer and scientist Samuel Pierpont Lang'ley, who died in 1906. Area: 3,195 acres. Altitude: 10 ft.

Laredo AFB, Tex. 78040; 3 mi. NE of Laredo. Phone: (512) 723-1111. AUTOVON: 484-2110. ATC base. 38th Flying Training Wing, undergraduate pilot training in T-41, T-37, and T-38 aircraft. Activated Aug. 1, 1942. Area: 2,095 acres. Altitude: 508 ft.

Laughlin AFB, Tex. 78840; 7 mi. E of Del Rio. Phone: (512) 298-3511. AUTOVON: 721-1110. ATC base. 47th Flying Training Wing, undergraduate pilot training. Base activated Oct. 1942; named for 1st Lt. Jack T. Laughlin, killed in action Jan. 29, 1942. Area: 3,908 acres. Altitude: 1,080 ft.

Laurence G. Hanscom Field, Mass. 01730; 17 mi. NW of Boston. Phone: (617) 861-2001. AUTOVON: 478-1001. AFSC base. Hq. Electronic Systems Div., AFSC; also site of AF Cambridge Research Laboratories, AFSC, providing basic and applied research in electronics and geophysics; AFRES airlift operations. Joint federal-state use of the base began in 1946; named for Laurence G. Hanscom, pre-WW II advocate of private flying, killed in 1941 in a lightplane accident. Area: 1,623 acres. Altitude: 133 ft.

Little Rock AFB, Ark. 72076; 12 mi. NE of Little Rock. Phone: (501) 988-3131. AUTOVON: 731-1110. TAC base. 834th Air Division; 314th Tactical Airlift Wing; 308th Strategic Missile Wing; combat crew training also serves as SAC Titan ICBM support base; used as a SAC satellite base; home of Arkansas ANG tactical recon group. Base activated in 1941. Area: 6,000 acres. Altitude: 310 ft.

Lockbourne AFB, Ohio 43217; 1 mi. SSE of Columbus. Phone: (614) 492-8211. AUTOVON: 950-1110

SAC base. 301st Air Refueling Wing; 121st Tactical Fighter Wing (ANG); 302d Tactical Airlift Wing (AFRES). Base activated Apr. 1942. Area: 1,500 acres. Altitude: 744 ft.

Loring AFB, Me. 04750; 4 mi. NW of Limestone. Phone: (207) 999-1110. AUTOVON: 920-1011. SAC base. 42d Bomb Wing. Base activated Feb. 25, 1953; named for (SAMSO); manages the development, production, test, and delivery of most of DoD's space and ballistic systems; has 28 other tenant units. Base activated Dec. 14, 1960.

Lowry AFB, Colo. 80230; 1 mi. SE of Denver. Phone: (303) 388-5411. AUTOVON: 926-1110. ATC base. Technical training center. Base activated Feb. 26, 1938; named for Air Division, ADC. Because of its 2,500,000-acre Gila Bend gunnery range, Luke is the largest fighter training base in the free world. Programs include training USAF pilots in F-4 and F-100; training West German students in F-104G; and MAP training in F-5 (at nearby Williams AFB). Base activated in 1941; named for 2d Lt. Frank Luke, 1st Tactical Training Wing for replacement training in F-4 Phantoms and B-57 Canberras. Base activated May 24, 1940; named for Col. Leslie MacDill, killed in airplane accident Nov. 8, 1938. Area: 6,000 acres. Altitude: 6 ft.

Malmstrom AFB, Mont. 59402; 4 mi. E of Great Falls. Phone: (406) 731-9990. AUTOVON: 728-1500.

ctive Air Force Installations in the US

laj. Charles J. Loring, Jr., WW II iot killed Nov. 22, 1952, in North orea; posthumously awarded the edal of Honor. Area: more than 2,000 acres. Altitude: 746 ft.

Los Angeles AFS, Calif. 90045; 12 i. SW of Los Angeles. Phone: (213) 43-1000. AUTOVON: 833-1110. AFSC upport base. Hq. AFSC's Space nd Missile Systems Organization

1st Lt. Francis B. Lowry, killed in action Sept. 26, 1918. Area: 2,001 acres. Altitude: 5,400 ft.

Luke AFB, Ariz. 85301; 20 mi. WNW of Phoenix. Phone: (602) 935-7411. AUTOVON: 853-1110. TAC base. 58th Tactical Fighter Training Wing, F-4 tactical fighter crew training; houses SAGE region control center, NORAD, and Hq. 26th

Jr., America's No. 2 ace in WW I, winner of Medal of Honor, killed in action Sept. 29, 1918. Area: 4,008 acres plus 2,500,000-acre range. Altitude: 1,101 ft.

MacDill AFB, Fla. 33608; adjacent SSW of Tampa. Phone: (813) 830-1110. AUTOVON: 968-1110. TAC base. Hq. US Readiness Command;

SAC base. 341st Strategic Missile Wing; also Hq. 24th Air Division, ADC; SAGE region control center, NORAD; EB-Defense Systems Evaluations Squadron. Base activated Dec. 15, 1942; named for Col. Einar A. Malmstrom, WW II fighter commander killed in T-33 accident Aug. 21, 1954. Site of SAC's first Minuteman wing, 1961. Area: 3,573 acres,

plus about 23,000 sq. mi. in missile complex. Altitude: 3,525 ft.

March AFB, Calif. 92508; 9 mi. SE of Riverside. Phone: (714) 655-1110. AUTOVON: 283-1110. SAC base. Hq. 15th AF; 22d Bomb Wing. Base activated Mar. 15, 1918; named for 2d Lt. Peyton C. March, Jr., who died in US of crash injuries Feb. 18, 1918. Area: 8,840 acres. Altitude: 1,530 ft.

Mather AFB, Calif. 95655; 12 mi. ENE of Sacramento. Phone: (916) 364-1110. AUTOVON: 828-1110. ATC base. 322d Flying Training Wing; USAF's only training installation for navigators, navigator-bombardiers, and electronic-warfare officers; also houses SAC 320th Bomb Wing. Base activated Feb. 1918; named for 2d Lt. Carl S. Mather, killed in US Jan. 30, 1918, in midair collision. Area: 6,500 acres. Altitude: 96 ft.

Maxwell AFB, Ala. 36112; 1 mi. WNW of Montgomery. Phone: (205) 293-1110. AUTOVON: 875-1110. AU base. Hq. Air University, professional education center for USAF; site of Air War College, Air Command and Staff College, Squadron Officer School, Academic Instructor and Allied Officer School, AU Institute for Professional Development; Hq. AFROTC; Hq. Civil Air Patrol-USAF. Base activated 1918; named for 2d Lt. William C. Maxwell, killed in air accident Aug. 12, 1920, Luzon, P. I. Area: 2,423 acres. Altitude: 166 ft.

McChord AFB, Wash. 98438; 1 mi. S of Tacoma. Phone: (206) 984-1910. AUTOVON: 976-1110. MAC base. 62d Military Airlift Wing; Hq. 25th Air Division, ADC; fighter-interceptor squadron, ADC; SAGE region control center, NORAD; AFRES military airlift group. Base activated June 7, 1940; named for Col. William C. McChord, killed in crash Aug. 18, 1937. Area: 4,500 acres. Altitude: 550 ft.

McClellan AFB, Calif. 95652; 7 mi. NE of Sacramento. Phone: (916) 643-2111. AUTOVON: 633-1110. AFLC base. Hq. Sacramento Air Materiel Area; management, maintenance, and supply support of such AF weapon systems as F-111, A-10, F-100, F-104, F-105, and various communications systems; houses military airlift group, AFRES; USAF Environmental Health Laboratory; 552d Airborne Early Warning and Control Wing, 9th Weather Reconnaissance Wing. Base activated July 1936; named for Maj. Hezekiah McClellan, pioneer in Arctic aeronautical experiments, killed in crash May 25, 1936. Area: 2,583 acres. Altitude: 76 ft.

McConnell AFB, Kan. 67221; 5 mi. SE of Wichita. Phone: (316) 685-1151. AUTOVON: 962-1000. SAC base. 381st Strategic Missile Wing; 384th Air Refueling Wing; also home of one TAC F-105 squadron, 184th Tac Fighter Group, Kansas ANG. Base activated June 5, 1951; named for Capt. Fred J. McConnell, a WW II bomber pilot who died in crash of a private plane, Oct. 25, 1945; and for his brother, 2d Lt. Thomas L. McConnell, also a WW II bomber pilot, killed July 10, 1943, during attack on Bougainville. Area: 34,500 acres. Altitude: 1,371 ft.

McCoy AFB, Fla. 32812; 8 mi. SSE of Orlando. Phone: (305) 855-3210. AUTOVON: 341-1110. SAC base. 42d Air Division (SAC); 306th Bomb Wing; also houses airborne early warning and control detachment, ADC. Base activated Apr. 1943; named for Col. Michael N. W. McCoy, project officer for "Lucky Lady I," first nonstop round-the-world flight, killed in US Oct. 9, 1957, when his B-47 jet exploded. Area: 4,214 acres. Altitude: 127 ft.

McGuire AFB, N. J. 08641; 18 mi. SE of Trenton. Phone: (609) 724-2100. AUTOVON: 440-0111. MAC base. Hq. 21st AF; 438th Military Airlift Wing; C-141 associate AFRES squadrons; 514th Military Airlift Wing (AFRES); 108th Tactical Fighter Wing (ANG); Hq. N. J. ANG. Base adjoins Army's Ft. Dix; reactivated 1949; named for Maj. Thomas B. McGuire, Jr., second leading US ace of WW II, holder of Medal of Honor, killed in action Jan. 7, 1945. Area: 5,000 acres. Altitude: 133 ft.

Minot AFB, N. D. 58701; 13 mi. N of Minot. Phone: (701) 727-4761. AUTOVON: 783-1110. SAC base. 5th Bomb Wing; 91st Strategic Missile Wing; also houses fighter-interceptor unit, ADC. Base activated Aug. 1959. Area: 5,151 acres plus 19,058 additional for missile sites. Altitude: 1,668 ft.

Moody AFB, Ga. 31601; 10 mi. NNE of Valdosta. Phone: (912) 333-4211. AUTOVON: 460-1110. ATC base. 3550th Pilot Training Wing; undergraduate pilot training for USAF, ANG, USMC, and allied nations. Moody has adjoining FAA radar approach facility. Base activated June 1941; named for Maj. George P. Moody, killed May 5, 1941, while testing Beech AT-10. Area: 5,000 acres. Altitude: 233 ft.

Mountain Home AFB, Idaho 83648; 10 mi. SW of Mountain Home. Phone: (208) 828-2111. AUTOVON: 857-1110. TAC base. 366th Tactical Fighter Wing (F-111s). Base activated Apr. 1942. Area: 6,639 acres. Altitude: 3,000 ft.

Murphy Dome AFS, Alaska (APO Seattle 98750); 20 mi. NW of Fairbanks. Phone: (907) 744-1202. AAC base. Air defense activities. Base activated Dec. 1950; named for veteran hard-rock miner John Murphy, who lived and worked in the area before the site was built. Area: 60 acres around immediate site but includes a total of 1,360 acres. Altitude: 2,990 ft.

Myrtle Beach AFB, S. C. 29577; 1 mi SW of Myrtle Beach. Phone: (803) 448-8311. AUTOVON: 748-1110. TAC base. 354th Tactical Fighter Wing. Site of first operational A-7Ds. Fighter-recon training in T/AT-33 aircraft. Base activated Mar. 1941. Area: 3,800 acres. Altitude: 25 ft.

Nellis AFB, Nev. 89110; 8 mi. NE of Las Vegas. Phone: (702) 643-1800. AUTOVON: 682-1800. TAC base. 57th Fighter Weapons Wing; 474th Tactical Fighter Wing; tactical fighter training, including F-111 combat crew training; site of USAF Tactical Fighter Weapons Center for test and evaluation of air tactics and AF equipment; home of the USAF Thunderbirds aerobatic team. Base first activated July 1941; named for 1st Lt. William H. Nellis, WW II fighter pilot, killed Dec. 27, 1944, in Europe. Area: 3,000,000 acres (see Indian Springs). Altitude: 1,868 ft.

Niagara Falls International Airport, N. Y. 14306; 6 mi. E of Niagara Falls. Phone: (716) 297-4100. AUTOVON: 822-1470. AFRES base. Houses F-100 group, N. Y. ANG, and AFRES tactical airlift group. Base activated Nov. 1942. Area: 979 acres. Altitude: 590 ft.

Norton AFB, Calif. 92409; 59 mi. E of Los Angeles, within corporate limits of city of San Bernardino. Phone: (714) 352-1110. AUTOVON: 876-1110. MAC base. 63d Military Airlift Wing; Hq. Air Force Inspection and Safety Center; Hq. Air Force Audit Agency; also houses C-141 AFRES associate unit; Aerospace Audio-Visual Service, MAC. Base activated Mar. 2, 1942; named for Capt. Leland F. Norton, WW II attack-bomber pilot, killed May 27, 1944, in Europe. Area: 1,981 acres. Altitude: 1,156 ft.

Offutt AFB, Neb. 68113; 8 mi. S of Omaha. Phone: (402) 291-2100. AUTOVON: 271-1110. SAC base. Hq. Strategic Air Command; 55th Strategic Reconnaissance Wing; 544th Aerospace Reconnaissance Technical Wing; AF Global Weather Center; 3d Weather Wing. Base activated 1888 as the Army's Ft. Crook; landing field named in 1924 for 1st Lt. Jarvis J. Offutt, WW I pilot who died Aug. 13, 1918, from injuries received from enemy fire over France; entire installation renamed Offutt in 1946. Area: 1,907 acres. Altitude: 1,049 ft.

Otis AFB, Mass. 02542; on Cape Cod, 7 mi. NNE of Falmouth. Phone: (617) 968-1000. AUTOVON: 881-3330. ANG base. Hq. Mass. ANG; 102d Fighter Interceptor Wing (ANG). Base activated in 1938 as Army's Camp Edwards; turned over to USAF in 1948; renamed in 1949 for 1st Lt. Frank J. Otis, member of Massachusetts ANG, killed Jan. 11, 1937, in crash. Area: 22,000 acres. Altitude: 132 ft.

Patrick AFB, Fla. 32925; 1 mi. S of Cocoa Beach. Phone: (305) 494-1110. AUTOVON: 854-1110. AFSC base. Maintains and operates the AF Eastern Test Range in support of DoD, NASA, and other agency missile and space programs. Activated in 1940, base is airhead for Cape Kennedy AFS, open for drive-through tours on Sundays from 9:00 a.m. to 3:00 p.m., with stopping point at Air Force Space Museum. Named for Maj. Gen. Mason M. Patrick, Chief of AEF's Air Service in WW I and Chief of the Air Service, 1921–27. Area: 2,332 acres. Altitude: 9 ft.

Pease AFB, N. H. 03801; 3 mi. W of Portsmouth. Phone: (603) 436-0100. AUTOVON: 852-1110. SAC base. 45th Air Division; 509th Bomb Wing; also houses air rescue and recovery unit, MAC; tactical airlift group, ANG. Base activated 1956; named for Capt. Harl Pease, Jr., WW II B-17 pilot and Medal of Honor winner killed Aug. 7, 1942, during attack on Rabaul, New Britain Island. Area: 4,373 acres. Altitude: 101 ft.

Peterson Field, Colo. 80914; 6 mi. E of Colorado Springs. Phone: (303) 591-7321. ADC base. Supports NORAD, Hq. ADC, and Air Force Academy administrative flying activities; USAFA T-41 pilot indoctrination; activated 1942; named for 1st Lt. Edward J. Peterson, killed in aircraft accident, 1942. Area: 995 acres. Altitude: 6,172 ft.

Plattsburgh AFB, N. Y. 12903; mi. SW of Plattsburgh. Phone: (518 563-4500. AUTOVON: 893-1450. SAC base. 380th Bomb Wing; FB-111 combat crew training. Established a military installation in 1812; activated as AFB July 15, 1955. Area 3,100 acres. Altitude: 255 ft.

Pope AFB, N. C. 28308; 11 m NNW of Fayetteville. Phone: (91 394-0001. AUTOVON: 486-1110. TA base. Home of 839th Air Divisio and 317th Tactical Airlift Wing. Bas adjoins Army's Ft. Bragg; activate Sept. 1918; named for 1st Lt. Hayley H. Pope, WW I flyer killed Jan 7, 1919, in a crash near Fayetteville. Area: 2,000 acres. Altitud 218 ft.

Randolph AFB, Tex. 78148; 13 m ENE of San Antonio. Phone: (512 652-1110. AUTOVON: 487-111 ATC base. Hq. Air Training Command; 12th Flying Training Wing Instrument Flight Center; T-37 and T-38 pilot instructor training; sit **of Air Force Military Personnel Cen ter; Hq. USAF Recruiting Service and Community College of the Air Force. Base activated Oct. 193** named for Capt. William M. Ran dolph, killed Feb. 17, 1928, in a crash. Area: 2,618 acres. Altitude 761 ft.

Reese AFB, Tex. 79401; 6 mi. W of Lubbock. Phone: (806) 885-451 AUTOVON: 838-1110. ATC base. 64 Flying Training Wing, undergradua pilot training. Base activated i 1942; named for 1st Lt. Augustus F Reese, Jr., fighter pilot killed i Sardinia May 14, 1943. Area: 3,59

acres. Altitude of the base: 3,338 ft.

Richards-Gebaur AFB, Mo. 64030; within city limits of Kansas City. Phone: (816) 348-2000. AUTOVON: 960-1110. AFCS base. Hq. Air Force Communications Service; also houses 442d AFRES Tactical Airlift Wing, ARRS, ADC units, and AFCS NCO Academy. Base activated Mar. 1944; named for 1st Lt. John F. Richards and Lt. Col. Arthur W. Gebaur, Jr. Richards was killed Sept. 29, 1918, while on artillery-spotting mission. Gebaur was killed Aug. 29, 1952, over North Korea. Area: 2,000 acres. Altitude: 1,090 ft.

Robins AFB, Ga. 31093; at Warner Robins, 18 mi. SSE of Macon. Phone: (912) 926-1110. AUTOVON: 468-1001. AFLC base. Hq. Warner Robins Air Materiel Area; Hq. AFRES; also site of 19th Bomb Wing, 5th Mobile Communications Group, AFCS. Base activated Sept. 1941; named for Brig. Gen. Augustine Warner Robins, an early Chief of the Materiel Division of the Air Corps, died June 16, 1940. Area: 7,246 acres. Altitude: 295 ft.

Scott AFB, Ill. 62225; 6 mi. ENE of Belleville. Phone: (618) 256-1110. AUTOVON: 638-1110. MAC base. Hq. Military Airlift Command; hq. of two of MAC's services—Aerospace Rescue and Recovery Service, and Air Weather Service; 375th Aeromedical Airlift Wing; AFRES aeromedical associate airlift group. Base activated June 14, 1917; named for Cpl. Frank S. Scott, first enlisted man to die in an air accident, killed Sept. 28, 1912. Area: 2,310 acres. Altitude: 453 ft.

Selfridge AFB, Mich. 48045; 3 mi. NE of Mount Clemens. Phone: (313) 465-1241. AUTOVON: 892-1790. ANG base. 127th Tactical Fighter Wing (ANG): 403d Tactical Airlift Wing (AFRES); also houses Navy Reserve training and US Coast Guard Air Station for Detroit. Base activated July 1917; named for 1st Lt. Thomas E. Selfridge, first Army officer to fly in an airplane and first military fatality of powered flight; killed Sept. 17, 1908, at Ft. Myer, Va., when plane piloted by Orville Wright crashed. Area: 3,660 acres. Altitude: 583 ft.

Seymour Johnson AFB, N. C. 27530; 2 mi. SSE of Goldsboro. Phone: (919) 736-0000. AUTOVON: 583-1110. TAC base. Hq. 19th AF; 4th

USAF'S MAJOR INSTALLATIONS OVERSEAS

Albrook AFB, Canal Zone
APO New York 09825
Hq. USAF Southern Command

Andersen AFB, Guam
APO San Francisco 96334
Hq. 8th Air Force, SAC

Ankara AS, Turkey
APO New York 09254
TUSLOG detachment, USAFE

Athenai Airport, Greece
APO New York 09223
Support base, USAFE

Aviano AB, Italy
APO New York 09293
Tactical group, USAFE

Bitburg AB, West Germany
APO New York 09132
Tactical fighter base, USAFE

Camp New Amsterdam, The Netherlands
APO New York 09292
Fighter-interceptor base, USAFE

Ching Chuan Kang AB, Taiwan
APO San Francisco 96319
Tactical airlift base, PACAF

Clark AB, Philippines
APO San Francisco 96274
Hq. 13th Air Force, PACAF

Cording AS, West Germany
APO New York 09060
Fighter-interceptor base, USAFE

Frankfurt, West Germany
APO New York 09101
Support base, USAFSS

Fuchu AS, Japan
APO San Francisco 96525
Hq. 5th Air Force, PACAF

Goose AB, Labrador, Canada
APO New York 09677
Strategic bomber base, SAC

Hahn AB, West Germany
APO New York 09109
Tactical fighter base, USAFE

High Wycombe AS, United Kingdom
APO New York 09241
Support base, USAFE

Howard AFB, Canal Zone
APO New York 09817
Support base, USAF Southern Command

Incirlik AB, Turkey
APO New York 09289
Tactical fighter base, USAFE

Iraklion AS, Crete
APO New York 09291
Support base, USAFSS

Izmir, Turkey
APO New York 09224
Support base, USAFE

Johnston Island AB, Central Pacific
APO San Francisco 96305
Support base, PACAF

Kadena AB, Okinawa
APO San Francisco 96239
Air division base, PACAF
Strategic operations, SAC

Keflavik Airport, Iceland
FPO (US Navy), New York 09571
Fighter-interceptor base, ADC

Korat AB, Thailand
APO San Francisco 96288
Tactical fighter base, PACAF

Kunsan AB, South Korea
APO San Francisco 96264
Tactical fighter base, PACAF

Kwangju AB, South Korea
APO San Francisco 96324
Combat support base, PACAF

Lajes Field, Azores
APO New York 09406
Airlift base, MAC

Lindsey AS, West Germany
APO New York 09633
Hq. European Communications Area, AFCS
Support base, USAFE

Misawa AB, Japan
APO San Francisco 96519
Support base, USAFSS

Moron AB, Spain
APO New York 09282
Support base, USAFE

Nakhon Phanom RTAB, Thailand
APO San Francisco 96310
US Support Activities Group, PACAF
Special operations base, PACAF

Osan AB, South Korea
APO San Francisco 96570
Air division base, PACAF
Tactical fighter base, PACAF

RAF Alconbury, United Kingdom
APO New York 09238
Tactical reconnaissance base, USAFE

RAF Bentwaters, United Kingdom
APO New York 09755
Tactical fighter base, USAFE

RAF Chicksands, United Kingdom
APO New York 09193
Support base, USAFSS

RAF Lakenheath, United Kingdom
APO New York 09179
Tactical fighter base, USAFE

RAF Mildenhall, United Kingdom
APO New York 09127
Hq. 3d Air Force, USAFE
Tactical airlift base, USAFE

RAF Sculthorpe, United Kingdom
APO New York 09048
Support base, USAFE

RAF Upper Heyford, United Kingdom
APO New York 09194
Tactical fighter base, USAFE

RAF West Ruislip, United Kingdom
APO New York 09218
Support base, USAFE

RAF Wethersfield, United Kingdom
APO New York 09120
Support base, USAFE

RAF Woodbridge, United Kingdom
APO New York 09405
Tactical fighter base, USAFE

Ramey AFB, Puerto Rico
APO New York 09845
Support base, MAC

Ramstein AB, West Germany
APO New York 09012
Hq. USAFE
Tactical reconnaissance base, USAFE

Rhein-Main AB, West Germany
APO New York 09057
Tactical airlift base, USAFE

San Vito dei Normanni AS, Italy
APO New York 09240
Support base, USAFSS

Sembach AB, West Germany
APO New York 09130
Hq. 17th Air Force, USAFE
Support base, USAFE

Shu-Lin-Kou AS, Taiwan
APO San Francisco 96360
Support base, USAFSS

Sondrestrom AB, Greenland
APO New York 09121
Support base, ADC

Spangdahlem AB, West Germany
APO New York 09123
Tactical fighter base, USAFE

Tachikawa AB, Japan
APO San Francisco 96323
Support base, PACAF

Taegu AB, South Korea
APO San Francisco 96213
Combat support base, PACAF

Tainan AS, Taiwan
APO San Francisco 96340
Support base, PACAF

Taipei AS, Taiwan
APO San Francisco 96280
Air division base, PACAF

Tempelhof Airport, Berlin, Germany
APO New York 09611
Support base, USAFE

Thule AB, Greenland
APO New York 09023
Aerospace defense base, ADC

Torrejon AB, Spain
APO New York 09283
Hq. 16th Air Force, USAFE
Tactical fighter base, USAFE

Ubon Airfield, Thailand
APO San Francisco 96304
Tactical fighter base, PACAF

Udorn Airfield, Thailand
APO San Francisco 96237
Tactical fighter/reconnaissance base, PACAF

U-Tapao Airfield, Thailand
APO San Francisco 96330
Strategic bomber base, SAC
Combat support base, PACAF

Wiesbaden AB, West Germany
APO New York 09332
Support base, USAFE
Weather base, MAC

Yokota AB, Japan
APO San Francisco 96328
Support base, PACAF

Yongsan AB, South Korea
APO San Francisco 96301
Hq. United Nations Command/US Forces, Korea/US 8th Army

Zaragoza AB, Spain
APO New York 09286
Tactical fighter training base, USAFE

Zweibrucken AB, West Germany
APO New York 09860
Tactical fighter/reconnaissance base, USAFE

Tactical Fighter Wing; 68th Bomb Wing. Base first activated June 12, 1942; named for Navy Lt. Seymour A. Johnson, killed in 1942. Area: 4,124 acres. Altitude: 109 ft.

Shaw AFB, S. C. 29152; 7 mi. WNW of Sumter. Phone: (803) 668-8110. AUTOVON: 965-1110. TAC base. Hq. 9th AF, TAC; RF-4C and EB-66 recon crew training; 363d Tac Recon Wing. Base activated Aug. 30, 1941; named for 2d Lt. Ervin D. Shaw, one of first Americans to see air action in WW I; killed in action July 9, 1918. Area: 3,022 acres and supports another 10,339 acres. Altitude: 252 ft.

Shemya AFS, Alaska (APO Seattle 98736); located at western tip of the Aleutian chain, midway between Anchorage, Alaska, and Tokyo, Japan. Phone: 572-3400. AAC base. Activated in 1943, Shemya was used as a bomber base in WW II. The International Date Line has conveniently been "bent" around Shemya so that local date is the same as elsewhere in the US. Area: about 4½ mi. long by 2½ mi. wide. Altitude: 270 ft.

Sheppard AFB, Tex. 76311; 3 mi. N of Wichita Falls. Phone: (817) 851-2511. AUTOVON: 736-1001. ATC base. Sheppard Technical Training Center; 80th Flying Training Wing; furnishes undergraduate pilot training for the German Air Force. Base activated June 14, 1941; named for Morris E. Sheppard, US Senator from Texas, died in 1941. Area: 4,182 acres. Altitude: 1,015 ft.

Tinker AFB, Okla. 73145; 8 mi. SE of Oklahoma City. Phone: (405) 732-7321. AUTOVON: 735-1110. AFLC base. Hq. Oklahoma City Air Materiel Area; furnishes logistic support for bombers, jet engines, instruments, and electronics; houses hq. of AFCS's Southern Communications Area, 3d Mobile Communications Group, AFCS, and AFRES tactical fighter group. Base activated May 1941; named for Maj. Gen. Clarence L. Tinker. On June 7, 1942, at the end of the Battle of Midway, General Tinker's B-24 Liberator crashed on the way back to Hawaii. Area: 4,100 acres. Altitude: 1,291 ft.

Travis AFB, Calif. 94535; at Fairfield, 50 mi. NE of San Francisco. Phone: (707) 438-4011. AUTOVON: 837-1110. MAC base. Hq. 22d AF; 60th Military Airlift Wing; 349th Military Airlift Wing (AFRES); also houses SAC tanker operations; David Grant Medical Center. Base activated May 25, 1943; named for Brig. Gen. Robert F. Travis, killed Aug. 5, 1950, in a B-29 accident. Area: 6,000 acres. Altitude: 62 ft.

Truax Field, Wis. 53707; 2 mi. E of Madison. Phone: (608) 249-0461. AUTOVON: 884-1590. ANG base. ANG air defense wing; named for 1st Lt. Thomas L. Truax, killed in a crash on Nov. 2, 1941. Altitude: 868 ft.

Tyndall AFB, Fla. 32401; 7 mi. SE of Panama City. Phone: (905) 283-1113. AUTOVON: 970-1110. ADC base. Air Defense Weapons Center; conducts combat crew training for F-106 pilots; AF Civil Engineering Center. Base activated Dec. 7, 1941; named for 1st Lt. Frank B. Tyndall, WW I fighter pilot, killed in crash July 15, 1930. Area: 28,000 acres. Altitude: 18 ft.

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 first activated Nov. 1941; named for Lt. Col. Leon R. Vance, Jr., Medal of Honor winner, killed July 26, 1944, when air-evac plane returning him to the United States went down in the Atlantic Ocean, near Iceland. Area: 1,603 acres. Altitude: 1,307 ft.

Vandenberg AFB, Calif. 93437; 8 mi. NNW of Lompoc. Phone: (805) 866-1611. AUTOVON: 276-1110. SAC base. Site of 1st Strategic Aerospace Division; provides launch facilities and support for operational ICBM tests and unmanned polar-orbiting space operations of USAF, NASA contractors, et al.; Space and Missile Test Center, AFSC; 6595th Aerospace Test Wing. Originally Army's Camp Cooke; activated Oct. 1941, base was taken over by USAF June 7, 1957; renamed for Gen. Hoyt S. Vandenberg, USAF's second Chief of Staff, died Apr. 2, 1954. It is the only AFB from which are launched operational ballistic missiles in the SAC deterrent force and polar-orbiting satellites in US space program. More than 1,115 launches have taken place from Vandenberg since Dec. 1958. Area: 98,400 acres. Altitude: 400 ft.

Webb AFB, Tex. 79720; 2 mi. SW of Big Spring. Phone: (915) 267-2511. AUTOVON: 866-0111. ATC base. 78th Flying Training Wing, undergraduate pilot training. Base activated Sept. 25, 1942; named for 1st Lt. James L. Webb, WW II fighter pilot, killed in a crash in Japan, June 16, 1949. Area: 2,311 acres. Altitude: 2,561 ft.

Westover AFB, Mass. 01022; 5 mi. NE of Chicopee Falls. Phone: (413) 557-1110. AUTOVON: 589-1110. SAC base. 99th Bomb Wing; houses AFRES tactical airlift group and ADC EB-57 Defense Systems Evaluation Squadron. Base activated Oct. 1939; named for Maj. Gen. Oscar Westover, Chief of the Air Corps, killed Sept. 21, 1938, in aircraft accident. Area: 4,931 acres. Altitude: 244 ft.

Wheeler AFB, Hawaii (APO San Francisco 96515); located near center of the island of Oahu. Phone: (808) 422-0531. PACAF base. Furnishes administrative and logisti support to the Hawaiian Air Defens Division (326th Air Division); Join Coordination Center, Far East; an 22d Tactical Air Support Squadror Also supports US Army flying activi ties from adjacent Schofield Barracks. Hq. of Pacific Communications Area, AFCS. Base activated Feb. 1922; named for Maj. Sheldon H. Wheeler, killed July 13, 1921, during aerial exhibition. Area: 1,423 acres. Altitude: 845 ft.

Whiteman AFB, Mo. 65301; 1.5 mi. S of Knob Noster. Phone: (816) 563-5511. AUTOVON: 975-1110. SAC base. 351st Strategic Missile Wing Base activated 1942; named for 2d Lt. George A. Whiteman who was shot down while taking off in a fighter plane from Wheeler Field Hawaii, on Dec. 7, 1941, the first AF casualty of WW II. Area: 3,384 acres plus area encompassed by missile complex of about 15,660 sq mi. Altitude: 869 ft.

Williams AFB, Ariz. 85224; 16 mi SE of Mesa; 10 mi. E of Chandl Phone: (602) 988-2611. AUTOVO 474-1011. ATC base. 82d Flyi Training Wing, largest undergradu ate pilot training base; also pr vides F-5 combat crew training f foreign students. Base activated Ju 1941; named for 1st Lt. Charles Williams, killed in crash July 6, 19 during aerial demonstration. Ar 3,867 acres. Altitude: 1,385 ft.

Wright-Patterson AFB, Ohio 454 Fairborn, 10 mi. ENE of Dayt Phone: (513) 257-1110. AUTOVC 782-1110. AFLC base. Hq. Air For Logistics Command; Hq. Aeronautic Systems Division; Foreign Techn ogy Division, AFSC; AF Institute Technology; Wright-Patterson US Medical Center; AF Contract Main nance Center, AFLC; Air Force M seum; 17th Bomb Wing; plus mo than 150 other DoD activities ar government agencies. Originally sep rate, Wilbur Wright Field and Pa terson Field were merged an redesignated Wright-Patterson AF on Jan. 13, 1948; named for avia tion pioneers Orville and Wilbu Wright and for 1st Lt. Frank Patterson, killed June 19, 1918, the crash of a DH-4. The Wrig brothers did much of their ear flying on Huffman Prairie, D Areas A and C of present ba Area: 8,242 acres. Altitude: 830

Wurtsmith AFB, Mich. 48753; mi. NW of Oscoda. Phone: (5 739-2011. AUTOVON: 722-3450. S base. 40th Air Division; 379th Bo Wing. Base activated in 1926; signed to SAC Apr. 1, 1960; nam for Maj. Gen. Paul B. Wurtsmi killed Sept. 13, 1946, in cra Area: 5,200 acres. Altitude: 634

GUIDE TO AIR FORCE STATIONS

In addition to the major facilities listed in this "Guide to Bases," USAF has a number of Air Force Stations (AFS) throughout the United States and overseas. These stations, for the most part, perform an air defense mission and house radar, SAGE, or AC&W units. Here is AIR FORCE Magazine's listing of those stations, with state and ZIP code.

Aiken AFS, South Carolina 29801
Almaden AFS, California 95042
Antigo AFS, Wisconsin 54409
Baudette AFS, Minnesota 56623
Bedford AFS, Virginia 24523
Benton AFS, Pennsylvania 17814
Blaine AFS, Washington 98230
Boron AFS, California 93516
Bucks Harbor AFS, Maine 04618
Calumet AFS, Minnesota 49913
Cambria AFS, California 93428
Campion AFS, APO Seattle 98703
Cape Charles AFS, Virginia 23310
Cape Lisburne AFS, APO Seattle 98716
Caswell AFS, Maine 04750
Charleston AFS, Maine 04426
Dauphin Island AFS, Alabama 36528
Empire AFS, Michigan 49630
Fallon AFS, Nevada 89406
Finland AFS, Minnesota 55603
Finley AFS, North Dakota 58230
Fort Lee AFS, Virginia 23801
Fort Fisher AFS, North Carolina 28449
Fortuna AFS, North Dakota 59275
Galena AFS, APO Seattle 98723
Gentile AFS, Ohio 45401
Gila Bend AFAF, Arizona 85337
Gibbsboro AFS, New Jersey 08026
Indian Mountain AFS, APO Seattle 98748
Jacksonville AFS, Florida 32229
Kaala AFS, APO San Francisco 96786
Kalispell AFS, Montana 59922
Keno AFS, Oregon 97601
Klamath AFS, California 95548
Lake Charles AFS, Louisiana 70601
Lockport AFS, New York 14094
Makah AFS, Washington 98357
Martinsburg AFS, West Virginia 25401
Mica Peak AFS. Washington 99023
Mill Valley AFS, California 94941
Minot AFS, North Dakota 58702
Montauk AFS, New York 11954
Mt. Hebo AFS. Oregon 97122
Mt. Laguna AFS, California 92048
Newark AFS, Ohio 43055
No. Bend AFS, Oregon 97459
No. Charleston AFS, South Carolina 29404
No. Truro AFS, Massachusetts 02652
Oklahoma City AFS, Oklahoma 73150
Opheim AFS, Montana 59250
Osceola AFS, Wisconsin 54020
Othello AFS, Washington 99344
Point Arena AFS, California 95468
Port Austin AFS, Minnesota 48467
Punamano AFS, APO San Francisco 96731
Richmond AFS, Florida 33157
Roanoke Rapids AFS, North Carolina 27870
San Antonio AFS, Texas 78208
Saratoga AFS, New York 12866
San Pedro Hill AFS, California 90000
Sault Sainte Marie AFS, Minnesota 49783
Savannah AFS, Georgia 31402
Sparrevohn AFS, APO Seattle 98746
St. Albans AFS, Vermont 05478
Sunnyvale AFS, California 94088
Tatalina AFS, APO Seattle 98747
Tin City AFS, APO Seattle 98715
Watertown AFS, New York 13601

Airman's Bookshelf

Architect of Triumph

George C. Marshall: Organizer of Victory, 1943–45, by Forrest C. Pogue. The Viking Press, New York, N. Y., 1973. 683 pages. $15.00.

Seventeen years ago, Forrest Pogue began work on his multivolume biography of General of the Army George C. Marshall. *Education of a General, 1880–1939,* appeared in 1963 and was followed three years later by *Ordeal and Hope, 1939–1942.* With this, the third volume, Pogue has truly hit his stride, and the claim of the late Douglas Southall Freeman, biographer of Robert E. Lee, to have written the greatest military biography in our history is in clear and present danger.

The first thing to be said about this book is that it is far more than a biography. Starting with the preparations for the Casablanca Conference of January 1943, where the basic strategy for the war in Europe was laid out, and continuing to V-E Day in 1945, this volume stands by itself as a vital contribution to the history of World War II. Whether at the battlefront, in conference, or on the home front, every major decision that shaped the course of the conflict is treated carefully, dispassionately, and in the light of the best and most recent scholarship.

In the years since the war, critics have railed from hither to yon about Churchill's Mediterranean strategy, the Italian campaign, the MacArthur/Nimitz feud in the Pacific, Eisenhower's "broad-front" strategy, the decision to stop at the Elbe, the circumstances leading to the devastation of Dresden, ad infinitum. The critics have had a field day with "what might have been"; Pogue has registered an unmistakable triumph on the level of what happened, when, how, and to what effect.

On the level of global strategy, the greatest problem facing the Combined Chiefs of Staff was that each nation — and each service within each nation—could always find cogent reasons for pressing ahead with the fight in the area or areas where its own forces were strongest. And no field commander (Monty in Belgium, Alexander in Italy, MacArthur in the Southwest Pacific, Nimitz in the Central Pacific, Stillwell in China) could admit to understanding why his theater did not have an undisputed claim to priority. This should hardly be surprising. What *is* surprising and, indeed, awe-inspiring, is that any one man should have come so to dominate the higher councils of wartime decision, to exert such sure and deft control over the final distribution of resources and effort as did Marshall. In the end, it was Churchill, loser time after time in head-on conflict with the General, who harkened back to Lazare Carnot and dubbed Marshall "the true organizer of victory."

No brief review can set out clearly for the reader how it was that General Marshall won claim to the respect and admiration of all with whom he dealt—whether Presidents, Prime Ministers, Marshals of the Soviet Union, Admirals of the Fleet, members of Congress, or his own orderlies. What comes through between the lines is a picture of an almost superhuman melding of character and professional competence. Speaking to the 1971–72 class at the Army War College on the subject of generalship, Barbara Tuchman suggested that between the two — character and professional capacity—the first is probably more important than the second, "although it is useless, of course, if separated from the second, and vice versa. The most brilliant master of tactics cannot win a battle if, like General Boulanger, he has the soul of a subaltern. Neither can the most magnetic and dashing soldier carry the day if, like General Custer, he is a nincompoop in deployment." Although she did not mention General Marshall in this context, she might well have used him as the model for the point she was making.

Finally, air-minded readers will find, as in the preceding volume, that matters of particular concern to them are given fair, enlightened coverage. Eisenhower's insistence on retaining control over strategic forces both before and after Normandy is treated here better than anything else I have read, and the eight pages (541–47) dealing with events leading up to Dresden are the best available anywhere.

In every respect, this book is well worth reading by all serving officers — including those who worry now and then, as Marshall did between the wars, that the service is passing them by. George Marshall never stopped preparing himself for the chance that might come. He was fifty-two years old before he made colonel, only a few months from fifty-six when he won his first star. When the chance came, to his own and his nation's benefit, he was ready.

—*Reviewed by Maj. David MacIsaac, Department of History, USAF Academy.*

Air Strategy In ETO

The Air Plan That Defeated Hitler, by Maj. Gen. Haywood S. Hansell, Jr., USAF (Ret.).

This significant book recently appeared in a private printing of 2,000 copies. It has been distributed to all Air Force unit libraries, Air Force Reserve and National Guard units, AFROTC units, and most of the service schools. It may become available for broader distribution at a later date.

Not often does a qualified, competent author write a book on a subject of his personal knowledge and experience. Generally, writers on historical subjects have to resort to research, reports, and records—which give their efforts the quality of hearsay evidence. General Hansell was present and participated in the events about which he writes. He was one of the creators of the air plan, and he knew intimately and worked closely with the other planners.

There have been many books about air operations in World War II, but few about the evolution of air plans and none, prior to this,

Airman's Bookshelf

competently covering the genesis and development of the US air plan to defeat Hitler.

The author describes the origin of the plan and features individuals who played major parts. He details the hurdles faced, the many attempted abortions the plan survived, and the tortuous path it traveled until eventually approved. He then had the opportunity to go to Britain and actively participate in its trial by fire as the US Eighth Air Force struggled to follow it.

The air plan, as Hansell accurately recounts, suffered more perils than Pauline. It had many powerful enemies. Many generals and admirals opposed it because it would use resources, materiel, and manpower they badly needed. Politicians were lukewarm because it was new and untried. It was also questioned by Presidents and Prime Ministers. As the writer accurately portrays, it survived mainly because of a father figure, present at its birth, who jealously protected and guarded it from cradle to maturity, a fourteen-karat genius named H. H. "Hap" Arnold.

Everybody tried to get in the act. There were many diversions and a multitude of proposals for changes in target systems, airplanes, operational methods, and even in theaters of war. For example, we were just getting started after Hitler in Europe when it was decided to chase Rommel in the African desert.

The scientists played a part, too, as General Hansell accurately relates. And there is no more eager beaver than a scientist turned strategist. The organization to carry out the air plan also was subject to change without notice.

But eventually, as the book portrays, the original air plan, not basically altered, was carried out by harassed commanders and courageous combat crews. It was proved to have been a sound plan, prophetically accurate in its concepts.

A remarkable feature of the plan was its logistics section. The totals in planes, crews, and support elements it estimated as the ultimate requirement to achieve its predicted goal were very close to the numbers eventually employed.

This book will be of interest to millions of Americans who participated, one way or another, in the air war against the Nazis, and it probably will be a pleasant surprise to the combat crews to learn, all these years later, that we did have a plan.

Gen. "Tooey" Spaatz and I were recently discussing General Hansell's book when General Spaatz, always a miser with words, made this accurate evaluation: "This is the most complete and authoritative book on the subject I have seen."

—Reviewed by Lt. Gen. Ira C. Eaker, USAF (Ret.). General Eaker is the author of a syndicated column on defense affairs.

Ike as Military Manager

Eisenhower as Military Commander, by E. K. G. Sixsmith. Stein and Day, New York, N. Y., 1973. 221 pages with bibliography, chronology, index, and maps. $10.00.

The image of Eisenhower as the Second World War's most efficient manager of military resources is clearly outlined in this book. Maj. Gen. Sixsmith served as a commander and as a staff officer during the time; his book reflects his deep knowledge of the events, issues, and techniques in which Eisenhower was involved. The author's economical style and his use of sources — mostly the Eisenhower Papers—are a model of unobtrusive authority that any staff officer or professional scholar might envy. Only occasionally, as when General de Gaulle "screams" for reinforcements, does emotion obtrude.

Eisenhower's military commands in America and the Philippines are covered very rapidly; he reaches the age of forty-six by page ten, and commander of armies in North Africa by chapter three. Thereafter, the detail becomes stronger and the management process clearer. The two other principal actors, Bradley and Montgomery, appear as the base of the command pyramid. The stage is always full, but in the book as a whole, other names—Brooke, Alexander, Tedder, Clark, and even Patton—have walk-on parts, and Roosevelt, Marshall, and Churchill thunder from the wings. The drama continues through Normandy to the last days of the Third Reich when, because of the death of Roosevelt, the divine mantle falls to some extent on Eisenhower.

The tone of the book is not heroic. It is no longer considered helpful to account for a military leader in terms of his personal qualities, and General Sixsmith spends only a short paragraph on these. He tells rather what Eisenhower did. He gives the reader evidence of the way in which Eisenhower's management functioned; how he managed the task before him, the team he had chosen or been given to help him, and the individuals in that team. In each chapter, the actions and decisions are described, and, at the end of each episode, the balance is struck. Was Eisenhower right in general? Was he right in detail? Could the task have been better completed? Should someone else have done it? The judgments are fair and wise.

This is very much an Army book. It will be most useful to sophisticated students of Eisenhower's campaigns and to those learning about leadership. The photographs are of the left-to-right variety; the maps are towns joined by roads. (The incorrect caption to photograph No. 9 and the last paragraph on page 119 seem to have suffered from the attention of the printer's devil.) The chronology, bibliography, and index are all short, but useful.

—Reviewed by Squadron Leader D. H. Stables, RAF, Department of History, USAF Academy.

The Finns' Finest Hour

The Winter War, by Eloise Engel and Lauri Paananen. Charles Scribner's Sons, New York, N. Y., 1973. 176 pages with photos and maps. $7.95.

If there was ever an unjustified assault by one nation on another, it was the Soviet Union's attack on its small neighbor, Finland, in the fall of 1939. The Soviets, in an expansionist and paranoid mood, had demanded impossible concessions of territory from the Finns. When the Finns refused, Stalin ordered war. He thought the Soviet war machine would make short work of the Finns, who had precious little by way of weaponry and were vastly outnumbered. The Soviets did not reckon with the Finns' incredible determination to defend themselves.

Veteran military writer Eloise Engel and Lauri Paananen, a Finn

who took part in the Winter War as a teenage member of the Home Guard, have teamed to write a fast-paced and often moving account of the Finnish stand against the Soviet colossus. They have skillfully laced the story with personal recollections of Finnish soldiers recounting in dramatic detail the ingenious ski tactics and hit-and-run maneuvers of the Finnish defenders who, allied with cruel winter, managed to destroy vast numbers of the invading Soviet armies, bottle up many of the Soviet units, and capture large quantities of Soviet equipment. The reminiscences convey in grim detail the unimaginable cold in which the opposing armies had to fight.

There is compassion, too, in the narrative for the Soviet soldiers who were sent into Finland, ill-equipped for winter war, poorly officered, ill-fed, and for the least honorable of reasons—naked aggression.

The war lasted 105 days and cost the Russians an estimated million killed, according to Nikita Khrushchev. In the end, of course, despite the gallantry of the Finns, and the imaginative use of scarce resources and men by the aristocratic Finnish commander, Field Marshal Mannerheim, the Soviets won by sheer numbers of men, guns, tanks, and planes. They tore from Finland even more than what had been demanded before the Winter War.

The Finns, during their struggle, won the admiration of the world but hardly any help. They lost 25,000 killed and 55,000 wounded, staggering losses for a nation of only 4,000,000 people, and were stripped of valuable territory and resources. But they retained their independence.

The photographs of Finland at war are dramatic and evocative. But, inexplicably and unfortunately, the campaign maps are crudely drawn and there are too few of them to inform an exciting narrative.

—Reviewed by William Leavitt, a former Senior Editor of this magazine.

New Books in Brief

Army Badges and Insignia of World War 2, by Guido Rosignoli. More than 2,000 badges and insignia of some of the principal armies that fought in World War II. Meticulous illustrations, most of them in color, are complemented by a detailed text that includes an historical introduction to the army of each country dealt with. Macmillan Co., New York, N. Y., 1973. 228 pages with index. $4.95.

The Asian Alliance: Japan and United States Policy, by Franz Michael and Gaston J. Sigur. A monograph on Japanese affairs over the past quarter of a century. Special attention is given to the contemporary political scene, the economy, the armed forces, Japan's relations with the United States, and its unfolding—and increasingly independent—foreign policy. National Strategy Information Center, Inc., 130 E. 67th St., New York, N. Y. 10021, 1972. 92 pages with appendix and bibliography. $1.00.

Biplane, by Richard Bach. The author of the No. 1 best seller, *Jonathan Livingston Seagull,* tells about his flight in 1964 from North Carolina to Los Angeles in an open-cockpit biplane—a 1929 Detroit-Ryan Speedster, Model P-2A. Bach, who has flown jet fighters and four-engine transports, acquired the old biplane on a whim. His flight into the past is a poetic and nostalgic voyage that will appeal to all who knew the open-cockpit days, or wish they had. Harper & Row, New York, N. Y., 1966. 163 pages. $5.95.

F.P.R.I. Research Monograph Series, numbers twelve and thirteen. The chapter headings briefly describe the contents of both monographs. *Aden and British Strategy: 1839–1968,* by Harvey Sicherman. (1) The Acquisition of Aden, (2) Why the British Kept Aden, (3) Why the British Left Aden, (4) Conclusion: The Course of Empire. 53 pages with footnotes, appendix, and maps.

The Impact of President Nixon's Visit to Peking on International Politics, by William R. Kintner. (1) Consequences, (2) Reasons, (3) Regional Impact, (4) Epilogue. 65 pages with appendix. Foreign Policy Research Institute, 3508 Market St., Philadelphia, Pa. 19104, 1972. $3.50 each.

Locomotives in Profile, Volume 2, edited by Brian Reed. The Anglo-American contents of Volume 1 have been widened to include European and Asiatic steam locomotives. Included are twelve double-page color plates. Doubleday & Co., Garden City, N. Y., 1972. 288 pages. $22.00.

Missiles of the World, by Michael J. H. Taylor and John W. R. Taylor. This companion volume to *Military Aircraft of the World* and *Civil Aircraft of the World* contains details and photographs of all guided missiles known to be in service or under development throughout the world. The authors have presented the information in a way that can be understood by non-technical readers. Charles Scribner's Sons, New York, N. Y., 1973. 167 pages with index. $6.95.

Salt: Implications for Arms Control in the 1970s, edited by William R. Kintner and Robert L. Pfaltzgraff, Jr. A collection of essays dealing with many aspects of the complex problems of arms control. It is based upon a series of papers and discussions presented at the Fifth International Arms Control Symposium in Philadelphia in 1971. Part VI and the appendix, which carries the text of the agreements, bring the book as up to date as possible. University of Pittsburgh Press, Pittsburgh, Pa., 1973. 447 pages with appendix, glossary, biographical notes, and index. $11.95.

Small Arms in Profile, edited by A. J. R. Cormack. This first volume of *Small Arms in Profile* presents twelve famous international weapons from the late nineteenth and twentieth centuries. A comprehensive text, outlining the development and use of each weapon, is supported by more than 650 black-and-white and 100 color illustrations. Doubleday, Garden City, N. Y., 1973. Includes index and glossary of terms. $22.50.

Uniformed Services Almanac 1973, compiled by Lee E. Sharff. This fifteenth edition of the Almanac contains up-to-date information on pay, allowances, VA entitlements, federal and state income taxes, Social Security, insurance, and a host of other matters pertinent to the personal affairs of members of the armed services and the Reserve Forces. There also is a compilation of useful statistical data. Uniformed Services Almanac, P. O. Box 400, Washington, D. C. 20044. $1.25 paperback.

—By Catherine Bratz

LAKE SUPERIOR NORTHLAND CHAPTER, MICH.

cited for effective programming in support of the mission of AFA, most recently exemplified in the dinner honoring the Second Air Force (SAC).

By Don Steele
AFA AFFAIRS EDITOR

More than 120 members and guests attended the **Lake Superior Northland Chapter's** first Annual Dinner honoring the Second Air Force (SAC). The dinner was held at the K. I. Sawyer AFB, Mich., Officers' Open Mess on February 2.

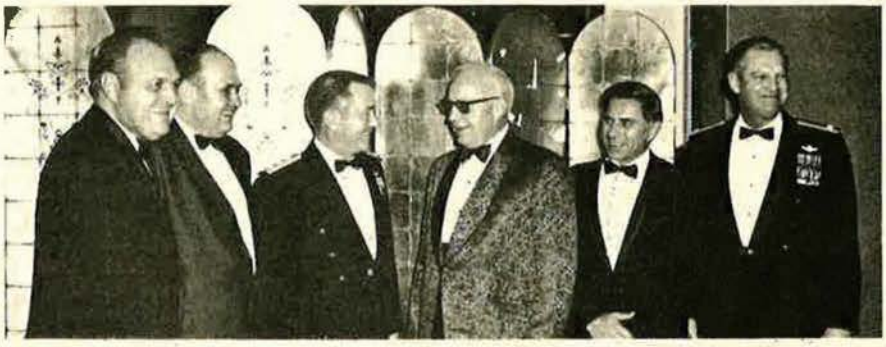
Guests of honor were **Lt. Gen. James M. Keck,** Commander, Second Air Force, Barksdale AFB, Shreveport, La.; **L. Calhoun Allen,** Mayor of Shreveport; and **Bernard D. Osborne,** Vice President for AFA's Great Lakes Region.

Local dignitaries included the **Most Reverend Charles A. Salatka,** Roman Catholic Bishop of Marquette; **Col. Morris E. Shiver,** Commander, 410th Bomb Wing, K. I. Sawyer AFB; and Marquette Mayor **William J. Malandrone.**

Following remarks by Mayors Malandrone and Allen, General Keck gave the main address of the evening, in which he discussed the rapidly changing times and how this applies to today's Air Force. Chapter President **Lynn B. Coleman** was master of ceremonies.

A highlight of the evening was the presentation of the Meritorious Service Medal to Colonel Shiver by General Keck.

In recognition of the outstanding efforts of this young Chapter, we are pleased to name the Lake Superior Northland Chapter as AFA's "Unit of the Month" for May.



Participants in the Lake Superior Northland Chapter's recent dinner honoring the Second Air Force were, from left, L. Calhoun Allen, Mayor of Shreveport, La.; Bernard D. Osborne, Vice President for AFA's Great Lakes Region; Lt. Gen. James M. Keck, Commander, Second Air Force; Chapter President Lynn B. Coleman; Marquette Mayor William J. Malandrone; and Col. Morris E. Shiver, Commander, 410th Bomb Wing, SAC, K. I. Sawyer AFB, Mich.

Six civilian and four military personnel from Hill AFB, Utah, as well as eleven members of the **Ute Chapter** were honored at the Chapter's awards banquet in February.

James M. Stone, vice president and general manager of Thiokol Chemical Corp.'s Wasatch Division, was guest speaker.

Hill AFB personnel honored were **John Becker,** Materiel Management Directorate, "Item Manager Award"; **James E. Solomon,** Small Business and Contractor Relations Office, "Middle Management Award"; **Connie R. Bowe,** Comptroller, "System Support Manager Award"; and **Virginia A. Kraupie,** Directorate of Distribution, "Transportation Management Award."

Also, **Robert Wolfe, base hospital,** "Staff Service **Management** Award"; **Capts. Barry Berman** and **Melvin R. Baker,** base hospi-

During the Ute Chapter's annual awards banquet, Utah AFA President Lynn Summers presents the Chapter's "Public Relations Award" to Capt. Barry Berman, as his wife looks on. Captain Berman is a dentist at the Hill AFB hospital.

Guests at the New York Iron Gate Chapter's January luncheon meeting were, from left to right, Rear Adm. W. M. Pugh, II, Commandant, Third Naval District; Maj. Gen. John M. Hightower, Commanding General, Fort Hamilton; Sen. Barry Goldwater (R-Ariz.); Chapter President Herbert O. Fisher; Adm. John S. McCain, Jr., USN (Ret.); Hon. Secor Browne, Chairman, CAB; and Maj. Gen. Robert N. Ginsburgh, Director of Information, USAF. Admiral McCain, former Commander in Chief of the Pacific, was the principal speaker.

Apollo-16 Astronaut Col. Charles N. Duke, Jr., was the guest of honor and speaker at a breakfast meeting sponsored by the Grand Strand Chapter at the Myrtle Beach AFB Officers' Open Mess on February 14. Following the meeting, Colonel Duke was inducted into the newly established South Carolina Hall of Fame, located at Myrtle Beach.

tal, "Public Relations Award"; **Capt. R. Parker Dawkins,** Materiel Management Directorate, "Distinguished Officer Award"; **MSgt. Paul J. Cummiskey,** Management Engineering Team, "Distinguished Airman Award"; and **E. Dean Ross,** Maintenance Directorate, "Exceptional Service (Handicapped) Award."

Ute Chapter members honored were **Dale Johnston, Oren Child, Gil Friederichs, Frank Bishop, Gary Larsson, Bryant Cash, Robert Bowman, Lee Mohler, Larry Sidle, Chris Lambrose,** and **Lee Gilbert.**

The accomplishments of Captains Baker and Berman, both dentists, have received national attention.

Captain Baker, on his own time and flying his own aircraft, gives free dental treatment to the Goshute Indian tribe, while Captain Berman has been recognized for his work with the eye disorder *Retinitis Pigmentosa*, spending much of his time and personal funds to bring the plight of the diseased victims to the public's attention.

More than 200 members and guests attended a recent dinner meeting of North Carolina's **Pope Chapter** in the Pope AFB Officers' Open Mess.

The guest of honor and speaker was **Lewis E. Turner,** Acting Assistant Secretary of the Air Force for Installations and Logistics. In his address, Mr. Turner discussed the myths and realities of defense spending. He pointed out that it is a commonly held belief that the defense budget dominates public spending, while the fact is that in the 1973 fiscal year, defense spending accounted for only thirty percent of the federal budget. Mr. Turner went on to say that defense spending in the last four years has dropped $23 billion, while other federal spending has grown by more than $36 billion.

Chapter President **Thornton Rose** reported a seventy-eight percent increase in the Chapter's membership since July 1, 1972. Congratulations to Thornton and

1920 William M. Whitney, IV 1973

Bill Whitney, a member of AFA since 1947 and an AFA leader for many years, died on February 24, 1973, after a long illness.

AFA was an important part of Bill's life. He was a Life Member, a Past Chapter and State President, a former Regional Vice President, a former member of the Organizational Advisory Council, and was a member of the Credentials Committee at several AFA National Conventions. Bill's wife, Dorothy, has been President of the General Claire Chennault Chapter in Detroit since January 1969.

At the time of his death, Bill was controller and vice president of Graphic Services, Warren, Mich. Also, he was vice president of the Oakland County Chapter of the National Association of Accountants.

AFA extends its deepest sympathy to his wife, Dorothy, and to the other members of his family.

Bill Whitney

to the Pope Chapter on this remarkable growth in membership.

CROSS COUNTRY WITH AFROTC . . . AFROTC Cadet **Barbara Cook** of Chattanooga, Tenn., was crowned **Air Force ROTC Queen** at the University of Tennessee. The announcement was made during the annual Air Force Ball at the University on February 17. Miss Cook is also a member of the Angel Flight at the University. Upon graduation, she will be commissioned a second lieutenant in the USAF and plans to work in physical therapy.

AFROTC Cadet **Mary K. Higgins** has been elected **Commander** of the **Kittyhawk Squadron** of the **Arnold Air Society.** Miss Higgins is not the average junior cadet, explained her Professor of Aerospace Studies at Illinois Institute of Technology. She was a vice commandant award recipient at six-week field training, is a CAP Cadet Colonel, and recipient of the Frank Borman Falcon Awards, and recently earned her FAA Private Pilot Certificate. Mary has been on the dean's list every semester at Saint Xavier College, where she is a junior majoring in chemistry. She participates in the IIT program through a cross-town agreement between the two schools.

J. Gilbert Nettleton, Jr., left, immediate Past President of the Iron Gate Chapter and Board Chairman of the Aerospace Education Foundation, accepts the Annual New York AFA Presidential Award from State President Gerald V. Hasler. The presentation was made at a recent New York AFA Executive Committee meeting hosted by the Iron Gate Chapter.

Brig. Gen. (Maj. Gen. selectee) Lester T. Kearney, Jr., left, receives the first AFA Charity Golf Tournament Distinguished Service Award from Maj. Gen. Don Coupland, USAF (Ret.), the tournament's General Chairman. General Kearney, now Chief of Staff, MAC, formerly was Commander, 63d Military Airlift Wing, Norton AFB, Calif., and one of the tournament's strongest supporters.

On a recent visit to Eglin AFB, Fla., members of AFA's Fort Worth Airpower Council were guests of honor at an Eglin Chapter meeting, during which Council Chairman (also AFA's Board Chairman) Joe L. Shosid presented a Fort Worth Honorary Citizen Scroll to Maj. Gen. Henry Kucheman, Jr., Commander, Armament Development and Test Center, Eglin AFB. Shown here after the presentation are, from left, Chapter President William E. Bethea; General Kucheman; Mr. Shosid; Florida AFA Vice President Frank Fisher; and Cecil Anchors, Circuit Court Clerk.

COMING EVENTS . . . AFA Missile Symposium, to be held during the **Strategic Air Command's** annual **Missile Competition** at Vandenberg AFB, Calif., May 2–3 . . . **Illinois AFA Convention,** O'Hare International Airport, May 5–6 . . . **Washington AFA Convention,** Sea Tac Hyatt House, Seattle, May 11–12 . . . **Alabama AFA Convention,** Mobile, May 11–13 . . . **Colorado AFA Convention,** Pueblo, May 12 . . . **Florida AFA Convention,** Melbourne Beach, Florida, May 18–20 . . . **New Hampshire AFA Convention,** Pease AFB, May 19 . . . **Missouri AFA Convention,** Kansas City, May 19 . . . **South Carolina AFA Convention,** Charleston AFB, May 26 . . . **AFA's Annual Dinner** honoring the **Outstanding Squadron** at the Air Force Academy, The Broadmoor, Colorado Springs, Colo., June 2 . . . **New York AFA Convention,** The Treadway Inn, Niagara Falls, June 8–9 . . . **Michigan AFA Convention,** Holiday Inn, Gaylord, June 9 . . . **Virginia AFA Convention,** Harrisonburg, June 16 . . . **Wisconsin AFA Convention,** Marriott Motor Inn, Brookfield, June 16 . . . **Pennsylvania AFA Convention,** The Viking Motor Inn, Pittsburgh, June 22–23 . . . **Utah AFA Convention,** Ramada Inn, Ogden, June 22–23 . . . **Texas AFA Convention,** Menger Hotel, San Antonio, June 29–30 . . . **AFA's Twenty-seventh National Convention and Aerospace Development Briefings,** Sheraton-Park Hotel, Washington, D. C. September 16–20. ■

AFA STATE CONTACTS

Following each state name, in parentheses, are the names of the localities in which AFA Chapters are located. Information regarding these Chapters, or any place of AFA's activities within the state, may be obtained from the state contact.

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Bob Stevens'

"There I was..."

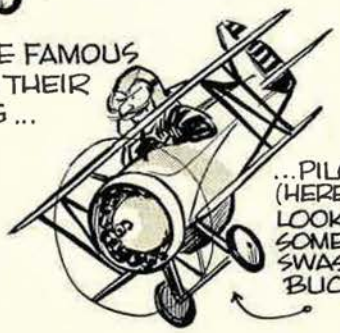
Poor Robert's "Almanack"

A LOOK AT FIGHTERS - MEN *and* MACHINES - 1917 TO DATE

AMERICA'S FIRST "SPEED SCOUT" WAS THE C-3 TRIPE. IT TOOK A PRETTY GOOD SCOUT TO GO UP IN ONE.

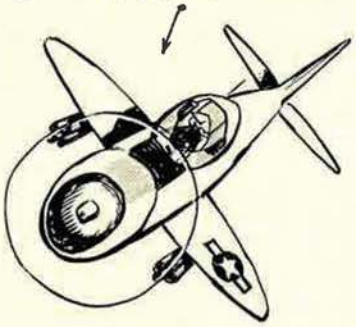
THE FIRST U.S. FIGHTERS PRODUCED IN QUANTITY WERE THE P-1 *and* P-6 "HAWKS." THEY FLEW ON 50-OCTANE; THE PILOTS ON 100 PROOF.

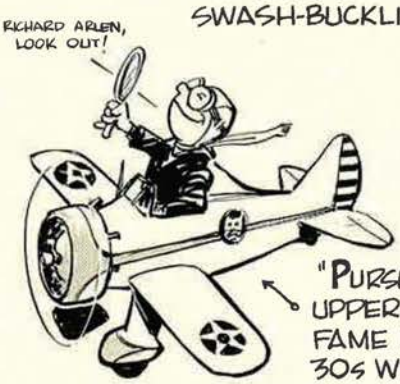
LATER CAME THE FAMOUS P-12 SERIES WITH THEIR SWASH-BUCKLING ...



... PILOTS. (HERE'S ONE LOOKING FOR SOMEONE'S SWASH TO BUCKLE)

TYPICAL OF THE WW II FIGHTERS WAS THE P-47 "JUG." BUILT LIKE A TANK WITH GLIDE RATIO TO MATCH.





"PURSUITS" LOST THEIR UPPER WING *and* GAINED FAME IN THE MOVIES OF THE 30s WITH THE P-26 PEASHOOTERS.

THE F-86 SABRE KEPT THE NORTH KOREANS (*and* OTHERS) HONEST DURING THE 50s.

EVERYBODY GLOMMED ONTO THE F-4. A SUPER BIRD FLOWN BY SUPER JOCKS!

THIS SPACE RESERVED FOR THE F-15!

Bob Stevens

Not all of our rockets are huge successes.

We're known for our large rockets.
But we also make small ones.
And medium-size ones.

And large or small, they have one thing in common: success.

So whether your rocket propulsion problem is large or small, bring it to us.

We specialize in success. In all sizes.

United Technology Center
DIVISION OF UNITED AIRCRAFT CORPORATION
SUNNYVALE, CALIFORNIA 94088

UTC's 120", 1.2 million pound thrust solid rocket. Over 40 consecutive successes in the Titan III-C and -D programs.

UTC's new 45", 130,000 pound thrust Algol III. Has operated flawlessly on its first four missions as booster stage of NASA's Scout launch vehicle.

UTC's variable thrust hybrid. Powered a high altitude supersonic target vehicle perfectly on its maiden flight.

UTC's FW-5, a 6,000 pound thrust apogee/upper stage motor. Successfully placed TELESAT Canada's Anik I satellite into orbit.

UTC's veteran FW-4, a 6,000 pound thrust apogee/upper stage motor. Has put 62 payloads on station in space.

Phantom: the standard for comparison.

The acceptance of the F-4 Phantom as the leading Free World fighter has made it the standard against which other fighters are measured. Ten nations, including five NATO countries, have assigned it their most important fighter missions.

They chose the Phantom because of its performance, durability, and proven combat capabilities.

We've built more than 4,300 twin-engine Phantoms. We keep building them better—keeping the best of what they have and adding the best of what is new. The latest is a new look-down, shoot-down, long range radar. No wonder defense planners keep the Phantom in their plans.

MCDONNELL DOUGLAS

F-4A...U.S.Navy
F-4B...U.S.Navy & U.S.Marines

F-4D...U.S.Air Force, South Korea & Iran

F-4F...West German Luftwaffe

F-4K...Royal Navy

RF-4C...U.S. Air Force

F-4C...U.S.Air Force & Spain

RECORD FLIGHTS OF THE PHANTOM

Altitude	over 100,000 ft.
Sustained Altitude	66,443 ft.
500 Km Closed Course	1,216 mph
100 Km Closed Course	1,390 mph
3 Km Low Altitude	902 mph
15/25 Km	1,606 mph
Los Angeles to New York	170 minutes
New York to London	4 hr., 47 min.
Time to Climb	
3,000 Meters	34.52 sec.
6,000 Meters	48.78 sec.
9,000 Meters	61.62 sec.
12,000 Meters	77.15 sec.
15,000 Meters	114.54 sec.
20,000 Meters	178.50 sec.
25,000 Meters	230.44 sec.
30,000 Meters	371.43 sec.

MISSIONS OF THE PHANTOM
Fleet Defense · Air Superiority · Intercept
Long Range Strike · Close Air Support
Interdiction · Reconnaissance

RF-4B...U.S.Marines

F-4E...U.S.Air Force, Iran, Japan, Israel, Greece & Turkey

F-4J...U.S.Navy & U.S.Marines

F-4M...Royal Air Force

RF-4E...West German Luftwaffe, Israel & Iran