

# AIR FORCE

PUBLISHED BY THE AIR FORCE ASSOCIATION

MAGAZINE



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Sidewinder AIM-9L approaches head-on intercept of target drone at Naval Weapons Center, China Lake, California.

RAYTHEON

# AIR FORCE

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MAGAZINE

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*The Milestones of Flight gallery in the new Air and Space Museum, now open to the public on the Smithsonian grounds in Washington, D. C. For a cover story and photo gallery on the spanking new facility, which is garnering rave reviews, see pp. 42 through 48.*

—Staff photo by  
William A. Ford

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**Assistant Publisher:** John F. Loosbrock  
**Associate Publishers:**  
Charles E. Cruze, Richard M. Skinner

**Editor:** John F. Loosbrock  
**Executive Editor:** John L. Frisbee

**Senior Editors:**  
Claude Witze, Edgar Ulsamer

**Military Relations Editor:**  
James A. McDonnell, Jr.

**Contributing Editors:**  
Ed Gates, Don Steele, John W. R. Taylor  
("Jane's Supplement")

**Regional Editors:**  
Stefan Geisenheyner, Wiesbaden, Germany  
Irving Stone, Los Angeles, Calif.

**Managing Editor:** Richard M. Skinner

**Ass't Managing Editor:** William P. Schlitz

**Director of Design and Production:**  
Robert T. Shaughnessy

**Art Director:** William A. Ford

**Special Assistant to the Editor:** Nellie M. Law

**Editorial Assistants:**  
Nellie M. Law, Pearlle M. Draughn,  
Grace Lizzio

**Administrative Assistant to the Publisher:**  
Ethel J. Vernon

**Assistant for Editorial Promotion:**  
Robin Whittle

**Advertising Director:**  
Charles E. Cruze  
1750 Pennsylvania Ave., N.W.  
Washington, D.C. 20006  
Telephone: (202) 452-7300

**Advertising Service Manager:**  
Patricia Teevan

**Area Sales Managers:**  
Bayard Nicholas, Stamford, Conn.  
(203) 357-7781  
James G. Kane, Chicago (312) 296-5571  
Harold L. Keeler, Los Angeles (213) 879-2447  
William Coughlin, San Francisco  
(415) 398-4444  
Yoshi Yamamoto, Tokyo 535-6614

**European Sales Representative:**  
Richard A. Ewin  
Overseas Publicity Ltd.  
214 Oxford St.  
London W1N 0EA, England  
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# Two airplanes for

The two airplanes are one and the same: the Boeing 747 Advanced Tanker/Cargo Aircraft.

Instead of having two separate airplanes doing two separate jobs, one wide-body 747 does both.

The 747 ATCA can refuel C-5A, C-141 or fighter aircraft to extend their useful range, or complement the present USAF cargo carriers by hauling "oversize" cargo.

For example, the range of the C-5A and the C-141 carrying combat loads can be significantly extended when they are teamed with the Boeing 747 ATCA.

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747s in service or on order by airlines throughout the world, Boeing has proven its ability to meet the broad-based requirements for an advanced tanker/cargo aircraft.

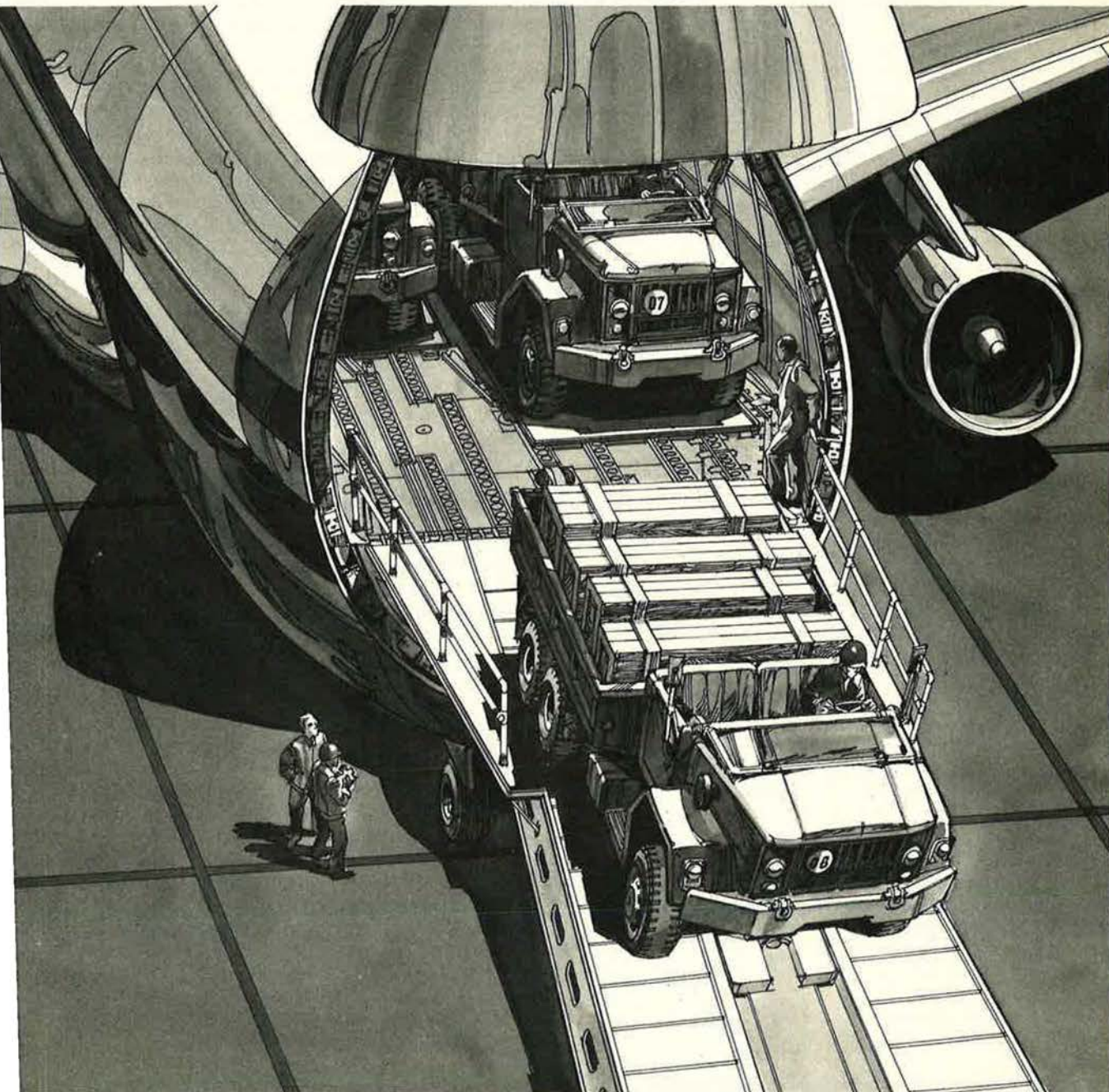
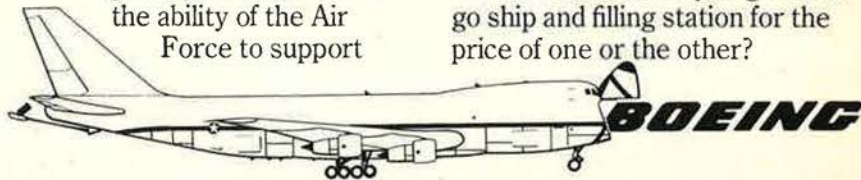
Considering the operational flexibility of these ATCA aircraft, the multi-mission concept is obviously an economical choice, and in the long run will save taxpayers millions of dollars.

As a tanker, the 747 could cut down America's dependence on foreign bases for refueling.

As a military cargo carrier, the 747, with its oversize cargo surge capability, would enhance the ability of the Air Force to support

U.S. Army deployment overseas. Especially in an emergency where large amounts of equipment must be moved quickly.

The 747 Tanker/Cargo Aircraft. Where else could you get a cargo ship and filling station for the price of one or the other?



# Soviet Civil Defense— Upsetting the Strategic Balance

By John L. Frisbee, EXECUTIVE EDITOR

**A**SSURED Destruction, the foundation of US deterrence on which our survival as an independent and influential world power ultimately rests, has been undermined by a significant, though undramatic, element of the USSR's military posture. That element—Russia's massive civil defense program—has been known to, but ignored by, the US SALT negotiators. Consequently, you will find scant evidence of concern in the annual defense reports of the Secretary of Defense and the Chairman of the JCS. Nevertheless, concern is real, and it is justified. In recent weeks, the door has been opened a crack on a scene that has chilling implications for the US deterrent.

While these implications are being studied in the Pentagon (and one hopes in the State Department, too) and discovered on Capitol Hill, an important book has come off the press: *War Survival in Soviet Strategy*, by Leon Gouré, Director of Soviet Studies at the University of Miami's Center for Advanced International Studies. Here are a few highlights that emerge from the book and from other sources:

The Soviets have never accepted Assured Destruction as an operational strategy. They do not share the Western notion that a nuclear war would be over in a few days, and that there could be no winner. The Soviet concept is based on a first strike to blunt the US retaliatory capability and decimate our control and industrial structure, an extensive air defense system, and comprehensive civil defense measures that would enable them to fight on to victory. Civil defense, in their view, is a "decisive strategic factor"; victory depends on "survival preparations."

Guided by this strategy, the USSR began in the mid-1950s to invest an estimated \$1 billion a year in civil defense. Since the SALT agreements of 1972, they have stepped up their civil defense expenditures. (The US Defense budget for FY '77 includes \$71 million for civil defense.)

The scope of Soviet war survival preparations is difficult to grasp. The entire program is headed by a Deputy Minister of Defense, General Colonel A. T. Altunin. Enough hardened shelters have been built already to accommodate a large part of the administrative and industrial work force. Elaborate plans have been made and rehearsed for evacuating other urban residents to safe areas. All citizens are required to take courses in civil defense, and several million people, including 40,000 regular Civil Defense Troops, are in-

involved in administering the program. Essential industry has been dispersed to nonurban areas, hardened against nuclear attack, and spare parts cached in secure storage.

How has all this affected the US Assured Destruction capability, generally defined as the ability to respond to a Soviet first strike by destroying half of their industry and killing forty percent of the population? The Soviets claim, and US defense experts believe, that Soviet preparations would reduce their casualties to about seven percent of the entire population and five percent of workers in essential industry. The US, with virtually no civil defense program, would lose half its population or more, depending on the nature of the Soviet first strike.

Now an even more ominous development has emerged. The Soviets are increasing their emphasis on shelters (to which people could repair in minutes) and reducing reliance on evacuation, which would take about seventy-two hours, could not be concealed, and hence would give us strategic warning. (See box, p. 73.) This move, coupled with the enormous buildup of Soviet offensive forces, has the earmarks of a drive for a credible first-strike posture and a world in which there would be only one superpower.

What can the US do about it? For economic, social, and political reasons, we may as well forget about duplicating the Soviet civil defense system or persuading them to scrap theirs. But former US Ambassador to the USSR Foy Kohler offers some alternatives in his foreword to Dr. Gouré's book. The purpose of the SALT talks supposedly is to achieve equal security for both sides. We, therefore, should demand a higher ceiling on US offensive weapons to offset the imbalance in civil defense. He also suggests that we could threaten to pull out of the ABM Treaty of 1972 and build a comprehensive ABM system, relying on our technology to outdistance the Soviets. There are other, perhaps more effective measures, such as accelerating development of MX and improving missile accuracy; and still others that could be taken concurrently, including withholding technical and economic aid to the Soviets.

The extent and implications of Soviet war survival preparations have too long remained in the shadows of détente and of the frantic search for "mutual limitation" of strategic arms. Civil defense is as much a part of the strategic balance as are missiles and bombers. The crucial fact must no longer be ignored.

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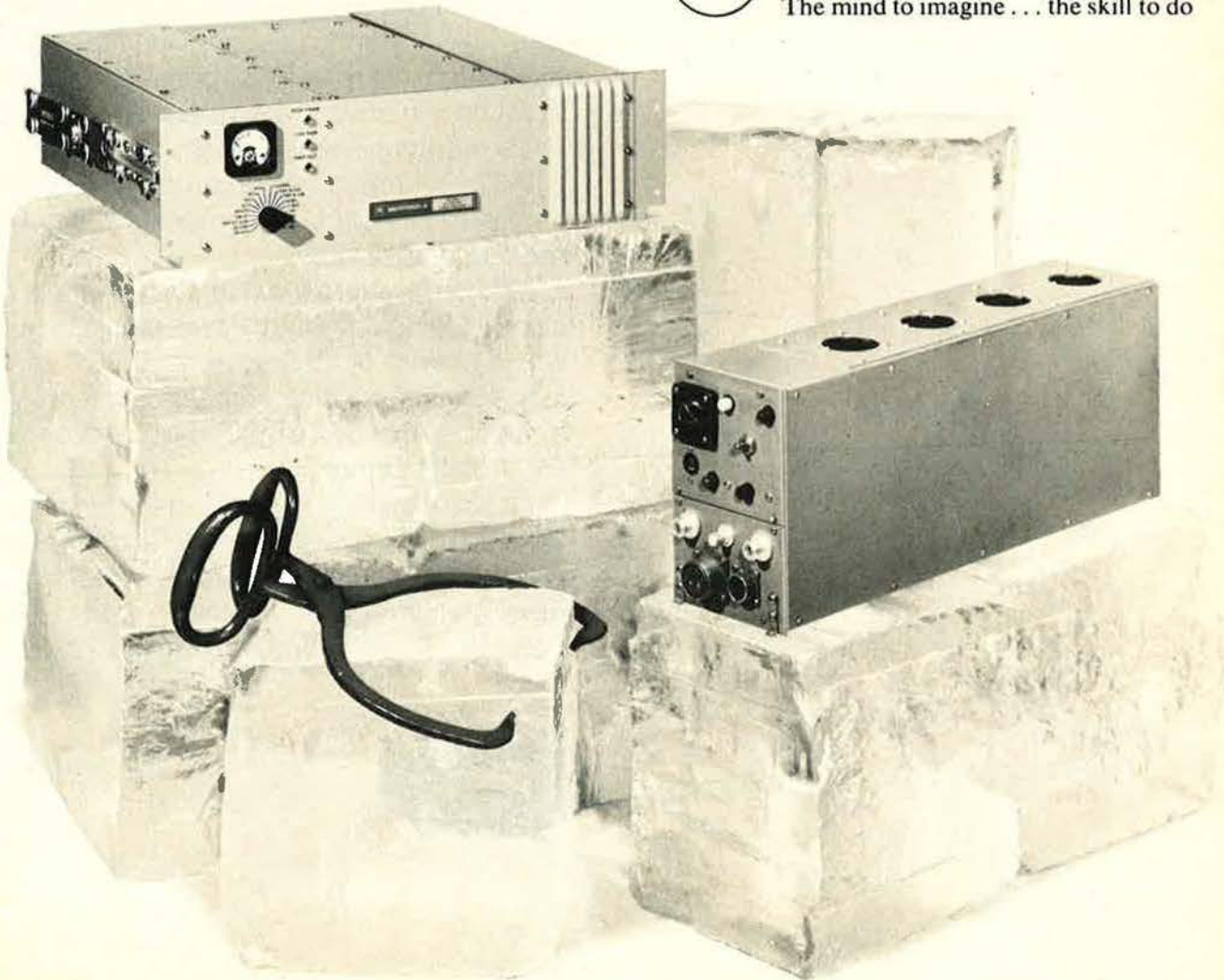
tion and simplicity in state-of-the-art design. The result: high efficiency with lower life cycle cost.

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If you would like additional information on the capabilities of the Bendix Corporation's Aerospace-Electronics Group, write for our brochure "Worlds of Creativity" at 1911 North Fort Myer Drive, Arlington, Virginia 22209.







# Airmail

## Containment by a Different Tool

At the end of his analysis of Soviet military expenditures (*May issue*, p. 33), Lt. Gen. Daniel O. Graham poses the question: "Can the United States continue to deter the growing Soviet military threat with a grudging 5.4 percent outlay on defense?"

Earlier in the article, after concluding that Soviet military expenditure is about twenty percent of GNP and showing how this drains the nonmilitary sector, he makes the point: "They would rather expend their limited hard currency to buy grain from America than alter military priorities."

Isn't that the crux of it? Surely the test of US determination to oppose Soviet expansion is to use all the tools available. Nothing illustrates more clearly the inherent contradictions of the Soviet system than its inability to feed the people who suffer under it.

The paradox of the East-West struggle is that the authoritarian regimes, which deny individual freedom, are winning hands down by promising the poor nations advantages they are incapable of delivering to their own people.

The West, where individual freedom, though threatened by increasing government intervention, is still a reality, appears to be content to let the Third World go the authoritarian route. The West, which has made an art of selling commercial ideas, fails to apply it to the vital matter of selling political ones.

Soviet military expansion forces the United States to match it. What better way to contain that expansion than by forcing the Soviets to divert domestic effort from guns to butter?

Kenneth McDonald  
Willowdale, Ontario, Canada

## New Picture Emerging

Your June article, "The Luftwaffe's Master Interrogator," by Royal D. Frey, provided something that very few Americans know about—the discovery that highly professional, humanitarian, intelligent, and kind

officers served in the German armed forces during WW II.

There must be many more un-sung men like Hanns Scharff, who served with honor, fought with courage, held malice toward none, and treated everyone with a human kindness that was in direct opposition to Nazi ideals of conquest and hatred. The fact that they served in a German uniform does not belittle their accomplishments and the credit they were to the men they commanded and came in contact with.

The picture of soldiers like Hanns Scharff shatters the myth, painted by Hollywood, that all Nazi officers were brutal and animalistic. I'm glad to see it done.

2d Lt. Bert M. Obleski  
Pittsburgh, Pa.

## Lower Benefits

The article, "AFRES/ANG—Best Shape Ever," by Ed Gates, in the June issue was excellent, and I would like to see more news coverage of the Reserve Forces.

I would like to correct Mr. Gates in the Reserve Forces benefits presented. He stated that a nonrated O-5 with twenty-two years received \$5,500 annually. According to my computations, and I am an O-5 with twenty-two, the benefit is closer to \$4,316.

Leon G. Rabinowitz  
Macon, Ga.

• *The \$5,500 figure was given by the Reserve people and it survived when a final draft ran through them. However, it was wrong, we regret to say. The correct figure: \$4,316.19.—*  
THE EDITORS

## Screwy Weapons Department

It was quite amusing to read about the WW II experience with the "Flying 75" ["AAF's Flying Artillery—The 75-mm Baker Two-Five," by Lt. Col. Jim Brewers, USAF (Ret.)], but as long as we are going back, let's go just a few more years back to a somewhat more sophisticated and probably just as hilarious scheme that the Air Force tried in the B-18A

(the "A" was the Andy Gump chinless version of the '18).

In the late '30s, someone in the Air Force hierarchy got worried about massive enemy bomber fleets and how to cope with them. The 75-mm gun firing shrapnel shells was the candidate bomber-knocker downer.

A 75-mm field piece, complete with gun crew, was mounted in the fuselage of the B-18A, the tube sticking out under the nose through a sort of ball joint, which provided limited tube movement so that the pilot was not charged with lifting the nose of the aircraft to adjust for range. A two-meter base range-finder was stuck through both sides of the fuselage to determine the range for the purpose of cutting the fuze.

The idea was to lay back about 3,000 yards and, in effect, shoot at bomber fleets with a three-inch shotgun firing ½-inch lead balls (and for all you throttle jocks, no one in the US Air Force saw any shrapnel, that being an onomatopoeic misnomer for shell fragments that Claude Witze's "Wayward Press" got screwed up even back in WW II). This idea didn't prove too practical either.

There were a couple of other interesting but seemingly screwy ideas that were tried in the same time period. Using automotive drum brakes to stop windmilling propellers on the B-17 was one of them.

There was a unit at Wright Field headed by Maggie Herion that had a historian named Fitzgerald, I believe, who recorded a lot of these schemes. It might be interesting to resurrect some of them, if for no other reason than to recall that we have been constantly reinventing the wheel!

To those of us who grew up with the "Dayton Kids," it has been very gratifying reading about some of them—people like Brookley, Doc Little, Street, Harris, Wade, Strahr to name a few.

Thanks for the memories!

N. J. Constantine  
Washington, D. C.

## One of Our Bases Is Missing!

The 1976 edition of the Air Force Almanac is filled with excellent and useful Air Force statistics that I will refer to in the course of my job during the next twelve months.

In looking at the organization

charts on SAC (Command, Eighth, and Fifteenth Air Forces), I cannot find Castle AFB, Calif. (93d Bomb Wing). The 1975 Almanac reflected Castle as a direct reporting unit to Fifteenth Air Force. Is there a reason why Castle is omitted from the Fifteenth Air Force organization chart, *i.e.*, realigned as a direct reporting unit to Eighth Air Force or SAC?

I was assigned to the Castle Management Engineering Team (SAC-MET) from December '72 through July '74, and thoroughly enjoyed Castle as an assignment. Would appreciate your assistance in trying to "locate" Castle within the Air Force organizational structure.

MSgt. Richard H. Lewis  
APO New York

• *Castle AFB and the 93d Bomb Wing are alive and well, and still reporting to Fifteenth Air Force. The installation was inadvertently omitted on the chart furnished by the Command.*—THE EDITORS

#### FAIP Flap

When first-assignment instructor pilots (FAIPs) heard, a few months ago, that only one in ten would likely remain in the cockpit after leaving ATC, there was much concern throughout the command. FAIPs were disgruntled, to put it mildly, and the rumblings on the line echoed up the chain of command through squadron and wing commanders to General Roberts.

During this time squadron commanders tried to calm the FAIPs and keep morale from waning. Instructors were told that first-assignment pilots in other commands were facing the same situation. As the rumor mill ginned up and rumors of FAIPs being PCAed and then returned to instructor duty circulated, FAIPs became critically concerned. Such career progression would delay if not eliminate the chances for a weapon systems identification.

By this time, General Roberts had studied the problem and wrote directly to the FAIPs. He would personally investigate and, if able, ameliorate the situation.

As a consequence, in recent communications with MPC I find that FAIPs now have a sixty-seventy percent chance of continuing to fly after leaving ATC. Recently, here at Columbus AFB, five of five

FAIPs found themselves remaining in the cockpit. Rumors have ceased, we're mission-oriented again, and morale is strong.

We FAIPs now look forward to our next assignments, whereas but a few months ago we were apprehensive about the assignment system. More importantly, we feel that General Roberts has earned our personal respect and admiration for such concern for the welfare of his people. We will long remember his example of care coupled with action as we ourselves become supervisors.

General Roberts, Sir: Well done—and thanks!

Lt. Glenn A. Mercer  
Columbus AFB, Miss.

#### Unit Patch Display

I am working on a display for my Air Force Recruiting Office in which I am using Air Force unit patches. As I am having quite a bit of difficulty locating these patches, would deeply appreciate any, old or new, that anyone would like to contribute to a good cause. Please send them to

TSgt. Delbert F. Harris  
USAF Recruiting Office  
P. O. Box 387  
Hickory, N. C. 28601

#### P-47 Wreckage

On April 23, 1944, a P-47C, Serial No. 41-6585, assigned to the 495th Fighter Training Group, based at Atcham, England, was on a flight near Shawsbury when it collided with an RAF "Tiger Moth," shearing off the P-47's port wing.

The pilot bailed out and hit the ground not too far from where his ship went in. The farmer on whose property they landed ran to check him out and ascertained he was unhurt.

Last December, a group of Air Wreckologists received a report of this crash and received permission from the farmer to dig it out. Using a mine detector, they pinpointed the wreckage and dug out the remains from sixteen feet down, their deepest dig.

I act as liaison for these English Air Wreckologists, who travel all

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

over England digging out the remains of Allied and German aircraft. They have asked me to try to put them in contact with the P-47's pilot, if at all possible.

The only other information that has been learned to date is that the Group's CO was a Col. Jack W. Hickman.

If any readers can supply information on the incident, or the identity and whereabouts of the pilot, please write me.

George B. Gosney  
419 N. Wabash St.  
Wheeling, W. Va. 26003

#### German POW's Ring

I have come into possession of a ring that formerly belonged to a World War II US Army Air Forces pilot who was taken prisoner and confined in a German POW camp, Stammlager VIIA, at Moosburg, Bavaria.

In April 1945, the pilot traded his ring to an Italian officer in exchange for some food. Recently, the Italian, who now lives in Florence and is most anxious to return the ring to its rightful owner, asked if I could help find the former pilot in question.

The information provided here is meager, but I am hopeful of developing some facts that will ultimately lead to the ring's return.

I would be most grateful to anyone who can provide any helpful scrap of information.

Lawrence Elliott  
Arch Bridge Road  
Ghent, N. Y. 12075

#### 78th TFS History

The 78th Tactical Fighter Squadron, RAF Woodbridge, England, is attempting to reconstruct its history in a more detailed format. We'd like to make contact with former "Snakes" of World War II and before, especially the period between September 1933 and September 1937.

1st Lt. Charles T. McCrea  
78th Tactical Fighter Sqdn.  
APO New York 09405

#### 95th History

The 95th Pursuit/Fighter/Fighter Interceptor Squadron has been reactivated at the Air Defense Weapons Center, Tyndall AFB, Fla., as the 95th Fighter Interceptor Training Squadron.

Since reactivation, the 95th has

# Airmail

attempted to reconstruct its proud history. We would appreciate hearing from anyone who has historical data directly or indirectly related to our squadron. Personal recollections welcome. Any materials received will be promptly returned upon request and in the condition received.

The 95th is grateful to those individuals who have already contributed.

2d Lt. Stephen W. Losacker  
Assistant Historian  
95th FITS (ADCOM)  
Tyndall AFB, Fla. 32401

## "Cottontails"

Former members of the 450th Bomb Group (H) "Cottontails" are requested to write some of their exploits while serving with the group in Europe during WW II. I am writing a book on the "Cottontails" and can use all the material I can gather, along with historical material from USAF Historical files.

MSgt. Herb Manchester, USAF  
(Ret.)  
1275 15th St., Apt. 9Q  
Fort Lee, N. J. 07024

## Trying to Locate . . .

I am trying to contact, or find out the whereabouts, of the following former classmates of Class 50-F at Randolph AFB, Tex., and Williams AFB, Ariz.:

Col. John W. Planinac, USAF (Ret.); George A. Bloomfield, Jr.; Beverly L. Dunjill; Monte M. Duncan; Robert F. Hazeleaf; Stanley R. Luther; Cecil L. Kempfer; John W. Oshant; Clayton K. Squire; Theodore W. Quandt; David R. Huffman; Vance R. Sluder; and Kenneth Houseman.

Any information will be appreciated.

Jerry Schnapp  
4709-3 Arlington Ave.  
Riverside, Calif. 92504

After discharge from the Ninth AAF I lost contact with my overseas group—the 908th Air Engineer Squadron, 490th Air Service Group. Would appreciate hearing from former members.

Edmond J. Mussche  
435 Ridge Rd., #104  
Wilmette, Ill. 60091

## UNIT REUNIONS

### Air Commandos

The 1976 Air Commando reunion will be held in Fort Walton Beach, Fla., October 9-11. All persons ever assigned to or associated with a USAF Air Commando or Special Operations unit are invited. For details and/or advance reservations write

Reunion Committee  
Air Commando Association  
P. O. Box 7  
Mary Esther, Fla. 32569

### AIRSHO 76

On October 7-10, the Confederate Air Force will produce AIRSHO 76, in Harlingen, Tex. Top airshow performers will fly during the 4-day show. In addition to displaying the greatest collection of WW II combat aircraft, the Ghost Squadron of the CAF will recreate the historic air battles of WW II. Evening entertainment in a WW II bomber hangar will be provided for the spectators. Further information from

Glenn Bercot, CAF  
Chairman, AIRSHO 76  
Hq. Confederate Air Force  
Rebel Field  
Harlingen, Tex. 78550

Phone: (512) 425-4193

### FACs

All FACs, past and present, are invited to a reunion September 17-19, at the Sheraton Hotel, San Antonio, Tex. Further information from

Capt. Gary Pointer  
2102 Peachblossom Dr.  
San Antonio, Tex. 78247

Phone: Autovon 487-5697

### Pampa Army Air Field

The 4th annual reunion of all former servicemen and civilians stationed at Pampa Army Air Field, Pampa, Tex., during WW II, will be held August 14-15. For additional information or to make reservations contact

PAAF Reunion Ass'n  
Box 2015  
Pampa, Tex. 79065

Phone: N. Spoonmore, (806) 665-2526

### 8th Air Force

A Stateside reunion of the 8th Air Force will be held in Dayton, Ohio, October 15-17. For details write

8th Air Force Reunion  
c/o Reunion Services  
Box 1304  
Hallandale, Fla. 33009

### 9th Air Force

A reunion of former members of all units of the WW II 9th Air Force (North Africa and Europe) is being held at Miami Beach, Fla., October 29-31. For details write

9th Air Force Reunion  
c/o Reunion Services  
Box 1304  
Hallandale, Fla. 33009

### 39th Fighter Group

A reunion of the 39th Fighter Group (1939-46) will be held October 8-10, at the Ramada Inn, Fort Walton Beach, Fla. All past members invited. Contact

E. S. Wildermuth  
8 Wimbledon Way  
Shalimar, Fla. 32579

or

James Darnley  
3 Anastasia Dr.  
Fort Walton Beach, Fla. 32548

### 345th Bomb Group

A reunion of the 345th Bomb Group (M) will be held October 6-8 at Gulf Shores, Ala. For further information contact

James Burson  
210 Euclid Ave.  
Mt. Brook, Ala. 35213

### 346th Fighter Squadron

The 346th Fighter Squadron, 350th Fighter Group, WW II, will hold a reunion October 29-31, at the Belleview Gulf Resort Motel, St. Petersburg, Fla. Contact

Leo Fiyalko  
3920 Central Ave.  
St. Petersburg, Fla. 33711

Phone: (813) 821-1020

### 391st Bomb Group

The second reunion of the 391st Bomb Group Association (WW II, England and France) will be held October 2-3, at the Hyatt-on-Hilton-Head Island, Hilton Head, S. C. Contact

M. V. Myklethun  
1893 E. Minton Dr.  
Tempe, Ariz. 85282

### 416th Bomb Group (L)

A reunion of the 416th Bomb Group (L) will be held at Howard Johnson's Motor Lodge, Orlando, Fla., August 6-8. Details from

Larry T. Hancock  
930 Gelwood Ave.  
Orlando, Fla. 32807

### 482d Bomb Group

The 482d Bomb Group, Alconbury, England, WW II Station 102, includes the 36th, 812th, 813th, and 814th Bomb Squadrons and attached units. We are in a regrouping action for future reunions and setting up a newsletter. Minireunions will be held at 8th AF reunion, London, England, September 13-17, and Dayton, Ohio, October 15-17. Anyone assigned at any time to above units please contact

Denny Scanlan  
200 West Plato Blvd.  
St. Paul, Minn. 55107

### 829th Bomb Sqdn., 485th Bomb Grp.

I am interested in making contact with members of the 829th Bomb Squadron, 485th Bomb Group (H), 15th AF. Please write

Col. Willis D. Muir  
NGB/CF, Rm. 2E384  
The Pentagon  
Washington, D. C. 20310

# Airpower in the News

By Claude Witze, SENIOR EDITOR

## Fireworks, Here and Now

Washington, D. C., July 7

There is a feeling, as the bang of Bicentennial fireworks dies out along the Potomac, that the Air Force's B-1 bomber program is nearing realization. Only the most timorous have failed to predict that the production order will come this year. The betting is about like that on Jimmy Carter for President; he may win that one, but it is unlikely that the B-1 go-ahead will be held up until he gets in the White House. In this connection, there are words of caution to be found in the new Democratic platform, just pounded together in a five-day session at the Mayflower Hotel. The platform calls for:

- Continued maintenance of US strength in both strategic nuclear forces and conventional forces.
- Reduction of defense spending by from \$5 billion to \$7 billion.
- Delay of further decisions regarding B-1 bomber production until February 1977.

The platform committee debate on these issues did not take long, and wherever changes were made in the first draft, they generally called for a stronger defense posture. Carter forces were credited with support for a platform demand for parity with Russia. The party liberals managed to defeat another amendment that would have pledged JS military capability "second to none."

As reported here last month, the idea of delaying a B-1 production decision until next year was approved once by the Senate, voting on an amendment to the defense authorization bill by Sen. John C. Culver. In the past month there have been three important votes in Congress and a conference that is worth viewing this month. The votes:

• **June 17:** The House passed a bill appropriating \$105.4 billion for defense in Fiscal 1977, by a vote of 331 to 53. An amendment to defer B-1 production until next year lost, 186 to 207.

• **June 30:** The House passed an authorization bill for weapons procurement and research and development, calling for an expenditure of \$32.5 billion in this segment of defense activity. The vote was 339 to 66. There is no restriction on the B-1 program.

• **July 1:** The Senate passed the same bill, 78 to 12, and sent it to the White House.

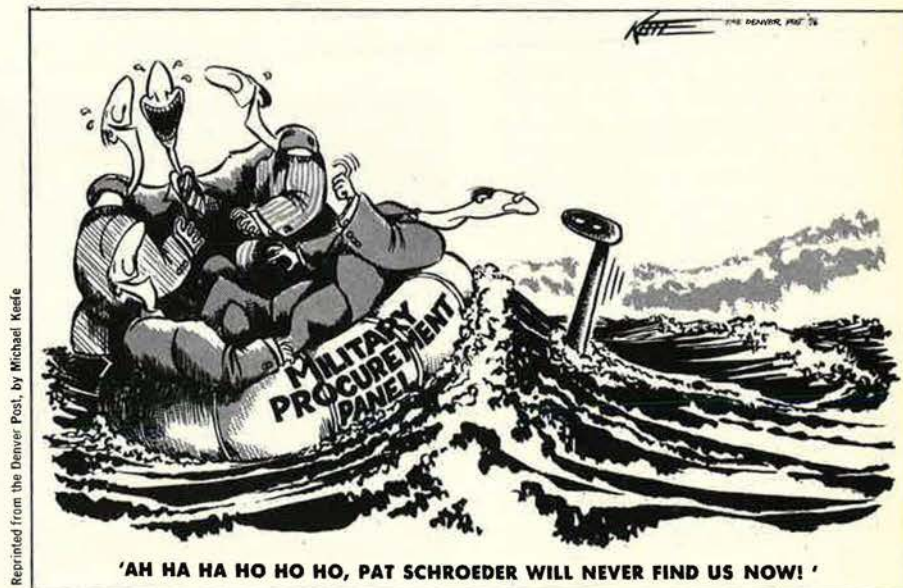
On top of this, Chairman Edmund Muskie of the Senate Budget Committee appears content, as he did not a month ago, and there is satisfaction that defense will stay within the budget target set last May. The remaining hurdle is final Senate action on defense appropriations. Mr. Culver says he will continue his fight to let the winner of the election have his own way on the bomber.

The story behind the compromise on the authorization measure is a new chapter in legislative history. There were wide differences between the original versions of the authorization bill as passed initially by the House and Senate. In addition to the B-1 delay, added in the Culver amendment, the House had voted to procure three expensive nuclear-powered Navy vessels, not approved by the Senate. In fact, the Senate version would have authorized \$1.5 billion less than the House had voted.

The \$32.5 billion bill now approved in both houses is about \$2 billion less than the Pentagon requested, but that still is a smaller cut than experienced in recent years.

The most interesting challenge was not to the spending program at all, but to the established procedures. The row started on June 10, when the Senate and House conferees, all from the respective Armed Services Committees, met in Room S-126 at the Capitol. Among those present, but not named as conferees, were Representatives Patricia Schroeder, Democrat of Colorado, and Bob Carr, Democrat of Michigan. Both are members of the House Armed Services Committee. They announced they were going to stage a sit-in. Ms. Schroeder said "it is a matter of principle" and they wanted to be present to defend their own proposed amendments and see how the conferees handled their business.

This announcement came as something of a shock to such vet-



# Airpower in the News

erans of the system as Sen. John C. Stennis, Chairman of the Senate Armed Services Committee. It was even more of a jolt to House seniors, particularly Chairman Melvin Price, former Chairman F. Edward Hébert, Samuel S. Stratton, and others of the designated conferees. Mr. Hébert, who has announced he is retiring from Congress, is the Armed Services veteran who was deposed as Chairman last year in an early revolt of the young contingent elected in 1974. At the outset, Mr. Hébert declared the presence of Ms. Schroeder and Mr. Carr was contrary to the rules and that he would not take part in a conference with them present. He was supported, for what it was worth, by a vote which called for eviction of the two visitors.

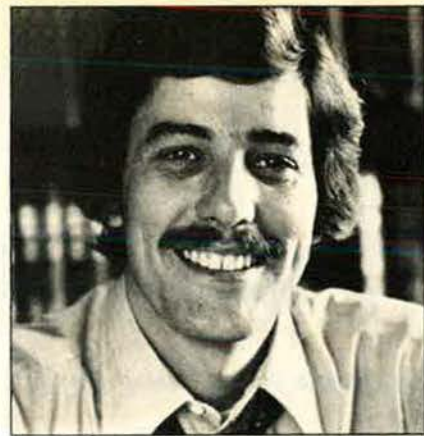
On June 11, the confrontation was resumed, and for a time there were three protesters, as the rebels were joined by Rep. Ronald V. Dellums, Democrat of California. He did not stay long. But the conferees voted to request Ms. Schroeder and Mr. Carr to depart "in accordance with the rules of the House." They maintained they had no such interpretation of the rules from the House parliamentarian. For a second day, no business was transacted.

Mr. Hébert said privately he had obtained a ruling from the parliamentarian, William Holmes Brown, and that the sit-in violated House regulations. The next meeting of the conferees was held on June 15. Mr. Carr told reporters in the corridor that the conferees and their acting chairman, Mr. Price, were somewhat helpless. The only way he and Ms. Schroeder could be ejected would be by the Sergeant at Arms of the House, Kenneth R. Harding. But the conference on weapons authorization was being held in a Senate conference room in the Capitol, and the House officer has no jurisdiction there. At the suggestion that perhaps the Sergeant at Arms of the Senate, Frank N. Hoffmann, might do the job, the reply was that Mr. Hoffmann could not discipline a member of the House of Representatives.

On top of this, Chairman Price



Rep. Patricia Schroeder.



Rep. Bob Carr.

clearly had no appetite for a confrontation or a situation that would bring newspaper and television cameramen to the door for pictures of an eviction. Both Ms. Schroeder and Mr. Carr retained their dignity, simply insisting that the conference should be open to interested parties and they would not obey any rules to the contrary. That situation prevailed; reports are there was no misbehavior as the House and Senate men got down to work and hammered out the compromise authorization bill. They simply had two unwelcome spectators.

The Schroeder-Carr team held a press conference when their assault on House tradition, and rules, was finished. Mr. Carr was quoted as saying the House-Senate meeting was "nothing more than a floating crap game" with "an old-boy, clubby atmosphere." The opposing viewpoint—held by Mr. Hébert and others—was that the dissident couple were "childish" and "out for publicity." Their reply, in es-

sence, was that a small group of about twenty—actually there are twelve appointed conferees from each chamber—sat down and re-wrote legislation passed by the House and Senate. They charged that two-man subcommittees, staffers on loan from defense contractors, and legislators who need jobs for their constituents made the critical decisions.

Critic Carr followed this with a press release announcing that his sit-in experience will result in a Carr-Schroeder package of resolutions for the House, designed to open conference committees to the public eye. They would change the House rules to:

- Require that all conference committee meetings be open to the public unless the full House specifically authorized closing of a meeting.
- State that House members have the right to attend any conference committee meeting.
- Prohibit conference committees



The first two B-1 bombers at Edwards AFB, Calif., were joined by a third on June 1

from conducting business through subcommittees.

- Require that the Speaker make appointments to conference committees without regard to seniority.

- Allow members who have successfully offered an amendment to a bill being considered by a conference committee to discuss their amendment before the full House-Senate conference.

- Forbid conference committee votes being taken by proxy.

The Carr-Schroeder team has particular interest in the proposed guarantee of a voice in conference for amendment authors who win on the floor. Ms. Schroeder had succeeded, in the first round, in balking the outlay of \$474.7 million for AWACS aircraft until NATO nations agree to purchase the system. The Senate members of the conference opposed this idea and, the report says, "the House very reluctantly

recedes." Mr. Carr's pet project was the elimination of \$170 million proposed for the procurement of a dozen US-3A Carrier Onboard Delivery (COD) airplanes for the Navy. He was successful in the initial House vote, but his amendment was compromised in conference. The report recommended funding for six aircraft. Next time, they want the right to "discuss" the issue with the conferees before they vote the final terms.

When the conference report on weapons authorization was presented to the House by Mr. Price on June 25, it was followed in the *Congressional Record* by a steaming statement from Representative Hébert. He pointed out that the conference had unanimously adopted two motions offered by Mr. Hébert at the outset. They called for complete executive sessions and attendance restricted to designated con-

ferees and staff members. He cited a House rule:

"... a committee may close its doors in executive session to persons not invited or required, including Members of the House who are not members of the committee."

There was a vote taken by the conferees, in which they asked members in violation of that rule to leave the premises. Ms. Schroeder and Mr. Carr refused and sat in for the duration. To Mr. Hébert, they have created a situation that "must be nipped in the bud now because of its possible catastrophic effect upon the orderly conduct of the House."

He said he agreed with the conference report, but kept himself absent from the proceedings to call attention to the defiance that threatens House procedures. Here is one firecracker that will sputter on into the 95th Congress. ■

## The Wayward Press

We could not help being amused at the screams of horror from the newspaper world as it prepared to cover the Democratic National Convention at New York's Madison Square Garden. Our authority is *Editor & Publisher*, the trade magazine that prints facts about the press that the press frequently finds unfit to print.

The media were outraged when they found out how much it would cost to cover the convention. Some newspapers simply canceled out after a glance at the right-hand side of the menu. A television set—which print reporters now use to cover the news—rented for \$50 a day. Chairs were available for \$37.50 each per day. A typewriter stand, for those newsmen who can type, went for \$55 a day, without the typewriter.

*Editor & Publisher* reported the Associated Press was quoted a price of \$46,420 for installation and removal of photo facilities. And, "similar equipment and facilities were installed and removed twice at the 1972 Democratic and Republican conventions in Miami for \$14,000."

All this was in the *E&P* issue of June 26. Three days later, on June 29, commentator Marquis Childs told his readers he was aghast to learn that the cost estimate of current weapons in production had gone up—according to his authority—by \$55 billion since the projects went on the drawing board. In most cases, that was long before 1972, the last time his syndicate rented a chair at a convention. Mr. Childs called the \$55 billion an "overrun." Of course, there was no overrun at Madison Square Garden. After all, the press didn't get the cost estimate a decade ago.

A final note: Since 1965, television advertising rates in the Washington area have gone up 417 percent. Radio ad rates are up 149 percent. Newspapers have boosted the bite 128 percent. The *Washington Post* published the figures in June.

National defense is not involved, except on the periphery, but note must be made of a genuine blow for Freedom of the Press. It was not struck by the press itself, but by E. B. White, the distinguished essayist. Mr. White rose up at the Xerox Corporation. He said he jumped, in fact, and in the direction of his typewriter. What upset him was the fact

that Xerox paid \$55,000 to Harrison Salisbury, who has retired from the *New York Times*, to write a twenty-three-page article on travel in America. Xerox also agreed to buy \$115,000-worth of advertising space when *Esquire* magazine printed the Salisbury report.

Mr. White, who is seventy-six years old and lives on a farm in Maine, wrote to his local newspaper, the *Ellsworth American*, and called the *Esquire* arrangement a disaster for freedom of the press. Xerox was upset by what seemed to be a petulant comment from an old man and started a correspondence with the author. Now, Xerox won't do it again. Mr. White made his point, that subsidized articles set a dangerous precedent. He admitted the firm had been fully honest in its approach, but he was not confident other corporations and institutions would be so careful.

"Whenever money changes hands, something goes along with it," Mr. White wrote. "It would be hard to resist the suspicion that *Esquire* feels indebted to Xerox, that Mr. Salisbury feels indebted to both, and that the ownership, or sovereignty, of *Esquire* has been nibbled all around the edges."

In view of the alacrity with which the press jumps on possible ethical transgressions by others in our society, it is interesting that it was private citizen White, and not the press, who blew the whistle. There was no decisive blow from The Society of Professional Journalists, the Reporters Committee for the Freedom of the Press, the National Press Club, the American Society of Newspaper Editors, the National News Council, the American Newspaper Publishers Association, or any other organization. So far, *Esquire* retains its accreditation in the Periodical Press Galleries on Capitol Hill. The gallery rules, to which AIR FORCE Magazine and all other publications are subject, appear to ban representatives of any subsidized press, or one not mainly in the business of selling news reports.

E. B. White has done more for the Freedom of the Press than the press itself would attempt, shivering, as it says it is, in the "chilling effect" of judicial, legislative, and executive breezes. ■

# Aerospace World News, Views & Comments

By William P. Schlitz, ASSISTANT MANAGING EDITOR

Washington, D. C., July 6  
★ From the beginning, US space scientists stressed that events might preclude an attempt to land an instrument package on Mars during America's Fourth of July Bicentennial birthday celebration.

Their caution proved justified. Photographs from Viking 1, which was placed in orbit around the Red Planet in mid-June, revealed that the primary landing site was far too hazardous and that alternate areas would have to be investigated before a landing attempt.

Meanwhile, Viking 2, following a similar, months-long journey from earth, is due to begin orbiting Mars in August and to land an instrument package in September. This will either supplement or back up that of Viking 1. If either or both land successfully, one of the most exciting scientific undertakings of all time will begin—the quest for life on another planet.

Viking photos have already revealed that water—an essential to life as it is known on earth—is present in greater amounts on Mars

than had previously been suspected.

Closer to home, the Soviet Union in mid-June put into earth orbit a new unmanned space station—Salyut-5—apparently to test improvements in orbital-laboratory technology.

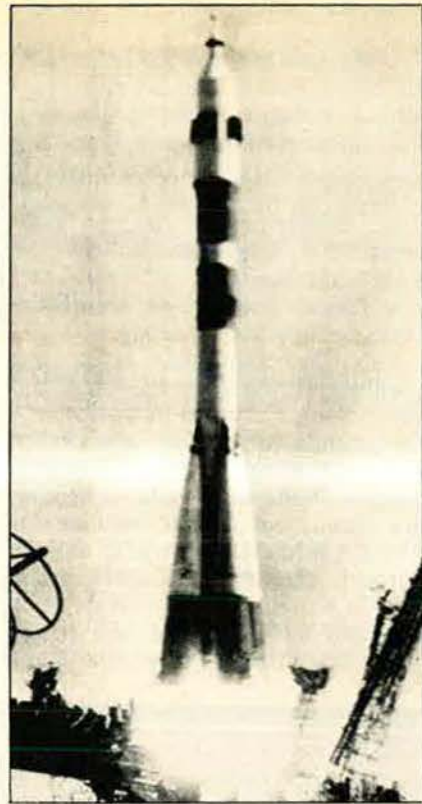
The craft is capable of housing up to six cosmonauts and is said to have two docking ports.

Some US observers believe that the Soviets may have under way a shot at the orbital endurance record set by an American Skylab crew in 1974—eighty-four days.

★ The Air Force has awarded a contract of almost \$29 million for the development of a longer service life rocket motor for its AGM-69 Short Range Attack Missile (SRAM).

For the program, Thiokol Corp.'s Wasatch Division, Brigham City, Utah, is to produce fifty-nine solid-propellant motors. USAF previously selected Thiokol over four other competitors. Boeing Aerospace Co., Seattle, Wash., is prime contractor for the SRAM program.

Once qualified, the Thiokol motors



Early in July, the USSR orbited Soyuz-21, manned by two cosmonauts and destined for a rendezvous with Salyut-5 (see adjacent item). This was the first manned space mission since the US/USSR orbital linkup in July 1975.

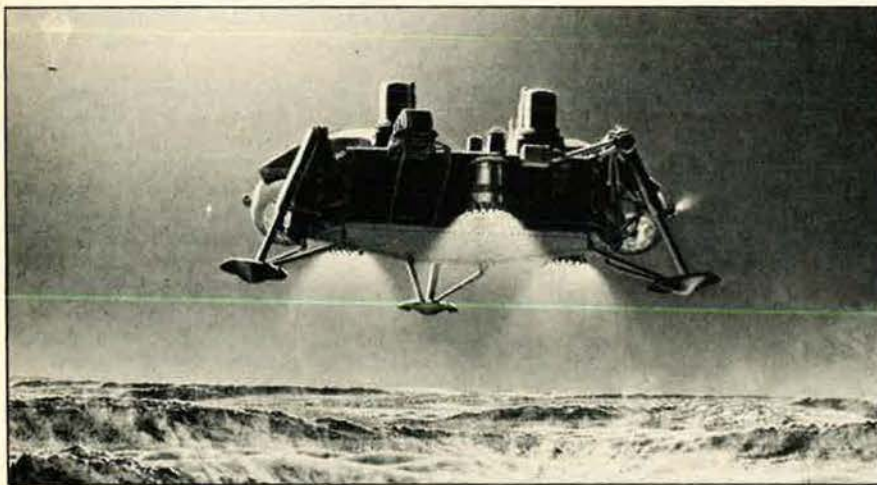
will replace existing AGM-69A motors as required and will power the AGM-69B, the SRAM proposed specifically for the B-1 bomber. Currently, SRAMs are a primary weapon of the B-52 and FB-111 bomber force.

Of the motors supplied during the thirty-five-month program, two will be flight-tested aboard missiles over the White Sands Missile Range in New Mexico while others will undergo qualification on static test stands.

The motors' service life is to be lengthened by changes in the solid propellant's ingredients.

The inventory motors now powering SRAM were built by Lockheed Propulsion Co., which has terminated its solid-rocket motor business.

In other missile news, the successful third test flight of an Air-Launched Cruise Missile (ALCM) over White Sands in late June demonstrated the capability of the weapon's engine, flight-control systems, and terrain-following equipment.



Artist's concept of the Viking touching down on Mars. Landing system nozzles have been especially designed to disperse propulsion.



This clears the way for a crucial series of tests bearing on ALCM's inertial-guidance equipment. The key to the missile's great accuracy, an on-board computer compares preprogrammed geographical features of the missile's flight plan to what is actually seen during the flight and corrects course as necessary.

The four flights scheduled for this phase of the Boeing missile's test program are expected to be completed by December.

★ The new AQM-34V tactical electronic warfare remotely piloted vehicle (RPV) is being put through its paces in a flight-test program at Hill AFB, Utah.

The usual procedure is for the vehicle to be launched from a DC-130E, perform a series of maneuvers to demonstrate flight capabilities, and then be recovered by HH-53 helicopter in flight.

The AQM-34V is an uprated version of the chaff dispenser RPV that was originally developed for deployment in Southeast Asia.

The "V" version has incorporated "improvements in active and passive ECM jamming, flight control, launch, recovery, and multiple vehicle control capabilities," according to USAF.

On completion of the Hill AFB tests, TAC will undertake a test and evaluation program to determine the operational capabilities of the RPV, built by Teledyne Ryan Aeronautical, San Diego, Calif.

★ In mid-June, a Short Range Attack Missile (SRAM) successfully separated from a B-1 bomber in flight. The inert SRAM weighed about 2,300 pounds (1,043 kg) and contained no engine or electronics.

The SRAM drop, according to USAF, was one of several tests accomplished during the seven-hour, forty-three-minute flight of B-1 prototype No. 1 and the first of a number of flight tests the bomber will undertake with the missile in coming months.

The separation test took place over Edwards AFB, Calif., while the B-1 was at 10,000 feet (3,048 m) altitude with a speed of 0.6 Mach or 450 mph (724 km/h).

With the recent maiden flight of USAF's third B-1 prototype, the bomber program at this writing had logged forty missions totaling more than 195 hours, of which about six

and a half hours were supersonic. Top speed: about 2.1 Mach or 1,350 mph (2,172 km/h).

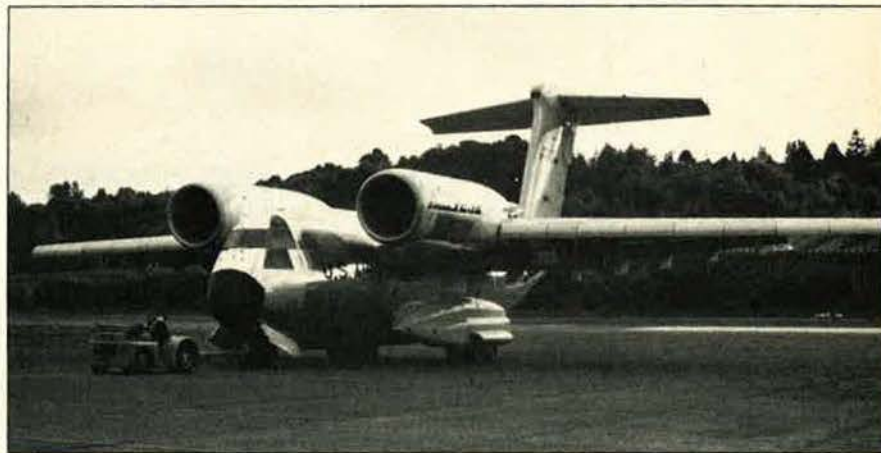
★ The JCS are gearing up to convert the Military Airlift Command to a specified command. In this context, MAC would be treated as a separate entity in all planning for peacetime JCS exercises and for war.

JCS would also be responsible for the allocation of tactical and strategic airlift resources, including

flight tests of various systems are to begin this fall at the Air Combat Maneuvering Instrumentation Range at Nellis AFB, Calif.

The plan is for Navy F-14 and Air Force F-15 fighters to simulate dogfights with F-5Es acting as aggressors. Computers will monitor the mock battles and evaluate the effectiveness of systems under test.

★ The Boeing Aerospace Co.'s entry in USAF's Advanced Medium Short Takeoff and Landing Trans-



Boeing's entry in the AMST program, the YC-14, at rollout ceremonies conducted recently in Seattle. The company will build two for USAF evaluation.

setting airlift priorities, and for MAC's direction during crises to ensure efficient and effective support of the unified commands. USAF would continue to support MAC administratively and logistically.

In ordering the move, Deputy Secretary of Defense William P. Clements, Jr., said that he considers it "imperative that the consolidation of tactical and strategic airlift resources be accomplished as expeditiously as possible. . ."

In a related move, in June President Ford nominated USAF Gen. George S. Brown for reappointment for another two years as Chairman of the Joint Chiefs.

★ DoD is planning a joint Navy/USAF air-to-air missile test program that may lead to a common missile system to replace the Sidewinder in the 1980s.

The program is to be divided into two independent but related areas: Air Intercept Missile Evaluation (AIMVAL) and Air Combat Evaluation (ACEVAL).

Under Defense Research and Engineering (DDR&E) supervision,

port (AMST) program was rolled out in ceremonies at Seattle, Wash., in mid-June.

The Boeing YC-14 is designed to operate from undeveloped runways as short as 2,000 feet (609 m), carrying 27,000-pound (12,247 kg) payloads.

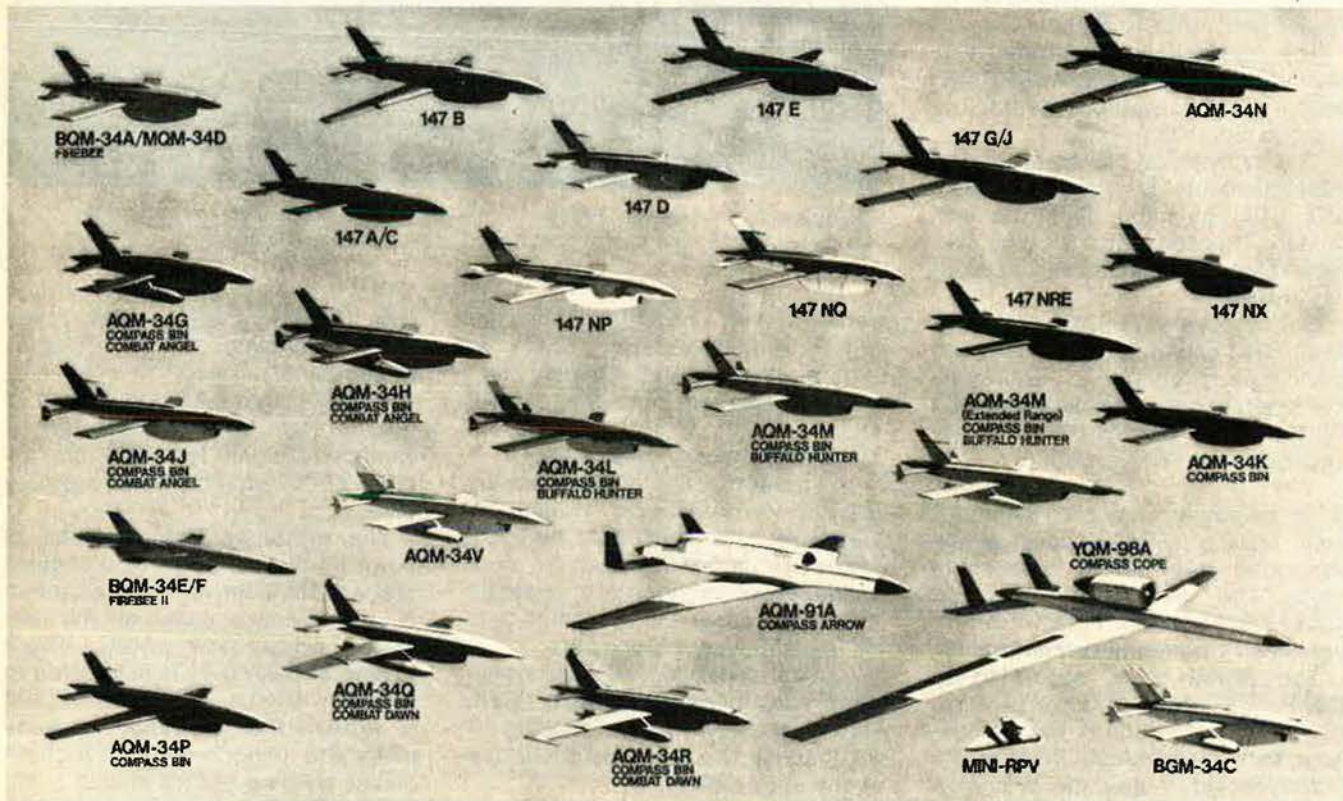
The prototype Boeing AMST is powered by two GE CF6-50 engines that are shoulder mounted atop and at the leading edge of the aircraft's wings (see photo). Flight testing of the YC-14 is scheduled to begin in August. A second aircraft is expected to be ready by summer's end, under a contract for both planes totaling \$105.9 million.

The Boeing contender in the AMST development program incorporates several innovations, including upper surface blowing—a way of deflecting engine exhaust along the curve of the wing and downward to create powered lift. The YC-14 also has a triply redundant digital electronic flight control and a long-stroke landing gear to absorb the shocks of landings on unpaved runways.

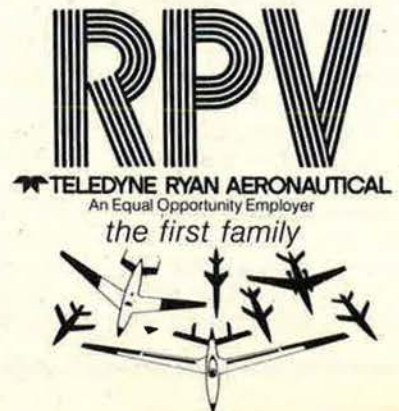
Two McDonnell Douglas proto-

# Teledyne Ryan has built and flown more combat-proven, record-setting, multi-mission RPVs than anyone else in the world.

## No one else even comes close.



When it comes to engineering and building operationally reliable and cost effective Remotely Piloted Vehicles, Teledyne Ryan shows the way. That's just part of a tradition of RPV leadership that began over 25 years ago, when we raised our family of RPVs to fly special missions. Long endurance, fast or slow, high and low. Today, all that experience is packaged in multi-mission RPVs that are something very special. And ready to go when you are.



# Aerospace World

type YC-15s are currently undergoing flight testing at the Air Force Flight Test Center, Edwards AFB, Calif.

★ Another rollout of a unique aircraft—the Rotor Systems Research Aircraft (RSRA)—took place early in June at United Technologies Corp.'s Sikorsky Div., Stratford, Conn.

The RSRA, the first of two planned flight test vehicles for a NASA/Army program, is a hybrid helicopter capable of both standard helicopter maneuvering and conventional cruise flight.

RSRA will be used to test and evaluate new rotor concepts, as well as current designs, in a realistic flight environment that can't be simulated in ground-based facilities, NASA said. The research will concern rotor aerodynamics, performance, structures, and dynamics.

compete favorably in the world helicopter market.

Objectives of the program: reduced noise and vibration, improved performance and cruise speed, and lower costs.

★ In an important related matter, NASA has chosen its Ames Research Center, Mountain View, Calif., as chief manager of future helicopter R&D. Ames will also act as focal point for industry participation in helicopter research, the space agency said.

This move followed a review of R&D needs by the specially appointed NASA Helicopter Management Advisory Group, which cautioned that significant advances must be made in helicopter technology if US industry is to share in the anticipated growth in the world market for both military and civil vehicles.

Ames has been assigned direction of the overall program and will conduct research in aeromechanics, including technology integration and large-scale testing and simulation.

Supporting Ames will be the Langley Research Center, Hampton, Va., responsible for structures and



USAF Capt. David J. Meyer, attached to the Marine Corps aboard the USS Nimitz, earned a "Centurion" patch for his 100th arrested landing. He's the first USAF F-4 Phantom pilot to earn the distinction.

AFA President George M. Douglas expressed his and the Association's appreciation of her efforts on behalf of the nation's active-duty servicemen and disabled veterans.

Since the death of her husband, Army Col. Mark Braymes, in 1965, Mrs. Braymes has continued a program initiated by him to bring groups of servicemen from around the country to the New Jersey resort for rest and relaxation on three-day, all-expense-paid trips. She has mobilized local civic and labor groups, area businessmen, and even the state police to provide everything from meals to transportation. At last count, more than 14,000 servicemen had thus been entertained.

For all this, Mrs. Braymes has a more ambitious project in mind. She is campaigning for the Atlantic City location of a VA rehabilitation center specifically designed to treat disabled veterans.

According to Mrs. Braymes, such a facility would be the first of its kind in the country. In her view, a specialized institution of this sort is urgently needed.

★ A Security Police Museum is planned for Lackland AFB, Tex., site of the USAF Security Police Academy.

The museum is to serve as a focal



Rollout of NASA/Army's hybrid Rotor Systems Research Aircraft took place at the Sikorsky facility in Connecticut in June. (See adjacent item.)

NASA is hoping to apply whatever technology advances stem from the program to civil uses, while the RSRA will be available to the US helicopter industry for rotor systems testing, the space agency confirmed.

Considering the predicted growth in civilian helicopter use, NASA said, it is important that technology advances be made available on a timely basis so that the US can

materials, avionics, and noise control. Lewis Research Center, Cleveland, will handle engines and propulsion, and helicopter transmissions, gearing, and shafting.

In its announcement, NASA noted Ames's proximity to the Army's Air Mobility R&D Lab, located at Moffett Field, Mountain View.

★ In a recent letter to Mrs. Lois Braymes of Atlantic City, N. J.,

# Aerospace World

steps are taken now to preserve it, General Sadler, who proposed the new museum, said: "Security police participation in both the Korean and Vietnam conflicts was distinctive and deserving of lasting recognition."



During the recent joint US military exercise "Solid Shield '76," Air Force C-130 transports flown by active, ANG, and AFRES crews carried some 5,900 troops to airdrops or airdrawings. It was the ninth annual readiness exercise.

point for generating esprit de corps and professional unity by giving security policemen a sense of history and pride, according to the chief of security police, Maj. Gen. Thomas M. Sadler.

Citing the wealth of experience and data that might be lost unless

Open to the public and housed within the Security Police Academy, the museum will include documents, replicas, communications and personal equipment, trophies, murals, and firearms. Later, larger items such as armored personnel carriers may be added.

## Note To AFRES Officers

Air Reserve Personnel Center (ARPC) Career Planners will be on hand at AFA's National Convention (September 19-23) in Washington, D. C., to provide individual counseling for Air Reserve officers (lieutenant colonel and below). They will be available at the Sheraton-Park Hotel on Monday, Tuesday, and Wednesday, September 20, 21, and 22.

AFRES officers who are not on extended active duty or on the retired roles, and who are interested in reviewing Career Briefs containing data from their Master Personnel Records, may arrange to do so by writing or calling the Officer Career Development Division, 3800 York St., Denver, Colo. 80205. Telephone toll-free 800-525-3086 for states other than Colorado; for Colorado: 800-332-9962.

Requests for Career Briefs must be received by the Air Reserve Personnel Center by no later than September 15. Interested officers should provide their name, rank, and Social Security number at the earliest possible date.

★ Each even-numbered year, at Germany's Hannover Air Show, the members of a unique fellowship assemble for an evening of rousing good cheer.

This past May was no exception, as hundreds of West German military pilots from all over the Federal Republic gathered for a reunion of the "Arizona Cactus Squadron."

The organization was created as a pleasantry in 1967 by then Gov. Jack Williams, who decreed that honorary Arizona citizenship be conferred on West Germans completing pilot training in the state. This was partly in recognition of the enthusiasm with which the young men joined in charitable, community, and social activities during their tours in the US.



The all-Air Force Johnson family. Clockwise from top, Col. Kenneth Johnson and sons, Mark, a first lieutenant, Kevin, newly commissioned, and David, a captain.

The German pilots—being pilots—reacted in kind and now every other year a passel of cowpokes and their fraus descend on Hannover for a night of high livin' and tall tales.

This time around it was also book night, as a special volume entitled, in English, "Those Wonderful Men in the Cactus Starfighter Squadron," went on sale. The book, with texts in both German and English, includes pictures of more than 1,000 German airmen who have gone through training at Luke AFB, Ariz., and of all USAF and Luftwaffe instructors. Edited by retired USAF Col. Barney Oldfield, it may be or-



**our world of  
make-believe  
will make  
a believer  
out of you...**

**FLIGHT SIMULATORS BY GRUMMAN**

**GRUMMAN** AEROSPACE CORPORATION

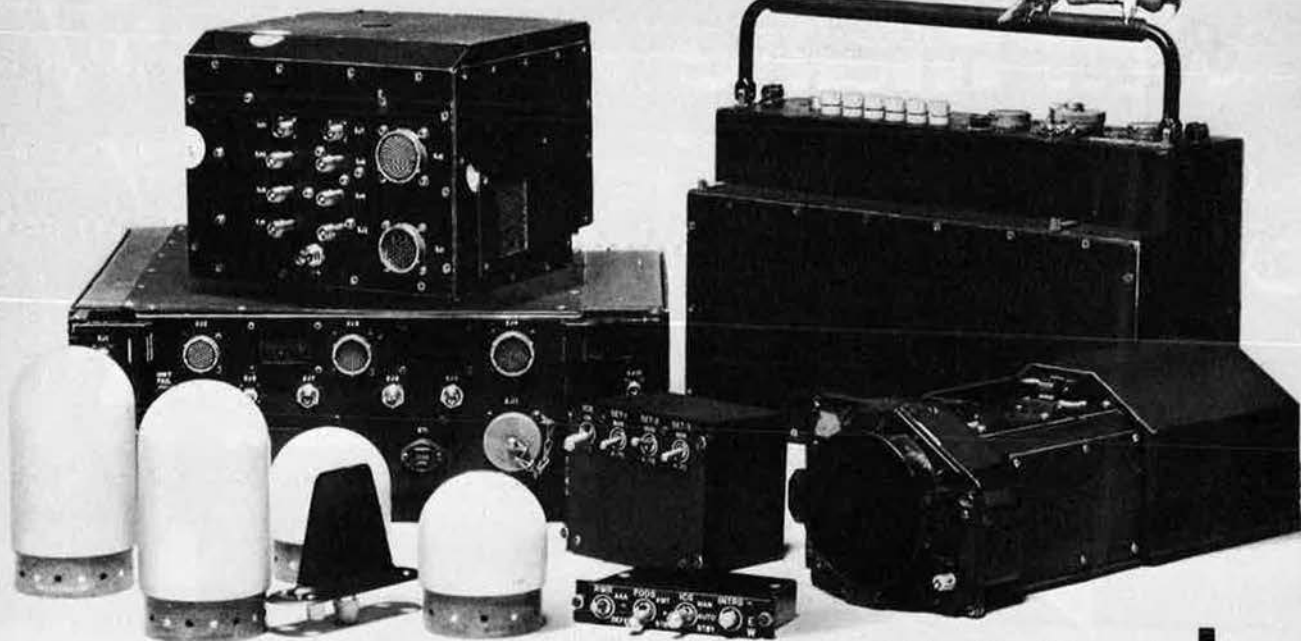
The fighter pilot's EW threat information and management system is now on board the F-15, the fighter pilot's fighter.

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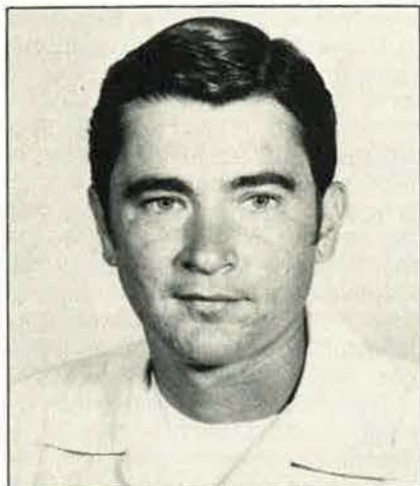


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# Aerospace World

dered for \$10.95 from Tom Rhone, Litton Industries, P. O. Box 1735, Glendale, Ariz. 85311. Proceeds go to the Glendale Boys Club, long a cause of Cactus pilots.



The Air Force Communications Service has named TSgt. Kenneth G. Saylor, 1961st Communications Group, Clark AB, P. I., as its Air Traffic Controller of the year (May '75 through April '76).

★ **NEWS NOTES**—USAF recently took possession of **Lockheed C-130 Hercules** No. 1,400, marking one of the longest aircraft production runs in history. The Hercules is in the service of thirty-seven countries around the globe.

Meanwhile, **Northrop Corp.** has delivered its **500th F-5E** tactical fighter. The F-5E and F-5F fighter-trainer serve some twenty nations; a total of 880 has been ordered thus far.

And, late in June, USAF took delivery of the 100th McDonnell Douglas F-15 Eagle fighter.

**Isaac T. Gillam IV**, formerly Program Manager of Small Launch Vehicles, NASA Headquarters, has been named **Director of Space Shuttle Operations**, Dryden Flight Research Center, Edwards AFB, Calif.

**David Taylor**, formerly USAF Assistant Secretary (Manpower and Reserve Affairs), has been named **DoD Assistant Secretary (Manpower and Reserve Affairs)**.



During this summer's Third Lieutenant program, USAF Academy Cadets Wayne Gravatt, left, and Gerald Pellett "fly" a B-52 simulator during their tour of service at Carswell AFB, Tex.

**John Martin** has been named **Assistant Secretary of the Air Force for R&D**, replacing Walter LaBerge, now at SHAPE Hq. in Belgium.

**AFRES Maj. Gen. John W. Huston**, AFA's Total Force Advisory Council Chairman, has begun active duty as **Chief of the Office of Air Force History**, Washington, D. C.

The final phase of a seven-year, \$123.6 million project to modernize **NORAD's underground air defense center** has begun. It will be completed next year.

**Marion Jayne** and her daughter, **Patricia Keefer**, piloting an Aero Commander 200D, placed first in the **26th Annual All Women's International Air Race**—the "Angel Derby"—a 1,732-mile (2,787 km) flight from Quebec to Fort Lauderdale, Fla.

The first fully guided **Tomahawk cruise missile** was launched from a Navy A-6 at 11,500 feet (3,505 m) on June 5 for a successful sixty-one-

minute flight over the White Sands Missile Range. General Dynamics builds Tomahawk.

The second week in August has been reserved for a "**Salute to Pioneer Air Line Pilots**"—those intrepid flyers who helped build the US civil air transport system. On August 11 the pioneers will be feted at a banquet in Washington, D. C., sponsored by the National Aeronautic Association.

**Dr. Alan M. Lovelace**, NASA Associate Administrator for Aeronautics and Space Technology, has been named **NASA Deputy Administrator**. Throughout a long career in Air Force R&D, Dr. Lovelace held a number of top posts, including AFSC Director of Science and Technology and Acting Deputy Assistant Secretary of the Air Force for R&D.

**Died: Floyd Odium**, multimillionaire industrialist husband of aviatrix Jacqueline Cochran, at his home in California. He was eighty-four. ■

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# Airman's Bookshelf

## USSBS Recaptured

*The United States Strategic Bombing Survey* (ten volumes), edited and with forewords by David MacIsaac; and *Strategic Bombing in World War II: The Story of the United States Strategic Bombing Survey*, by David MacIsaac. Garland Publishing Co., 545 Madison Ave., New York, N. Y. 10022, 1976. Ten-volume set, 3,379 pages: \$225. *Story of USSBS*, 190 pages; \$12.50.

*The United States Strategic Bombing Survey* (USSBS), begun some months prior to V-E Day and completed in 1947, is cited frequently by columnists, reporters, and commentators to prove (a) that World War II strategic bombing was the decisive factor in winning both the European and Pacific wars, and (b) that strategic bombing was a failure. With the passage of time and the increasing difficulty of finding copies of the original USSBS reports, both the proponents and the opponents of strategic bombing (especially the younger ones) have tended to accept USSBS documentation of their preferred positions as articles of faith, often, we suspect, without ever having seen a single USSBS report. The "Summary Reports" for each combat zone support proponents; selective use of various specialized reports has provided ammunition for the opponents.

The USSBS staff produced 321 reports on various aspects of strategic bombing during the war. Now the thirty most important have been made available in this ten-volume set, eleven for the first time. Henceforth, no public or institutional library of any size may be con-

sidered complete without the set.

For those whose shelf space or budget will not accommodate the full set, David MacIsaac's one-volume *Story of USSBS* provides a fascinating account of the organization and operations of USSBS and enough detail on findings and conclusions to help readers evaluate what the *Survey's* more than 1,000 civilian and military analysts really said. As a bonus, the book includes an excellent review of the development of strategic doctrine. It may be bought separately, but goes free to purchasers of the ten-volume work.

Dave MacIsaac, an Air Force lieutenant colonel and a member of the Air Force Academy Department of History, is considered the foremost authority on USSBS. He is presently on special assignment to the Naval War College in its Department of Strategy.

—Reviewed by John L. Frisbee, Executive Editor.

## Bicentennial JAWA

*Jane's All the World's Aircraft 1975-76*, edited by John W. R. Taylor. Franklin Watts, Inc., 730 Fifth Ave., New York, N. Y. (US distributor). 830 pages, large format. \$72.50.

Each time I see the newest edition of *Jane's All the World's Aircraft*, I wonder how John Taylor and his talented but very small staff do it. Then I answer my own question. They do it very well indeed, with much hard work, a vast knowledge of the field, meticulous attention to detail, and a dedication to the task that is unmatched in the aerospace publishing business. That's how they do it. The 1975-76 edition, before me as I write, is no exception. Jam-packed with data

and illustrations, many appearing for the first time, *Jane's* remains in a class by itself as the aerospace reference work par excellence.

In 830 pages, one would expect to find 525 devoted to aircraft of some forty countries. But where else would one find thirty-two pages devoted to remotely piloted vehicles? Or forty-four pages on sailplanes? Or nine pages on hang gliders? Not to mention the sections on first flights, official records, international programs, and satellite and spacecraft launches. Even what is left out is left out for a purpose, it being *Jane's* normal policy to include a new aircraft only after a firm order for it has been placed or when metal is actually being cut on a prototype, accounting for the absence of data on the Boeing 7X7, the McDonnell Douglas DC-X-200, the Dassault Mercure 200, or the Hawker Siddeley "Bident." (See p. 53 of this issue for a "Jane's Supplement" item on the Dassault-Breguet Mercure 200—The Editors.)

Readers of this magazine get a good cross-section preview of *Jane's* every other month in our "Jane's Supplement," a feature of which we are extremely proud, not the least because the competition would like so desperately to latch onto it.

From the professional view, a substantial fringe benefit of working for AIR FORCE Magazine is the opportunity to collaborate with John W. R. Taylor and his able colleagues, including Kenneth Munson, W. T. Gunston, Michael Taylor, Maurice Allward, and the Lord Ventry, as well as the artist suppliers of the three-view drawings—Dennis Punnett of Pilot Press, Roy Grainge, and Michael Badrocke.

John Taylor brings to his work a substantial background—fifteen years—as an engineer and designer in the British aircraft industry. Demanding as are his *Jane's* duties, he has managed to produce, in addition, more than 160 books. He makes me feel truly slothful in comparison. He is a delight to work with, a true professional, and above all, dependably a gentleman as well as scholar.

The price tag on *Jane's* at first blush seems stiff. But, in terms of value received, it remains one of the biggest bargains in the bookstores.

—Reviewed by John F. Loosbrock, Editor.



## Pictorial History

*The Air Force Museum*, by USAF Lt. Col. Gene Gurney and Nick P. Apple. Crown Publishers, Inc., New York, N. Y., 1975. 200 pages with appendix and index. \$8.95.

This book, with its vast array of illustrations and accompanying blocks of text, is much more than a photographic essay on the Air Force Museum. Using some 450 photos of the Museum's collection of aircraft and space vehicles, its illustrations and artifacts, the authors have traced the history of flight from its early beginnings through the Wright era and into the jet and space ages.

Since the Museum, located at Wright-Patterson AFB, Ohio, has quite naturally stressed the evolution of military aerospace, so do the authors, but the end product is a thorough documentation of the entire Age of Flight.

The book contains a foreword by aviation pioneer Lt. Gen. Ira C. Eaker, USAF (Ret.), and a special "Behind the Scenes" section that underlines the Museum's role as research and education center.

—Reviewed by William P. Schlitz, Assistant Managing Editor.

## New Books in Brief

*The Apollo Spacecraft: A Chronology* (Vol. III), by Courtney Brooks and Ivan Ertel. Third in the Apollo Spacecraft series, this volume covers the period October 1, 1964, to January 20, 1966, when emphasis was on engineering details of the Apollo spacecraft. Payload problems, uncertainty about the lunar surface and the space environment, radiation sickness, and other effects also were dealt with by engineers and scientists. Illustrations, appendices, index. Superintendent of Documents, US Government Printing Office, Washington, D. C. 20402, 1976. 286 pages. \$5.20.

*Arms, Men, and Military Budgets: Issues for Fiscal Year 1977*, edited by William Schneider, Jr., and Francis Hoerber. Soviet military capabilities have never been greater nor as threatening to the US, the authors conclude. Since 1964, the US has been underinvesting in defense while allowing its arms stock

to dwindle in readiness and quality. In almost every category the US has either conceded superiority to Russia or will have in a few years. Concise, authoritative analysis of the current status of US defenses and what is required in the future. National Strategy Information Center, Inc. Crane, Russak and Co., Inc., New York, N. Y., 1976. 288 pages. \$5.95.

*The Dragon's Wings*, by William M. Leary, Jr. Well-documented account of the beginnings of commercial aviation in China. The China National Aviation Corp., founded by America's Curtiss-Wright in partnership with the Chinese government and later taken over by Pan American Airways, pioneered the route between China and India and, during the Sino-Japanese war in 1937, remained China's sole means of speedy communication with the outside world. This book received AIAA's History Manuscript Award in 1973. Previously unpublished photos, appendices, notes, bibliography, and index. University of Georgia Press, Athens, Ga., 1976. 279 pages. \$12.

*The Electronic Battlefield*, by Paul Dickson. A critical look at electronic weapons, warfare, and the battlefield of the future. The author contends that extraordinary changes in military technology are taking place without benefit of public debate. One of his concerns is the impersonal nature of electronic warfare, which he believes makes the act of killing remote and unreal. Appendix, index. Indiana Univ. Press, Bloomington, Ind., 1976. 244 pages. \$10.

*I Learned About Flying From That!*, by the editors of *Flying*. Here are seventy hair-raising pilot stories that show the dangers of anxiety and overconfidence and the importance of practicing under the hood before an emergency occurs. Delacorte Press/Eleanor Friede, New York, N. Y., 1976. 310 pages. \$9.95.

*Implications of the 1976 Arab-Israeli Military Status*, by Robert Pranger and Dale Tahtinen. Four zones of possible Middle East conflict are described, with the argument that current planning by both sides indicates emphasis on surface warfare by forces not directly engaged in front-line combat. Six

hypotheses on future war, implications for US policy, and likely uses of major weapons now in the arsenals of the two sides are discussed. Appendices detail Arab-Israeli arms inventories. American Enterprise Institute for Public Policy Research, Washington, D. C., 1976. 49 pages. \$3.

*The Law of the Sea: US Interests and Alternatives*, edited by Ryan Amacher and Richard Sweeney. Edited proceedings of a 1975 conference in which more than fifty private and government lawyers, economists, and political scientists aired their views on the UN sea law negotiations. Topics ranged from protecting US security and economic interests to ocean pollution. American Enterprise Institute for Public Policy Research, Washington, D. C., 1976. 196 pages. \$4.

*Military History of the American Revolution*, edited by Stanley Underdal. Proceedings of the Sixth Military History Symposium, held at the Air Force Academy in 1974. Military historians of the American Revolution discuss new concepts and fresh insights based on new research tools. Superintendent of Documents, US Government Printing Office, Washington, D. C., 20402, 1976. 198 pages. \$2.70.

*A Short History of Guerrilla Warfare*, by John Ellis. The author contends that guerrilla warfare is as old as man and has been a chosen tactic along with more orthodox methods throughout history. Examples range from Biblical times through highly successful campaigns of the Viet Cong. Photos, appendix, bibliography, and index. St. Martin's Press, Inc., New York, N. Y., 1976. 220 pages. \$8.95.

*Women on the March*, by Gene and Clare Gurney. Although women now are playing important roles in America's armed forces, acceptance did not come easily. Here are stories of women pioneers and their present-day counterparts who serve in the Army, Air Force, Marines, and Coast Guard. Includes information on scholarships, training, and career opportunities available to young women in each branch of the service. Photos, illustrations, index. Abelard-Schuman, New York, N. Y., 1975. 160 pages. \$5.95.

—Reviewed by Robin Whittle

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Strategic parity has raised questions about the value of tactical nuclear weapons in a limited context. Here, the author looks at . . .

# Tac Nukes and Deterrence

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

**D**URING the recent Italian elections, a certain amount of commotion surrounded the candidacy of a General Nino Pasti, who ran on the Communist ticket. General Pasti, it seems, was once the deputy for nuclear matters in Supreme Headquarters, Allied Powers Europe, in the days when US Gen. Lyman Lemnitzer was SACEUR. The commotion, naturally, came from the assumption that NATO's nuclear secrets were now Communist property. It does make a good story.

It is no secret that there are too many Italian generals and admirals—too many, by any standard—and that they often have a hard time finding things to do. An Italian friend of mine, a general himself, with a malicious sense of humor, refers to his out-of-work colleagues as call-generals, waiting by the telephone for an engagement. Maybe General Pasti got a telephone call, or maybe he ran for office out of sincere conviction. It doesn't really matter, any more than it matters that he had something to do with the nuclear business when he was in NATO. There is nothing mysterious or sensitive in what he is likely to know.

It is no secret that NATO has nuclear weapons, or rather, that the United States has nuclear weapons deployed in Europe for NATO use. There are, as we have all read, some 7,000 of these weapons. They include land mines, bombs, artillery shells, and rocket warheads, and they are an integral part of the strategy of flexible response. The only mystery surrounding these weapons is whether, and under what provocation, they are likely to be used. That is not

something General Pasti, or any other general for that matter, knows, for it is unknowable.

We have lived for thirty-one years now with nuclear weapons in our inventory. Back in the 1950s we seemed committed to nuclear delivery systems almost to the exclusion of everything else. In those days the Strategic Air Command was the answer to all major problems. Tactical air, with smaller nukes, could settle the neighborhood scuffles. That, at least, seemed to be the general idea, and so we shipped the weapons to Europe.

As a means of educating our NATO allies in the arcane nuclear business, Secretary of Defense Robert S. McNamara proposed the creation of a Nuclear Planning Group, consisting of a few permanent member countries and a rotating membership among the others. Over the years this Nuclear Planning Group has met regularly.

The nations are represented by politicians, not military men, and the business is thus policy, not tactics or technology. Without divulging anything I shouldn't, it is possible to make a few observations about NATO's nuclear policy as it has emerged over the years.

There is, to begin with, no question as to NATO's capability to use these weapons. The delivery systems are there for all to see, and no one doubts the ready availability of the warheads. Equally, there is no question about the essentiality of these weapons as a counter to the USSR's clear superiority in forces available in Central Europe.

That, in a roundabout way, gets us

to the theme of nuclear weapons in general. There is growing skepticism, in these days when we admit to strategic parity with the USSR, as to the value of nuclear weapons in any sort of limited context. The argument against tactical nuclear weapons in the NATO arsenal is that they can only lead, if used, to general nuclear war. The Catch-22 in this argument is that if they are not to be used, any war in Central Europe will very likely result in a Soviet victory. And, if it is clear that they are not to be used, the probability of Soviet pressures increases.

No one, military or civilian, likes to contemplate the use of nuclear weapons. They have undeniably added a new and horrifying dimension to modern warfare. So, however, did the 2,000-bomber raids of World War II. The sight of Hamburg burning, the firestorm, was not a pretty one, even from 30,000 feet. The world has moved on since those 2,000-bomber days. We will never again have the sort of massive forces we relied on in that war. It follows, then, if we are serious about these commitments we have to NATO and Korea, for instance, that nuclear weapons must be our equalizer. If we renounce their use, or even act as though we would not use them, we had better pull in our horns. The all-volunteer force is well-trained and formidable, but it is a thin shield. There is not much chance, with the end of the draft, or even with it, that this country will ever be able to mobilize reinforcements in time to serve any purpose. We will go with what we have, and what we have cannot stand long attrition.

So, like it or not, the nukes must be part of our arsenal, and hence part of NATO's arsenal. If we accept the essentiality of nuclear weapons in our inventory, it should follow that we accept the probability of their use if we need them. And if we accept that, and make it clear that is how we plan to fight if need be, with nuclear weapons part of our battlefield strategy, matters take on a new perspective.

The main idea, after all, is to deter a war, not fight it. Effective deterrence is another way of saying the prize is not worth the cost. Tactical nuclear weapons, standing behind an otherwise inferior force, up the cost pretty sharply. ■

A government-wide realignment of the US intelligence apparatus leads to fundamental changes in how military intelligence operates and by whom it is controlled and monitored. While there is no visible change regarding the allocation of "roles and missions" between CIA and the Pentagon's intelligence operations, increasing "civilianization" of the latter is evident . . .

# MILITARY INTELLIGENCE

## Streamlined, Centralized, Civilianized

**BY EDGAR ULSAMER, SENIOR EDITOR**

**I**N MAY, the Pentagon, in extension of a White House Executive Order issued earlier this year, started a major overhaul of its several intelligence branches, including a reassessment of how, and by whom, they are to be managed, controlled, and supervised. Some of the attendant changes are penetrating, others cosmetic. Together they clearly signal more "civilianization" of military intelligence and closer rapport

with intelligence consumers and other constituents of the intelligence community.

There were also sanguine assertions by the Pentagon that, by making the Defense Intelligence Agency (DIA) a "recognized and acknowledged center of excellence" in intelligence analysis and estimating, its judgments will carry more weight. The risk of DIA estimates that are at odds with those of the CIA going unheeded, DoD claimed, would lessen as a result. Deputy Secretary of Defense Robert Ellsworth told AIR FORCE Magazine: "There will be more competition [among the producers of intelligence], and we hope that this will cause a veering away from the tendency to estimate toward a common denominator."

In the 1960s and the early 1970s, he said, there was a "marked, and in retrospect, demonstrable tendency to underestimate the rate at which the Soviets would deploy their strategic missile forces," in part because of pressures within the "system—and I don't mean improper, specific political pressures—to estimate toward a common denominator." Secretary Ellsworth is DoD's ranking intelligence executive and a member of the new three-member US Committee on Foreign Intelligence. Another related cause for underestimating Soviet strategic efforts in the past was "drifts away from reality" predicated on the desire that "pervaded the thinking of that era" to believe that the Soviets, like the US, sought stability through strategic parity, Secretary Ellsworth said.

The President's Executive Order 11905 of February 1976 realigning the US intelligence community in general, and DoD's subsequent internal changes, both seek "to improve the quality of intelligence needed for national security, to clarify the authority and responsibilities of the intelligence departments and agencies, and to establish effective oversight."

### Fundamental Changes

On the highest level, the National Security Council directs and guides the development and formulation of US intelligence activities with a new and specific mandate to conduct semiannual reviews that consider "the needs of users of intelligence and the timeliness and quality of intelligence products and the continued appropriateness of special activities in support of national foreign-policy objectives."

Reporting to the NSC is the new Committee on Foreign Intelligence, the senior national intelligence body, composed of the Director of Central Intelligence (DCI), who is the committee's chairman; the Deputy Secretary of Defense who oversees intelligence; and the Deputy Assistant to the President for National Security Affairs. Committee decisions may be reviewed by the National Security Council upon appeal by the Director of Central Intelligence or any member of the NSC. (Statutory members of the



*Deputy Secretary of Defense Robert Ellsworth, DoD's ranking intelligence executive, assumed office on January 2, 1976.*

NSC are the President, the Vice President, and the Secretaries of State and Defense.)

Another new body is the Operations Advisory Group, which considers and develops policy recommendations—and deals with dissents—concerning special intelligence activities in support of national foreign-policy objectives. The Chairman of the Joint Chiefs of Staff, along with the Secretaries of State and Defense, the Assistant to the President for National Security Affairs, and the DCI belong to the Operations Advisory Group.

The Executive Order also creates an Intelligence Oversight Board whose three members, drawn from "outside the government," monitor the practices and procedures of the inspectors general and general counsels of the intelligence community. This Board reports to the Attorney General and the President, and concerns itself mainly with activities by the intelligence community that raise questions of legality and propriety.

### The Defense Intelligence Structure

The Defense Department's realignment of its intelligence activities, arrived at with the agreement of the Chairman of the Joint Chiefs of Staff, includes these central actions:

- Creation of the post of Department of Defense Inspector General for Intelligence who reports *directly* to the Deputy Secretary of Defense who oversees intelligence. The IG also maintains liaison with the new Intelligence Oversight Board.
- A Defense Intelligence Board composed of senior military and civilian defense policy-makers will be established, on a six-month trial basis, to bridge the gap between the producers and users of intelligence.
- Designation of the Assistant Secretary of Defense for Intelligence as Director of Defense

Intelligence (DDI), exercising line authority over DoD intelligence functions under the overall cognizance of the Deputy Secretary of Defense and providing staff support to OSD.

- The DDI is given management authority over the Defense Intelligence Agency (DIA), and the National Security Agency (NSA), and is responsible for coordinating all intelligence functions of the military services.

- The DDI will have a Principal Deputy and two deputies—a Deputy for Programs and Resources and a Deputy for Intelligence Production, Plans, and Operations, who also serves as the Director of the Defense Intelligence Agency. While DIA is now a part of the civilian echelon in terms of policy, line authority, and management, the Joint Chiefs of Staff continue to exercise operational control over that agency in the areas of their own intelligence needs and those of the unified and specified commands. The NSA's status as the government's overall signals intelligence branch is changed only to the extent that the DDI now acts as the surrogate for the Secretary of Defense who retains final responsibility for the agency.

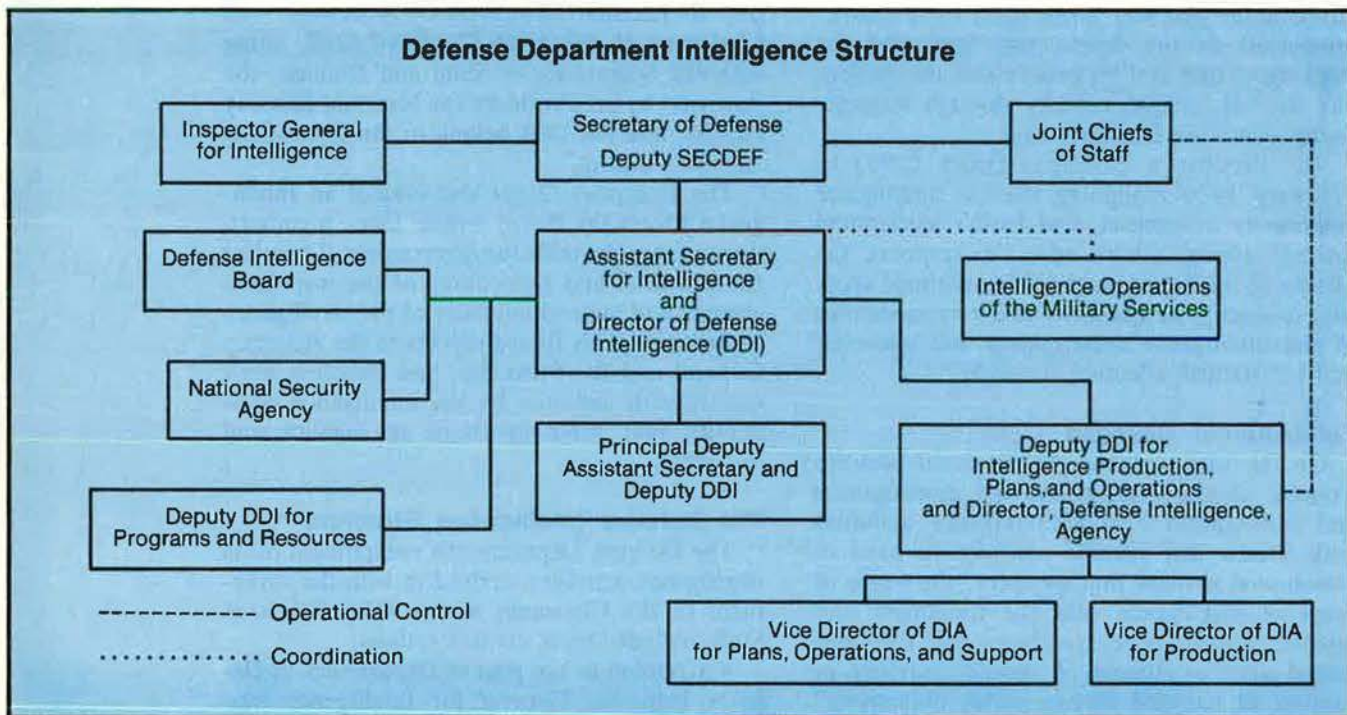
- The Defense Intelligence Agency, with a staff of about 4,500 people, is being reorganized

can't be ruled out "forever," according to Secretary Ellsworth.

In response to a question about rotating defense intelligence leadership among the services, he said: "My goal for all of the key defense intelligence positions is to fill them with the best qualified available individuals. Therefore, service rotation as such will not be the governing factor in selecting the Directors of DIA and NSA or any of their immediate subordinates."

### The Meaning Behind the Changes

Among the reasons for the changes in defense intelligence, Secretary Ellsworth told AIR FORCE Magazine, was the need to "turn the spotlight on intelligence production, the most difficult phase of the job. Our intelligence collection is very good; that is to say, we can count well. But we need better analysis and estimating, which depends on brilliance of mind and articulateness. This we want to stimulate through the accountability and recognition that the realignment accords to production. I expect the DIA, through the improvement in quality of its work, through strengthening of its accountability and recognition of its work, to develop into a center of excellence in this town and in



to improve the quality of analysis and estimating that goes to Pentagon and other government policy-makers. Two major divisions have been formed, one headed by the Vice Director for Plans, Operations, and Support, who controls the defense attachés, and the other by the Vice Director for Production. The DIA Director, for the foreseeable future, is to be a general officer of three-star rank, although the prospect of a civilian taking over eventually

this government and challenge other agencies engaged in intelligence analysis and estimating."

Creation of the Defense Intelligence Board, although concerned with better intelligence production, is meant primarily to improve the relationship between producers and users, especially "policy-level users" of intelligence, Secretary Ellsworth said. The problem, he added, is that "the intelligence community tends to be incestuous, to brook no outside evaluation, and to

work toward its own goals, just as most other professional groups tend to do. Policy-makers, on the other hand, have a propensity for criticizing the intelligence community, *after* the fact. They tend to lack the time to tell intelligence what they need and want. The Intelligence Board is going to be the crucible where we hope to force these two worlds to talk to each other cohesively, to come together."

The fact that DIA has been placed under civilian control, Secretary Ellsworth said, does not increase the risk of "politicizing" the agency or of making it more susceptible to tailoring its product to the political objectives of a given administration. The reason why the restructuring "should *decrease* the risk of politicizing military intelligence is that we . . . reduce the middlemen sitting between an analyst or producer and the person needing the intelligence. For instance, daily intelligence goes directly to the Secretary of Defense and the Chairman of the JCS from the producing elements of DIA," without passing through the various intelligence echelons of the Pentagon, Secretary Ellsworth said. The realignment, he added, "increases the directness of support, that is, by cutting out those who can politicize an analyst's report"; and, secondly, by creating incentives for better products at the analyst level through career development. Overall, the standing of DIA within the intelligence hierarchy was elevated by "double-hatting" its director as a Deputy Director of Defense Intelligence and, thus, lending him the "direct policy and management support" of the Secretary of Defense, Secretary Ellsworth suggested.

Key to boosting the quality of intelligence is the DoD-wide Intelligence Career Development Program, affecting both military and civilian personnel. In general, the Secretary said, "my concerns center on analyst professionalism—those who actually produce intelligence—and on maintaining distinct, effective career patterns. I would also encourage the services to include combat intelligence as an element of military intelligence career patterns. Basic combat knowledge is a major ingredient in analyzing foreign military intelligence at the departmental and national level." The responsibility of guiding and shaping the Department's intelligence career development now rests with the DDI. A recent congressional recommendation to apply to DIA Public Law 313 (which permits freer hiring of civilian professionals by exceptions to Civil Service rules and regulations) is looked upon with favor by the Pentagon, Secretary Ellsworth said.

### **The Role of Service Intelligence**

In restructuring defense intelligence, the Defense Department carefully noted that the DDI will "coordinate but not direct" intelligence



*Lt. Gen. Samuel V. Wilson, USA, was named Director of the Defense Intelligence Agency on May 17 of this year.*

operations of the military services because much of this activity is at a tactical level and under the direction of specific commanders or the services' staffs. The DDI's role, Secretary Ellsworth said, is to obtain from the intelligence branches of the services specialized scientific and technical intelligence as well as to arrange collection operations that they are uniquely qualified for, "to exercise general coordination over service intelligence operations, and to review and recommend on service intelligence resources." In most cases, DIA will carry out coordination of this kind for the DDI, he added.

DoD, he said, has perceived "for some years now that tactical intelligence could be improved through better integration of the various intelligence disciplines at field headquarters. . . ." Rapid technological advances on both the Soviet and US sides compound the need for fast intelligence reaction: "Our effectiveness in tactical intelligence depends on how rapidly intelligence staffs can process, evaluate, and display tactical indicators for their commanders," Secretary Ellsworth pointed out. Also, important perishable combat intelligence often remains bottled up at major headquarters because of security classification and doesn't reach the operational units in time. "Through my participation in both the Committee on Foreign Intelligence at the national level and by drawing on proposals . . . of the Defense Intelligence Board, I believe that both the DDI and I are in a better position to resolve policy questions concerning tactical intelligence which are beyond the authority of Defense alone," he told AIR FORCE Magazine.

### **Coordination With CIA**

"The main line of demarcation" between Defense Department intelligence activities and

the CIA is drawn by the unique professional competence of DoD analysts in the disciplines of military technology, organization, tactics, doctrine, and training, according to Secretary Ellsworth. Expertise of this type "alone can provide the basis for the production of military intelligence information" used by the Pentagon as well as civilian elements of government, especially so far as threat assessments are concerned. The intelligence information on which defense planning is based, therefore, remains the domain of the DDI, while such areas as the National Intelligence Estimate, the Strategic Target List, and SALT verification will continue to be handled jointly with the CIA and other elements of the US intelligence community. The development of the strategic target list, he said, "is the result of work of military people as well as of civilian economists and scientists. Its compilation is not the exclusive domain of military intelligence," Secretary Ellsworth pointed out.

Neither the general revamping of the US intelligence community nor the realignment of defense intelligence is expected to affect the specific contributions of DIA, CIA, and the individual service intelligence operations in monitoring SALT terms by the so-called national technical means of verification. These include photographic, radar, and electronic surveillance capabilities, seismic instrumentation to supply information on the location and magnitude of underground nuclear explosions, sensitive air-sampling systems, and advanced, sophisticated techniques for analyzing and evaluating the data collected, none of which "operate from installations in the territory of the parties being monitored," according to the US Arms Control and Disarmament Agency. The various means of verification presumably include reconnaissance satellites in low earth orbit, a possibility that invariably draws a "no comment" response by government spokesmen.

Overall responsibility for SALT studies, assessments, and guidance continues to center in the Verification Panel of the National Security Council, according to Secretary Ellsworth. He added emphatically that special national reconnaissance programs over which the Defense Department has executive responsibility "stay as before." This is true in terms of operations as well as budget. "Although the Executive Order [of February 1976] assigns the task of preparing the government's budget for all foreign intelligence operations to the Committee on Foreign Intelligence, it in no way curtails the Secretary of Defense's responsibility for operating and funding those functions that are under his stewardship," Secretary Ellsworth said.

The Secretary explained that added emphasis will be placed on technological intelligence, even though he took issue with the often-stated con-

tention that there have been frequent misreadings of Soviet technological capabilities. Public perception of unclassified intelligence information, or decisions of the political leadership based on incomplete information, are not always a reliable index of the quality of US intelligence, he said. "In almost all cases, the intelligence has proved to be both accurate and timely. It is true and also desirable that there is usually little public discussion of these issues, since discussion could jeopardize the intelligence sources and methods."

Nevertheless, Soviet and other nations' progress in advanced technology that could lead to significant improvements of existing weapons, or the creation of revolutionary weapon systems, is "a question of key national interest" under constant review, he said. A concrete result of this increased emphasis is the appointment of Dr. Malcolm R. Currie, Director of Defense Research and Engineering, as chairman of the government-wide foreign intelligence technology panel. Also, the Director of DIA established a "DoD-wide task force to develop an integrated and well-coordinated intelligence program dealing with the status of advanced technology in the USSR. This task force will review the current intelligence efforts in this area, and make recommendations to increase the scope and usefulness of technical intelligence reporting," according to Secretary Ellsworth.

The realignment of US intelligence at the government-wide and DoD levels does not deal specifically with the "severe problem of counter-intelligence," according to Secretary Ellsworth. "This field of intelligence is a growing problem because of the openness of our society and because of the increasing boldness of those who take advantage of our openness. It is, however, not an overwhelming problem, and we see no need for, or even desirability in, requesting special legislation dealing with this issue—certainly nothing like the British Official Secrets Act, which would not be compatible with our system of government," he explained.

The reorganization of defense intelligence, if anything, will increase the degree of candor with which the Pentagon plans to report to the American people about evolving military threats. "We will share with the public as much of this information as we can without endangering our sources and methods of doing business. We plan to release information about the Soviet threat as it is produced and without regard to political expediency or the budget cycle. This candor already has increased public recognition of the high rate of Soviet arms development and deployment. The public has a right to be informed about these threats, in detail and without overstatement. We plan to intensify efforts in this regard," Secretary Ellsworth asserted. ■





# THE ISRAELI AIR FORCE

Compared to other major air forces, Israel's air arm is short on history but long on operational experience. Unique in many respects, the IAF's concepts, doctrine, tactics, and organization have evolved in response to the country's peculiar defense requirements.

**BY ZEEV SCHIFF**

**T**HE Israeli Air Force is one of the most experienced in the world. The wars of the past two decades have given Israel's air arm vast operational experience and made it the only force that can claim to have downed hundreds of jet aircraft in aerial combat over the last decade. Though it is the air force of a small country, it matches or outnumbers in combat equipment the air forces of such large European

1956); the Six-Day War to the end of October 1973—including the War of Attrition and the Yom Kippur War; and the period since the Yom Kippur War.

### The War of Independence

Like the other branches of the Israeli Defense Forces, the roots of the IAF are found in the era before the War of Independence. Though much of the attention of the small

Flying Fortresses—were bought from US war surplus. One of the B-17s actually bombed Cairo on its way from America to Israel. The IAF progressed from a stage in which the Arabs enjoyed absolute freedom of the skies (Tel Aviv was bombed sixteen times) to one in which it could supply air support to ground forces, at will and without interference, and could bomb a number of Arab capital cities without hindrance.

One aspect of this period is a historic curiosity. Communist Czechoslovakia sold to Israel, for cash at market prices, scores of Messerschmitts—and trained a number of Israelis and Czech Jews as combat pilots. They were even prepared to allow Israel a special base on Czech soil, in which to accumulate military equipment (including US surplus) to be airlifted to improvised Israeli landing strips.

The War of Independence ended with another curiosity, equally significant. On January 7, 1949, while the Israeli Army was pursuing the Egyptian Army into the Sinai Peninsula, an aerial battle took place between IAF planes and RAF aircraft from a base across the Suez Canal. The British, who were pressuring Israel to withdraw from Sinai, lost five aircraft.

After the war, as the volunteers returned home, the Israeli era of the IAF began. A flying school and a technical training base were established. Since, in the early 1950s, the armaments markets were closed to Israel, the main source of aircraft was from surplus or scrap. The Messerschmitts were replaced by American Mustangs bought in Sweden, World War II vintage Spitfires, and Mosquito fighter-bombers picked up from salvage lots in France. In 1953, the IAF joined the jet age with Meteor 8s from England.

The procurement of scrap and surplus ended with the advent of French equipment. Political considerations (the war in Algeria) brought the French government to a decision to sell Israel weapons and aircraft. This stage began in 1955 with the procurement of Ouragans, and then of Mystères, and ended on the eve of the Six-Day War in 1967, when Charles de Gaulle imposed an embargo. During these twelve years, the IAF was built around Mystère 4s,



*Although independent for only twenty-eight years, Israel produces much of its own military equipment. These Kfir fighters are a product of Israel Aircraft Industries.*

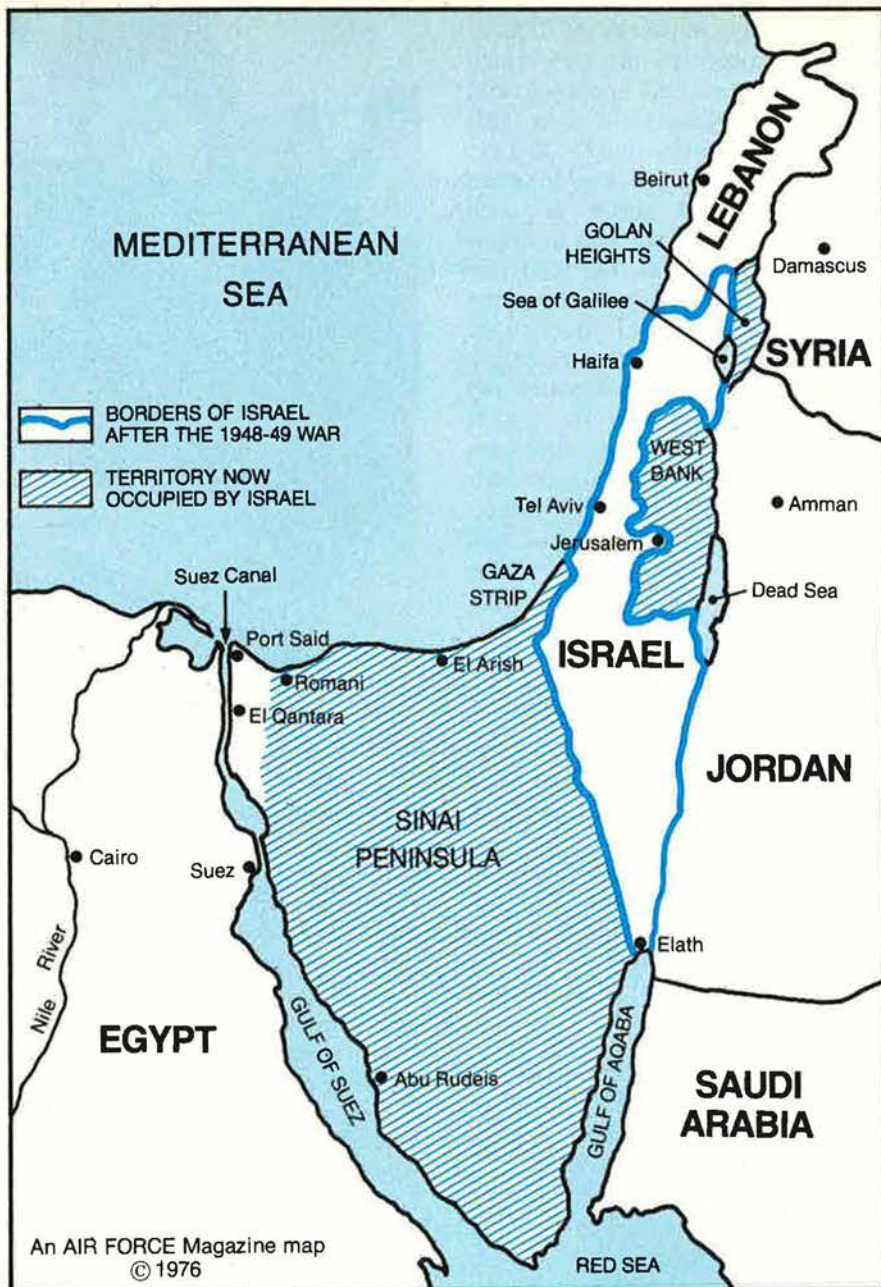
countries as England, France, or Germany.

Political circumstances and inter-bloc rivalry have brought into action in the Middle East arena the best of Eastern and Western weapon systems, a fact that has been particularly noticeable in the air. The Israeli Air Force has faced first-line Soviet aircraft, ground-to-air missiles, and anti-aircraft guns at the highest level of density ever fielded by the Soviet Union. This profusion of sophisticated opposition armament has provided the IAF with technological, operational, electronic, and intelligence experience worth its weight in gold. It is, therefore, only natural that many other air forces should be paying attention to the IAF and the answers that it finds.

Despite the many wars the IAF has fought, and the numerous combat missions its pilots have flown, the force is only twenty-eight years old. That deserves a few moments' study. The twenty-eight years can be divided into three distinct periods: from the War of Independence in 1948 to the Six-Day War in June 1967—a period in which the IAF fought two major wars (in 1948 and

Jewish community in Palestine had been directed to land forces, there were training courses for pilots of light aircraft. During World War II, 2,500 young Palestinian Jews (from a population that totaled less than half a million) enlisted in Britain's Royal Air Force. They were destined to be the pioneers of the IAF. In fact, three commanders of the IAF, of whom the senior was twenty-five years old when he took over, were trained as RAF pilots. When the War of Independence started, this was a partisan air corps. The first squadron commanders were elected by their comrades. A flavor of "international brigade" was added by the arrival of 700 volunteers from abroad—pilots, navigators, aircrew, and technicians—mostly from the United States and South Africa. The majority were Jews, but there was a handful of non-Jewish aces who were willing to fight for and with a young nation that faced extinction almost before birth.

The planes came, openly or covertly, from anywhere and everywhere. From nineteen light craft at the beginning of the war, the number grew to 205 by the end. Sixty-nine aircraft—including three B-17



Super Mystères, Vatuurs, and—from 1962—Mirages, supported by Nord-Atlas transports and Super Frelon helicopters.

### Evolution of IAF Structure

The IAF went into its second war, the Sinai Campaign of 1956, equipped with French jets, but still using a great many piston planes that were finally grounded in 1959. Facing it was a preponderance of MiG-15s. This was a limited war as far as the Air Force was concerned. Political reasoning had led to rejection of an IAF proposal to open with an air strike. It was only in the second stage that the Air Force took an active part in ground-support missions and pursuit of the re-

treating Egyptians. The Egyptian Air Force had already been seriously damaged in the bombing of its airfields by the RAF and the French Air Force. There were few aerial battles, and the losses amounted to fifteen Egyptian planes and ten Israelis—only one a jet, and most to ground fire.

The IAF came out of the Sinai Campaign with the distinct feeling that it had not been allowed to prove its true power and worth. A particularly hard blow had been the Israeli government's request to France to supply French-flown interceptors to protect Israeli airspace against the Egyptians' Russian-made Ilyushin-28 bombers. There was no need for such protection but, for the com-

mander of the IAF, it was the flash that ignited an ambition to prove that Israeli pilots could be relied on in any situation.

Though the Sinai Campaign had not permitted the IAF to develop its operational plans, the work of perfecting offensive techniques, which were to find full expression in the Six-Day War, went on at an unflagging pace. It was in this period that the structure of the IAF as we know it today really took shape. The major organizational factor is the integrated Israeli Defense Force (IDF) General Staff, which is without separate staffs for land, sea, and air. The Chief of Staff is to all intents and purposes "Supreme Commander." This unity prevails in command and in combat operations, when the commanders of air force and navy serve as professional advisers to the Chief of Staff.

The IAF has five divisions that parallel some of the branches of the General Staff: Operations, Training, Intelligence, Quartermaster, and Manpower. The training function is based on four schools: aircrew (pilots and navigators); technical (which takes in boys from the age of fifteen); aeronautical professions; and anti-aircraft. Responsibility for anti-aircraft defense in its entirety was transferred from the Artillery Corps to the Air Force in 1971. Up to then, the IAF was only responsible—in parallel to its radar functions—for the HAWK ground-to-air missile systems.

The basic IAF structure is of wings, each with its air base and squadrons of different types. A wing can, for example, contain interceptors and fighter-bombers together with transport squadrons and helicopters. The wing supplies all services to its squadrons, but operational responsibility is in every case a central function within the jurisdiction of Operations Division.

### IAF Concepts and Doctrine

The Israeli Army's combat doctrine and the structure of the IDF have prescribed a unique role for the IAF. The IDF is a militia army, primarily based on reserves. To prevent surprise and facilitate rapid mobilization, it was decided to augment two entities—Intelligence and the IAF. The Air Force was entrusted

not only with protecting Israel's airspace, but also with the task of ensuring mobilization with a minimum of enemy interference. A parallel function is the containment of enemy action or advance until mobilization is complete. For the IAF to be ready to react immediately, it was necessary to center on regulars rather than the standard IDF pattern of reserves with a small standing army nucleus.

Given the geographic dimensions of Israel, at one point only ten miles wide, the temptation to an attacking force would be great. The IAF role would be critical—mainly defensive. The IAF was not prepared to settle for that alone. Since the 1950s, it based all its planning on a patently offensive concept. The intention was to alter the prevailing IDF attitude that air was a purely support dimension. The Air Force set out to persuade the other fighting arms that it could be a serious factor in defeating enemy armies, and should not be relegated to purely defensive missions (like those of the RAF during the Battle of Britain).

Within the IAF as early as the late 1950s, there was a growing belief that the force must be built first

To get the most out of Israel's then tiny airpower, the IAF opted for maximal massed operation and centralized control, and from this derived the "turn-round" theory: shortening the time lag between each operational sortie of each aircraft—a factor that was to dominate the Six-Day War. The relatively short range within the potential arena of battle caused the IAF to renounce the need for pure bombers. Since the advent of French weaponry, the IAF constantly looked for planes that would be good in ground support, interception, and attack—all-purpose aircraft—resulting in a multipurpose doctrine of tactical and strategic use of one and the same craft.

### The Six-Day War

The concepts were put to full and successful use in the Six-Day War. However, there was an event worthy of mention some ten months before the war: an Iraqi pilot defected to Israel with his MiG-21. This was the first plane of its type to reach the Western world, and it gave IAF pilots a chance both to fly it and to simulate combat against it.

The IAF's greatest hour arrived

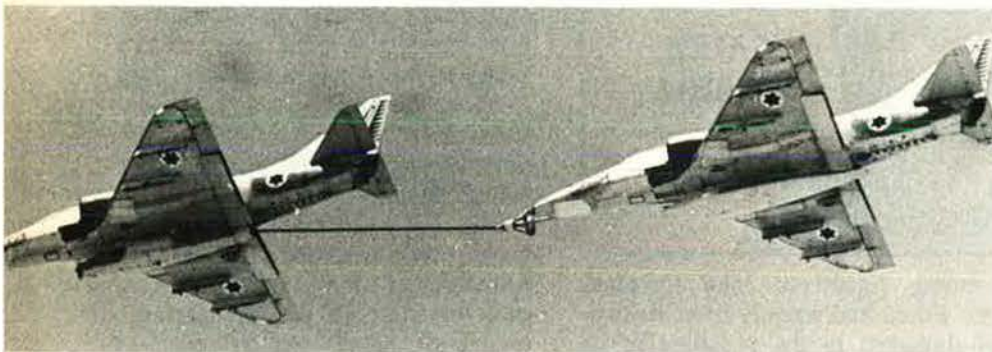


*Israel's Army is largely a militia force, but its Air Force is composed of regulars, including many women.*

mostly to ground fire, and twenty pilots. SA-2 missile batteries in Egypt did not interfere, and, in fact, were dealt with only in the second stage, when the IAF took an active part in the ground war on all three fronts. On the Syrian and Jordanian fronts in particular, the Air Force could claim a respectable share of credit for the collapse of the two enemy armies. Victory was achieved as a result of excellent aerial intelligence, thorough planning, first-rate control, and, of course, an impressive level of performance.

The IAF's victory strengthened the belief that the key to a short war lay in the hands of Israel's airmen: only air supremacy could open the way for the armored echelons and permit the decisive moves of the campaign. This was the prevailing opinion after the 1967 war. But in the Yom Kippur War, the equation proved incomplete. The results of 1967 altered Israel's aerial deployment. Territories added to Israel by the Six-Day War brought something far more important than just a few more airfields: the early warning space was enlarged. Before 1967, an Egyptian plane taking off from a forward air base in Sinai (El-Arish) needed only four minutes to reach Tel Aviv.

This war had opened a new stage, in which the IAF could count on full



*The IAF has about 500 combat aircraft, including six squadrons of these McDonnell Douglas A-4 Skyhawks. Israel plans to buy F-15s and more F-4s and A-4s.*

and foremost on the offensive; otherwise the IDF would lose the main potential inherent in its air arm. Ezer Weizman, the Commanding General, repeatedly insisted: "Israel's best defense is in the skies of Cairo!" Clearly, if the offensive concept did not gain currency, Israel—with her few airfields—would be exposed to sudden air attack. It was this concept that led to the detailed planning of missions designed to catch the Arab air forces on the ground before takeoff.

on the morning of June 5, 1967. Years of planning and training went into three hours of aerial activity that decided the outcome of the Six-Day War. The Egyptian Air Force, with its planes trapped on seventeen airfields, ceased to exist within two hours and fifty minutes. Then the IAF turned to deal with the air forces of Syria and Jordan (and also raided a distant air base in Iraq). The Arabs lost 452 aircraft, of which fifty to sixty were downed in aerial combat. Israel lost fifty planes,

The author, Zeev Schiff, is military affairs editor of the independent Tel Aviv newspaper Haaretz and an authority on Middle East military affairs. He has covered the Vietnam War for his paper, reported from the Soviet Union, and authored several books on the Middle East wars of the past decade.

recognition of its importance and uniqueness, and in which the exalted status of pilots as an elite of Israeli society was further strengthened. Defense Minister Moshe Dayan went on record: "The pilots of Israel are the apple of the nation's eye." The recruiting slogan of the 1950s—"The Best Fly"—took on special significance. Volunteering for the IAF became a mass movement, and the force began to look like a "nature reserve for outstanding youth."

Within all this, the number of volunteers from the communal settlements—the *kibbutzim*—was out of all proportion to their share in the total population. Among *kibbutz* offspring, being a fighter pilot was considered the top of the professional ladder. The settlements themselves took pride in their pilots, and their feeling was contagious: the phenomenon spread to the *moshavim*—immigrant cooperative villages—and to development towns.

Dropouts from a course that lasted two years, and went through five stages—including training in Piper Cubs, Fouga Magisters, and Skyhawks—were numerous. The reason was simply that the IAF would settle for only the highest possible quality. In fact, insistence on this

aspect resulted in the graduation from one intake (in 1960) of only one pilot. The commanders of flying school are convinced that their method—based as it is on the education of a flying warrior rather than just the training of a pilot—has proved itself, but this clearly is not the only reason for the high quality of Israeli pilots. Strong motivation is another reason. As one young pilot put it after the Yom Kippur

tween the operational and decision-making echelons, which in turn makes for quick correction and improvement.

### The War of Attrition

The summer of 1969 marked the beginning of yet another war for the IAF—the "War of Attrition," in which Israeli pilots clashed with Russian airmen, who had taken responsibility for defending Egyptian



*IAF cadets parade at flight school. The two-year course is designed for the education of "a flying warrior rather than just the training of a pilot."*

War: "The internal, almost subconscious, obligation to country and homeland, the knowledge that this is a war for survival—develops a sense of mission."

Motivation is reinforced by an awareness of belonging to "the family." Most of the pilots live, with their families, in the same housing developments and inside the social circle of the IAF. Motivation and belonging undoubtedly help the IAF to get excellent results from its men, in exactly the same way that Israel's relative poverty obliges the system to get the maximum out of every tool. But the method and the size limitations of the force also help. The fact that a squadron leader can contact the Commanding General directly and draw his attention to any particular problem or innovation creates a special rapport be-

airspace. But that was at a late stage, and only after a number of highly significant and far-reaching developments.

The eve of the Six-Day War and Charles de Gaulle's embargo on arms shipments heralded the end of the French era in IAF equipment. Fifty Mirage 5s ordered by Israel were delayed, and finally in part delivered to Libya. Luckily for Israel, the United States had already agreed to sell her fighter planes, following years of repeated refusals. An initial agreement to supply Skyhawks had actually been signed in February 1966, but the first of these craft were delivered after the war. (The decision to sell Phantom F-4s was announced in December 1968, and the first planes arrived in Israel in September 1969.) The changeover to American equipment was a quantum leap forward. Pilots and ground crew, experienced in French aircraft, said that the American planes were simpler, yet more sophisticated and



*Maj. Gen. Binyamin Peled, Commanding General of the IAF, comments on air tactics of the Yom Kippur War.*



A Syrian MiG goes down in flames during the Yom Kippur War. The IAF claims to have downed 396 Egyptian and Syrian planes.

reliable—particularly when damaged in combat. Not only did the new planes ease the effects of the French embargo; they also allowed the IAF to wage successfully the “War of Attrition” and make effective strikes against the Egyptians.

As far as the Israeli Air Force was concerned, the War of Attrition lasted from July 1969 to early August 1970, though it began much earlier for the ground forces. There were countless aerial clashes, mostly on the Egyptian front but in a few cases with the Syrian Air Force. IAF pilots recorded a “bag” of 113 downed Egyptian planes and twenty-six Syrian aircraft. Once again the Egyptians concluded that there was no way they could beat Israeli pilots, and this led to a new emphasis on anti-aircraft systems. At first they built on SA-2s, but the batteries were neutralized by the IAF. During 1969, the Air Force destroyed twelve SA-2 batteries in the Suez Canal zone, when these interfered with the IAF’s role as “flying artillery” to protect the Israeli line, where IDF gunners were numerically inferior.

In January 1970, three months after arrival of the first Phantoms, the IAF opened a new phase of the War of Attrition. With the intent of forcing Nasser to agree to a cease-fire, aircraft were dispatched on missions against military targets deep inside Egypt—particularly around Cairo. The Egyptians had no feasible answer to the aerial offensive, even though they had received improved SA-2s. The deep penetration bombing was undoubtedly a decisive factor in Nasser’s acceptance of a cease-fire (in August 1970), but it also—indirectly—increased the military involvement of the Soviet Union.

In answer to Egyptian requests, the Kremlin sent anti-aircraft units equipped with SA-3s and radar-guided ZSU-23 guns. They also stationed five squadrons of interceptors in Egypt. Moscow was virtually taking over responsibility for the integrity of Egyptian airspace. Despite the fact that the IAF discontinued its deep-penetration missions in April, a clash between Israeli and Russian pilots was inevitable. Israel had already announced that she was ready to face Russians—if they intervened on the side of Egypt and in the front-line area.

After two encounters that ended without tangible results, the Israeli government gave the IAF permission to react with all necessary dispatch. The great air battle took place on July 30. Eight Phantoms and eight Mirages clashed with sixteen MiG-21s, piloted by Russians. Five MiGs were downed—a good enough reason for the Kremlin to apply more pressure on Cairo for a cease-fire. The War of Attrition ended on Au-

gust 8, 1970. The picture as regards aircraft vs. missiles was different. The war had left question marks. The IAF had hit the missile batteries hard, but had lost planes, particularly to the SA-3s and the ZSU-23s.

### The Yom Kippur War

Israel’s fifth war—the Yom Kippur War—was the hardest of all as far as the Air Force was concerned. The IAF went to war many times stronger in planes, and with many more pilots, than in the Six-Day War. On the other side, the Arab air forces totaled more than a thousand warplanes, including 177 from Iraq, Algeria, Libya, Kuwait, and Saudi Arabia, and pilots from North Korea. But initial hostilities were far more complex and difficult than in earlier wars. First, the IAF, like other IDF elements, was taken by surprise. Planners had estimated that any future war would be more massive, but they had not foreseen such a long war, nor had they envisaged a situation in which their plans would be upset by the need for “firefighting” missions in the opening days.

This war also posed its questions, but before dealing with them, it must be said that the IAF’s achievements during the Yom Kippur War were all the more impressive. Above all, the IAF succeeded in keeping the skies over Israel clear throughout the war. Despite the element of surprise, and thanks to the Air Force, Israel was able to mobilize her reserves and pour units into the front lines without interference. The Arab air forces were unable to penetrate populated areas. In one case, Israeli pilots even intercepted an air-to-ground Kelt missile fired from an



One of the IAF’s most effective weapons in air-to-air combat is this Israeli-built Shafrir missile. The IAF is said to have lost 102 aircraft in the Yom Kippur War, but forty percent of them were to Russian-made SAMs.

Egyptian Tu-16 twin-jet bomber.

During the first two days, and because of the adverse opening conditions, the IAF was primarily engaged in containment missions. There were a great many aerial battles, during which seventy-three Egyptian, Syrian, and Iraqi aircraft were shot down, but the Air Force also made a staggering contribution to the land battle. Air Force planes destroyed forty-two helicopters carrying Egyptian commandos and smashed their airborne offensive. The land forces were convinced that IAF support could have allowed the Bar Lev Line strongholds to hold out much longer, and the Air Force was unable to save the garrisons, but it played a major part in stopping armored offensives on both fronts. On the Syrian front, the IAF alone stopped Syrian tanks from descending the Golan Heights into Israel below the Sea of Galilee. On the Egyptian front, Israeli pilots a number of times turned back Egyptian armored columns heading for the Abu Rudeis oil field and along the Qantara-Romani road.

Within a very short time, the IAF gained absolute aerial superiority. The knowledge that this superiority was only a matter of time was undoubtedly one of the factors in Jordan's decision not to intervene directly in the war. As opposed to the Six-Day War, the supremacy was expressed this time not in the destruction of Arab planes on the ground but in hundreds of dogfights. The Israeli pilots wore down and decimated Arab airpower. According to Maj. Gen. Shlomo Gazit, Director of IDF Intelligence, 265 Egyptian and 131 Syrian planes were shot down, most of them by Israeli aircraft. At one stage of the war, the IAF also flew missions against strategic targets inside Syria, resulting in serious damage to the Syrian fuel and electricity systems. On the Egyptian front, the IAF was restricted by the political echelon to missions on the front line and against enemy airfields.

IAF losses in the Yom Kippur War were 102 aircraft—a considerable number in terms of the total available and by comparison with previous wars. However, Air Force officers say that, considering the length of the war, its intensity, the

targets tackled, and the number of sorties flown, the loss ratio was not high. Losses as a percentage of sorties were 1.9 in the Six-Day War, but only 0.9 in the Yom Kippur War, when 12,000 sorties were flown. In aerial combat, the impressively low Israeli losses were approximately three percent. Forty percent of Israeli losses were to enemy missiles.

The Yom Kippur War posed two cardinal questions. First, could aircraft cope with densely placed missile batteries and anti-aircraft systems? Second, was the IAF capa-

had been underestimated. Rather than the planned two or three days (for the Egyptian front), it in fact took two weeks—until Israeli armor was across the Suez Canal. Both the General Staff and the IAF had assumed that planes would be targeted against missile batteries at the beginning of a war. However, the early IAF effort had gone into containment missions. During the first days, the Air Force attacked batteries intermittently, without opportunity to follow up on partial successes. The Commanding General, Maj. Gen.



An IAF F-4 prepares to land at a base in the Sinai. The Israeli Air Force now has some 200 F-4Es. During the most recent Middle East war, experienced IAF F-4 pilots were reported to have turned with MiGs on the deck.

ble of supplying close support to ground forces as it had in the past? The debate over these two points still continues, though the battlefield data has become much more clear. The IAF was called on to face one of the densest and most advanced missile systems that any air force has ever encountered. It was certainly denser than anything in North Vietnam, and contained more modern missiles. Egypt had 146 batteries, including SA-6s, of which sixty-two batteries were concentrated on the Suez front. Syria had thirty-four batteries, again with some SA-6s, all of which were in the area between the front line and Damascus. Israel had accurate information about most of the missile systems, but the new SA-6—which has been defined as a “camouflaged sniper”—was too much an unknown for the rapid design of appropriate countermeasures.

It had been assumed that the Air Force would overcome the missile obstacle, but the time it would take

Binyamin Peled, said of the action:

“Instead of carrying out air defense suppression operations in an orderly manner, we rightly preferred to break them up into small operations and try to do them in the periods in between other things more important at that time.”

There are some (Maj. Gen. Ezer Weizman, past Commanding General, IAF) who argue that, all in all, too few sorties were directed against the missiles. Yet the fact is that the missile systems were destroyed. Though only three batteries were destroyed on the Syrian front, this in no way prevented the IAF from achieving aerial supremacy and carrying out its missions, nor did it contain the IDF armored breakthrough toward Damascus. Forty-four batteries were destroyed in Egypt, all of them in the front line zone. The turning-point came when Israeli armor crossed to the west bank of Suez. In a joint operation, the air defense system was crushed, a quar-

ter by land forces and the rest by the IAF.

### Lessons of the War

The IAF's conclusions from this confrontation between aircraft and missiles were: The aircraft—like the tank—has become more vulnerable because of the multiplicity of modern missiles; the battlefield is more complex and lethal for both land and air forces; however, the plane's chances of overcoming the missile are good, particularly because of the rapid development of standoff weaponry, which is accurate and lethal. Anyone who concludes from the Yom Kippur War that the aircraft has no future is mistaken.

It is now clearer than ever before that the key to blitzkrieg is not primarily air action. It now is held by an integrated team: the aircraft, tank, mobile artillery, and occasionally airborne forces. To successfully confront the latest anti-aircraft weaponry, the plane alone is not enough. The job calls for an inter-arm combat team. In parallel, Israel also learned that she must strengthen her own anti-aircraft system. The HAWK missile is the best of its kind in the world, but it must be augmented by other weapons. For this purpose, Israel has procured Chapparal missiles and Vulcan 20-mm guns, and integrated into the system many captured Russian guns—particularly the ZSU double-barrelled 23-mm towed gun, after it became clear that the West has no better anti-aircraft gun to offer today.

As for close support of ground forces, it is necessary to reexamine the battlefield environment and better define what ground forces may expect from airpower. As a result of overwhelming victory in the Six-Day War, the ground forces had expected massive air support. They did not get it—especially in the initial stages. Many field commanders were surprised to find that battlefield conditions had changed. The battalion commander could no longer expect an aircraft to hover overhead until he spotted and defined the target. More senior officers were surprised that in areas of high-density missiles, IAF planes were compelled to carry out strafing and bombing attacks from a greater range, with necessarily lower accuracy than in

the past. From a practical viewpoint, the result was that forces in contact with the enemy received less close support than in the past. The planes still took part in the ground battle—but from outside the tactical combat box. Inevitably, before the missile system was eliminated, Israeli ground force counterattacks (like that of October 8 on the Egyptian front) were supported by minimal air effort.

My conclusions are various: Close support will be much more limited and less effective, at least until missile systems are destroyed. IDF land forces must increase their artillery firepower, and equip themselves with ground-to-ground tactical missiles—like the Lance—in order to integrate with the Air Force and assist the planes in combating ground-to-air missile batteries. But that is not enough. To improve Air Force capability in ground battle, the flow of information from the battlefield to the IAF must be greatly improved. This requires “real-time” intelligence and exercising field commanders in its techniques, including improvement of their language of communication with pilots. And, indeed, IDF and the IAF have done these things since the war. Field commanders are being taught the correct use of airpower. A serious step is being taken in the sphere of real-time intelligence.

Apart from the lessons of weapon systems and infrastructure, a number apply to IAF manpower. One is the need to train more pilots. Where in the past volunteers were expected to report by themselves for pilot acceptance examinations, all potential draftees with high medical gradings are now put through examination months before enlistment. If they pass, they are asked to volunteer for flying school, and the number has indeed increased. The Air Force is now willing to accept pilot cadets who have minor health defects that do not interfere with flying (flat feet, for example). Technical manpower is a different question. The problems exist even though the IAF has enlarged its technical school, in parallel with expansion of the trade and professional high school system in general. If a country as small as Israel wants to absorb the modern weapons that are essen-

tial for defense, there must be an immense investment in training reserves of first-rate technicians.

Many of the new weapons that Israel decided to procure after the Yom Kippur War are intended for the Air Force. Among them are the F-15, Hawkeye radar planes, and Cobra attack helicopters. Purchase of the F-15 was preceded by a debate on whether Israel should buy such an expensive plane (both the F-15 and F-14 had been tested out in the US). There was no question about the quality of the plane, but rather about what should be the first priority, given Israel's financial constraints. Some suggested that it would be better to improve the Israeli-made Kfir. Finally it was decided to buy the F-15, but in a smaller quantity than originally requested.

Clearly, if it were possible to manage today without the F-15, this would not be the case in another two or three years when the Arab air forces will be able to field hundreds of modern aircraft. This viewpoint was reinforced by the F-15's capability to undertake strategic missions. The IAF is preparing the infrastructure necessary to maintain F-15s when deliveries begin. In parallel, the order of battle continues to grow, based on other aircraft; Israel is concluding procurement of additional F-4s and Skyhawks, and successfully integrating the excellent American-powered Kfir from Israel Aircraft Industries.

The IAF is far stronger than in the Yom Kippur War, but Israel has to augment her airpower constantly because of developments in the Arab air forces that are obtaining modern planes from both the Soviet Union and the West—the United States, Great Britain, and France. The need for constant awareness is all the greater because countries like Libya and Iraq are procuring Soviet Tu-22 bombers, and Saudi Arabia and Jordan are developing a new offensive capability for their air forces. Jordan is a particular source of anxiety because of her proximity to densely populated areas of Israel and to strategic targets. This is a new challenge to the IAF, but the force's commanders are convinced that they will meet it successfully, as they have all others in the past. ■



**T**HE Air Force has responded to complaints about its noncommissioned officer policies—that nearly all airmen are sergeants, membership is automatic, and NCO prestige has tumbled—with a revamped enlisted structure. It is complete with major changes affecting promotions, assignments, career progression, and tenure.

The service, in short, is in the midst of an NCO corps overhaul, and tens of thousands of its members, from recruits to veteran supergraders, will feel the impact. More alterations are in the works, and full implementation will take another year. But the vital word on the outcome of the new plan—whether the troops approve it or not—should surface within a few months.

Rough spots have been commonplace in the USAF's enlisted force structure. Officialdom, for instance, has changed its mind about exactly who should be NCOs. In 1952 it was decided that E-3s and E-4s were not noncoms, leaving only E-5s, E-6s, and E-7s in the prized category. But six years later, introduction of the two supergrades raised NCO ranks to five.

Then, in 1967, as an incentive for recruitment and reenlistments, Air Force returned the journeymen E-4 grade to noncom status, a move officials later acknowledged was a mistake. It proliferated the already top-heavy NCO force; thousands of additional airmen automatically gained the status during their initial two or three years in uniform, without any special preparation. This continued until two months ago.

It's not surprising that over the years NCO status lost

some of its luster. More and more airmen complained about loss of rank and job prestige. There was confusion over roles and responsibilities, in part because they were not spelled out in directives. Related NCO problems involved the status of E-7s—were they senior noncoms?—and lack of promotion visibility for E-7s and E-8s, since those not selected received no clues as to why.

Accordingly, USAF leaders last year began searching for antidotes. Their goal was a brand-new NCO management system that would "define NCO responsibilities more clearly, resolve confusion over the status of E-4s and E-7s, and establish a framework for future enhancement of the NCO force." Quite an order, but essential, the leadership insisted, if it were to ensure a quality, productive force for the future.

### **Three-Tier Organization**

The ambitious new package, launched June 1, is titled the "Three-Tier Organization." It aligns the nine enlisted pay grades into ten actual ranks grouped into three levels, or tiers. Responsibilities for each grade are spelled out, and a clear avenue of career progression for all airmen, as they gain experience and more rank, materializes.

The bottom, or "Trainee/Apprentice" tier, contains E-1s, E-2s, E-3s, and some of the E-4s; the middle, or "Technician/Supervisor" tier covers the rest of the E-4s, plus E-5s and E-6s; and the top, or "Supervisor/Manager," tier includes the E-7s, E-8s, and E-9s.

**In response to widespread criticism about NCO personnel policies, the Air Force has launched a program that is certain to impact on thousands of members of the enlisted force. The aim is to more clearly define NCO responsibilities, resolve the confusion over grade status, and lay the foundation for future enhancement of the NCO force . . .**

# **Revamping the Enlisted Structure**

**BY ED GATES, CONTRIBUTING EDITOR**

It is reasonably easy to follow, and the E-7 is definitely designated a senior NCO, usually as a supervisor but with some managerial responsibilities.

The spellout of responsibilities by grade is an important "first," because heretofore directives contained only one composite role description for the entire NCO

To	Army	Navy	USMC	USAF
E-9	22.8	19.6	22.5	24.0
E-8	18.4	16.6	19.5	21.7
E-7	14.5	14.2	15.5	17.6
E-6	7.0	7.8	8.4	13.4
E-5*	33	42	40	66
E-4*	19	28	28	31
E-3*	8	12	14	11

\* In months

force, E-4s through E-9s. This change alone, officials feel, is about to end the confusion over roles and responsibilities.

What about the drastic change in splitting E-4s into two groups? Understandably, it has triggered considerable static, for it ends the advancement to NCO status that occurred automatically on promotion to E-4. Newcomers to that grade are now "senior airmen," not non-commissioned officers. And they will remain senior airmen, and in the apprentice tier, for at least a year. During that period each senior airman must complete a new eighteen-hour NCO training program, maintain a high-level performance, and be recommended by his immediate boss and his commander.

Those who clear these hurdles will officially become sergeants; those who do not may be on their way out of service.

To underscore the importance Air Force attaches to a member's moving from senior airmen to sergeant, the local commander must hold a formal ceremony and present the new NCO with a certificate of appointment. Suitable for framing, this new document is reminiscent of those formerly awarded airmen at promotion time. Officials hope they will be regarded as prestige symbols.

Training will not stop once an E-4 becomes an NCO. On reenlistment he now must take a fifty-hour advanced training program. Interestingly, the individual's civilian supervisor must also attend this training project.

Subsequent training that ambitious young NCOs are encouraged to complete under the new three-tier program are leadership schools, command NCO academies, and the USAF senior NCO Academy.

### Promotion Innovations

To give fast burners a special shot at E-4, "below-the-zone" (BTZ) promotions will go to almost 1,200 airmen per quarter. This represents ten percent of the normal E-4 promotion quota. Heretofore, promotion to E-4 was virtually automatic at about the thirty-second month for four-year enlistees. For new BTZ selectees, advancements are being made from one to six months earlier.

And candidates must appear personally before their local boards.

Authorities explained that while "early promotions" are indeed an innovation for lower graders, in effect they already exist at the higher levels. For example, while the average promotion to E-5 occurs at about five and one-half years' service, a few persons make it with just three years in uniform. BTZ hikes, of course, have long been a regular feature of field-grade officer promotion activity.

For lower ranking enlisteds, it seems clear, the overhaul attempts to create incentives to study, work hard, and broaden one's experience with rewards to follow.

The three-tier project is "the most dramatic change to the NCO structure since the E-8 and E-9 grades were created," according to Richard Kisling, a former Chief Master Sergeant of the Air Force, now retired. Currently, he is a Hq. USAF civilian employee deeply involved in making the service a better place for airmen to work and live.

Also heartily endorsing the new package is the current CMSgt. of the Air Force, Thomas N. Barnes. Chiefs Kisling and Barnes, of course, are part of "management" and their endorsements come as no surprise. Yet, their expertise and impressive credentials are well known throughout the service, and their remarks must command more than passing attention.

Still, the important thing now is the reaction from the rank and file of the membership, which should start filtering in soon from throughout the Air Force.

Closely linked with the overall program's acceptance is the new plan to revise E-8 and E-9 promotions. This will create a WAPS-type report based on tests, time in grade, and other factors similar to those used in promotions to E-5 through E-7. In addition, central boards will evaluate and score the supergrade contenders, with promotions based on the total WAPS score plus the board score.

Nonselectees will receive a report card. This plan, still waiting final clearance at Hq. USAF, is expected to eliminate the main concern about the supergrade promotion program by telling people why they weren't promoted.

While many may welcome these promotion alterations, they should not expect speedier advancement. USAF members continue to be promoted slower than those in the other services, one reason being that a higher percentage remain for a career. This means less turnover and fewer vacancies. USAF E-6s, for instance, wait about three years longer than soldiers and sailors to make E-7, and the disparity is even greater to E-6 (see table).

### More Changes Ahead

Also on the NCO front are additional related changes, some pending, some newly approved. They include:

- A new evaluation system for top three graders. For more than a year, USAF officials have explored ways of dealing with inflation in Airman Performance Reports. One plan for the "top three" called for limiting the number of ratings that could be given in the top two blocks, as is done in officer rating actions. But that idea hasn't jelled and won't for a while. USAF says "several possibilities" exist. But "a final, approved APR change will

not be available for some time." Headquarters told AIR FORCE Magazine.

- A one-year extension of the "high year of tenure" for selected chief and senior master sergeants. A few supergraders can now serve beyond their normal mandatory retirement points of twenty-eight and thirty years, respectively. Candidates must "occupy key management positions," Headquarters said.

- A new set of stripes or other insignia change for the top three graders. This is under serious consideration and could make an early appearance. Commands, asked earlier for their ideas, were reviewing the most popular recommendations at press time.

- Strengthening the first sergeant career field. A first sergeant functional manager position was created at Hq. USAF recently, to quarterback the enhancement drive. CMSgt. Royce A. Flynn fills it. He's examining a variety of ideas, and his office is about to turn loose new directives which, among other things, will (a) better define first sergeant roles; (b) require newcomers to the career field to complete promptly the in-resident first sergeant school at Keesler AFB, Miss.; (c) explain how to transfer to another field; and (d) broaden the first sergeant's advisory roles to his commander.

- Earmarking more demanding jobs for supergraders at bases, commands, and Hq. USAF (see box).

If nothing else, USAF's revamped NCO structure should erase the image of "every enlisted member a sergeant." There are about 480,000 airmen today, and until June the "top six" grades accounted for 316,000 of them. But that figure is being reduced for two reasons: the one-year moratorium on appointment of new E-4 sergeants, and a regulation change removing Chief Master Sergeants from the sergeant category in terms of address. Each is now officially known as "Chief."

Air Force is encouraging members below E-9 to be addressed by their grade, such as "Senior Master Sergeant," or as "Sergeant." And, according to Chief Barnes, all sergeants are urged to use their full titles over the telephone. Thus, when E-7 Robert Smith answers the phone, he should bark out, "Master Sergeant Smith," not the traditional "Sergeant Smith" that has been the custom throughout US military history.

The CMSgt. of the Air Force also noted, with pleasure, that more buildings and streets at bases are being named for former enlisted members. He cited recent dedications at Chanute, Williams, Hill, Randolph, and Robins AFBs. Scott AFB, Ill., remains the sole USAF base named for an enlisted person, the Chief noted. Which raises the question—why can't there be more?

### Entitlements and Reenlistments

Chief Barnes, who recently was extended a second time as the service's top NCO, said the quality of the force is continuing to rise. He lauded the newcomers, saying, "We are getting a new product that is desirous of contributing, as opposed to just receiving. There is a general earlier indication of commitment than a few years ago."

Along with other USAF leaders, Chief Barnes has addressed many Air Force groups on the sticky question of benefits and entitlements and the perception of many

members that erosion is taking place. Gripes have been heavy the past year, but Chief Barnes feels they are on the decline because the troops are becoming better informed of budgetary problems and related factors.

Still, many military people remain convinced that the benefits erosion is in full operation and the quality of life in uniform has suffered. While Air Force leaders can do little about this—the Administration, Defense Department, and Congress call most of the shots—the three-tier project and related changes USAF is invoking may partially offset the unhappiness created by the benefits flap.

Despite beefs, there is no rush to the exit gate. It's still pretty much a buyer's market for the Air Force. FY '76 first-term reenlistments reached a healthy forty-

### INCREASING SENIOR NCO RESPONSIBILITY

*Make-up of the different E-8 and E-9 central promotion board panels has been changed from one chief master sergeant and two colonels to two chiefs and one colonel. And the newly created base-level E-4 below-the-zone panels consist of two senior NCOs and one colonel.*

*In a related move to increase senior NCO responsibilities, USAF is assigning more of them to decision and policy-making posts—"action-officer positions"—at Hq. USAF. This parallels the recent earmarking of 341 key base and command billets for selected chief master sergeants, a project being monitored by the "Chief's Group" at the USAF Military Personnel Center, Randolph AFB, Tex.*

one percent through late spring, while third and subsequent re-ups topped ninety-two percent.

Second-term reenlistments dipped to about sixty-nine percent, which is the reason Headquarters just last month laid on a special selected reenlistment bonus program in twenty-nine critical skills. It's for about 2,000 members with six to ten years of service who hold those skills or who are willing to retrain into them. Some will receive around \$2,300, others about \$4,700 in bonus money.

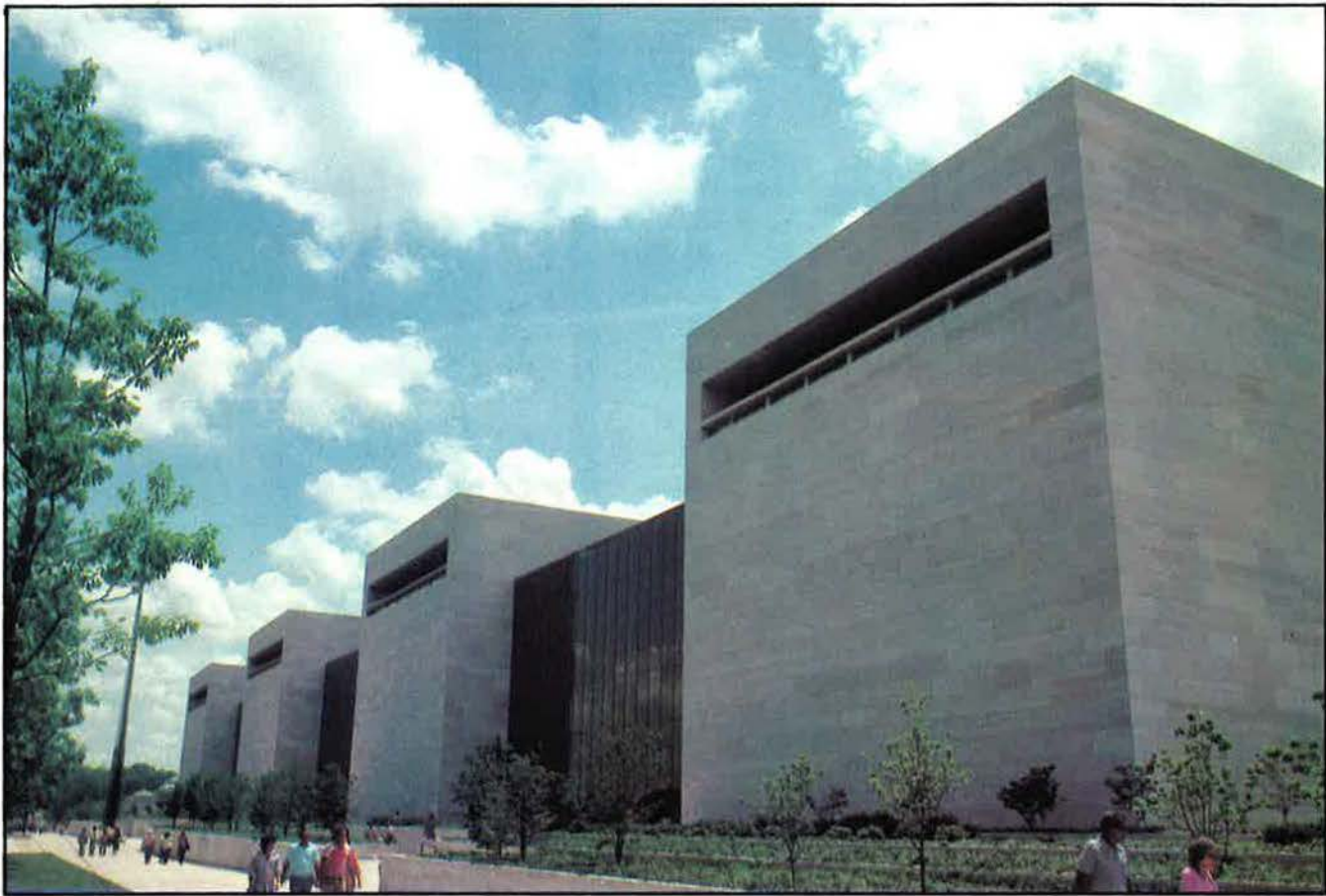
Other than this token reenlistment bonus action, however, the Air Force is well-heelled in trained, experienced airmen—so much so that the latest bonus skills list for reenlisting first termers is the smallest since bonuses were introduced over a decade ago. "We don't have to pay extra money to keep good people," one official said.

More and more, he indicated, airmen who perform marginally or are unwilling to retrain from overage to shortage skills, or who reach their high year of tenure without promotion, are being eased out. The combined total is running to almost 10,000 a year, and authorities feel it may increase in the future.

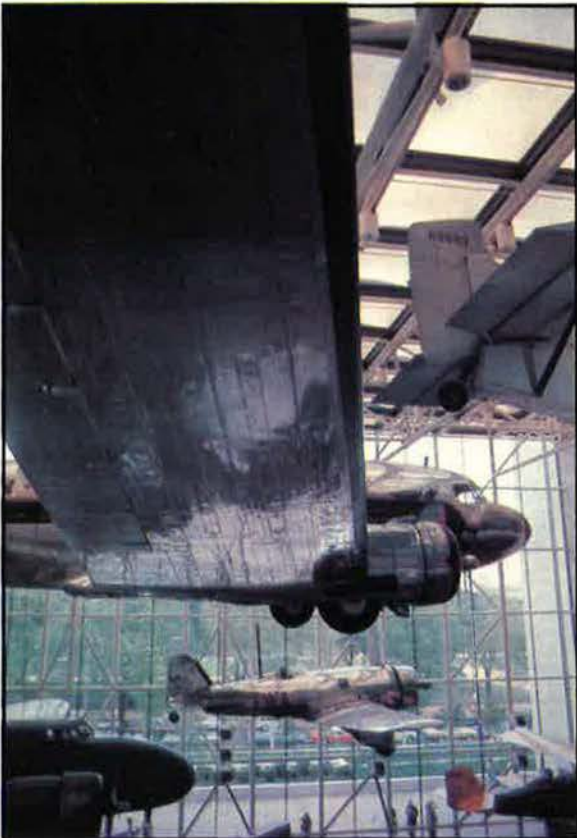
Accordingly, the new noncommissioned officer programs—particularly the tough criteria for advancement to NCO status—appear to present an important challenge to enlisted members generally. At the same time, the changes could go far to improve NCO utilization and restore a large measure of prestige the corps sorely needs. ■



*Gleaming airplanes signify milestones in aviation history.*



On July 1, in Museum dedication ceremonies attended by many dignitaries including the President, the ribbon cutting was triggered by a signal from Viking 2, then approaching Mars.



Here, among other aircraft, a famed DC-3 donated by Eastern Airlines. Below it, the last remaining Alpha NC-11Y mail plane, which has been restored to mint condition by TWA employee volunteers as a gift to aviation history.



Attracting attention: linked Apollo/Soyuz orbital spacecraft.



Now being shown in the Museum's theater is "To Fly," a film that portrays America's love affair with flight. Produced under the direction of film-maker Francis Thompson, Inc., of New York City, its brilliant photography is the work of Greg MacGillivray and Jim Freeman of Laguna Beach, Calif. Mr. Freeman died in a helicopter crash just prior to the Museum's opening. The film is his legacy.

Now open to the public on the Mall in the nation's capital is the most recent addition to the complex of buildings that houses the Smithsonian's vast collection of historic memorabilia. Designed as a showcase for our treasure of aviation and space artifacts, the facility is itself a treasure . . .

# AMERICA'S NEW AIR AND SPACE MUSEUM

By William P. Schlitz, ASSISTANT MANAGING EDITOR



Museum Director Mike Collins is a former Air Force test pilot who, as an astronaut, went to the moon on the Apollo-11 mission.

**A**S THIS is written, the finishing touches are being put to the big and beautiful newcomer to the complex of buildings that rims the Smithsonian Institution's Mall area in the nation's capital.

The new National Air and Space Museum, three city blocks long and some eighty-three feet high, is faced in gleaming Tennessee marble and constitutes a stunning addition to the architecture of the capital.

Even before its official opening on July 1 of this Bicentennial year, the Museum had drawn thousands of visitors to its huge glass bays for a peek at the nation's historical aerospace treasures being readied for display.

The building has been structured with twenty-three galleries and two "presentation centers" (a theater and planetarium), total-

ing a whopping 200,000 square feet of exhibit area.

The first sight to greet a visitor in the Museum's main entrance hall is the "Milestones of Flight" gallery, which contains a grouping of famous aeronautical and space hardware that sums up America's progress in aerospace during the last seven decades.

In this gallery can be found the crown jewel of the Museum's collection—the Wright brothers' Kitty Hawk Flyer, the world's first successful airplane. Suspended from the ceiling, it shares airspace with another VIP (very important plane): Lindbergh's *Spirit of St. Louis*. Among other celebrities on hand are the Bell X-1 (first aircraft to fly faster than the speed of sound); *Friendship-7* (first manned US spacecraft to orbit the earth); and other space-age hallmarks, including the Apollo-11 capsule that brought the first moon walkers back to earth.

In Space Hall, an adjoining gallery, rests an immense cylinder—a Skylab Orbital Workshop—its gold-foil outer skin glowing richly in the subdued lighting. This spacecraft provided backup for the vehicle used during the actual mission. Beside it stands a solar panel, which, in concert with others, would have powered the lab with electricity converted from sunlight.

Visitors are invited to enter Skylab, to see how astronauts lived and worked while in orbit. This marks the first time that the general public has been allowed within a spacecraft.

Also in Space Hall, towering sentinels—rockets that are representative of major advances in space propulsion—reach to the

ceiling from the base of a fifteen-foot-deep well constructed especially for them. And exhibited nearby are linked US and Soviet spacecraft, sister ships to those of the spectacular Apollo/Soyuz rendezvous and docking in July 1975.

## World War II Remembered

Certain to stir memories in air warriors of a bygone era is the Museum gallery devoted to World War II. Among major memorabilia are a Messerschmitt Bf.109G, a famed Mitsubishi A4M-6 Zero, and a North American P-51D Mustang—three contenders in the fighter sweepstakes of the period. One gallery wall measuring 1,825 square feet bears a mural by artist Keith Ferris—replete with flak and fighters—of B-17s in combat over Europe. (And in a display case of its own, a fifty-mission cap—bat-



Paul E. Garber, Museum Historian Emeritus, who was the first curator, began the spadework for creation of the new Air and Space facility.



*A spacious display of aeronautical history.*



*Airplanes of the 1930s vie for attention with an F-86 and a World War II P-40.*



*Outside the Museum "Art Astra," a sculpture by Richard Lippold.*

**Photos by William A. Ford,  
ART DIRECTOR**

tered symbol of the air combat veteran.)

The distant rumbling and flashes of a nighttime artillery duel make a fittingly martial prop in the Museum's World War I gallery, decked out to resemble an Allied flying field. Here, one can eavesdrop on the interrogation of a captured enemy pilot and tread the duckboard walkways that keep the mud of France off one's flying boots. Among the veterans built of fabric, wood, and wire on display: a Spad VII and Fokker D-VII.

Earning special mention for its imaginative realism is the Museum's Sea-Air Operations gallery, whose main area is fitted out as an aircraft carrier hangar deck. At peace now within its Navy-gray bulkheads are two strike aircraft of the Pacific war—a Dauntless dive bomber and a Wildcat fighter. Planes in the gallery cover a span of history from the early 1930s (an F4B4) to today's A-4C Skyhawk.

Mount a ladder (sailor talk for ascending a staircase) and you're on the carrier's bridge, complete with instrumentation from actual flattops deactivated by the Navy. From the bridge, visitors see catapulting aircraft—a further realistic touch provided by color film shot during actual carrier operations.

Adjoining the bridge area is a simulated interior of the ship's primary flight center, the carrier's tower, from which observers can watch planes practicing landings on the angle deck (also filmed segments of the real thing).

### Many, Many Aircraft

The Museum has devoted much of its resources to reflecting developments in aviation's civil sector, from vertical flight to general aviation. Air transportation also has its own gallery, as do flight testing, air traffic control, and flight technology. Favorites among the many aircraft displayed are the Ford Trimotor, Douglas DC-3 (designed before World War II and still in service around the world), and the Beech Bonanza.

The Smithsonian began accumulating airplanes, and other aeronautical artifacts, decades ago and now possesses about 270

aircraft of historical and technical merit, one of the most extensive collections of original aircraft in the world. Before the coming of the new building, and because of lack of exhibit space, many of these were stored at the Smithsonian facility at Silver Hill, Md. A complex of warehouses and workshops, Silver Hill has long provided renovation and other services for the Museum.

(Gone now from the Mall area



At Silver Hill, Md., is the Museum's restoration and preservation facility, where artifacts are readied for display.

is the "Tin Shed"—a long-time Washington landmark. The Shed, actually a hangar constructed in 1917 to shelter aeronautical equipment being inspected by government officials and dubbed by former Museum curator Paul Garber as "the most permanent temporary building in Washington," once housed a goodly portion of the Museum's exhibits.)

Silver Hill will continue to be used for storage, since the entire collection cannot be displayed at any one time, and will still offer logistic support and conduct further aircraft restorations.

While many aircraft passed through the Silver Hill refurbishing process, the Museum gives high praise to the aerospace industry, the airlines, and the military services for their efforts in donating and renovating aircraft and other items.

Fleshing out the Museum's stat-

ic exhibits of aircraft and space hardware are eighty-four separate audio/visual displays that use a wide range of educational tools (one a puppet show that demonstrates the team effort associated with designing aircraft) to impart information in interesting ways.

### Education and Research

Officials are quick to emphasize the Museum's dual function as educational institution and research center. Museum Deputy Director Melvin Zisfein, in charge of exhibit development, says of the Museum's attitude toward the general public: "Visitors to the Museum range from neophyte to knowledgeable, and we try to incorporate much educational material for all of them."

(Museum officials pride themselves on the accuracy of their data. For example, the exhibit labels—the printed matter that contains technical and historical information about each display—are reviewed by at least five experts in a particular field before being okayed.)

With this educational role in mind, the Museum has scheduled a full program of events for two of its most promising facilities—its theater and planetarium.

The Museum's 485-seat theater is equipped with a unique projector that runs special 70-mm film to cast an extremely high-fidelity and waver-free image on a gigantic screen seventy-five feet wide by fifty feet high. Screened daily for the public is "To Fly," a specially made thirty-minute film in celebration of the Bicentennial year that relates by aerial photography the story of America's westward expansion and the coming of the Space Age. ("To Fly," underwritten by Continental Oil Co. as a public service, will run about a year, to be followed by other films made specifically for the Museum theater.) Standard projection gear is also available when the theater requires its use.

### Museum "Spacearium"

The Museum planetarium, named for Albert Einstein, is housed in a dome seventy feet in diameter.



The core of its visual system is a Zeiss Mark VI "planetarium instrument"—a Bicentennial gift of the West German government. Supplementing this intricate machine are literally hundreds of projectors around the dome's perimeter. All linked together by computer, the "Spacearium" is capable of duplicating any interstellar activity from a trip to the lunar surface to a visit to another galaxy.

On the Museum's third floor is a Smithsonian research and reference library containing more than 21,000 bound volumes, brought together over the last fifteen years primarily by the Institute of Aeronautical Sciences but also generously augmented by gifts from individuals and institutions. The library, under the supervision of Kitty Scott, is also the custodian of a collection of rare books and much historical reference material, useful to students and scholars alike. (The library is open to researchers and the public by appointment.) The library's backlog of rare and historic photos is equally important as source material. The library wing also plays host to the Center for Earth and Planetary Studies, under the direction of Farouk El-Baz.

The Museum was fortunate to inherit NASA's art collection, initiated by the space agency at the beginning of the space program and now composed of more than 500 major works by many of the country's leading artists. Among them: Norman Rockwell, James Wyeth, Lamar Dodd. Curator of the collection is artist James D. Dean, who is also responsible for overseeing the Museum's art gallery.

The Museum's unique relationship with the space agency guarantees the future benefit of additional contributions of hardware and data to the Museum's collection as the conquest of space progresses. Selectivity in this area will be a prime concern of Museum Director Michael Collins, a former astronaut. Mr. Collins, currently an Air Force Reserve major general, became Museum Director in April 1971, following a brief stint as Assistant Secretary of State for Public Affairs.

A brand new point of interest that celebrates America's contribution to the age of flight has opened on the Mall in the Capital City and is already gearing up for

the big time. Museum officials estimate they will be welcoming—and helping to educate—between six and seven million visitors annually. ■

### National Air and Space Museum—Background

It was Gen. H. H. "Hap" Arnold who, in 1946, went to Capitol Hill to urge legislation authorizing a facility on the Smithsonian grounds to act as a repository for the aircraft of World War II. He convinced West Virginia's Rep. Jennings Randolph (now Senator) to introduce legislation to that effect, and, in August 1946, President Harry Truman signed into law a bill creating a National Air Museum allied to the Smithsonian.

In 1958, a site for the building was selected and its eventual construction assured by law.

In 1966, on a day that saw future Museum Director Mike Collins orbiting the earth in Gemini-10, further legislation was approved by the Senate for planning and construction of a National Air and Space Museum with broadened responsibilities and functions. However, funds for the Museum's construction were deferred because of the economic drain of the war in Southeast Asia.

Finally, in June 1972, and to a great extent because of the advocacy of Sen. Barry Goldwater, Congress appropriated \$40 million in construction funds for the building. (Monies for the refurbishment and creation of exhibits have thus far come to an additional \$6 million.) In November 1972, ground was broken for the new building.

The Museum opened to the public on July 1 of the Bicentennial year.

### NATIONAL AIR AND SPACE MUSEUM CONSTRUCTION FACTS

<b>Architect:</b>	Gyo Obata, of the firm Hellmuth, Obata & Kassabaum, St. Louis, Mo.
<b>Project Manager:</b>	General Services Administration
<b>Construction Manager:</b>	Gilbane Building Co., Providence, R. I.
<b>Construction:</b>	
<b>Commencement:</b>	September 1972
<b>Completion:</b>	July 1975
<b>Area:</b>	
<b>Total gross square feet:</b>	632,685
<b>Net assignable square feet:</b>	446,398
<b>Dimensions:</b>	
<b>Length:</b>	685 feet
<b>Width:</b>	225 feet
<b>Height:</b>	82 feet, 9 inches
<b>Exhibition Area:</b>	200,000 square feet
<b>Structural System:</b>	Steel. Exposed pipe truss system carries portions of the roof and glass wall panels. 3,500 tons of steel used.
<b>Exterior Materials:</b>	Tennessee cedar marble—250,000 square feet of 1¼-inch marble used.
<b>Museum Facilities:</b>	
<b>Lower level:</b>	Parking—400 cars.
<b>Main level:</b>	Exhibition space: 117,000 square feet. Three main exhibit bays: 115 feet x 124 feet x 62 feet (to bottom of truss).
<b>Second level:</b>	Exhibition space: 72,377 square feet. "Spacearium": 3,630 square feet. Theater: 4,800 square feet.
<b>Third level:</b>	Library and offices: 20,904 square feet. Cafeteria: 13,360 square feet.
<b>Estimated Visitors:</b>	
<b>Annually</b>	6-7,000,000
<b>Daily maximum</b>	60,000
<b>Cost:</b>	
<b>Building Construction:</b>	About \$41 million.
<b>Exhibits:</b>	About \$6 million.



Among space hardware, a Lunar Module.



A view of the Sea-Air Operations gallery.



Early rocketry, and a Skylab Orbital Workshop.



In the World War II gallery, a British Spitfire stands sentinel duty by the Keith Ferris mural depicting B-17s in combat over Europe.

# JANES'S

ALL THE WORLD'S AIRCRAFT SUPPLEMENT



*The first prototype General Dynamics YF-16, modified for CCV research*

**GENERAL DYNAMICS**  
**GENERAL DYNAMICS CORPORATION;**  
*Head Office: Pierre Laclède Center, St. Louis,  
Missouri 63105, USA*

#### **GENERAL DYNAMICS CCV YF-16**

Under a \$6 million contract awarded by the USAF, General Dynamics Fort Worth Division has modified the No. 1 prototype of the F-16 air combat fighter as a test-bed for a control configured vehicle (CCV) programme. This is being directed by the Air Force Systems Command's Air Force Flight Dynamics Laboratory at Wright-Patterson AFB, Ohio.

The YF-16 was selected for this programme because, in place of conventional flying controls, it has a quadruple-redundant fly-by-wire control system, in which electrical circuits replace the usual mechanical linkages between the pilot's controls and the related aerofoil control surfaces. This system was integrated into the F-16 design to exploit, from the outset, the total capabilities of flight control system technology through the CCV principle. In the F-16, the application of CCV technology was concerned with the relationship of aircraft balance to static longitudinal stability, allowing the CG to be moved further aft than

is normally possible with an aircraft of conventional configuration and control. It results in a significant reduction of trim drag at high load factors and at supersonic speeds. The effect is to reduce overall drag, which includes both the tail drag and the change in drag on the wing resulting from changes in wing lift required to balance the down load on the tail.

Until the advent of the YF-16 prototypes, CCV technology was a mainly-theoretical concept which aerodynamicists had exploited by the conventional approach of analysis, models, and wind tunnel research. With the availability of CCV basic hardware, in the



Close-up of the canards on the CCV YF-16

form of the highly successful YF-16 which had given some hint of CCV potential, further exploration of the principle was inevitable.

The only external change visible on the YF-16 No. 1 prototype is the addition of two canard surfaces, each 0.74 m<sup>2</sup> (8 sq ft) in area, mounted on each side of the engine air intake duct and operated by hydraulic actuators. Other changes include means of isolating port and starboard wing fuel tanks from the forward and aft fuselage fuel cells, providing a manual means of varying the aircraft's CG position; modifications to the flight control system to permit the use of wing trailing-edge flaperons (flaps/ailerons) in combination with the all-moving tailplane to provide direct lift control; and similarly to use the new canards and the conventional rudder in conjunction to give direct sideforce control.

The expected result of these changes is to give the aircraft radically different performance characteristics. Thus the CCV should be able to point its nose in any direction without changing its flight path; or rise, descend, and move sideways without changing its nose direction. Movement of the nose to port or starboard, sideways movement without bank or roll, and wings-level turns are executed by using the canards and rudder in conjunction. Pitching movements of the nose, and climb and descent, are effected by co-ordinated movements of the wing flaperons and all-moving tailplane.

These additional control freedoms may prove invaluable for better target tracking performance and weapon delivery accuracy. Instead of having only a fleeting moment for aim and weapon discharge, it would seem possible to fly a CCV aircraft

with the nose crabbed a few degrees port or starboard, or similarly pitched up or down a few degrees, or a combination of both, allowing the target to be aligned accurately in the gunsight. Another advantage of the CCV results from the very rapid response of the flight control system, which senses, reacts, and damps out gust effects before the pilot is aware of them.

The CCV YF-16 flew for the first time with its canard surfaces operative on 24 March 1976, and by 8 April had already accumulated 14 hours of flight testing. The programme is scheduled for a period of seven months, during which time the Flight Dynamics Laboratory hopes to demonstrate that these additional control surfaces will make for better performance, ease the pilot's work load, and make possible completely new combat manoeuvres. The end result may be an aircraft that is smaller, lighter, and less expensive, with the ability to combine better payload/range and combat kill potential than previous fighters.

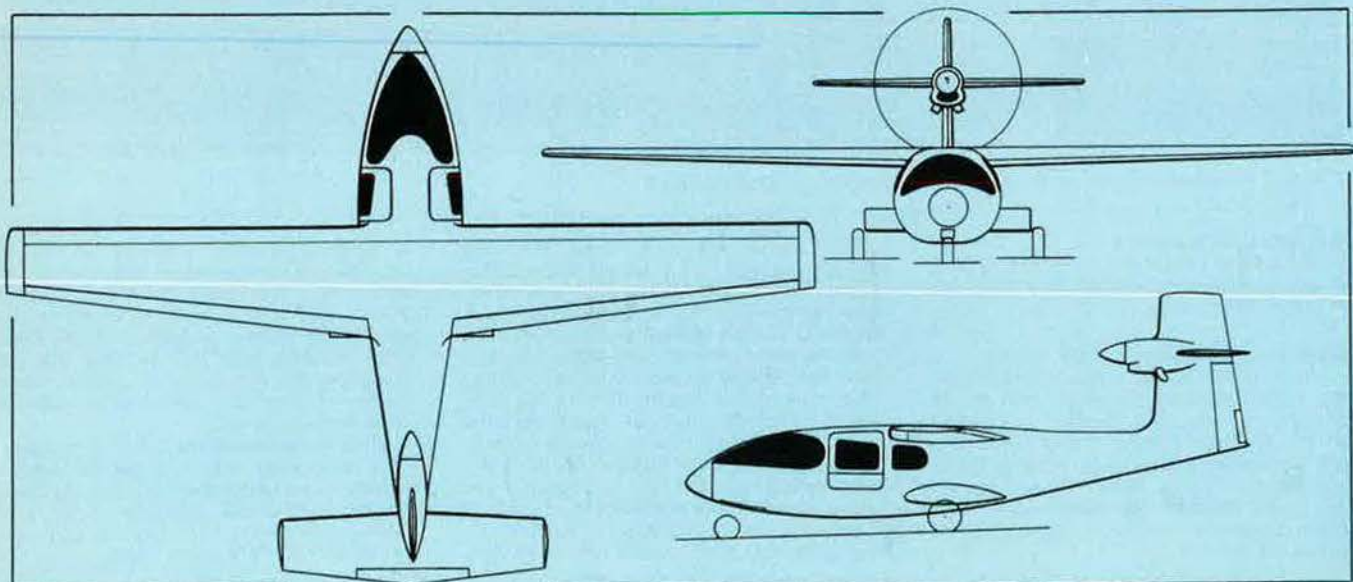
**EQUATOR AIRCRAFT**  
**EQUATOR AIRCRAFT GESELLSCHAFT**  
 FÜR FLUGZEUGBAU mbH ULM; Head  
 Office: 8 München 40, Adalbertstrasse  
 110, German Federal Republic

Günther Pöschel, formerly President of Pöschel Aircraft GmbH, designed and built the prototype of a five/six-seat light STOL amphibian, designated P-300 Equator. Powered by a 231 kW (310 hp) Lycoming TIO-541 flat-six engine, this flew for the first time on 8 November 1970, and was last described in the 1972-73 *Jane's*.

At that time there was the intention to produce a turboprop-powered version, under the designation P-400 Meridian Turbo-Stol-Amphibian, but lack of capital was responsible for a halt to the development of this aircraft. Herr Pöschel has now formed this new company to continue development and production of the turboprop-powered version, redesignated P-400 Turbo-Equator, as well as production of the piston-engined P-300 Equator.

**EQUATOR AIRCRAFT P-400**  
**TURBO-EQUATOR**  
 TYPE: Lightweight STOL amphibian executive aircraft.

The projected Equator Aircraft P-400 Turbo-Equator (Pilot Press)





The original prototype P-300 Equator in its current form (Martin Fricke)

**WINGS:** Cantilever high-wing monoplane. Conventional single-spar structure with outer skin of reinforced glassfibre. Full-span double-slotted trailing-edge flaps.

**FUSELAGE:** Conventional semi-monocoque structure, with outer skin of reinforced glassfibre, forming a watertight hull.

**TAIL UNIT:** Cantilever structure with outer skin of reinforced glassfibre. Cruciform tail unit; fin integral with fuselage. Tailplane and elevators mounted approximately two-thirds up the fin, in line with propeller axis. Rudder extends from base of fin to just below tailplane. Trim tab in rudder.

**LANDING GEAR:** Conventional tricycle-type retractable landing gear for operation from land. When gear is retracted into fuselage, the structure is completely watertight to permit operation from water. Small stabilising surfaces, on each side of fuselage, directly below wings, to give stability when operating on water.

**POWER PLANT:** One 313 kW (420 shp) Allison 250-B17B turboprop engine, driving a three-blade propeller. The small diameter of this engine (only 483 mm; 19 in), allows it to be mounted in the tail unit, with its axis coincident with the intersection of the tailplane and fin.

**ACCOMMODATION:** Standard seating for pilot and up to seven passengers. Access by means of door on each side of fuselage, located forward of wing. Cabin heated and air-conditioned. Dual controls standard.

**DIMENSIONS, EXTERNAL:**

Length overall 8.60 m (28 ft 2 3/4 in)  
Height overall 3.55 m (11 ft 7 3/4 in)

**AREA:**

Wings, gross 18.00 m<sup>2</sup> (193.8 sq ft)

**WEIGHTS AND LOADING:**

Weight empty 950 kg (2,094 lb)  
Max T-O weight 2,000 kg (4,409 lb)  
Max wing loading 111.11 kg/m<sup>2</sup> (22.76 lb/sq ft)

**PERFORMANCE (estimated, at max T-O weight):**

Max level speed at 2,400 m (7,875 ft)  
254 knots (470 km/h; 292 mph)  
Max cruising speed at 3,600 m (11,800 ft)  
248 knots (460 km/h; 286 mph)  
Cruising speed at 7,200 m (23,625 ft)  
237 knots (440 km/h; 273 mph)  
Landing speed  
55 knots (102 km/h; 63.5 mph)

**Max rate of climb at S/L**

720 m (2,360 ft)/min  
Service ceiling 8,500 m (27,875 ft)  
T-O run 170 m (560 ft)  
T-O to 15 m (50 ft) 245 m (805 ft)  
Landing from 15 m (50 ft) 250 m (820 ft)  
Landing run 165 m (540 ft)  
Landing run, with propeller reversal 50 m (165 ft)  
Range with max fuel, at 3,600 m (11,800 ft) 755 nm (1,400 km; 870 miles)

**HAL**

**HINDUSTAN AERONAUTICS LIMITED;**  
Head Office: Indian Express Building,  
Vidhana Veedhi, PO Box 5150, Bangalore  
560 001, India

**HAL HPT-32**

Under development for the Indian Air Force, the HPT-32 is a fully-aerobatic piston-engined basic trainer, with side-by-side seats for instructor and pupil, and a third seat at the rear. It is intended for a

wide range of ab initio training, including instrument, navigation, night flying, and formation flying; for armed patrol; for observation, liaison, or sport flying; or for weapon training, light strike duties, supply dropping, search and rescue, reconnaissance, or glider and target towing. The airframe is of all-metal construction, is designed to FAR 23, and is expected to have a fatigue life of 6,500 hr. General configuration of the HPT-32 is shown in the accompanying three-view drawing.

Two prototypes have been ordered, the first of which is expected to fly in early 1977.

**TYPE:** Two/three-seat basic trainer.

**WINGS:** Cantilever low-wing monoplane of all-metal construction. Dihedral 5° from roots. Incidence 2° 30' at root.

**FUSELAGE:** All-metal semi-monocoque structure.

**TAIL UNIT:** Cantilever all-metal structure, with sweptback vertical surfaces.

**LANDING GEAR:** Retractable tricycle type. Nose unit retracts rearward, main units inward into wings.

**POWER PLANT:** Prototypes powered by 194 kW (260 hp) Lycoming AEIO-540-D4B5 flat-six engine, driving a Hartzell two-blade constant-speed propeller with spinner. Two integral wing fuel tanks, with total capacity of 227 litres (50 Imp gallons); provision for 136.5 litre (30 Imp gallon) tank in place of rear seat. For production aircraft, an indigenous engine of similar power is under development.

**ACCOMMODATION:** Side-by-side seats for two persons, with third seat to rear, under rearward-sliding jettisonable canopy. Front two seats adjustable in height by 127 mm (5 in); rear seat is not adjustable. Baggage space beside rear seat. Full dual controls, and adjustable rudder pedals, for instructor and pupil.

**ARMAMENT AND EQUIPMENT:** Four under-wing attachments for armament or other stores, up to a total of 255 kg (562 lb). VHF radio, ADF, and marker beacon.

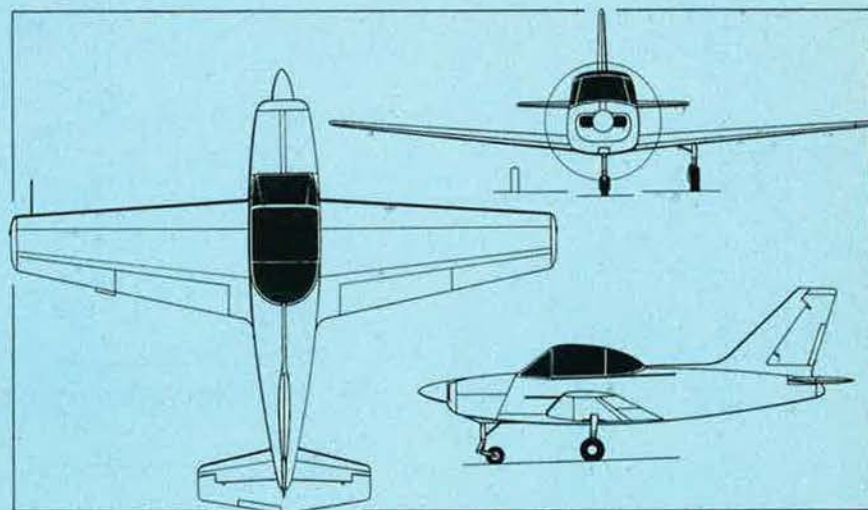
**DIMENSIONS, EXTERNAL:**

Wing span 9.50 m (31 ft 2 in)  
Wing aspect ratio 6.0  
Length overall 7.72 m (25 ft 4 in)  
Height overall 2.93 m (9 ft 7 1/4 in)  
Wheel track 3.30 m (10 ft 10 in)  
Wheelbase 1.71 m (5 ft 7 1/4 in)

**AREA:**

Wings, gross 15.00 m<sup>2</sup> (161.46 sq ft)

Three-view drawing of the HAL HPT-32 basic trainer, under development for the Indian Air Force (Pilot Press)



**WEIGHTS:**

Weight empty (without electronics) 850 kg (1,874 lb)  
 Normal T-O weight 1,200 kg (2,645 lb)  
 Max T-O weight 1,500 kg (3,307 lb)

**PERFORMANCE** (estimated, at 1,200 kg; 2,645 lb normal T-O weight. A: landing gear down; B: landing gear retracted):

Max level speed at S/L:  
 A 140 knots (260 km/h; 161 mph) EAS  
 B 165 knots (307 km/h; 190 mph) EAS  
 Stalling speed, flaps up:  
 A 59.5 knots (110 km/h; 68.5 mph) EAS  
 B 58.5 knots (108 km/h; 67.5 mph) EAS  
 Stalling speed, flaps down:  
 A 51 knots (94 km/h; 58.5 mph) EAS  
 B 50 knots (92 km/h; 57.5 mph) EAS  
 Max rate of climb at S/L:  
 A 417 m (1,368 ft)/min  
 B 479 m (1,571 ft)/min  
 Service ceiling:  
 A 5,750 m (18,865 ft)  
 B 6,500 m (21,325 ft)  
 T-O to 15 m (50 ft):  
 A, B 280 m (918 ft)  
 Landing from 15 m (50 ft):  
 A, B 390 m (1,280 ft)  
 Range at 2,000 m (6,560 ft):  
 A 458 nm (850 km; 528 miles)  
 B 539 nm (1,000 km; 621 miles)  
 Endurance at 2,000 m (6,560 ft):  
 A, B (50 Imp gallons fuel) 4 hr 30 min  
 A, B (80 Imp gallons fuel) 7 hr 0 min

**DASSAULT-BREGUET**

AVIONS MARCEL DASSAULT/BREGUET AVIATION; Head Office: 27 rue du Professeur Victor Pauchet, 92420-Vaucresson, France

Following the decision of the French Defence Ministry to abandon development of the Super Mirage ACF (Avion de Combat Futur), and selection of the General Dynamics F-16 rather than the Mirage F1-E by four NATO air forces in Europe,



Artist's impression of the 'stretched' Mercure 200, which may form the basis of a joint Dassault-Breguet/McDonnell Douglas programme

there has been much speculation concerning fighter aircraft which Dassault-Breguet might evolve to follow the currently operational Mirage F1. To counter incorrect reports, Dassault-Breguet has provided information which will form the basis of the following entries in the 1976-77 edition of *Jane's*. No other authorised data are yet available.

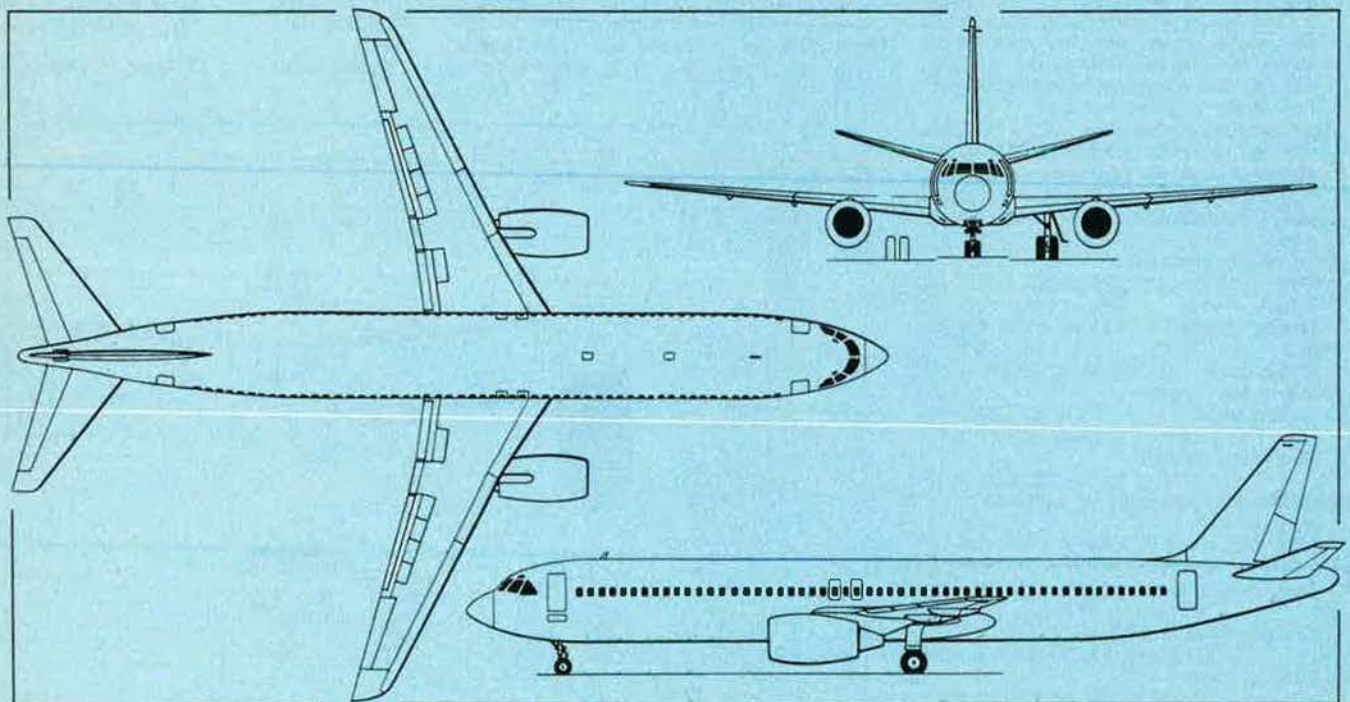
**DASSAULT DELTA MIRAGE 2000**

This is the aircraft which is being developed, under French Air Force contract, to take the place of the now-abandoned ACF (Avion de Combat Futur) sweptwing Super

Mirage, described briefly in the 1975-76 *Jane's*. Intended basically as an interceptor and air superiority fighter, it will be equally suitable for reconnaissance, close support, and low-altitude attack missions in areas behind a battlefield.

The Delta Mirage 2000 will be powered by a single SNECMA M53 turbofan engine. In the first prototype this is likely to be an M53-2, one of which has already completed its 150 hr type test at 54.4 kN (12,235 lb) st dry and 83.4 kN (18,740 lb) st with afterburning. Reversion to a delta wing, embodying the latest aerodynamic concepts, has enabled Dassault to claim that

Three-view drawing of the projected Dassault-Breguet Mercure 200 (Pilot Press)



the Delta Mirage 2000 will have a markedly superior performance to that of current combat aircraft in the class of the Mirage F1-E.

The French government's new six-year defence programme, covering the period 1977-82, includes funding for an initial series of 127 Delta Mirage 2000s, of which the first 10 are to be delivered within this time-scale. Production aircraft are expected to be powered initially by an M53-5, of 5% greater thrust, and ultimately by an M53-7, rated at 63.7 kN (14,330 lb) st dry and 95.2 kN (21,384 lb) st with afterburning.

#### DASSAULT DELTA SUPER MIRAGE

The Delta Super Mirage, of which a prototype will be built as a private venture by Dassault-Breguet, is intended as a high-performance export fighter powered by two SNECMA M53 turbofan engines. It will perform the same combat missions as the Delta Mirage 2000, and will also be able to make low-altitude penetration attacks on targets situated at considerable distances from its base. A prototype is scheduled to fly in the Summer of 1978.

#### DASSAULT-BREGUET MERCURE 200

On the basis of experience gained with the Mercure, Dassault-Breguet completed in the first half of 1975 a preliminary study for a higher-capacity version, powered by SNECMA/General Electric CFM56 turbofans, under contract to the French authorities.

At the instigation of the French Transport Ministry, Dassault-Breguet made contact subsequently with McDonnell Douglas Corporation in the USA, to investigate the possibility of joint development of the new aircraft as a successor to both the original Mercure and the DC-9. Seven months of joint work by the two companies led to further design changes, and the resulting proposal was submitted to the French Ministry of Transport on 8 April 1976 as the Mercure 200.

Basic changes by comparison with the original Mercure are as follows:

The power plant consists of two CFM56 high by-pass ratio turbofans. These will each be rated at 97.9 kN (22,000 lb) st for the first two years, but in the event of an engine failure the remaining CFM56 will be able to deliver 106.75 kN (24,000 lb) st.

The engine pods are suspended under the wings, instead of being integral with them. This requires lengthening of each main landing gear unit by 270 mm (10 3/4 in) and the nose unit by 380 mm (1 ft 3 in), with associated redesign of wheel wells. Aircraft ground clearance is improved, and forward location of the engines reduces the possibility of wing damage in the event of a rotor break-up.

Redesign of the rear portion of the wing aerofoil, with trailing-edge camber, provides a more highly accentuated supercritical-type wing without changes forward of the rear spar. Addition of wingtip extensions offers a reduction in induced drag when the wing is working under high lift factors, notably during take-off and high-altitude cruising.

The trailing-edge flaps are redesigned in two segments, taking advantage of recent McDonnell Douglas research into high-lift double-slotted flaps.

As a result of these modifications, it is possible to increase take-off weight and provide increased accommodation by inserting two 'plugs' with a total length of 6 m (19 ft 8 1/2 in) in the fuselage fore and aft of the wings. With six-abreast seating and centre aisle, this offers maximum accommodation for 186 passengers at a seat pitch of 813 mm (32 in). Normal accommodation would be

for 174 passengers at a pitch of 864 mm (34 in), with an alternative mixed class version for 16 first class passengers, four-abreast at a pitch of 965 mm (38 in), and 144 economy class six-abreast at 864 mm (34 in) pitch. In all cases, the normal fore and aft galleys and toilets are retained.

These changes, apart from the engines and nacelles, affect only 23% of the total airframe structure and 5% of the aircraft systems by comparison with the original Mercure. Structure life is calculated to be 40,000 flights or 40,000 flying hours.

#### DIMENSIONS, EXTERNAL:

Wing span	31.95 m (104 ft 10 in)
Wing aspect ratio	6.6
Length overall	40.93 m (134 ft 3 1/2 in)
Tailplane span	12.77 m (41 ft 10 3/4 in)
Wheel track	6.60 m (21 ft 7 3/4 in)
Wheelbase	15.71 m (51 ft 6 1/2 in)

#### AREA:

Wings, gross	118.7 m <sup>2</sup> (1,278 sq ft)
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#### WEIGHTS AND LOADING:

Normal fuel load	14,750 kg (32,518 lb)
Max zero-fuel weight	59,000 kg (130,072 lb)
Max ramp weight	70,500 kg (155,425 lb)
*MAX T-O weight	70,000 kg (154,323 lb)

of main rotor hub, made of glassfibre, with elastomeric spherical stops and oleo-elastic frequency matchers.

The decision to build prototypes of the Ecureuil was taken in April 1973. The first of these (F-WVKH) flew on 27 June 1974, powered by an Avco Lycoming LTS 101 turboshaft engine. It was followed in February 1975 by a second prototype (F-WVKI) with a Turboméca Arriel turboshaft. Both engines will be offered in production helicopters, of which the first is expected to fly in mid-1977, permitting deliveries to begin in early 1978.

TYPE: Five/six-seat light general-purpose helicopter.

ROTOR SYSTEM: Three-blade main rotor, with Starflex glassfibre hub in which the three conventional hinges for each blade are replaced by a single ball-joint of rubber/steel sandwich construction, requiring no maintenance. Glassfibre blades, with stainless steel leading-edge sheath, produced by an entirely mechanised process. Two-blade tail rotor; each blade comprises a sheet metal skin around a glassfibre spar, the flexibility of which obviates the need for hinges.



Prototype Aérospatiale AS 350 Ecureuil five/six-seat light helicopter

Max landing weight	63,000 kg (138,890 lb)
Max wing loading	590 kg/m <sup>2</sup> (120.8 lb/sq ft)
* Eventual uprating of engines to 106.75 kN (24,000 lb) st will permit increase in T-O weight to 71,000 kg (156,528 lb)	
PERFORMANCE (estimated at max T-O weight):	
Max operating speed	380 knots (703 km/h; 437 mph) EAS
Max operating Mach number	0.85
T-O run	2,450 m (8,000 ft)
Range with 174 passengers:	
standard fuel	1,528 nm (2,830 km; 1,758 miles)
with increased fuel	1,665 nm (3,085 km; 1,917 miles)

#### AÉROSPATIALE

SOCIÉTÉ NATIONALE INDUSTRIELLE AÉROSPATIALE; Head Office: 37 boulevard de Montmorency, 75781-Paris cédex 16, France

#### AÉROSPATIALE AS 350 ECUREUIL (SQUIRREL)

Intended as a successor to the Alouette, the AS 350 Ecureuil was designed with an emphasis on low operating and maintenance costs, and low noise and vibration levels. It embodies Aérospatiale's new Starflex type

ROTOR DRIVE: Simplified transmission, with single epicyclic main gear train. By comparison with Alouette II, the number of gear wheels is reduced from 22 to 9, and number of bearings from 23 to 9. Tail rotor drive-shaft coupling on engine.

FUSELAGE: Basic structure of light alloy pressings, with skin mainly of thermoformed plastic, including doors to cabin and to baggage compartment.

TAIL UNIT: Horizontal stabiliser, of inverted aerofoil section, mid-mounted on tailboom. Sweptback fin, in two sections above and below tailboom.

LANDING GEAR: Steel tube skid type.

POWER PLANT: One 478 kW (641 shp) Turboméca Arriel or 441 kW (592 shp) Avco Lycoming LTS 101 turboshaft engine, mounted above the fuselage to the rear of cabin. Plastics fuel tank with capacity of 530 litres (116.5 Imp gallons).

ACCOMMODATION: Two individual bucket seats at front of cabin, with dual controls. Three individual armchair seats, or four-place bench seat, at rear of cabin. Large forward-hinged door on each side. Baggage compartment aft of cabin, with full-width upward-hinged door on starboard side. Top of baggage compartment reinforced to provide platform on each side for inspecting and servicing rotor head. Provision for underfuselage cargo sling, capacity 800 kg (1,763 lb).

**DIMENSIONS, EXTERNAL:**

Diameter of main rotor	10.69 m (35 ft 0¾ in)
Diameter of tail rotor	1.86 m (6 ft 1¼ in)
Length overall	13.00 m (42 ft 8 in)
Length of fuselage	10.91 m (35 ft 9½ in)
Width of fuselage	1.80 m (5 ft 10¾ in)
Height overall	2.94 m (9 ft 7¾ in)
Skid track	2.10 m (6 ft 10¾ in)

**DIMENSION, INTERNAL:**

Baggage compartment volume	1.00 m <sup>3</sup> (35.31 cu ft)
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**WEIGHTS:**

Weight empty	950 kg (2,094 lb)
Max T-O weight	1,900 kg (4,190 lb)

**PERFORMANCE (at max T-O weight, with LTS 101 engine):**

Never-exceed speed below 500 m (1,640 ft)	144 knots (268 km/h; 166 mph)
Max cruising speed at S/L	124 knots (230 km/h; 143 mph)
Max cruising speed at 1,500 m (5,000 ft)	118 knots (220 km/h; 136 mph)
Vertical rate of climb at S/L	480 m (1,575 ft)/min
Vertical rate of climb at 1,500 m (5,000 ft)	288 m (945 ft)/min
Max rate of climb at S/L	540 m (1,770 ft)/min
Max rate of climb at 1,500 m (5,000 ft)	408 m (1,340 ft)/min
Service ceiling	5,800 m (19,025 ft)
Hovering ceiling in ground effect	2,750 m (9,025 ft)
Hovering ceiling out of ground effect	2,000 m (6,560 ft)
Max range at S/L	432 nm (800 km; 497 miles)
Max range at 1,500 m (5,000 ft)	496 nm (920 km; 571 miles)

**FOKKER-VFW**

*FOKKER-VFW BV (Subsidiary of Zentralgesellschaft VFW-Fokker mbH); Head Office: PO Box 7600, Schiphol-Oost (Amsterdam Airport), The Netherlands*

**FOKKER-VFW F27MPA MARITIME**

The F27MPA Maritime is a medium-range maritime patrol version of the Friendship, intended for customers who do not require a more sophisticated long-range patrol aircraft. The basic design was defined in July 1975, and shortly afterwards Fokker-VFW began converting an ex-airline F27 (Mk 100 No 68, delivered originally to THY) to serve as a prototype/demonstration aircraft. First flight of this prototype took place on 25 March 1976.

The F27MPA is not intended for anti-submarine duties, but rather for patrol of fishery areas and coastal shipping lanes, surveillance of offshore oil industry operations, search and rescue, environmental control, and similar duties. It is operated by a crew of up to seven persons. Power plant comprises two 1,677 kW (2,250 shp) Rolls-Royce Dart 536-7R turboprop engines. The provision of additional fuel capacity in centre-wing bag tanks and wing pylon tanks gives the aircraft an endurance of 10-12 hours, or a range of 1,600-2,300 nm (2,963-4,259 km; 1,842-2,648 miles), depending on the mission to be flown.

The extent and complexity of electronic surveillance systems will depend upon individual customer requirements, but a complete range of possible equipment is being evaluated during the flight test programme in 1976. Basic equipment on board includes a Litton AN/APS-503F search radar, with its scanner mounted in a ventral radome to provide 360° coverage; a Litton LTN-7 long-range inertial navigation system; an

Collins 301E VHF/UHF D/F system. Two 'bubble' observation windows are provided in the rear fuselage, in which is also installed a marine marker launcher.

**HAWKER SIDDELEY**

*HAWKER SIDDELEY AVIATION LTD.; Head Office: Richmond Road, Kingston upon Thames, Surrey KT2 5QS, England*

**HAWKER SIDDELEY 748 COASTGUARDER**

Hawker Siddeley Aviation, Manchester, is building the prototype of a coastal patrol and surveillance version of the well-established HS 748 twin-turboprop transport. Known as the HS 748 Coastguarder, this aircraft is scheduled to fly in early 1977.

Its development was initiated by the need for an economic and versatile aircraft to protect vulnerable offshore energy and fishery resources and, at the same time, to provide a vehicle suitable for anti-smuggling, search and rescue and general maritime reconnaissance missions. The airframe is generally similar to that of the standard HS 748 civil and military transport; but there is crew accommodation for two pilots, two beam observers, and a tactical navigator, to enable the Coastguarder to fulfil its primary roles. A 0.30 m (1 ft 0 in) diameter chute is mounted in the aft fuselage for the air launch of five-man rescue dinghies, and smoke or flame floats. The standard radio, radar, and navigation equipment has been expanded to cover the normal naval radio frequencies, and to provide adequate navigation aids for long overwater flights.

The tactical navigator's station is situated midway down the cabin, on the starboard

*Prototype/demonstration version of the Fokker-VFW F27MPA Maritime patrol aircraft*







Tactical station inside the main cabin of the Fokker-VFW F27MPA

side, and is equipped with an MEL MAREC radar display and plotting board, Decca 72 Doppler, and a Decca 9447 TANS computer/display. The MAREC radar was chosen as standard on the basis of experience gained in previous ASV, ASW, and SAR applications. It has an underfuselage antenna, an 0.43 m (1 ft 5 in) diameter main display and plotting board, with an 0.13 m (5 in) repeat display for the pilot. Used in conjunction with the Doppler, TANS computer, and Marconi Omega VLF navigation system, the resulting tactical navigation system can, in addition to satisfying all normal search and navigation requirements, provide effective tactical plotting to control an exercise involving a group of friendly vessels and other radar targets, including aircraft. MAREC provides up to 200 nm (370 km; 230 miles) display range

in all directions for the tactical navigator and up to 250 nm (460 km; 285 miles) for the pilot's repeater display. A choice of presentation scale between 0.5 and 25 nm (0.9-46 km; 0.575-28.75 miles) per inch allows enlargement of any selected part of the display.

To provide the additional range required for a maritime reconnaissance role, the fuel tankage has been increased to a maximum of 9,956 litres (2,190 Imp gallons). The standard Coastguarder may be used for a number of maritime and other roles without any change to the basic configuration. Additional passengers can be accommodated by fitting seats to the standard rails which run the full length of the cabin. The optional rear freight door provides an air-dropping capability, allowing the despatch of large dinghies or supplies in an air/sea

rescue role. As many as twelve 30-man dinghies can be transported and dropped for the rescue of a large number of aircraft/ship survivors. The Coastguarder can also be converted easily for cargo carrying, by removal of the tactical navigator's station and other equipment.

**TYPE:** Twin-turboprop maritime patrol aircraft.

**WINGS:** Cantilever low-wing monoplane. Wing section NACA 23018 at root, NACA 4412 at tip. Dihedral 7°, Incidence 3°. Sweepback 2° 54' at quarter-chord. All-metal two-spar fail-safe structure. No cutouts in spars for engines or landing gear. All-metal set-back hinge, shielded horn balance, manually-operated ailerons. Electrically-operated Fowler flaps. Geared tab in each aileron. Trim tab in starboard aileron. Pneumatic leading-edge de-icing boots.

**FUSELAGE:** All-metal semi-monocoque fail-safe structure, of circular section.

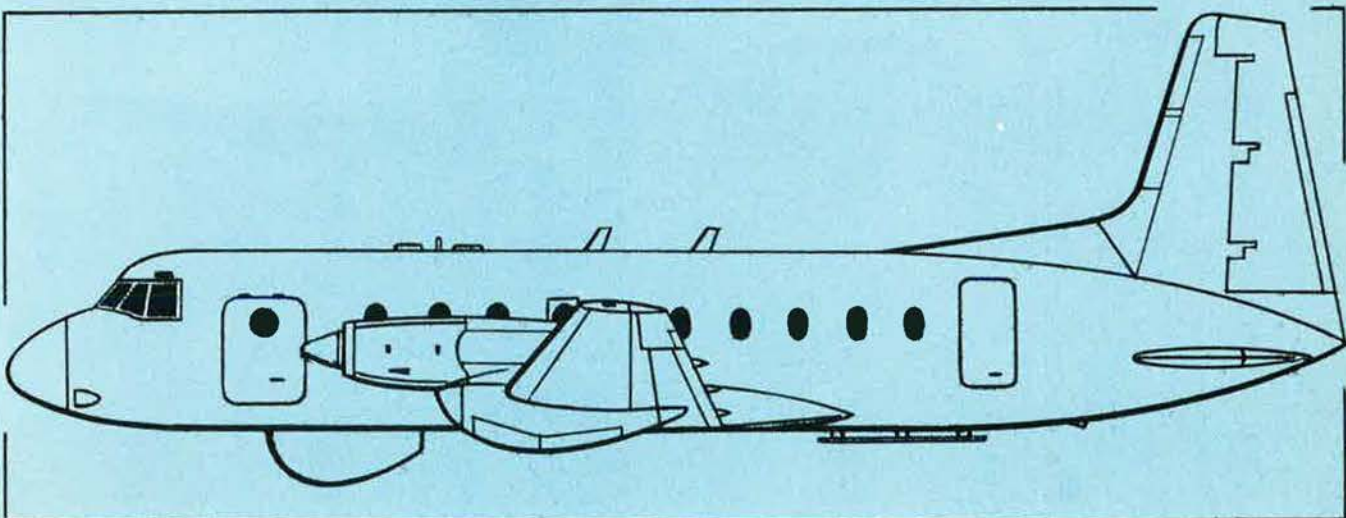
**TAIL UNIT:** Cantilever all-metal structure. Fixed-incidence tailplane. Manually-operated controls. Trim tabs in elevators and rudder. Spring tab in rudder. Pneumatic de-icing boots on leading-edge of fin and tailplane.

**LANDING GEAR:** Hydraulically-retractable tricycle type. All units retract forward, main wheels into bottom of engine nacelles, forward of main spar. Nosewheel hydraulically steerable. Dowty Rotol shock-absorbers. Twin wheels, with Dunlop tyres, on all units. Main wheels size 32 x 10.75-14. Nosewheels size 25.65 x 8.5-10. Standard tyre pressures: main wheels 5.03 bars (73 lb/sq in), nosewheels 3.79 bars (55 lb/sq in). Minimum tyre pressures: main wheels 4.48 bars (65 lb/sq in), nosewheels 3.45 bars (50 lb/sq in). Dunlop disc brakes with Maxaret anti-skid units. No brake cooling.

**POWER PLANT:** Two 1,700 kW (2,280 ehp) Rolls-Royce Dart RDa. 7 Mk 535-2 turboprop engines, each driving a Dowty Rotol four-blade metal constant-speed and fully-feathering propeller. Fuel in integral wing tanks and fuselage tanks with a max combined capacity of 9,956 litres (2,190 Imp gallons). Oil capacity 14.2 litres (25 Imp pints) per engine.

**ACCOMMODATION:** Standard Coastguarder layout has two pilots on flight deck; two beam observers seated at forward end of cabin, one each side, with domed windows; and tactical navigator approximately midway down cabin at tactical

Side elevation of the Hawker Siddeley 748 Coastguarder (Pilot Press)



station on starboard side. Toilet on starboard side at aft end of cabin, with galley opposite. Main door on port side at rear of cabin; smaller door for emergency exit on starboard side. Crew door on port side at front of cabin. Large rear freight door optional. Four airline-type seats, forward of tactical navigator's station, on starboard side, serve as crew rest area.

**SYSTEMS:** Normalair pressurisation and air-conditioning system, giving equivalent altitude of 2,440 m (8,000 ft) at 7,600 m (25,000 ft). Max pressure differential 0.38 bars (5.5 lb/sq in). Hydraulic system, pressure 172 bars (2,500 lb/sq in), for landing gear retraction, nosewheel steering, brakes, and propeller brakes. One 9kW 28V DC generator and one 22kVA alternator on each engine. Two 1,800VA inverters.

**ELECTRONICS AND EQUIPMENT:** Electronics include dual Collins 618M-3 VHF com transceivers, dual Collins 51RV-2B VHF nav receivers, Collins AN/ARC-159 UHF com transceiver, Collins 51Z-4 marker beacon receiver, dual Collins DF 206 ADF, Collins DF 301E UHF D/F, Collins 618T-3 HF transceiver, Collins 346D-1 address system, Ultra UA 60 interphone, Sperry RN 200 radio navigation display, Honeywell AN/APN-171 radio altimeter, MEL MAREC radar with 0.43 m (1 ft 5 in) main display and 0.13 m (5 in) pilot's repeat display, Marconi AD 1800 Omega VLF nav system, Decca 72 Doppler, and Decca 9447 TANS computer/display. Attitude stabilised antenna, size 0.91 m x 0.53 m (3 ft 0 in x 1 ft 9 in), in underfuselage radome, provides 360° azimuth viewing, plus selected sector scan facilities. Provisions for optional ATC transponder, DME, and height encoding

altimeter. Standard equipment includes a 0.30 m (1 ft 0 in) launch chute for five-man rescue dinghies and smoke or flame floats. Optional equipment includes large rear freight door, additional passenger seats, large dinghies, and other rescue equipment.

**DIMENSIONS, EXTERNAL:**

Wing span 30.02 m (98 ft 6 in)  
Wing chord at root 3.49 m (11 ft 5¼ in)  
Wing chord at tip 1.34 m (4 ft 5 in)  
Wing aspect ratio 11.967  
Length overall 20.42 m (67 ft 0 in)  
Height overall 7.57 m (24 ft 10 in)  
Tailplane span 10.97 m (36 ft 0 in)  
Wheel track 7.54 m (24 ft 9 in)  
Wheelbase 6.30 m (20 ft 8 in)  
Propeller diameter 3.66 m (12 ft 0 in)  
Propeller ground clearance 0.61 m (2 ft 0 in)

**Cabin door (port, rear):**

Height 1.57 m (5 ft 2 in)  
Width 0.76 m (2 ft 6 in)  
Height to sill 1.84 m (6 ft 0½ in)

**Crew door (port, fwd):**

Height 1.37 m (4 ft 6 in)  
Width 1.22 m (4 ft 0 in)  
Height to sill 1.84 m (6 ft 0½ in)

**Optional freight door (port, rear):**

Height 1.72 m (5 ft 7¾ in)  
Width 2.67 m (8 ft 9 in)

**DIMENSIONS, INTERNAL:**

**Cabin, excl flight deck:**

Length 14.17 m (46 ft 6 in)  
Max width 2.46 m (8 ft 1 in)  
Max height 1.92 m (6 ft 3½ in)  
Volume 56.35 m³ (1,990 cu ft)

**AREAS:**

Wings, gross 75.35 m² (810.75 sq ft)  
Ailerons (total) 3.98 m² (42.90 sq ft)  
Trailing-edge flaps (total) 14.83 m² (159.80 sq ft)

Fin 9.81 m² (105.64 sq ft)  
Rudder, incl tabs 3.66 m² (39.36 sq ft)  
Tailplane 17.55 m² (188.9 sq ft)  
Elevators, incl tabs 5.03 m² (54.10 sq ft)

**WEIGHTS AND LOADINGS:**

Weight empty 10,354 kg (22,827 lb)  
Basic operating weight 11,971 kg (26,393 lb)

Typical sortie T-O weight 20,446 kg (45,076 lb)  
Normal max T-O weight 21,092 kg (46,500 lb)

Normal zero-fuel weight 17,460 kg (38,500 lb)  
Normal landing weight 19,500 kg (43,000 lb)

Overload max T-O weight 23,135 kg (51,000 lb)  
Overload zero-fuel weight 19,500 kg (43,000 lb)

Overload max landing weight 21,545 kg (47,500 lb)  
Max wing loading 307.09 kg/m² (62.9 lb/sq ft)

Max power loading 6.80 kg/kW (11.1 lb/ehp)

**PERFORMANCE (estimated, at max normal T-O weight, unless indicated otherwise):**

Max cruising speed at 18,145 kg (40,000 lb) AUV 242 knots (448 km/h; 278 mph)

Max rate of climb at S/L at 18,145 kg (40,000 lb) AUV 402 m (1,320 ft)/min

Service ceiling 7,620 m (25,000 ft)  
Min ground turning radius 11.89 m (39 ft 0 in)

T-O run 1,030 m (3,380 ft)  
T-O to 15 m (50 ft) 1,237 m (4,060 ft)

Landing from 15 m (50 ft) at normal landing weight 620 m (2,035 ft)

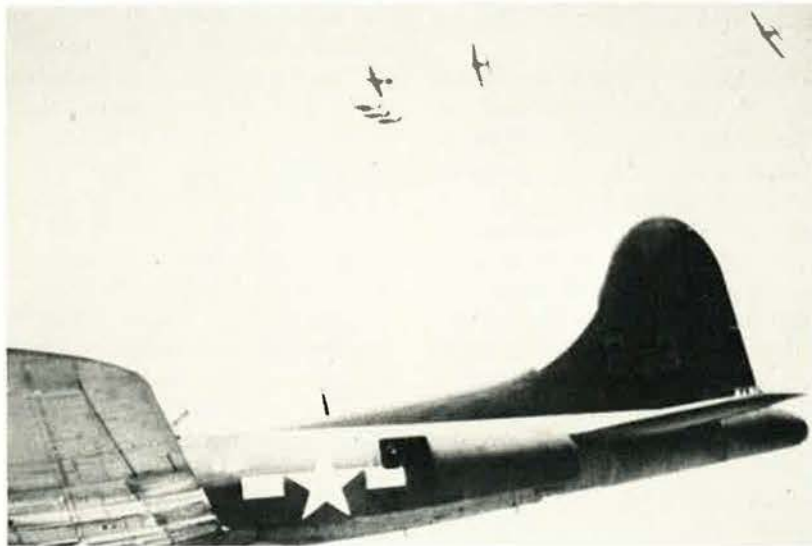
Landing run at normal landing weight 390 m (1,280 ft)

Artist's impression of the Hawker Siddeley 748 Coastguarder, of which a prototype is under construction



During World War II, the Army Air Forces, with the help of university scientists and industry engineers, developed what was probably the most realistic combat training device in the history of modern warfare . . .

# THE TEXAS PINBALL MACHINE



World War II B-17 gunners hose "enemy" fighters with live ammunition as the fighters bore in for a "kill." The scene was not Europe, but the cloudless skies of Texas.

BY CAPT. JOHN D. EDGAR, USAF

**T**HE time: late in World War II. A lone B-17 flies through cloudless skies at 8,000 feet. Every member of the crew strains his eyes, watching for fighters. Suddenly, the intercom comes to life.

"Fighter at five o'clock!" The waist gunner tenses. Sunlight glints off aluminum skin as the fighter slashes in on attack. The gunner's mind is racing. "1,000 yards . . . 900 yards . . . 800 yards . . . get a lead on him . . . 700 yards . . . 600 yards . . . open fire, open fire!" The gunner can see bright flashes as his bullets smash into the fighter's wings and fuselage.

\* \* \*

This scene wouldn't have been unusual if it had occurred over occupied Europe—but it didn't. The mission took place somewhere over the southwestern United States. The attacking aircraft was an American fighter flown by a combat-experienced American pilot, and the B-17 gunner was firing live ammunition at him. Similar missions took place thousands of times during the spring and summer of 1945 at the Army Air Forces' seven flexible gunnery schools, but not a single aircrew member was injured by gunfire. How was that possible?

It all began in the spring of 1942 at the Harlingen Army Air Field Flexible Gunnery School in Texas, where Maj. Cameron D. Fairchild was Synthetic Training Aids Officer. Ground training for enlisted gunners included shooting skeet from a moving jeep and tracking aircraft images projected on a movie screen. Air training was limited to firing at towed cloth target sleeves. Unfortunately, none of these techniques prepared a gunner to cope with an actual fighter attack. Psychologists monitoring the training programs concluded that "air-to-air firing as now conducted is, for most students, a bewildering emotional experience which quite effectively smothers learning." The poor performance of gunners in combat prompted the AAF's Commanding General, Gen. H. H. Arnold, to write: "Reports are still being received which indicate a serious lack of gunnery training for our aerial gunners. . . ."

Recognizing this deficiency, Major Fairchild was convinced that the

only way to provide effective training was to realistically simulate an actual fighter attack. The one item needed to make this simulation possible was a bullet that could hit an aircraft without damaging it or the pilot. The idea seemed farfetched, but Major Fairchild wrote to more than 100 colleges and universities asking for help. Most responses labeled the project a "crackpot scheme."

One of the people who took Major Fairchild's proposal seriously was Prof. Paul Gross, the Director of Research at Duke University. Professor Gross visited Harlingen to get a first-hand look at existing training methods. That visit convinced him that Major Fairchild was on the right track and that a new bullet, harmless to aircraft, could be designed. The two men headed for Washington with their idea.

In September 1942, they attended a meeting in the Pentagon with representatives from the Army Air Forces, the Army Ordnance Department, the Navy, and the National Defense Research Committee (NDRC). Discussions centered on how a realistic simulation of a fighter attack might be achieved. It was agreed that the new bullet could have a lower than standard velocity and that the target aircraft could carry some armor protection. To keep the gunner's sight picture unchanged, aircraft speeds could be reduced and the optical gunsight modified for speed effects. Finally, some means would have to be devised for scoring hits on the target. With these guidelines, Professor Gross went back to Duke University to begin developing the "magic bullet." Major Fairchild took on the job of devising a target aircraft.

### **Assembling the Building Blocks**

The immediate problem confronting Professor Gross was to select a material for the bullet. No known metal was soft enough to do the job, so other materials, including glass

and plastics, were tried. Gross narrowed the field to a mixture of plastic resin (bakelite) and powdered lead. This mixture, supplied by the Bakelite Corp., could be molded into a bullet that would survive being fired from a machine gun. Tests showed that the bullets would not damage quarter-inch thick aluminum armor when bullet velocity was kept below 1,700 feet per second. On impact the bullet disintegrated in a cloud of fine powder. The "frangible bullet" was born.

The low velocity of the frangible bullet created other problems. Since only a small amount of powder could be used, the ammunition didn't generate enough gas pressure to activate the recoil-operated mechanism of the Browning aircraft machine gun. Throughout the winter of 1943, Duke University worked on modifying the mechanism, and finally designed a "piston booster adapter" that fitted on the gun's muzzle. The adapter used gun gases trapped at the muzzle to increase barrel recoil, so the machine gun would function normally with frangible ammunition. The modified weapon was called the T9 Trainer.

While Duke University was developing the frangible bullet and T9 Trainer, Major Fairchild worked on the target aircraft. He had convinced the Aircraft Laboratory of the Air Technical Services Command at Wright Field, Ohio, to cover an A-20 attack bomber with lightweight aluminum armor. On January 7, 1944, the Duke University frangible bullet was successfully test fired against an A-20 wing section that had been armored by the Laboratory. At the request of Brig. Gen. R. W. Harper, Assistant Chief of Staff for Air Training, the NDRC accepted a frangible bullet project in February 1944. Duke University and the Bakelite Corp. contracted to design a bullet suitable for mass production.

Developing the last major building block—a means for detecting hits on the target—was turned over to the Sperry Gyroscope Co. of Brook-

lyn, N. Y. Sperry designed a "hit-indicator device" around a radiosonic sensor—a microphonelike instrument originally developed to detect detonation in internal combustion engines. The radiosonic sensors were located beneath the aircraft's armor to pick up vibrations produced by bullet impact. The sensors' amplified electrical signal triggered a hit counter mounted in the cockpit. For visual effect the device also flashed the aircraft's landing lights to show the gunner that he had scored a hit.

The Frangible Bullet Project reached a milestone on May 29, 1944, when all the system components were brought together for air-to-air test firings at Buckingham Army Air Field near Fort Myers, Fla. There was one minor hitch. When Capt. Charles Everett, an A-20 combat pilot, arrived at Buckingham to fly the armored A-20, he was startled to find that, rather than being behind the gun, he was going to be in front of it. As Major Fairchild later recalled, "He was the maddest captain I ever saw!" Fairchild calmly sat in the cockpit of the A-20 (nicknamed "Alclad Nag") behind an inch of bulletproof glass and allowed Captain Everett to pepper the aircraft with frangible bullets from point-blank range. Satisfied by the demonstration, Everett flew the first attack against a modified B-17 bomber that fired frangible bullets from its upper gun turret.

The project almost came to a catastrophic end before it was well under way. On the second day of testing, one engine of the "Alclad Nag" quit, and the heavily armored plane rapidly lost altitude. Fortunately, Captain Everett regained control and made an emergency landing at a nearby auxiliary field. The engine failure was caused by a mechanical defect; however, if the only experimental target aircraft had crashed, the frangible bullet undoubtedly would have taken the blame and the project would have been terminated. Undaunted, Cap-

tain Everett continued the test flights and the Frangible Bullet Project was given a go-ahead for the gunnery training program.

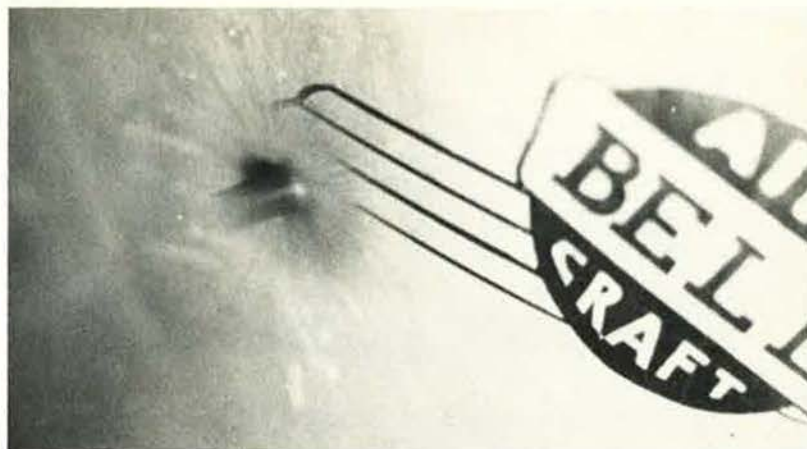
### Realism on the Range

The first task was to select a fighter similar in size and maneuverability to German fighters then in use over Europe, to replace the A-20 as a target. That job fell to Lt. Col. Donald S. Russell of Laredo Army Air Field, Tex., who visited plants manufacturing single-engine fighters and reported to Brig. Gen. E. B. Lyon, the Training Command Deputy for Flexible Gunnery. The General selected the Bell Aircraft Corp.'s P-63 Kingcobra, which would be armored against all head-on shots striking within thirty degrees of the plane's line of flight. It was designated RP-63A, the "R" indicating "restricted from combat."

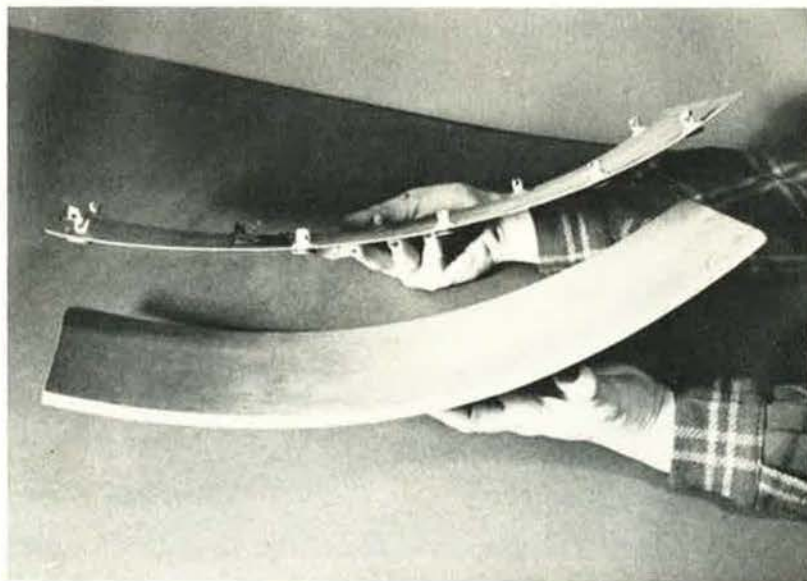
On July 19, 1944, Colonel Russell reported at Bell's Niagara Falls, N. Y., plant to supervise building five prototype aircraft. Individual armor plates were shaped to the aircraft's contours and bolted over the original skin. Sounds easy, but it wasn't. The aluminum armor plates, up to one-quarter inch thick, broke the drop hammer dies used to form the original, much thinner, skin plates. The prototype aircraft had to be built almost entirely by hand. Colonel Russell described it this way in his report:

In practically every instance on the first three airplanes it was necessary to shape each piece [of armor plate] by hand and rollers. In Department 86, we set up solid steel tables and secured fifty-pound sacks of sand. The steel table, with sand sacks, and eight-pound sledge, plenty of sweat, and a desire to build this airplane shaped these pieces. . . . Two of those ships, Pinball and Frangible Sal, are the two airplanes that I built with these two hands. . . .

The hand-built prototypes were successfully test flown in August 1944,



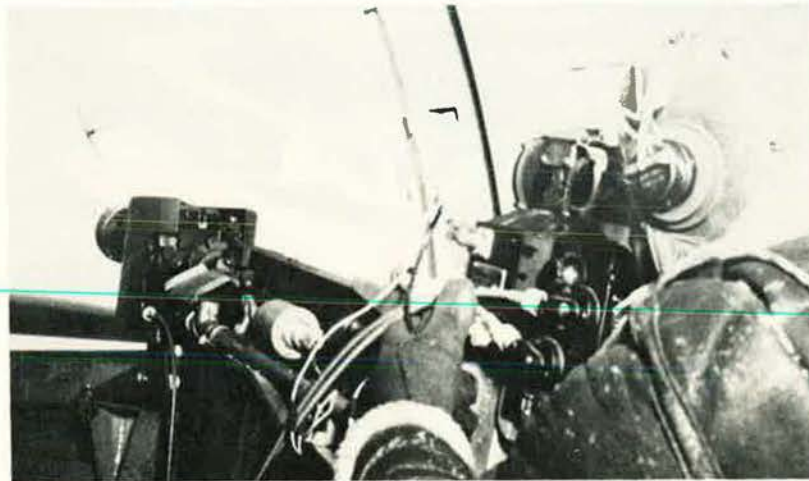
A "crackpot scheme" became reality when Paul Gross of Duke University developed a .30-caliber machine-gun bullet that would disintegrate when fired against aluminum armor, as shown in this high-speed photo.



The original skin of the P-63 (top) was overlaid with aluminum armor plate up to one-quarter inch thick. Armor for the first three target planes had to be shaped mostly by hand. The prototype was test flown in August 1944.



*This hand-built RP-63A prototype was followed by more than 100 production models. During the spring and summer of 1945, some 12,000,000 rounds of frangible ammunition were fired by flexible gunners at these target planes.*



*A waist gunner takes aim on an RP-63 during one of the 11,000 training missions flown at AAF flexible gunnery schools. After remaining dormant for three decades, frangible bullets are again under development by USAF.*

and Bell was awarded a contract to manufacture ninety-five more RP-63As.

By August, Duke University had the frangible ammunition design completed. Final specifications called for a bullet with two-thirds the weight (107 grains) and one-half the muzzle velocity (1,350 feet per second) of standard combat ammunition. These specifications ensured that the bullets would not penetrate  $\frac{3}{16}$ -inch aluminum armor at a range of twenty-five yards. The Ordnance Department approved the design on August 31, 1944, and assigned it the name Cartridge, Ball, Frangible, Caliber .30, T44. For identification the bullet tip was painted green with a white band directly behind the tip. The first production ammunition began reaching the Central School for Flexible Gunnery at Laredo in December 1944.

Several RP-63As were already stationed at Laredo. The T9 Trainer machine gun was fitted in the powered gun turrets of B-17, B-24, and B-29 bombers. Gun cameras were mounted alongside the machine guns so that the trainee's target tracking ability could be evaluated postflight. The most troublesome aspect of developing a training method was the selection of a gunsight. The lower bullet velocity required that both bomber and fighter speeds be reduced by about thirty percent. This would make the gunner hold about the same lead angle as he should in a combat situation. To minimize development time, an existing optical gunsight, the Sperry K13 compensating sight, was modified to work with the reduced aircraft speeds.

By April 1945, the frangible bullet technique was ready for the AAF's seven flexible gunnery schools. The original 100 RP-63A target aircraft were supplemented with 200 RP-63Cs—a later version equipped with a more powerful engine. As Major Fairchild had envisioned, the realistic training atmosphere provided by the frangible bullet exercise generated tremendous interest and motiva-

tion among gunnery students. A conference of gunnery experts held at Las Vegas in July 1945 declared it "the most successful and best air training device developed to date." In a congratulatory letter to Major Fairchild, General Lyon wrote: "It is *the* development which will revolutionize gunnery training." During the spring and summer of 1945, 12,000,000 rounds of frangible ammunition were fired in 11,000 training missions.

### Gunnery Gremlins

As with any new development, the Frangible Bullet Project had its share of problems. Less than a year had passed from the first air-to-air firing test until the system was rushed into the gunnery schools—hardly enough time to work out the bugs. During the initial weeks of training frangible bullet tips occasionally broke off, jamming the machine gun. A "short round eliminator" was quickly devised to prevent this. Powder used in the frangible ammunition didn't burn completely, and accumulated carbon deposits caused gun jamming. The piston booster adapter was modified to solve that problem. The sensitivity of hit indicator devices was difficult to set properly, and they frequently gave false readings. The K13 gunsights would not hold their adjustments under prolonged firing. All of these factors led to a disappointingly low percentage of hits—below one percent in many instances.

However, the most serious problem of all was with the RP-63 aircraft itself. The liquid-cooled Allison in-line engine was located behind the cockpit. Coolant circulated through radiators in the wing roots. Not all frangible bullets striking the aircraft disintegrated completely, and bullet particles entered the wing ducts, puncturing the radiators. Loss of coolant resulted in rapid engine failure and a deadstick landing in the nearest open field. After several forced landings, the entire RP-63 fleet was grounded on August 4,

*The author, Capt. John D. Edgar, holds undergraduate and graduate degrees in aeronautics and astronautics from Massachusetts Institute of Technology. He has served as a project officer in SAMSO's Development Plans office and in the Guns and Rockets Division of the USAF Armament Laboratory. "The Texas Pinball Machine" was written while Captain Edgar was a member of the 1975-76 class at Air Command and Staff College. He is now assigned to the office of the DCS/Research and Development at Air Force Headquarters.*

1945, to have improved armored louvers installed in the wing ducts. Bell was awarded a contract for another 450 more effectively armored RP-63G aircraft with deliveries to begin in September 1945.

By this time, several programs to improve the frangible bullet training system were under way. A new type ammunition with a better powder, the T74 cartridge, was being tested. The new powder gave more consistent bullet velocities and didn't carbon up the piston booster adapter. Frangible ammunition with a completely different physical shape than the standard combat ammunition was being designed, to ensure that combat and frangible ammunition were not intermingled. Finally, a new target aircraft, the RP-63Z, was on the drawing boards. Armor plates were to be an integral part of the RP-63Z's structure rather than being overlaid, and the armor was to be thicker. None of these improvements reached the production stage.

### Old Wine in New Bottles

All plans for the Frangible Bullet Project fell victim to the defeat of Japan on August 15, 1945, and the rapid general demobilization that followed. RP-63 procurement was immediately cut back to about thirty aircraft, and by September all AAF flexible gunnery training was terminated. By early 1946, most of the

RP-63s were put in storage and eventually sold for scrap. The remaining frangible ammunition and trainer machine guns were shipped back to Army arsenals.

The story of the Frangible Bullet Project might have ended right there, but it didn't, thanks to Air Force Systems Command's Armament Laboratory at Eglin AFB, Fla. The Armament Laboratory, whose AAF predecessor had worked on the original Frangible Bullet Project, has recently resurrected the concept to solve a new gunnery training problem. This time the problem is how to prevent cannon projectiles from ricocheting during air-to-surface fighter gunnery practice and endangering civilians living near Air Force gunnery ranges. Also, Air Force aircraft frequently are struck and damaged by rebounding projectiles. Today's aircraft use 20-mm cannons, but the new A-10 close air support aircraft will have a more powerful 30-mm cannon that may cause the ricochet problem to grow drastically.

To solve this problem, the Armament Laboratory has been experimenting with frangible bullet designs that can be fired from 20-mm and 30-mm cannons. The new designs, like the World War II frangible bullet, also make use of plastics but in a different way. The projectiles consist of a stack of thin steel discs held together by an external plastic skin. This design is exceedingly strong along the projectile axis so that it can withstand gun firing; however, when the projectile strikes the ground at an angle the plastic skin breaks up and the steel discs fly apart. Because of their high drag shape, the discs do not ricochet great distances.

The 30-mm frangible projectile is currently undergoing tests at the Armament Laboratory to determine its feasibility and performance characteristics. If the projectile is found suitable for use, a concept pioneered by the Army Air Forces of the 1940s may yet find a home in the US Air Force of the 1970s. ■

# The Bulletin Board

By James A. McDonnell, Jr., MILITARY RELATIONS EDITOR

## AECF, CCAF Approvals Near

Headquarters at midyear was preparing to reinstate the Airman Education and Commissioning Program, and developing plans for awarding associate degrees from the Community College of the Air Force. USAF authorities rate these two education programs high on the list of prized personnel projects.

Pending expected final congressional approval, Hq. USAF officials said:

- They plan to convene an AECF selection board about the end of this summer to pick 145 from an estimated 600 to 700 applicants. These, plus fifty-five airmen already chosen for AECF, would enter college early in FY '77 (which begins October 1, 1976). USAF has exerted heavy pressure on Congress to reopen the AECF. The House recently approved funds for 200 entries, a move officials believe will lead to a like number of entries annually. While welcome, it is a smaller program than that suspended by Congress two years ago. A current AFA Resolution urges Congress to reinstate the program.

- They believe two-year associate degrees (instead of the present certificates) can be awarded airmen by the CCAF starting early next year. This would boost the youthful college's prestige considerably. The Senate approved the degree-granting authority in the FY '77 military procurement bill, and the House was expected to go along. Earlier, AFA President George M. Douglas stated, in a letter to House Armed Services Committee Chairman Rep. Melvin Price (D-Ill.), that AFA's Board of Directors strongly endorsed the degree-granting authority.

Meantime, the US Office of Education will work out the CCAF

degree accrediting requirements. High-level thought is also being given to establishing a CCAF degree as a requirement for noncommissioned officers vying for a nine-skill level AFSC (the springboard for supergrade rank). About 30,000 airmen are currently enrolled in CCAF-approved courses.

## Anti-Alcohol Drive Expanded

USAF is expanding its alcohol abuse drive on several fronts and now reports that seventy-five percent of its drinking rehabilitees are returning to duty. Three years ago, the return rate was just fifty-six percent.

Officials also told AIR FORCE Magazine that USAF has budgeted \$8.2 million to fight excessive drinking in FY '77; that compares with \$1.6 million as recently as FY '73. Furthermore, USAF wants to slash random urinalysis testing for drugs and put the savings into the anti-drinking drive.

In related moves the service said:

- It is preparing "new guidance" for commands to "more actively deglamorize alcohol while providing suitable alternatives to alcohol abuse." This should further curtail "happy hours" and other drinking gimmicks as Headquarters has sought the past two years.

- New four-hour drinking education programs will be laid on promptly for specific groups, including recruits, Air Force Academy and AFROTC cadets, NCO academies, professional officer schools, first sergeants, commanders, and other supervisors. These projects, officials said, "will be presented at key points in members' careers when, as research indicates, they are most receptive to learning."

All bases now offer a Concerned Drinker Program, officials added.

Individuals meet with Social Actions personnel or medical consultants and plot out their anti-imbibing game plans, elect a formal USAF-sponsored alcohol rehabilitation program, and so on.

From another quarter, the House Appropriations Committee, in a stinging report, claims the services are underemphasizing the alcohol problem among service members. It urged DoD to shift half the money being used on drug abuse to fighting excessive drinking. It further charged the services with denying reenlistment to members returned to duty after completing alcohol rehabilitation programs.

The Air Force flatly denied the latter charge. Alcohol rehabilitees, it declared, are not denied reenlistment based on rehab participation, and they "do compete with all other Air Force members for reenlistment under the Selective Reenlistment/Careers program."

USAF has cut its drug-abuse outlays and increased its alcohol-abuse spending. The FY '77 breakout is scheduled to be \$8.5 million for the former, and the aforementioned \$8.2 million for the latter.

The House Committee also rapped Air Force for randomly testing 195,000 members for drug usage in 1975. It said there was a return of only 604 confirmed "positives" from urinalysis samples, at an average cost of \$3,710 per confirmation. The report said random testing "was demoralizing and degrading to participants" as well as extremely costly.

USAF officials said the question of shifting half the drug-abuse funds is under review. However, Air Force "does support replacing random urinalysis with commander-directed urinalysis and reallocating these funds into the alcohol-abuse program."

## OER Trends Cause Concern

Charges that top-block OERs are going almost exclusively to officers facing promotion boards are untrue, Hq. USAF officials say. But they agree that "some gaming is going on," and they are highly concerned about it.

In recent months rumors have spread that rating officers are attempting to "beat the system" by reserving top-block ratings for persons coming up for immediate promotion consideration, and telling



## Three of AFA's Councils Meet, Hear General McBride

AFA's Total Force, Enlisted, and Junior Officer Advisory Councils met in Washington June 24-25. Here's photo coverage.



Gen. William V. McBride, Vice Chief of Staff, addressed AFA's recent joint advisory council meeting.



Among guest speakers at the gathering was Sen. Dewey F. Bartlett (R-Okla.).

Vice Chief of Staff Gen. William V. McBride and Sen. Dewey F. Bartlett (R-Okla.) of the Senate Armed Services Committee were among the dignitaries who spoke

to a joint meeting of AFA's Total Force, Enlisted, and Junior Officer Advisory Councils June 24-25. The two-day conclave was held at the Sheraton National Motor Hotel, Arlington, Va.

AFA President George M. Douglas welcomed the council members and General McBride then addressed them on a variety of current issues. Senator Bartlett was the speaker at the main luncheon. Leading round-table discussions on their particular areas of expertise were Maj. Gen. William Lyon, Chief of the Air Force Reserve; Maj. Gen. John J. Pesch, Air National Guard Director; USAF Surgeon General Lt. Gen. George E. Schafer; Maj. Gen. Bennie L. Davis, USAF's Director of Personnel Plans; and J. Craig Cumbey, Deputy Director of USAF Civilian Personnel.

Maj. Gen. John W. Huston, AFRES, Chairman of the Total Force Advisory Council, was the luncheon toastmaster.



Maj. Gen. John J. Pesch, ANG Director, leads a round-table discussion on Guard activities.



Members of the Junior Officer Advisory Council prepare their timetable for this year's council project.



The Enlisted Council mulls over the status of AFA resolutions concerned with "people" problems.

# The Bulletin Board

quate statutory provisions seem to exist to prevent it," the Air Force Association said in an extended statement recently. AFA's position of "unalterable opposition to unionization of the military" was hammered out by the Association's

acknowledged AFA's interest, but didn't promise hearings.

## Hill Acts on ROTC, Other Projects

Nearly 100 more low-producing ROTC units, including twenty belonging to the Air Force, almost got the axe recently.

The House Appropriations Committee for years has gone after DoD and the services to eliminate ROTC units that produce only a handful of new officers. In those units turning out fewer than ten a year, the cost can run up to \$70,000 per graduate; where fewer than five are produced, the per-graduate cost can exceed \$100,000, the Committee has declared. Committee Chairman Rep. George Mahon (D-Tex.) calls that "intolerable." But DoD has dragged its feet, particularly over closing the many low-producing Army units, the Mahon group contends.

So, this year in the FY '77 military appropriations bill, it approved language that would close units that did not have twenty junior class students enrolled during at least one year in a five-year period (including the upcoming school year).

When the bill came to the House floor, however, the ROTC amendment was opposed by several lawmakers from districts that would lose units. Most contended that their schools' future junior classes would have more than twenty students. Mahon, normally a power in the House, stood by the amendment, declaring it was reasonable. But the House voted it down seventy-two to forty-eight, and a Senate Appropriations subcommittee followed suit.

Thus, the 100 units were saved. The eleven AFROTC units announced earlier for closing—Idaho, Bradley, Coe, Washburn, Wichita State, Nicholls State, Missouri, Allegheny, Gettysburg, St. Joseph's, and Southern Methodist—are not affected. Their closing next spring will reduce AFROTC units to 152.

Congress, meanwhile, in acting on the FY '77 military appropriations and procurement bills, was also shaping other important personnel programs. The picture at press time:

- **Military Personnel Strength.** USAF will come out with about 571,000 active-duty members, the budgeted figure. This means no



Milton Caniff, creator of the "Terry and the Pirates" and "Steve Canyon" comic strips, was honored May 6 in New York City at a "Salute" sponsored by the Skyline Association and the 9015th Air Reserve Information Squadron. Mr. Caniff received a telegram of greeting from President Ford plus a number of awards, including one from AFA's Iron Gate Chapter. Shown here is Col. Glenn Jones, Executive Assistant to JCS Chairman Gen. George S. Brown, who presented Mr. Caniff this Cybis Porcelains "Bicentennial Carousel Horse" on behalf of the Department of Defense.

others they'll "be taken care of later" when their year groups enter the promotion zone.

Though statistics were not immediately available, sources indicated that officers recently considered in the primary zone for the first time had received higher percentages of top-block ratings than other officers not in the primary zone for the first time. However, it was not the landslide that some reports have claimed. No category of officers received all high ratings, nor were any groups excluded.

Authorities are stressing the need for raters and reviewers to look on their people as entire groups and concentrate on "relative merit rather than promotion eligibility" in distributing ratings. They are giving OER rating trends close attention.

## AFA Speaks on Unions, SBP

"The evidence is overwhelmingly against military unions, and ade-

Board of Directors at a meeting in Colorado Springs, Colo. (For the full text of the position paper, see July issue, pp. 88-89).

Acknowledging talk of organizing the military by the American Federation of Government Employees and other groups, AFA called on the Administration "to exercise its authority and prohibit it." AFA President George M. Douglas also wrote union leaders explaining the Association's position.

Mr. Douglas, in another recent action affecting the military community, urged the House Armed Services Committee to hold hearings on the Survivor Benefit Plan and eliminate the (1) "lock-in" payment provision even though eligible survivors are deceased, and (2) requirement that the annuity be 100 percent offset by Social Security.

AFA stands ready to testify on these SBP issues, Mr. Douglas said. Committee Chairman Melvin Price

cuts of significance and probably no officer RIF for at least a year.

• **Reserve-Guard Manpower Revisions.** The Administration earlier (see *June issue*, pp. 55-59) moved to curtail Category A (forty-eight drills) positions, require flyers to

put in eight- instead of four-hour drills following their civilian jobs, and make other dollar-saving cuts. Congress was in the process of rejecting them.

• **Elimination of the one-percent add-on in military retired pay.** Both

the House and Senate have voted to erase it. The recorded House vote was 331-64 for elimination, with such normally prominent pro-military members as present and former chairmen of the Armed Services Committee, Reps. Melvin

Ed Gates . . . Speaking of People

## Doing Right by the Veterans

Uncle Sam, it seems abundantly clear, is determined to do right by the country's nearly 30,000,000 veterans.

The government's substantial commitment to the veterans community—it includes veterans, spouses, children, other dependents, and survivors—covers nearly half the entire population of the country. And in spite of growing costs of veterans' programs, that commitment may even increase in the years ahead.

We had lost track of all the benefits, so a recent visit to headquarters of the Veterans Administration in the nation's capital produced an excellent new pamphlet that explains them all. In easy-to-read language, "Federal Benefits for Veterans and Dependents (VA IS-1 Fact Sheet)" contains the current word on more than three score—count 'em—federal programs for veterans. (It's available, for ninety-five cents, from the US Government Printing Office, Washington, D. C. 20402.)

The programs range from "Alcoholism Treatment" to "Wheel-chair Homes." The prominent ones, of course, include GI Bill education and training, comprehensive health care, six insurance plans, and compensation and pension awards. But in case you've forgotten, the government also provides vocational rehabilitation, drug treatment, dependency-indemnity compensation, unemployment payments, four kinds of loans, dental care, children's education, spouse education, job assistance, death gratuity payments, small business assistance, and others.

It is big business and growing ever larger. The VA medical system alone, with its 172 hospitals and 230 outpatient clinics, nursing homes, and other facilities, is the largest health care organization in existence. It treats about 180,000 inpatients and 1,455,000 outpatients a month. Another 37,000 receive domiciliary and nursing care.

Nearly 6,500,000 veterans, or fifty-eight percent of those eligible, have received education and training under the current GI Bill. That performance tops World War II and Korean veterans; only fifty and forty-three percent of them took advantage of the earlier GI Bill programs.

Some 2,300,000 service members and veterans, plus 900,000 Reservists, are insured for up to \$20,000 under the Servicemen's and Veterans' Group Life Insurance project. More than 5,000,000 government-sponsored policies are in force for older veterans.

On another front, 2,200,000 veterans with service-connected ailments receive disability compensation, ranging from \$35 to \$655 a month (plus large extra amounts in specific cases). Another million draw nonservice-connected pensions of up to \$196 per month. Rates of these and other compensation programs are raised frequently.

From these few examples of governmental assistance for military veterans, it is hardly surprising that total expenditures are approaching \$20 billion annually. Indeed, the Senate Veterans' Affairs Committee estimates that the FY '77 tab for the veterans community will reach nearly \$20.5 billion. That is about \$3 billion more than the Administration budgeted for, but Committee Chairman Sen. Vance Hartke (D-Ind.) says the budget was underestimated and based on assumptions unlikely to occur.

Meantime, the number of vets eligible to use the GI Bill is increasing, and more are taking college courses than heretofore. These factors are driving up costs, Hartke says.

Congressional critics also fault the Administration for not including in the budget expected cost-of-living raises this year for some 5,000,000 veterans and dependents on various VA payment rolls. But Congress is acting on them anyway.

The House Veterans' Affairs Committee recently approved measures to raise (1) disability compensation for service-connected vets by eight percent; (2) Dependency-Indemnity Compensation for service widows by seven percent; (3) nonservice-connected pensions based on low income by seven percent; and (4) all pension benefits for the 170,000 veterans eighty years or older by twenty-five percent. The latter action is in response to a long campaign by supporters of remaining World War I veterans.

And many other bills to embellish benefits continue to pile up on Capitol Hill, though whether the backers are always serious about their proposals is another matter.

One controversial move some lawmakers say they favor would extend the May 31, 1976, GI Bill expiration date for vets who served between 1955 and 1966. Although some persons were in training at the cutoff, and therefore found their benefits stopped, it was pointed out that they had had ten to twenty-one years following separation to use up their eligibility.

The extension proposal appears dead, but meanwhile persons who began service in 1966 and thereafter enjoy ten years of GI Bill eligibility from their dates of separation.

While the government provides veterans a bundle of helpful programs, the agency that administers them frequently comes under fire. Starting in the late 1960s, Vietnam returnees and other jobless veterans scored the Veterans Administration for indifference and other alleged failures.

VA, though not nearly the villain often portrayed, responded by turning a large publicity spotlight on benefits and by actively seeking out returning vets and encouraging them to participate. This has helped, VA officials contend. On the employment front, latest government figures on the "Vietnam group" (now ages 25-29) show 6.6 percent of the veterans out of work compared to a flat six percent for nonveterans.

More recently, it was disclosed that VA has overpaid millions in GI Bill funds; some went to veterans who pocketed the money and never attended classes. Faulty record keeping by certain colleges accounted for some. VA officials told AIR FORCE Magazine that as of April 30, total overpayments had reached \$942 million, of which \$562 million had been recovered. They said that new controls are reducing abuses.

The VA is the government's largest independent agency, so perhaps such bureaucratic snags are inevitable. At least some close observers feel that in view of its very considerable work load, the agency does reasonably well as federal departments go.

Certainly the government is straining to be of service to all eligible veterans. In any event, the VA—or one of its field offices—remains a key checkout point for persons separating from service to establish a basis for benefit entitlements. ■

# The Bulletin Board

Price (D-III.) and F. Edward Hébert (D-La.), voting with the majority. However, the lawmakers made clear the add-on will not be dropped unless it also is cut from federal civilian retirement pay raises.

- **CHAMPUS Funding.** The House has approved \$582 million for CHAMPUS in FY '77, an increase of \$67 million over FY '76. It also agreed to DoD's request to deny "nonmedical" claims for pastoral, family and child, or marital counseling.

- **Commissaries.** Appropriated fund support for store employees' salaries appears favorable for another year, informed sources said. This should assure another year's operation at about the present twenty-two percent customer savings.

## Hundreds Switch to ANG/AFRES

Approximately 3,500 more airmen and seventy-five more officers switched from active duty to active Reserve Forces status under the Palace Chase Program during FY '76. For the present transition quarter plus all of FY '77, the quota calls for 3,275 airmen and seventy-five officer transfers.

Palace Chase, partially responsible for the improved manning in the Air Guard and Air Force Reserve, allows volunteers in accepted skills to transfer if they agree to serve two years in an ANG or AFRES unit for each year of their remaining active-duty commitment. Airmen in shortage skills are ineligible; the token officer quota is for rateds only. The latter reflects the big overage of active-duty rated officers and the fact that the Air Reserve Forces also are generally well manned with officers.

Hq. USAF stressed that people going the Palace Chase route must be physically qualified for ANG/AFRES enlistment (some earlier transferees were not), and this means a mandatory physical exam. Also, applicants should understand that they must repay any unearned reenlistment bonus before switching.

Some applicants for transfer may

be accepted if the gaining ANG or AFRES unit will retrain them in a needed skill. AFR 35-46 contains details for interested applicants.

## Overseas Teacher Benefits Snagged

The Defense Overseas Dependents' School System consists of about 200 elementary and 100 junior and senior high schools, located in twenty-seven countries. It enrolls 150,000 students, mostly US military children, and is operated by 7,500 teachers and administrators.

Many of the teachers are military wives who are hired after accompanying or joining their husbands on foreign assignments. Last year, for instance, 1,468 teachers in the system were hired locally and 1,326 of them were dependents.

The fact that dependents do not receive teacher "recruitment-retention" incentives such as post differentials and housing allowances have triggered complaints. Some quarters think they should receive the same extras overseas that teachers recruited in the States enjoy.

A House subcommittee has been looking into the matter. It heard Defense's Deputy Assistant Secretary for Civilian Personnel Policy, Carl W. Clelow, denounce the idea. He said teachers hired locally are already there and receive "housing support and transportation entitlement based on dependency," so there is "no justification" for the extra payments.

No action was taken. A subcommittee spokesman indicated that the unit may issue a report outlining "how the problem might be resolved."

## Short Bursts

Headquarters is urging members going overseas on remote tours to consider **moving their families into government housing** at Schilling Manor, Salina, Kan. More than 200 USAF families now reside there, which means there are frequent openings. Run by the Army, Schilling has most of the facilities of any small base including a dispensary with two doctors, youth programs, and many activities. Air Force liaison members at Schilling are CMSgt. Jack Vickery and SSgt. James L. VanNoy, 2929 Scanlan Ave., Salina, Kan. 67401; AUTOVON 886-1760, Station 4. CBPOs should



*Brig. Gen. William G. Hathaway, who commanded the AFRES 452d Tactical Airlift Wing, Hamilton AFB, Calif., from 1972-75, and was Base Commander until Hamilton's closing in January, recently retired. He was a B-25 pilot in the South Pacific during World War II.*

also have details. Occupancy requires surrender of BAQ.

The USAF Finance Center has disclosed an Air Force-wide **error rate of 43.5 percent in charges for inadequate quarters.** Some occupants pay too little rent, others too much. Sometimes rental deductions continued after occupants left the quarters. "Take immediate action" to straighten things out, housing and finance officers were told.

AFA's Board of Directors has endorsed the **nomination of Billy Mitchell for enshrinement** in the Hall of Fame for Great Americans. AFA President George Douglas told Hall of Fame selection committee members that the air pioneer's "visionary thinking" in the use of strategic airpower led to plans that brought victory in World War II.

More hard evidence that **advanced academic degrees pay off handsomely** comes from statistics on new Regular officer appointments. In recent three-year group selections, 2,628 young officers were considered and 675 selected for Regular. That's twenty-six percent. However, of the 125 with advanced degrees, sixty-eight, or fifty-five percent, made it. Similarly, in the recent seven-year group competition, advanced degree holders fared far better than those with only BA-level sheepskins.

One of the more interesting bills recently introduced in Congress **would make the chief of the Air Force Biomedical Services a brigadier general.** Rationale of sponsors:

USAF's 900 chaplains include two generals, its 1,200 JAGs include six generals, and the other components have numerous generals. But the 1,300 biomedes are general-less.

A recent message from the Hq. USAF DCS/Personnel, Lt. Gen. Kenneth L. Tallman, to major commanders calls for **greater commander involvement in equal opportunity projects**. He singled out slow progress "in the employment and advancement of women and minorities." At the same time, Defense Secretary Donald Rumsfeld issued a tough new directive aimed at strengthening EO programs in off-base housing and other projects.

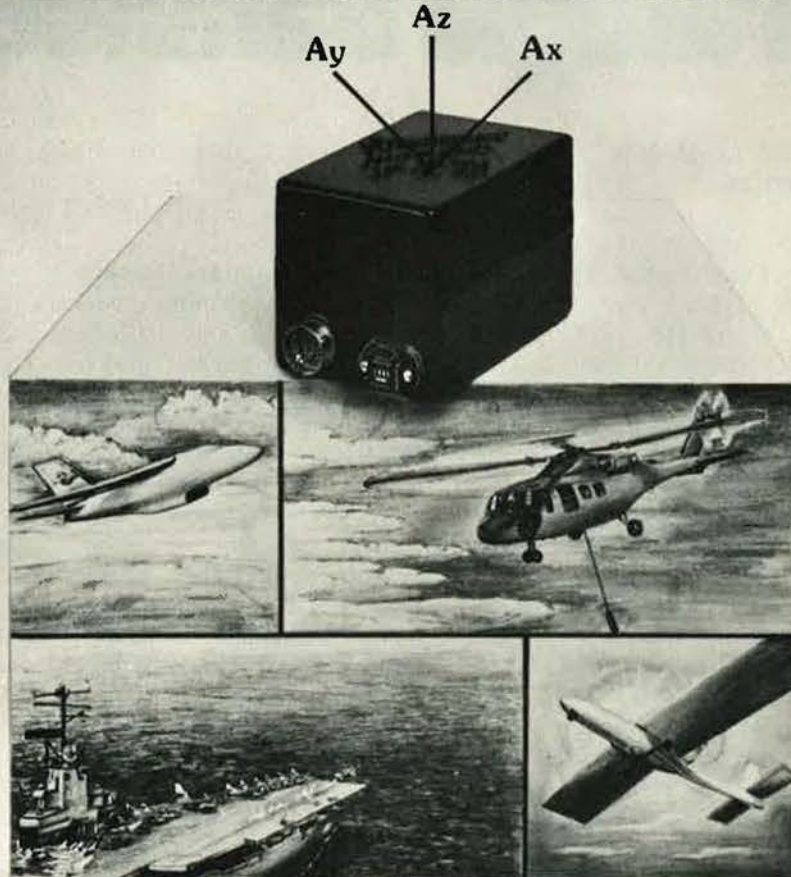
### Senior Staff Changes

**RETIREMENTS:** AFRES B/G William G. Hathaway; Chaplain B/G Thomas M. Groome, Jr.

**CHANGES:** B/G Bruce K. Brown, from Cmdr., 14th Aerospace Force, ADCOM, Ent AFB, Colo., to DCS/Ops., ADCOM, and Asst. DCS/Ops. for Ops., J-3, Hq. NORAD, Ent AFB, Colo., replacing B/G Elwood A. Kees, Jr. . . . M/G James L. Brown, from DCS/Intel., Hq. SAC, Offutt AFB, Neb., to Dir., J-2, US European Command, Vaihingen, Germany . . . Chaplain Col. (B/G selectee) Richard Carr, from Command Chaplain, Hq. TAC, Langley AFB, Va., to Dep. Chief of Chaplains, Hq. USAF, Washington, D. C., replacing retiring Chaplain B/G Thomas M. Groome, Jr. . . . B/G William E. Carson, from Cmdr., 63d MAW, MAC, Norton AFB, Calif., to Insp. Gen., Hq. MAC, Scott AFB, Ill., replacing B/G Edward J. Nash . . . B/G David L. Gray, from Exec. to C/S, Hq. USAF, Washington, D. C., to Cmdr., 47th Air Div., SAC, Fairchild AFB, Wash., replacing B/G Eugene D. Scott.

B/G Elwood A. Kees, Jr., DCS/Ops., ADCOM, and Asst. DCS/Ops. for Ops., J-3, Hq. NORAD, Ent AFB, Colo., to Cmdr., 25th NORAD Region, and additionally Cmdr., 25th Air Div., McChord AFB, Wash. . . . B/G David M. Mullaney, from Sp. Asst. to C/S, SHAPE, Belgium, to DCS/Dev. Plans, Hq. AFSC, Andrews AFB, Md. . . . B/G Edward J. Nash, from Insp. Gen., Hq. MAC, Scott AFB, Ill., to DCS/Log., Hq. MAC, Scott AFB, Ill. . . . B/G Eugene D. Scott, from Cmdr., 47th Air Div., SAC, Fairchild AFB, Wash., to Dep. Dir., J-3 (NMCC), Joint Staff, OJCS, Washington, D. C. ■

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From specific steps designed to prevent technological surprise to the need to fine-tune flexible strategic options, AFA's Symposium on "Tomorrow's Strategic Options" illuminated current and crucial topics that influence the nation's future defense posture . . .

# A Blueprint for Safeguarding the Strategic Balance

BY EDGAR ULSAMER  
SENIOR EDITOR

- *Soviet investments in military and space R&D exceed those of this country by sixty-five percent. In procurement outlays the USSR tops the US by 350 percent in ICBMs, by thirty percent in sophisticated aircraft, and by ninety percent in ships and boats.*

- *The Soviets do not consider nuclear war unthinkable. Through an intensive, accelerating civil defense program and industrial hardening and dispersion, they may be able to cut their losses in case of nuclear war to as little as seven percent of the population.*

- *Analyses of even "worst case" scenarios projected for the next decade indicate that a Soviet first strike could not destroy more than eighty-five percent of the US silo-based ICBM force. The surviving fifteen percent of USAF's proposed new MX missiles would carry more warheads than did all 1,000 Minuteman missiles prior to MIRVing.*

- *Dramatic weight and size reductions in high-energy lasers now under study could lead to laser weapons aboard spacecraft within a few years.*

- *A single, large space-based power station deriving its energy from the sun could provide enough electricity for a city the size of Houston. Such an installation could be assembled in space and placed in geosynchronous orbit with the help of Space Shuttles.*

**T**HESSE were among the disclosures made at AFA's Symposium "Tomorrow's Strategic Options," at Vandenberg AFB, Calif., held in conjunction with the Strategic Air Command's

1976 Missile Combat Competition. AIR FORCE Magazine's first report on this event appeared in last month's issue.

## The Tilting Military Balance

Several Symposium speakers expressed concern and puzzlement about the USSR's relentless push for comprehensive military superiority over the US, unaffected by détente and unresponsive to US concessions. If Soviet military efforts continue at present rates, "we would face in the 1980s the ominous possibility of confronting not only a numerically superior Soviet force, but one with important technological advantages as well," warned Deputy Secretary of Defense Robert Ellsworth, who is one of the country's three highest ranking intelligence executives. (See also p. 26 of this issue.)

Assessing the US/USSR military balance in five key areas—strategic nuclear, naval, projection of power, NATO vs. Warsaw Pact, and investments for the future—Secretary Ellsworth told the AFA meeting "recent trends are not promising. Over the last decade, the Soviet defense budget has increased approximately three percent per year in real terms. During the same period, and in the same real terms, our defense expenditures have been declining. . . . In the last three years, the Soviets have produced almost six times as many tanks, three times as many armored personnel carriers, nine times as many artillery pieces, and seventy percent more tactical aircraft."

The Soviets, Secretary Ellsworth said, "employ a multithrust approach. They work on everything in every military field, and they are willing to devote years and years to an effort." They don't consider nuclear war un-

thinkable, and take all steps necessitated by that perception while "we tend to avoid public discussion of a nuclear exchange, its effects on our society, and steps required to survive and recover in the postattack environment." The crucial need, he added, is to "contend with the Soviets over the long term, rather than restricting our thinking to only the cataclysm. We must study our potential adversary, his equipment, tactics, doctrine, and organization. We do not have to match the Soviets tank for tank, ship for ship. Being bigger is not as important as being smarter."

In the strategic arena, he said, the present status of essential equivalence is increasingly endangered by the "more vigorous manner" in which the Soviets pursue strategic goals. They are ahead of the US in the development of land-mobile systems, civil defense, and air defense. Soviet "program momentum," such as a 500 percent increase in their stockpile of nuclear warheads and bombs since 1965, an increase in ICBMs from 225 to 1,600 over the same period, and actual or pending deployment of four new MIRV-capable ICBMs and new missile launching submarines, "portend . . . grave consequences for the future," he said. But, "if we choose, the US has a greater capability to develop combinations of high-accuracy, low-yield weapons for discriminating use, and "our bomber forces, both in terms of capability and operational experience, provide a large and important plus factor," according to the Secretary.

Air Force Secretary Thomas C. Reed told the AFA meeting that détente and a "vastly inefficient economic system" notwithstanding, the Soviet Union now devotes more than one-sixth of its GNP to military programs. There are, he reported, "no indications of restraint in Soviet ICBM deployment, submarine construction, or Backfire [strategic bomber] production. There is no lessening of production in tactical areas, nor are there any indications of cut-backs in the massive Soviet research and development program. There remain substantial differences between the US and USSR that have hindered our efforts to achieve an acceptable SALT II agreement."

As a consequence, Secretary Reed said, the early 1980s will be a "very difficult time for the US in general and the US Air Force in particular." He



Secretary Ellsworth delivered the principal address at the AFA meeting, which highlighted the Soviet threat.

quoted Alexandr Solzhenitsyn's dire prophecy that the Soviets soon "will be twice as powerful as you . . . and some day they will say to you: 'We are marching our troops into Western Europe and if you act, we shall annihilate you!' And the troops will move, and you will not act." The Secretary asked rhetorically, "In 1984 will the Soviets send a few missiles into North Dakota while evacuating their own cities, to signal the showdown?" His own answer was: "Not if our resolve [to modernize the strategic Triad] is firm."

Explaining that the US Navy's forty-one Polaris and Poseidon submarines

must be replaced because of age and the growing Soviet ASW threat, he stressed the importance of maintaining the pace of the Trident program, which "represents a great advance over Polaris/Poseidon. That submarine will be significantly quieter, at patrol speeds, than our current submarines. The passive sonar will be far more sensitive, allowing better detection of enemy antisubmarine ships. Operations will be streamlined by a fully integrated tactical command and control system. Each boat's capacity will be expanded to twenty-four missiles, and each Trident missile, in turn, will incorporate MIRVs. The missiles will be capable of a 4,000-mile range with full payload. This will increase the potential operating area of the Trident, making the Soviet ASW problem that much more difficult."

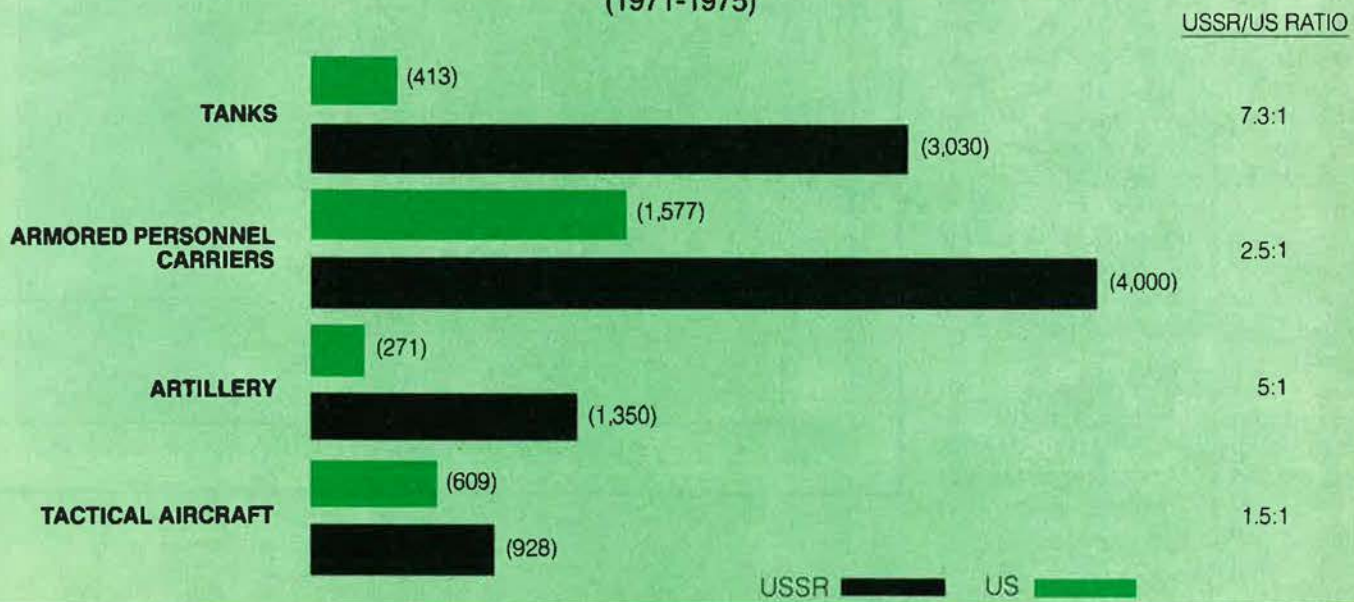
More than half of this nation's nuclear weapons delivery capability in terms of megatonnage resides in USAF's strategic bombers, a fact that helps counterbalance the Soviet Union's fourfold advantage in ICBM throw-weight, Secretary Reed said. "We believe that a mix of B-1s and B-52s is what the nation needs to ensure a viable bomber capability into the next century. . . . We are currently planning to buy only 244 B-1s, as compared to 742 B-52s built during the life of that program. We envision over 300 B-52s remaining in the active inventory for the rest of this century. We expect to target the B-1s against the heavily de-

fended, high-valued targets. The B-52s, with the addition of the Air-Launched Cruise Missile, would be used to attack the less heavily defended areas," he told the AFA Symposium.

There is no compelling reason "that we should abandon fixed-silo ICBMs," the Air Force Secretary said, because there is no evidence that any foreseeable Soviet first strike could destroy more than eighty-five percent of USAF's hardened ICBM silos. The next generation ICBM, the MX, will carry a dozen or more MIRVs. Even under "worst case" conditions, the surviving force, therefore, would carry more warheads (and "still a great deal of firepower") than the 1,000 Minuteman ICBMs prior to MIRVing, Secretary Reed pointed out. Consequently, in a first-strike attack the Soviets would have to launch virtually all of their large-throw-weight ICBMs, thus removing any doubt on the part of US National Command Authorities "about what sort of attack [was] under way." Inevitably, the US bomber and submarine forces would be activated. Also, given the steady advances in US warning capability, the "Soviets must have second thoughts" about finding the 1,054 US ICBM silos occupied by the time their warheads arrive, because the President might have decided to fire these weapons rather than sit out the attack, Secretary Reed said.

The Pentagon's decision on the fundamental characteristics of MX could be made this summer, the Secre-

### ESTIMATED US/USSR RELATIVE PRODUCTION RATES (1971-1975)





Gen. William J. Evans, Commander of the Air Force Systems Command, was one of the main speakers at the Symposium.

tary announced at the AFA Symposium, adding "I really think it is time . . . to determine the direction in which the future ICBM force ought to go." Meanwhile, hardening has been completed for about half the Minuteman silos, and "we hope to be done by 1979," he said. Software improvements to increase the accuracy of the Minuteman III guidance system are scheduled for completion in 1978.

### The US R&D Deficit

A comparison of US and Soviet technological trends shows that this country has deficiencies requiring immediate correction, according to Gen. William J. Evans, Commander of Air Force Systems Command. The Soviet Union is increasing R&D investments, expressed in constant dollars, by the equivalent of \$2.3 billion each year. In contrast, the US technology base decreased by forty percent between 1967 and 1975. The areas most affected by R&D cutbacks are advanced and basic technology, the keys to future force capability, he said, adding that only about four percent of the FY '77 Air Force budget is allocated to advanced and basic technology programs.

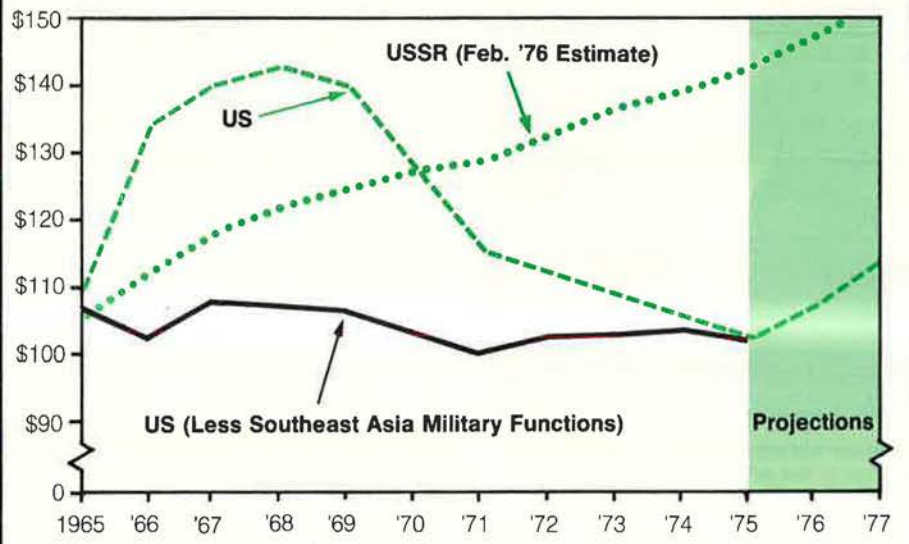
One of the most promising Air Force technology programs is the Advanced Strategic Air Launch Missile, known as ASALM, according to General Evans. This hybrid system, part solid-fuel rocket and part air-breathing ramjet, combines the high speed of SRAM, the B-52's standoff missile,

## US AND SOVIET DEFENSE PROGRAM TRENDS

(US Expenditures and Estimated Dollar Costs of Soviet Programs)

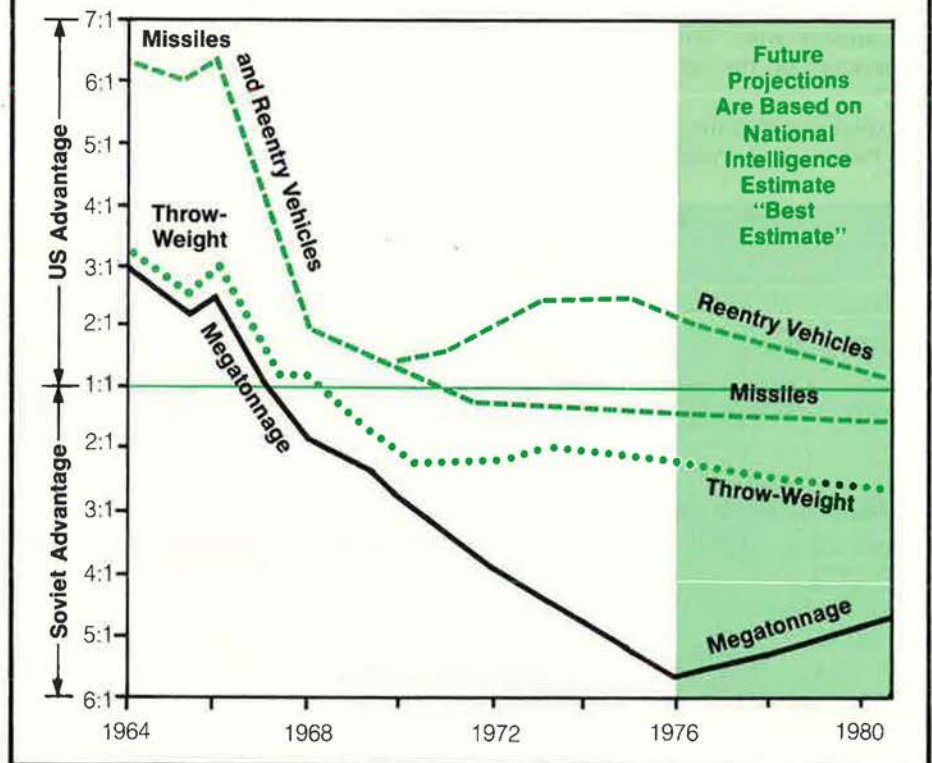
Billions  
FY '77 Dollars

(Constant FY '77 Dollars)



Secretary Ellsworth used this chart at the AFA meeting to bring out the magnitude of the Soviet defense effort. Valid as of March of this year, the chart shows the steady growth of Soviet defense program costs, expressed in constant Fiscal Year 1977 dollars and based on US intelligence estimates. Comparable US investments are given in two ways, one counting the expenditures associated with the war in Southeast Asia and the other deleting that category of US military functions.

## US/USSR STRATEGIC MISSILE ADVANTAGE



Starting out with a clear advantage in ICBM capabilities in 1964, the US winds up with a clear disadvantage by 1981 in all key areas except number of reentry vehicles. This chart, used by Secretary Ellsworth at the AFA Symposium, shows future projections based on NIE's so-called "best estimate."



with the long range of the Air-Launched Cruise Missile, currently in flight test, to "allow us dramatic ranges at supersonic speed." ASALM, he said, has a multimission potential that extends from tactical and air defense roles and homing on emitting radar sites, to strategic missions, including bomber defense. "Various combinations of guidance and warheads are being considered, such as radar, electro-optical seekers, or inertial guidance and either conventional or nuclear warheads." Because it can combine high accuracy and a sizable warhead, ASALM qualifies as a hard structures killer, the AFSC Commander said.

Electronically Agile Radar, EAR for short, is an important AFSC initiative that will combine in one system functions such as high-resolution terrain mapping, terrain avoidance, terrain following, and velocity and position update that now require several airborne radars. "Combining these functions into one Electronically Agile Radar provides better penetrability at low altitude, route-to-target flexibility, and increased hard target kill potential as a result of increased accuracy. Growth provisions in EAR allow for an effective counterair role and, when combined with target detection and tracking, will lead to a see-everywhere-shoot-everywhere capability," according to General Evans. Development has been slowed by limited funding, mainly because neither current weapon systems nor the current threat specifically require EAR. General Evans predicted that, subject to future funding, the first system might become available in about three or four years and that an improved version will go on the B-1 later. "I would guess that we will have [produced] forty to fifty B-1s before EAR could be incorporated," General Evans said.

AFSC is exploring technological options for "the next generation airframe" in collaboration with NASA. This involves "planning tests of aircraft that can attain speeds of Mach 6 or better, and fly at altitudes in excess of 100,000 feet," the AFSC Commander said.

Summarizing AFSC research associated with the MX program, he said that in the propulsion area "we are investigating such advances as high-performance propellants and high-strength case materials. Energetic polymers and plasticizers offer significant

increases in energy. . . . There is also the possibility of achieving large, high-deflection, lower-stage nozzles that would give missiles high slew rates and more flexibility in directional control." Payoff from these and related technologies is a substantial boost in payload capability.

### MX Status Report

The guidance and control system of MX will be nuclear-hardened and will "give us more reliable service and greater precision than is presently available," according to General Evans. Advanced computer technology con-



Four Symposium participants are shown at the Banquet head table. From left to right: SAC CINC Gen. Russell E. Dougherty; DARPA Director Dr. George H. Heilmeyer; Lt. Gen. Ray B. Sitton, Director, J-3, JCS; and SAMSO Vice Commander Maj. Gen. R. C. Henry.

cepts and the software to support them are also under investigation. The overall goal of AFSC's MX research is to come up with "a baseline system that we can expect to maintain and improve economically over an extended service life of twenty years or more. The large payload and accuracy planned for the MX will . . . maintain essential equivalence and enable us to meet the challenge of increasing Soviet proliferation of hard target structures. . . . The MX is planned to be deployed initially in existing silos, but could take advantage

of other basing modes if the threat dictated," according to the AFSC Commander.

To cover the potential time gap until MX might enter the inventory, modification of the Minuteman force is under consideration, including "improved hardness of the missiles in their silos, increased time that the silos can be self-operable after attack, and increased hardness of the missile during flyout," he told the AFA Symposium.

The Air Force is improving the science and technology associated with missile reentry as part of the long-term Advanced Ballistic Reentry System (ABRES), General Evans said. The purpose of ABRES is to design better RVs as well as to better understand the Soviet missile threat and to provide countermeasures. Key goals this year will be exploration of a Maneuvering Reentry Vehicle (MaRV) and of an Advanced Reentry Vehicle for use on MX or other follow-on missiles.

MaRV, at first, will be designed to fly a reentry trajectory using inertial guidance, but eventually "we expect to fly a terminally guided reentry vehicle that either homes in on the infrared or other radiation from a target or perhaps compares the terrain over which it is passing with the contours programmed into its computer."

Stored radar or electro-optical imagery can be compared by the RV's sensors against the actual terrain that is being overflown to provide zero CEP guidance, but "we have problems with acquisition, with weather, and with *a priori* information about the target area that we have yet to solve," he said. "We are getting CEPs now that are quite impressive simply through software advances, but we could improve further and attain zero CEP," the AFSC Commander asserted.

Existing warning and attack assessment capabilities provide "strategic intelligence data in real time to confirm the plausibility of launch." In addition "our sensors will provide us . . . in likely scenarios, information about the objectives of the attack," according to General Evans.

Improvements in the attack assessment system now under way, coupled with advances in command and control, "will provide a war-fighting capability and the ability to launch under attack before the incoming ICBMs have detonated, thus decreasing the enemy's confidence in achieving an ad-

vantage from a first strike. Both are positive contributions to our deterrent posture," General Evans stressed.

### Guarding Against Technological Surprise

Although handicapped by the easy access of foreign adversaries to US defense technology, this nation can guard against technological surprise, Dr. George H. Heilmeier, Director of DoD's Advanced Research Projects Agency (DARPA), told the AFA Symposium. The need to do so becomes paramount as sophisticated weapons technology increases the likelihood that "the first battle is the last battle. This means that forces in being are more important than force potential. . . ."

In addition to the imperatives of maintaining broad technological initiatives and of assuring that intelligence is made available rapidly to defense technologists, Dr. Heilmeier stressed technological options: "We must proceed down several paths so that technological surprise that may nullify a key capability is not decisive."

The DARPA Director urged more cooperation between technologists and combat commanders "in the evaluation of technology [toward] a kind of test marketing, a further refinement on 'fly-before-buy.'" Similarly, the rapport between defense-oriented scientists and engineers and those in industry and the universities should be strengthened to assure a cross-fertilization of ideas and concepts so important to technological breakthroughs.

Among the technologies that receive more funding in the USSR than in this country, he said, are high-pressure physics (considered the steppingstone to solid hydrogen—a potentially revolutionary fuel), inductive storage for pulsed power control (important for laser weapons), satellite-borne radar, and chemical and biological warfare. Dr. Heilmeier asserted that US laser weapons research is adequately funded. He feels that space-based laser weapons will become viable by the time "some captains in this room" make lieutenant colonel, basing this prediction on the absence of propagation and pressure recovery problems in space-based systems—the "bugaboo" of terrestrial high-energy lasers—as well as dramatic weight reduction. Recent research indicates that chemical laser weapons can be built that weigh

less than one-tenth as much as gas dynamic lasers and no more than one-ninth as much as electric lasers with the same energy output, he said.

Space lasers also offer a "mind-boggling communications potential," according to SAMSO's Vice Commander, Maj. Gen. Richard C. Henry, who told the AFA meeting that "by 1979, a SAMSO-developed system is expected to transmit and receive one billion bits of information per second, or twenty times the volume presently sent over a commercial satellite communication link."

### The NAVSTAR System

The Defense Department's NAVSTAR Global Positioning System (GPS), under development by SAMSO and scheduled to reach operational status by 1984, will be a "force multiplier for both tactical and strategic forces. . . . The capability to perform precise, passive rendezvous in a common grid [involving accuracies of tens of feet] will facilitate refueling, rescue, and antisubmarine operations. Also, GPS user equipment, integrated with aircraft inertials, will permit precision bombing in time-coordinated scenarios with run-in from all azimuths at high or low altitude. The weapons delivery platform would approach targets passively—without using radiating [detectable] systems—since its inertial would be calibrated via GPS to deliver ordnance accurately. A worldwide precise time standard, accurate to one second in 300,000 years, will be provided by atomic clocks carried by GPS satellites. This precision in the on-board clocks will provide users with an ability to determine position, velocity, and rate of change in three dimensions with unprecedented accuracy," General Henry said.

The twenty-four satellite system relies on dispersion to assure a reasonably high degree of invulnerability to attack by Soviet satellite killers, General Henry said. The GPS satellites are arranged in three different orbital planes, at an altitude of slightly more than 10,000 miles. No two satellites are ever closer to each other than 3,500 miles, he explained, making it extremely difficult to take out all the satellites.

SAMSO's Fault Tolerant or Self-Repairing Spaceborne Computer program is a major step in assuring highly reliable USAF satellites, according to

General Henry. "The self-repairing abilities of the computer [allow] the satellite to recover from a computer fault within a fraction of a second. Many seconds, minutes, or even days can be lost if it is necessary to detect and diagnose failures through ground-based analysis. We expect the Fault Tolerant Computer to have a .95 probability of being fully operational at the end of a five-year mission," he said.

The Defense Department's commitment to NASA's Space Transportation System, the Space Shuttle, does not release the Air Force from its obligation to provide an "assured launch capability" for military payloads and the responsibility to provide backup through Expendable Launch Systems (ELV) until the Shuttle has proved reliable in terms of military requirements, according to General Henry. The Air Force, therefore, is considering making the Shuttle Interim Upper Stage (IUS) "dually compatible with the Shuttle and Titan [USAF's large payload launcher], thereby buying only one upper stage for a mission," according to General Henry. The IUS, under development by the Air Force, is necessary because the Shuttle is designed for low orbits, no higher than 400 miles, while most military payloads require high orbits, often the 22,300-mile altitude needed for geosynchronous positioning.

The Air Force plans to launch a Shuttle from the modified Manned Orbiting Laboratory complex at Vandenberg AFB early in 1983. Construction of the permanent Vandenberg Shuttle facility for launch, landing, and turnaround processing, scheduled to start in 1979, won't be completed in time for the first USAF Shuttle flight, according to General Henry. USAF's investment in developing IUS and the Vandenberg complex will amount to \$1.45 billion by FY '81. This does not include DoD's share in the cost of the Shuttle system, yet to be determined by the Office of Management and Budget and the White House. Also as yet undetermined are the payload fees NASA will charge the Defense Department whenever NASA-operated Shuttles are used for placing military payloads in orbit.

### Two USAF Space Shuttles

Dr. Christopher C. Kraft, Director of NASA's Lyndon B. Johnson Space Center at Houston, Tex., told the AFA

meeting that present plans call for five Space Shuttles, "two of which will be used by the Air Force." The first three or four approach and landing tests of the Shuttle's Orbiter, the reusable element of the system that flies into and returns from space in airplane fashion, will take place in March 1977 at Edwards AFB, Calif. The system's first orbital flight is scheduled for mid-1977. One of the Shuttle's major technological hurdles, reusable insulation against the searing heat of reentry, "has more than met all design requirements." Developed by Lockheed Corp., this material was designed to withstand temperatures of 2,400 degrees Celsius, but "actually can handle 2,600 degrees" without ill effects on the aluminum structure of the Orbiter vehicle, he said. The Orbiter, according to Dr. Kraft, lands at about 180 knots. Its approach angle is between twenty-four and twenty-six degrees, a condition that the pilots, helped by digital con-

trols, "will be able to handle quite well."

Among the most spectacular missions envisioned by NASA for this or the next generation of Space Shuttles are space-based power stations that convert solar radiation into electric energy which is transmitted to earth by microwave via a one km-long antenna. According to Dr. Kraft, a station weighing about fifty million pounds and placed into geosynchronous orbit above the equator could furnish all the electric power needed by a city the size of Houston, Tex.

Lt. Gen. Ray B. Sitton, Director for Operations (J-3), Organization of the Joint Chiefs of Staff (since appointed Director of the Joint Staff), described efficient and reliable command control and communications (C<sup>3</sup>) as the "force multiplier" that permitted the nation to reduce its military strength from a two and a half to a one and a half war capability over the past few years with-

out "commensurate reduction" in US foreign policy interests or commitments, and without diminutions of the Soviet threat.

Over the past eight years, US command and control capabilities have taken a "quantum jump," he explained. In 1968, "the *Pueblo* was captured [by the North Koreans] and was being hauled into port before the National Command Authorities in Washington were fully aware of exactly what took place. [By contrast], the military response to the *Mayaguez* incident [last year off Cambodia] was managed from Washington on a real-time basis," he pointed out.

The need now is to improve "the capabilities of C<sup>3</sup> to maximize overall force effectiveness. The system must allow us to monitor situations and assess events with adequate knowledge to select the best options for force employment in sufficient time to influence the outcome in our favor. We want to be able to 'swing' forces in such a manner that our commitments can be met, even though our resources have become smaller," General Sitton said.

Security and survivability of the Pentagon's C<sup>3</sup> system are paramount concerns. A "secure voice capability" in combat radios and security involving computer teleprocessing systems are being developed. General Sitton said. Even though the possibility of a "bolt out of the blue" Soviet strike against the US is probably remote, some countermeasures to protect the C<sup>3</sup> system must be taken: "With the Soviets capable of delivering weapons in the multi-megaton range, the practicality of building all command and control facilities to withstand a concentrated attack becomes exceedingly costly—if not physically impossible." The Pentagon, therefore, has opted for development of a "minimum essential" command and control system that is predicated on broad redundancy of those facilities that perform the vital C<sup>3</sup> function during and after an attack, General Sitton said. Current studies of an advanced attack assessment system involve the possible use of the PAR "D" radar of the US Army's Safeguard ABM system, he added.

#### **Flexible Options vs. a High Nuclear Threshold**

Lt. Gen. John W. Pauly, USAF's Deputy Chief of Staff for Plans and

### **CIVIL DEFENSE IN THE SOVIET UNION**

In my article "Civil Defense in the USSR," which appeared in the October issue of AIR FORCE Magazine, I noted that about 1966 "there was a shift from primary reliance on shelters, to evacuation. The general plan was to disperse essential workers at distances of thirty-five to fifty miles from cities likely to be hit."

A Soviet publication, *Civil Defense Yesterday and Today*, by K. G. Kotlukov and others, released in Moscow last year, indicates that there has been still another shift in the Soviet concept for protecting the population. The following excerpt is from pp. 90 and 92 of that publication:

The basic method of protecting the population is sheltering them in protective structures and also evacuation and dispersion. Here it must be recalled that in the not distant past the main method of protecting the population was considered to be evacuation and dispersion.

Now, when further development and improvement of the nuclear rocket weapon and strategic aviation have taken place, the aggressor in the event of unleashing war might make an attempt to carry out a preemptive nuclear rocket strike. Such a variant for unleashing war might be tempting for the imperialists. In these conditions the time for protective measures of civil defense might be very limited, especially the time needed to carry out dispersal and evacuation.

Consequently, today the plan to shelter the population in protective structures has been placed in the forefront as the most reliable method of preserving peoples' lives from nuclear rocket weapons. It is obvious that if such protection is assured then a person will not be threatened with destruction by other kinds of weapons.

In present-day conditions in connection with the immeasurably growing chances for a preemptive strike on cities and objectives, warning systems, their sureness and reliability, are basic for all activities of civil defense.

The Soviet authors note that those workers in major cities and important economic activities who will make up the essential productive force in wartime will be provided shelter protecting them from all destructive effects of nuclear weapons. Other able-bodied citizens will continue to be evacuated to predesignated areas, most of them on foot.

—HARRIET FAST SCOTT



USAF's Deputy Chief of Staff for Plans and Operations, Lt. Gen. John W. Pauly, suggested that the USSR will develop flexible options.

Operations, suggested that to "believe flexible options promote nuclear war-fighting is like believing that life preservers aboard ships encourage the passengers to jump overboard." Because flexible nuclear options increase the credibility of the nation's announced military strategy, they "reinforce deterrence across a wider range of potential provocations, thus decreasing the likelihood of any conflict, conventional or nuclear," General Pauly maintained.

Asserting that "we must have positive deterrence across the entire nuclear threat spectrum if we are going to have deterrence at all," General Pauly argued that "without flexible nuclear options, we would be casting out even the most remote possibility for a termination of nuclear war at some point prior to mutual annihilation." Regardless of what the Soviets say publicly, he predicted, "they, too, will eventually have to see the logic behind flexible options—if they don't already. . . . With the directions in which their stra-

tegic weapon programs are progressing, they will soon have an excellent capability to selectively attack strategic targets in the US."

### Boosting Strategic Mobility

"Taking MAC's complete active-duty force operating at wartime rates, and adding the rather significant augmentation from our Reserve Forces, and then also adding the complete CRAF [Civil Reserve Air Fleet] cargo capability—three stages of CRAF activated—we'd remain well short" of the requirement for strategic mobility in case of a NATO war, the Military Airlift Command's Vice Commander, Lt. Gen. John F. Gonge, told the AFA meeting. Worse yet, if, as is possible, sealift "were denied us, the need for airlift could more than triple, even beyond the requirements we can't meet today," he added. Enhancement of MAC's airlift capabilities, as proposed by the Defense Department, therefore becomes imperative. (See April '76 issue, "ATCA—Key to Global Mobility.")

MAC is investigating a new technique called Naval Emergency Air Cargo Delivery System (NEACDS) to resupply naval forces over great distances by airdropping flotation-equipped bundles weighing up to 18,000 pounds from C-141s. Initial tests showed that such packages, dropped at points about 1,000 yards off recovery ships, can be brought aboard in about eleven minutes, according to General Gonge. MAC expects to increase NEACDS package weight to 50,000 pounds, he added. The command's aerial delivery of containerized supplies to ground forces also is improving by using C-141 aircraft, in addition to C-130s, for Container Delivery System (CDS) missions, Gen-



Lt. Gen. John F. Gonge, Vice Commander of the Military Airlift Command, reported on measures to correct shortfalls in US airlift capacity.

eral Gonge disclosed. The C-141 can accommodate about twice as many containers as the C-130, and can transport them over much greater distances in a shorter time.

In defining the Advanced Tanker/Cargo Aircraft (ATCA), General Gonge said that the Air Force is considering the possibility of acquiring both Boeing 747- and Douglas DC-10-based models, if the quantity of aircraft USAF is permitted to buy is large enough to justify diversification. "Both the DC-10 and the 747 have great capabilities. It would add to our capability to have both types," especially so far as Reservist crews who fly one or the other type for the commercial carriers are concerned, he said. Tentative plans call for the acquisition of about forty ATCAs to give MAC's C-5 and C-141 fleets nearly global range.

More than 700 aerospace industry executives and civic leaders from around the country attended the AFA Symposium. ■

### WORD TO THE WISE

While serving as a Radar Officer on a remote Pacific island, I commanded several young airmen in our mission of twenty-four-hour radar surveillance. During one especially tedious midnight shift, I noticed that the airman on the surveillance scope was apparently asleep. I slipped up behind him and was deciding how to handle the situation when he must have sensed my presence. Without a word, he crossed himself, whispered "Amen," opened his eyes, and went back to work. I walked away as quietly as I came.

It wasn't until the time of his transfer, several months later, that I learned that he was not a Catholic.

—Contributed by D. H. Duger

(AIR FORCE Magazine will pay \$10 for each anecdote accepted for publication.)

# the imperatives of national readiness

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

Gen. Robert J. Dixon  
Commander, TAC

Gen. F. M. Rogers  
Commander, AFLC

George M. Douglas, incumbent AFA President, has been nominated by acclamation for a second term, while Gerald V. Hasler has been nominated to become next year's Chairman of the Board. These and nominees for other national offices and directorships will be presented next month to delegates attending AFA's Thirtieth Anniversary National Convention . . .

# AFA Nominees for 1976-77

By Don Steele  
AFA AFFAIRS EDITOR



*George M. Douglas*



*Gerald V. Hasler*

IN conjunction with a meeting of AFA's Board of Directors, the Association's Nominating Committee met in Colorado Springs, Colo., on May 29, to select new leaders for the year 1976-77.

The Nominating Committee, which consists of AFA national officers, the members of the Board of Directors, and the President of each AFA State Organization or his designee, chose a slate of four National officers and nineteen Directors.

This slate will be presented to the delegates at AFA's 30th Anniversary National Convention, to be held in Washington, D. C., September 19-22.

Incumbent AFA President **George M. Douglas**, of Denver, Colo., was nominated by acclamation for a second term. Mr. Douglas is Assistant Vice President/Marketing of Mountain Bell. During World War II, he served with the Army in the Pacific Theater. Currently he is an AFRES major general with an assignment as the Mobilization Augmentee to the Vice Commander of the Aerospace Defense Command. A Life Member of AFA, he now serves as AFA National President; as Chairman of the Nominating and Convention Site Committees; as a member of the Executive, Finance, and Resolutions Committees; as an ex officio member of all committees and councils; and as a member of the Board of Trustees of the Aerospace Education Foundation. Mr. Douglas is a former National Director, and State and Chapter President.

For Chairman of the Board, the Nominating Committee nominated **Gerald V. Hasler**, of Endwell, N. Y. Mr. Hasler is the President and Chief Executive Officer of an architectural design and remodeling corporation. During World War II, he was a B-25 instructor pilot. Immediately following the war, he was with the United Nations Relief and Rehabilitation Administration as its Director for the French Zone of Occupation and Director of Supply and Transport for Austria with headquarters in Austria. An AFA member since 1963, he is a former State President, National Committee Chairman, and National Parliamentarian. He currently serves as an AFA National Director, as a member of the Executive Committee, as an ex officio member of the Finance Committee, as Treasurer of the Aerospace Education Foundation, and as a Chapter President.

**Jack C. Price**, of Clearfield, Utah, was nominated by acclamation for the office of National Secretary. A former Air Force NCO, he now is an Air Force civilian executive at the Ogden Air Logistics Center, Hill AFB. A Life Member of AFA, Mr. Price has served as Chapter and State President, Vice President for AFA's Rocky Mountain Region, and Chairman of the Organizational Advisory Council. Currently, he is an AFA National Director and a member of the Finance Committee.

Incumbent National Treasurer **Jack B. Gross**, of Hershey, Pa., was nominated by acclamation for reelection. Mr. Gross, a colonel retired from the Air Force Reserves, is a prominent civic leader and businessman. He is now serving his fifteenth term as National Treasurer, and also serves as Chairman of AFA's Finance Committee, as a member of the Executive, Resolutions, and Convention Site Committees, and as a member of the Aerospace Education Foundation's Board of Trustees. He has served as Chairman of the Board, an elected National Director, and a

State and Chapter President. He is a Life Member of AFA.

The following are permanent members of the AFA Board of Directors under the provisions of Article IX of AFA's National Constitution:

John R. **Alison**, Joseph E. **Assaf**, William R. **Berkeley**, Edward P. **Curtis**, James H. **Doolittle**, George M. **Douglas**, Joe **Foss**, Jack B. **Gross**, George D. **Hardy**, Martin H. **Harris**, John P. **Henebry**, Joseph L. **Hodges**, Robert S. **Johnson**, Arthur F. **Kelly**, George C. **Kenney**, Thomas G. **Lanphier, Jr.**, Jess **Larson**, Curtis E. **LeMay**, Carl J. **Long**, Howard T. **Markey**, Nathan H. **Mazer**, John P. **McConnell**, J. B. **Montgomery**, Martin M. **Ostrow**, Julian B. **Rosenthal**, John D. **Ryan**, Peter J. **Schenk**, Joe L. **Shosid**, C. R. **Smith**, William W. **Spruance**, Thos. F. **Stack**, Arthur C. **Storz**, Harold C. **Stuart**, James M. **Trail**, and Nathan F. **Twining**.

The nineteen men whose pictures appear on the following pages are nominees for the eighteen elective Directorships for the coming year. (Names marked with an asterisk are incumbent National Directors.)



Jack C. Price



Jack B. Gross



Brosky



Dan Callahan



Daniel F. Callahan



Campbell



Clark



Fisher



Grazioso



Haire



Harris



Haug



Keith



Lawson



Nedder



Nettleton



Stearn



Stewart



Taylor



A. A. West



Herbert M. West

## Nominees for AFA's Board of Directors

**\*John G. Brosky**, Pittsburgh, Pa.—judge. Former Chapter, State President; National Convention Parliamentarian; National Council member. Current National Committee member; Aerospace Education Foundation Board of Trustees member. AFA Presidential Citation 1970 and 1974. Life Member.

**\*Dan Callahan**, Warner Robins, Ga.—physician. Former Chapter, State President; National Committee member; Current National Council member; Aerospace Education Foundation Board of Trustees member. AFA Presidential Citation 1972 and 1973. Life Member.

**\*Daniel F. Callahan**, Nashville, Tenn.—management engineering consultant. Former Chapter, State President; National Council Chairman. Current National Committee member. Life member.

**Stanley L. Campbell**, San Antonio, Tex.—company executive. Former State President; National Committee member. Current Vice President (Southwest Region); National Council Chairman. AFA Presidential Citation 1975.

**\*Earl D. Clark, Jr.**, Kansas City, Kan.—construction company executive. Former Chapter officer; State President; Vice President (Midwest Region). Current National Committee member. Life Member.

**\*Herbert O. Fisher**, Kinnelon, N. J.—retired metropolitan area aviation official. Former Chapter President. Current Aerospace Education Foundation Board of Trustees member.

**\*James P. Grazioso**, West New York, N. J.—roofing and sheet metal contractor. Former Chapter officer; State President; Vice President (Northeast Region). Current Chapter President.

**John H. Haire**, Huntsville, Ala.—engineer. Former Chapter, State President. Current Vice President (South Central Region); Aerospace Education Foundation Board of Trustees member.

**\*Alexander E. Harris**, Little Rock, Ark.—property management executive. Former Chapter, State President; Vice President (South Central Region).

**Roy A. Haug**, Colorado Springs, Colo.—telephone company executive. Former Chapter, State President. Current Vice President (Rocky Mountain Region); National Committee member; Aerospace Education Foundation Board of Trustees member.

**\*Sam E. Keith, Jr.**, Fort Worth, Tex.—traffic and maintenance engineering manager. Former Chapter, State President; National Council member; Vice President (Southwest Region). Current National Committee member; Aerospace Education Foundation Board of Trustees member. AFA "Man of the Year" 1967. Life Member.

**\*Robert S. Lawson**, Los Angeles, Calif.—textile industry executive. Former Chapter, State President; Vice President (Far West Region); National Committee Chairman. Current Aerospace Education Foundation Board of Trustees member. Life Member.

**\*Edward T. Nedder**, Hyattsville, Md.—attorney. Former Vice President (New England Region); National Council member. Current National Committee member.

**\*J. Gilbert Nettleton, Jr.**, Washington, D. C.—aerospace industry executive. Former Squadron Commander; Chapter President; Chairman of National Air Force Salute; Chairman of the Board of Trustees, Aerospace Education Foundation. Current National Council member. Aerospace Education Foundation Board of Trustees member. AFA Presidential Citation 1966 and 1974. Life Member.

**\*Edward A. Stearn**, San Bernardino, Calif.—aerospace industry executive. Former Chapter President; State officer; National Committee member. Current National Council member. AFA Presidential Citation 1972; Citation of Honor 1975.

**\*Hugh W. Stewart**, Tucson, Ariz.—attorney. Former Chapter, State President; National Committee Chairman. Current National Council member. Aerospace Education Foundation Board of Trustees member.

**Liston T. Taylor**, Lompoc, Calif.—aerospace industry executive. Former Chapter, State President. Current National Council member.

**\*A. A. West**, Newport News, Va.—aerospace industry executive. Former Chapter, State President; Vice President (Central East Region); National Council Chairman. Current National Committee and Council member. AFA Presidential Citation 1972 and 1973.

**Herbert M. West, Jr.**, Tallahassee, Fla.—environmental consultant. Former Chapter, State President. Current Vice President (Southeast Region); National Council member; Aerospace Education Foundation Board of Trustees member. AFA Presidential Citation 1975.



AFA's 30th Anniversary National Convention and its 1976 Aerospace Briefings and Displays will be held at the Sheraton-Park and Shoreham-Americana Hotels, September 20-23. Accommodations are limited at the Shoreham-Americana Hotel and will be used primarily by other



Executive's Reception and Buffet.

We urge you to make your reservations at the Sheraton-Park Hotel as soon as possible to ensure obtaining your reservations. Arrivals after 6:00 p. m. require a one-night deposit for the night of arrival.



organizations meeting in conjunction with AFA's 1976 National Convention.

All reservation requests for rooms and suites at the Sheraton-Park Hotel should be sent to: Reservations Office, Sheraton-Park Hotel, 2660 Woodley Road N.W., Washington, D.C. 20008.



Be sure to refer to AFA's National Convention when requesting reservations. Otherwise, your reservation requests will not be accepted by the Sheraton-Park.

AFA's National Convention activities will include luncheons for the Secretary of the Air Force and the Air Force Chief of Staff, and the Air Force Anniversary Reception and Dinner Dance. The National Convention will also include AFA's Business Sessions, Conferences, and several invitational events, including the President's Reception, the Annual Outstanding Airmen Dinner, and the Chief



PLAN NOW TO COME TO WASHINGTON, D.C., TO ATTEND . . .

# **AFA's 30th Anniversary National Convention September 20, 21, 22 and its 1976 Aerospace Briefings and Displays September 21, 22, 23**

# AFA News

## Unit of the Month

THE ENID CHAPTER, OKLA., cited for effective programming in support of the missions of the Air Force and AFA through its newly established program of honoring foreign military students.

By Don Steele, AFA AFFAIRS EDITOR

More than 300 members and guests attended the Washington State AFA's Convention Luncheon, which featured an address by the Hon. Thomas C. Reed, Secretary of the Air Force, and was held in the McChord AFB NCU Open Mess. Shown visiting during the luncheon reception are, from left, Col. Robert H. Campbell, McChord AFB Commander; Mrs. Campbell; Secretary Reed; M. A. "Peg" Reed, Washington State AFA President-elect; Sherman W. Wilkins, Vice President for AFA's Northwest Region; and Washington State AFA President Theodore O. Wright. Lt. Gen. Robert E. Hails, DCS/Systems and Logistics, was the speaker at the convention banquet; AFA Board Chairman Joe L. Shosid was a special guest.



AFA National President George M. Douglas was the guest speaker at the Massachusetts State AFA's 28th Annual Convention Banquet at the L. G. Hanscom AFB Officers' Club. Headtable guests included, from left, Andrew W. Trushaw, Jr., Vice President for AFA's New England Region; Brig. Gen. Robert T. Herres, Deputy for Security Assistance Programs, Electronics Systems Division (AFSC); AFA National Director Joseph E. Assaf; Brig. Gen. Robert A. Foster, Deputy Designate for Advanced Airborne Command Post, FSD; AFA National Director Edward T. Nedder; Brig. Gen. Thomas A. Diab, mobilization augmentee to Commander, 21st Air Division, ADCOM; Massachusetts AFA President Arthur D. Marcotti; Col. Bernard S. Morgan, Jr., Commander, Air Force Geophysics Laboratories; Mr. Douglas; and Maj. Gen. Lawrence A. Skentze, Deputy for Airborne Warning and Control Systems, ESD. During the business session, Frederick J. Gavin, Jr., was elected to succeed Mr. Marcotti as State President.



PHOTO BY A. DOUGLAS M. SCOTT, JR.

AFA President George M. Douglas was the guest of honor and speaker at a recent luncheon meeting sponsored by AFA's Hawaii Chapter. In the photo, Gen. Louis L. Wilson, Jr., left, Commander in Chief, Pacific Air Force, is shown chatting with Mr. Douglas, center, and Don Steele, right, AFA's Assistant Executive Director/Field Operations. More than 200 AFA members and guests attended the luncheon in Honolulu's Hale Koa Hotel.



OFFICIAL USAF PHOTO

### INTERESTED IN JOINING A LOCAL CHAPTER?

For information on AFA Chapters in your area, write:  
 Assistant Executive Director/Field Operations  
 Air Force Association  
 1750 Pennsylvania Ave., N. W.  
 Washington, D. C. 20006

# chapter and state photo gallery



During the Colorado State AFA's recent convention in Denver, AFA President George M. Douglas, right, presented Denise Reardon, center, a member of the Angel Flight at the University of Northern Colorado at Greeley, an AFA scholarship of \$300. The scholarship is presented annually to a deserving member of the Angel Flight, an auxiliary of the Arnold Air Society. Cliff Baker, Vice President of the Weld County Chapter in Greeley, is at the left.



The Enid, Okla., Chapter has established a program designed to help make foreign military students at Vance AFB feel at home in America, to help them develop friendships with people in the local community, and to help the local people develop better understanding of people from other countries. Students from Denmark, Norway, Thailand, and Venezuela were guests of honor at the initial dinner in the program. Each of the twelve guests was hosted and introduced by an active AFA member from the local community. In the photo, Enid Mayor Paul Crosslin, right, is shown introducing his guest, Lt. Einar Nordberg, a student from Norway. In recognition of this unique program, AFA President George M. Douglas names the Enid Chapter as AFA's "Unit of the Month" for August.



AFA President George M. Douglas was the guest speaker at the Colorado State AFA's annual convention, which was held recently in Denver. Head-table guests at the convention banquet included, from left, Roy A. Haug, Vice President for AFA's Rocky Mountain Region; CMSgt. Stanley Krakowski, recipient of the State AFA's Recruiter of the Year Award; Mr. Douglas; and Colorado State AFA President James Hall. Ed Marriott, a Vice President of the Colorado AFA, was named the State AFA's "Man of the Year" and was also elected to serve as the State AFA's President for the coming year.



The First South Central Regional Convention, which included the annual meetings of the Alabama, Arkansas, Louisiana, Mississippi, and Tennessee AFAs, was held recently in Selma, Ala., with AFA's Assistant Executive Director John O. Gray as the guest speaker at the convention banquet. Participants and special guests included, from left, AFA National Director Alexander E. Harris; Col. Charles E. Bishop, Craig AFB Commander; Selma Mayor J. T. Smitherman; Alabama AFB President James Tipton; Louisiana AFA President Toulmin Brown; Mississippi AFA President Billy McLeod; Tennessee AFA Vice President Tom Bigger; AFA National Director Daniel F. Callahan; B. A. Reynolds, Probate Judge, Dallas County, Ala.; and John H. Haire, Vice President for AFA's South Central Region.

# AFA News



Oklahoma State AFA President David L. Blankenship, right, an executive of Rockwell International, was guest speaker at the New Hampshire State AFA's Annual Convention in Manchester. Following his presentation on the B-1 bomber, Mr. Blankenship and New Hampshire State AFA President R. L. "Dev" Devoucoux discuss similarities between the B-1 and the Soviet "Backfire" held by Mr. Devoucoux. Delegates elected William W. McKenna of Bedford to be State President for the coming year.



The South Carolina State AFA's 1976 Convention was held recently at Shaw AFB. Distinguished guests and participants at the convention banquet included, from left, Cadet Randy S. Wenzel; Cadet Rodger F. Seidel; Rep. Floyd D. Spence (R-S. C.); State President Roger Rhodarmar, who was reelected for another term; Gen. Bernard A. Schriever, USAF (Ret.), the guest speaker; Dr. Richard Walker, Director, Dept. of International Studies, University of South Carolina; Brig. Gen. Robert H. Morrell, Chief of Staff, South Carolina Air National Guard; Cadet William Michael Creamer; and 2d Lt. Russell M. Mims. Dr. Walker, General Morrell, Lieutenant Mims, and the three AFROTC cadets each received the State AFA's Outstanding Achievement Award.



—USAF PHOTO BY SGT. BOB TIPTON

AFA National Secretary Martin H. Harris was the guest speaker at the USAF Tactical Air Warfare Center's recent Dining-Out observing the thirtieth anniversary of the Tactical Air Command. The event, which was held in the Eglin AFB Officers' Club, was attended by some 285 TAWC members and their wives, as well as several former TAWC commanders and current senior officials of TAC. In the photo, Brig. Gen. Thomas H. McMullen, right, TAWC Commander, is shown presenting Mr. Harris a memento of his visit.



At the University of New Hampshire AFROTC Unit's recent Awards Ceremony, New Hampshire State AFA President R. L. Devoucoux, left, presented AFA's AFROTC Silver Medal and the New Hampshire State AFA's Initiative Award to the unit's outstanding cadet, Cadet Col. Charles "Kirk" Taft, right, of Durham, N. H.

# chapter and state photo gallery



More than 175 members and guests attended the Charleston, S. C., Chapter's recent meeting at which Gen. William V. McBride, Vice Chief of Staff, USAF, was the guest of honor and speaker. During the program, a Jimmy Doolittle Fellow plaque sponsored by the Chapter in the name of its former President, the late Walter Andrews, was presented to Mr. Andrews' widow. Distinguished guests and program participants included, from left, South Carolina State AFA President Roger Rhodarmer, Maj. Gen., USAF (Ret.); General McBride; Chapter President C. T. Ireland, Maj. Gen., USAF (Ret.); and Chapter President-elect Vernon Strickland.



Gen. F. M. Rogers, right, Commander, Air Force Logistics Command, was the guest speaker at the Middle Georgia Chapter's recent Membership Victory Dinner Meeting. Chapter President H. C. "Butch" Strawser, left, is shown presenting the General a chapter plaque in appreciation of his "outstanding support to the Middle Georgia Chapter . . . EDIMGIAFAD [Every Day In Middle Georgia Is Air Force Appreciation Day]."



AFA President George M. Douglas was the guest of honor and speaker at a recent dinner meeting sponsored by the Swamp Fox Chapter of Sumter, S. C. Distinguished head-table guests at that dinner included, from left, Herbert M. "Bud" West, Jr., Vice President for AFA's Southeast Region; Sumter Mayor Richard Moses; Lt. Gen. James V. Hartlinger, Commander, Ninth Air Force (TAC); Mr. Douglas; South Carolina State AFA President Roger Rhodarmer; and Swamp Fox Chapter President Walt Turnier.



Brig. Gen. James L. Wade, Commander, 452d Tactical Airlift Wing (AFRES), March AFB, Calif., was the guest speaker at the Tucson, Ariz., Chapter's sixteenth Annual Air Force Appreciation Luncheon. The luncheon, which is the kickoff event for the annual three-day Aerospace and Arizona Days Celebration, recognizes the contributions made by the Air Force in the Tucson community. Honored guests are the major commanders in the Tucson area and their senior noncommissioned officers. Head-table guests included, from left, Arizona AFA Vice President Ed Jewett; Col. Charles B. Stratton, Acting Commander, 12th Air Division at Davis-Monthan AFB; General Wade; Chapter President Charlie Niblett; Judge Jack Arnold, representing Arizona Governor Castro; William Chandler, Vice President for AFA's Far West Region; and Sam Lena, member of the Pima County Board of Supervisors.

# 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.

**ALABAMA** (Auburn, Birmingham, Huntsville, Mobile, Montgomery, Selma): **James B. Tipton**, 3032 Hill Hedge Dr., Montgomery, Ala. 36111 (phone 205-263-6944).

**ALASKA** (Anchorage, Fairbanks): **Edward J. Monaghan**, 2401 Telequana Dr., Anchorage, Alaska 99503 (phone 907-279-3287).

**ARIZONA** (Phoenix, Tucson): **Robert J. Borgmann**, 2431 E. Lincoln Cir., Phoenix, Ariz. 85016 (phone 602-955-7845).

**ARKANSAS** (Blytheville, Fort Smith, Little Rock): **Jack Kraras**, 120 Indian Trail, Little Rock, Ark. 72207 (phone 501-225-5575).

**CALIFORNIA** (Apple Valley, Edwards, Fairfield, Fresno, Hawthorne, Hermosa Beach, Long Beach, Los Angeles, Marysville, Merced, Monterey, Novato, Orange County, Palo Alto, Pasadena, Riverside, Sacramento, San Bernardino, San Diego, San Francisco, San Mateo, Santa Barbara, Santa Monica, Tahoe City, Vandenberg AFB, Van Nuys, Ventura): **Liston T. Taylor**, 4173 Oakwood Road, Lompoc, Calif. 93436 (phone 213-536-2855).

**COLORADO** (Aurora, Boulder, Colorado Springs, Denver, Ft. Collins, Grand Junction, Greeley, Littleton, Pueblo): **James C. Hall**, P. O. Box 30185, Lowry AFB Station, Denver, Colo. 80230 (phone 303-366-5363, ext. 459).

**CONNECTICUT** (East Hartford, Stratford, Torrington): **Margaret E. McEnerney**, 1476 Broadbridge Ave., Stratford, Conn. 06497 (phone 203-377-3517).

**DELAWARE** (Dover, Wilmington): **George H. Chabbott**, 33 Mikell Dr., Dover, Del. 19901 (phone 302-421-2171).

**DISTRICT OF COLUMBIA** (Washington, D. C.): **James M. McGarry**, 2418 N. Ottawa St., Arlington, Va. 22205 (phone 703-534-2663).

**FLORIDA** (Bartow, Broward, Cape Coral, Ft. Walton Beach, Gainesville, Jacksonville, New Port Richey, Orlando, Panama City, Patrick AFB, Redington Beach, Sarasota, Tampa): **Jack Rose**, 5723 Imperial Key, Tampa, Fla. 33615 (phone 813-855-4046).

**GEORGIA** (Athens, Atlanta, Rome, Savannah, St. Simons Island, Valdosta, Warner Robins): **James D. Thurmond**, 219 Roswell St., Marietta, Ga.

30060 (phone 404-252-9534).

**HAWAII** (Honolulu): **James Dowling**, 2222 Kalakaua Ave., Honolulu, Hawaii 96815 (phone 808-923-0492).

**IDAHO** (Boise, Pocatello, Twin Falls): **Larry L. Leach**, 6318 Bermuda Dr., Boise, Idaho 83705 (phone 208-344-1671).

**ILLINOIS** (Belleville, Champaign, Chicago, Elmhurst, O'Hare Field): **Hugh L. Enyart**, 112 Ruth Dr., O'Fallon, Ill. 62269 (phone 618-398-1950).

**INDIANA** (Logansport, Marion, Mentone): **William Pfarrer**, 604 Green Hills Dr., Logansport, Ind. 46947.

**IOWA** (Des Moines): **Ric Jorgensen**, P. O. Box 4, Des Moines, Iowa 50301 (phone 515-255-7656).

**KANSAS** (Topeka, Wichita): **Albin H. Schweers**, 7221 Woodward St., Overland Park, Kan. 66204 (phone 816-374-4267).

**KENTUCKY** (Louisville): **Charles R. Head**, 9412 Habershaw Dr., Louisville, Ky. 40222 (phone 502-425-9237).

**LOUISIANA** (Alexandria, Baton Rouge, Bossier City, Monroe, New Orleans, Shreveport): **Toulmin H. Brown**, 6931 E. Ridge Dr., Shreveport, La. 71106 (phone 318-424-0373).

**MAINE** (Limestone): **Alban E. Cyr**, P. O. Box 160, Caribou, Me. 04736 (phone 207-492-4171).

**MARYLAND** (Andrews AFB, Baltimore): **James W. Poultney**, P. O. Box 31, Garrison, Md. 21055 (phone 301-363-0795).

**MASSACHUSETTS** (Boston, Falmouth, Florence, Hanscom AFB, Lexington, Taunton, Worcester): **Arthur D. Marcotti**, 215 Laurel St., Melrose, Mass. 02176 (phone 617-665-5057).

**MICHIGAN** (Detroit, Kalamazoo, Lansing, Marquette, Mount Clemens, Oscoda, Petoskey, Sault Ste. Marie, Southfield): **Dorothy Whitney**, 3494 Orchard Lake Rd., Orchard Lake, Mich. 48033 (phone 313-682-4550).

**MINNESOTA** (Duluth, Minneapolis, St. Paul): **Joseph J. Sadowski**, 1922 Malvern St., St. Paul, Minn. 55113 (phone 612-631-2781).

**MISSISSIPPI** (Biloxi, Columbus, Jackson): **Billy A. McLeod**, P. O. Box 1274, Columbus, Miss. 39701 (phone 601-328-0943).

**MISSOURI** (Kansas City, Knob Noster, Springfield, St. Louis): **Robert E. Combs**, 2003

W. 91st St., Leawood, Kan. 66206 (phone 913-649-1863).

**MONTANA** (Great Falls): **James E. Huber**, P. O. Box 685, Great Falls, Mont. 59403.

**NEBRASKA** (Lincoln, Omaha): **Lyle O. Remde**, 4911 S. 25th St., Omaha, Neb. 68107 (phone 402-731-4747).

**NEVADA** (Las Vegas, Reno): **Cesar J. Martinez**, 4214 Grace St., Las Vegas, Nev. 89121 (phone 702-451-3037).

**NEW HAMPSHIRE** (Manchester, Pease AFB): **R. L. Devoucoux**, 270 McKinley Rd., Portsmouth, N. H. 03801 (phone 603-669-7500).

**NEW JERSEY** (Andover, Atlantic City, Belleville, Camden, Chatham, Cherry Hill, E. Rutherford, Forked River, Fort Monmouth, Jersey City, McGuire AFB, Newark, Trenton, Wallington, West Orange): **Joseph J. Bendetto**, 2164 Kennedy Blvd., Jersey City, N. J. 07305 (phone 201-420-6154).

**NEW MEXICO** (Alamogordo, Albuquerque, Clovis): **Harry L. Gogan**, 2913 Charleston, N. E., Albuquerque, N. M. 87110 (phone 505-264-2315).

**NEW YORK** (Albany, Bethpage, Binghamton, Buffalo, Catskill, Chautauqua, Griffiss AFB, Hartsdale, Ithaca, Long Island, New York City, Niagara Falls, Patchogue, Plattsburgh, Riverdale, Rochester, Staten Island, Syracuse): **Kenneth C. Thayer**, R. D. #1, Ava, N. Y. 13303 (phone 315-827-4241).

**NORTH CAROLINA** (Charlotte, Fayetteville, Goldsboro, Greensboro, Raleigh): **Dozier E. Murray, Jr.**, 1600 Starbrook Dr., Charlotte, N. C. 28210 (phone 704-523-0045).

**NORTH DAKOTA** (Grand Forks, Minot): **Leo P. Makelky**, 611 16th Ave., S. W., Minot, N. D. 58701 (phone 701-839-5186).

**OHIO** (Akron, Cincinnati, Cleveland, Columbus, Dayton, Newark, Toledo, Youngstown): **Robert L. Hunter**, 2811 Locust Dr., Springfield, Ohio 45504 (phone 513-323-2023).

**OKLAHOMA** (Altus, Enid, Oklahoma City, Tulsa): **David L. Blankenship**, P. O. Box 51308, Tulsa, Okla. 74151 (phone 918-835-3111, ext. 2207).

**OREGON** (Corvallis, Eugene, Portland): **Philip G. Saxton**, 15909 N. E. Morris, Portland, Ore. 97230 (phone 503-254-0145).

**PENNSYLVANIA** (Allentown,

Beaver Falls, Chester, Erie, Homestead, Horsham, King of Prussia, Lewistown, New Cumberland, Philadelphia, Pittsburgh, State College, Washington, Willow Grove, York): **Lamar R. Schwartz**, 390 Broad St., Emmaus, Pa. 18049 (phone 215-967-3387).

**RHODE ISLAND** (Warwick): **Matthew Puchalski**, 143 TAG RIANG, Warwick, R. I. 02886 (phone 401-737-2100, ext. 36).

**SOUTH CAROLINA** (Charleston, Columbia, Greenville, Myrtle Beach, Sumter): **Roger K. Rhodarmer**, 412 Park Lake Road, Columbia, S. C. 29204 (phone 803-788-0188).

**SOUTH DAKOTA** (Rapid City): **James Anderson**, 913 Mt. Rushmore Rd., Rapid City, S. D. 57701.

**TENNESSEE** (Chattanooga, Knoxville, Memphis, Nashville, Tullahoma): **James W. Carter**, 314 Williamsburg Rd., Brentwood, Tenn. 37027 (phone 615-373-9339).

**TEXAS** (Abilene, Austin, Big Spring, Commerce, Corpus Christi, Dallas, Del Rio, El Paso, Fort Worth, Houston, Laredo, Lubbock, San Angelo, San Antonio, Waco, Wichita Falls): **Vic Kregel**, P. O. Box 9495, San Antonio, Tex. 78204 (phone 214-266-2242).

**UTAH** (Brigham City, Clearfield, Ogden, Provo, Salt Lake City): **Robert D. Walker**, 283 W. 550 N. Clearfield, Utah 84015 (phone 801-825-0267).

**VERMONT** (Burlington): **Ronald R. Corbin**, 204 Staniford Rd., Burlington, Vt. 05401 (phone 802-862-2847).

**VIRGINIA** (Arlington, Danville, Harrisonburg, Langley AFB, Lynchburg, Norfolk, Petersburg, Richmond, Roanoke): **Lester J. Rose**, 177 Corinthia Dr., Denbigh, Va. 23602 (phone 804-877-4372).

**WASHINGTON** (Port Angeles, Seattle, Spokane, Tacoma): **Theodore O. Wright**, P. O. Box 88850, Seattle, Wash. 98188 (phone 206-237-0706).

**WEST VIRGINIA** (Huntington): **Evelyn E. Richards**, 10 Berkley Pl., Huntington, W. Va. 25705 (phone 304-529-4901).

**WISCONSIN** (Madison, Milwaukee): **Charles W. Marotske**, 7945 S. Verdev Dr., Oak Creek, Wis. 53154 (phone 414-762-4383).

**WYOMING** (Cheyenne): **Robert R. Scott**, 508 W. 27th St., Cheyenne, Wyo. 82001 (phone 307-634-2121).

# AFA News



—PHOTO BY EDWARD P. LILE

AFA's Ute Chapter recently sponsored a Bicentennial "Salute to NASA." Held in the new Salt Lake Hilton Hotel, the dinner program featured four of the world's foremost aerospace experts, Dr. Wernher von Braun, Vice President for Engineering and Development, Fairchild Industries, Inc.; Astronaut Gene Cernan, Capt., USN; William M. Allen, Chairman Emeritus, The Boeing Co.; and Dr. George M. Low, Deputy Administrator, NASA. During the program, Sen. Frank E. Moss (D-Utah), center, the program's Honorary Chairman and Master of Ceremonies, was presented an AFA Life Membership by the Utah AFA's Gold Card Chapter. The presentation was made by AFA National Director Nathan H. Mazer, left, a member of the chapter, with the assistance of Ute Chapter President James Taylor, right. More than 700 members and guests attended the dinner.



AFA's Northern Virginia Chapter and the Andrews Area, Md., Chapter recently cosponsored a dinner at the Fort Myer Officers' Club to raise funds for the Enlisted Widows and Dependents Home. Participants in the program included, from left, Brig. Gen. William McCall, Chief of Staff, D. C. Air National Guard; Gen. William V. McBride, Vice Chief of Staff, USAF, the guest speaker; Andrews Area Chapter President Thomas Anthony; and Brig. Gen. William E. Brown, Jr., Commander, 1st Composite Wing, Andrews AFB, Md.

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Choose either the Standard or High-Option Plan

### The AFA Standard Plan

Insured's Age	New Benefit	Old Benefit	Extra Accidental Death Benefit*	Monthly Cost Individual Plan
20-24	\$75,000	<del>\$66,000</del>	\$12,500	\$10.00
25-29	70,000	<del>60,000</del>	12,500	10.00
30-34	65,000	<del>50,000</del>	12,500	10.00
35-39	50,000	<del>40,000</del>	12,500	10.00
40-44	35,000	<del>25,000</del>	12,500	10.00
45-49	20,000	<del>15,000</del>	12,500	10.00
50-54	12,500	<del>10,000</del>	12,500	10.00
55-59	10,000	<del>10,000</del>	12,500	10.00
60-64	7,500	<del>7,500</del>	12,500	10.00
65-69	4,000	<del>4,000</del>	12,500	10.00
70-75	2,500	<del>2,500</del>	12,500	10.00

### The AFA High-Option Plan

Insured's Age	New Benefit	Old Benefit	Extra Accidental Death Benefit*	Monthly Cost Individual Plan
20-24	\$112,500	<del>\$100,000</del>	\$12,500	\$15.00
25-29	105,000	<del>90,000</del>	12,500	15.00
30-34	97,500	<del>75,000</del>	12,500	15.00
35-39	75,000	<del>60,000</del>	12,500	15.00
40-44	52,500	<del>37,500</del>	12,500	15.00
45-49	30,000	<del>22,500</del>	12,500	15.00
50-54	18,750	<del>15,000</del>	12,500	15.00
55-59	15,000	<del>15,000</del>	12,500	15.00
60-64	11,250	<del>11,250</del>	12,500	15.00
65-69	6,000	<del>6,000</del>	12,500	15.00
70-75	3,750	<del>3,750</del>	12,500	15.00

### Optional Family Coverage

(May be added either to the Standard or High-Option Plans)

Insured's Age	Spouse Benefit New	Spouse Benefit Old	Benefit, Each Child**	Monthly Cost Family Coverage
20-24	\$10,000	<del>\$6,000</del>	\$2,000	\$2.50
25-29	10,000	<del>6,000</del>	2,000	2.50
30-34	10,000	<del>6,000</del>	2,000	2.50
35-39	10,000	<del>6,000</del>	2,000	2.50
40-44	7,500	<del>5,250</del>	2,000	2.50
45-49	5,000	<del>4,050</del>	2,000	2.50
50-54	4,000	<del>3,000</del>	2,000	2.50
55-59	3,000	<del>3,000</del>	2,000	2.50
60-64	2,500	<del>2,250</del>	2,000	2.50
65-69	1,500	<del>1,200</del>	2,000	2.50
70-75	750	<del>750</del>	2,000	2.50

\* In the event of an accidental death occurring within 13 weeks of the accident, the AFA plan pays a lump sum benefit of \$12,500 in addition to your plan's regular coverage benefit, except as noted under AVIATION DEATH BENEFIT, below.

\*\* Each child has \$2,000 of coverage between the ages of six months and 21 years. Children under six months are provided with \$250 protection once they are 15 days old and discharged from the hospital.

### AVIATION DEATH BENEFIT:

A total sum of \$15,000 under the Standard Plan or \$22,500 under the High-Option Plan is paid for death which is caused by an aviation accident in which the insured is serving as pilot or crew member of the aircraft involved. Under this condition, the Aviation Death Benefit is paid in lieu of all other benefits of this coverage.

**AFA'S DOUBLE PROTECTOR**—now with substantial benefit increases—gives you a choice of two great plans, both with optional family coverage. Choose either one for strong dependable protection, and get these advantages:

**FAMILY PLAN.** Protect your whole family (no matter how many) for only \$2.50 per month. Insure newborn children as they become eligible just by notifying AFA. No additional cost.

**Wide Eligibility.** If you're on active duty with the U. S. Armed Forces (regardless of rank, a member of the Ready Reserve or National Guard (under age 60), A Service Academy or college or university ROTC cadet, you're eligible to apply for this coverage. (Because of certain limitations on group insurance coverage, Reserve or Guard personnel who reside in Ohio, Texas, Florida and New Jersey are not eligible for this plan, but may request special applications from AFA for individual policies which provide similar coverage.

**No War Clause,** hazardous duty restriction or geographical limitation.

**Full Choice of Settlement Options,** including trusts, are available by mutual agreement between the insured and the Underwriter, United of Omaha.

**Disability Waiver of Premium,** if you become totally disabled for at least nine months, prior to age 60.

**Keep Your Coverage at Group Rates to Age 75,** if you wish, even if you leave the military service.

**Guaranteed Conversion Provision.** At age 75 (or at any time on termination of membership) the amount of insurance shown for your age group at the time of conversion may be converted to a permanent plan of insurance, regardless of your health at that time.

**Reduction of Cost by Dividends.** Net cost of insurance to AFA insured persons has been reduced by payment of dividends in 10 of the last 13 years. However, dividends naturally cannot be guaranteed.

**Convenient Premium Payment Plans.** Premium payments may be made by monthly government allotment, or direct to AFA in quarterly, semi-annual or annual installments.

**EFFECTIVE DATE OF YOUR COVERAGE.** All certificates are dated and take effect on the last day of the month in which your application for coverage is approved. AFA Military Group Life Insurance is written in conformity with the insurance regulations of the State of Minnesota. The insurance will be provided under the group insurance policy issued by United of Omaha to the First National Bank of Minnesota as trustee of the Air Force Association Group Insurance Trust.

**EXCEPTIONS.** There are a few logical exceptions to this coverage. They are:

**Group Life Insurance:** Benefits for suicide or death from injuries intentionally self-inflicted while sane or insane shall not be effective until your coverage has been in force for 12 months.

**The Accidental Death Benefit and Aviation Death Benefit** shall not be effective if death results: (1) From injuries intentionally self-inflicted while sane or insane, or (2) From injuries sustained while committing a felony, or (3) Either directly or indirectly from bodily or mental infirmity, poisoning or asphyxiation from carbon monoxide, or (4) During any period a member's coverage is being continued under the waiver of premium provision, or (5) From an aviation accident, either military or civilian, in which the insured was acting as pilot or crew member of the aircraft involved, except as provided under AVIATION DEATH BENEFIT.

### PLEASE RETAIN THIS MEDICAL INFORMATION BUREAU PRENOTIFICATION FOR YOUR RECORDS

Information regarding your insurability will be treated as confidential. United Benefit Life Insurance Company may, however, make a brief report thereon to the Medical Information Bureau, a nonprofit membership organization of life insurance companies, which operates an information exchange on behalf of its members. If you apply to another Bureau member company for life or health insurance coverage, or a claim for benefits is submitted to such a company, the Bureau, upon request, will supply such company with the information in its file.

Upon receipt of a request from you, the Bureau will arrange disclosure of any information it may have in your file. (Medical information will be disclosed only to your attending physician.) If you question the accuracy of information in the Bureau's file, you may contact the Bureau and seek a correction in accordance with the procedures set forth in the federal Fair Credit Reporting Act. The address of the Bureau's information office is P.O. Box 105, Essex Station, Boston, Mass. 02112, Phone (617) 426-3660.

United Benefit Life Insurance Company may also release information in its file to other life insurance companies to whom you may apply for life or health insurance, or to whom a claim for benefits may be submitted.



# Increase in Premium MILITARY GROUP LIFE INSURANCE



## APPLICATION FOR AFA MILITARY GROUP LIFE INSURANCE



Group Policy GLG-2625  
United Benefit Life Insurance Company  
Home Office Omaha, Nebraska

Full name of member \_\_\_\_\_  
Rank Last First Middle

Address \_\_\_\_\_  
Number and Street City State ZIP Code

Date of birth \_\_\_\_\_  
Mo. Day Yr.  
Height \_\_\_\_\_  
Weight \_\_\_\_\_  
Social Security Number \_\_\_\_\_

Name and relationship of primary beneficiary \_\_\_\_\_

Please indicate category of eligibility and branch of service.

Extended Active Duty       Air Force  
 Ready Reserve or National Guard       Other \_\_\_\_\_  
 (Branch of service)

Air Force Academy       \_\_\_\_\_ Academy

ROTC Cadet \_\_\_\_\_  
 Name of college or university

Name and relationship of contingent beneficiary \_\_\_\_\_

This insurance is available only to AFA members

I enclose \$10 for annual AFA membership dues (includes subscription (\$9) to AIR FORCE Magazine).  
 I am an AFA member.

Please indicate below the Mode of Payment and the Plan you elect.

### HIGH OPTION PLAN

Members Only	Members and Dependents
<input type="checkbox"/> \$ 15.00	<input type="checkbox"/> \$ 17.50
<input type="checkbox"/> \$ 45.00	<input type="checkbox"/> \$ 52.50
<input type="checkbox"/> \$ 90.00	<input type="checkbox"/> \$105.00
<input type="checkbox"/> \$180.00	<input type="checkbox"/> \$210.00

### Mode of Payment

**Monthly** government allotment. I enclose 2 months' premium to cover the period necessary for my allotment to be established.

**Quarterly.** I enclose amount checked.

**Semiannually.** I enclose amount checked.

**Annually.** I enclose amount checked.

### STANDARD PLAN

Members Only	Members and Dependents
<input type="checkbox"/> \$ 10.00	<input type="checkbox"/> \$ 12.50
<input type="checkbox"/> \$ 30.00	<input type="checkbox"/> \$ 37.50
<input type="checkbox"/> \$ 60.00	<input type="checkbox"/> \$ 75.00
<input type="checkbox"/> \$120.00	<input type="checkbox"/> \$150.00

Names of Dependents To Be Insured	Relationship to Member	Dates of Birth			Height	Weight
		Mo.	Day	Yr.		

Have you or any dependents for whom you are requesting insurance ever had or received advice or treatment for: kidney disease, cancer, diabetes, respiratory disease, epilepsy, arteriosclerosis, high blood pressure, heart disease or disorder, stroke, venereal disease or tuberculosis? Yes  No

Have you or any dependents for whom you are requesting insurance been confined to any hospital, sanitarium, asylum or similar institution in the past 5 years? Yes  No

Have you or any dependents for whom you are requesting insurance received medical attention or surgical advice or treatment in the past 5 years or are now under treatment or using medications for any disease or disorder? Yes  No

IF YOU ANSWERED "YES" TO ANY OF THE ABOVE QUESTIONS, EXPLAIN FULLY including date, name, degree of recovery and name and address of doctor. (Use additional sheet of paper if necessary.)

I apply to United Benefit Life Insurance Company for insurance under the group plan issued to the First National Bank of Minneapolis as Trustee of the Air Force Association Group Insurance Trust. Information in this application, a copy of which shall be attached to and made a part of my certificate when issued, is given to obtain the plan requested and is true and complete to the best of my knowledge and belief. I agree that no insurance will be effective until a certificate has been issued and the initial premium paid.

I hereby authorize any licensed physician, medical practitioner, hospital, clinic or other medical or medically related facility, insurance company, the Medical Information Bureau or other organization, institution or person, that has any records or knowledge of me or my health, to give to the United Benefit Life Insurance Company any such information. A photographic copy of this authorization shall be as valid as the original. I hereby acknowledge that I have a copy of the Medical Information Bureau's prenotification information.

Date \_\_\_\_\_, 19 \_\_\_\_\_

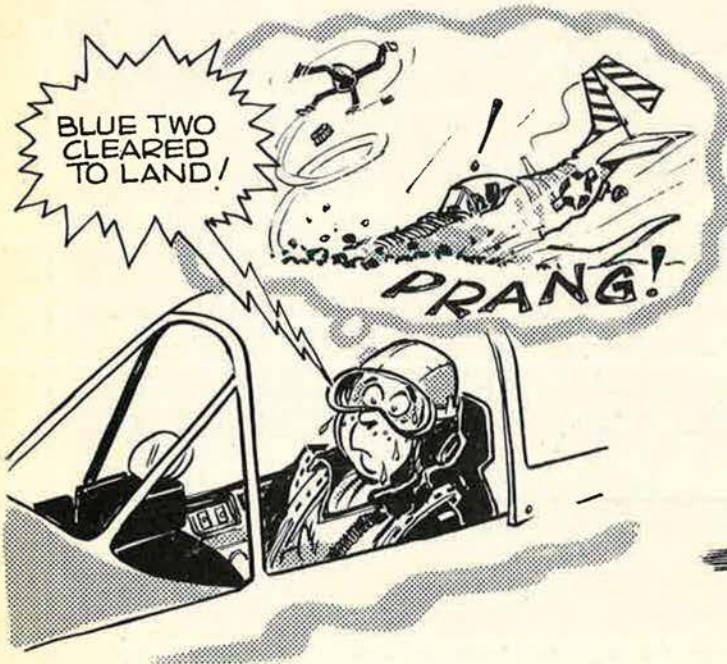
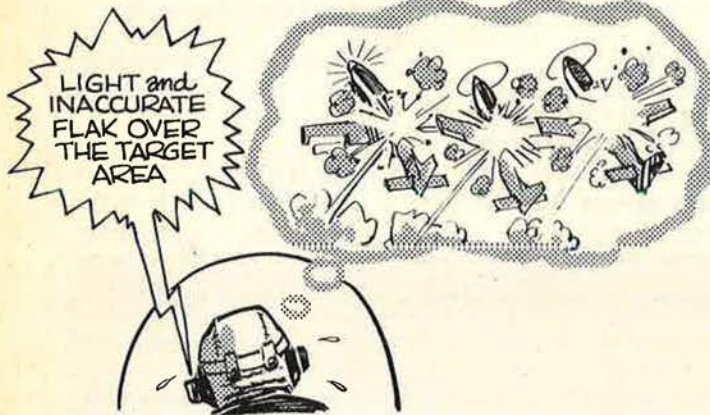
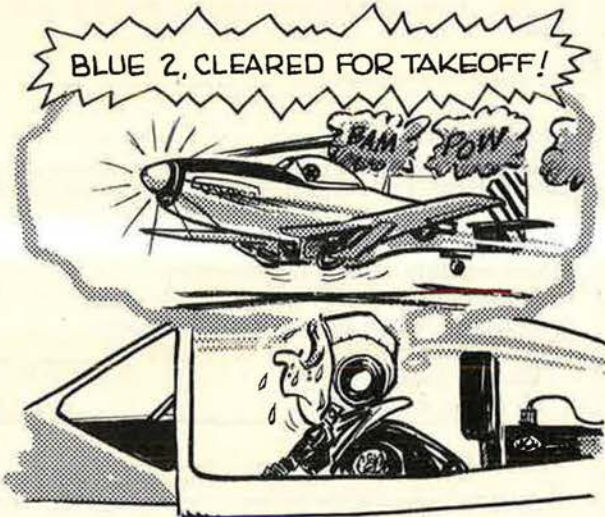
Member's Signature \_\_\_\_\_

Bob Stevens'

# "There I was..."



THIS EPISODE MIGHT BE ENTITLED "CHICKEN IN THE SKY." WE DEAL WITH THE INNERMOST THOUGHTS OF MAN... A PRETTY TERRIFYING SUBJECT, AT BEST. WORDSWORTH PEGGED IT WITH, "VOYAGING THROUGH STRANGE SEAS OF THOUGHT, ALONE."



# THIS POPULAR CORPORATE JETPROP IS AT HOME IN THE AIR FORCE.

The Air Force C-12A utility transport first gained its world-wide reputation for capability as a corporate jetprop, the Beechcraft Super King Air.

A reputation gained for a number of solid reasons that make it particularly well-suited for its new role in the Air Force.

Because the Air Force, like industry, needs to move people and cargo swiftly, economically and dependably. And more often than not, the service needs on-demand transportation that commercial carriers do not deliver, plus small-field capabilities that many other aircraft cannot provide.

This fine transport comfortably accommodates eight passengers and two pilots. And it provides a lavatory plus adequate space for baggage. It has a useful load of 4,425 lbs. Cruise speed is more than 228 knots and maximum range with full load is more than 1,200 miles. Cabin pressurization allows over-the-weather operation to 30,000 ft. without oxygen.

With these performance capabilities, the C-12A gives the Air Force an economical alternative to other aircraft in its utility fleet. Because operating and maintenance costs are significantly lower than most other available personnel and cargo carriers.

Even though the C-12A begins its Air Force service as an air attache transport, its versatility, performance and economy suggest several other mission possibilities: aerial surveillance, photography, tactical field support, proficiency flying for desk-bound pilots, courier service, shuttle air-service over heavy traffic routes, to name a few. There are many more.

In addition, Beech's new C-12A program introduces a first for the Air Force. All C-12As under current order have full contractor support on a world-wide arrangement, wherever these airplanes are stationed. Through full Beech logistic support, these airplanes are exceeding the contractual requirement for 80% operational readiness.

The versatile, economical Beechcraft C-12A. It's right at home in the Air Force.

## ASK FOR OUR C-12A INFORMATION KIT.

Perhaps your organization has a mission requirement that this hustling jetprop can fulfill. We'd like to show you how it can.

For your information kit, write or call  
E.C. Nikkel, Vice President-Aerospace Program,  
Beech Aircraft Corporation,  
Wichita, Kansas 67201.  
Phone (316) 689-8175.



# DC-10:

## The economical way to win America's battle for "Independence."

America is faced with a challenge: to become independent of overseas refueling bases that might be denied in time of crisis.

It can't be done with today's smaller aerial tankers.

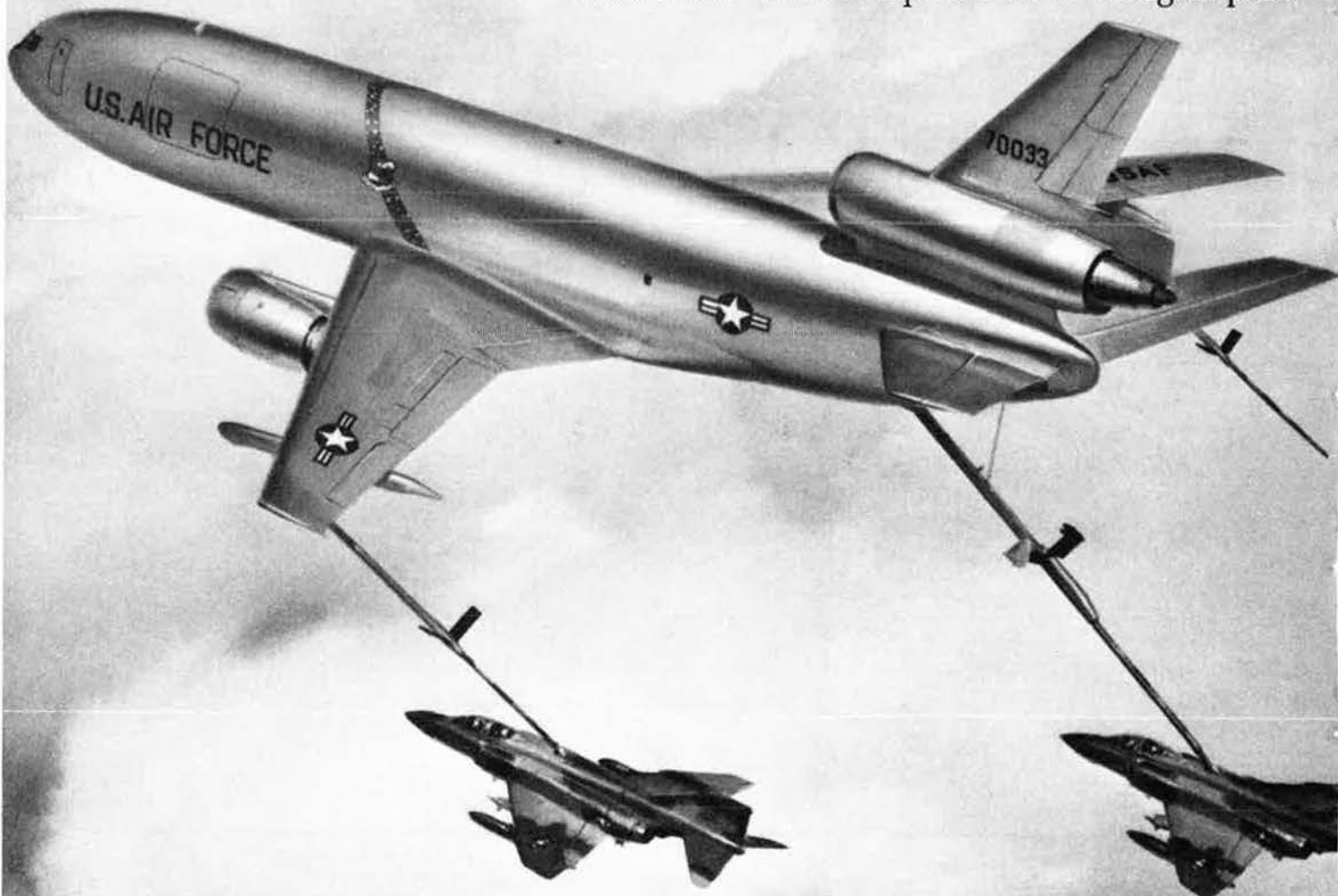
At huge savings to the taxpayer, the Air Force plans to select an existing commercial jetliner for its ATCA (Advanced Tanker/Cargo Aircraft). The research and development costs on these planes have already been paid for by private capital.

The McDonnell Douglas DC-10 – the same aircraft that flies with 34 airlines around the world – is ideal for the ATCA mission.

Compared to alternative solutions, the 3-engine DC-10 offers obvious economic advantages. It costs less to buy than other wide-body jetliners.

The DC-10's lower fuel consumption and lower maintenance cost can yield additional savings during the service life of the aircraft.

The DC-10 – airlift independence at a bargain price.



**The DC-10 ATCA**  
**MCDONNELL DOUGLAS**

