

# AIR FORCE

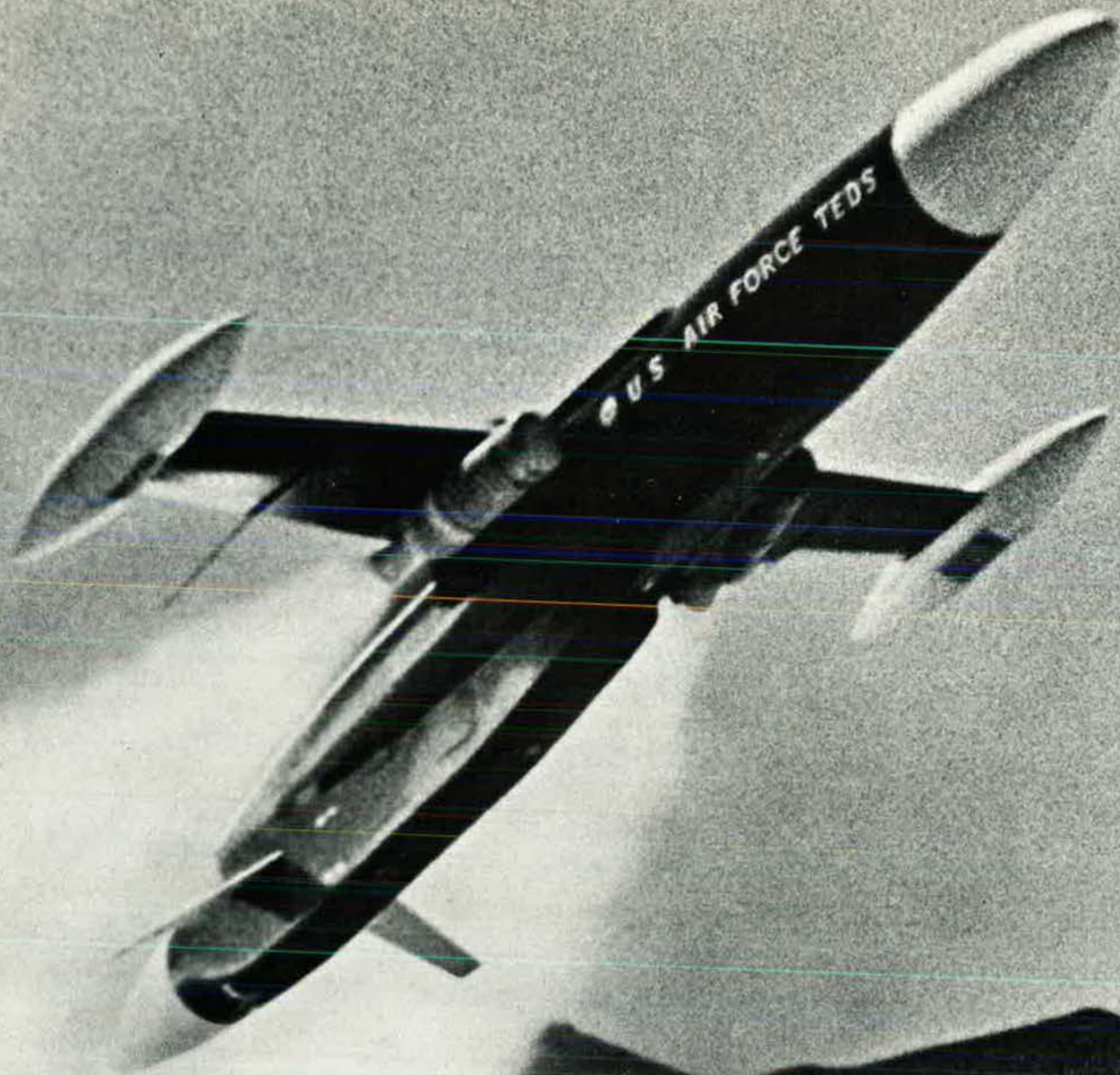
FEBRUARY 1977/\$1

PUBLISHED BY THE AIR FORCE ASSOCIATION

MAGAZINE

## Mirage F1-C's of the French Armée de l'Air





# TEDS

Tactical Expendable Drone System. Northrop TEDS has successfully completed all validation flights for U.S. Air Force. Provides electronic countermeasures support for strike aircraft. 500 knot speed. 400 nautical mile range.

Based on combat-proven technology. TEDS is low-cost, high-performance modification of Northrop MQM-74C/Chukar II production target drone. More than 76,000 remotely-piloted vehicles have been built by Northrop for U.S. and 20 other nations. All delivered on time, on cost, performance as promised.

Aircraft, Electronics, Communications, Construction, Services. Northrop Corporation, Ventura Division, 1515 Rancho Conejo Blvd., Newbury Park, California 91320, U.S.A.

**NORTHROP**

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

**Editor:** John F. Loosbrock  
**Executive Editor:** John L. Friebee  
**Senior Editors:**  
Claude Witze, Edgar Ulsamer, James H. Taylor  
**Military Relations Editor:**  
James A. McDonnell, Jr.  
**Contributing Editors:**  
Ed Gates, Don Steele, John W. R. Taylor  
("Jane's Supplement"), Maj. Terry A. Arnold, USAF  
**Regional Editors:**  
Stefan Gelsenheyner, Wiesbaden, Germany  
Irving Stone, Los Angeles, Calif.

**Managing Editor:** Richard M. Skinner  
**Asst. Managing Editor:** William P. Schlitz  
**Director of Design and Production:**  
Robert T. Shaughness  
**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) 452-7330

**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) 546-1234  
Yoshi Yamamoto, Tokyo 535-6614

**European Sales Representative:**  
Richard A. Ewin  
Overseas Publicity Ltd.  
214 Oxford St.  
London W1N 0EA, England  
Telephone: 01-636-8296

AIR FORCE Magazine (including SPACE DIGEST) is published monthly by the Air Force Association, Suite 400, 1750 Pennsylvania Ave., N.W., Washington, D.C. 20006. Phone: (202) 452-7300. Second-class postage paid at Washington, D.C. Membership rate: \$10 per year (includes \$9 for one-year subscription); \$24 for three-year membership (includes \$21 for subscription). Subscription rate: \$10 per year; \$5 additional for foreign postage. Single copy \$1. Special Issues (Soviet Aerospace Almanac, USAF Almanac, Anniversary Issue, and "Military Balance" Issue) \$2 each. Change of address requires four weeks' notice. Please include mailing label. Publisher assumes no responsibility for unsolicited material. Trademark registered by Air Force Association. Copyright 1977 by Air Force Association. All rights reserved. Pan-American Copyright Convention.



Circulation audited by  
Business Publication Audit

## This Month

- 4 **Those National Intelligence Estimates**  
An Editorial by John L. Friebee
- 12 **Today Sweethearts. Tomorrow?** / By Claude Witze
- 16 **Life in Postwar South Vietnam** / A Special Report
- 18 **Special Committee Issues Somber Report on SEA MIAs**
- 22 **Harold Brown—Fourteenth Secretary of Defense**  
By Jim Taylor
- 29 **Flying Robots With a Lethal Sting** / By Edgar Ulsamer
- 35 **A Manual of Missile Capability** / By Robert Sherman
- 40 **NATO Membership for Spain?**  
By Gen. T. R. Milton, USAF (Ret.)
- 41 **USAFE and AAFCE: Central Europe's Airpower**  
By Jim Taylor
- 48 **Industrial Associates of the Air Force Association**
- 53 **The Imbalance in Civil Defense** / By John L. Friebee
- 58 **Armée de l'Air—1977** / By John W. R. Taylor
- 62 **Major Armée de l'Air Aircraft** / A Gallery
- 68 **Urgent Air Force Needs for 1977** / By Edgar Ulsamer
- 72 **New Reflections From a Brighter Badge**  
By Maj. Terry A. Arnold, USAF
- 77 **Jane's All the World's Aircraft Supplement**  
By John W. R. Taylor
- 87 **Solid Progress in JAG Manning** / By Ed Gates
- 90 **Flying the Early Birds: The P-36**  
By Brig. Gen. Ross G. Hoyt, USAF (Ret.)

## ABOUT THE COVER



Shown are Dassault-Breguet Mirage F1-C air-superiority fighters of the French Air Force. For a report on the organization, equipment, and capabilities of France's Armée de l'Air, see John W. R. Taylor's article beginning on p. 58.

## Departments

- 6 **Airmail**  
9 **Unit Reunions**  
12 **Airpower in the News**  
14 **The Wayward Press**  
15 **Aerospace World**  
21 **Index to Advertisers**  
85 **The Bulletin Board**  
87 **Speaking of People**  
89 **Senior Staff Changes**  
92 **Airman's Bookshelf**  
94 **AFA News**  
99 **AFA State Contacts**  
100 **There I Was**

Upper surface blowing.

It's based on a phenomenon known as the Coanda Effect. The discovery by Belgian physicist Henri Coanda back in the 1930s that a fast-moving fluid coming in contact with a curved surface tends to adhere to that surface.

On the Boeing YC-14, engine exhaust is the fluid and the wing and flap

assembly act as the curved surface.

In this unique design, the engines are mounted on top of the wings. During USB operation the flaps directly behind the engines are lowered to almost 90 degrees vertical. The engine exhaust is thus redirected downward to create powered lift.

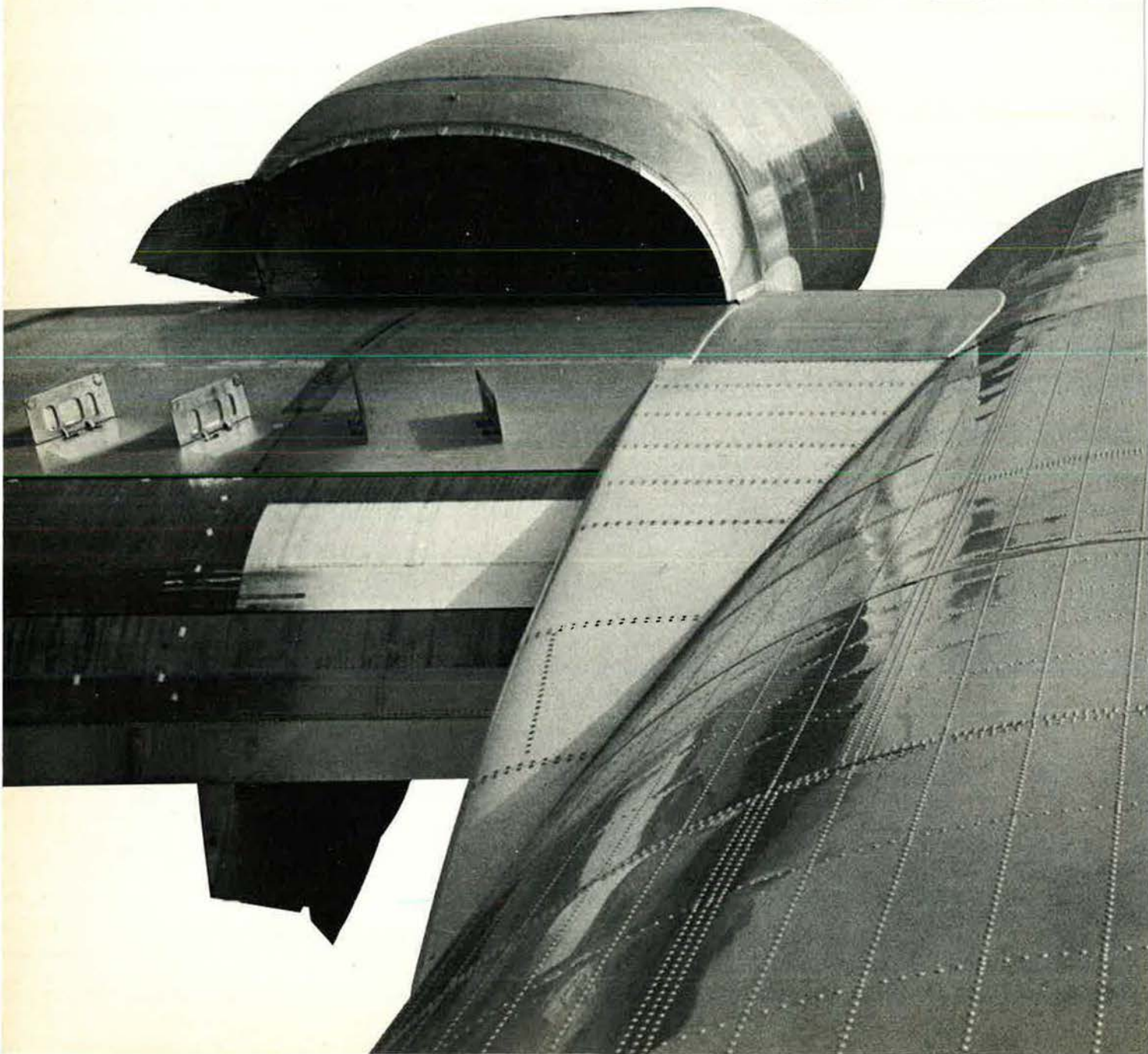
That's what enables a plane the

size of a 727 to land at speeds under 100 miles per hour while carrying a payload of 27,000 pounds into and out of a 2,000-foot semi-prepared airfield.

And do it with only two engines.

With a twin-engine configuration, manufacturing and operating costs are reduced. And by selecting already proven turbofan jet engines, YC-14

# The most innovative since the



designers were also able to avoid extra development costs.

Other design advantages of USB and top-mounted engines are reduced engine noise, no ingestion of dirt and debris from unpaved fields, and more room under the wings for external stores. Also, with a reduced infra-red signature from the ground aspect

there's less chance of being hit by a surface-to-air missile during combat operations.

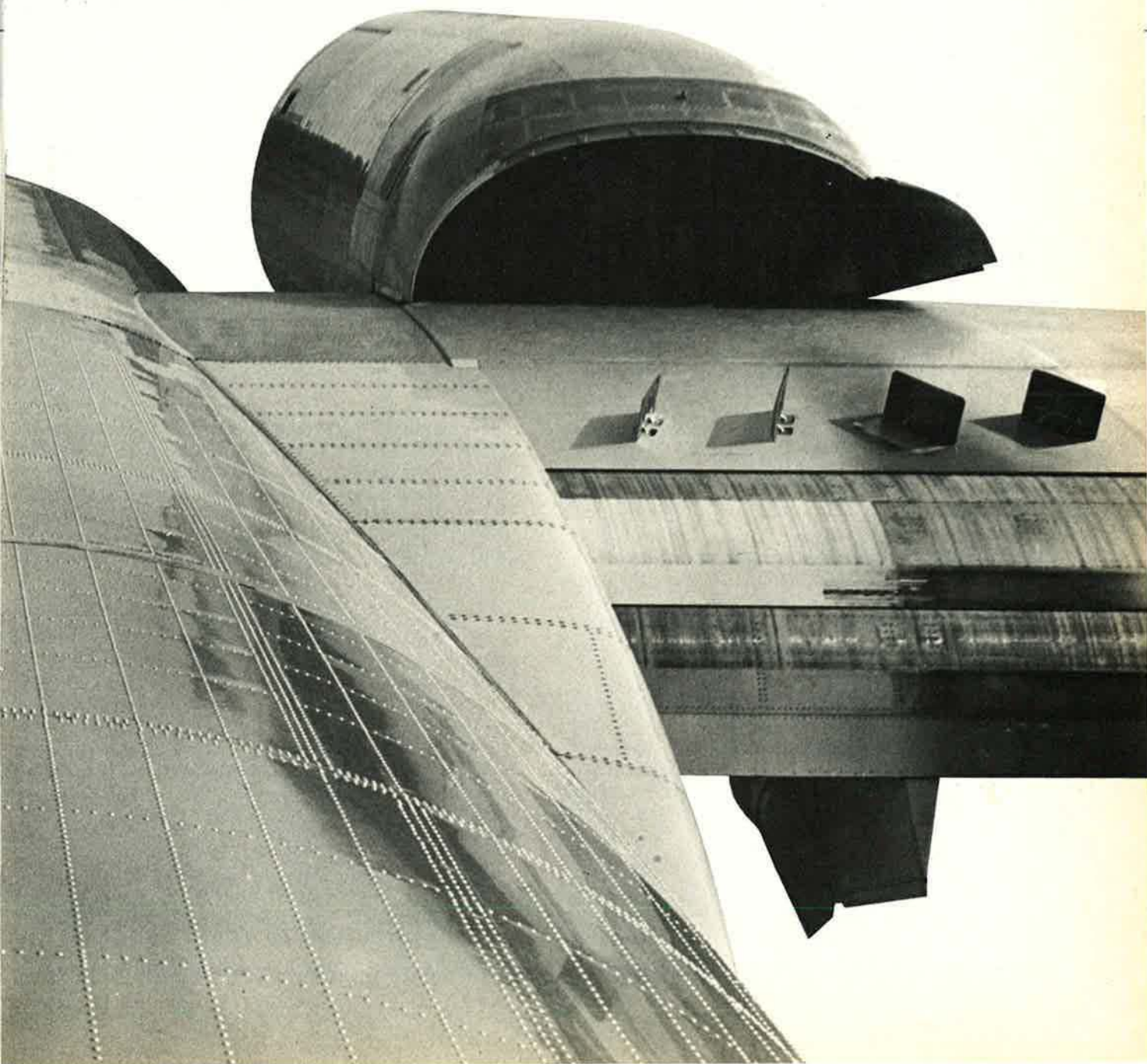
Upper surface blowing is an innovative, logical, efficient and economical way to generate powered lift in a STOL aircraft.

And the YC-14 is the only one in the world to use it.



**BOEING YC-14**

# Concept in lift elevator.



# Those National Intelligence Estimates

By John L. Frisbee, EXECUTIVE EDITOR

Washington, D. C., January 14  
**T**HE Air Force Association's Statement of Policy for 1976-77 includes the blunt assertions that the USSR is embarked on a "relentless . . . drive toward comprehensive military superiority," and that the Kremlin "seeks a first-strike posture. . . ." When the Policy Statement was adopted at AFA's national convention last September, the then-current National Intelligence Estimates held that Russia's aim was military parity.

The AFA Statement further called for a "non-partisan reassessment of the geopolitical and military threats facing this nation and how we must respond in terms of national policy in general, and defense policy in particular."

Now, four months later, a reassessment is taking shape, triggered principally by two recent revelations. The first is the judgment of recently retired Air Force intelligence chief, Maj. Gen. George J. Keegan, Jr., that the USSR has already achieved military superiority over the US, largely because our defense budgets and programs have been based on unduly conservative intelligence estimates over the past fifteen years. General Keegan's appraisal was reported in the *New York Times* on January 3, and widely picked up by other media.

The second revelation is contained in the new National Intelligence Estimates (NIE), completed early in December. The NIE concludes that Russia's goal is not parity, but military superiority.

This NIE has become something of a *cause célèbre*, not just because of its conclusion, but also because of the unique manner in which it was produced, and because of leaks to the press.

Last August, at the suggestion of the President's Foreign Intelligence Advisory Board and with the approval of President Ford, CIA Director George Bush selected a team of "outsiders" to work with CIA analysts who develop the NIE. By design, the outsiders, who made up Team B (the CIA analysts formed Team A) were men known to have more pessimistic views of Soviet intentions than the CIA.

The B Team was not a group of dilettantes. Headed by Richard Pipes, Professor of Russian History at Harvard, it included Paul Nitze, former Deputy Secretary of Defense and once a member of the US SALT delegation; retired Army Lt. Gen. Daniel Graham, a career intelligence officer and former head of the Defense Intelligence Agency; Thomas Wolf of the Rand Corp., who has written volumes on Soviet defense affairs; Paul Wolfowitz from the Arms Control and Disarmament Agency; retired Air

Force Gen. John Vogt; and William Van Cleve, who has served on the US SALT delegation.

To what extent Team B influenced the drastically more somber NIE conclusions is known only to the participants. A member of Team B told us that Team A judgments were modified in part by new intelligence that has emerged during the past year. It is known that Team B exposed some flaws in CIA methodology that have resulted in low estimates of future Soviet capabilities and budgets, and a misreading of Soviet intentions. As one experienced intelligence officer put it, Team B also helped set the estimates in a context of Russian history and Communist thought processes.

Whether the A/B Team format should be continued or not is open to debate. Two things can be said with certainty. First, Team B was not a kangaroo court, as alleged by columnist Joseph Kraft. Since it had no authority to overrule the CIA, we can conceive of no way it could influence the CIA team other than by force of logic.

Second, attempts by some reporters and commentators to discredit the conclusions of the new NIE by portraying the developmental process as a rigged encounter between hawks and doves is a disservice. We have never thought of the CIA as a dove cote. Beyond that, a second opinion on the life-and-death judgments that must be made by US leaders seems no less warranted than a second opinion on a patient's need for open heart surgery. Both can be up-or-down propositions. As Richard Pipes has observed: "The problems facing modern government . . . raise questions on which honest and competent people can honestly as well as competently disagree."

The stage has now been set for what we hope will be a full-scale debate on defense policy. And, for once, we agree with Senator Proxmire. If General Keegan is correct (and we would add the NIE, as well), "then indeed the country does face a crisis of confidence in our military capability. If not, then we need to know the facts, all the facts, so that other judgments can be drawn."

President Carter has promised an open administration. We trust that he will make publicly available all of the facts pertinent to Soviet capabilities, programs, and perceived intentions that can be released without truly compromising national security.

Failure to share with the public what the Soviets already know—and also know the collection means and methods by which we know—would scarcely benefit a government of, by, and for the people. ■



# electric company!

The U. S. Air Force EF-111A Tactical Jamming System (TJS) will be welcome company indeed, for tactical aircraft operations in tomorrow's ominous electronic warfare environment.

Vastly more powerful electronically than any previous tactical jammer, the combat-proven ALQ-99 system will provide a safe "highway in the sky" by denying an enemy effective use of his surveillance "eyes" and weapons guidance radar.

Now under prototype development at Grumman, the EF-111A will move U. S. tactical jamming into the supersonic era.

EF-111A TJS . . . will be known (and appreciated)  
by the company it keeps!

**GRUMMAN** AEROSPACE  
CORPORATION

# Airmail

## High Cost of Pensions

I noted a news article which stated that President-elect Carter was concerned about the current high—and rising—military pension costs.

Of course, a great factor in continuing high overall military personnel costs is the system that forces about ninety-nine percent of the people out onto the pension rolls after thirty years. That often means age forty-nine or fifty, excluding those who volunteer out after twenty years.

Were the system changed to meet some other minimum age (sixty is suggested) or physical criteria (most assuredly a method could be devised to eliminate the sick, lame, and lazy), much more use would be obtained from the people concerned and military personnel costs, especially those connected with pensions, would decline—maybe up to as much as one-third. In computing such savings, one must not forget to include the very expensive replacement training and factors other than pension payments, which would also be lessened by retaining the same people for a longer period of time.

This approach flies in the face of custom (and mystique) which the military has built up since World War II. However, in my experience, it is only a self-serving custom (the promotion system), an expensive fiction uniquely American (what other nation discards its fit, trained personnel at such an age?), and not based on proven necessity.

The many factors that militate against changing the existing system may make this letter an exercise in tilting at windmills, but the thought of the possible savings as well as the improved utilization of the vast number of people involved may just well be worthy of Mr. Carter's attention.

R. Hoskins  
Sunnymead, Calif.

## EMS on TDY

An old and moderately publicized problem has prompted this letter. The problem is the gross inequities of the military officer vs. enlisted

per diem settlements after any length of temporary duty away from their home station.

Primarily, the problem stems from the enlisted members being forced to utilize the available enlisted dining facility during their TDY, while an officer may dine where he chooses. The point is that the noncommissioned officer is expected to perform in an equally responsible manner; yet he is not even accorded the privilege of choosing where he may dine.

As a master sergeant, I am responsible enough to be entrusted with the welfare of crews and passengers, as well as critical areas, of the C-5A aircraft. Still I am forced, while TDY, to dine cafeteria style, many times choosing from foods I may not like, during limited hours, at the "chow hall."

The answer I have received for years from my superiors is that it is "public law" and can only be corrected through new legislation—this is true.

I am asking elimination of the inequities in this frustrating, financial, paperwork nightmare; and the elimination of the three separate and lengthy procedures utilized to determine civilian, officer, and enlisted per diem. The mass of people, forms, and individual base policies is a costly exercise in bureaucracy and could be eliminated by modifying one block on the Form 1351-2—The Rank Block. There is no need for three separate procedures for three categories of travelers who sleep and dine in similar fashion. There would not be a mass exodus from the dining halls because, in most cases, the dining halls afford the traveler a meal at a price financially attractive when compared to commercial facilities.

The morale among enlisted travelers has been declining and is presently at an all-time low. The most serious complaint continuously discussed among enlisted service members is the inequity of the per diem program.

Consider the following example: After a conference, while TDY, civilians and officers are free to

discuss the day's subjects in an environment of their own choosing. The noncommissioned officers, usually Masters through Chiefs, are immediately segregated to the chow line, or use their personal funds to defray meal costs. As a member of the top three, with sometimes upward of twenty years' service, this is an unjust alternative. NCOs, particularly those in the top one and two percent, Chief Master and Senior Master Sergeants, should be treated with the respect and trust to which their rank and responsibilities entitle them.

MSgt. Marion D. Fincher  
Pemberton, N. J.

• *You are absolutely right. AFA has long supported the concept that this inequity has no reasonable basis. The Quadrennial Review of Military Compensation (QRMC) should address this issue. Defense officials have told us this is possible. If QRMC doesn't, however, we'll be back banging on doors.*—  
THE EDITORS

## Ideas For a New System

Reference the article by Ed Gates, "Continuing Turbulence on the OER Front," in the November '76 issue.

It appears that the "new system" is causing the same anxieties, frustrations, and disappointments, and will prove no better than the old system. Mr. Gates said that critics have failed to set forth alternatives, so I'd like to propose one. I call it the Non-OER System.

The end result, if not the primary purpose, of the OER system is to determine who is to be promoted and when they are to be promoted. By and large, most officers are deserving of promotion, at least through major. If each of these officers were automatically promoted when he reached the proper years and months in service, the OER System could essentially be eliminated—except to identify the small percentage who are truly outstanding and those who are truly substandard. Officers earning an outstanding rating would have their normal date for promotion advanced one year with only one advancement allowed in each rank. Officers receiving two substandard ratings would have their promotion date set back one year. A third substandard rating would dictate forced separation.



USAF would probably want to limit the number of OERs each unit could submit to ensure that only the truly outstanding are advanced ahead of their contemporaries. They might also want to require a minimum number of substandard OERs.

Once an officer attained the rank of major or perhaps lieutenant colonel, automatic promotions would cease but an officer would be assured of retirement. Consideration for promotion to a higher grade would require an outstanding OER.

Some of the advantages of this system are:

1. Guarantees each officer he will be promoted in turn, if he does his job.

2. Guarantees the fast burner the opportunity to advance one year ahead of his contemporaries in each grade.

3. Rids the service of substandard performers who oftentimes hang on for retirement.

4. Essentially reduces the requirement for OERs from nearly 90,000 to maybe 10,000 annually with a resultant saving in: man-hours to write and endorse and review OERs, typing and processing, and material.

5. Eliminates promotion boards for lower grades.

Maj. Ron Azarcon, USAF (Ret.)  
Pleasanton, Calif.

### "Flak Bait" Crew Members

As many of your readers may know, the front section of "Flak Bait," Martin B-26B Marauder s/n 41-31773, is now on display at the new National Air and Space Museum in Washington, D. C. This scarred and patched bomber, famous for having flown more missions than any other plane in the ETO, still wears its original paint job, including 202 bomb symbols.

We are trying to locate former "Flak Bait" crew members, as well as 322d Bomb Group, 449th Bomb Squadron, Ninth Air Force, personnel who might have photographs of the plane (fuselage code PN-O). Any material submitted will be copied and returned.

Jay P. Spenser

Research Assistant, Aeronautics  
National Air and Space Museum  
Smithsonian Institution  
Washington, D. C. 20560

### Mr. Webster Says . . .

While it may not merit special mention in "The Wayward Press," you

committed a grievous semantic error in your December 1976 issue, an error which I have taken a solemn vow to eradicate from Air Force writing. Your support in this struggle would be valuable and appreciated.

Near the bottom of the third column on page 120, it is stated, "An updated AFR 35-10 . . . is due out momentarily." I trust you meant to say "is due out soon" since "momentarily" means "for a moment." If the AFR will be out only momentarily, few of us will ever see it.

Lt. Col. Reid R. Samuelson  
Newark AFS, Ohio

• *Our Webster's New Collegiate gives three meanings for the word: (1) for a moment, (2) instantly, and (3) at any moment. So perhaps our "grievous semantic error" is not so grievous after all.*—THE EDITORS

### Upstaged By a Zipper

The Thunderbirds wish to thank Bob Stevens for his good-natured dig at "demonstration teams" in his December "There I Was. . . ." We wish, however, to take exception to his accuracy. The Commander/Leader is the only pilot on this team issued a flight suit with a zipper. It keeps everyone else humble.

Maj. Chris G. Patterakis  
Commander/Leader  
The Thunderbirds  
Nellis AFB, Nev.

### No Affront Intended

In an article discussing the Air Force's continuing emphasis on personal appearance and grooming in the "Bulletin Board" section of the December 1976 issue, there is a needless slur on the Air Force Reserve.

Your statement that "With the exception of numerous nonactive duty Reservists whose hair styles remain more civilian-oriented than military-oriented, most USAFers do look pretty sharp," reflects a prejudice against the Air Force Reserve which is no longer shared by the active Air Force. Among many nonobligated Reservists, there is a conscious effort to surpass the standards of dress and grooming established by the active force. "Civilian-oriented" hair styles are indeed a problem, but not one which should be ascribed principally to the Reserves.

Maj. Bruce W. Bean, AFRES  
New York, N. Y.

### Hooray for Ross!

Re the letter in your December '76 issue from SSgt. Laurie E. Ross—the best damn attitude I have seen come down the pike!

An air traffic controller! She could run the program.

One small chauvinistic comment—"A Beautiful Broad!"

Col. Earl Longacre, USAF (Ret.)  
Stockton, Calif.

### Missing the Main Point

Let's get down to brass tacks and say that through all the petty quibbling about AFA being an officers' preserve, one prime fact stands out from all the self-serving letters you have printed. They all seem to be missing the point! You, as a respected and responsible magazine, also seem to miss the point. A prime interest in national defense should mean the best buys for the defense dollar and *real* strength for our country.

I am a career enlisted member in a support job. As an interested observer and indignant taxpayer I have watched vast sums dissipate while no additional security has been provided for our country! Sure, what do I know about the defense posture? I'm just another enlisted man with no experience in defense matters. So what? We're out there by the thousands, everyday observers to the vast waste and inefficiency in the military.

I won't attempt any statement about a subject like the B-1 bomber. I'll leave that to the experts. I can tell you that millions, possibly billions, could be saved by heeding plain old common sense observed every day by the man out there on the line.

It seems to me that the people who call the shots are out of touch with what goes on in the field. We have IG inspections for such critical defense problems as the length of hair, nit-picky paperwork items, and, of course, such shattering items as the latest change to a reg.

Each year we get smaller defense forces for larger defense costs. What's wrong with cutting defense flat? I'm sure you agree—nothing. The only problem is the cuts are always in the wrong place at the wrong time. If we don't start doing something soon, our defense posture will be in the same boat as New York City.

In conclusion, let me say that most of us are sensible enough not

# Airmail

to want a military union and all that it entails, but somebody better wake up before the average military member who gets his or her job done stops bitching and starts moving!

Name Withheld

## "Bright Ideas" Continued

I join Brig. Gen. Harry C. Aderholt in his criticism ("Airmail," December '76) of those who downgrade the military importance of "bright ideas such as gunships." Given the advantages of 20/20 hindsight, let's examine one possible consequence of this resistance to innovation.

Having had a part in the original concept of firing laterally in a turn, I am painfully aware of the shameful delays in the early recognition and implementation of the gunships.

The Theater Commander, Gen. William Westmoreland, stated that "Gunships were the most effective weapon we had in Vietnam." The unclassified portion of the top secret official USAF history of the gunships shows that had the Air Force been more open-minded as regards innovations in weaponry, gunships could have been operational in quantity in Southeast Asia in December 1961 instead of three years or so later.

As documented in the *Gunship History* (bottom paragraph, p. 6), "... two different USAF Aeronautical Systems Division (ASD) review boards of weapon and ballistics experts evaluated the idea then rejected the idea as technically unsound." Understandably, these rejections combined to delay operational use of gunships in Vietnam for about three years.

Many, besides the "experts" at Wright Field, must share the blame. For example, the Tactical Air Command panel that met in September 1961 to discuss new weapons for limited war could have recommended a minimal investigative flight-test program of my (*Gunship History*, bottom p. 3) memo to them entitled "Transverse Firing of Rockets and Guns," dated September 14, 1961. A "jury rigged" actual firing test would have validated the side-firing gunship principle in a week.

Had the gunships been operational in December 1961, the Air Force might not have been called on to fly the RANCH HAND Program, in which large areas were sprayed with defoliants to kill vegetation and reduce the likelihood of ambush. This use of defoliants/herbicides caused a great uproar in America, in Vietnam, and around the world. Those opposed to the war claimed that the defoliants "made people sick." If so, the enemy was psychosomatic. We routinely sprayed our positions, while manned, to keep the fields of fire open and to help prevent enemy sneak attacks. It is most unfortunate that the American people were not told that the Air Force never used any defoliants except those recommended by the US Department of Agriculture and/or the US Forest Service.

It, therefore, seems that the operational use of gunships, starting in December 1961, would have had an incalculable effect on the war. Reducing the flow of troops and supplies from the North would have greatly reduced the American casualties, reduced the internal disension that wracked the nation, largely because of the casualties, and, quite possibly, would have let us leave as victors with both our national pride and our reputation for keeping our military commitments intact.

Col. G. C. MacDonald,  
USAF (Ret.)  
Shalimar, Fla.

As long as others are getting in their digs at General Milton for his "Tankers, Task Forces, and Terrorism" article, there was one item that didn't ring true as far as I'm concerned. Again, it was in the "Bright ideas . . ." paragraph, and specifically about helicopters masquerading as fighters.

Helicopters, in the Vietnam conflict as now, do *not* masquerade as fighters. Helicopters are troop carriers, air assault vehicles, cargo carriers, rescue craft, observation aircraft, and make outstanding weapons platforms—not to mention the myriad other tasks they perform. I flew armed UH-1B and C model Hueys in SEA and was just a bit closer to the infantry types. Therefore, I can speak from their experiences as well as my own. Helicopters, as proven late in the war, are among the most effective

tank destroyers as well. Further, helicopters can and will survive in the mid- to high-intensity conflicts—nap-of-the-earth tactics *do* work, as I'm sure some fighter and attack jocks know by this time.

I'm sure there are some who think of the Army's attack helicopters as fighters, but the helicopter is just that—a helicopter. It is highly maneuverable, has the ability to physically hide from air or ground surveillance, and has the capability to provide pinpoint close air support fires as well as destructive fires. But it is not a fighter and never attempted to masquerade as such. I also heartily agree with many of the other comments on the article, especially concerning A-1s, AC-47s, and AC-130s. Such bright ideas are unquestionably appropriate—the best close air support type in Vietnam were A-1s—far and away more effective and accurate than pure jets. Again, I'm speaking from a user point of view.

One final comment: regarding quick-reaction forces of tankers, cargo aircraft, and fighters, I'm sure high-level planners have already thought about the C-5's ability to carry Army UH-1s, AH-1 Cobras, and OH-58 scouts intact and ready to fly. After all, it's pretty hard to sneak up on somebody in your everyday C-5.

CW3 James P. Fazekas  
Ft. Campbell, Ky.

## Missions to Frankfurt

I am a writer and would like to contact members of the Eighth Air Force, World War II, who participated in missions against Frankfurt.

G. K. Lerch  
Melemstrasse 20  
6 Frankfurt/Main 1  
West Germany

## Atrocities Research

I am researching and writing a major magazine article on Viet Cong and North Vietnamese atrocities against US servicemen and need personal account information and leads.

The magazine article will deal with a relatively obscure portion of the Vietnam conflict—one of which the public is not really aware. Such atrocities include, but go beyond, the harsh treatment meted out to prisoners of war. Atrocities have included such things as decapitation, summary executions, and similar treatment.

The primary reason for this article is to counteract in a small way the public's harsh reaction to the widely publicized My Lai affair. The vast majority of the public is not aware of what US servicemen had to put up with—such as five-year-olds tossing grenades at them, and the uncertainty of knowing exactly who was friend and who was the enemy.

Those with information, leads, or photographs are asked to write.

Donald R. Blum  
670 Merrimon Ave.  
Asheville, N. C. 28804

#### AFROTC Det. 225

I am Unit Historian for AFROTC Detachment 225, University of Notre Dame, and am trying to locate the whereabouts of graduates of the 225th. Please contact me.

Cdt. 2d Lt. Albert S. Wickel  
Unit Historian  
AFROTC Det. 225  
University of Notre Dame  
Notre Dame, Ind. 46556

#### Search for P-51 Pilot

I'm trying to locate a P-51 pilot from WW II. The only thing I know about him is that he was fired on by a top-turret gunner while escorting the 566th Squadron, 389th Bomb Group, on a raid to Regensburg on or about April 7, 1945.

He might remember it as the day that an FW-190 deliberately dived into the flight deck of the number one plane in a four-plane element, causing three of them to explode, very shortly after he was fired upon.

Frank J. Haraburda  
Box 126  
Dover, Pa. 17315

#### Former Flying Tiger

I am trying to locate a wartime member of the Flying Tigers. He was Col. Maurice Sheahan, who from 1942-45 was Forward Supply Director for the Flying Tigers. After the war, he was Far East Director for TWA. Colonel Sheahan's prewar home was Ontario, Calif.

Anyone with knowledge of his whereabouts, please contact me.

Vance Tiede  
2807 Key Blvd.  
Arlington, Va. 22201

#### Thud Profile

F-105 Thunderchief information needed. Although my Profile (No. 226) on the Thunderchief was published some years back, I am still

doing research on this excellent piece of aircraft in order to update the Profile and to compile articles on the Thud for the *Journal of the American Aviation Historical Society* in connection with Research Project No. 7316.

It is my desire to contact pilots, EWOs, and maintenance people who are/were connected in any way with the F-105. Photos, negs, slides, stories, logbooks, and notes would be most welcome in my research. All materials loaned will be carefully handled and returned in good condition with an autographed copy of the Profile.

Let's keep the Thud alive!

Theodore W. Van Geffen, Jr.  
P. O. Box 9194  
Utrecht 2500, Holland

#### UNIT REUNIONS

##### Penn State AFROTC Drill Team

All Brothers of the Penn State Air Force ROTC Drill Team are invited to the 25th anniversary of the team on May 8, at University Park. Contact

Keith Kurtz  
1013 S. Allen St., Apt. 311  
State College, Pa. 16801

Phone: (814) 238-5754  
865-5454 (daytime)

##### Shadow Gunshippers

All former members of the 71st Troop Carrier Squadron, 71st SOS, and 71st Tac Fighter Squadron stationed at Bakalar AFB, Ind.; Lockbourne AFB, Ohio; Nha Trang AB, RVN; and Grisom AFB, Ind., are urged to attend the June 10-12 reunion in Indianapolis, Ind. Contact

Tom Coughlin  
2323 Bennett Rd.  
Lafayette, Ind. 47905

Phone: (317) 474-0230

##### 4th Strategic Support Sqdn.

The 4th Strategic Support Squadron (SAC) is planning a reunion for June 18-19 at Abilene, Kan. Please contact

Allen H. Osnes  
181 Juniper St.  
Vacaville, Calif. 95688

##### 12th Bombardment Group

World War II veterans of the 12th Bombardment Group (81st, 82d, 83d, and 434th Squadrons) will hold a reunion at the Hilton Hotel, Buffalo, N. Y., June 29-July 2. Contact

Joseph C. Prisco  
Dept. of Business Administration  
Providence College  
Providence, R. I. 02918

##### P-47 Thunderbolt Pilots

A reunion of the P-47 Thunderbolt Pilots Association will be held May 6-8 at the St. Moritz on the Park Hotel, New York,

N. Y. For further information contact  
Herbert O. Fisher  
628 Mountain Rd.  
Smoke Rise  
Kinnelon, N. J. 07405  
Phone: (201) 838-2040

##### 19th Photo Charting Sqdn.

The 35th annual reunion of the 19th Photo Charting Squadron will be held in Miami, Fla., May 5-7. Contact

Ted Balon  
112 Lakeside Dr.  
Andover, Conn. 06232

##### P-40 Warhawk Pilots

The Hilton Inn, Oakland Airport, Calif., will be the site of the P-40 Warhawk Pilots' reunion on June 24-26. Further information from

Lloyd "Scotty" Hathcock  
34 College Ave.  
Dayton, Ohio 45407

Phone: (513) 223-8432

##### 56th FG and 33d SG

A joint reunion of the 56th Fighter Group and 33d Service Group will be held June 25-26, 1977, at the Holiday Inn Downtown, St. Louis, Mo. Please contact

Leo D. Lester  
600 E. Prospect St.  
Kewanee, Ill. 61443

##### 358th Fighter Sqdn.

A reunion in June 1977 is being planned by the 358th Fighter Sqdn., AAF Station 122, 8th Air Force, Steeple Morden, England, during WW II. Write

Gordon H. Hunsberger  
75 Congo Rd.  
Gilbertsville, Pa. 19525

##### 474th Fighter Group

A reunion of the 474th Fighter Group (428th, 429th, 430th Fighter Squadrons) will be held in Fort Worth, Tex., May 20-22. Personnel of other P-38 units welcome. Write to

Robert D. Hanson  
474th FGA Secretary  
Suite 226  
7515 Wayzata Blvd.  
Minneapolis, Minn. 55426

##### 490th Bomb Group

The 2d reunion of the 490th Bomb Group Association will be held in Denver, Colo., at the Denver Hilton Hotel, Downtown, June 15-18. Please look up, call, correspond with any lost soul who did not attend the 1st reunion.

490th BG Association  
Denver Reunion Office  
285 South Santa Fe  
Denver, Colo. 80223

Phone: (303) 778-1350

##### 494th Bomb Group

"Kelly's Cobras," the 494th Bomb Group, 7th AF, is planning a reunion in the fall of 1977 at Colorado Springs, Colo. Interested members please write

Richard W. Graham  
90 Purdue  
Pueblo, Colo. 81005

Phone: (303) 561-4400

# A total capability.

Singer's Aerospace and Marine Systems capability is based on the advanced technology resident in its four divisions . . . HRB-Singer, Kearfott, Librascope and Link. Each possesses unique skills and products representing years of specialized experience coupled with third generation hardware. Facilities of these divisions occupy 2.9 million square feet and are staffed by more than 6,150 technical and professional personnel in a total population of over 11,500.

## NAVIGATION AND GUIDANCE

Kearfott continues to make significant contributions to the technology of aerospace navigation, missile guidance and airborne systems for digital data processing systems. Representative on-going programs include U.S. Navy P-3C, USAF SRAM missile, Advanced Re-Entry Guidance for the U.S. Navy and U.S. Air Force, and the B-1 manned bomber. Recently initiated programs include inertial navigators for the USAF F-16, Swedish Air Force JA-37 Viggen, the French Navy Super Etendard and the USAF F-4 Update Program.

## SIMULATION SYSTEMS AND PRODUCTS

Link, originator of the "Blue Box" trainer, has expanded its simulation capability to include the range from single engine private aircraft to NASA's Space Shuttle Orbiter. In addition, advancements in the field of visual simulation include digitally generated full

color presentations and night visual systems containing in excess of 6,000 light points capable of including such features as horizon glow, runway texture and landing light effects. Simulation in the form of complex naval tactics trainers including radar and sonar sensors provide the capability for training in all phases of naval warfare. Systems for simulating tracked vehicles, ships, and nuclear and conventional power generation facilities are also available.

## COMMAND AND CONTROL SYSTEMS

Naval Electronic Systems produced by Librascope for Digital Fire Control and Acoustic Counter-Measures are now in service aboard strategic and attack submarines and surface ships. Librascope also supplies the Query Control Station (QCS), a stand-alone tactical data and communications terminal, which is part of the U.S. Army's Tactical Data System (ARTADS). The QCS functions as a tactical computer system, a remote access to large data processing centers and as a multi-function secure communications link. The division also produces dynamic, large screen laser generated situation displays.

## INFORMATION SCIENCES

Primarily in support of the U.S. Intelligence Community, HRB-Singer activities include the collection, processing and analysis of electromagnetic signal information. Specifically, HRB defines the user's requirements, formulates the system hardware and software and performs the data processing operations to provide analysis of the information received.

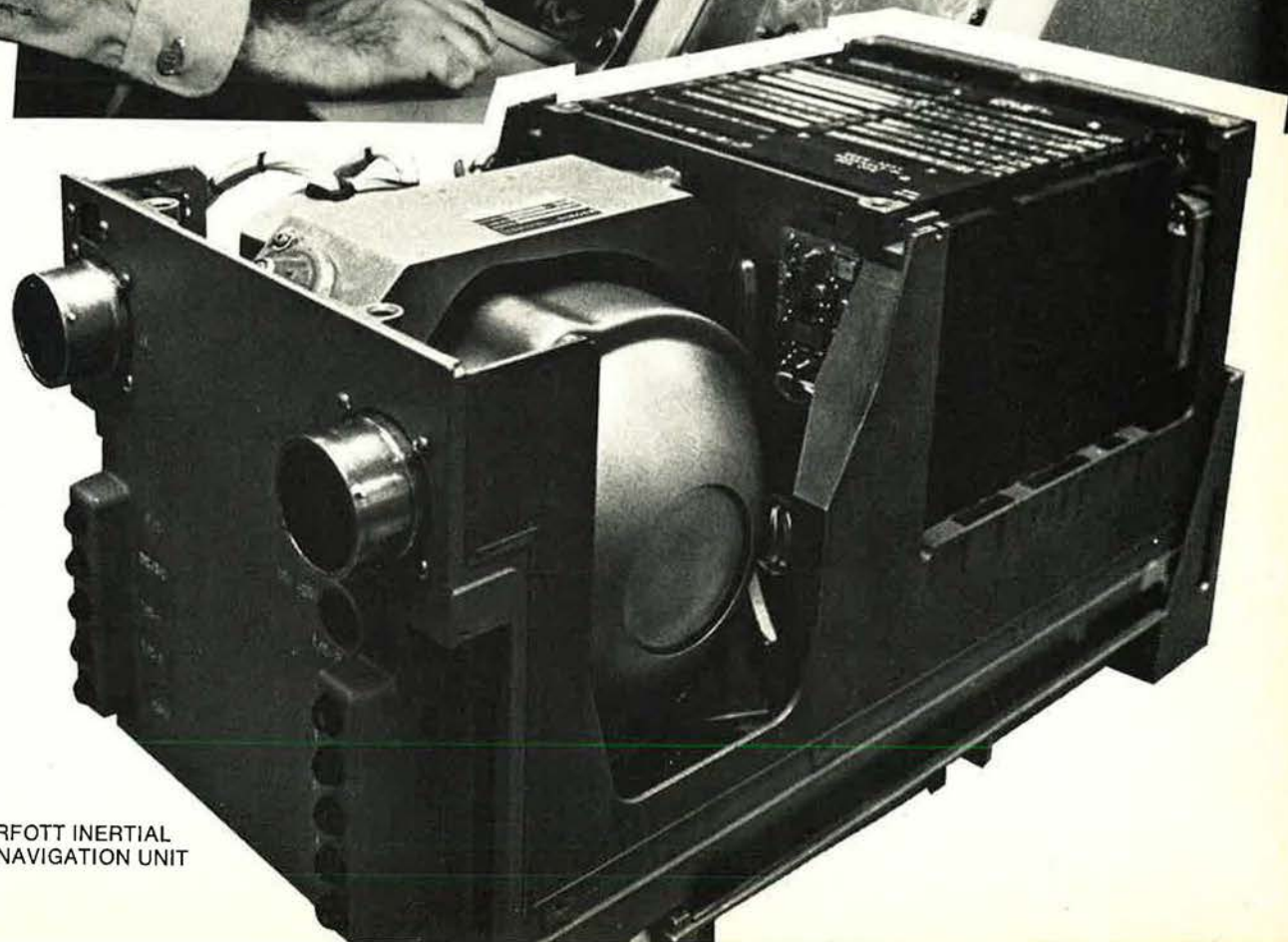
We would like to discuss these capabilities with you in greater detail. Please write The Singer Company, Aerospace and Marine Systems Group, 30 Rockefeller Plaza, New York, New York 10020.

LINK AIR-TO-AIR  
COMBAT SIMULATOR



**SINGER**  
AEROSPACE & MARINE SYSTEMS

LIBRASCOPE NAVAL FIRE  
CONTROL SYSTEM



KEARFOTT INERTIAL  
NAVIGATION UNIT

# Airpower in the News

By Claude Witze, SENIOR EDITOR

## Today Sweethearts. Tomorrow?

Washington, D. C., Jan. 4

The 95th Congress convenes today. This may be the most important event in the career of Jimmy Carter as President of the United States. He will be inaugurated in two weeks and two days.

This reporter, whose presidential recollections go back to Woodrow Wilson, cannot remember a White House occupant who moved in with more intriguing honeymoon prospects than Mr. Carter. The greatest love affair was enjoyed by Franklin D. Roosevelt. In four elections, FDR garnered 472, 523, 449, and 432 electoral votes. Jimmy Carter got 297, which means he has been denied a degree of public support, and enthusiasm, that would help Congress smile quickly on his programs. The case of John F. Kennedy could be cited in this connection, but he faced a Congress of different temperament. And he came out of its ranks, not from Plains, Ga. The new President has a legislative priority list and a staggering number of campaign promises, including some that deal with national security. It will be interesting to see how many of them come to fruition.

There is no escaping the sense that Democratic Party liberals have been disappointed, even before the inauguration. The holiday season wave of appointments by the President-elect brought groans from many quarters, almost all of them from the left of Mr. Carter's peanut patch. Somehow, they did not create much of a disturbance. It could be that if these complainants really had important influence, Mo Udall of Arizona would have been the Democratic candidate and, possibly, the new President. They lost,

didn't they? It is the winner who picks the cabinet-level team, and if he doesn't want Bella Abzug or Paul Warnke, they are out.

Equal weight must be given to the fact that the 95th Congress will be cast almost in the exact image of the 94th Congress. The Democrats controlled the last House, 291 to 144. They still have control, this time by 292 to 143. In the Senate, there is no change. It remains Democratic, 62 to 38. The conservatism of the 94th Congress surprised many people. A smaller number expressed disappointment. The 95th Congress, ever more aware of threats to national security—and growing public concern about them—is not likely to veer off the track set by the 94th.

The domestic economy has top priority for attention both at the White House and on Capitol Hill. But issues of foreign policy and national defense cannot be put aside. There was little attention paid at the time, but President-elect Carter visited Washington last November 23 and made an inter-

esting appearance before the Senate Committee on Foreign Relations. The attendance, when Chairman John Sparkman of Alabama rapped the gavel, was unprecedented. Of sixteen Senators assigned to the committee, twelve were present, and one of the absentees, Jacob K. Javits of New York, sent a message of regret.

Mr. Carter was accompanied by Frank Moore and Jack Watson of his staff, and the chairman made it clear that the special session was called at the request of Mr. Carter. No other committee was so honored.

The session lasted almost an hour. Everything was sweetness and light. In his role as the witness, not sworn, Mr. Carter paid homage to his hosts and said that as a young man he always felt "a sense of assurance that the foreign policy of our nation was shaped both by the President and by Congress in consultation and on a bipartisan basis." He said he intends to restore that impression. It was a clear bid for support from an important committee that has, in recent years, felt that its power and influence have been eroded by what some have called the "imperial" presidency. Mr. Carter was almost humble in his approach:

"I will certainly defer to your restraints, or constraints, about the degree to which you want to be involved," he told the committee and more than fifteen other prominent Senators who sat in on the meeting. "But I will take the initiative and hope that you will respond in establishing a personal relationship with you, a relationship between the chairman and the com-

## History, Old and New

The Associated Press reports, in a London dispatch, that a Briton named Graham Lyons has published a book called *The Russian Version of the Second World War*. In it, he discloses that Russian school children, like most school children, get their World War II history from textbooks. The Soviet texts include no mention of the Battle of Britain or the American war in the Pacific.

The *Washington Post*, in a report from New York, says the Communist regime in Vietnam has been condemned for "gross abuses" of civil liberties. They are accused of "grievous and systematic violations of human rights." These evils, of course, are characteristic of totalitarian governments, of the right and the left (see p. 16).

The real news is that the protests now are coming from, of all places, the American Civil Liberties Union, folk singer Joan Baez, radical poet Allen Ginsberg, the War Resisters League, and one of the founders of the Clergy and Laity Concerned.

All of them, now, are bedfellows of Alexander Solzhenitsyn, a victim of Communist civil rights policies who writes, but never wrote a Russian school textbook.

mittee and me, and in keeping you completely aware of the evolving opportunities and problems as they relate to the foreign policy of our country."

Mr. Carter said the US could have avoided tragedies of the past eight years if his policy had been maintained. He went on to mention OPEC and the oil prices, Panama—a "festering problem"—and then said that the SALT negotiations would demand his immediate attention. The new President said he would be an "eager student" looking to the committee as one of the "major repositories of continuing and historical knowledge." It all was designed to flatter the Senators and start the honeymoon with hugs and kisses.

It also cannot be denied that the Russians know what is going on. The new President comes to Washington much as a novice in the area of foreign policy and, notwithstanding his Navy experience, national security. As governor of Georgia he had experience with domestic issues. His confrontation with Russia, at a summit meeting, at the SALT conferences, or at any inflammable spot on the globe, will be risky. As in the case of his zero-based budgeting proposal, Mr. Carter should face the Soviets only after a zero-based review of what they have done and what they are capable of doing. The review might determine how he would react to a serious threat of Russian aggression. The example set by John F. Kennedy during the Cuban missile crisis of 1962 could be less than tenable long before 1980.

There is apprehension, undisguised, that the Carter Administration will rush into SALT, to our peril. The choices of Cyrus R. Vance as Secretary of State and Harold Brown to head the Pentagon did not allay the fearsome. The *Wall Street Journal*, which seems to be more concerned about the foreign policy quicksands than those in the domestic economic quagmire, listened to what Mr. Carter had to say:

"The bad parts of his comments are the things he has been saying recently on television interviews: That it's terribly important to get the talks moving, which is scarcely the posture to strike when you're about to bargain with Russians. And that the talks have been stalled by disagreements within the US bureaucracy, which absolves the



Sikorsky's UH-60A UTTAS (Utility Tactical Transport Aircraft System).

### Waste Not, Want Not

The US Army has awarded a contract for production of a troop-carrier assault helicopter to the Sikorsky Aircraft Div. of United Technologies Corp. Loser in the hard-fought competition was Boeing Vertol Co. There is interesting arithmetic involved, particularly for an Administration determined to weed out waste in government agencies through improved management.

The initial contract is for fifteen helicopters, and the estimated price in the Fiscal 1977 budget was \$213 million. In the first six months of 1976, the cost of food stamps given to recipients who were not eligible to receive food stamps was \$215 million.

The Sikorsky contract will run for eight years and put 1,107 helicopters on Army airfields. The total program cost is estimated at \$2.5 billion. The total annual cost to the taxpayers of all welfare swindles, nationally, now runs to \$2.5 billion a year.

Sen. William Proxmire and Rep. Les Aspin, please copy.

Soviets of any responsibility for their own intransigence.

"In fact, the record of the negotiations is best summarized as this:

"The Soviets have demanded concession after concession—first the throw-weight advantages codified at Vladivostok, then the exemption of their Backfire bomber from the limits agreed there, then the inclusion of the US cruise missile never discussed at Vladivostok, and finally and preposterously the counting of each B-1 bomber as equivalent to three missiles.

"So long as the US gave in to each successive demand, the talks

showed 'progress.' When the US stopped giving in, the talks stalled."

This evaluation is dangerous so early in the year, but the selection of Zbigniew Brzezinski as Mr. Carter's assistant for national security affairs and director of the National Security Council may provide the proper balance of skepticism. The Professor, whose background is startlingly similar to that of Henry Kissinger, was of the opinion in 1974 that détente was working out to the advantage of the Soviet Union. There is no evidence he has changed his mind.

At the Georgia press conference

# Airpower in the News

where he was introduced, Mr. Brzezinski was asked whether he believed in détente on the same basis as pursued in the previous administrations. He was cautious in his reply, but did say that détente, "to be enduring, to be accepted by the American people, has to be a détente which is reciprocal and which progressively becomes more comprehensive."

Does he think it has not been reciprocal?

"I think that there have been, over the last few years, some imbalances in certain areas and perhaps there is the need for a greater clarification of the mutually binding character of the terms in a variety of areas, in a variety of fields."

That is professorial. It is not blunt. But it says that the new national security counsel is not satisfied that détente, so far, has been running on a two-way street.

Aside from the broad foreign policy issues, there is concern among the military about the pulsating Carter pledges to consider cuts in the defense budget. There is something almost ethereal about the question, and it certainly was not a campaign issue. The new President sticks, when pressed, to his idea that from \$5 billion to \$7 billion can be saved, but he has not indicated where he will find it. Harold Brown, the new Defense Secretary (see p. 22), believes Pentagon spending will have to go up, and certainly the Russians are doing everything they can to win public and congressional support for a hike.

This is only one of several issues with the potential of starting a fire in the bedroom during the Carter-Congress honeymoon.

In addition to the major committees, such as Armed Services, Appropriations, Foreign Relations, and others, the Administration will face new jealousies in the House and Senate Budget Committees. They have tasted success, and that creates a new atmosphere for budget suggestions from the White House. The committees will not ignore their procedures, even to accommodate a Democratic President.

There probably are even bigger problems ahead for the new White House staff once it is resolved how the Administration proposes to reorganize government bureaus and agencies. Each of them constitutes a constituency; most of them, including much of the White House staff itself, were established by legislation. It will take legislation to effect any sort of meaningful changes.

There is momentum built into the system, and it is not easy to stop. Did you ever play with a yo-yo on a string? ■

## The Wayward Press

As the battle over the Defense Department program and budget proceeds between now and the heat of August, the role of the press must not be overlooked. A significant opener was the lead story in the *New York Times* on the day after Christmas. There had been earlier references to the facts of life in the *Boston Globe*. But, as a *Times* Pentagon reporter told us once, more than twenty years ago, "It's not news until it is in the *New York Times*."

On December 26, the *Times* led the paper with a long account of a new Central Intelligence Agency estimate that Russia seeks military superiority over the United States. It has, of course, been a Russian goal ever since the Navy blockade and bombers of the Strategic Air Command made Moscow withdraw its missiles from Cuba in 1962. That was about one year after the Russians built the Berlin Wall. The Wall, an international indecency that does not disturb many Americans, still stands. The missiles are gone from Cuba, but there is no pledge that they cannot come back once again.

According to the *Times*, the CIA now views Soviet objectives more somberly than it has in a decade. It quoted George Bush, CIA Director, as speaking of "changed perceptions" in the agency. These changes, according to sources who had seen the new estimate, led to conclusions that are more than somber—they are grim. Mr. Bush himself said "there are some worrisome signs."

It was not until a week later, on January 2, that the *Washington Post* paid attention to the other paper's scoop. The lead, in this case, was not about Russia shifting its goal from strategic parity to strategic superiority. To the *Post*, the news was that President-elect Carter "will inherit an intense dispute over US intelligence estimates of the Soviet Union's global strategy."

The emphasis here was on the dispute between CIA's "traditional estimators" and a special group enlisted to introduce an "adversary" element. These men argue that

CIA has for years been miscalculating Soviet intentions. The result of their confrontation is top secret.

Now comes Richard Dudman, a reporter for the *St. Louis Post-Dispatch*, who is upset because the whole wrangle got into print. Writing in *The New Republic*, Mr. Dudman detects a "leak" from the "alarmist, hawkish faction." Said Mr. Dudman: "The CIA has been known to leak secret materials when the publicity would do it good. In this case, the CIA is said to have been the loser, since the specialists had been less alarmist but were beaten down and forced to reverse themselves by the hawkish outsiders." The dirty part of the plot, according to Mr. Dudman, is that it will put the new President on the spot.

The Wayward Press finds certain elements missing in the Dudman analysis. These include:

1. Any reference to the public's right to know.
2. Any reference to the duty of a free press to print important national secrets for the simple purpose of exposure, in the exercise of First Amendment privileges.
3. Any reference to the "chilling effect" of government efforts to withhold information, when the administration feels it should be withheld.

Mr. Dudman's own *Post-Dispatch* is one of the papers that printed extracts from the Pentagon Papers, after a restraint imposed by the court was lifted following legal action taken by the *Times* and *Post*. The papers were, of course, "leaked" by a man named Daniel Ellsberg.

The manipulation of the press by undisclosed "sources" has become routine, and generally is acknowledged by the press, which always can rationalize its conduct. What cannot be explained away is the consistent exercise of a double standard.

If a Daniel Ellsberg, or a Daniel Schorr, turns out to be a hero to the American press, why is the same distinction denied to an expert who finds a clear and present danger to national security?



# Aerospace World News, Views & Comments

By William P. Schlitz, ASSISTANT MANAGING EDITOR



Stationed at RAF Alconbury, UK, are USAF F-5E fighters that are performing as "aggressors" in a program geared initially to help train US pilots in the intricacies of aerial combat over Europe. Characteristics of the Northrop-built aircraft are high performance, maneuverability, small size, and smokeless engines. For additional word on the status of USAFE forces and how they are being improved to contend with the growing Soviet threat, see below and p. 41.

Washington, D. C., Jan. 5

★ "The most massive, complex, and compressed peacetime tactical air operation ever conducted" in the US took place in November.

TAC amassed 414 aircraft over Edwards AFB, Calif., and the tactical ranges of Nellis AFB, Nev., with flying units deploying from twenty CONUS bases—as far away as the east coast. Besides TAC, involved were personnel and equipment from SAC, ADCOM, MAC, ANG, AFRES, and the US Navy. FAA handled airspace safety procedures.

Primary object of the exercise was the initial operational test and evaluation of the E-3A Airborne Warning and Control System (AWACS) aircraft conducted by the Air Force Test and Evaluation Center, headquartered at Kirtland AFB, N. M. After some initial skirmishing to assure feasibility and safety, the actual mock battle took place on November 10. It lasted a thrill-packed fifty minutes.

Staffs of Hq. Twelfth Air Force and Hq. TAC planned and controlled the air operation, which involved 134 "friendly" aircraft pitted against 274 "aggressor" aircraft. An additional six monitored flying safety.

The battle scenario, according to USAF, was representative of a high-density wartime environment and purposely matched a mass attack of numerically superior aggressors against technologically superior friendlies.

The first operational E-3A, a modified Boeing 707 airframe topped by a rotodome radar capable of tracking aircraft at high and low altitudes over land or water, is to be delivered to TAC in March 1977.

★ NATO command and control of air resources in northern Germany will be upgraded with the establishment of additional USAF units in the area. (For a review of the history and current structure of US airpower in Europe, see p. 41.)

The 606th Tactical Control Squadron (TCS) will be headquartered at the Carl Schurz Kaserne near Bremerhaven. Also, an Air Force-manned NATO operations support cell (NOSC) will be located at Kalkar, about seventy miles from Cologne.

The new units will be assigned to the 600th Tactical Control Group, presently forming at Hessisch-Olmendorf, about thirty miles southwest of Hannover, site of the 609th TCS since last May.

The NOSC would assist Headquarters 2d ATAF with communications support of US aircraft during wartime, with the 606th providing command control and surveillance capability in the conduct of combat air operations. Its computerized mobile tactical radar unit would act as a control and reporting post.

While the creation of the units will involve about 1,000 new personnel slots, the overall number of USAFE people will not increase because of the withdrawal of other support personnel, officials said.

★ AIR FORCE Magazine in recent issues has contained reports on USAF efforts to provide more realistic combat flight training.

Also to that end, AFSC's Rome Air Development Center, Griffiss AFB, N. Y., has developed MUTES, for multiple threat emitter system. Via its computer, MUTES can simulate and transmit signals resembling those of enemy radar, missile, and weapon complexes.

In fact, MUTES can transmit five different signals simultaneously, to give aircrews a real trial in the use of electronic countermeasures to confuse and avoid tracking system lock-ons.

"This ability allows us to simulate a true combat environment, because in the real world a crew usually finds itself faced with more than one hostile threat system," said Capt. Kenneth Nocito, of RADC's Intelligence and Reconnaissance Division.

MUTES is also highly mobile, can be hauled on a flatbed and reassembled in a matter of hours.

The first MUTES prototype, built by General Dynamics Fort Worth, began experimental testing last June. It is now at SAC's Radar Bomb Scoring Site, Watertown, N. Y., for operational test and evaluation.



In December, former airline flying instructor Ed Mack Miller was presented the Colorado Wright Brothers Memorial Foundation's annual award for outstanding contributions to aviation. Founder and past president of the Colorado Aviation Historical Society and author of several books on aviation, Mr. Miller has also contributed many articles to AIR FORCE Magazine.

★ Cochairmen James Doolittle and Neil Armstrong have recruited some heavyweights to assist them in raising \$5 million for the recently established Lindbergh Memorial Fund, dedicated to financing fellowships in science and conservation (see December '76 issue, p. 26).

Heading up the women's committee is Mrs. Angier Biddle Duke, wife of the US diplomat. Joining her are Princess Grace of Monaco, Miss Helen Hayes, Cornelius Vanderbilt Whitney, and Lawrence Copley Thaw, among others.

Chairman of the corporations committee is Thomas J. Watson, Jr., head of IBM Corp.

William Randolph Hearst, Jr., will chair the foundations committee.

Accepting chairmanship of the entertainment committee is Arthur Godfrey.

Chairing the sports committee is Michael Burke, President of Madison Square Garden.

Accepting membership on the in-

ternational sponsoring committee is England's Prince Philip.

Lindbergh Fund headquarters is located at 30 E. 42d St., New York, N. Y. 10017. It is organizing a commemorative transatlantic flight and fund-raising dinners in May to celebrate the fiftieth anniversary of Lindbergh's flight.

★ A new safety device that signals a ground controller when an airliner is below a minimum safe altitude or appears headed there is now in operation at both Dulles International Airport in Virginia and Los Angeles International.

The MSAW (for Minimum Safe Altitude Warning) system is also scheduled for installation at the country's sixty-three busiest airports by the middle of 1977.

If an aircraft should descend below or be on a flight path headed below a predetermined minimum altitude, MSAW sounds a five-sec-



The late Col. Charles "Chuck" Kervin

## LIFE IN POSTWAR SOUTH VIETNAM

Details about conditions in South Vietnam following the military collapse and takeover by the North Vietnamese have been sparse, the result of a virtual blackout on news reporting.

However, according to *Foreign Report*, published by Britain's prestigious *Economist*, considerable insight into the policies of the new regime have been revealed by Father Gelinias, a Jesuit priest and longtime Vietnam hand who was expelled by Communist authorities late last summer.

Following are excerpts from the *Foreign Report* article based on Father Gelinias's testimony:

Life in Ho Chi Minh city (formerly Saigon) is overshadowed by the knowledge that failure to toe the line will result in transfer to the re-education camps or the new economic zones. Persons classified as "hostile" to the revolution are sent to re-education camps to be shown the error of their ways. The location of the camps is secret and the inmates—mostly members of the armed forces, the police, and the civil service of the former government—are forced to work long hours at hard manual tasks, to attend nightly political instruction, and to participate in endless self-criticism sessions. They receive meagre rations and no medical care whatsoever. While there is no evidence of torture, there is abundant testimony of "exemplary" punishment to instill fear in others.

More than 18 months after the annexation of South Vietnam, less than one per cent of the detainees have been released from these camps. Some of those released were sick men who were sent home to die. Anyone said by the communist cadres to be a "counter-revolutionary" may be sent to these camps at any time without either trial or the right of appeal. A conservative estimate of the number of camp prisoners is 300,000. . . .

The communist authorities propose to send six million people to the new economic zones, a euphemism for uninhabited areas where the unfortunate settlers must clear the ground, build their houses and farms. In many zones there is a shortage of water, and almost all are infested with malaria and other diseases. . . .

It is believed in Saigon that transfer to these zones is tantamount to a death sentence for the elderly and for children. . . . Anyone who is

## Pioneer Aviator Charles Kerwood Dead at Seventy-nine

Col. Charles "Chuck" Kerwood, USAF (Ret.), an aviator great who during his long career fought for three nations in four wars, died in Washington, D. C., in December after a long illness. He was seventy-nine.

Colonel Kerwood entered aviation in 1916 when, while serving in the enlisted ranks of the French Foreign Legion in World War I, he was detached to enter flying school. Thereafter, he flew fighters and bombers in the Lafayette Corps and was wounded twice before being shot down and captured by the Germans. During one of several escape attempts he was wounded again. (Legend has it that shortly after America's entry into the war, Kerwood bumped into Eddie Rickenbacker in Paris. The famous young racing driver, who was Gen. Billy Mitchell's chauffeur at the time, became so fired up by Kerwood's enthusiastic talk of flying that he resolved to become a pilot himself.)

Following the war, Colonel Kerwood returned to civilian life as one of the country's first barnstormers whose death-defying act included aerobatics and parachute jumps. He was also a test pilot.

In 1923, Colonel Kerwood was given a commission and command of the Royal Greek Air Force in that country's war with Turkey. In North Africa, during the French campaign against the Rifis in the mid-1920s, he organized and led the American Volunteer Squadron in the first recorded

instance where aircraft dropped food and other supplies in support of troop columns on the march.

After flying in other parts of the world, including the Soviet Union and the Balkans, Chuck Kerwood returned to the US to discover that aviation was coming of age here.

During the 1930s, Colonel Kerwood flew for several of the nation's early airlines. For a period he was also a special investigator, probing air crashes for the US Senate and participating in the establishment of the Civil Aeronautics Administration.

Recalled to active duty in the Army Air Corps in January 1941, Colonel Kerwood served initially in intelligence and other staff posts in Washington. Later, he saw combat in North Africa, Europe, and the Pacific.

Following the war, Colonel Kerwood traveled around the world for the State Department in the interest of a host of aviation projects.

During his colorful career, Colonel Kerwood wrote numerous articles about civil and military aviation and assisted in the production of several films, as well as putting in a brief stint as a broadcaster on aviation matters.

A long-time member of AFA, Colonel Kerwood had been inducted into the Aviation Pioneers Hall of Fame during ceremonies in June of 1976.

employed or fails to respond to the demands for "voluntary" labour dig canals, build roads or railways is said to lack civic spirit and is able to be sent to the zones.

The census conducted last summer helped to tighten communist control. Each person involved in the census was required to name five friends who would vouch for the veracity of his declarations—and to provide details about their political beliefs. . . .

Armed resistance against the communist regime continues, but the authorities have introduced new counter-measures. When a man claims to be a member of the resistance comes to a house at night and asks for help, it is more than possible that he is an agent provocateur. A reply to send him away is not enough. . . .

Unemployment is high and many commodities are in short supply. Rice is difficult to obtain because its purchase by the authorities is compulsory and the prices paid are so low that the farmers in some areas have stopped planting more than they need for themselves. Families survive through the black market. Few people ask for state help because they would then be liable to be sent to a new economic zone.

In sharp contrast, some officials from the north are said to be living on a scale lavish even by old Saigon standards. Senior officials have commandeered the best houses and filled them with air conditioners, cars, television sets and refrigerators. Some streets have even been cordoned off from the local inhabitants to create exclusive official zones. . . .

Everything seems to be for sale in South Vietnam, despite the legendary austerity of the Vietnamese communists in the past. Some officials accept lavish bribes for exit visas, false papers, permits, and the quashing of indictments. So numerous and all-embracing are the regulations introduced by the communists that it is almost impossible to remain in the country without breaking at least some of them. Petrol is available only to the army, and officers can earn large sums by selling it on the black market at high prices.

Buddhists have suffered severely under the communists. Many pagodas have been closed down and well-known monks here disappeared without trace. Roman Catholics, in contrast, are still relatively well-served with churches and the means of pursuing their faith. The Vietnamese communists are conscious that the Catholic Church, with its international recognition, is capable of damaging their reputation abroad should they ever give it cause to do so. But there is very little Buddhist organization at an international level, so the communists are less inhibited in dealing with Buddhists.

and warning as well as flashing "Low Alt" on the ground controller's radar screen. He, in turn, alerts the plane's aircrew to pull up.

The MSAW radar system works in tandem with the transponders aboard most commercial aircraft that indicate position as well as course heading and altitude.

Development of MSAW began in mid-1973, following the crash of an airliner in the Everglades. Cost of installation around the country: a total of \$2.9 million.

★ Shades of the 1920s, when biplanes hung from dirigibles, and the 1950s, when USAF experimented with launches of fighter aircraft from the underfuselage of bombers in flight.

Air Force Flight Dynamics Lab, Wright-Patterson AFB, Ohio, recently completed second-phase wind-tunnel tests of a "microfighter" that could be launched and recovered in flight by a modified Boeing 747.

Programs were conducted in two of the facility's wind tunnels. One examined the static stability of the fighter designs and another the aerodynamic interaction between the 747 and the fighter—designated MF-5B.

In testing the fighter concept, three configurations were monitored through a wide range of flight speeds and attitudes.

In tests of the 747 and fighter together, data were acquired of the 747 in both a "clean" configuration and with the two fighter access bays open.

One aspect of such a fighter/transport combination—a Boeing concept—would be the increased time that fighter aircraft could remain on station in a combat zone.

★ June 30, 1977, is the deadline for the military services to submit to NASA the names of candidates for the Space Shuttle astronaut program.

The space agency called for the applications of civilian astronaut candidates last July, with a deadline also of June 30 this year. (See *September '76 issue*, p. 26.)

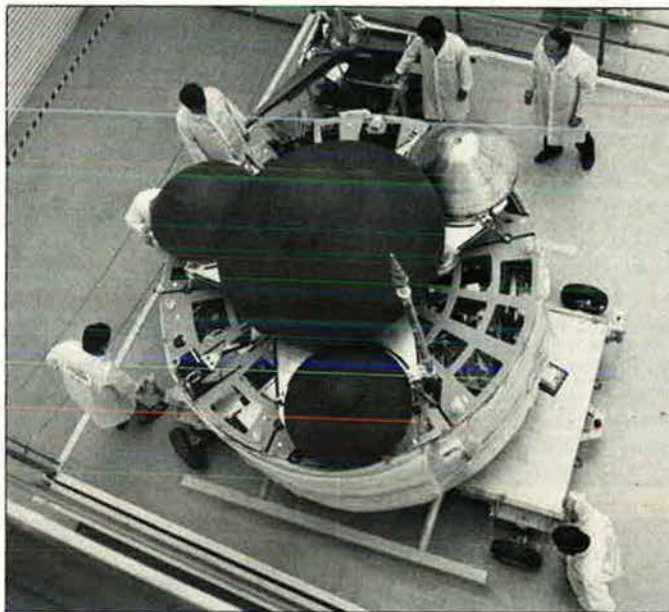
While each service is permitted to submit up to 100 applications,

it is expected that only USAF and the Navy will respond with the maximum.

Those selected for either pilot or mission-specialist training will be pooled with their civilian counterparts in a two-year training program scheduled to begin in July

1978 at the Johnson Space Center in Houston, Tex.

★ The Advanced Systems Division of AFSC's Human Resources Lab, Wright-Patterson AFB, Ohio, is undertaking an ambitious project in cost-accounting:



*Undergoing structural tests is a model of the probe-carrying vehicle that NASA is developing for a 1978 mission to the planet Venus.*

## SELECT COMMITTEE ISSUES SOMBER REPORT ON SEA MIAs

The House Select Committee on Missing Persons in Southeast Asia, after an investigation of fifteen months, has concluded that no evidence exists upon which to base a belief that American military personnel missing in Southeast Asia are still alive.

Additionally, the committee concluded that because of the circumstances of warfare in SEA, and the passage of time, only a partial accounting of those still missing could be hoped for, even with the cooperation of the respective Asian governments. (In any future negotiations, the committee recommended that the possibility of offering humanitarian aid should be considered, but not the payment of war reparations.)

Officials of the League of Families of American Prisoners and Missing in Southeast Asia objected strongly to the committee's findings and recommendations, averring, in effect, that the report would stifle further attempts to determine the fate of the missing. "While the committee has no evidence to confirm that any Americans are alive in SEA," said League Executive Director Carol Bates, "there is no evidence to confirm that they are all dead either."

In presenting its wrap-up report in December, the committee, which under authorizing legislation was then to disband, recommended among other things that:

- The House International Relations Committee assume responsibility for overseeing State Department negotiations with the SEA governments concerned in pressing for an accounting of those 1,400 Americans still missing and the repatriation of their remains where possible.

- The service Secretaries lift the moratorium on status changes and resume case reviews, in accordance with public law, of those still listed as missing in action in

Southeast Asia. The law, as it now stands, provides adequate legal protection of the MIAs and their next of kin, the committee said.

The committee reached its conclusions and recommendations following the testimony of about fifty witnesses and the scrutiny of hundreds of documents, including case histories on 300 of the missing men.

While a number of committee members harbored an initial belief that perhaps some of the missing Americans might be alive in Southeast Asia, all recognized the necessity to conduct the investigation with the utmost objectivity and impartiality, said committee chairman Rep. G. V. Montgomery (D-Miss.). The evidence, however, based on documentation and testimony of witnesses, including that of representatives of the intelligence community and the Departments of State and Defense, was overwhelming, and led the committee to its conclusions, Mr. Montgomery said. The committee staff members, who handled basic research during the investigation, concurred, the Mississippi congressman said.

According to the committee, "In no case after World War II or the Korean War did a serviceman return alive who had been MIA and later presumed dead in accordance with the Missing Persons Act."

The fear of some MIA family members that further status changes from MIA to presumed killed in action would erode the SEA governments' responsibility under the Paris accords to render an accounting is unfounded, the committee said in its report.

For their part, League officials insist that the committee went far beyond its entitled powers in reaching some conclusions, including those pertaining to questions of law and status changes.

"A four-phase study to determine the total life-cycle cost of an aeronautical system [read airplane] from exploratory development through deactivation from the operational inventory."

The study will include costs for support equipment, replacement parts, personnel, training, and fuel.

Officials hope the study will point the way toward a methodology that can be used to determine life-cycle costs of future systems, emphasizing human resources.

First phase of the study involves a close look, cost-wise, at the C-130E Hercules, to include the aircraft's maintainability and reliability. Boeing Aerospace Co., Seattle, will develop this data.

Next, the cost of ownership of the Advanced Medium Short Take-off and Landing Transport (AMST) will be examined, taking into account the number and training costs of maintenance personnel.

Third phase will be a study of the Air Force personnel structure, specifically projected to support AMST in the future.

Final phase will be an evaluation of the accuracy of estimates and projections.

★ **NEWS NOTES**—The American Institute of Aeronautics and Astro-

nautics has presented its top honor—the **Reed Aeronautics Award**—to **William C. Dietz**, a General Dynamics veteran of thirty-six years and currently Vice President Engineering for the upcoming F-16 Air Combat Fighter.

For the second failure in as many months, and following four successful test flights, an Air Force **AGM-86 Air Launched Cruise Missile**

recently crashed after low-level launch from a B-52 over the White Sands Missile Range in New Mexico. The matter is under investigation.

**Dr. Robert C. Seamans, Jr.**, former Secretary of the Air Force who is currently Administrator of the Energy Research and Development Administration, in December headed the **US delegation** to the



THE GROWING IMBALANCE BETWEEN COMBAT FORCES OF EAST AND WEST AND ITS IMPLICATIONS AND CONSEQUENCES ARE DETAILED IN

**JANE'S  
ALL THE WORLD'S AIRCRAFT 1976-77**

Edited by John W. R. Taylor

Russia's growing force of "Backfire" swing-wing bombers vs. the U.S. fleet of subsonic 1955-model B-52s . . . the Yak-36 "Forger" naval aircraft vs. the British Harrier and the U.S. Navy's F-14 Tomcat . . . the MiG-25 "Foxbat" and what examination of the one that landed in Japan last September did and did not show . . .

Once again, the latest edition of JANE'S ALL THE WORLD'S AIRCRAFT brings together the most up-to-date and accurate information essential to everyone involved in the aerospace business.

**JANE'S**  
A Division of  
Franklin Watts, Inc.  
730 Fifth Avenue, New York, N.Y. 10019

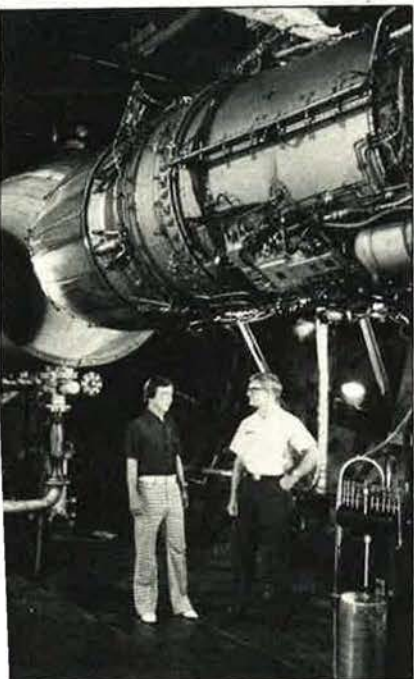
**You know you need the new Jane's. Order it now.**

TO: **JANE'S USA**/A Division of Franklin Watts, Inc.  
Department AM, 730 Fifth Avenue, New York, N.Y. 10019

Please send me \_\_\_\_\_ copies of JANE'S ALL THE WORLD'S AIRCRAFT 1976-77 (03260-4) @ \$72.50, plus \$2.00 shipping charge, per copy.

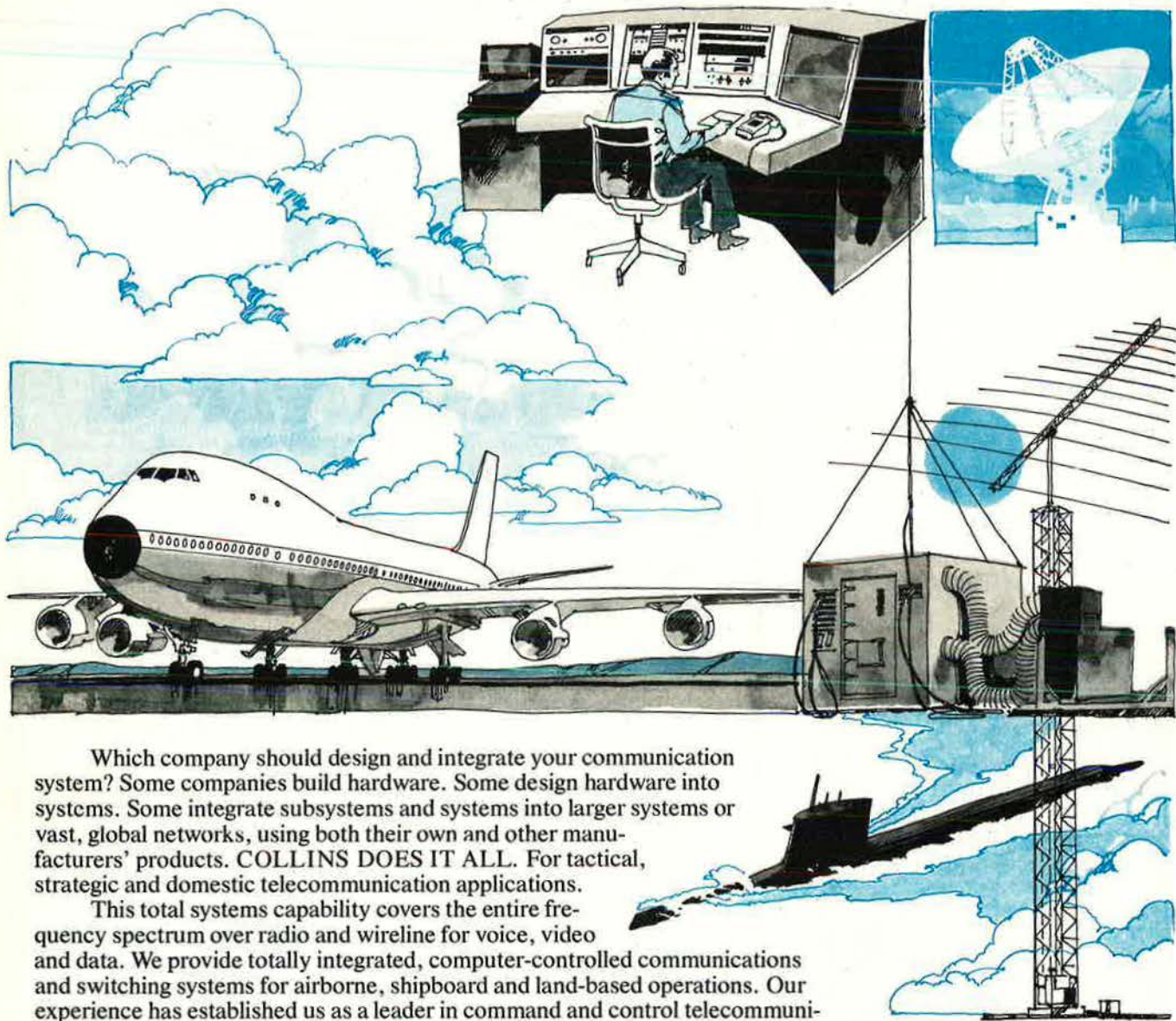
Enclosed is my check/money order for \$\_\_\_\_\_.  
(All orders must be accompanied by payment unless submitted on company purchase order.)

Name \_\_\_\_\_  
Company \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_



The highest jet engine thrust ever recorded was recently chalked up by the F-111 bomber powerplant, the GE F101, during recent verification tests.

# Large systems integration. Linking anywhere to everywhere with Collins communications.



Which company should design and integrate your communication system? Some companies build hardware. Some design hardware into systems. Some integrate subsystems and systems into larger systems or vast, global networks, using both their own and other manufacturers' products. **COLLINS DOES IT ALL.** For tactical, strategic and domestic telecommunication applications.

This total systems capability covers the entire frequency spectrum over radio and wireline for voice, video and data. We provide totally integrated, computer-controlled communications and switching systems for airborne, shipboard and land-based operations. Our experience has established us as a leader in command and control telecommunication systems and as an important partner in space and national defense.

**SOME CREDENTIALS.** Collins has contributed significantly to the success of the following programs:  APOLLO  VERDIN  TACAMO  TACTICAL DATA SYSTEMS  E-4A/E-4B AABNCP  E-3/ AWACS  AFSATCOM  AT&T DOMSAT  AN/TSC-60  SCOPE CONTROL  NAVY SATCOM.

In fact, we've participated in almost every major communications program in the Nation's Minimum Essential Emergency Communication Network. We also produce large and small earth stations for military, government and commercial satellite communications.

**COLLINS CAN SOLVE YOUR COMMUNICATIONS PROBLEMS. NOW.** We have the experience and capabilities to solve your global command and control communications needs with innovative systems designs, quality products and high performance standards.

For complete information, contact Collins Government Telecommunications Division, Rockwell International, Dallas, Texas, U.S.A. 75207. Telephone: (214) 690-5743.



**Rockwell  
International**

...where science gets down to business



AFLC's Gen. F. M. Rogers presents posthumous DSM to Patricia L. Barnes, the widow of Maj. Gen. Frank G. Barnes. The General was deputy chief of staff at Hq. AFLC at his death in September.

Fourth Meeting of the US/USSR Joint Committee on Cooperation in the Peaceful Uses of Atomic Energy held in Erevan, Armenian USSR.

In December, USAF accepted delivery of its last F-4 Phantom II;

## Tours Begin at NASM's Silver Hill Facility



The Smithsonian Institution's National Air and Space Museum on the Mall in the nation's capital opened on July 1, 1976, to instant acclaim. By year's end it had been visited by a phenomenal 5,000,000 people. (Most good museums consider 10,000 visitors a day as a large attendance; the Air and Space Museum has been running as high as 80,000.)

But because of space limitations, the Museum has now on display only sixty-five of its collection of 260 historically significant aircraft. The rest, aside from those on loan to other museums and institutions, languish unappreciated in storage at the Museum's storage and restoration facility at Silver Hill in Suitland, Md.

To remedy the situation, Museum officials in January 1977 inaugurated twice-daily tours of Silver Hill, located about five miles from the capital city.

At the twenty-one-acre Silver Hill facility, two large, hangar-like buildings, where aircraft and other aerospace artifacts are housed, will be open to public tours, as well as a third building where aircraft restorations are actually under way. Aircraft being worked on range from the ME 262, the world's first operational jet fighter, to a World War I Caudron twin-engine bomber.

The tours, conducted by volunteers and by reservation only, are at 10:00 a.m. and 2:00 p.m., Tuesday through Saturday. A special booth has been established at the Museum to accept reservations and to mail out confirmations and maps (telephone (202) 381-4056 between 9:00 a.m. and noon, Monday through Friday).

## Index to Advertisers

Aerospace Historian .....	98
Alkan USA, Inc. ....	66
Bell & Howell, Datatape Div. ....	Cover III
Boeing Co. ....	2 and 3
Collins Radio Group, Rockwell International .....	20
Grumman Aerospace Corp. ....	5
Jane's Yearbooks .....	19
McDonnell Douglas Corp. ....	Cover IV
Motorola Inc., Government Electronics Div. ....	28
Northrop Corp. ....	Cover II
Singer Co., Kearfott Products Div. ....	10 and 11
SNECMA .....	63
Thompson-CSF .....	64
United Technologies Corp., Norden Div. ....	26 and 27
United Technologies Corp., Pratt & Whitney Div. ....	49, 50, 51, and 52

AIR FORCE Magazine .....	67
--------------------------	----

the fighter, an E model with leading edge wing slats, was assigned to TAC's 4th TFW, Seymour Johnson AFB, N. C.

NORAD's Gen. Daniel James, Jr., has been presented the military Kitty Hawk "Sands of Time Award" for 1976, while the civilian version went to Lt. Gen. James H. Doolittle, USAF (Ret.). The awards are presented annually by the Los Angeles Area Chamber of Commerce.

**Died: Aleksandr A. Novikov**, chief of the Soviet Air Force in World War II, in December in Moscow following a long illness. He was seventy-six.

**Died: Marshal Ivan I. Yakubovskiy**, World War II tank leader whose latest post was as CINC of Warsaw Pact forces, in November in Moscow after a long bout with cancer. He was sixty-four. ■

The new Secretary of Defense is no stranger to the Pentagon, where he served, while in his thirties, as DDR&E and Secretary of the Air Force in the Kennedy and Johnson Administrations. He believes that to deter effectively, a military organization must be prepared to fight effectively.

# HAROLD BROWN Fourteenth Secret



—WIDE WORLD PHOTOS

*Harold Brown (right), President Carter's nominee for the post of Secretary of Defense, was escorted to the hearings on his nomination by Sen. John Stennis, Chairman of the Senate Armed Services Committee.*

**A**BOUT A decade ago, the then Secretary of the Air Force, appearing on a TV talk show, was asked whether he considered himself a hawk or a dove. He responded that he would like to be looked on as an owl.

That Secretary was Dr. Harold Brown, who returned to the Pentagon

last month after an eight-year absence, with hair a little grayer, though not appreciably longer, and with confidence intact.

With a change in administration, he had departed in February 1969 to become president of California Institute of Technology, after eighteen years of direct and indirect associa-

tion with the military, capped by four years as Secretary of the Air Force.

It was in 1961, with ten years' experience in weapons technology behind him, that he first set up residence in the Pentagon. At thirty-three years of age, he was appointed Director of Defense Research and Engineering (DDR&E) by the new Secretary of Defense, Robert S. McNamara. He held that post—the third highest in the DoD hierarchy—until he was appointed Secretary of the Air Force in 1965.

Precocious achievements were not new to Harold Brown. He graduated at fifteen from the Bronx High School of Science, a school for gifted children, with a '99.5 grade average. Two years later—before he was old enough to vote—he held a Phi Beta Kappa key and a bachelor's degree from Columbia College at Columbia University. He received his Ph.D. in physics at twenty-one and started lecturing in nuclear physics.

In 1952, he became a weapons scientist at Livermore Laboratory in California. There, with Dr. Edward Teller, father of the hydrogen bomb, he worked on developing weapons with the Atomic Energy Commission. By 1960, he was director of the laboratory.

Following two years as a consultant to the Air Force Scientific Advisory Board, he served as a member of that Board from 1958 to 1961. From 1956 to 1958, he was also a member of the Polaris Steering Committee.

He returns as Secretary of Defense after eight years of solid but low-profile management experience as president of Cal Tech, the first scientist to be Secretary of Defense.

Since his name became prominent as a potential member of the Carter team, Dr. Brown has been variously



# y of Defense

BY JIM TAYLOR, SENIOR EDITOR

categorized by the press as hawkish, arrogant, intense, high strung, introverted, shy, humorless, experienced, humorous, and dovish, along with a mixture of other assorted tags.

He was criticized for his concentration on technological matters at the expense of the human element, for having brought forth the idea of the multiservice TFX (later to be the F-111, but rejected by the Navy, which developed the F-14 instead), and both for killing the B-70 and for supporting development of the AMSA (Advanced Manned Strategic Aircraft—later to become the B-1). He has been characterized as a Vietnam hawk because of his support for tactical interdiction bombing in North Vietnam.

By still others he has been criticized for his advocacy of arms control, and for his role as a member of the US delegation to the Strategic Arms Limitation Talks since their beginning in 1969.

A review of his record as Secretary of the Air Force and discussions with persons who knew him then refute some of those charges.

Harold Brown came to the Air Force after many years in weapons development, aware of his lack of experience in personnel affairs. When traveling, he took his meals with airmen, NCOs, and junior officers. He held lengthy discussions with them and personally corresponded with those who had made suggestions or asked him questions.

While he continued to give considerable attention to people, and personnel matters, he remained devoted to technology in both a practical and a philosophical context.

"The habit of thinking logically and quantitatively, which technical training at its best induces in us," he said in a speech, "has created the

## Harold Brown's Statement After His Nomination To Be Defense Secretary

I'm honored by Governor Carter's confidence in me and humbled by the prospect of the challenging responsibility of being Secretary of Defense in his Administration.

As the President-elect has indicated on previous occasions, no obligation of a government takes precedence over the maintenance of peace and the security of its people. We must have a strong defense capable of that function and of fully supporting our vital foreign policy commitments. Moreover, it must be so perceived by our own people and by the rest of the world. These are the purposes of America's military forces and of the supporting structure that trains and equips them.

In performing as one of the diplomatic, military, and economic components of US policy in the world, the Defense Department must operate in the most efficient and effective way possible. An efficient, lean, muscular, responsive military organization is more likely to deter military action by others and, if necessary, to fight effectively.

The functions of the Secretary of Defense and Deputy Secretary and the civilian and military leaders who are their subordinates are, as I see them, as follows: to understand what maximum level of military effectiveness overall and in various categories of forces is achievable at various levels of resource allocation and to reach that level of effectiveness as closely as possible for any given level of expenditure; to join with the principal foreign policy and economic advisers to the President in recommending an appropriate combination of foreign policy commitments, military capability, and expenditures, and to advise on the corresponding strategies; and to ensure that our military forces are combat ready and will be combat effective whenever needed.

This is a big order.

Governor Carter, I pledge you my best efforts in working with my military and civilian colleagues in the Defense Department and elsewhere throughout the government. Knowing that no one's best can ever be good enough in so demanding a post, I am comforted, if that's the right word, by the knowledge that there will be many to advise, to exhort, and to correct me.

I'm proud to be a part of the new Administration and to have the opportunity to work toward its goals.

Thank you again.

great economic and social benefits which science and technology have given our society. They stand as the distinguishing mark of Western civilization in the last three centuries."

Air Force technical advancement and its applications improved under him. He was a strong advocate before Congress of greater tactical airlift and modernization of the tactical fighter force.

Dual basing for European units was conceived and implemented under his direction. So was in-flight refueling for F-106s, which proved

valuable in quickly moving them to South Korea at the time of the *Pueblo* crisis.

Under him OV-10s for forward air controllers were introduced and the conceptual definition of the F-15 was made. The aeromedical evacuation fleet was modernized with the introduction of the C-9A.

Dr. Brown was a strong advocate of the strategic missile program. The ICBM force was improved with introduction of the Minuteman II, and the Minuteman III was developed. He accelerated development of the

AMSA as a complement to the ICBMs.

Under him the C-5 was produced, so that the Air Force was able to airlift both soldiers and the heavy combat equipment they needed in a single aircraft. (It later proved vital to the survival of the Israelis in the 1973 Mideast conflict.)

He strongly supported the Air Force Reserve and Air National Guard. The Guard became 100 percent equipped, and three pieces of legislation to improve these forces were passed with Secretary Brown's support.

But as Secretary, he was equally persistent about cost reductions. Nearly half of all the savings realized in the Department of Defense during his four years as USAF's civilian chief were made in the Air Force.

As to his personal methods, an individual who worked close to Secretary Brown describes him as a voracious reader with a photographic memory who "would get impatient with anyone who tried to snow him, but never expected anyone below him to have all the answers. He just expected honest admissions when all the information wasn't immediately available." He is said to have been forgiving of honest mistakes and willing to give more credit than was sometimes due to those working for him.

While some service Secretaries keep a distinct division between civilian and military leadership, Dr. Brown met frequently with then Chief of Staff of the Air Force Gen. J. P. McConnell, often twice daily. He regarded his relationship with the Air Staff as a team effort and made a conscious effort to stimulate creative thinking among its members.

"There are three degrees of service," he once said. "The first is to

### ... And the New Deputy Secretary

Charles William Duncan, Jr., a prominent businessman from Houston, Tex., has been named Deputy Secretary of Defense.

He had been president of the family-owned Duncan Foods Co. when it was acquired by the Coca-Cola Co. in 1964. He became a vice president of Coca-Cola in 1965, executive vice president in 1970 and, in 1971, he moved to Atlanta as president. In 1974, he resigned to become board chairman of an investment banking firm.

At the time of his selection to be Deputy to Harold Brown, he still served on the board of directors of Coca-Cola (in which he is a major stockholder), three other large corporations, and as an advisory director of two additional corporations. He was on the board of trustees of three universities, a children's hospital, and the Houston Symphony Society.

Mr. Duncan was in the Army Air Forces from 1944 to 1946; he was still an aviation cadet when the war ended. He remained in the Air Force Reserve until 1957, departing as a captain.

He holds a degree in chemical engineering from Rice University, and did two years of graduate work in management at the University of Texas.

An avid hunter and fisherman, Mr. Duncan spends leisure time at his ranch in Cody, Wyo. Like his new boss, he is a tennis enthusiast.

family, the second to the state, the third to time. Each has its own rewards. The first brings contentment, the second gratification, and the third a legacy."

Brown husbanded his time, and was a hard and dedicated worker. He spent at least twelve hours a day in his office, including Saturdays, and took work home at night. For

mental relaxation he read detective novels, sometimes a half dozen over his short weekend. For physical relaxation he played tightly scheduled games of tennis a couple of days each week.

While some of Secretary Brown's decisions have been questioned, especially by those whose vision improves as they look backward, before going to Cal Tech he expressed his own view of the consequences of decision-making:

"You inevitably have to face all the negative consequences of the decisions that you make. And, therefore, the decisions that you didn't make always look much more appealing in retrospect. The further you go back, the more attractive the alternatives look because the less clear it is what the negative effects would have been."

Which way will he decide on the big one—to recommend continuing production of the B-1 or not?

In a letter he sent Sen. William Proxmire (D-Wis.) last May, Dr. Brown is quoted as having said that proponents of the B-1 "have the best of the argument in terms of accuracy, clarity of assumptions, and defensibility of conclusions."

However, during the Presidential campaign, his new boss described the B-1 as wasteful of taxpayers' dollars. Political realities may thus influence Secretary Brown's recommendation. (He describes himself as a pragmatist and not an ideologue.) During the press conference immediately following the announcement of his selection, he said in regard to the B-1, "I think it would be premature for me to reach a position to recommend to him [President Carter] before I have had a chance to look at it in office."

What about the Defense budget?

In his prepared statement (*see p. 23*) at the announcement of his

selection, Dr. Brown pictured the future of Defense in terms of "lean" and "muscular." He is on record as instituting economies within the Air Force, in spite of the Vietnam War, while improving its overall capabilities.

In responding to a question of how \$5 to \$7 billion could be cut from the Defense budget, as proposed by President Carter during his campaign, and still keep up with the Soviets, the new Secretary replied:

"I think that the confusion results from the word 'cut' rather than the word 'savings.' There is no intention to cut US military capabilities. In fact, I think it's going to be necessary to increase them. That means that over a period of years the budget would probably have to continue to rise.

"But I believe it can rise at a lower rate than had been planned by the earlier Administration. And that difference will come from savings—things that cost money but that in fact do not contribute to US military capability."

In a subsequent interview, Dr. Brown commented on personnel costs, including fringe benefits, for possible reductions. "The whole pay structure needs to be looked at," he said. "Since military personnel costs run fifty-five percent of the total Defense budget—including roughly \$8 billion in pension costs, which is seven percent all by itself—a proper balance among costs, value of services, and fair treatment of the individual has to be struck."

What about SALT?

A person who worked near him during his Air Force days had some judgments on Dr. Brown's beliefs. He said that the new Secretary knows intuitively, far more than most, the destructive power of nuclear weapons. He designed them;



*Air Force Secretary from October 1965 until February 1969, Harold Brown mingled with the people of USAF when he could. Here he's at Korat RTAFB in the spring of '68.*

he worked on them. "But he is no dove."

In the TV interview referred to previously, he said:

"I think that arms negotiations have to be pursued in the interests of the United States and the interests of the world, too. In so doing, our aim is to increase our security, and I think we should not make any agreements that decrease our secur-

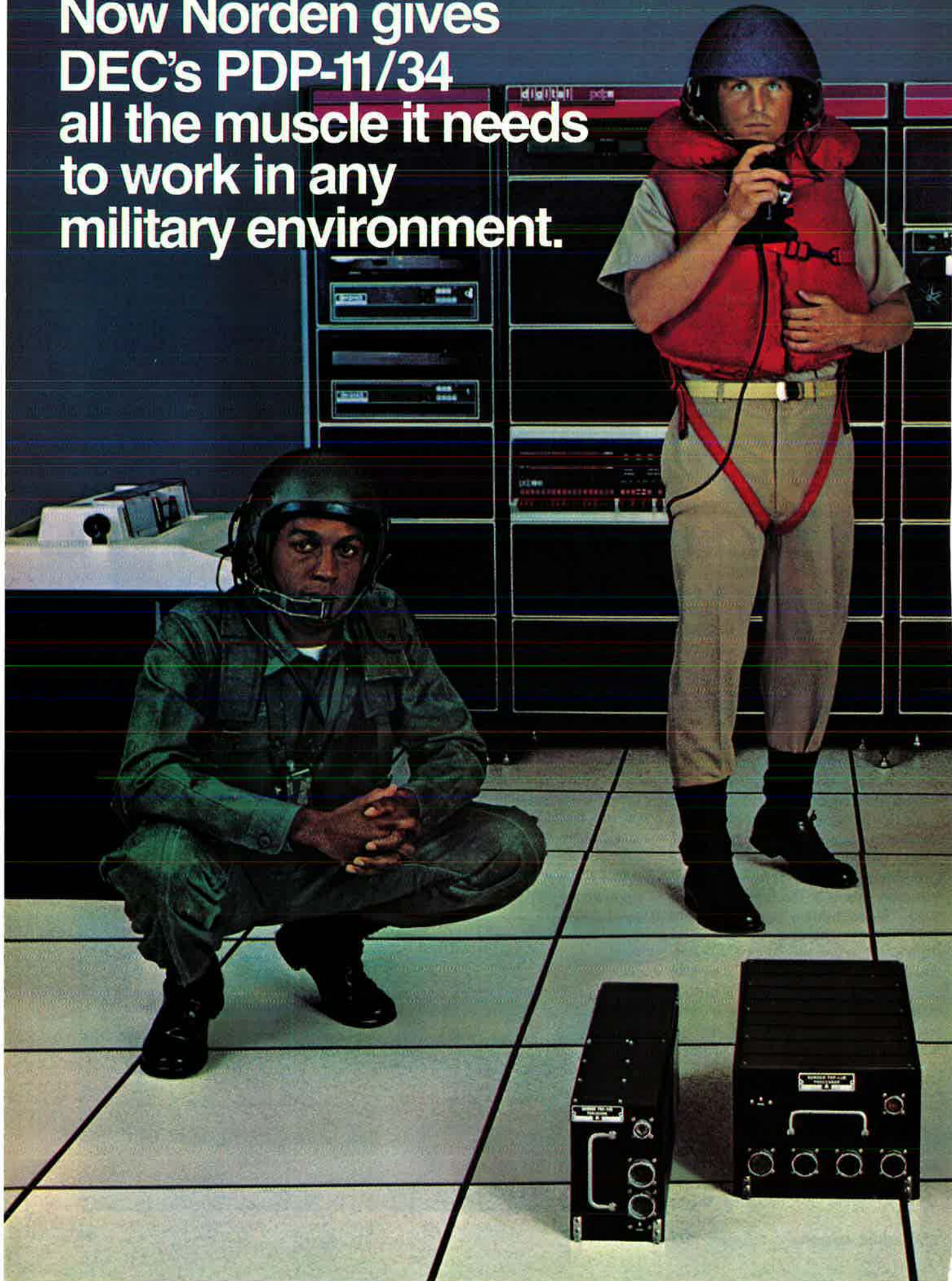
ity. And one can define that as tough or not. To me it is merely sensible."

What kind of Secretary of Defense will Harold Brown be, and what kind of decisions (there are many more waiting in the wings) will he make? We have some indicators, but along with the pundits and prognosticators, we will have to wait—and observe. ■

#### SECRETARIES OF DEFENSE

James V. Forrestal	September 1947—March 1949
Louis Johnson	March 1949—September 1950
George Catlett Marshall	September 1950—September 1951
Robert A. Lovett	September 1951—January 1953
Charles E. Wilson	January 1953—October 1957
Neil H. McElroy	October 1957—December 1959
Thomas S. Gates, Jr.	December 1959—January 1961
Robert S. McNamara	January 1961—February 1968
Clark M. Clifford	March 1968—January 1969
Melvin R. Laird	January 1969—January 1973
Elliot L. Richardson	January 1973—May 1973
James R. Schlesinger	July 1973—November 1975
Donald H. Rumsfeld	November 1975—January 1977
Harold Brown	January 1977—

Now Norden gives  
DEC's PDP-11/34  
all the muscle it needs  
to work in any  
military environment.





### **Announcing the new PDP-11/34M in half ATR and full ATR versions**

First of a family of military computers to spring from the union of Norden's experience in high technology military electronics and DEC's leadership in minicomputers.

The PDP-11/34M has the muscle for severe environment operation, meeting airborne (MIL-E-5400), shipborne (MIL-E-16400), and land based (MIL-E-4158) specs. It's packaged in a compact half ATR chassis or a versatile full ATR chassis each with cooling and mounting options.

### **Fully compatible with PDP-11**

The PDP-11/34M is completely compatible with DEC's commercial counterpart. Thus, the most extensive, proven software in the mini-computer industry is now available on a true military computer. Powerful, efficient operating systems cover single user, time-sharing, real-time, and multi-function choices included in RT-11, RSX-11, and RSTS/E. High level languages include MACRO-assembler FORTRAN, FORTRAN Plus, COBOL, BASIC and BASIC Plus.

### **Extensive features**

The Norden PDP-11/34M comes with the extended PDP-11 instruction set (over 400 instructions); multiple register architecture; hardware stack processing; multiple priority level vectored interrupts; and integral direct memory addressing (DMA).

What's more, the PDP-11/34M can be configured with up to 124K words of byte parity core memory using 16K or 32K word modules, and with a memory management system for program protection—plus a floating point processor for high speed number crunching.

In addition, it boasts integral CPU and memory diagnostics. And large selection of peripherals and interfaces.

### **An unbeatable combination**

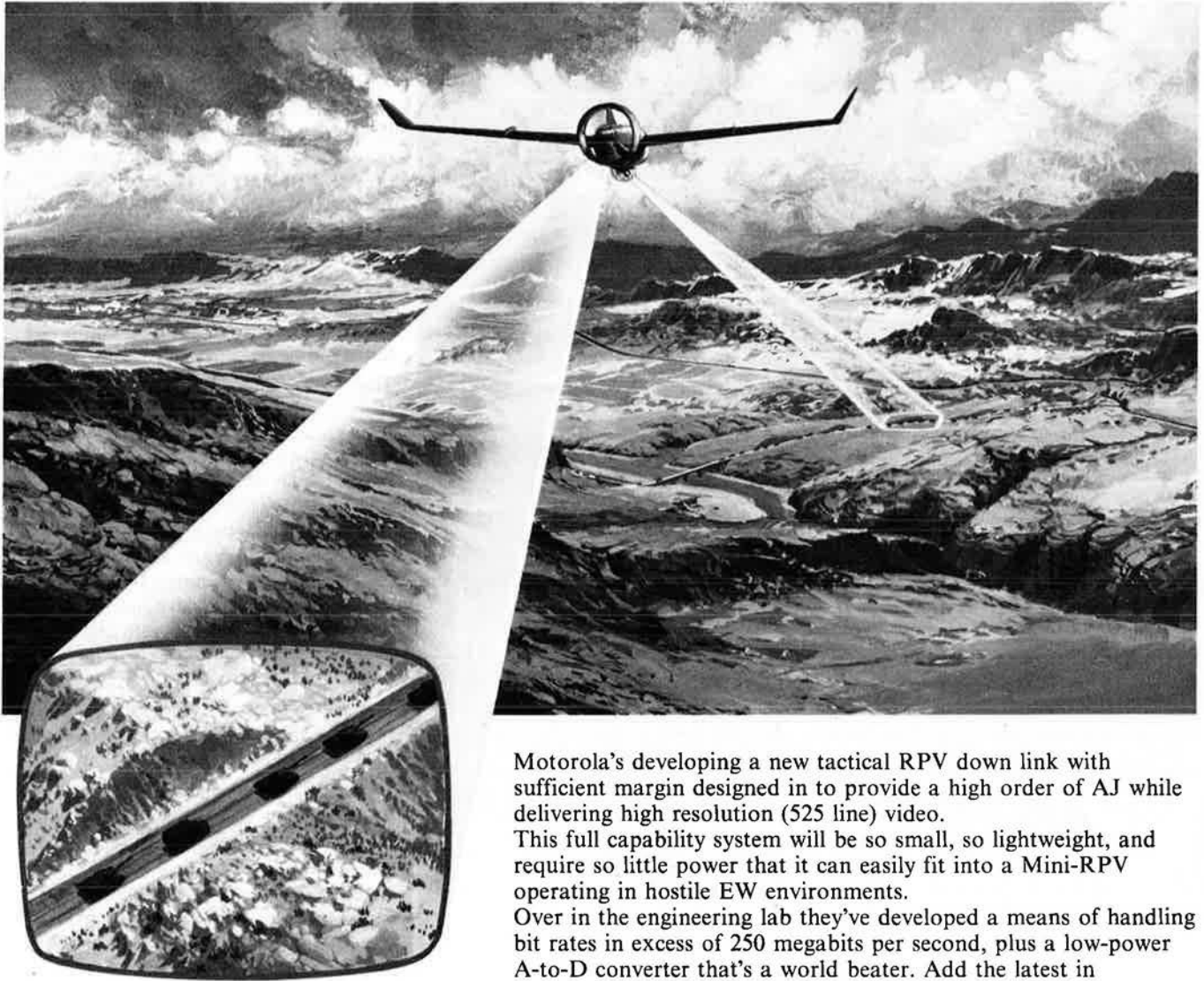
Add it up and you get a military computer so muscular, so powerful, and so easy to use, it makes the others look like under-achievers. To learn more, write or call Marketing Manager, Computer Products Center, Norden Division, United Technologies Corporation, Norwalk, CT 06856. (203-838-4471)

### **PDP-11 data processing with military muscle**

# **NORDEN**

Division of  
 **UNITED  
TECHNOLOGIES®**

# A secure RPV down link that delivers high-resolution video.



Motorola's developing a new tactical RPV down link with sufficient margin designed in to provide a high order of AJ while delivering high resolution (525 line) video.

This full capability system will be so small, so lightweight, and require so little power that it can easily fit into a Mini-RPV operating in hostile EW environments.

Over in the engineering lab they've developed a means of handling bit rates in excess of 250 megabits per second, plus a low-power A-to-D converter that's a world beater. Add the latest in bandwidth compression technology and a frame store memory, then you can make additional tradeoffs between frame rates and AJ margin to match your mission requirements.

We think they have thought of everything. . . even EIA standard RS-170 plug-to-plug compatibility in this easily transportable system that's built for quick set-up and knock-down.

For more information about Motorola's secure RPV down link, or about our field-proven uplink systems for over-the-horizon command and control, call Ronald Levetin at (602) 949-4215 or write him at Motorola Government Electronics Division, P.O.Box 1417 (MD 3240), Scottsdale, AZ 85252.



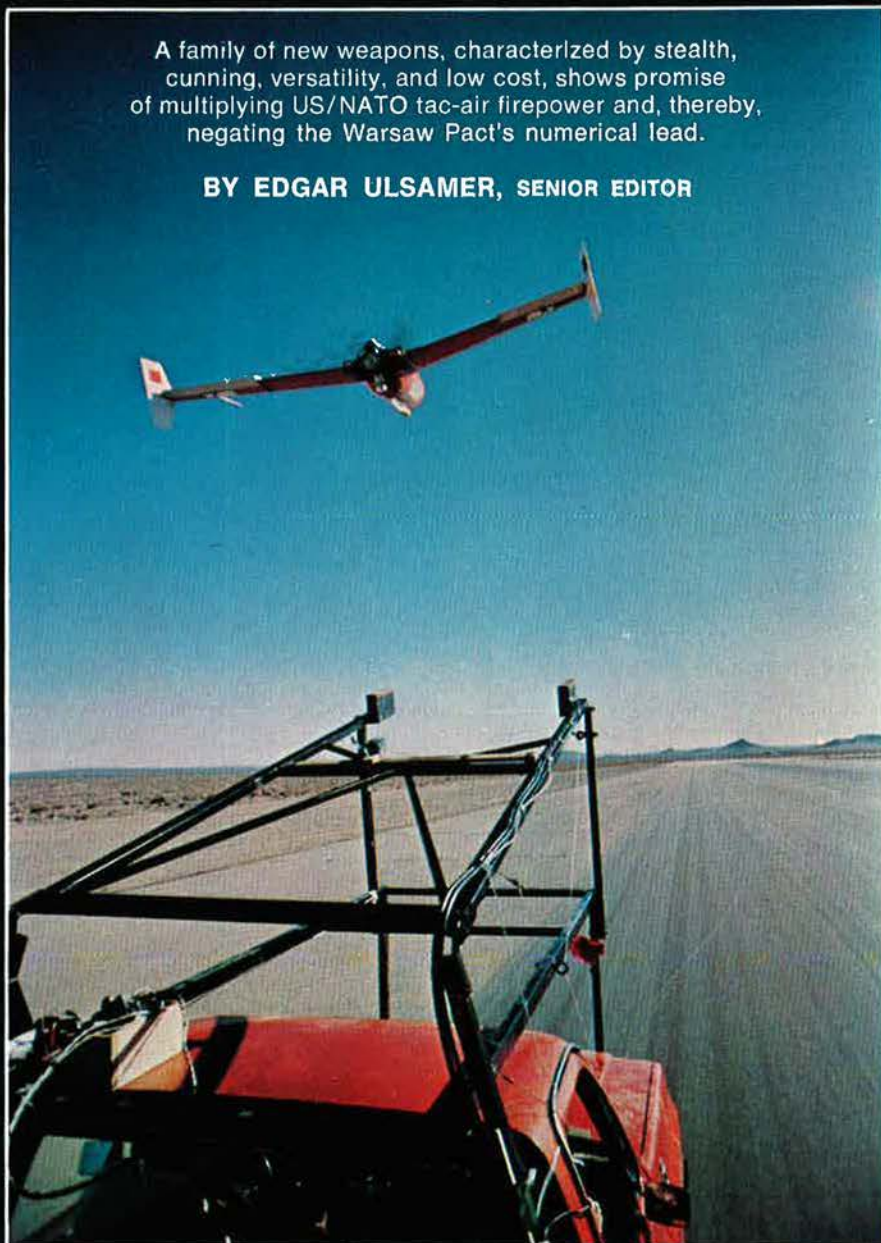
**MOTOROLA**

The mind to imagine . . . the skill to do

# Flying Robots With a Lethal Sting

A family of new weapons, characterized by stealth, cunning, versatility, and low cost, shows promise of multiplying US/NATO tac-air firepower and, thereby, negating the Warsaw Pact's numerical lead.

BY EDGAR ULSAMER, SENIOR EDITOR



**E**XCEPT for providing US strategic deterrence, the Defense Department's most important job is to create and maintain the tactical warfare capabilities needed to counter the Warsaw Pact's blitzkrieg threat against NATO. There is little chance that the new Administration would or could alter this pivotal priority.

The underlying facts provide no latitude for differing interpretations: The relentless quantitative and qualitative buildup in the Pact's military capabilities is causing a bad situation to get worse. Sens. Sam Nunn (D-Ga.) and Dewey Bartlett (R-Okla.), following a recent two-week fact-finding tour of NATO installations,

outlined the problem in this joint statement:

As the Warsaw Pact capability to attack from a standing start grows relative to NATO's defensive capacity, so does the likelihood that the Warsaw Pact would be already on the Rhine when the NATO decision is made to use nuclear weapons. . . . The Soviets have provided their non-nuclear forces deployed opposite West Germany an ability to initiate a potentially devastating invasion of Europe with as little as a few days' warning. This is evident in a growing emphasis on readiness, mobility, and firepower of the Soviet Army; in recent military exercises; in the dramatic transformation of Soviet tactical aviation from a defensive force into a hard-hitting offensive air armada of expanded reach; and in the concentration of the Soviet Navy on developing a capability to neutralize the US Sixth Fleet—particularly aircraft carriers—in the first days of a conflict. The viability of NATO's current strategy of flexible response in the use of conventional nonnuclear, tactical nuclear, and strategic nuclear forces is now open to serious question.

Current NATO planning, Senator Nunn argues, is seriously flawed: "Trading space for time works only if one has abundant space to trade and plenty of time to trade it." NATO clearly has neither. It is equally clear—and so admitted by Gen. Alexander M. Haig, Jr., Commander in Chief, US European Command—that a symbolic trip-wire force is no longer effective or credible in an era of perceived nuclear parity between the US and the USSR.

The most pronounced need is fundamental enhancement of NATO's conventional warfare capabilities, especially, as Senators Nunn and Bartlett point out, "a quantum jump in conventional firepower." Translated into specifics, the Pentagon's answer to the new Warsaw Pact challenge is an explicit policy of "clear superiority—not just equivalence—in tactical airpower and, in particular, tactical airpower operating in intimate relationship to the field forces." The quote is from Dr. Malcolm R. Currie, Director of Defense Research

and Engineering. "Superior fixed-wing and rotary-wing aircraft, superior target acquisition, superior command and control, superior firepower, and ordnance from these platforms" are key elements of his prescription for overcoming the Pact's twin advantage of superior numbers and surprise. "The successful application of our tactical airpower is essential," he said, if the NATO defenders "are to achieve the rapid mobility, the intensity, and the precision of firepower that can defeat massed, swiftly moving armor and change the nature of land combat."

### New Hardware for the Air-Land Battle

A potential NATO/Pact war is likely to place US airpower in an unaccustomed, uncomfortable position: Lack of air superiority. As William E. Stoney, OSD's Deputy Director of Defense Research and Engineering for Tactical Warfare Programs, told AIR FORCE Magazine: "The new NATO scenario is different from any that US tactical airpower faced in the past. There will be far more time-dependence and we will be on the defensive for the first time." According to Gen. Robert J.



AFSC's Aeronautical Systems Division, in concert with ARPA, is testing three different designs for mini-RPVs involving entries by Northrop (above), E-Systems' Melpar Division, and Lockheed.



Dixon, Commander of Tactical Air Command, "If the whistle blows" the Soviets could have 1,800 of their advanced, long-range, large-payload fighters "over NATO territory within thirty minutes."

Integrating the functions of surveillance, target acquisition, and command and control through the E-3A AWACS, thus giving the battle commander real-time intelligence and force execution, is being counted on to multiply the lethality of NATO forces. To assure jam-resistant surface and air communications and data links essential for command

modern tactical airpower involves coping with the extremely dense and lethal air defense system manned by air defense forces and those organic to the Pact's ground forces without being distracted from the primary job—the blunting of the armored attack. The dominant and obvious need is for more suppression and standoff capability combined with a boost in kills-per-pass and greater aircraft survivability. The electro-optical and imaging infrared (I<sup>2</sup>R) versions of Maverick and GBU-15 as well as the helicopter-launched Hellfire missile probably provide as

is a sophisticated model airplane cum warhead operating in a kamikaze mode. Its onboard sensors and mini-processors provide it with enough artificial intelligence to play cat and mouse with hostile air defense radar. The weapon, according to Dr. Heilmeyer, is "smart" to the extent that it isn't thwarted when the enemy turns off his air defense radar emitters.

In such a case the mini-RPV loiters in the area, lying in wait until he goes on the air again. In each round of such a cat-and-mouse game, the harassment drone gets closer



*The E-45 twin-boom harassment demonstration vehicle of E-Systems' Melpar Division is shown during recent concept validation test flights at Nellis AFB, Nev. (above), and in wind-tunnel testing (left).*

much standoff against mobile, hardened targets as the technological state of the art permits over the near term. The solution of the suppression problem, at least to a limited degree, may be in hand in the form of mini-RPVs, although a number of others, outside the scope of this article, are equally promising.

Among the most promising developments in this context is the harassment drone, an R&D project of the Defense Advanced Research Projects Agency (DARPA), the United States Air Force, and the armed forces of West Germany. This system, DARPA Director Dr. George H. Heilmeyer told this reporter, is a mini-RPV that homes on hostile radar emitters. The harassment drone

to the target until it finally strikes. In both an operational as well as a cost-effectiveness sense, the harassment mini-RPV appears to have the edge over the adversary: "We can afford to put large numbers of these vehicles into localized areas. They don't represent a command and control problem because they can be made fully autonomous and they function without encroaching on friendly manned aircraft operating in the same area. Because they have an endurance over the designated battle area of between four and five hours, their effect on the enemy's air defense is major. The enemy has one of three choices. He can stay down, in terms of radar, until they do run out of endurance. In that case, our manned aircraft and other systems have free access to the airspace, which is likely to cause him staggering losses. His second choice is to stay on the air and take his losses, which may prove equally costly. His third, and most likely,

and control and standoff weapons, the Joint Tactical Information Distribution System (JTIDS) is scheduled for installation in AWACS and several combat aircraft.

The second set of challenges to

choice is to engage the harassment RPVs, which, because of their low observables, are hard to find and attack, a fact that has been demonstrated convincingly in a series of test flights. The draw-down on his own force is far greater than our own since we can deploy these low-cost weapons in large numbers. For the first time, it seems that we are on the right side of the exchange," according to Dr. Heilmeyer.

A mini-RPV of even greater potential for influencing the air-land battle in Europe is the air-loitering mine, in effect an airborne sensor



*Top view is of Melpar's single-tail-boom pusher powered by Roper 3.5-hp., single-cylinder, two-cycle engine. Above is another Melpar design on its launcher. Northrop's "Flying Wing" mini-RPV, right, is powered by a Kolbo D274 8.5-hp., twin-cylinder, two-cycle engine.*

with a warhead. Like the harassment RPV, the loiter mine can be deployed in large numbers to specific areas where it searches out the "signature" of its targets, most likely tanks. Once its microprocessor is convinced that there is unambiguous target information, it delivers its warhead directly on the target.

The loiter mine is small, quiet, and unobtrusive in other ways. Operational tests show that it can come within about 500 feet of its target without serious fear of detection. From such short distances, the loiter mine's sensors can make out the target with precision to reduce the chance of false alarm. If there is doubt, the weapon's miniature computer can break the lock-on, direct the vehicle to make a yet closer



pass, and, depending on its findings, attack or break off the engagement. Because of the relatively high value of the targets loiter mines are meant to deal with—\$500,000 plus armor, heavy artillery, or armored personnel carriers—it makes sense eco-

nomically to equip them with a combination of sensors. Tests to date have proved the feasibility of millimeter wave, acoustic, radar, infrared, and electro-optical sensors.

A number of operational concepts for loiter mines are under examination, including launching large numbers by rocket to extend their range. Once airborne, swarms of loiter mines would fly toward their pre-assigned target areas up to 100 miles away. On arrival, the weapons loiter in specified sectors covering several square kilometers where they go into a random search pattern until they spot a target. Several of the sensors can function at night or under poor weather conditions. Under such conditions, the enemy's ability to detect and engage them is virtually nil.

A novel approach that's being tested aboard RPVs is two-color IR or infrared sensors working in two band-widths, with a microprocessor comparing and correlating their individual findings. Such a system can differentiate between a "live tank" and a burning one and thereby cut

back on unproductive attacks and false alarms brought on by sun glints, camp fires, and similar distractions.

### The AEQUARE Miniature RPV

Other miniature remotely piloted vehicle concepts developed and tested by DARPA and the services include a range of applications tailored to high-threat environments where these low-cost vehicles can augment or replace manned aircraft or full-size, more expensive RPVs. Over the past few years, DARPA and the Air Force have conducted test flights of a small RPV weighing about 100 pounds to establish its capability in surveillance and target-designation missions. Known as the AEQUARE program, one of these approaches provides a loiterable sensor platform with standoff capability. This unusual vehicle is stored, with wings folded, in a pod carried under the wing of an F-4. The pod, or canister, can be tossed up in glide-bomb fashion to increase the weapon's range by as much as fifty miles. Toward the end of the glide the pod deploys a drogue parachute that slows the canister's descent. The pod then opens and a large parachute extracts AEQUARE, which begins its preprogrammed flight plan while radio control and data transfer links are being established. AEQUARE, an unarmed system, is reusable. The loiter mines and harassment drones that carry warheads must be prevented from returning to friendly territory and aren't reusable. AEQUARE also can be ground-launched from a rocket-powered pod to make it compatible with ground-based target designation and surveillance systems.

AEQUARE can be controlled from ground stations hundreds of miles away while the F-4 "mother-ship" acts as a relay point. Basic control is carried out by an on-board miniature autopilot that, in turn, reacts to commands from a ground-control center, according to Dr. Heilmeier. In case that command link is broken, the RPV automatically goes into a series of climbing turns until control is reestablished. AEQUARE can carry a small television camera and laser target designator that are used to direct laser-guided bombs or other weapons.

The remotely located pilot/operator uses the TV system to keep a target in the crosshairs of the sight, which is coupled to the laser designator.

One of the system's key attractions is its ability to fly underneath low cloud cover significantly lower than the minimum operating altitude of manned combat aircraft. The attack aircraft uses its own radar and a radar beacon on the AEQUARE to establish the relative position of the two vehicles so that a laser-guided weapon can be given initial directions.

Like all other mini-RPVs, AEQUARE is not fully invulnerable to attack by ground-based weapons or fighter aircraft. But, as DARPA's chief of the airborne systems, Kenneth Perko, points out, it is very hard to see and "almost undetectable by contemporary fire-control radars." Obviously, data links can be electronically jammed. For this reason, DARPA developed and tested novel concepts of coding and data compression to be used in connection with spread spectrum techniques to reduce the RPV's susceptibility to jamming. One payoff of this DARPA work is the ability to reduce the amount of information transmitted by the on-board TV sensor almost 1,000-to-one and still retain the relatively high pictorial resolution needed for battlefield use. This system, known as the Integrated Communications-Navigation System (ICNS), also limits vulnerability to interference through an airborne adaptive antenna and a ground-based antenna that seeks out frequencies not affected by hostile jammers. Test results of the AEQUARE program are being reviewed to optimize the weapon's final configuration.

Another promising mini-RPV program, Aquila, is under full-scale test by the US Army. Among Aquila's potential missions are real-time, "over-the-hill" scouting, photographic reconnaissance, and a number of target designating tasks. This recoverable system can be launched from a truck-mounted pneumatic catapult and is powered by a shrouded pusher propeller. Upon completion of its mission, the vehicle is flown into a special net for recovery. Various combinations of sensors can be used by the Aquila family of mini-RPVs.

### Army Applications

Mini-RPVs appear to be the front-runner for solving one of the toughest technological problems associated with the land combat phase of a NATO war, the ability to locate hostile artillery, rockets, and mortars. In-depth studies by DARPA in conjunction with the Army and the Marine Corps point up the potential of a small, lightweight, high-performance radar for mini-RPVs. Such a radar system was test-flown on a mini-RPV last year. The sensor incorporates the latest in radar technology, with a significant part of its processor and all of the data displays on the ground. The airborne portion of the system weighs only about thirty-five pounds and could be mass-produced at a unit cost of about \$18,000, according to the DARPA executive. Further work on this program is being carried out to establish the degree of accuracy with which an RPV-borne radar can detect the signature of artillery. Actual target designation could be through a millimeter wave system rather than laser, in order to be effective in clouds or dusty environments.

Another approach to locating hostile mortars under investigation by DARPA centers on a system combining forward-looking IR and laser radar. The IR array stares just above the horizon to detect objects resembling a mortar projectile; whenever it does, a laser radar is activated to confirm the target and produce accurate position data. The mortar can then be struck by a variety of weapons.

A third avenue being pursued by DARPA, and the US Army is development and test of IR-guided projectiles. The underlying principle is that artillery tubes retain their heat after firing and can be used as an automatic target acquisition aid for locating enemy artillery. A two-color IR seeker that furnishes spatial and temperature discrimination is being tested for this mission. The Army Armament Command has exploited DARPA's work on guided projectiles to demonstrate also the feasibility of using such rounds against operating tanks.

The recent technological advance that makes possible IR seekers for fire-and-forget weapons is the IR

charge coupled device (CCD), a revolutionary solid-state technique that combines IR detection and processing on the same chip. The net gain for IR applications is lower cost and greater capability.

Another major program to acquire moving targets is the Army's Standoff Target Acquisition System (SOTAS), which is being field-tested jointly with USAF. SOTAS consists of a helicopter-borne moving target indicator (MTI) radar with MTI data adjusted for helicopter position and displayed as real-time target information at a central command control point. It has been tested on a tank company, an artillery convoy, helicopters, personnel, and an assembly area. SOTAS information was passed to an F-4 which launched smart glide bombs against the targets from a standoff position.

### New Area Weapons

There is consensus among Pentagon leaders that an indispensable tool for NATO war scenarios is area denial weapons that can negate massed armor and artillery. In many instances these weapons may be the key to increasing the kills per pass required to offset the Warsaw Pact's numerical superiority leads. Specifically, Dr. Currie advocates, such a system should enable the pilot to attack from below 200 feet while flying at moderate speeds, provided that the attendant technical problems of pattern control and safe fuzing can be solved. A really effective area munition, Dr. Currie argues, "would reduce the need for truly precision delivery, which would be a real plus under marginal weather conditions; it would have high lethality in the area of contact, in many cases affording multiple kills per pass; and it would be extremely difficult to counter. One approach we believe holds promise is the terminally guided submunition. If we can produce such a weapon, and if we can provide it at an affordable cost, it would have sound application for medium- and low-altitude attack and also for surface-to-surface systems."

There is no argument about the categorical need for a low-level dispenser of area munitions. But there are different schools of thought on how to do the job. A concept sug-

gested by Mr. Stoney and his staff and under critical review by the Air Force centers on dispensing area munitions from side-looking pods installed on A-10 close air support aircraft. The intrinsic "hardness" of the A-10 in regard to small-arms fire and smaller caliber anti-aircraft guns underlies DDR&E's concept of "flying under the enemy's air defenses" at altitudes below 200 feet and at speeds of about 250 knots. The technique is a variation of a concept for dispensing area weapons to the side developed by Panavia GmbH with USAF cooperation for the British-German-Italian MRCA (multirole combat aircraft), now known as Tornado. It is essentially a box hanging under the aircraft with cylindrical holes on both sides through which up to 4,700 antiarmor area munitions can be spewed out. Small charges, activated by the pilot, dispense the munitions. The advantage of this technique over vertical drops is better pattern control due to the ability to dispense at slower speeds from minimum altitude.

DDR&E's preference for using this or a similar technique on the A-10 rests on the latter's great payload, survivability, and maneuverability, which combined can increase the numbers of kills per pass. The problematical aspect of the scheme is its dependence on terminally guided antiarmor submunitions, which do not exist yet. This caveat does not apply to airbase attacks where terminal guidance is not needed.

While there is no consensus on whether millimeter-wave length or IR-guided submunitions can be produced at an affordable price, there is widespread agreement that greater emphasis must be placed on the development of new area weapons and their aerial deployment to augment "smart" weapons. Emphasis here is on fuel air explosives (FAEs), weapons that create a cloud of fuel mixed with air that is detonated by a number of simultaneously activated charges. The result is similar to the explosion of a propane tank truck. Used against armor, FAEs will not necessarily destroy the vehicle, but will be lethal to the crews through overpressure and heat as long as there are any openings in the tanks or armored personnel carriers.

Area munitions, according to C. R. Myers, Jr., ODDR&E's Assistant Director for Air Warfare, also can play a major role in a NATO scenario. Delivered by ballistic surface-to-surface missiles (SSMs) or by land-launched cruise missiles with a range of about 250 miles and a flight time of six to seven minutes for ballistic missiles and about twenty minutes for cruise missiles, weapons of this kind can be used to attack enemy airfields. Unlike theater nuclear armed missiles, those dispensing area munitions need not be mobile or hardened beyond some protection from sabotage, since they would be launched at the time of attack. (Although NATO scenarios presuppose a surprise attack by Pact forces, it is assumed that there will be some warning.) The resultant savings in both cost and manning make it possible to deploy large numbers of these weapons. DDR&E's rationale for area weapon-dispensing SSMs and ground-launched cruise missiles (GLCMs) is that, although enemy aircraft will have taken off before our weapons are fired, destruction of their home bases will force the enemy to divert returning aircraft to his dispersed operating bases. Since dispersed bases do not have the heavy air defenses and hardening of primary bases, they make ideal targets for USAF manned aircraft.

If and when terminally guided submunitions become available, missile-delivered area weapons could be used against enemy armor, according to Mr. Myers. (Some experts are less sanguine about this approach.) Other payloads might be aerially-emplaced mines; the antiarmor Gator that also can be fuzed for personnel targets, the antivehicular Grasshopper, and the shallow-water antiarmor Piranha mines.

In Dr. Currie's view, the range of weapons now under development by all services and NATO, combined with the current broad modernization of USAF's tactical aircraft arsenal, amounts to "a revolution in tactical warfare." It provides us an opportunity "to maintain the balance of power convincingly in our favor, even in the face of staggering momentum and numerical odds" on the part of the Warsaw Pact forces. ■

The balance between opposed missile forces depends on interactions among several missile characteristics and their relevance to targeting doctrines. The author herein provides serious students of defense affairs the basic tools for reaching independent conclusions pertinent to present and future US strategic programs.

# A MANUAL OF MISSILE CAPABILITY

BY ROBERT SHERMAN

AS EVERYONE who reads the newspapers knows, the United States strategic nuclear missile force is superior to that of the Soviet Union in terms of accuracy, numbers of warheads, and reliability, while the Soviet force is superior in terms of throw-weight, yield, and numbers of missiles.

But you could read every word that has been printed in the general press and still not have the foggiest idea of how these various superiorities and inferiorities fall into a pattern in which one force or the other possesses overall superiority. Neither would you have any means of judging whether a particular change in either force, for example one which reduces megatonnage but increases the number of warheads, is desirable or undesirable. True, you could read a great many pronouncements by highly vocal groups arguing that accuracy and numbers of warheads are the most important things, and by equally vocal groups answering that, on the contrary, it is throw-weight and numbers of missiles that are the basic determinants of capability. Since the first groups appear to be motivated by a desire to make the US position appear stronger so as to reduce the apparent need for military spending, and the second appear to have the opposite purpose for the opposite reason, both must be to an extent disregarded. The intellectually honest citizen who wishes to proceed from evidence through reasoning to conclusion, rather than starting with his conclusion and working backward, is given no way to do so.

The purpose of this article is to fill that gap. I will discuss the raw missile characteristics of yield, inaccuracy, throw-weight, numbers, and reliability, and show how they interact and how they can be combined to calculate the capability to destroy certain types of targets. It is not my purpose here to argue for or against any particular position, but merely to provide the tools with which the reader can form his own conclusions based on the evidence as it is published in AIR FORCE Magazine and

elsewhere. These tools will not be the most sophisticated available (it is always possible to gain a little more precision by introducing a lot more complication), but they will be good enough for everyday use. Finally, I will take a real-life example and show how conclusions derived from superficial analyses of nuclear-weapon capabilities can be reversed by applying criteria of even the most moderate sophistication.

## Target Properties

Before discussing properties of weapons it is first necessary to discuss briefly three properties of targets.

- **Hardness.** The hardness of a target, which for simplicity we can consider as resistance to blast, is measured by the number of pounds per square inch (psi) required to destroy it. Hardness of common targets ranges from about two psi for an aircraft sitting on a runway up to about 10,000 psi for some concrete objects. In between are human beings (about ten to twenty psi), industrial facilities (tens of psi or, if hardened, possibly in the low hundreds of psi), and ICBM silos and control centers (hundreds or low thousands of psi).

- **Area.** The area of a target exposed to the blast of a weapon may range from a few square inches to hundreds of square miles. Some targets are so small in relation to the destructive power of the weapon attacking them that the force impacting on the part of the target nearest the explosion is not significantly greater than that impacting on the farthest part. In this case, area can be neglected and the target can be considered to be a *point target*.

- **Countervalue and Counterforce.** *Value targets* are those elements of a society that make life possible, profitable, or enjoyable for its citizens. *Force targets* are those elements of an enemy society that have the ability to destroy your own value targets or to destroy your ability to destroy his value targets. Clearly, population and most economic/industrial facilities are value targets, and deployed strategic weapons are force targets. There is also a gray area consisting of nonnuclear and theater nuclear forces that can be considered "value" in some senses but "force" in other senses.

Much of the popular discussion of counterforce in recent years has tended to equate it with hard-point targets—that is, ICBM silos. While silos are the principal and most demanding counterforce targets, it is probably best to avoid confusion by describing them as *countersilo targets*, thus distinguishing them from such hard countervalue targets as underground storage depots, such soft counterforce targets as bombers on the ground, and so forth.

## Missile Properties

Let us now consider seven aspects of missile capability.

I. **Yield** is the total energy released by the nuclear explosion. (For simplicity, I am considering blast only, and am setting aside radiation, heat, fallout, etc.) A *kiloton (kt)* is the blast energy equal to that which would be released by the explosion of a thousand tons of TNT. A *megaton (MT)* is equal to a thousand kilotons, or to a million tons of TNT.

Yield is best visualized as the *destructive volume* of an explosion. Thus, a one-megaton bomb will generate a

given intensity of destructive force into one thousand times as much volume as will a one-kiloton bomb.

Yield is also useful as a rough measure of the fallout-producing potential of a nuclear weapon.

II. **Inaccuracy** is the distance by which a reentry vehicle (RV) is expected to miss its aim point. It is measured by the CEP, which is usually described as "circular error probable," or "circular error of probability." Perhaps these terms mean something in the English language, but I have never been able to understand what. The correct definition of CEP is *circle of equal probability*, which is the radius of a circle within which half the RVs will fall (that is, it is "equally probable" that a given RV will fall inside this circle or outside of it).

III. **Throw-weight and Payload** are usually measured in *pounds*. Throw-weight is the weight that is thrown after the last booster stage of the missile has burned out and separated. It includes RVs, MIRV bus, penetration aids, etc. Payload is the weight of the RVs alone. For a simple non-MIRV ICBM or SLBM without penetration aids, throw-weight and payload are identical. But MIRV and penetration aids can absorb, in round numbers, one-third to one-half of a missile's throw-weight, thus reducing payload by the same proportion.

IV. **Area Destruction Capability** is more significant than yield because man and almost all his works are located within a few tens of feet of the surface of the earth.

The unit of area destruction is the *megaton-equivalent (MTE)*, which is defined as the area destruction equivalent to that caused by a one-megaton weapon. Consider, for example, a one-megaton weapon directed against an industrial complex of twenty-five-psi targets. The weapon will destroy a majority of these targets out to a distance of about 1.07 nautical miles. The area of destruction will be that of a circle with a radius of 1.07 miles, or about 3.57 square miles.

But there is no way to shape or direct the force of a nuclear explosion. It goes in all directions equally. Therefore, the same explosion that knocks down buildings out to 1.07 miles is also projecting sufficient energy to destroy buildings 1.07 miles straight up and 1.07 miles straight down. Since there are no buildings or any other desirable targets there, this energy is largely wasted. The explosion can be visualized as a 5.08-cubic-mile sphere of energy, all of which is wasted except for a thin plane cut horizontally through the center.

Now consider this same megaton broken up into 1,000 weapons of one kiloton each. If these 1,000 weapons were placed in a spherical pattern and detonated simultaneously, their effect would be exactly the same as that of the single one-MT weapon. But suppose instead we place each weapon at ground level, widely separated from its fellows. The radius of destruction of each weapon would be about 0.107 mi., one-tenth of the one-MT weapon. Volume of destruction per weapon would be 0.00508 cubic mi.; for the 1,000-weapon force, it would total 5.08 cubic mi., which, of course, is just the same as the one-MT weapon. But the area of destruction for a thousand one-kt weapons would be 35.7 square miles, or ten times that of the single one-MT weapon. (As a corollary, only one hundred one-kt weapons would be required to provide the same area destruction as a single

*The author, Robert Shorman, is staff assistant to three members of the House Armed Services Committee, Congressmen Robert Carr, Thomas Downey, and Robert Leggett. He graduated from Oberlin College with a bachelor's degree in chemistry and received a master's degree in social psychology from the University of Connecticut.*

one-MT weapon.) Thus, while distributing a given yield among many small weapons has no effect on destructive volume, it can increase destructive area if the weapons are properly placed.

Since it is a two-dimensional slice through a three-dimensional quantity (yield), area destruction is calculated by taking the two-thirds power of yield. (Conversely, you raise MTE to the 1.5 power to derive yield in MT.) The effect of using MTE is to reduce the apparent differences between large weapons and small ones. Thus, for example, a twenty-five-MT weapon shrinks to 8.55 MTE, while a 0.04 MT weapon grows to 0.12 MTE. (Note: In doing these calculations, you must always work with megatons or fractions thereof. If you try to mix MTE with "kiloton equivalents," your calculation will not work out.)

By coincidence the megaton-equivalent has an extremely useful property entirely unrelated to its measure of area destruction. This is known as "Walsh's Law" after its author, John B. Walsh, Deputy Director of Defense Research and Engineering for Strategic and Space Systems. It states the following:

*Assuming a given range, MIRV footprint, and level of technology, and assuming weapon yields are, in round numbers, between 0.1 and ten megatons, the megaton-equivalence of a missile is directly proportional to its payload.*

Using Walsh's Law it is possible to calculate yield if payload is known, or vice versa.

**Example:** Assume Minuteman III has 2,400 lb. throw-weight and, with the new Mark 12A RV, three RVs of 0.35 MT each. Suppose we want to design a new missile with 4,800 lb. throw-weight and RVs of 0.1 MT each. Assuming no advances in yield-to-weight technology, how many RVs can this missile carry?

**Solution:**

First, convert all MT figures to MTE.

$$(0.35 \text{ MT})^{2/3} = 0.50 \text{ MTE}$$

$$(0.1 \text{ MT})^{2/3} = 0.22 \text{ MTE}$$

Second, determine the MTE per thousand pounds (kp) of Minuteman III.

$$0.50 \text{ MTE/RV} \times 3 \text{ RVs/MMIII} = 1.50 \text{ MTE/MMIII}$$

$$\frac{1.50 \text{ MTE}}{2.4 \text{ kp}} = 0.625 \text{ MTE/kp}$$

Since the new missile will use the same technology as MMIII, according to Walsh's Law it will also carry 0.625 MTE/kp.

Third, determine the MTE of the new missile.

$$0.625 \text{ MTE/kp} \times 4.8 \text{ kp/new missile} = 3 \text{ MTE/new missile}$$

Fourth, determine the number of RVs the new missile can carry.

$$3 \text{ MTE/new missile} \times \frac{1 \text{ RV}}{0.22 \text{ MTE}} = 13.6 \text{ RVs}$$

**Answer:** The new missile could carry 13 RVs with slightly increased range or footprint, or 14 RVs with slightly decreased range or footprint.

V. **Soft Target Destruction Capability** is sometime equated with area destruction capability. But while are

destruction is a considerably better measure than yield in that it measures ability to destroy ground rather than to heat air, it is deficient in that it does not measure ability to destroy high-value as opposed to low-value ground.

For example, MTE is identical for a single one-MT weapon or for ten 0.032 MT weapons. In the context of a small attack against a large target—say, New York or Moscow—it would not matter, in terms of blast, which force were used. But if the attack were against a large number of small dispersed targets, the multiple small weapons would be ten times as effective as the single large weapon. The small weapons would destroy ten targets while the large weapon would destroy only one.

This effect becomes increasingly significant as the scale of the attack enlarges, as large targets are exhausted, and as it becomes necessary to attack ever smaller and more widely dispersed targets. The unit of soft target destruction capability is the Adjusted Megaton Equivalent (AMTE), which cannot be quantified unless the scale and conditions of the attack are also specified. (AMTE is a new term, coined by Rep. Tom Downey in *Road to Monad—and Disaster, Foreign Policy*, fall 1976, pp. 172–

Thus an eight-headed MIRV has about 2.5 times as much soft-target destruction capability as a non-MIRV missile of the same throw-weight, even though the MIRVing reduces total yield to one-sixth that of the non-MIRV missile.

**VI. Hard Point Target Lethality.** The ability to destroy a point target—which for illustrative purposes will be considered a hard target—can be described by “lethality,” which is defined as the MTE divided by the square of the CEP.

**Example:** Assume a Minuteman III ICBM with Mark 12A RV will have a CEP of 0.1 nm and yield of 0.35 MT per RV. What is the hard-target lethality per RV? If each missile carries three RVs, what is the lethality per missile?

**Solution:**

$$\frac{(0.35 \text{ MT})^{2/3}}{(0.1)^2} = \frac{0.5 \text{ MTE}}{0.01} = 50 \text{ lethality per RV}$$

$$50 \text{ lethality/RV} \times 3 \text{ RVs/missile} = 150 \text{ lethality per missile}$$

If lethality is known it is possible to calculate the theoretical (*i.e.*, neglecting unreliability) probability of

**TABLE I**

Warhead	Total MT (Volume Destruction)	Total MTE (Area Destruction)	Total AMTE (Soft-target Destruction)
non-MIRV (5MT)	5	2.92	1.62
2-unit MIRV (2 x 0.82MT)	1.64	1.75	1.88
3-unit MIRV (3 x 0.45MT)	1.35	1.75	2.35
5-unit MIRV (5 x 0.21MT)	1.05	1.75	3.11
8-unit MIRV (8 x 0.10MT)	0.81	1.75	4.03

201.) For a very small attack, AMTE is the same as MTE, or the two-thirds power of yield. As the attack enlarges, yield per weapon becomes less important, numbers of weapons become more important, and the exponent decreases. Carried to the theoretical extreme, in an infinitely large attack AMTE would be defined as yield to the zero power. At this theoretical point, all weapons would be equally effective regardless of yield.

In a classic countervalue attack designed to destroy two-thirds of Soviet industrial floor space, the AMTE of a weapon is determined to be yield to the 0.3 power. In a similar attack against US industrial targets, which are larger but less numerous than their Soviet counterparts, the AMTE is yield to the 0.4 power.

Consideration of the AMTE illuminates the advantages of MIRVing to attack soft targets, even in the absence of a hostile ABM. Many Americans were puzzled, for example, to find the one-MT Polaris SLBM replaced at considerable expense by the Poseidon, which was much larger but carried only 0.4 MT distributed among ten RVs of 0.04 MT each. MIRVing becomes more comprehensible in light of the increased AMTE it permits. This is illustrated by Table I, which lists various possible MIRV alternatives, based on Walsh's Law, for a five-MT missile with the MIRV mechanism absorbing forty percent of the payload.

destroying a point target of known hardness. Unfortunately, this calculation is too complex for an article of this type. But kill probabilities can be quickly and easily derived by use of the special-purpose circular slide rule called the “Damage Probability Computer” (Rand Report R-1380-PR). I urge everyone with access to this indispensable tool to obtain one. A similar device, somewhat easier to use but less versatile, is made by General Electric.

It is important to note that, in determining lethality, accuracy is by far the most important factor, and is as important as the cube of yield. For example, a fourfold improvement in accuracy is equivalent to a sixty-fourfold improvement in yield, each producing a sixteenfold increase in lethality. (This does *not* mean kill probability will be increased sixteen times. It *does* mean that one missile upgraded by either method will have the same kill probability against a given target as will sixteen original missiles.)

As an illustration of the effect of various missile characteristics upon kill probability, consider the options faced by a hypothetical hard-target counterforce planner possessing missiles with single one-MT RV and one-nm CEP. Contemplating possible future enemy silos of 3,500 psi, he finds himself with a kill probability of about two percent. He can seek to raise kill probability by

(1) lowering inaccuracy, (2) increasing force payload, whether by increasing payload per missile or by increasing the number of missiles, and/or (3) increasing yield per pound through advanced technology. Figure 1 illustrates the effect of each of these routes upon kill probability.

Because the MIRV mechanism absorbs approximately one-third to one-half of the throw-weight, it introduces an immediate thirty-three to fifty percent reduction in payload, and therefore in lethality. Yet while MIRVing reduces total lethality, it is nevertheless necessary for a large-scale countersilo attack, for reasons that will be explained in the next section.

**VII. Numbers and Reliability of RVs and Missiles.** As we have seen, for a given throw-weight, soft-target destruction capability is aided by subdividing each missile into as many MIRVed RVs as possible, unless the yield per RV becomes so small that MTF-to-weight falls off. But for the countersilo mission the picture is not so simple.

Except for very large missiles, countersilo kill probability per pound of throw-weight is maximized by not MIRVing. But a countersilo strike by a non-MIRV force against an enemy force of roughly equal numbers is not feasible even with infinite lethality. The best the attacker could expect would be for one of his missiles to destroy one of the other side's, and when unreliability is considered, it is clear he would be unlikely to approach this even trade. Thus, the attack would draw down the attacker more than it would the victim.

But MIRV permits one attacking missile to address several silos, rendering a profitable countersilo attack at least theoretically possible. Translating theory into practice is a matter of obtaining sufficient lethality, which in turn is today primarily a matter of reducing inaccuracy. If terminal guidance offering inaccuracy of about 0.02 nm. were to be developed, it is conceivable that a large missile such as Trident II or M-X could carry more than ten RVs, each with sufficient lethality to destroy any silo with better than ninety-nine percent probability.

Reliability is the proportion of RVs on station that will actually arrive at the target and perform as advertised.

The *deliverable* effectiveness (whether effectiveness be measured in numbers of missiles, throw-weight, MT, MTE, AMTE, point-target lethality, or whatever) is derived by multiplying the theoretical effectiveness by the reliability. Thus, a missile force of 1,000 theoretical effectiveness units and eighty percent reliability will be equivalent at most to a perfectly reliable force of only 800 units.

Theoretical hard-target kill probability per RV must also be reduced by multiplying by reliability in order to derive deliverable kill probability.

Because it is nonglamorous and difficult to predict, and because such predictions as are made are generally highly classified, reliability is not highly emphasized in public discussion of strategic strength. This is regrettable, since it is at least as significant as most of the more highly-publicized measures. In the countervalue mission, a given change in reliability will have a greater influence on effectiveness than will a change in yield of similar proportions, and will have the same effect as a change in

numbers or throw-weight. In the countersilo mission, reliability is also more significant than yield, equally as significant as throw-weight and numbers, but less significant than accuracy.

However, as accuracy improves, the limiting effect of unreliability will become increasingly important. Take, for example, an RV carrying ten MT with a CEP of one inch, giving it 100 percent theoretical kill probability against any conceivable target. If its reliability is only eighty percent, deliverable kill probability can never be higher than eighty percent.

In attacking point targets, the effect of directing multiple partially reliable RVs against a single target is easily calculated. You simply take the survival probability (*i.e.*, one minus the kill probability) of each partially reliable weapon and multiply them together to derive the overall survival probability.

**Example:** A given missile silo is attacked by four RVs having kill probabilities of thirty-two percent, forty-one percent, sixteen percent, and seventy-one percent. These RVs have reliabilities of fifty-five percent, seventy-three percent, eighty percent, and sixty-one percent respectively. What is the overall kill probability of the attack?

**Solution:**

First, convert from theoretical kill probabilities to deliverable kill probabilities.

$$0.32 \times 0.55 = 0.18$$

$$0.41 \times 0.73 = 0.30$$

$$0.16 \times 0.80 = 0.13$$

$$0.71 \times 0.61 = 0.43$$

Second, convert deliverable kill probabilities to survival probabilities.

$$1 - 0.18 = 0.82$$

$$1 - 0.30 = 0.70$$

$$1 - 0.13 = 0.87$$

$$1 - 0.43 = 0.57$$

Third, multiply the survival probabilities together.

$$0.82 \times 0.70 \times 0.87 \times 0.57 = 0.28$$

Finally, convert back to kill probability.

$$1 - 0.28 = 0.72 \text{ total kill probability}$$

In practice, such an attack would probably not be feasible because of RV fratricide. The detonation of each RV would tend to damage or blow off course those that followed. As a rule of thumb, it is possible to direct two, but not more than two, RVs against a point target within a reasonably short time. Thus an optimum countersilo force consists of two available RVs per target, and deliverable kill probabilities per RV must be sufficiently high so that two RVs per targeted silo will achieve the desired level of attrition. In the example given wherein unreliability limited theoretical kill probability to eighty percent per RV, two such RVs would give ninety-six percent, which may or may not be sufficient depending on the countervalue capability of the surviving four percent and on how much retaliation you are willing to accept.

### Putting It All Together

Now let us see how the foregoing concepts can be applied to a subject of current interest.

In an attempt to prevent the deployment of new Soviet heavy ICBMs, the US unilaterally declared an "understanding" to the Vladivostok agreement, stating that silo size of ICBMs should not be increased more than fifteen



percent. Despite this, the Soviet Union developed, and has now begun deployment, of the SS-19 ICBM as a replacement for the SS-11. Basic characteristics of the two missiles have been described as follows:

	SS-11	SS-19
Volume, cubic meters	69	100
Throw-weight, kp	2	7
CEP, nm	1	0.3
Warhead	1 MT single	6-unit MIRV
MTE/kp, throw-weight	0.5	Assumed to be same as Minuteman III, or about 0.38 for a MIRV. Assuming the SS-19 MIRV mechanism takes up fifty percent of payload, MTE-to-throw-weight is 0.76 for a non-MIRV.

Some argue that this is cheating on the part of the Soviets, in that they enlarged their missiles fifteen percent in all directions rather than just in diameter. Others feel the Soviets were smart but legal in that they were not bound by our unilateral understanding and, moreover, the understanding dealt with silo size rather than missile size and did not specify that the fifteen percent was to apply in one direction only.

Setting these considerations aside, let us examine this question: *What proportion of the SS-11 and SS-19 capability increase is attributable to the gray-area fifteen percent size increase, and what proportion is attributable to other factors not even mentioned in the understandings?* For space reasons, I will here consider countersilo capability only, which is the aspect of greatest concern.

*Effect of fifteen percent length increase:* Assuming a given diameter, a fifteen-percent length increase produces a fifteen-percent volume increase, which in turn permits a fifteen-percent payload increase. According to Walsh's Law, this payload increase translates into a fifteen-percent increase in MTE, which in turn produces a fifteen-percent increase in lethality. Thus, increasing length by fifteen percent simply translates into a fifteen-percent lethality upgrade.

*Effect of other improvements not considered in the Vladivostok agreement:*

- **Throw-weight-to-volume technology.** The SS-11 has 2,000-lb. throw-weight in sixty-nine cubic meters, or twenty-nine pounds per cubic meter. The SS-19 has 7,000 pounds in 100 cubic meters, or seventy pounds per cubic meter. Thus, improved weight-to-volume technology raised throw-weight 141 percent.

- **MTE-to-payload technology.** With the SS-11 having 0.5 MTE/kp payload and the SS-19 having 0.76, the new missile is fifty-two percent superior. (Note: Using Walsh's Law and the methods illustrated earlier, it can be calculated that the SS-19 offers its builders options of a single twelve-MT warhead or, among others, the 6 x 0.29 MT MIRV evidently chosen.)

- **Accuracy** is improved 233 percent.
- **Overall hard-point lethality**, as we have discussed, is measured by  $\frac{MTE}{(CEP)^2}$

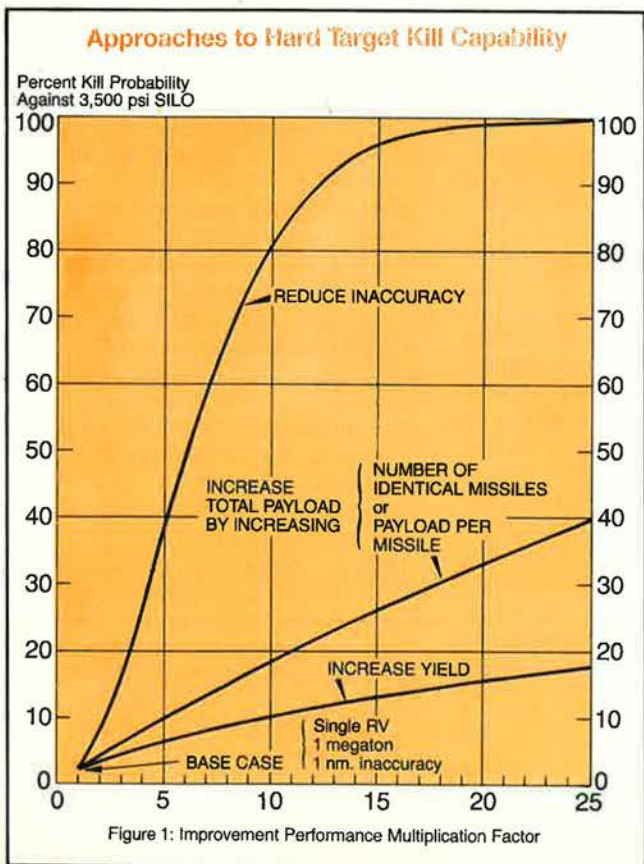
In combining various capability improvements, we must treat, for example, a fifty-two percent improvement as a ratio of 1.52. Therefore, for the total MTE upgrade

$$\begin{aligned} & \text{we have:} \\ & 2.41 \text{ throw-weight-to-volume} \times 1.52 \text{ MTE-to-payload} \\ & \qquad \qquad \qquad = 3.66 \end{aligned}$$

This is then multiplied by the square of the accuracy improvement:  $3.66 \times (3.33)^2 = 40.6$

**Answer:** The disputed increase in missile size improved countersilo capability fifteen percent for the SS-19 vis-à-vis the SS-11. But various technological improvements, not even mentioned in the Vladivostok agreement or the understandings, increased countersilo capability by 4,060 percent. (The fifteen percent diameter increase permitted by the understanding enables volume, and therefore all capabilities, to be increased thirty-two percent. When combined with the technological improvements, this increases countersilo capability 53.6 times without even getting into a gray area of the agreement and understanding.)

**Conclusion:** If they are concerned about limiting countersilo capability, both our SALT negotiators and the bulk of their critics are barking up the wrong tree. Even if the Soviets had adhered strictly to the most rigorous interpretation of our unilateral understanding, their recent capability increase would not have been reduced significantly. Compliance and drafting problems are important, but not nearly as important as the failure of our negotiators to focus on the technological progress that is the real foundation of growing countersilo capabilities on both sides. The highly publicized size enlargement is a tempest in a teapot compared to the technological progress that was not even addressed at Vladivostok. ■



*Despite its strategic location, Spain has long been regarded as a pariah by the countries that now make up NATO. But there are clear signs that a rapprochement is under way.*

## NATO Membership for Spain?

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

**F**OR whatever small comfort it may provide to those of us old enough to remember back forty years, that span is just an historical moment, a mere blink of the eye as historians measure time. It was, then, only yesterday that Hitler and Mussolini came to the aid of an obscure Spanish general bent on ruling Spain. The Republican regime then in power was being helped by Stalin, a conglomeration of international volunteers, and the earnest, if sometimes addled, good wishes of all those who viewed fascism as the ultimate in political depravity but somehow thought communism might be okay. The fact that Joseph Stalin's brand of communism was itself monstrous escaped much notice in those days. Hitler and Mussolini were so despised there was no room for anyone else. If Stalin was against those two, he could not be all bad.

Franco's victory in 1939 was, thus, a qualified one. The rest of Europe viewed him with distrust and, here and there, hostility. While the Franco regime remained officially neutral in World War II, the Spanish Blue Division saw action alongside the Germans on the Russian front, raising a question as to whom Spain was neutral against.

The hostility in Western Europe toward General Franco and Spain lingered on after World War II. There was, of course, a great deal of hypocrisy in this attitude. Scandinavians, Dutchmen, the Brits, and the French in great numbers discovered the touristic joys of Spain, even while they continued to denounce its government.

This attitude continued through the years among the NATO countries. The existence of the US bases in Spain, begun in 1953, made no difference in that country's pariah status. The importance that these

bases, and Spain itself, could play in European defense was something NATO did not want to talk about as long as the Franco government existed.

The Generalissimo's death marked the end of an era—both for Spain and the rest of Europe. Last winter, the Spanish Foreign Minister paid a round of visits to Western European capitals, including two of the previously more hostile ones, Copenhagen and The Hague. He was received cordially and with full protocol. In Brussels, Señor Arielza even visited NATO Headquarters, to be greeted by the Secretary-General as a distinguished and honored visitor. Two years ago, any such visit by a Spanish Foreign Minister would have been a surreptitious one if, indeed, it could have taken place at all. For those who watch diplomatic indicators, this was a significant event, the first step in Spain's admittance to NATO. The NATO Council of Ministers, in their meeting last December, gave further signs that a *rapprochement* with Spain is under way.

For an alliance that has begun to accumulate the aches and pains that inevitably accompany the aging process, Spanish membership should be a powerful rejuvenator. Not that Spain has large and modern forces to contribute, for she has not. Those can come later. The immediate effect of Spain as a member of NATO would be the assured use of the Spanish bases. There would be some other instant benefits as well—the presumed commitment to NATO of US Air Force and naval units based

in Spain, along with the commitment of Spanish units, particularly those of the Spanish Air Force and Navy. There would also be a sudden new depth to the NATO Alliance. The entire Iberian peninsula, Spain as well as Portugal, would be a NATO stronghold, well removed from any Soviet blitzkrieg.

However, by far the most important contribution Spain could bring to NATO—at least in my opinion—is the effect Spanish membership would have on the Mediterranean. For some years now, the allied strategy in the Med has become increasingly tattered. There is, first of all, the ever-growing Soviet naval presence as a challenge to the US Sixth Fleet. There is the smoldering hostility between Greece and Turkey over the still unresolved, and maybe never to be resolved, matter of Cyprus. Then there is Yugoslavia and the worry over Tito's succession. Italy is floundering, politically and economically. Even the most optimistic military planner would have to ask himself a few questions when assessing Italy's future value to the Alliance.

There is Malta, whose erratic premier, Dom Mintoff, has made political capital out of his eviction of NATO. The pact allowing a small British force in Malta, signed in 1972, has only two more years to run. Mintoff has just been reelected, and the British no longer feel they can support overseas commitments. Malta in unfriendly hands would provide a major obstacle to Mediterranean naval strategy.

That brings us back to Spain. The Mediterranean, for all its importance as a sea route and as an area for naval battles, is going to belong in the next war, as it did in the last, to the side that owns the air. NATO can take a giant step toward a claim to Mediterranean air superiority with Spain on its side, for Spain puts the whole Med within striking distance, or loitering distance, or just plain demonstration distance, of air-refueled tactical forces.

Unless something goes badly wrong in the democratic rehabilitation process now under way in Spain, the omens look favorable for her early admittance to NATO. It would be the best thing that has happened to NATO, and for that matter, to Spain, in recent memory. ■

# USAFE and AAFCE: Central Europe's Airpower

BY JIM TAYLOR, SENIOR EDITOR



SSgt. Edward Spence refuels an F-4 from Holloman AFB, N. M., during Crested Cap.

**USAFE, an essential member of the European Command, is modernizing while training with NATO allies. Its role with Allied Air Forces Central Europe is a key element in the defense of that region.**

**A**MONG the gently rolling hills of south central Germany, half-way between the Rhine River and the French border, lies Ramstein Air Base, home of US Air Forces in Europe (USAFE) Headquarters and NATO's Allied Air Forces Central Europe. Next door is Kaiserslautern, where red-bearded Frederick Barbarossa held sway over the Palatinate nine centuries earlier.

Fifteen minutes away by fighter aircraft are the opposing forces of the Warsaw Pact—all within an area containing the greatest concentration of combat power in the world today.

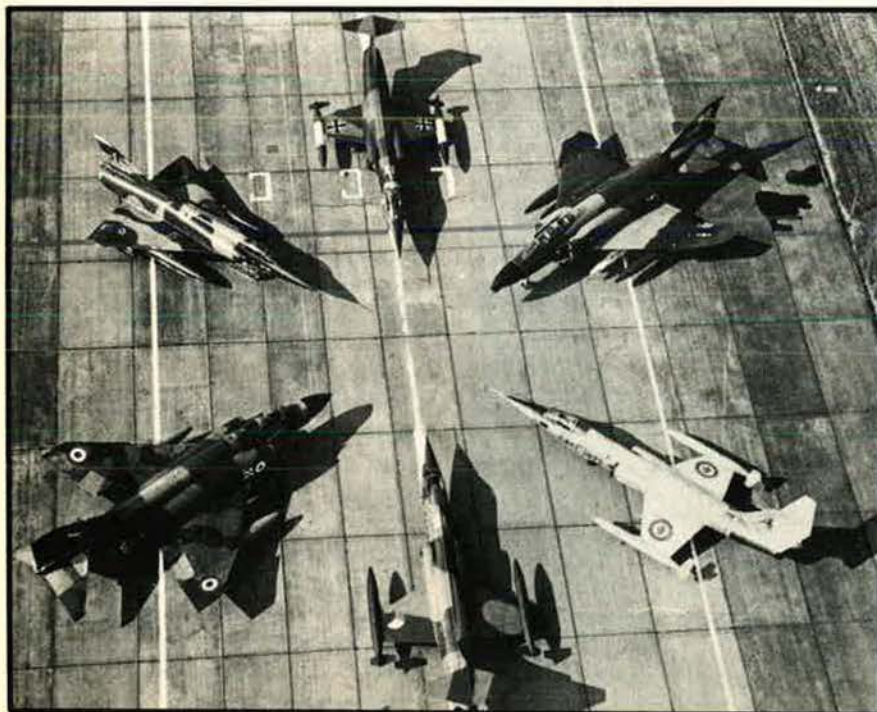
"The [Soviet] Air Force today is essentially and increasingly taking the character of offensive and is in the position to fly missions over Western European territory. In terms of quality, that's a dramatic change," Gen. Alexander M. Haig, Jr., Supreme Allied Commander Europe, recently said.

Within a little more than two years, the Soviets have brought to bear a third generation of fighter bombers with double the payload, greater technical and electronic sophistication, and greater range and performance than their predecessors. Warsaw Pact countries have immediately available to them a better than two-to-one advantage in aircraft and three-to-one in tanks.

—PHOTO BY TED ROHDE, STARS AND STRIPES

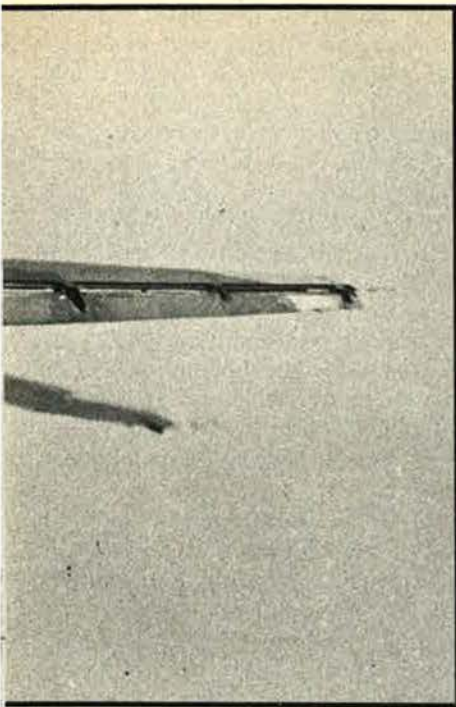


A USAF F-111, above, takes off from RAF Upper Heyford, UK, on a training flight. At right is an F-5E Tiger II of the 527th Tactical Fighter Training Squadron at RAF Alconbury, UK. Fighter aircraft of six nations, below, form the NATO star. Clockwise from top are: German F-104, USAF F-4, Canadian F-104, Royal Netherlands F-104, RAF F-4, and Belgian Mirage.



The Soviets are arming intermediate-range ballistic missiles with multiple nuclear warheads that could cover most of Europe. Truck-borne SS-X-20 IRBMs, each with three nuclear warheads, will represent considerable muscle and maneuverability as they become available. For themselves, the Soviets believe that a nuclear war is survivable and they are making all-out efforts in air and civil defense.

In 1966, the Soviets began improving their air forces extensively, including all their air roles. This has been an ongoing program that is estimated to last at least until 1980. Its aircraft are concentrated mostly in the central region, where dual-purpose Mach 2 strike and ground-attack aircraft can probe great distances into NATO countries. From a previous combat radius of some 300 nm, newer aircraft can readily



reach targets between 500 and 600 nm from their bases. Paris, London, and other formerly distant targets are now well within striking distance. Concurrently, their surface-to-air missiles and transportable missile-defense radars lead to the conclusion that more dual-purpose aircraft can now be tasked for offensive operations.

As the Pact increases its ability to launch a surprise attack, the Iron Curtain continues to look exceedingly formidable.

#### **USAFE—The Air Force Element**

The US Air Force element in this equation is USAFE. It was created on August 7, 1945, from the World War II US Strategic Air Forces Europe. Its NATO role was established on Christmas Day in 1950, when all US forces in Europe were committed to the newly designated Supreme Allied Commander. And today, USAFE's mission remains to train and maintain Air Force units for combat operations in support of NATO. "We understand, live, and breathe NATO here," said a senior USAFE official.

USAFE is commanded by Gen. Richard M. Ellis, former Vice Chief of Staff of the Air Force, who has extensive NATO experience at various levels of command and staff work. Under his USAFE hat, he commands more than 57,000 people,

divided into 229 units at squadron level or above, and possessing some 570 tactical aircraft.

Back in the early 1960s, a decade before "teeth-to-tail ratio" became a buzz phrase, and before the average American could accurately pinpoint Vietnam on a map, the Air Force had been reducing its headquarters and support elements in Europe. Personnel costs were already climbing and weapon systems were becoming technologically more demanding. USAFE began shrinking its headquarters years before congressional concern resulted in the Nunn Amendment, which called for the reduction of military headquarters throughout the services.

In 1962, USAFE eliminated its 2d Air Division. And the Air Materiel Headquarters in Europe, along with its two depots, were likewise dispensed with. Over succeeding years, eleven more headquarters have been eliminated, leaving only USAFE Headquarters itself and its Third, Sixteenth, and Seventeenth Air Forces, along with European Communications Area Headquarters (AFCS), which is under USAFE's operational control.

Thus, headquarters manpower has been reduced by more than forty percent within the last seven years. And the end is not quite in sight.

Yet to some it remains surprising that total Air Force manpower in Europe has risen. There were 85,958 military and civilian spaces authorized by the Air Force in FY '75 throughout Europe and the Middle East. This dropped by some 2,000 the following year, but will reach more than 88,000 during FY '77.

Within USAFE itself are currently more than 57,000 authorizations for military and civilians, with eighty percent being military. Seven out of eight military are enlisted, while five out of six civilians are local nationals.

With impressive reductions in headquarters, why is manning increasing? The essential and binding reason is force modernization, which generates increased manpower costs. But manning is "getting closer to the weapon system," say USAFE manpower officials.

Aircrews have increased from one for each aircraft for the early Century Series models to double that required in two-seater F-4s, RF-4s,



*Gen. Richard H. Ellis commands both USAFE and AAFCE.*

and F-111s. Concurrently, along with aircraft sophistication, the maintenance manpower factor has increased. For the F-4, it is twenty-two percent greater than for the F-100, and for the F-111, forty-eight percent greater.

Increased aircraft sheltering on both the Continent and in the United Kingdom brings with it a need for more manpower. Before sheltering, a single "sky cop" could observe many airplanes, but the ratio of security police to aircraft has increased because the planes are no longer so readily visible and because of the increased threat. In fact, security has become so important throughout USAFE that some ten percent of its manning is in security police, and a separate staff agency for security police has been established. Transportation and shelter maintenance further increase manning requirements, as does force survivability, particularly in ECM maintenance and supervision.

As everywhere, inflation has

worked its wicked way with manpower costs. Through considerable effort, however, those costs were held to sixty-seven cents of the USAFE dollar in FY '75, after having peaked at seventy-six cents in FY '73.

Economies were made by reducing both subordinate headquarters and USAFE Headquarters itself. The latter had resided comfortably in the historic spa city of Wiesbaden for almost two decades. Air Force people enjoyed the city and relations with their German neighbors were excellent.

But it had been Air Force policy to relocate overseas headquarters away from large urban population centers, when possible, to tactical air bases, where it is considerably cheaper to operate a major headquarters. Communications and other essential support facilities are available and fewer people are needed.

Thus, Gen. David C. Jones, then USAFE Commander and now Air Force Chief of Staff, announced in September 1972 that USAFE Headquarters would move to Ramstein AB by the end of the following year. "Once the USAFE shift is completed," he said, "there will be a savings of \$1 million annually through cuts in the operating expenses and manpower which can be reallocated to Air Force combat units. We did this earlier this year [1972] in the United Kingdom, with Third Air Force Headquarters moving from South Ruislip on the outskirts of London to RAF Mildenhall."

But General Jones also wore the hat of Commander of NATO's 4th Allied Tactical Air Force, headquartered at Ramstein. Relocation, according to him, would also improve the Command's war-readiness posture by being collocated with 4th ATAF. "USAFE, providing the principal tactical air component, as well as the commander for 4th ATAF area, can much more quickly be meshed into the NATO command structure in event of an emergency," General Jones said.

The move itself was carried out in less than a year at a cost of \$6 million, including added construction.

To accommodate USAFE, Headquarters Seventeenth Air Force moved from Ramstein to Sembach

AB, and concurrently reduced its manning from some 200 to about forty. (Headquarters Sixteenth Air Force is located at Torrejon AB, Spain.)

#### **AAFCE—The NATO Element**

All land and air forces from the Eibe to the Alps are under the Commander of Allied Forces Central Europe (CINCENT), a German general whose peacetime headquarters is at Brunssum in the Netherlands. Under CINCENT are the Allied Air Forces Central Europe (AAFCE). Subordinate to the Commander of AAFCE are two Allied Tactical Air Forces. In the north the 2d ATAF covers the area of the Northern Army Group, while in the south the 4th ATAF covers the area of the Central Army Group. The boundary between the two is roughly a line that runs east to west through Göttingen and Cologne. The 2d ATAF includes Belgian, German, United Kingdom, Netherlands, and US units, while the 4th ATAF has Canadian, German, and US components.

Allied Air Forces Central Europe was established by NATO's Defense Planning Committee on June 14, 1974, after it was proposed initially by the US in December 1971. It came into being on June 28, 1974, with the USAFE Commander, then Gen. John W. Vogt, given a dual hat. Since late August 1975, General Ellis has been Commander of both AAFCE and USAFE.

AAFCE's creation came about because of inadequacies of AFCENT air command and control. The two ATAFs were lacking in standardization and otherwise pretty much went their parochial ways with differing tactical doctrines and a wide assortment of aircraft and equipment. In fact, there were reported to be twenty-four different types of combat aircraft and, counting modifications, thirty-nine different combat models in the two commands.

The new peacetime headquarters was initially established at Ramstein, subsequently to move into a new AFCENT headquarters building at Brunssum. An underground war headquarters, to be shared by CINCENT and COMAAFCE, is nearing completion. It is scheduled to be occupied during the summer of 1977,

or so the current projections suggest.

About an hour's drive northwest of Ramstein AB, the underground bunker was initially built by the German military in the early 1960s at Börfink. It is to be the combat headquarters for AFCENT and AAFCE. Through its highly sophisticated linkage with tactical intelligence and elsewhere, it will increase intelligence capability and be able to withstand substantial attack. If and when bought by NATO, the E-3A AWACS, with its unparalleled low-level detection capability, will be an imposing intelligence element.

AAFCE's purpose is to coordinate and direct operations of the ATAFs and to establish operating procedures so that pilots will have no difficulty shifting between units of the 2d and 4th ATAFs. The 2d ATAF, headquartered in Mönchen-Gladbach, is commanded by a British air marshal, while the 4th ATAF is headquartered at Ramstein and now is commanded by a German air general.

#### **Doctrine and Operations**

Offensive capabilities come under AAFCE control only when released by allied nations, but air defense is its continuing responsibility and AAFCE executes this through three sector operational centers, under which come fourteen air defense squadrons located on nine bases. Tactical operations are controlled through Allied Tactical Operations Centers (ATOCs), which have final tactical control. There are two ATOCs in each ATAF.

Interoperability was, and remains, a substantial problem. Because the US is the major contributor, some sixty percent of the tactical aircraft assigned to AAFCE belong to the 4th ATAF. When US-based reinforcement aircraft arrive, the proportion jumps to eighty percent. Obviously, if parochialism prevailed, optimum allocation and rapid repositioning of aircraft between the areas could not exist. Under General Ellis, AAFCE can now allocate squadrons throughout the central front regardless of which ATAF "owns" them.

Tactical doctrines have differed less between ATAFs than between US and European units. With initially limited ECM equipment, European units relied mostly on direct



terested in this system, but the cost of sophisticated electronics remains too high for nearly all of them. The F-111s use beacon bombing in addition to normal visual radar techniques to provide all-weather close air support.

Between October and March, the central European region has a combination of bad weather and darkness eighty-six percent of the time, making aircrew training for all-

*Lt. Col. Joachim Hoppe, Lechfeld AB, Germany, discusses nonstop flight of 356th TFS from Myrtle Beach AFB, S. C., with squadron CO Lt. Col. Doug Stockton. Below, crew members go over Crested Cap flight plan.*



*Capt. Tom Cothran, left, and Col. Anthony Sheehan review F-4C training flight plan.*



low-level approaches to targets to get under opposing radar. The 2d ATAF has depended largely on individual pilot navigation, with forward air controllers to be used in ground-support missions. Under these conditions, it was essential that the northern ATAF crews be familiar with the terrain in their areas.

Conversely, the 4th ATAF has depended extensively on continuous ground control of its aircraft. This is a better tactical procedure for US dual-based aircraft whose pilots would be less familiar with the ter-

rain over which they must operate. It is also better for newly assigned USAFE pilots who must quickly learn new geography. US aircraft have relied to a considerable degree on the 407L radar control system for low-altitude radar control. About five percent of its F-4s are now equipped with LORAN-D navigation systems capable of all-weather navigation and precision bombing. Some F-4s are equipped with laser designators that help improve bombing accuracy. Other aircraft, primarily those of our NATO allies, fly formation with LORAN-equipped F-4 "Pathfinder" aircraft and drop ordnance concurrently—not dissimilar in principle to the "togglie" system used by US bombers in World War II. Some NATO nations are in-

weather and night operations critically important.

Standard operating procedures are being implemented and extensive training is being conducted. Common standards, improved communications, and a comprehensive command and control system are being developed.

Under heightened tensions, when USAFE melds into its AAFCE combat role, some 580 people from USAFE Headquarters and NATO organizations augment AAFCE in its Börfink bunker and at Brunssum. In turn, about 150 people from USAF's Tactical Air Command augment USAFE.

### **Training and Exercises**

Critical preparation for combat

includes peacetime exercises, military training's primary manifestation. The series of Autumn Forge exercises in conjunction with relocation of forces to Germany are Allied Command Europe's major exercises. The Autumn Forge concept was introduced in 1975.

"All of these exercises are to get maximum training," said General Haig during the 1976 maneuvers. "What we have done is to merge them into multinational configurations and place them all under a common, if you will, situation scenario that is designated to exercise the integrated allied staff—to bring nations together in multinational formations, to merge our air and ground capabilities in a way that will most closely approximate the needs we will be faced with should deterrence break down."

For the first time, General Haig

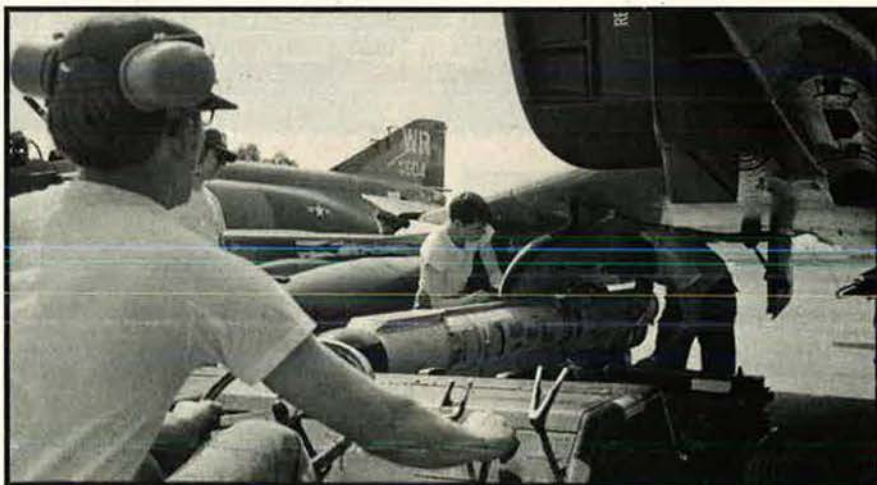
organized twenty-seven exercises under a single scenario that extended from Norway to Turkey. Thus, in addition to a quarter million men and 400 naval vessels, some 1,600 aircraft took part. Until 1976, the air portion of the autumn exercises had all been under US or national command and control.

"I think this [integrated training] is a very healthy situation," said Maj. Gen. Benjamin N. Bellis, Commander of USAFE's Seventeenth

Air Force, "because in no way would we be fighting a war in this theater as a national war. It must be performed in a complete allied NATO command and controlled environment."

As part of dual basing, USAFE tactical fighter squadrons of the 49th Tac Fighter Wing at Holloman AFB, N. M., flew to Europe to augment other USAFE aircraft under Crested Cap, as they have done for a number of years. After a month's

*At right, a USAFE weapons loading crew secures a missile to an F-5 pylon. Below, Army troops are airlifted to Germany by MAC for the annual Autumn Forge exercises.*





training, they were replaced by two more squadrons from the 49th, also for a month's training. (In addition to Crested Cap, dual-based crews in the US are sent to Europe for seven to ten days to practice tactics and learn route structure.)

But, for the first time, Air Force aircraft also deployed directly from CONUS to non-USAF bases for training. Eighteen A-7Ds flew into Lechfeld AB, Germany, from Myrtle Beach AFB, S. C. A squadron of F-4s from Seymour Johnson AFB, N. C., went to Flesland AS, Norway. Concurrently, during the fall exercises, AC-130s from Hurlburt Field, Fla., went to Zweibrücken AB, Germany, F-105s from George AFB, Calif., to Spangdahlem AB, Germany, and a squadron of F-105s from Byrd Field, Va., to RAF Lakenheath in the United Kingdom.

Operating Stateside aircraft from allied bases forces intra-Alliance cooperation to improve interoperability. Such training is now year-round for AAFCE aircrews and support people, who perform their own national training along with NATO exercises.

Under "Ample Gain," the turn-around capability of one ally's aircraft is exercised on bases of other NATO members. "Suddenly, F-4s or G-91s will show up at a base to be fueled and serviced," said a USAFE spokesman. "A post-mission report is made that includes all time problems."

A "family of weapons" that was widely dispersed throughout NATO nations was identified, and loading trials on the other nations' aircraft were made to see if they were compatible. Turnarounds are now practiced almost daily. The first stage of such training is simply a matter of "refuel and go." The second stage will be to refuel, rearm, and become airborne as rapidly as possible.

For a number of years now, US and allied squadrons have been "married" on an annual schedule. A USAFE squadron will deploy to another nation's base and operate from there under the host's rules, using his command and control methods and operational environment. Then the squadrons will reverse.

The Collocated Operating Bases (COBs) program will provide additional beddown sites for US air-

craft on allied bases. The COBs program was initiated in order to reduce US base loading and disperse augmentation forces. Now, at any given time more than fifty COBs may be working throughout the USAFE area.

An F-5E Aggressor Squadron (the 527th Tac Fighter Training Aggressor Squadron) became operational at RAF Alconbury, United Kingdom, in 1976. Its purpose is to simulate offensive air operations against NATO air forces. The first phase of its activities was one-on-one and one-on-two air battles (old-fashioned dogfights) flying both VFR and IFR. Its second phase will place F-5Es into other tactical fighter wings for aggressor training. And the F-5Es also will go to Zaragoza AB, Spain, for air combat mobility training.

### The Experience Factor

High-density population and limited airspace in Europe restrict total training. USAFE lost an ideal air-to-ground training base when Wheelus AB, Libya, was closed a decade ago. It now uses ranges near Zaragoza AB, Spain; Incirlik AB, Turkey; and Aviano AB, Italy. But USAFE crews also get time on other nations' ranges near main operating bases on the Continent and in the United Kingdom.

In part to compensate, the Air Force conducts "Red Flag" out of Nellis AFB, Nev., with a NATO environment combat scenario. There, T-38s and F-5s act as aggressor aircraft. USAFE sends crews to Nellis for training and briefing teams to discuss tactics and theater and NATO problems.

Assuming, as many experts do, that any attack from the east will come with minimum warning, the most likely air combat area will be that above West Germany. At fighter aircraft speeds, the operational area for AAFCE would be some fifteen minutes wide by about thirty minutes long. Across the Warsaw Pact border lies the world's heaviest concentration of air defenses. The combination of enemy fighters, SAMs, and AAA in this operational envelope is formidable.

But US crews and tacticians learned much from their Southeast Asia experiences. No other air force

has as much air-to-ground combat experience in a concentrated SAM and AAA environment as does USAF. USAFE crews are better trained and more experienced than Soviet and Pact crews. Training for Pact countries consists primarily of short missions nearly always completely ground controlled. Seldom are these aircrews permitted to use their own initiative. Conversely, allied training missions run about twice as long and maneuvering for the kill is stressed. Allied pilots are better able to deal with a changing situation.

Standardization evaluation teams under AAFCE inspect both ATAFs. For obvious reasons allied crews have more in-country experience than do US crews, and they are highly respected by their US counterparts. When an allied pilot makes an error it is not atypical to hear the comment, "He's a new guy—only been here six years." "But by the time our guy is here for six months," says a USAFE staff officer, "he's in good shape."

The Pact countries no longer limit themselves to autumn maneuvers, but lately have been conducting them almost year round. Their maneuvers are frequently of such size that, under exercise screening, they could launch an attack against the West. While a majority of strategists reject the idea, the very real possibility remains. And each maneuver is carefully monitored by NATO units. Constant surveillance is maintained as the intensity of such activity fluctuates along the Pact border.

In 1977, the F-15 air superiority fighter will make its appearance in USAFE. By 1980, the MRCA (Multi-Role Combat Aircraft) Tornado, the A-10 tank killer, and the F-16 multipurpose fighter along with, AAFCE people hope, the E-3A (by AAFCE description, "the most valuable air defense system ever invented"), and other weapon systems will be operational within NATO.

"From now until the 1980s is the critical period," say AAFCE strategists. It is a period during which USAFE and AAFCE must continue to refine their organizations, man them with the best people available, and aggressively train for any ultimate test. ■

# INDUSTRIAL ASSOCIATES OF THE AIR FORCE ASSOCIATION

## "Partners in Aerospace Power"

Listed below are the Industrial Associates of the Air Force Association. Through this affiliation, these companies support the objectives of AFA as they relate to the responsible use of aerospace technology for the betterment of society, and the maintenance of adequate aerospace power as a requisite of national security and international amity.

Aerojet ElectroSystems Co.  
Aerojet-General Corp.  
Aeronca, Inc.  
Aerospace Corp.  
ALL, Div. of Cutler-Hammer  
Allegheny Ludlum Industries, Inc.  
American Telephone & Telegraph Co.  
AT&T Long Lines Department  
Applied Technology, Div. of Itek Corp.  
AVCO Corp.  
Battelle Memorial Institute  
BDM Corp., The  
Beech Aircraft Corp.  
Bell Aerospace Textron  
Bell Helicopter Textron  
Bell & Howell Co.  
Bendix Corp.  
Benham-Blair & Affiliates, Inc.  
Boeing Co.  
Brunswick Corp., Defense Div.  
Brush Wellman, Inc.  
Burrroughs Corp.  
CAI, Div. of Bourns, Inc.  
Canadian Marconi Co.  
Cessna Aircraft Co.  
Chamberlain Manufacturing Corp.  
Chromalloy American Corp.  
Cincinnati Electronics Corp.  
Collins Division, Rockwell Int'l  
Colt Industries, Inc.  
Computer Sciences Corp.  
Connecticut International Corp.  
Conrac Corp.  
Control Data Corp.  
Day & Zimmermann, Inc.  
Dayton T. Brown, Inc.  
Decca Navigation Systems, Inc.  
Dynalectron Corp.  
E-A Industrial Corp.  
Eastman Kodak Co.  
E. I. Du Pont de Nemours & Co.  
Electronic Communications, Inc.  
Emerson Electric Co.  
Engine & Equipment Products Co.  
E-Systems, Inc.  
Ex-Cell-O Corp.—Aerospace  
Fairchild Industries, Inc.  
Federal Electric Corp., ITT  
Firestone Tire & Rubber Co.

Ford Aerospace & Communications Corp.  
GAF Corp.  
Garrett Corp.  
General Dynamics Corp.  
General Dynamics, Electronics Div.  
General Dynamics, Fort Worth Div.  
General Electric Co.  
GE Aircraft Engine Group  
General Motors Corp.  
GMC, Delco Electronics Div.  
GMC, Detroit Diesel Allison Div.  
GMC, Harrison Radiator Div.  
General Time Corp.  
Goodyear Aerospace Corp.  
Gould Inc., Government Systems Group  
Grimes Manufacturing Co.  
Grumman Corp.  
GTE Sylvania, Inc.  
Harris Corp.  
Hayes International Corp.  
Hazeltine Corp.  
HI-Shear Corp.  
Hoffman Electronics Corp.  
Honeywell, Inc.  
Howell Instruments, Inc.  
Hudson Tool & Die Co., Inc.  
Hughes Aircraft Co.  
Hughes Helicopters  
Hydraulic Research Textron  
IBM Corp.  
International Harvester Co.  
Interstate Electronics Corp.  
Israel Aircraft Industries, Ltd.  
ITT Aerospace, Electronics, Components & Energy Group  
ITT Defense Communications Group  
Kelsey-Hayes Co.  
Lear Siegler, Inc.  
Leigh Instruments Ltd.  
Lewis Engineering Co., The  
Libbey-Owens-Ford Co.  
Litton Industries, Inc.  
Litton Industries  
Guidance & Control Systems Div.  
Lockheed Aircraft Corp.  
Lockheed Aircraft Service Co.  
Lockheed California Co.  
Lockheed Electronics Co.  
Lockheed Georgia Co.  
Lockheed Missiles & Space Co.  
Logicon, Inc.  
Loral Corp.  
Magnavox Government & Industrial Electronics Co.

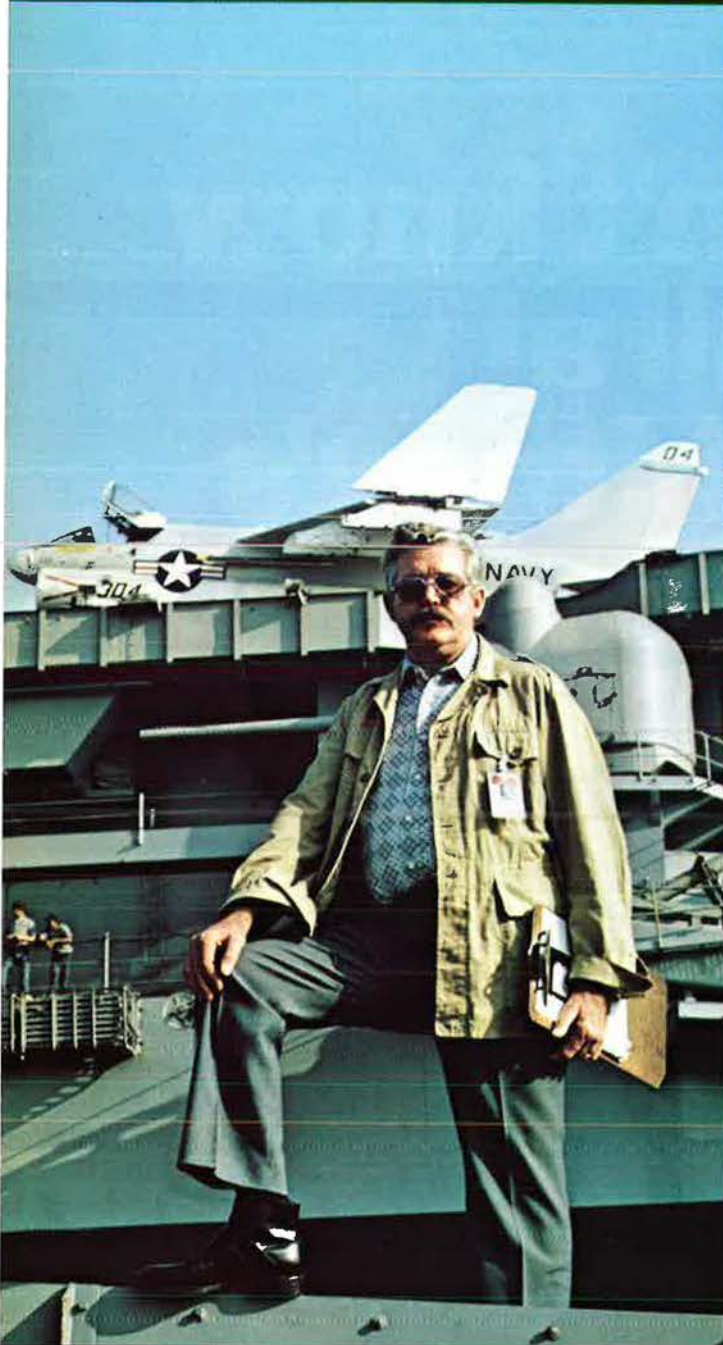
Martin Marietta Aerospace  
Martin Marietta, Denver Div.  
Martin Marietta, Orlando Div.  
McDonnell Douglas Corp.  
Menasco Manufacturing Co.  
MITRE Corp.  
Moog, Inc.  
Northrop Corp.  
OEA, Inc.  
O. Miller Associates  
Pan American World Airways, Inc.  
PRC Information Sciences Co.  
Products Research & Chemical Corp.  
Rand Corp.  
Raytheon Co.  
RCA  
Redifon Flight Simulation Ltd.  
Rockwell International  
Rockwell Int'l, Electronics Operations  
Rockwell Int'l, North American Aerospace Operations  
Rosemount Inc.  
Sanders Associates, Inc.  
Singer Co.  
Space Corp.  
Sperry Rand Corp.  
Sundstrand Corp.  
Sverdrup & Parcel & Associates, Inc.  
System Development Corp.  
Teledyne, Inc.  
Teledyne Brown Engineering  
Teledyne CAE Div.  
Teledyne Ryan Aeronautical Div.  
Texas Instruments Inc.  
Thiokol Corp.  
Tracor, Inc.  
TRW Systems, Inc.  
Union Carbide Corp.  
United Technologies Corp.  
UTC, Chemical Systems Div.  
UTC, Hamilton Standard Div.  
UTC, Norden Div.  
UTC, Pratt & Whitney Aircraft Div.  
UTC, Research Center  
UTC, Sikorsky Aircraft Div.  
Vought Corp.  
Western Gear Corp.  
Western Union Telegraph Co.  
Government Systems Div.  
Westinghouse Electric Corp.  
World Airways, Inc.  
Wyman-Gordon Co.  
Xonics, Inc.

**“If you don’t know  
who to call at  
Pratt & Whitney’s  
new Government  
Products Division,  
call me.”**

**“My number is (305) 844-4111.”  
Edmund V. Marshall  
President  
Government Products Division  
Pratt & Whitney Aircraft Group**

**“To make sure our new organization is responsive, we’re set up to go one-on-one in every engine program.”**

**Edmund V. Marshall**



“Flight line support is as important to us as it is to the people who use our engines. For example, we once had a random cracking problem in a compressor disk lug. Within 48 hours we had technical experts and specialized equipment aboard every deployed U.S. carrier, and the problem was under control in just a few weeks. We can’t always deliver that kind of result, but we sure do try.”

**Frederick E. Lehman**  
Senior Field Service Representative  
Navy Programs



“The buck stops with me when it comes to the F100 engine. And an important part of my job is to see that our customers get the service and support they need. Through constant customer contact, I’m often able to solve problems on the spot. The F100 engine has a great reputation so far, but I want it to get even better.”

**Leonard L. DeSantis**  
Vice President – F100 Program



"We're as serious about meeting our customer commitments as we are about making them. That's why we've set up action centers, like this one for the TF30, as well as a management-by-objectives system in all our major product areas. Every day we monitor specific check points and milestones in these centers. And if we see a problem, an action plan is due that very day. Those can be sessions, but they assure that things get done."

Joe R. Phillips  
Vice President—TF30



"Working in Oklahoma City, I'm in constant contact with my counterpart in the Air Force. Together we work out objectives and schedules for improving the reliability and maintainability of our engines in the field. And I have a direct line to our Program Office to see they're met. Along with over 100 other service representatives at customer locations around the world, I'm determined to do everything I can to achieve our mutual objectives."

William E. Salvadore  
Senior Spare Parts Field Representative  
Air Logistics Center—Oklahoma City

# "We put a lot of thought into our reorganization, and we're committed to make it work for you."

Edmund V. Marshall

Our new Government Products Division resulted from an in-depth study of how our organization could be more responsive to our customers' requirements.

It's a project oriented organization that makes sure each customer gets the support he needs without competition from other projects or problems.

Every engine program has a vice president or program manager with complete responsibility for that program. To help him, he has a personal representative in every functional department—such as Engineering, Product Support or Manufacturing. These people assure that each project gets the attention that it deserves.

This program management philosophy carries through to every level of our organization. For example, our Managers of Customer Requirements, stationed in 12 key locations, are assigned to specific customer organizations. These managers are measured against meeting individual objectives. In addition, at our West Palm Beach headquarters we have "action centers" in which program milestones are monitored. On one recent day 275 milestones came due on over 300 major projects.

While product integrity has always been paramount with Pratt & Whitney Aircraft, we've formalized it with the creation of a Product Integrity Department. Led by a vice president, this group is responsible for seeing to it that our products perform the way the user expects them to perform throughout their service life. The people in this department are assigned to every major product and program.

Our Product Support organization, also directed by a vice president, makes service and training representatives available to customers and projects anywhere in the world. This group is backed by a company service school in Wethersfield, Connecticut that has given specialized engine maintenance and ground training to more than 40,000 persons since the school opened in 1935.

In short, our new Government Products Division is organized to respond to your needs even better than before. And seeing that it does is my personal commitment to you.

*E. V. Marshall*

## Government Products Division Directory

Phone number: (305) 844-7311

William C. Missimer, Jr.  
Sr. VP—Programs  
Ext. 2114

Richard H. Anschutz  
VP—Advanced Systems and Programs  
Ext. 2329

Leonard L. DeSantis  
VP—F100 Program  
Ext. 3501

R. Jackson Guthrie  
VP—Product Support  
Ext. 3124

John F. McDermott  
VP—Product Integrity  
Ext. 3652

Joe R. Phillips  
VP—TF 30 Program  
Ext. 3354

Richard A. Schmidtke  
VP—Laser Programs  
Ext. 3614

Robert R. Atherton  
Mgr.—Industrial and Space Programs  
Ext. 2478



## PRATT & WHITNEY AIRCRAFT GROUP

Government Products Division  
West Palm Beach, Florida 33402



ON NOVEMBER 18 of last year, the Joint Committee on Defense Production of the US Congress listened to some shocking testimony on the imbalance between US and Soviet civil-defense programs. Committee members were told:

The threat of mutual assured destruction will provide an effective deterrent only if the Soviet rulers believe that the threat is indeed *mutual*. Examination of Soviet literature reveals, however, that the Soviets do not subscribe to the West's concept of assured destruction. On the contrary, there is a growing body of evidence that the Soviet Union is preparing to survive and to recover from nuclear war should such a war occur.

The most important factor affecting industrial recovery is the survival of the work force. The Soviet Union's published plans and observed preparations make it clear that it intends the bulk of its work force to survive should a nuclear war occur. Its concept is to employ a combination of evacuation and shelters. Although about half of America's nuclear arsenal should survive a first strike by the Soviet Union, the surviving weapons could destroy people unprotected against blast, thermal, and prompt radiation effects in, at most, 3 percent of Soviet territory. Evacuation, by distributing people over a comparatively large area, allows them to survive. The U.S. could, by foregoing half the effectiveness of its arsenal against industrial facilities, spread lethal radioactive fallout over about 15 percent of the Soviet Union. However, the evacuees will dig simple shelters to protect against this possibility, and the decay rate of radiation intensity would, within a week, permit the Russians to be out of their shelters for an 8-hour workday in 97 percent of Soviet territory. Our analyses confirm the validity of published Russian estimates of population survival [ninety-five to ninety-six percent] and show that even if their city dwellers merely walked for one day and dug shelters, they would be well protected.

The witness before the Committee was Thomas K. Jones, Program and Production Evaluation Manager of the Boeing Aerospace Co. and a former member of the US Strategic Arms Limitation (SALT) staff. Mr. Jones presented the findings of a study, "Industrial Survival and Recovery After Nuclear Attack" conducted by Boeing. A major conclusion was that Soviet civil-defense programs would make it possible for the USSR to recover from a nuclear war "within 2 to 4 years, contrasted with an estimated 12-year recovery period for the United States."

Relevant to the Boeing study is a Department of Defense analysis of US casualties resulting from Soviet counterforce or countervalue attacks on the US, released in September 1975 by

The USSR has invested billions of rubles in civil defense as a counter to the US nuclear deterrent, while our annual CD budget has shrunk to about the price of a single B-1. But at a moderate cost, much can be done to shore up US deterrence by reducing . . .

# The Imbalance In Civil Defense

BY JOHN L. FRISBEE, EXECUTIVE EDITOR

a subcommittee of the Senate Foreign Relations Committee. The principal conclusions of that analysis were reported by Senior Editor Edgar Ulsamer in an article, "Nuclear War: The Life-and-Death Issues," which appeared in the January 1976 issue of AIR FORCE Magazine. The DoD study found that:

In the case of a comprehensive [counterforce] attack on all of SAC's ICBMs and bombers, as well as the Navy's SSBN (ballistic missile submarine) bases, casualties would range from 3,200,000 to 16,300,000, with 6,700,000 the most probable toll. By contrast, [a countervalue] attack on the US industrial and economic centers could be expected to cause about 100,000,000 casualties.

Further credence is added to these estimates of the casualty balance by the independent judgment of Princeton University's Nobel Prize-winning physicist, Dr. Eugene P. Wigner. According to Dr. Wigner, "The total explosive power in Russian missiles is now about six times greater than the explosive power in our missiles. I have calculated what losses we could inflict if they evacuate their cities. The maximum damage that we could inflict on them would

be . . . less than four percent of the population. They could destroy or threaten to destroy forty-five percent of our population.”

There are no figures available on Soviet casualties that would result from a US counterforce

---

The USSR could recover from a nuclear war “within 2 to 4 years contrasted with an estimated 12-year . . . period for the United States.”

---

attack on the USSR’s ICBM, bomber, and SSBN bases. It may be assumed that they would be very much smaller than US counterforce casualties. Soviet strategic bases generally are in sparsely populated areas with few downwind population centers that would be subject to heavy nuclear fallout. By contrast, US strategic bases are rather evenly distributed throughout the CONUS, with most major population centers in high fallout areas. And Soviet citizens threatened by direct and delayed effects of nuclear explosions are far better protected from those hazards than are their US counterparts.

These are sobering facts, even within the typical American public view of civil defense as only an intrawar measure pertinent to a nuclear conflict that is unlikely ever to happen. They are still more somber if civil defense is considered an element of deterrence. It is so regarded by the USSR.

In Soviet strategic planning, civil defense is an integral part of a complex of war-survival measures. Those measures are designed to deter a nuclear attack by the US; provide military/political bargaining power by making credible any Soviet threat of nuclear action; eliminate any rational US escalation of theater war to the strategic level, thus keeping potential conflict at a conventional (or at worst, theater nuclear) level where the USSR/Warsaw Pact forces have numerical and geographical advantages; and, finally, to achieve victory, though at a very high cost, if a nuclear exchange were to take place.

Soviet war survival measures applicable to military forces rather than the urban population cannot be concealed from the all-seeing eye of our reconnaissance satellites. They include hard-

ening ICBM silos to an estimated range of from 2,500 to 4,000 psi; construction of about 30,000 hardened command posts, storage sites, communications farms, and other military installations; and providing nuclear and chemical/biological protection and training for troops in the field.

These military and civil preparations raise a serious question in the minds of some defense planners as to whether US strategic nuclear deterrent forces could perform the missions believed essential for deterrence, namely:

- To destroy or reduce Soviet strategic forces held in reserve after a Soviet first strike;
- To kill from twenty to twenty-five percent of the Soviet population (50,000,000 to 60,000,000 people);
- To destroy at least half of Soviet war-related industrial facilities.

The problem created by Soviet military hardening is beyond the scope of this article. However, from what has been said above and what follows, it should be obvious that “overkill” is a myth, though one that dies hard.

#### **Soviet Civil-Defense Programs**

During the past two years a great deal of information on Soviet civil defense has become publicly available in this country. Their system is described here only in broad outline, as a basis for comparison with US civil-defense programs. An excellent short account of Soviet preparations is “Soviet Civil Defense,” by Harriet Fast Scott in the October 1975 issue of this magazine. A wealth of detail may be found in Leon Gouré’s book, *War Survival in Soviet Strategy* (Center for Advanced International Studies, University of Miami, 1730 Rhode Island Ave., N. W., Washington, D. C., 1976. 218 pages; \$4.95) and in a recent Air Force translation of the Soviet handbook “Civil Defense” (US Government Printing Office, Washington, D. C., 1976. 374 pages; \$3.45).

The Soviet civil-defense organization is part of the Ministry of Defense and is headed by a Deputy Minister, General Colonel (Lt. Gen.) A. T. Altunin. Under him are at least seventy general officers as civil-defense chiefs in the union republics and at lower administrative levels. There are some 70,000 to 100,000 military Troops of Civil Defense organized in battalions and stationed throughout the country. Officers are trained in a four-year Civil Defense Academy located in Moscow. In addition to the military formations, several million civilians serve voluntarily in staffs and units down to factory and apartment level.

Civil-defense training is compulsory for all Soviet citizens. Courses are taught in school grades two, five, and nine, in the universities, and in the several youth organizations. Adult training is compulsory to age sixty for men and fifty-five for women. Exercises are con-



ducted in summer youth programs, schools, factories, and urban districts. There are "training villages" scattered around the country that simulate urban areas damaged by nuclear attack.

The Soviet concept of civil defense is based on shelters for a significantly large part of the population, dispersal and protection for essential workers in places not far distant from their work, and evacuation of nonessential persons to safe areas where they can be sheltered and cared for.

Each urban resident is assigned a specific evacuation area and a means of transportation to that area. It has been reported that seventy-five blast-resistant underground shelters have been constructed around the periphery of Moscow to accommodate the political leadership and key elements of the bureaucracy. Some basement shelters in apartment buildings are hardened to more than 100 psi. There are underground shelters in the immediate vicinity of essential industrial plants, some of them large enough to house several thousand workers for an extended period. Subways in the larger cities have been built deep underground and equipped with blast doors. The Moscow subway can shelter about 1,000,000 people. In 1974, there was an apparent shift from primary reliance on evacuation to renewed emphasis on shelter construction.

Industrial facilities have been dispersed

---

In 1974, there was an apparent [Soviet] shift from . . . evacuation to . . . emphasis on shelter construction.

---

throughout the country, subject to the limitations of a meager transportation system. Industrial sites are spaced so a single US warhead could not destroy two adjacent factories, and buildings of each factory are built about a quarter of a mile apart. There is some industrial hardening and at least a few factories are underground. The Boeing study indicates that it would require eight times more megatonnage per square foot to destroy the Soviet industrial complex than would be needed to decimate essential US industry.

The USSR has had an active civil-defense program since before World War II. Most

authorities agree that it would have cost the US about \$1 billion a year to duplicate the Soviet program from 1960 to 1972, and considerably more during the past four years.

### US Civil Defense

One index of the importance Americans attach to any program is the amount of money they are willing to appropriate for it. The US federal budget for civil defense reached its peak of \$207.6 million in 1961—the year of the Berlin crisis. From that point on, with minor perturbations, it has been all downhill. In FY '77, the Office of Management and Budget cut the funding request for civil defense from \$123 million to \$40 million, later restored to \$82.5 million or, in constant dollars, less than one-fourth what was budgeted in 1961.

One reason for our lack of attention to civil defense has been the US concept of Mutual Assured Destruction, which reached its zenith in 1972 with the Anti-Ballistic Missile Treaty between the US and USSR. Then, Americans were told the Soviets had tacitly agreed that both sides would leave their citizens undefended as hostages to their good behavior. Another reason is the widely held belief that "in the nuclear age, there is no place to hide," recently reiterated by Sen. William Proxmire when he recommended abolishing our civil-defense program. The Soviets have disproved both these assertions.

The budgetary figures cited above are not the total national investment in civil defense. The states contribute up to a maximum of \$50 million a year and all federal agencies plan for continuation of their activities during national disaster or war. All of this emergency preparedness planning is coordinated by the Federal Preparedness Agency of the General Services Administration. A September 1976 Library of Congress report on US and Soviet city defense estimates that from 1961 through 1976, the US spent \$2.6 billion (an average of about \$160 million a year) for civil defense.

Civil defense per se is the responsibility of the Defense Civil Preparedness Agency (DCPA) in the Department of Defense. It is largely a planning agency that assists state and local governments in protecting their residents from radioactive fallout generated by a nuclear attack. DCPA has about 600 employees, all but two or three civilians, in Washington and its eight regional headquarters. Including full-time state and local emergency preparedness employees (in most cases, civil-defense and natural-disaster functions are combined below the federal level) there are some 7,000 people engaged in civil-defense work. All planning is based on seventy-two hours' strategic warning of impending attack.

Since the National Fallout Shelter Survey

was started in 1961, more than 230,000 facilities with fallout shelter space for 227,000,000 persons have been identified. However, a high percentage of shelters are in urban/industrial areas that would be prime targets in a countervalue attack. Much of the shelter space is above ground in building corridors and would provide little if any protection against blast and fire.

Initially, many designated shelters were equipped with food, water containers, and radiological monitoring devices. Most of the food has passed its shelf-life, but there is no money in the DCPA budget to replace it.

Tapes, films, and camera-ready copy telling people how to protect themselves in the event of a nuclear attack have been prepared and made available to state and local organizations. DCPA has developed a textbook and other course materials for use in the seventh and eighth grades. In 1976, 2,700,000 students in sixteen states took the course. In order to make it acceptable to local authorities, ninety percent of the course deals with natural disasters and ten percent with civil defense. The FY '77 budget does not provide enough money to continue the course.

DCPA and its predecessor organizations have developed other components of a civil-defense system, including warning and communications nets, radiological monitoring capabilities, and state and local emergency operating centers.

A blast shelter program similar to that of the USSR has never been seriously considered in this country. However, DCPA planners have designated 400 areas in the US as "high risk." Those areas are in proximity to counterforce targets and other key military installations, and urban/industrial complexes with a population of 50,000 or more. In 1974, nine Crisis Relocation Planning pilot projects were started in Springfield, Mass.; Utica/Rome, N. Y.; Dover, Del.; Macon, Ga.; Duluth, Minn.; Oklahoma City; Colorado Springs; Tucson, Ariz.; and Great Falls, Mont. Ultimately, these projects will produce detailed preparations for evacuating residents to safe host areas and for fallout shelters and austere sustenance of the evacuees. DCPA hopes to conduct test exercises in the future. No detailed planning has yet been done for the major metropolitan centers of the northeast, north central, and west coast regions.

The state of civil-defense preparedness varies widely. Some communities that have had recent experience with widespread natural disasters probably could evacuate residents to relatively safe areas and provide minimum care. But most of the population could rely on little more than warning of an attack, generalized instructions on protection against fallout, and some indication of the direction in which

they should head. It is the absence of detailed evacuation plans, public education, preparation of host areas, and blast shelters for those who would have to remain in cities that accounts for the estimate of 100,000,000 US casualties in a countervalue attack.

### What Can Be Done?

DCPA Director John E. Davis says that Crisis Relocation Planning for the 400 high-risk areas could be completed by the early 1980s if DCPA were funded at between \$200 million and \$250 million a year for the next five years. He believes that urban evacuation is feasible even in the northeast corridor, extending from Boston to Washington, D. C. In his opinion, given three days' warning, US casualties in an urban/industrial attack could be reduced by about 70,000,000. Casualties resulting from a counterforce attack would be "significantly" lower than the 6,700,000 now postulated.

The DCPA Director sees civil defense as serving an essential deterrent function. Today, if the USSR evacuated its cities and threatened to attack the US, we would be confronted by

---

A blast shelter program similar to that of the USSR has never been seriously considered in this country.

---

a potential loss of life ten times that of the USSR. (Another Defense planner estimates that if both the Soviet and US civil-defense programs continue at present levels, the exchange ratio in casualties would stand at thirty-to-one by the early 1980s.) On the other hand, if the US is prepared to evacuate its cities rapidly, at least a semblance of "equal security" will have been restored. An evacuation potential also would be valuable in the event of an accidental nuclear explosion, or threats by nuclear-armed terrorists.

The modest DCPA budget suggested by Mr. Davis would provide no funds for protection of essential industry. The Boeing study claims that industrial losses can be vastly reduced and recovery vastly speeded up by such simple expedients as packing machinery in metal shavings and sand bags. The effectiveness of this technique (which is described in detail in

the Soviet handbook "Civil Defense") was demonstrated by subjecting a variety of machines to overpressures as high as 600 psi in a series of TNT-simulated nuclear blasts conducted by the Defense Nuclear Agency.

---

. . . urban evacuation is feasible . . . [and] US casualties . . . could be reduced by about 70,000,000.

---

Boeing's analysts estimate that essential US industry could be protected against blast overpressures of 200-300 psi for \$2.5 to \$3.0 billion.

It is fruitless to quibble over whether Soviet casualties in a nuclear exchange would or would not be as low as the Soviets and many US experts claim. There is incontrovertible evidence from satellite photography, the testimony of Soviet émigrés, and the statements of Soviet officials that they are making very extensive preparations to survive a nuclear war and rebuild their country.

Whether the Soviet leaders are spending billions of rubles on war-survival preparations in order to attack this country or to exert irresistible coercive political pressure on the US is, of course, an important question. But the difference, so far as the future of this country is concerned, is one of degree.

No one—not even the most ardent supporter of civil defense—would claim that a deterrent

balance based on equal security can be maintained solely by improving the US civil-defense posture. Keeping—or restoring—that balance will require continuing modernization of strategic offensive and defensive forces and an expanded R&D program with heavy emphasis on basic research. But civil defense is an essential element of deterrence; however, and it should be so understood by the American public. As Boeing's T. K. Jones told the Joint Committee on Defense Production:

. . . These Soviet [civil-defense] preparations substantially undermine the concept of deterrence that forms the cornerstone of U.S. security. . . . In any future confrontation, should the Soviet execute its civil defense plans, the consequences of further escalation would be disastrous to the United States. . . .

We can choose to try to make nuclear war as unthinkable for Russia as it now is for the U.S. or we can try to make it as survivable for the U.S. as it now is for Russia. . . . [The latter] course could permit the United States to maintain its security for less cost and with less nuclear weaponry than otherwise would be required.

It is an open question whether the American people are willing to spend \$1 billion over the next five years for minimum preparations to protect the population against nuclear attack, or something on the order of \$4 billion to protect both people and industry. The odds are not favorable unless there is better public appreciation of the civil-defense imbalance between the US and the USSR, the relationship of civil defense to deterrence, and the fact that civil defense need not be an exercise in futility.

The funds needed to restore some measure of balance are relatively small. Dollar for dollar, it could be the best investment this country has made in the nuclear era. ■

---

## SUPERPOWER

As duty electronics technician for a communications center in Southeast Asia, I'd worked long and hard to make certain everything was in readiness for the commanding officer's "Combat Readiness Inspection."

The inspecting colonel was duly impressed with my preparations and inquired: "Have you provided for auxiliary power in case the regular power supply is knocked out in a surprise attack?"

I proudly flipped the switch on a diesel generator I'd fortunately installed just that morning. But because of my faulty wiring, 440 volts zipped through a system designed to carry only 110 volts, instantly shattering the overhead fluorescent lights and sending a fine powder of broken glass down on the head and shoulders of the startled colonel.

Brushing the bits of glass from his hair, the colonel commented laconically: "Very good, Sergeant; if you don't kill any sneak attackers, you can at least worry the hell out of them with a bad case of dandruff."

—Contributed by John Cashman

(AIR FORCE Magazine will pay \$20 for each anecdote accepted for publication.)



## Armée de l'Air-1977

With its lineage dating back to 1909, the French Air Force is tightly organized and well equipped for its defense doctrine of flexible response.

**BY JOHN W. R. TAYLOR**  
EDITOR, JANE'S ALL THE WORLD'S AIRCRAFT

**T**HE French Air Force came into being officially, as the Armée de l'Air, on April 1, 1933. On July 2, 1934, it was declared an independent service; but its origins can be traced back to 1909.

In that year three Farman biplanes, two Wright biplanes, and two Antoinette monoplanes were ordered as initial equipment for an Aircraft Establishment at Vincennes, from which evolved the Service Aéronautique in April 1910. Almost from the start it was decided that only aircraft and engines of French manufacture would be acceptable for military aviation units.

This was reasonable in a period when France was the world center of pioneer flying. The official British history of the 1914-18 *War in the Air* admits that: "It was largely due to the assistance given us by the French during the first half of the war that we were able to carry on in the field while the British aircraft industry was being built up."

The First World War produced the first generation of French "aces"—men like Fonck, Guynemer, and Nungesser who, among them, were credited with 174 confirmed victories. The Service Aéronautique had 3,222 operational aeroplanes at the front on the day the fighting ended, with huge reserves, and was supported by an industry able to deliver nearly 100 new aircraft every day. It was the largest air force in the world, able to spare the Spads and Nieuports flown by most US fighter pilots who served in France.

Few things erode more quickly than military supremacy. Having proclaimed the independence of the Armée de l'Air, the French government followed up by nationalizing its aircraft industry on August 11, 1936. The aim was to create a thoroughly modern air force with 1,544 first-line aircraft and 1,297 reserves. The prototypes of designs like the Dewoitine D.520 fighter and Amiot 354 bomber showed promise of matching the best that Hitler's newly created *Luftwaffe* could put into the air. Production was so pathetic that production models were to play little part in the Second World War. Even the decision to fill the gaps by ordering huge numbers of combat aircraft from the US was taken too late.

As in the First World War, French pilots fought bravely. Up to June 11, 1940, they claimed 813 combat victories, of which 585 were confirmed. In doing so, they lost 1,490 men killed and wounded, and 1,200 aircraft, of which 413 were shot down in action. The Free French carried on the struggle, not least as members of the "Normandie-Niemen" Regiment, flying Yak-3 fighters in Russia.

Peace in 1945 brought little more than a change of enemy, with campaigns everywhere from Indo-China to Algeria and Suez. Gradually, the combat units exchanged their British and US equipment for products of the mixed nationalized/private home industry. Gradually, too, the policy of the French government seemed to become more isolationist. Under President de Gaulle, on March 7, 1966, France withdrew from NATO. It determined to have its own completely independent nuclear deterrent triad, with Mirage IV supersonic nuclear-armed strategic bombers, silo-based IRBMs, and submarine-based SLBMs. The stated policy was to be inevitable nuclear response against attack from any quarter.

A major change in French defense doctrine was suggested by the Chief of Staff of the Armed Forces, Général Guy Méry, in 1976. Under the next six-year military program, for 1977-82, the emphasis will switch to flexible response, with a buildup of conventional forces, and likely French participation in any conflict on NATO's borders with East Germany and Czechoslovakia if French security were threatened. No one doubts any longer the location of potential targets against which French IRBMs are programmed.

In meeting the needs of its armed forces and commercial operators, France has maintained an aerospace industry that exported products worth 6.9 billion francs (nearly \$1.4 billion) in 1975, and is able to advertise some of its combat types as "avions 100% Français." There is, however, another side to the coin. There are suggestions of lowered morale among French military personnel, resulting from relatively poor pay and conditions of service. Air Force leaders have complained about the proposed further eight percent reduction in



An Alpha Jet demonstrates its flexibility by operating from a French highway.

total flying, to 415,000 hours in 1977, through fuel economies, with a target fifteen hours a month for combat pilots.

The Air Force Chief of Staff, Général Maurice Saint-Cricq, is reported to have said that studies established the optimum number of combat aircraft as 650, but that the new program will result in a first-line strength of only 450 aircraft. He forecast a 1980 combat force of six squadrons of Mirage F1s, eight to ten squadrons of Jaguars, and fourteen to sixteen squadrons of Mirage IIIs and 5s up to twenty years old. It was an earlier Frenchman, Voltaire, who remarked that "God is always on the side of the big battalions."

### Organization

The President of the Republic exercises command over all the French armed forces. He is assisted by the Conseil Supérieur de la Défense Nationale, and by the Comité de Défense and Comité de Défense Restreint, which formulate directives. Responsibility for national defense is vested in the Prime Minister, and exercised through the Secrétaire Général de la Défense Nationale.

Since July 5, 1969, the Ministry of State for National Defense has been responsible for the Army, Air Force, and Navy. It is assisted by the Departmental Assistant for Weapons, the Secretary-General for Administration, the Chief of Staff of the Armed Forces, and the individual Chiefs of Staff of the Army, Air Force, and Navy. The armed forces have been organized since 1962 in three primary groups: the Nuclear Strategic Force (FNS), under the direct authority of the President; the Operational Forces of all three services, including Air Force tactical aircraft, transports, helicopters,

etc.; and the Home Defense Forces, consisting primarily of twenty Army regiments but with elements of the other services.

The Air Force (Armée de l'Air) is organized in seven major specialized commands, created in 1961-65:

**Commandement des Forces Aériennes Stratégiques (CFAS).**

Hq: Base aérienne 921, 95150 Taverny.

The Mirage IV strategic bomber force was reduced in 1976 from nine to six squadrons, with a total of thirty-two first-line aircraft plus reserves, in the following units:

**91 Escadre** (Wing). Hq. Mont-de-Marsan; other squadrons at Cazaux and Orange.

**94 Escadre**. Hq. Avord; other squadrons at St-Dizier and Luxeuil.

Boeing C-135F tankers to support these six squadrons are based at Istres.

**Commandement des Forces Aériennes Tactiques (FATAC).**

Hq: Base aérienne 128, 57039 Metz Cedex.

This comprises the 1st CATac (Tactical Air Command) with seventeen home-based strike/close support squadrons and three reconnaissance squadrons. It controls 2d CATac, air component of triservice Force d'Intervention, with two squadrons of Vautour IIB bombers in **92 Escadre**.

1st CATac units are as follows:

**2 Escadre**. Hq. Dijon; 2 squadrons Mirage III-E, 1 squadron Mirage III-B/BE.

**3 Escadre**. Hq. Nancy; 2 squadrons Mirage III-E, 1 squadron Mirage 5F.

**4 Escadre**. Hq. Luxeuil; 2 squadrons Mirage III-E for radar site suppression with Martel missiles.

**7 Escadre**. Hq. St-Dizier; 3 squadrons Jaguar (2 with nuclear role).

**11 Escadre**. Hq. Toul; 3 squadrons Jaguar, plus F-100 squadron in Djibouti.

**13 Escadre**. Hq. Colmar; 2 squadrons Mirage III-E, 1 squadron Mirage 5F.

**33 Escadre**. Hq. Strasbourg; reconnaissance wing with 2 squadrons Mirage III-R, 1 squadron Mirage III-RD.

**Commandement Air des Forces de Défense Aérienne (CAFDA).**

Hq: Base aérienne 921, 95150 Taverny.

Responsible for home defense against air attack. Eight squadrons of daylight/all-weather interceptors, plus sixteen batteries of Crotale close-range surface-to-air missiles for defense of bases housing strategic and tactical nuclear forces, and the overseas base at Djibouti, on the Gulf of Aden. It is linked to NATO's NADGE network. Units are equipped as follows:

**5 Escadre**. Hq. Orange; 2 squadrons Mirage F1.

**10 Escadre**. Hq. Creil; 2 squadrons Mirage III-C.

**12 Escadre**. Hq. Cambrai; 2 squadrons reequipping from Super Mystère B2 to Mirage F1.

**30 Escadre**. Hq. Reims; 2 squadrons Mirage F1.

**Commandement du Transport Aérien Militaire (CoTAM).**

Hq: Base aérienne 107, 78129 Villacoublay Air.

This Command provides transportation for all the French services, with some 300 fixed-wing aircraft and 150 helicopters. In addition to the primary tactical wings listed below, CoTAM has four DC-8Fs for intercontinental missions, and a VIP unit known as the Groupe des Liaisons Aériennes Ministérielles (GLAM 1/60) operating the Presidential Caravelle, five Mystère 20 and three Mystère 10 twin-jet executive transports, and six Puma and Alouette III helicopters for local flights. Search and rescue is a further CoTAM task.

**61 Escadre**. Hq. Orleans; 3 squadrons Transall C-160.

**62 Escadre**. Hq. Reims; 2 squadrons Noratlas.

**64 Escadre**. Hq. Evreux; 2 squadrons Noratlas, 1 squadron DC-6B.

**SSBS**

In addition to its Mirage IV strategic bomber force, the Armée de l'Air is responsible for the IRBMs of the Force Nucleaire Stratégique. Eighteen SSBS (sol-sol balistique stratégique) two-stage, solid-propellant missiles are deployed by the two operational squadrons of the 1e Groupement de Missiles Stratégiques, in hardened silo launchers on the Plateau d'Albion, east of Avignon in Haute Provence. Fire-control centers are at Rustrel (Vaucluse) and Reilhannette (Drôme).

The first group of IRBMs became operational in the summer of 1971, two years after the last prototype had made a completely successful 1,550-mile flight toward the Azores test area from a silo at Landes test center. The missiles are designed to be launched by the rapid remotely controlled opening of the silo doors, without requiring any human action at the dispersed launch sites.

Prime contractor for the SSBS is the Division des Systèmes Balistiques et Spatiaux of Aérospatiale. The first-stage P.16 (Norma 902) and second-stage P.10 (Norma 903) motors are supplied by SNPE. Guidance is inertial, with control by four gimbaled nozzles on each stage. A 150 kt warhead is fitted to current S-2 missiles; these will be superseded by 1 MT warhead, longer-range S-3 missiles by about 1980.

Overall length 48 ft 6½ in. Max body diameter 4 ft 11 in. Launch weight 70,325 lb. Max range 1,960 miles.



An SSBS, model 2, IRBM is paraded by during a military review.

**Commandement des Ecoles de l'Armée de l'Air (CEAA).**

Hq: Base aérienne 705, 37034 Tours Cedex.

Responsible for training personnel for all branches of the Air Force. Aircrew training is carried out on Magister jet basic trainers, T-33, and Mystère IV jet advanced trainers, MD.312 Flamant twin-engine conversion trainers, Noratlas navigation trainers, and two-seat versions of the Mirage III and Jaguar. Total strength is about 700 aircraft, including Magisters of the Patrouille de France national aerobatic team, CAP 20 piston-engined lightplanes of the associated Equipe de Voltige Aérienne (EVA), and D.140E lightplanes and gliders for recreational flying.

**Commandement des Transmissions de l'Armée de l'Air (CTAA).**

Hq: Base aérienne 107, 78129 Villacoublay Air.

Responsible for communications and electronic warfare. Units include EC 57 with Noratlas aircraft for radar calibration, and EE 54, also with Noratlas, for electronic warfare duties, from Metz.



Best known French warplane of World War I was the Spad, of which thousands were produced of various types, including a total of 8,440 of the Spad XIII. The Spad was the choice of such leading French aces as Guyemer and Fonck.

#### Commandement du Génie de l'Air.

Hq: Base aérienne 107, 78129 Villacoublay Air. Made up mainly of Army engineers, this Command undertakes air-base construction and maintenance, under Air Force control.

The home-based French Air Force is divided territorially among four metropolitan air regions:

**1er Région Aérienne**, centered on Metz-Frescaty and linked with the Commandement des Forces Aériennes Tactiques as FATAAC/1er RA.

**2e Région Aérienne**, centered on Villacoublay.

**3e Région Aérienne**, centered on Bordeaux.

**4e Région Aérienne**, centered on Aix-en-Provence.

Few Armée de l'Air units are based overseas. There are small transport and support units, equipped mainly with Noratlas aircraft and Alouette helicopters, at St. Denis, Réunion; Dakar, Senegal; Pointe-à-Pitre in the West Indies; and accompanying the F-100s in Djibouti. A CoTAM-controlled group with DC-6s, Noratlas, a Mystère 20 jet, and Alouette IIIs serves the French nuclear test center in the Pacific, with eight Vautours of 85 Squadron available for air-sampling duties.

#### Current Strength, Readiness, and Future Reequipping

At the beginning of 1976, personnel strength totaled 100,990, made up of 7,548 officers, 44,553 noncommissioned officers, 46,138 other ranks, and 2,751 women. Aircraft totaled 1,637, plus 390 minor supporting types, of which 1,020 were jets and 700 combat aircraft, including reserves. Numbers of each type of aircraft are given in the following section of this survey.

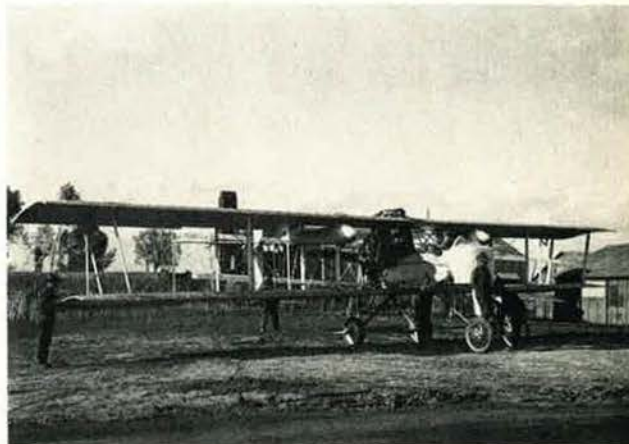
To maintain the degree of permanent alert demanded of the strategic, tactical, air defense, and transport forces, 600 officers and 5,000 NCOs are on duty around the clock. The total personnel involved is doubled if one counts such supporting elements as maintenance staff, security guards, airfield control, and personnel in operations centers. Preparedness for action is dependent on neither an order putting units on a war footing nor the recall of reservists. Exercises have demonstrated that sixty percent of the air forces can

be operational within three hours of an alert. Only thirty-six hours after being ordered overseas, F-100s of Esc 4/11 were in Dakar, West Africa, having been refueled en route by C-135F tankers.

The cost of maintaining independent national armed forces to such standards is high. The sum requested by the Defense Ministry under 1977 budget proposals represented an increase of nearly seventeen percent compared with 1976, and more than 17.5 percent of the total national expenditure. An even higher total of 59.7 billion francs (about \$12 billion) was finally authorized for overall military expenditure, including 4.6 billion francs (\$934 million) for aircraft and equipment for the Air Force. As an example of the growing sophistication of combat aircraft, Général Saint-Cricq has stated that expenditure on ECM increased by a factor of ten in the past five years, that all new aircraft required such devices, and that a Jaguar squadron was being assigned to offensive ECM operations.

No replacement for the Mirage IV-A strategic bomber is planned at present. The current force will remain operational, with its 60 kt AN-22 free-fall nuclear bombs, until 1985, following extensive refurbishing. After that, ten of the aircraft are expected to continue in use for all-weather reconnaissance.

From 1982, it is hoped that the new Delta Mirage 2000 fighter will begin to enter service at a rate of four aircraft per month. The initial production series of 127



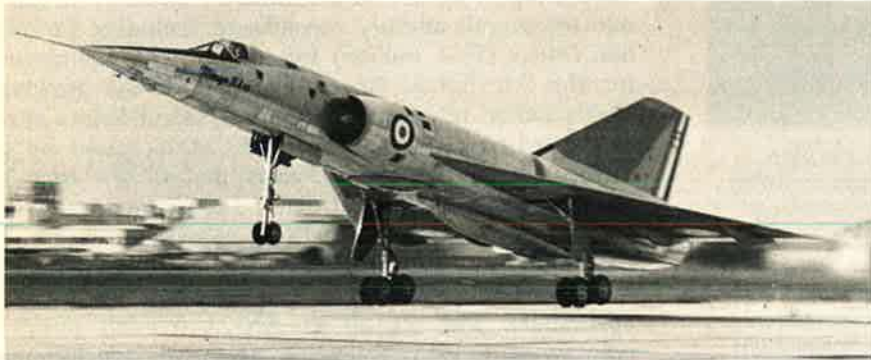
The Voisin "chicken-coop" appeared in a variety of models during WW I, and one of these rickety French bombers had the distinction of shooting down the first enemy aircraft of the war, on October 5, 1914.

will be assigned first to air defense squadrons. From 1985, others will replace Mirage III-Rs for tactical reconnaissance, fitted with the full range of photographic, SLAR, and other sensors. Mirage 2000s will also replace ground attack III-Es, carrying both conventional and nuclear weapons, including the projected ASMP medium-range nuclear standoff missile.

Delivery of 200 Alpha Jets required by the Armée de l'Air (eighty-nine ordered to date) is scheduled to begin in the fall of 1978, replacing Mystère IV-As. It is hoped also to replace some Noratlas transports with twenty-five to thirty Transall C-160s, if sufficient foreign orders can be obtained to justify resumed production.

(See Gallery of French Aircraft, starting on next page)

# Major Armée de l'Air Aircraft

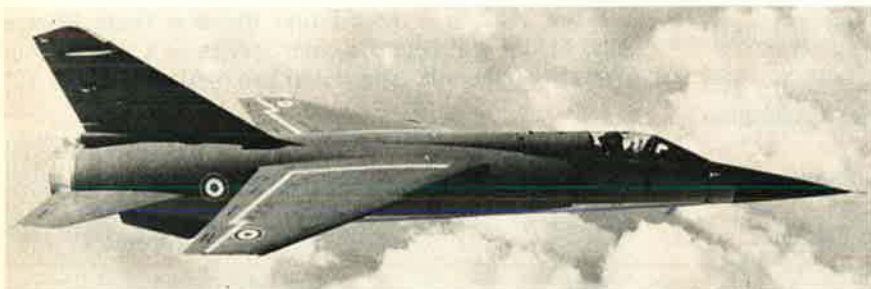


Mirage IV-A.

**Dassault Mirage IV-A:** Supersonic strategic bomber; crew 2. In service since February 1964; assigned primarily to low-level strike role, carrying AN-22 nuclear weapon, up to sixteen 1,000 lb bombs, or four Martel ASMs. Of 50 remaining Mirage IV-As, 32 equip 6 first-line squadrons. Provision for JATO and flight refueling.

**Power Plant:** Two SNECMA Atar 9K afterburning turbojets; each 14,770 lb st.

Span 38 ft 10½ in. Length 77 ft 1 in. Gross weight 70,550 lb. Max level speed Mach 2. Normal cruising speed at 36,000 ft Mach 0.9. Service ceiling 60,000 ft. Unrefueled combat radius 500-930 miles, according to profile. No defensive armament.



Mirage F1.

**Dassault-Breguet Mirage F1-C:** Single-seat all-weather interceptor. Operational since early 1974. Two wings, each with 31 aircraft; third wing reequipping with F1-Cs. Orders expected to total about 225. Prototype of two-seat F1-B flown on May 26, 1976.

**Power Plant:** One SNECMA Atar 9K-50 afterburning turbojet; 15,785 lb st.

Span 27 ft 6¾ in. Length 49 ft 2½ in. Gross weight 32,850 lb. Max level speed Mach 2.2 at high altitude, Mach 1.2 at low altitude. Max rate of climb at high altitude 47,835 ft/min. Service ceiling 65,600 ft. Combat radius 240-745 miles, according to profile.

Armament for air defense role includes two 30 mm DEFA 553 cannon with 125 rds/gun, Matra R.530 or Super 530 AAMs under wings and fuselage, and Sidewinder or Matra Magic AAM on each wingtip. Provision for wide range of ground attack weapons.



Mirage III-C.

**Dassault Mirage III-C:** Single-seat all-weather interceptor. Operational since late 1961; 55 in service with two full squadrons and other units, scheduled for replacement from 1980.

**Power Plant:** One SNECMA Atar 9B afterburning turbojet; 13,225 lb st. Optional SEPR 841 auxiliary rocket motor; 3,085 lb st.

Span 27 ft 0 in. Length 48 ft 5½ in. Gross weight 26,455 lb. Max level speed Mach 2.15 at high altitude, Mach 1.2 at low altitude. Combat speed at high altitude Mach 1.8. Service ceiling 54,100 ft. Combat radius 250-370 miles, according to profile.

Armament for air defense role includes two (optional) 30 mm DEFA cannon with 125 rds/gun, one Matra R.530 AAM under fuselage, and two Sidewinder AAMs. Provision for wide range of ground attack weapons.

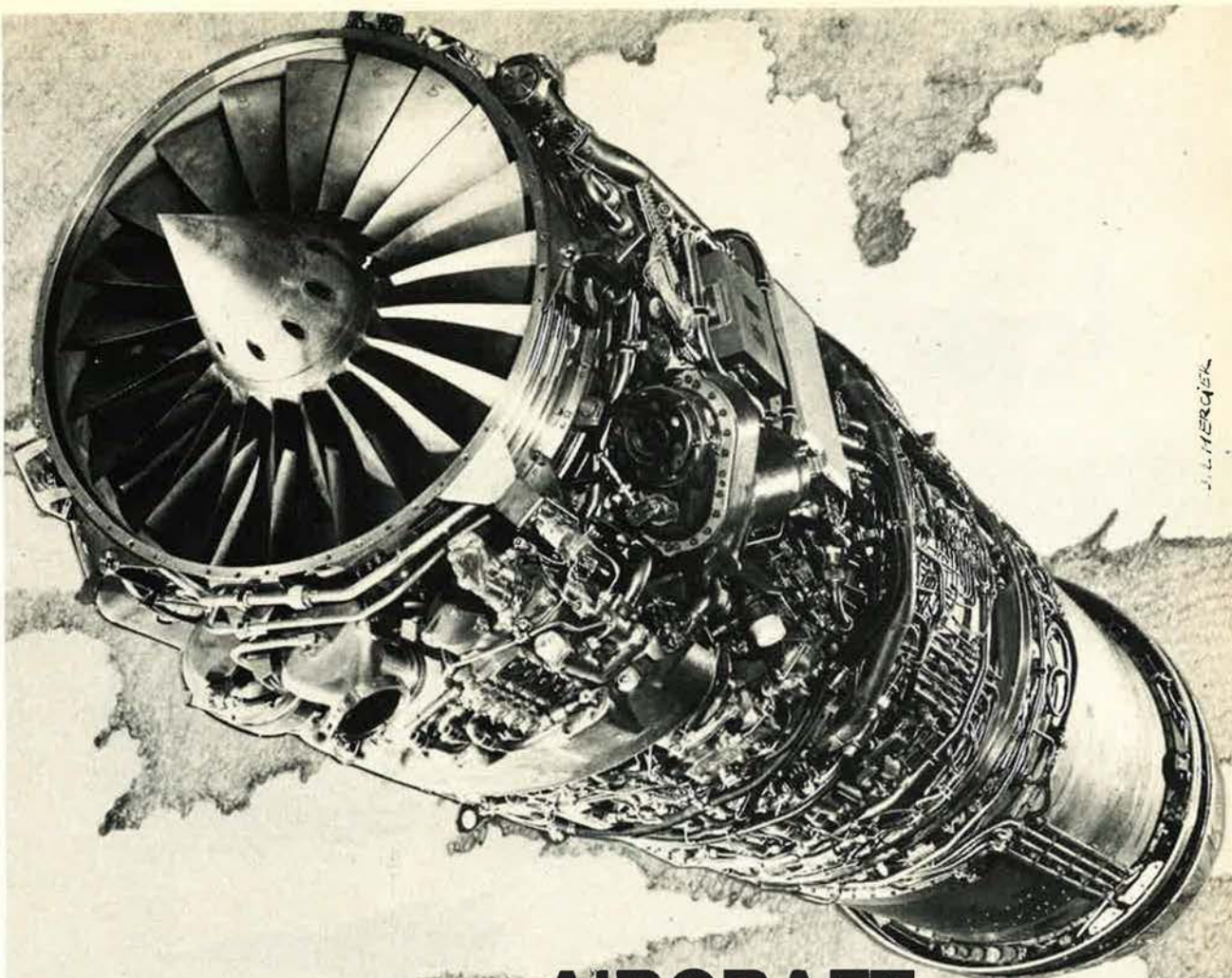


Mirage III-E.

**Dassault Mirage III-E:** Single-seat fighter-bomber/intruder. Operational since April 1964; total of 139 in service with Armée de l'Air.

**Power Plant:** One SNECMA Atar 9C afterburning turbojet; 13,670 lb st. Op-





J. L. MERCIER

# AIRCRAFT ENGINES

- FORGE-FOUNDRY
- ELECTRONICS
- EJECTION SEATS
- INDUSTRIAL GAS TURBINES
- TURBOCHARGERS
- NUCLEAR EQUIPMENTS



# SNECMA

150, BD HAUSSMANN - 75361 PARIS - TEL. 227.33.94

# Fighter Aircraft Systems



## ATLIS

Automatic Tracking  
Laser Illumination  
System

Produced jointly with

**MARTIN MARIETTA**  
AEROSPACE

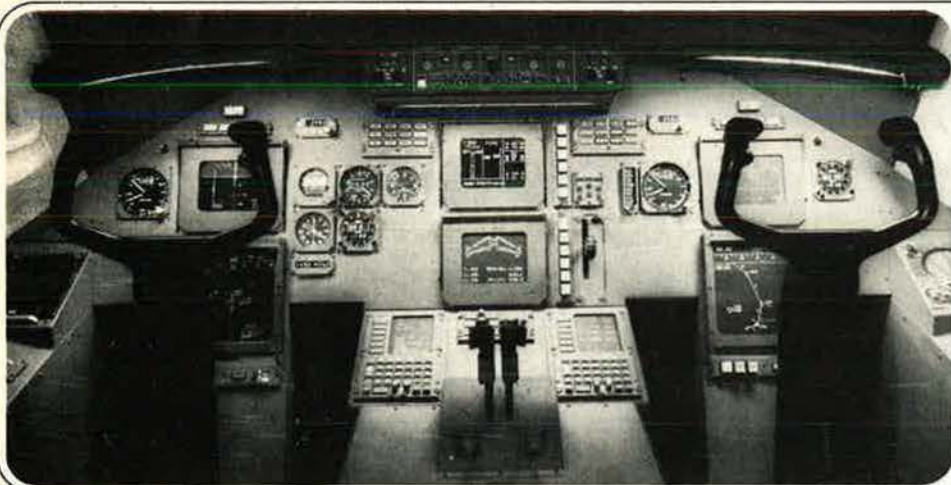
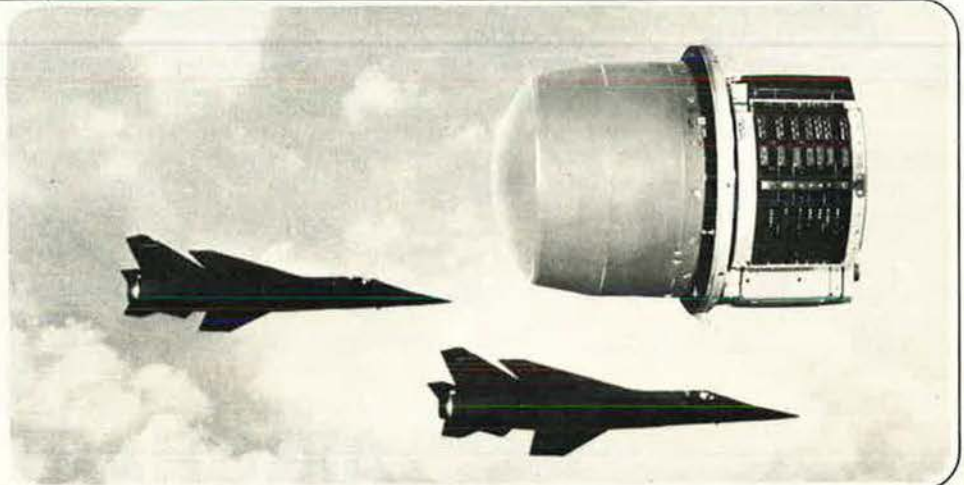
## AGAVE

Forward Looking  
Radar

The best weight-cost  
multimode  
performance  
compromise.

Produced jointly with

**EmD**  
ELECTRONIQUE  
MARCEL DASSAULT



## INTEGRATED INSTRUMENT PANEL

Multi-color display  
system for civil  
and military aircraft.

Produced jointly with

**Bendix**  
FLIGHT SYSTEMS DIVISION



**THOMSON-CSF**

DIVISION EQUIPEMENTS AVIONIQUES

178, BD GABRIEL PERI / 92240 MALAKOFF / FRANCE / TEL.: (1) 655.44.22

For information in USA: THOMSON-CSF INC. / 75 Rockefeller Plaza / New York N.Y. 10019 / Tél.: (212) 977 22.00

tional SEPR 844 auxiliary rocket motor; 3,300 lb st.

Span 27 ft 0 in. Length 49 ft 3½ in. Gross weight 29,760 lb. Max level speed Mach 2.2 at high altitude, Mach 1.13 at sea level. Cruising speed at 36,000 ft Mach 0.9. Service ceiling 55,775 ft (75,450 ft with rocket motor). Combat radius 125-745 miles, according to profile and configuration.

Armament for ground attack includes two 30 mm DEFA cannon with 125 rds/gun, and two 1,000 lb bombs; or an underfuselage AS.30 ASM and two 1,000 lb bombs; or JL-100 pods, each with 18 rockets, instead of bombs. Provision for carrying R.530 and Sidewinder AAMs for air defense duties.

**Dassault Mirage III-R:** Single-seat reconnaissance version of III-E, with five OMER 31 cameras in nose, adjustable for very low altitude, medium altitude, high altitude, and night reconnaissance missions. Self-contained navigation system and same optional ground attack weapons as Mirage III-C. Operational since March 1963; 41 in service with 2 squadrons. Specification generally similar to that of III-E, except no provision for rocket motor. Length 50 ft 10¼ in. Combat radius 310-715 miles.

**Dassault Mirage III-RD:** As III-R, but improved Doppler navigation, gyro gun-sight, and automatic cameras. Provision for Cyclope infra-red tracking equipment and 450 gallon underwing fuel tanks. One squadron with 18 aircraft operational.

**Dassault Mirage 5F:** Single-seat ground attack aircraft with the airframe and power plant of the Mirage III-E, simplified avionics, increased fuel, and much greater stores carrying capability. Two Armée de l'Air squadrons inherited 48 aircraft that were ordered by Israel but not delivered. Each Mirage 5F can carry more than 4 tons of stores on seven hardpoints. Specification as for III-E, except length 51 ft 0¼ in. Combat radius 400-805 miles, according to profile, with 2,000 lb bomb load. Ferry range 2,485 miles.

**SEPECAT Jaguar A:** Single-seat tactical support aircraft. Entered service with operational squadron in June 1973. More than half of 160 Jaguar As delivered, plus all 40 two-seat Jaguar Es. Power Plant: Two Rolls-Royce/Turboméca Adour 102 afterburning turbofans; each 7,305 lb st.

Span 28 ft 6 in. Length 55 ft 2½ in. Gross weight 34,000 lb. Max level speed Mach 1.5 at 36,000 ft, Mach 1.1 at sea level. Combat radius 357-818 miles, according to profile and configuration.

Armed with two DEFA 553 30 mm cannon and up to 10,000 lb of external stores, including AN-52 tactical nuclear weapon, Martel anti-radar missile, up to eight 1,000 lb bombs, Matra Magic AAMs, and air-to-surface rocket packs.

**Transall C-160:** Medium tactical/strategic transport; crew of 4 and 91 troops, up to 81 fully equipped paratroops, 62 litters and 4 attendants, or 35,275 lb of armored vehicles, trucks, equipment, or freight. Individual loads of up to 17,635 lb can be airdropped. Armée de l'Air has 47, with requirement for 25-30 more if production re-starts.

Power Plant: Two Rolls-Royce Tyne RTy.20 Mk 22 turboprops; each 6,100 ehp.



Mirage III-R (reconnaissance).



Mirage 5F.



Jaguar A.



Transall C-160 F.

—AIR PORTRAITS

—AIR PORTRAITS

—PHOTO BY PETER R. MARCH



Noratlas, used as navigation trainer.



Magisters.

Span 131 ft 3 in. Length 106 ft 3½ in. Gross weight 112,435 lb. Max level speed 368 mph at 16,000 ft. Econ cruising speed 282 mph at 20,000 ft. Service ceiling 25,500 ft. Take-off run at gross weight 2,450 ft. Normal landing run 1,800 ft. Range 1,056 miles with max payload. Ferry range 3,230 miles.

**Nord 2501 Noratlas:** Medium-range tactical transport; crew of 5 and 42 troops or 10,800 lb of vehicles or freight. Entered service October 1952; more than 120 still operational.

**Power Plant:** Two SNECMA (Bristol) Hercules 759; each 2,040 hp.

Span 106 ft 7 in. Length 72 ft 0 in. Gross weight 45,635 lb. Max level speed 273 mph. Normal cruising speed 195 mph. Normal take-off run 2,660 ft. Normal landing run 1,380 ft. Range with max payload 683 miles. Max range 1,550 miles with 5,840 lb payload.

**Potez/Aérospatiale CM 170 Magister:** Tandem two-seat jet trainer. Total of 317 in service. Original Magisters have 880 lb st Marboré IIA turbojets; data apply to last 130 built for Armée de l'Air as Super Magisters.

**Power Plant:** Two Turboméca Marboré VI turbojets; each 1,058 lb st.

Span 39 ft 10 in. Length 33 ft 0 in. Gross weight 7,495 lb. Max speed in dive Mach 0.82. Normal cruising speed 280 mph. Service ceiling 40,000 ft. Radius of operation 135–215 miles, depending on profile and mission. ■

## LES OISEAUX DE GUERRE

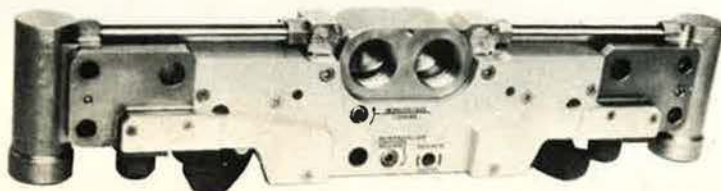
The instinct for accuracy is a major factor that helps assure the survival of every bird of prey.

It's the same with the warbird that operates in the aerospace environment. Extreme accuracy means greater combat effectiveness, greater survivability, lower cost of mission accomplishment.

Alkan's instinct for accuracy goes back over fifty years — and today helps assure the survival of birds of prey like the French Mirage, Gazelle, Dauphin and Puma.

It is exemplified by our crutchless bomb rack that reduces drag while enhancing bombing accuracy, aircraft performance and speed.

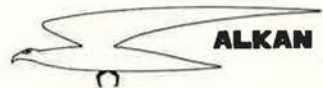
Alkan weapons release systems, along with Alkan armament counters/counters, cartridge launchers and other aeronautical equipment, are in use all over the world.



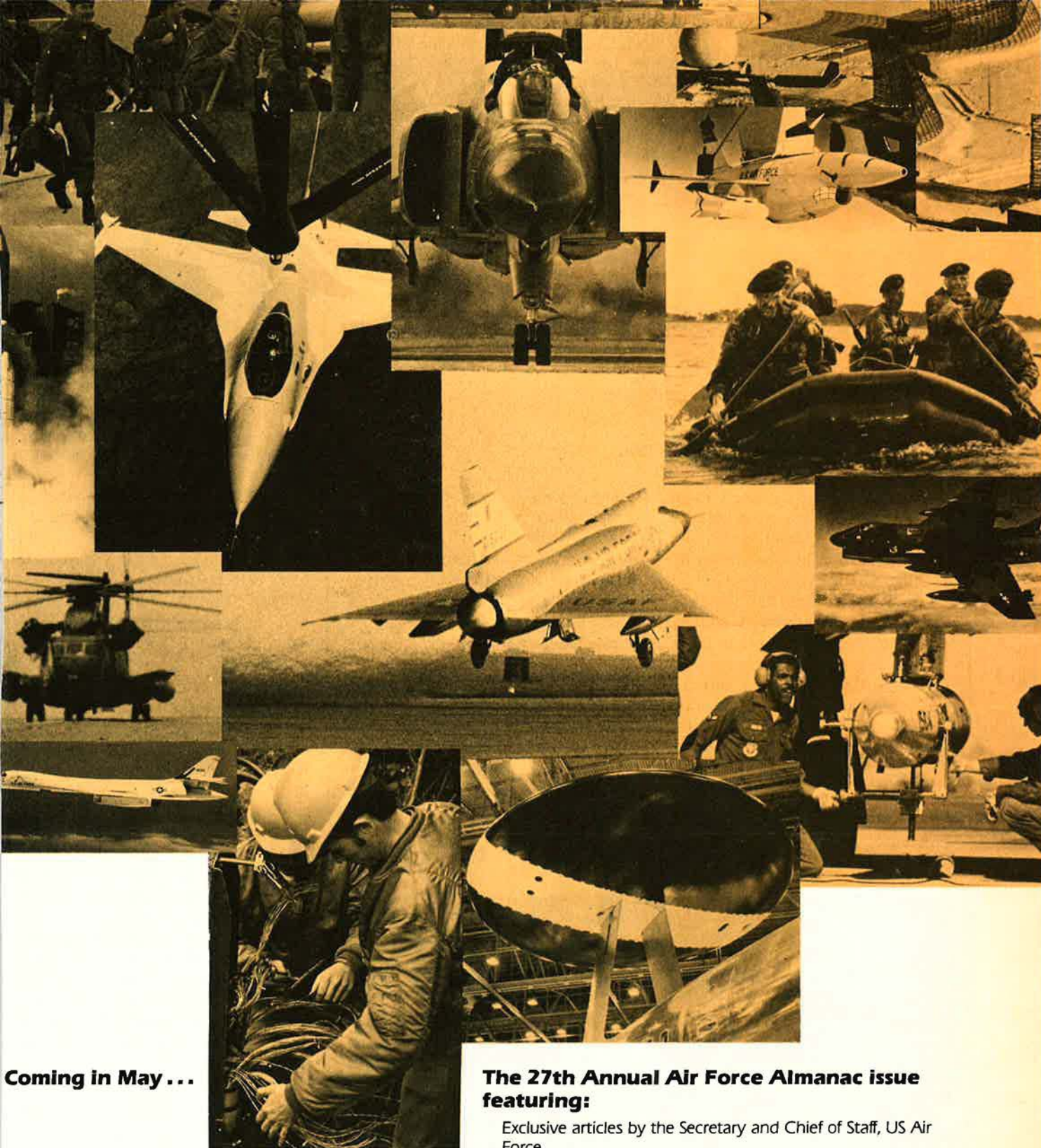
Our systems are in use on the Jaguar, Mirage and over 50 other aircraft, and our saddle suspension system has been selected for use on the MRCA and Gazelle.

Alkan makes a variety of equipment related to aircraft armament, including fixing and triggering mechanisms, release units, ejectors, pylons, multiple carrier adapters, pyrotechnical initiators, ejectable head bolts and electrovalves. Also a variety of cryogenic pumps and compressors, command and control equipment, inspection and testing devices and special handling equipment is developed and produced by Alkan.

Whatever the application, Alkan systems all have one thing in common. The instinct for accuracy that has made Alkan a leader in Aerospace technology.



**ALKAN U.S.A. INC.**  
235 Loop 820 N.E.  
Hurst, TX 76053  
Telephone: (817) 589-2451  
TELEX: 758463 ALKAN HRST



Coming in May ...

# AIR FORCE

PUBLISHED BY THE AIR FORCE ASSOCIATION

MAGAZINE

## The 27th Annual Air Force Almanac issue featuring:

- ★ Exclusive articles by the Secretary and Chief of Staff, US Air Force
- ★ Reports from each Command, including important statistical data
- ★ Gallery of Weapon Systems prepared by the staff of "Jane's All the World's Aircraft"
- ★ Compilation of important US Air Force statistics and data
- ★ Guide to Air Force Bases

You can be part of this important, authoritative issue with your advertising. Readership will be high throughout the year, as this issue serves as a desk-top reference for leaders in the Air Force, government and the aerospace industry.

**Advertising reservations close March 25, copy by April 6**

At a recent AFA symposium, top Air Force leaders probed the state of USAF's operational readiness and needs. They found some areas requiring improvement, from a soft industrial base to deficiencies in spares and a mounting need for force modernization.

# Urgent Air Force Needs for 1977

BY EDGAR ULSAMER, SENIOR EDITOR

- The Air Force views Fiscal Year 1978 as the "year of the M-X," but development of the new, large-throw-weight missile won't "overshadow everything else."

- Red Flag, and its new kin, Blue Flag, will be refined and intensified in the coming year to boost USAF's operational readiness and air-land battle coordination with the other services and allies. Overall, there is to be an *upturn* in USAF's flying hours.

- The Air Force, in FY '78, will move closer to, but isn't "programmed" to attain until the end of FY '81, the long-sought goal of twenty-six modernized tactical

wings, with seventy-two aircraft each, along with ten modernized Reserve wings.

- A follow-on interceptor program and comprehensive improvements in strategic warning and attack assessment systems will get under way in the coming budget year.

These and other central facts about USAF's plans for FY '78 were highlighted on October 23, 1976, at the second session of the Air Force Association's Symposium on "The Imperatives of National Readiness," held in Los Angeles, Calif. USAF Chief of Staff Gen. David C. Jones keynoted that ses-



Air Force Chief of Staff Gen. David C. Jones keynoted the October 23 session.

sion. The other speaker/panelists were the Strategic Air Command's Commander in Chief Gen. Russell E. Dougherty; TAC Commander Gen. Robert J. Dixon; AFLC Commander Gen. F. Michael Rogers; and ADCOM's DCS/Plans and Programs, Maj. Gen. William C. Burrows.

A crucial element of operational readiness, according to General Jones, is the industrial base: "And here we have a tough problem. Right now we have enough capacity in the aerospace industry, but because present production rates are relatively low, plant capability is not up to date—we haven't modernized enough. We must find a way to keep up basic capacity and, at the same time, modernize the industrial base at a reasonable cost. We need to ensure that in a crisis this nation will be able to increase its production to an adequate level and do it fairly rapidly. We cannot wait a couple of years to turn out the first aircraft."

Air Force readiness, according to General Jones, involves four other key areas: operations, support, command and control, and force modernization. Operational readiness is contingent upon the ability to "project" general-purpose forces rapidly. USAF's global mobility was demonstrated last fall following North



More than 500 industry executives, military and ROTC personnel, and AFA leaders attended the Los Angeles AFA meeting.



SAC's Commander in Chief, Gen. Russell E. Dougherty, stressed the importance of M-X.



TAC's Commander, Gen. Robert J. Dixon, discussed Blue Flag training program.



AFLC's Commander, Gen. F. M. Rogers, reported on logistics readiness improvements.

Korea's killing of two US Army officers when "on the day of the incident, we augmented our forces in Korea with an additional F-4 squadron from Okinawa. The next day, we brought in an F-111 squadron from Mountain Home, Idaho. The aircraft were flown nonstop from Idaho to Korea, landed, and went on alert immediately. And, from Guam, we put B-52s over South Korea. All of this pointed out that in a matter of hours we could be halfway around the world and, once there, operate."

The Air Force needs to learn how to sustain combat support without the umbrella of air superiority, General Jones pointed out: "We have never had to worry about the enemy destroying our ammunition and our aircraft because of our local air superiority. So, we have been learning—and are learning—from our allies in Europe who have had to face that problem in the past. Today, we are building more shelters for our aircraft, stressing rapid runway repair, toning down our bases and making them more difficult to find, improving air defense, and gaining a better chemical defense capability."

In the context of NATO, General Jones asserted that "the systems we buy for employment in Europe must be usable by and with those of our allies. And, as much as we can, we will try to use the same weapons. . . . We are making progress in standardizing and rationalizing our sys-

tems with our allies, but we have to do better."

### Strategic Requirements of the Air Force

In stressing the importance of the M-X ICBM to redress incipient Soviet advantages in the strategic balance, General Dougherty said the new system is required to provide greater survivability, accuracy, supportability, and maintainability and "we want it relatively soon." Because it is the sense of the Congress that M-X be deployed as a mobile system, the Air Force will concentrate on this deployment method, even though "we don't want to foreclose *any* reasonable basing mode. We know we can build an improved missile and operate it from silos. So, we won't foreclose this option." General Jones said that among the new program starts M-X ranks highest in priority: 1976 was "the year of the B-1; I think 1977 is the year of M-X. But this doesn't mean that it will overshadow everything else."

SAC's CINC listed as a need that "was never greater" improvements in the command's manned strategic reconnaissance capabilities, saying that the "depth and multiplicity of our aerial sensors are thin." The strategic portion of the Defense budget, including all services, weapon systems, and manning, accounts for a modest eight and a half percent, but this figure is scheduled to rise to ten and a half percent by FY '80, General Dougherty said.

The Advanced Tanker/Cargo Aircraft (ATCA) is needed because SAC's more than 600 KC-135s are aging and the demand for aerial refueling is increasing: "We're becoming progressively limited in offload [and will be] underpowered, overtaxed, and inadequate in the future unless we act now to modernize and expand with a limited number of" ATCAs. General Jones told the AFA meeting that the current ATCA competition, pitting Boeing's 747 against McDonnell Douglas' DC-10, can be expected to lead initially to the selection of one of the two designs. He added, however, that eventually the Air Force might buy some of each. The competitive evaluation is likely to show that one competing design is better for certain missions while the other may be more efficient in others, he predicted.

### Readiness Training

Tactical Air Command pilots get fewer flying hours today than they did three years ago "but they get *better* flying hours. We are packing into every hour everything that's hard, disagreeable . . . and complicated. That's what Red Flag is all about," General Dixon told the AFA symposium. Red Flag, initiated about two years ago by General Dixon as a "training experience just short of actually being shot at," centers on the deployment of squadron-size units and their support elements to Nellis AFB, Nev., to "op-

erate in an alien environment against aggressor aircraft and unfamiliar targets—just as they would in wartime. . . . We have made it more and more real by adding defense suppression, close air support, reconnaissance, Wild Weasel, search and rescue, communications jamming, combat air patrol for SAC B-52s and MAC C-141s. . . . Red Flag is very much an integrated, *joint* operation involving SAC, ADCOM, MAC, ATC, USAFE, PACAF, the Guard and Reserve, the Army and the Navy.” (For a more detailed discussion see “Red Flag: TAC’s Realistic Approach to Readiness,” January ’77 issue.)

Another combat training environment, Blue Flag, is now operating at Eglin AFB, Fla., to provide the “most extensive” simulated air defense net in existence, according to General Dixon. Taking full advantage of Eglin’s weapons ranges and electronic missile simulation, Blue Flag, tied to the facility’s Air Defense Weapons Operations Center, produces “a highly effective ‘enemy’ integrated air defense system against which we can test and train with a broad range of operational weapon systems. . . . Initial emphasis will be on the capability of a battle staff to collect and disseminate [intelligence] as they direct reconnaissance, fighter, and strike forces against enemy air defense. This will provide realistic decision-making situations, in a combat-oriented environment,” the TAC Commander explained.

“The equipment and procedures involved will be those we would expect to use if deployed to a contingency area today—with emphasis on standardizing the operational procedures that tactical air forces use in the Pacific and European theaters. Blue Flag will also provide a means for validating new operations concepts and tactics—and for refining command control and intelligence systems—especially their interoperability. Thus, Blue Flag will sharpen up the *whole* combat team—support forces, aircrews, and battle staff—and we in tac air will have a new standard for measuring our total operational readiness,” according to General Dixon.

In FY ’77, two-thirds of USAF’s airplane dollars were allocated to the

purchase of tactical airplanes, and one-half of the R&D budget covered development of new tac-air capabilities. The Soviets, nevertheless, “are building new fighters twice as fast as we are—in fact, they are spending almost twice as much as we are on all general-purpose forces, across the board, while we are sweating out a progressive five-year-plan buildup to twenty-six full-strength, modernized, active tac-air wings and ten Reserve wings,” according to General Dixon.

A five-year projection of current Soviet production and modernization trends suggests that “our long-term program needs added numerical improvement as well as the ongoing quality improvement. . . . We have to worry more and more about each succeeding year’s *current* net capability—airplane to airplane. Since 1965, the Soviets have tripled the payload delivery of their fighters and quadrupled the combat radius. . . . Our main-force fighter—the F-4—is now outclassed three to two by the MiG-23 in both payload delivery and combat radius. We shall redress this balance in time with the F-15/F-16/A-10 and new NATO aircraft. We shall redress it significantly when we have AWACS radar on station in adequate numbers,” General Dixon said.

Dr. Malcolm R. Currie, Director of Defense Research and Engineering and keynoter of the AFA symposium, applauded the efforts of TAC and the US Army’s Training and Doctrine Command (TRADOC) in “reaching interservice agreements that are cutting through the layers of institutional inertia, institutional concern about roles and missions, and institutional dogma. They are addressing and solving close air support problems in areas where progress has been glacial in the past.”

In elaboration, General Dixon explained “what we are doing is working out all facets of the air-land battle, tying them together, to get more firepower on the target, to do it without unneeded duplication, and to do it from the beginning of R&D programs instead of at the end. . . . We do this because we know that to the extent that we can plan, train, and employ our joint forces effectively, we will maximize our force structure—we will be able

to present rationale and obtain resources for forces now and the resources in R&D for future forces.”

### Logistics Readiness

“The past fiscal year was traumatic for logistics: We did not have sufficient spare parts for our weapon systems; we had an enormous backlog of equipment in depot maintenance awaiting repairs; we dipped too far into our war reserve stocks to satisfy peacetime requirements; and we sustained a large reduction in force—almost 7,000,” General Rogers told the AFA symposium. He cited specifically an increase from \$46 million in FY ’74 to more than \$200 million last year in the deficit of initial spares for new aircraft—the A-10, F-15, F-16, and AWACS—and, over the same period, an increase from \$62 million to about \$190 million in the deficit in replenishment spares to support peacetime training.

In similar fashion, the deficit in spares needed for contingencies attendant to both initial and sustained phases of combat shot up from \$400 million to \$700 million. Some relief is in sight, according to the AFLC Commander: “The Congress has approved the President’s request for nearly \$1.2 billion for vitally needed spares [which] should help us eliminate our shortages.”

The mushrooming growth of operation and support costs in recent years has reached a point “where they have eroded our ability to buy new weapons and our ability to buy replacement parts for existing weapons. And this decline in our purchasing power has denied industry much of the initiative to compete for defense contracts. What we have witnessed—and for a number of reasons—has been the erosion of the industrial base that we require for a credible defense,” General Rogers said. In order to counteract the operation and support cost spiral, AFLC and the Air Force Systems Command last year organized PRAM (Productivity, Reliability, Availability, and Maintainability) to correct or prevent problems associated with existing and new weapon systems: “The 130 projects in progress suggest a potential five-year savings of several hundred million dollars in operation and maintenance costs.”



In its campaign to force down life-cycle costs, AFLC last summer established the Air Force Acquisition Logistics Division with the mandate to influence the design and production of systems toward ease and economy of maintenance. "Our interest lies particularly early in the conceptual stages, where two-thirds of the life-cycle costs of a typical system are determined," General Rogers said. In the case of AMST (Advanced Medium STOL Aircraft), the new team effort has produced modifications of the original avionics requirement that "should save the Air Force about \$100 million in acquisition costs and at least one billion dollars in support costs over twenty years," according to the AFLC Commander.

AFLC's drive toward greater effectiveness is impeded somewhat by the recently passed law requiring Congress to establish annual civilian personnel ceilings. "This undermines our ability during peacetime to develop an organic work force for later surges in support of war plans. It also affects the economic peacetime use of our maintenance facilities. It seems to me that congressional exemption from all employment ceilings, including our depot maintenance activities, is warranted. We do not need two controls on one function—the budgetary ceiling is more than adequate. In fact, the management philosophy of the industrial fund [set up in 1968 to streamline the Command's depot maintenance activities] is totally contradicted by personnel ceilings," General Rogers said.

### **Air, Missile, and Space Defenses**

The precipitous disparity in air defense capabilities between the Soviet Union and the United States, aggravated by rising production of the USSR's long-range Backfire bomber, creates an urgent need for a "dedicated follow-on interceptor" as well as a range of other improvements in the US air defense arsenal, General Burrows told the AFA symposium.

General Jones disclosed that USAF's proposed FY '78 budget contains funds for the follow-on interceptor (FOI), adding that "we want to get on with it right now." This weapon, meant to replace the

aging and dwindling fleet of F-106s in ADCOM's inventory, involves no new aircraft development program but a "modified version of one of our existing aircraft," General Burrows said. (The choice is likely to be between the F-15 and F-16. DoD appears to have relented on its earlier insistence that the Navy's F-14 be considered also. Cost factors as well as the advantages inherent in an aircraft already in USAF's inventory—especially in performing the air defense mission overseas—favored the Air Force position.)

ADCOM's air defense capability has been pared down from massive strategic defense to a small force designed to cope with limited bomber threats, with augmentation from TAC. Augmentation, however, is "tenuous" because of TAC's other commitments, General Burrows pointed out.

Command and control for air defense, in peacetime, is provided by the Joint Surveillance System. As yet in an incipient state, this system allocates almost all existing military ground radars in the US to the FAA in what General Burrows termed "primarily an economy move that will save some \$140 million annually and free some 5,000 manpower spaces." The Joint Surveillance System includes no provisions for electromagnetic warfare, and its functions, in case of a bomber attack on the US, would have to be taken over by the E-3A AWACS, General Burrows said.

To assure continued limited defense capabilities against small bomber forces, an early warning system, the OTH-B (for over-the-horizon, backscatter radar) is essential. OTH-B is under construction and counted on to "give us between four and five hours of warning, both toward the east and west," and won't be affected by aurora borealis, according to General Burrows. In later years, he added, space systems will give the US "even greater warning and more capable weapons control to ensure our readiness to perform the strategic air defense mission."

### **Improved Attack Assessment**

ADCOM's most critical mission, General Burrows told the AFA symposium, is warning and assessment of an ICBM attack. The Command's

ability to provide warning of hostile ICBM launches is "well in hand. We'll know almost immediately that launches have occurred and we will have some indication of the target area." The scope and quality of the information, he pointed out, will permit SAC to launch its bomber fleet and to assume a more survivable and ready posture. But, for the time being, ADCOM cannot give the National Command Authorities (NCA) "adequate" information to make the "hard decisions regarding the nature, timing, and magnitude of our national response." What is needed, he stressed, is information about the size, nature, and probable intent of a missile attack at an early stage, "not merely warning that an attack of an ill-defined nature is in progress," General Burrows said.

ADCOM is remedying this deficiency in several ways. One phase involves planned improvements of BMEWS through better warning and significantly more accurate information characterizing the nature of a raid, General Burrows said. The upgrading of BMEWS "will prolong the useful life of the system and maintain a capability to provide reliable and early confirmation of the almost instantaneous information from our satellite Early Warning System." The proposed improvements entail "relatively low costs and low technical risk," he said.

ADCOM also is charged with "the defense of US resources in space [and] we can provide national readiness in the space regime," General Burrows told the symposium. ADCOM's space mission centers on detecting space threats and reporting them to the NCA; assuring that the Soviet Union is not granted "an exclusive sanctuary" in space; and providing free access and transit for US space systems, he explained. Performance of ADCOM's space missions becomes more difficult and important as the Soviet Union steps up efforts to make space the "fourth military area, along with sea, land, and air, and is making impressive progress" in deploying space systems serving tactical and strategic purposes, General Burrows stressed.

More than 500 industry representatives, USAF personnel, and AFA leaders attended the two-day meeting. ■



Sweeping changes in the USAF Security Police career field reflect its expanded role in national security affairs. A new organizational structure, increased combat training for its people, and a broader supervisory base are all parts of the SP's . . .

# NEW REFLECTIONS FROM A BRIGHTER BADGE

BY MAJ. TERRY A. ARNOLD, USAF, CONTRIBUTING EDITOR

**A** MIXTURE of international terrorism and self-recognized internal weaknesses has been the impetus for reorganization and revitalization of the USAF Security Police (SP) field. Formerly known as the Air Police, this often neglected, sometimes unjustly criticized, specialty is steadily improving its overall potential and, consequently, its public image.

Shocked by brutal terrorism at the 1972 Olympic Games at Munich, various US Government agencies saw an immediate need to increase capabilities for thwarting potential terrorist threats to US national in-

terests. The USAF, with its high-value equipment and manpower, was considered a prime peacetime target that required beefed-up protection. Air Force responsibility for terrorist countermeasures was assigned to the Security Police "soldiers in blue." This assignment demanded some long-overdue changes.

Providing base security was nothing new to the SPs. They had pulled this lonely and unrewarding duty for thirty years under every condition imaginable. Their ultimate challenge came during the Vietnam War, where they filled the defense void when ground forces often were not avail-

able for USAF installation security.

But peacetime terrorist operations involve different tactics, different and more sophisticated weapons, and, more importantly, different means to political ends. For the first time, base protection against terrorist attack was needed at USAF facilities both at home and abroad. It was a significantly altered mission from traditional peacetime security against theft, vandalism, and sabotage.

SPs took a hard look at new ways to fulfill their expanded responsibilities. Self-critiques, coupled with assistance from other staff agencies, led to sweeping changes in the SP

force: revamping the SP organizational structure; increasing the amount of combat training for all SPs, not just those assigned to security duties; and establishing a broader supervisory base to help remedy personnel problems.

Security Police responsibilities that had to be reassessed encompass three separate functions: physical security, law enforcement (including corrections), and information security. Physical security and law enforcement use the bulk of total available manpower. Physical security elements are charged with protecting vital resources and operational hardware, while the law-enforcement specialists provide basic police activities for the preservation of law and order. Corrections specialists operate and manage USAF confinement/corrections facilities. Information security includes personnel security, industrial security, and safeguarding classified information. SP units work closely with other military and local civilian police agencies, and through the USAF Office of Special Investigations (OSI) with federal law enforcement agencies.

Like most other Air Force activities, the SP career field has been reduced in size since the end of the Vietnam War. It now numbers about 37,000 people, including Department of the Air Force civilians, civilian contractors, administrative-support people, and overseas local national employees. At base level, the SP forces are assigned under the operational control of the combat support group commander. Prior to recent organizational changes, staff guidance was passed through USAF Inspector General channels. These communication lines have been changed by designating the Office of the Chief of Security Police as a separate Air Staff agency.

### Recognition and Realism

The recognition of the new staff office as a separate entity has had possibly the greatest impact on the career field's professional development. The new chief "cop" now reports directly to the USAF Chief of Staff.

The first and present SP chief is Maj. Gen. Thomas M. Sadler. Although in his first SP assignment,

he says, "Security Police are finally getting some of the attention and recognition they deserve." Most career SPs feel the same way and say the move recognizes the importance of the field and its direct role in national security matters. Major commands have established separate SP staff agencies.

Before he retired last year, former SP Senior Airman Advisor CMSgt. Howard E. Redd judged the changes have done much to project the field in the right direction. "No longer is being a cop considered the worst job in the Air Force and no longer do Security Police take a backseat in terms of equipment, facilities, and manning."

Today's SPs are better trained, with greater and more realistic emphasis on the physical countering of possible terrorist threats. All SPs now learn combat skills prior to their initial duty assignment. Before, only those being assigned to the Pacific and European Theaters or to Security Police Elements for Contingencies (SPECs) received combat training. SPEC members participate in Joint Chiefs of Staff combat exercises and often deploy to "bare-base" training locations.

SPs spend their final four weeks of training learning basic combat skills: fire and maneuver drills, search-and-clear operations, and vehicle deployment under hostile fire. Held at Camp Bullis near Lackland AFB, Tex., the training has more than a touch of authenticity. Trainees conduct combat operations in realistic environments. Buildings, industrial sites, storage areas, and even a flight line have been constructed to simulate the prime targets for terrorist attacks and sabotage attempts. Instructors act the part of terrorists, using their tactics, equipment, and techniques. "Live" fire-team training was instituted last summer.

A new wrinkle has just been added to the combat training. General Sadler told AIR FORCE Magazine, "We are going to assign 100 women to the Security field on a test basis. This is an area previously restricted to men." All of the women involved will be volunteers, and will attend both the basic security specialist and combat skills courses. After completion, they will be assigned for a one-year test to four



*Honored by AFA as an Outstanding Airman for 1976, SSgt. David Mickelson secures the Hq. AFCENT gate with the help of other NATO security specialists.*

bases: Barksdale AFB, La.; Nellis AFB, Nev.; Grand Forks AFB, N. D.; and Osan AB, Korea. The trial period will "afford ample time to evaluate their ability to withstand the rigors of security duties under a wide variety of conditions," according to General Sadler. "There will be no preference shown in duty assignment."

Lt. Col. Larry J. Runge, Chief of the SP Personnel Support Branch, expanded on the General's comments: "They will be treated equally. If there are jobs they can't do, we'll find that out in the test, not through any preconceived notion of what women can or cannot do." Additionally, all women SP officers are to be included in the test program and several have already completed the combat-training phase. Plans call for the women volunteers to train as a group and be assigned to their test bases by April.

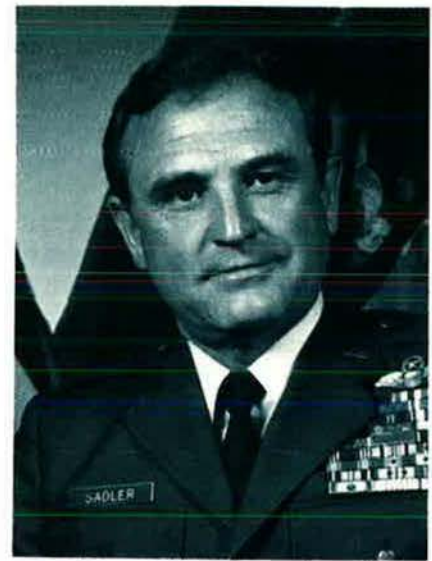
The use of women in combat roles shouldn't draw fire since federal law only prohibits Air Force women from engaging in combat while in an aircraft. However, it has long been USAF policy to exclude women from certain other combat-related duties, in Security Police for instance. The SPs have received a waiver from DCS/Personnel for the test, and if it proves that women are effective in combat-related roles, hopes are that all areas (not just the present law-enforcement specialty) of the career field will be open to women members.

### More and Better Supervisors

Besides focusing on the need to sharpen basic police and related combat skills, the SPs also recognized they had inherited many internal weaknesses that undermined total effectiveness while simultaneously lowering the force's public image. Chief Redd reflected that the SP image had been seriously hurt by "our theft rings and drug abusers. . . ." Col. Ralph E. Fisher, a twenty-four-year SP veteran and currently the USAF Deputy Chief for Security Police under General

Sadler, bluntly agreed that these internal problems have had a negative effect. "We had more than our share of illegal activities going on, and we started looking to see why. . . ." Qualitative and quantitative inadequacies at the supervisory level were clearly the culprits, according to Colonel Fisher. "We had not articulated our career field requirements properly to the manpower people in order to get the right standard set for supervision. In the last few years we've had the opportunity to . . . get proper studies done . . . and to get the people we need."

Compounding the supervisory problem was the fact that nearly seventy percent of the authorized SP force was first-term, lower-grade airmen. To a considerable degree, this trend still exists because of the very nature of the business. Turnover is, and will continue to be, a constant factor since there are fewer jobs available at the E-4 and E-5 level than there are SP first-term airmen applying for reenlistment. Although SP leaders say it may sound contradictory, they hope to fill the supervisory gap that now exists by encouraging senior NCOs in other



*Maj. Gen. Thomas M. Sadler, USAF's new chief "cop," feels SPs are finally getting the recognition they deserve.*

career fields to cross-train into the SP field. NCOs in grades E-7 through E-9 are needed to give lower-grade career SPs time to develop as senior NCO supervisors. "By having people in the right grades to fill the senior positions, you give the young NCOs time to develop and grow into them," said Colonel Runge.

The same is true for the officer force. In the past, many first lieutenants filled field-grade authorizations as squadron commanders. Now, all SP units are commanded by field graders—many in the rated supplemental category—thereby giving junior officers time to develop professionally before assuming greater command responsibilities.

With this increase in professionalism is a corresponding need for more supervisory training. Courses in security and law-enforcement subjects under the auspices of the Air Force Institute of Technology are now regularly attended by both SP officers and NCOs at three civilian universities. There also has been an increase in SP training at the Federal Bureau of Investigation's National Academy. Additionally, Professional Military Education courses for both officers and NCOs increase force professionalism.

Not all professional development changes have been solely at supervisory levels. The quality of airmen entering the field is higher and professional development has improved. Initial training courses have been ex-

*A1C Elliott Thompson and his canine companion, Clapton, have the unusual task of protecting SR-71 reconnaissance aircraft and crews at Beale AFB, Calif.*



panded to nine weeks, including the combat portion. The name of the SP technical school at Lackland AFB, Tex., has been changed to reflect its more professional status in both military and civilian police communities. What used to be called the Department of Security Police Training is now the US Air Force Security Police Academy. During Fiscal Year 1976, more than 20,000 SPs attended the Academy, either for basic instruction or refresher training. Twenty-two courses at the Academy and five other joint service courses at the Army's Military Police School are accepted by the Community College of the Air Force and can be applied toward a two-year associate degree.

Incoming Security Police members must meet higher educational and physical standards before they are accepted for training. Minimum aptitude scores have been significantly raised, and a continuous and intensive screening process has been started. The SPs want to weed out the malcontent and the potentially unproductive elements before they make it to their first duty assign-

*The author, Maj. Terry A. Arnold, is assigned to AIR FORCE Magazine for a year's training under the AFIT Education With Industry (EWI) program. Major Arnold was previously assigned as Chief, Editorial Division for the Air Force Office of Information, Command Services Unit, where he was responsible for production of printed informational materials designed for Air Force-wide distribution.*

ment. General Sadler commented, "The high caliber of the new Security Police from our SP Academy is proof of the pudding." Not only have entry standards been tightened; the elimination rate at the Academy has more than tripled in recent months, and later dismissals under the Human Reliability Program at the bases have dwindled accordingly.

### **Future Changes Reflect Technology Advances**

A future reliance on advanced technology is expected to further enhance SP professional status and overhaul its efficiency. Recent years have seen a tremendous rise in the use of electronic and electro-optical devices, especially by civilian and military surveillance and anti-intrusion forces. Colonel Fisher feels that "the equipment area is one where we

will make our greatest progress in the next few years. Our emphasis up to this point has been on using equipment to detect someone coming into an area." But using sensors only to this limited extent still requires large numbers of people. "When that alarm goes off and says there is something out there," continued Colonel Fisher, "we have to send an individual out to look, and decide what is going on. We think that in the immediate future we will be able to do a lot of assessment with TV or other imaging devices that will allow us to look and reach a decision from a control room." Undeniably, centralized monitoring will make the force more efficient and greatly reduce the number of "waiting for something to happen" jobs.

### **Not By SPs Alone**

The increased importance of Security Police functions has been the shot in the arm needed to promote professional pride and remove any

*Training for a Security Police Elements for Contingencies (SPECs) mission, Sgts. Jesse Mason and John Priest use cover and concealment techniques.*





A1C Ronnie Page prepares to board a helicopter at Malmstrom AFB, Mont., as part of a response force used to provide additional security for ICBM sites.

vestiges of past stagnation. Colonel Fisher says, "Right now is the best time that I've seen in twenty-four years as an Air Force Security Policeman. We've made a lot of progress that I wouldn't have thought possible ten years ago. We still have a long way to go, and I think the people who are here now or will be coming in during the next few years are going to benefit from that progress. It's an exciting time to be in the Security Police."

General Sadler knows that this progress was not possible without the help of several supporting Air Force offices. "The magic wand being waved to fix the career field doesn't have a Security Police badge on the end of it, but an Air Force crest," reflected the General. He credits his fellow blue-suiters—especially those in personnel, manpower, surgeon general, staff judge advocate, and the civil engineers—for his force's advancement. "Yes," concluded General Sadler, "things look good and the future looks great. We can repay everyone's help and our nation's trust in us by being better than we have ever been before." ■

### ABOMINABLE

The Army Air Corps's 1st Provisional Air Base Detachment was the original American contingent to land in Trinidad, BWI, on April 24, 1941, establishing the first of the World War II "lend-lease" bases as an operating bivouac at the edge of Piarco Field and bordering the sugar plantations at Caroni. Our commander was a major, but we were soon joined by a Coast Artillery unit headed by a National Guard brigadier general.

In those first few days we had accumulated all of the traditional following of a tropical encampment, from personal and personable laundry women to pets of every description. One of these, a mongrel pup named P-40, had attached itself to the four-man tent I occupied. By the time P-40 was tent broken, the quarters reeked of a combination of odors impossible to disguise and difficult to ventilate. About then the artillery unit commander chose to inspect the Air Corps detachment.

All went well until he reached our tent. He got no further than the entrance, where he stopped in mid-stride and sniffed as his ten-man retinue closed like an accordion behind him. Inside, four noncoms stood at ramrod attention—eyes straight ahead.

"This tent is abominable!" the General snapped.

"Thank you, sir!" Corporal Bobby James snapped back. "We try to keep it that way."

Speechless, the General quivered with rage while his face changed from deep tan to crimson to violet. Finally he whirled and stalked down the duck-walk to the next tent in line.

It wouldn't have been funny except that Corporal James possessed a Master's degree in English literature. He knew whereof he spoke.

—Contributed by Terence R. St. Louis

(AIR FORCE Magazine will pay \$20 for each anecdote accepted for publication.)

# JANE'S

ALL THE WORLD'S AIRCRAFT SUPPLEMENT



First prototype of the Boeing YC-14 advanced medium STOL transport (two General Electric YF103-GE-100 turbofan engines)

**BOEING**  
BOEING AEROSPACE COMPANY; Address: PO Box 3999, Seattle, Washington 98124, USA

**BOEING AMST**  
**US Air Force designation: YC-14**

Looking ahead for potential replacements during the 1980s for its fleet of Lockheed C-130 Hercules, Fairchild C-123 Provider, and de Havilland Canada C-7 Caribou transport aircraft, the US Air Force issued

requests for proposals on 24 January 1972 to nine US aerospace companies. Responses were received from Bell Aerospace, Boeing, Fairchild Industries, a combined Lockheed-Georgia/North American Rockwell team, and McDonnell Douglas. From these proposals, those of Boeing Aerospace and McDonnell Douglas were selected, and on 10 November 1972 these two companies were each awarded a contract to develop, construct, and flight test two aircraft to compete in a prototype fly-off competition.

This programme, known as AMST (Advanced Medium STOL Transport), is under the management of the Prototype Program Office of the USAF Systems Command's Aeronautical Systems Division, Wright-Patterson AFB, Ohio. The McDonnell Douglas contender, which has the USAF designation YC-15, was described in the *Jane's Supplement* in the December 1975 *AIR FORCE Magazine*.

Boeing's two prototypes, which have the USAF designation YC-14, were built and



Start of the first flight by the second YC-14, on 21 October 1976

are being developed under a \$107 million contract. Its Phase 1 requirement, which had a 90-day completion period, demanded the submission of additional design/performance analysis. Both companies completed this stage of the contract in just over a month, enabling the USAF to give a go-ahead for Phase 2 some 30 days ahead of schedule. Phase 2 covered a 45-month period, during which each company was to build and fly two prototypes, emphasis being placed on performance and cost goals rather than on rigid adherence to specification requirements.

In fact, the only rigid part of the specification was that the cargo 'box' on both aircraft should be not less than 14.33 m (47 ft) long, 3.57 m (11.7 ft) wide, and 3.44 m (11.3 ft) high. The remainder, expressed in terms of design goals, included the ability to carry a STOL cargo payload of 12,250 kg (27,000 lb) over a mission radius of 400 nm (740 km; 460 miles), with a midpoint field length of 610 m (2,000 ft). Overload payload, for conventional operation, was to be not less than 24,040 kg (53,000 lb), and the unit cost, in 1972 dollars, was not to exceed \$5 million, based on a production run of 300 aircraft. The USAF's current need for the selected AMST, which should begin to enter service in about 1983, has been assessed at 277 aircraft; in addition, the selected aircraft is expected to have a substantial export potential. Source selection is expected to be made by Autumn 1977, with FSD (full-scale development) funds sought in the FY 1978 budget request.

A significant feature of the Boeing YC-14 is the use of a relatively small and unswept supercritical wing, with an overwing installation of the power plant. This configuration utilizes a system known as Upper Surface Blowing (USB), which takes advantage of the principle of Coanda effect. In brief, if the curvature of a wing and its accompanying flap system is correctly designed, high-speed airflow over that surface will follow the curvature, even though the surface turns away from the flow's original direction. In the YC-14, this provides a powered lift component more than equal to the total amount of engine thrust available. Additional benefits accruing from this layout include the presentation of a low infra-red signature to ground-based detectors; an uncluttered underwing surface, simplifying the carriage of external stores, including auxiliary

fuel tanks and RPVs; efficient thrust reversal; more effective braking, assisted by the downward force of the thrust reversers; considerable reduction in the exposure of the engine air intakes to ingestion of dirt and debris; and a reduced noise footprint. Significant improvement of cargo compartment loading efficiency results from the adoption of a wide-body fuselage.

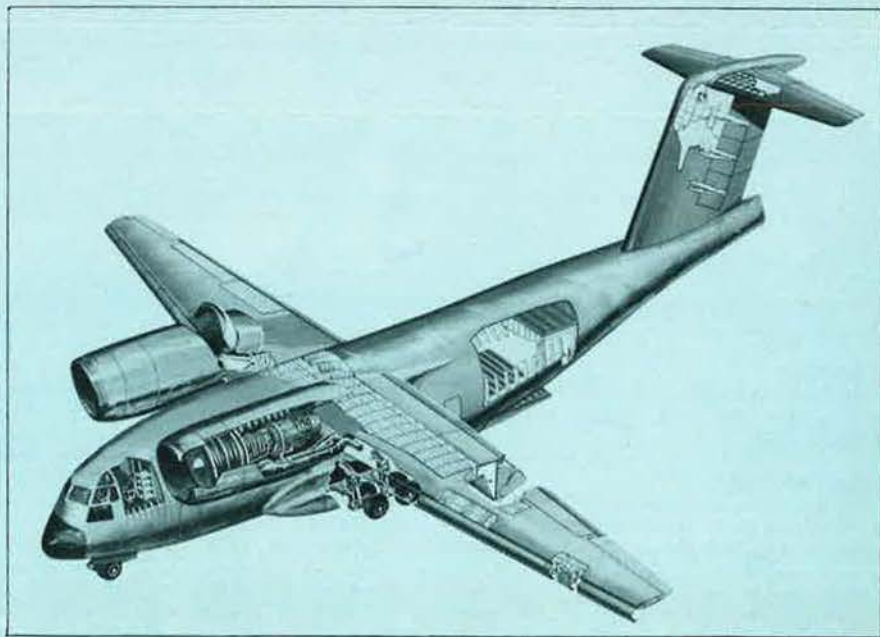
The first flight of the first YC-14 was scheduled originally for September 1975, and that of the second aircraft about two months later. After the programme originated, Congress set a limit of \$25 million on the YC-14 and YC-15 in the FY 1974 budget, instead of the \$65.2 million which the USAF had requested. As a result, the first flight had to be deferred until the middle of 1976.

The first YC-14 (01873) was rolled out on 11 June, began taxiing tests on 30 July, and made its first flight, from Boeing Field, Seattle, on 9 August 1976. This aircraft had completed just over 30 hours' flying by 21 October 1976, when the second

YC-14 (01874) flew for the first time. The second aircraft was used by the manufacturer primarily to test cargo loading and air-drop systems, and (since the first prototype has not been equipped with them) to test the thrust reversers during ground manoeuvring. Manufacturer's airworthiness and flutter tests had been completed satisfactorily in some 60 hours' flying by mid-November 1976, when both prototypes were flown to the Flight Test Center at Edwards AFB, California, for USAF test and evaluation. At that time, performance had been explored at altitudes up to 12,200 m (40,000 ft) and at speeds of up to Mach 0.78. Slow-speed flight had been explored down to 80 knots (148 km/h; 92 mph) on two engines, and down to 90 knots (167 km/h; 104 mph) on one engine. About 250 hours of further flight testing and evaluation are scheduled to be completed by the two YC-14s before selection of a winning AMST design is made.

TYPE: Twin-turbofan advanced military STOL transport aircraft.

YC-14 cutaway shows some structure, thrust reversing, flap track, and landing gear systems





**WINGS:** Cantilever shoulder-wing monoplane. Comparatively small, unswept, two-spar wing, consisting of a one-piece 'straight-through' centre-section and tapered outer panels. Entire wing is of supercritical profile, with a 32.00 m (105 ft) one-piece single-surface upper skin over most of span. Wing upper surface blowing (USB) concept requires the engines to be mounted above and forward of the wing, so that they exhaust over the wing upper surface; the control surfaces, when extended, then induce the high-speed airflow from the engines to cling to the surface of the wing/flap system and direct it downward, generating powered lift. On each leading-edge, from nacelle to tip, are seven-segment variable-camber Krueger flaps, a modified form of those fitted to the Boeing 747. Behind these, providing additional boundary layer air over the front part of the wing when the Krueger flaps are deflected to 30°, engine bleed air is piped along the inside of each mainplane leading-edge and vented through a row of apertures. On each trailing-edge, from root to tip, are the two-section double-slotted externally-hinged USB flaps, immediately aft of the engines, with a 70° range of deflection (from 16° to 86° from the horizontal); conventional double-slotted Fowler-type flaps; and a small high-speed aileron. Immediately forward of the outer flaps are two inboard (747 type) and three outboard (727 type) flight spoilers, to supplement the ailerons and assist in direct lift control during the approach. Control surfaces are actuated by hydraulic jacks, operated electrically by the electric flight control system or EFCS (see 'Systems' paragraph). There are no tabs. When the USB flaps are deflected for maximum lift, four small vortex generators are extended into each exhaust stream to act as flow dividers, and a small door on each side of the nozzle is opened outward, to spread the airflow more widely over the flap surface. To offset the loss of lift that would result from an engine failure, the EFCS is programmed to partially retract the inner (USB) and outer flaps on the live engine side, to reduce drag and roll, while the USB flap on the dead engine side behaves as a conventional double-slotted flap, extending to match the outer flap setting on its own side.

**FUSELAGE:** Conventional semi-monocoque all-metal structure of frames, stringers, and bulkheads. Glassfibre tailcone.

**TAIL UNIT:** Cantilever metal T tail, having sweptback fin (25°) and rudder with glassfibre fairing between. Rudder comprises three interchangeable double-hinged sections, of honeycomb construction. Variable-incidence tailplane, actuated hydraulically via EFCS. Double-hinged elevators, of honeycomb construction. No tabs.

**LANDING GEAR:** Retractable tricycle type, with Boeing oleo-pneumatic shock-absorbers on each unit. Hydraulic actuation, nose unit retracting rearward, main units upward into fairings on fuselage sides. Twin wheels on nose unit, with size 40 x 18-16 tyres. Each main unit is of the four-post, trailing-arm, levered suspension type, having two legs in tandem, each with a pair of wheels fitted with size 40 x 18-16 tyres. Main-wheel legs are interchangeable. Automatic braking, with three separate rates of deceleration and built-in anti-skid control.

**POWER PLANT:** Two General Electric YF103-GE-100 (CF6-50D) turbofan engines, each rated at 226.8 kN (51,000 lb st), in pylon-mounted nacelles above and

forward of wing leading-edges. Hydraulically-actuated upward-opening target-type thrust reverser door on top of each nacelle at rear, to deflect exhaust upward and forward. Smaller door on each side, behind and below thrust reverser door, to assist in spreading exhaust airflow over USB flaps. Engines interchangeable right/left. Entire internal fuel load of 30,120 kg (66,400 lb), equivalent to approx 37,092 litres (9,799 US gallons), is contained in integral tanks in wings. Provision for carrying two auxiliary underwing tanks, each containing an additional 11,000 litres (2,906 US gallons), to give total fuel capacity of 59,092 litres (15,611 US gallons). Provision for in-flight refuelling receptacle and for adaptation, if required, to tanker role.

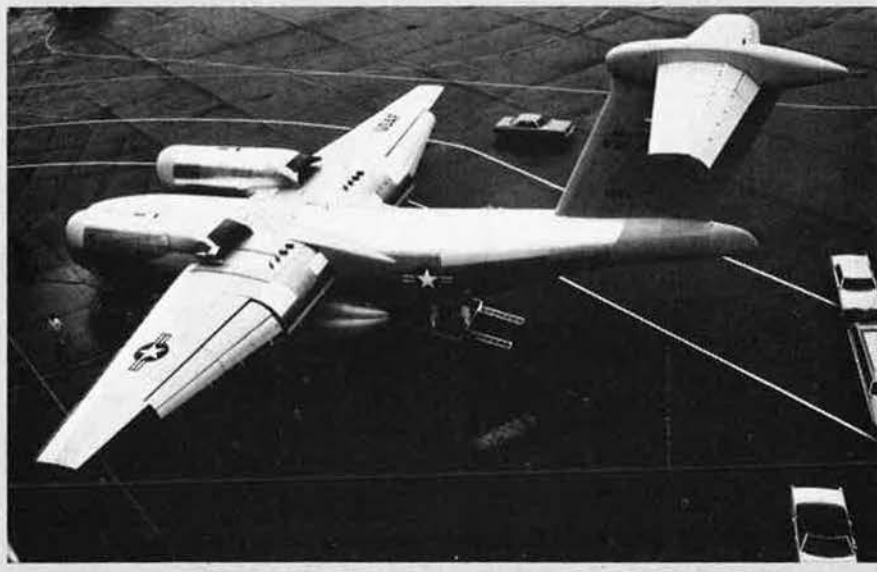
**ACCOMMODATION:** Crew of two on flight deck, which is reached by a staircase from a mechanically-actuated door in the port side of the lower front fuselage. Flight deck is pressurised, heated, and air-conditioned. Emergency escape for crew via ejection chute and ditching hatch in

flight deck roof. Windscreen wipers on flight deck centre windows. Paratroop jump door on starboard side of fuselage, aft of wing. Cargo loading ramp in under-surface of rear fuselage; an additional undersurface section retracts upward inside fuselage aft of ramp. The cargo door and its toe-piece provide a loading ramp more than 4.3 m (14 ft) long, with an incline of about 11° when extended to the ground. Four roller-track loading rails (on second prototype) run most of the length of the cabin; these can be removed easily and stowed to provide a flat floor with a uniform pattern of tie-down rings. Hold capacity is up to 150 troops or approx 12,250 kg (27,000 lb) of cargo for STOL operations, or up to 36,740 kg (81,000 lb) in conventional operation. Typical loads include seven standard military pallets and 44 troops (equivalent to approx 22,680 kg; 50,000 lb), or nine fully-loaded Jeeps, stowed two by two, and their crews.

**SYSTEMS AND EQUIPMENT:** Pressurisation system for fuselage. Air-conditioning unit,



ABOVE: Both prototypes of the YC-14 at Boeing-Seattle. Each aircraft has its rear loading ramp/door partially open. BELOW: Features of the YC-14 shown in this view include large curved flaps, vortex generators in engine exhaust flow, rear loading ramp, and double-hinged tail control surfaces





Artist's impression of the C-8A Buffalo which Boeing Commercial Airplane Company is modifying for NASA as a quiet short-haul research aircraft (QSRA). Scheduled to fly in the second half of 1978, the QSRA will be powered by four Avco Lycoming YF102 overwing turboprops and will have a similar wing lift system to that of the YC-14. It will be used to investigate methods of reducing airport congestion and noise

using engine bleed air, in port main landing gear fairing. Hydraulic system for actuation of wing and tail control surfaces, tailplane incidence, landing gear, engine thrust reversers, and rear loading doors. Marconi-Elliott Avionic Systems triple-redundant electrical flight control system (EFCS), supplied by three separate busbars, comprises three digital computers (each with 16K memory capacity), three interface units, three optical couplers, three optical data links, a control and display unit, and a test/fail identification panel. The EFCS provides fly-by-wire control of all flight control surfaces, including the tailplane; control wheel steering; autopilot and autostabilisation modes (altitude and heading hold); flight path assist; STOL speed hold; yaw damping; and flight test programming. It also adjusts the USB flap position and engine throttle opening, to maintain attitude and speed during STOL approach; is the first such system to employ fibre-optic data transmission techniques; and is fail-operational. There are also cables to each hydraulic actuator, so that, if all three channels of the electrical system should fail, the manually-operated mechanical system can take over. A television scanner, mounted in the nose, is linked to a Sperry EADI (electronic attitude director indicator) flight display panel in the cockpit, on which glideslope data is superimposed on a TV picture of the landing area.

#### DIMENSIONS, EXTERNAL:

Wing span 39.32 m (129 ft 0 in)  
 Length overall 40.13 m (131 ft 8 in)  
 Height overall 14.73 m (48 ft 4 in)  
 Fuselage: Max diameter 5.44 m (17 ft 10 in)  
 Tailplane span 16.68 m (54 ft 8 1/2 in)  
 Wheel track 5.66 m (18 ft 7 in)  
 Wheelbase 12.50 m (41 ft 0 in)  
 Cargo loading ramp/door: Length 4.32 m (14 ft 2 in)  
 Underfuselage rear door: Length 6.86 m (22 ft 6 in)

#### DIMENSIONS, INTERNAL:

Cargo compartment:  
 Length, incl ramp 18.66 m (61 ft 2 1/2 in)  
 Length, excl ramp 14.43 m (47 ft 4 in)

Max width 3.55 m (11 ft 8 in)  
 Width at floor 3.50 m (11 ft 6 in)  
 Height at front 3.40 m (11 ft 2 in)  
 Height at rear 3.66 m (12 ft 0 in)  
 AREA:  
 Wings, gross 163.7 m<sup>2</sup> (1,762.0 sq ft)  
 WEIGHTS AND LOADING:  
 Manufacturer's bare weight approx 53,525 kg (118,000 lb)  
 Operating weight empty 56,245 kg (124,000 lb)  
 Payload for STOL mission 12,250 kg (27,000 lb)  
 Max payload (conventional T-O) 36,740 kg (81,000 lb)  
 Internal fuel load (wing tanks) 30,120 kg (66,400 lb)  
 Design max STOL T-O weight 76,885 kg (169,500 lb)  
 Design max conventional T-O weight 113,828 kg (251,000 lb)  
 Landing weight (STOL) 72,575 kg (160,000 lb)  
 Max wing loading (STOL) approx 469 kg/m<sup>2</sup> (96 lb/sq ft)  
 PERFORMANCE (at design max STOL T-O weight, except where indicated):  
 Max level speed at S/L 350 knots (649 km/h; 403 mph)  
 Max level speed at 9,150 m (30,000 ft) 468 knots (867 km/h; 539 mph)  
 Long-range cruising speed 390 knots (723 km/h; 449 mph)  
 Approach speed 86 knots (159 km/h; 99 mph)  
 Approach speed, one engine out 86 knots (159 km/h; 99 mph)  
 Min emergency control speed 72 knots (134 km/h; 83 mph)  
 Rate of climb at S/L 990 m (3,250 ft)/min  
 Rate of climb at 1,525 m (5,000 ft) 1,829 m (6,000 ft)/min  
 Service ceiling 13,715 m (45,000 ft)  
 T-O run, S/L at 15°C 305 m (1,000 ft)  
 T-O field length, S/L at 15°C 527 m (1,730 ft)  
 Landing field length, idle reverse, S/L at 15°C 556 m (1,825 ft)  
 Landing run, S/L at 15°C 360 m (1,180 ft)  
 Mission radius (STOL) 400 nm (740 km; 460 miles)

Range with 36,740 kg (81,000 lb) max payload, conventional T-O and landing 1,000 nm (1,850 km; 1,150 miles)  
 Range with 17,240 kg (38,000 lb) payload and external tanks 2,600 nm (4,820 km; 2,995 miles)  
 Ferry range without external tanks 2,700 nm (5,000 km; 3,110 miles)

#### TUPOLEV

DEPUTY CHIEF OF BUREAU: Andrei Kandolov; USSR

#### TUPOLEV V-G BOMBER

NATO reporting name: "Backfire"

The following data concerning Backfire-B have been released officially in the USA:

#### DIMENSIONS, EXTERNAL:

Wing span:  
 fully spread 34.45 m (113 ft)  
 fully swept 26.21 m (86 ft)  
 Length overall 40.23 m (132 ft)  
 Height overall 10.06 m (33 ft)

#### WEIGHTS:

Nominal weapon load 7,935 kg (17,500 lb)  
 Max T-O weight 122,500 kg (270,000 lb)

#### CESSNA

CESSNA AIRCRAFT COMPANY; Head Office and Works: Wichita, Kansas 67201, USA

On 14 September 1976, Cessna released details of three business jet aircraft, the first of which, the Citation I, was due to become available in December 1976. The other two aircraft are designated Citation II and Citation III, the former being scheduled for delivery from February 1978.

#### CESSNA CITATION I

This model differs from the original Citation, first introduced in late 1971, by having a wing of increased span and Pratt & Whitney Aircraft of Canada JT15D-1A turbofan engines, giving an improved rate of climb and higher cruising speeds.

The description of the Citation 500 Series, on pages 274-5 of the 1976-77 *Jane's*, applies also to the Citation I, except as follows:

POWER PLANT: As described for Citation 500, except for the installation of Pratt & Whitney Aircraft of Canada JT15D-1A turbofan engines, each rated at 9.77 kN (2,200 lb st).

#### DIMENSIONS, EXTERNAL:

As for Citation 500, except:  
 Wing span 14.35 m (47 ft 1 in)

#### WEIGHTS:

Weight empty (incl electronics) 2,932 kg (6,464 lb)  
 Max T-O weight 5,375 kg (11,850 lb)  
 Max ramp weight 5,443 kg (12,000 lb)  
 Max landing weight 5,148 kg (11,350 lb)  
 Max zero-fuel weight 3,810 kg (8,400 lb)  
 Optional max zero-fuel weight 4,309 kg (9,500 lb)

PERFORMANCE (at max T-O weight except where indicated):

Cruising speed at average cruising weight 351 knots (649 km/h; 403 mph) TAS  
 Stalling speed at max landing weight 83 knots (154 km/h; 95.5 mph) CAS  
 Max rate of climb at S/L 817 m (2,680 ft)/min  
 Rate of climb at S/L, one engine out 244 m (800 ft)/min  
 Max certificated altitude 12,495 m (41,000 ft)  
 Service ceiling, one engine out 6,400 m (21,000 ft)  
 T-O to 10.7 m (35 ft) 838 m (2,750 ft)

Landing run at max landing weight  
701 m (2,300 ft)  
Range with 6 passengers, 45 min reserves  
1,333 nm (2,470 km; 1,535 miles)

### CESSNA CITATION II

This version of the Citation will introduce several new features, including a fuselage lengthened by 1.07 m (3 ft 6 in), an increased-span high aspect ratio wing, increased fuel and baggage capacity, and installation of Pratt & Whitney Aircraft of Canada JT15D-4 turbofans.

The description of the Citation 500 Series in the current edition of *Jane's* applies basically to the Citation II, except as follows:

**POWER PLANT:** Two Pratt & Whitney Aircraft of Canada JT15D-4 turbofan engines, each rated at 11.12 kN (2,500 lb st) for take-off, mounted in pod on each side of rear fuselage. Integral fuel tanks in wings, with usable capacity of 2,702 litres (714 US gallons).

**ACCOMMODATION:** As for Citation 500 Series, except seating for 8-10 passengers in main cabin, with toilet and increased baggage capacity.

#### DIMENSIONS, EXTERNAL:

Wing span	15.75 m (51 ft 8 in)
Wing aspect ratio	8.3
Length overall	14.40 m (47 ft 3 in)
Height overall	4.55 m (14 ft 11 in)
Tailplane span	5.74 m (18 ft 10 in)
Wheel track	5.36 m (17 ft 7 in)
Wheelbase	5.54 m (18 ft 2 in)

#### DIMENSIONS, INTERNAL:

**Cabin:**  
Length, front to rear bulkhead  
6.38 m (20 ft 11 in)  
Max width  
1.50 m (4 ft 11 in)  
Max height  
1.45 m (4 ft 9 in)  
Baggage capacity  
2.21 m<sup>3</sup> (78 cu ft)

#### WEIGHTS:

Weight empty (incl electronics)	3,157 kg (6,960 lb)
Max T-O weight	5,670 kg (12,500 lb)
Max ramp weight	5,761 kg (12,700 lb)
Max landing weight	5,443 kg (12,000 lb)
Max zero-fuel weight	4,763 kg (10,500 lb)
Optional max zero-fuel weight	4,989 kg (11,000 lb)

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

Cruising speed at average cruising weight	365 knots (676 km/h; 420 mph) TAS
Stalling speed at max landing weight	81 knots (150 km/h; 93 mph) CAS
Max rate of climb at S/L	1,067 m (3,500 ft)/min
Rate of climb at S/L, one engine out	311 m (1,020 ft)/min



Artist's impressions of (above) the Cessna Citation II and (at left) the Citation III business jets

Max certificated altitude	13,105 m (43,000 ft)
Service ceiling, one engine out	8,075 m (26,500 ft)
T-O to 10.7 m (35 ft)	732 m (2,400 ft)
Landing run at max landing weight	698 m (2,290 ft)
Range with 10 passengers, 45 min reserves	1,806 nm (3,347 km; 2,080 miles)

### CESSNA CITATION III

While retaining some general similarity to earlier members of the Citation family, the Citation III, which is scheduled for initial delivery in early 1980, is a very different aeroplane. Only brief details were released on 14 September 1976, but the Citation III is to have a supercritical swept

wing. It will be a larger aircraft, powered by a version of the Garrett AiResearch TFE 731 turbofan engine, and will be produced in two versions, a 10/15-seat Transcontinental and an 8/13-seat Intercontinental, the latter with increased fuel capacity. Cabin pressurisation will be at 0.61 bars (8.9 lb/sq in), to permit operation at a max certificated altitude of 13,715 m (45,000 ft).

#### DIMENSIONS, EXTERNAL:

Wing span	15.42 m (50 ft 7 in)
Length overall	15.72 m (51 ft 7 in)
Height overall	5.18 m (17 ft 0 in)
Tailplane span	5.33 m (17 ft 6 in)
Wheel track	4.06 m (13 ft 4 in)
Wheelbase	6.02 m (19 ft 9 in)

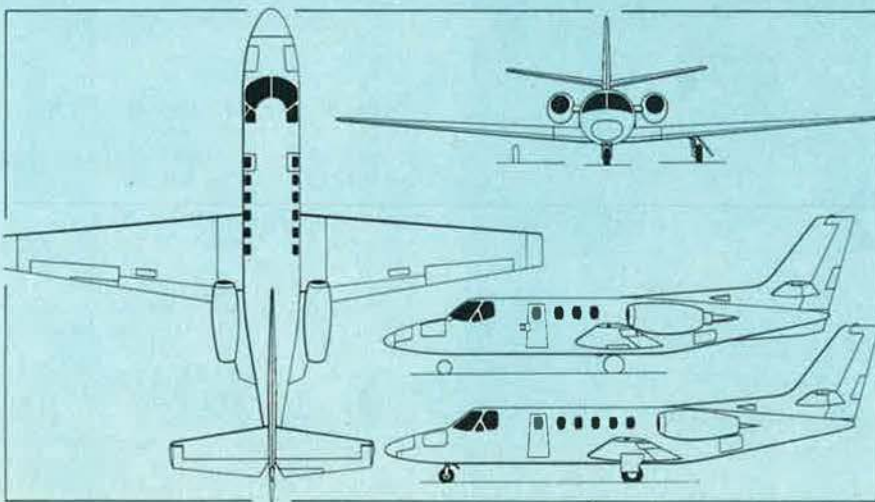
**DIMENSIONS, INTERNAL (A: Transcontinental; B: Intercontinental):**

**Cabin:**  
Length, front to rear bulkhead:  
A 7.01 m (23 ft 0 in)  
B 6.45 m (21 ft 2 in)  
Max width  
1.63 m (5 ft 4 in)  
Max height  
1.68 m (5 ft 6 in)  
Baggage capacity  
2.27 m<sup>3</sup> (80 cu ft)

**WEIGHTS** (estimated, A: Transcontinental; B: Intercontinental):

**Weight empty, equipped:**  
A 4,282 kg (9,441 lb)  
B 4,364 kg (9,621 lb)  
**Max fuel load:**  
A 3,030 kg (6,680 lb)  
B 3,833 kg (8,450 lb)  
**Max T-O weight:**  
A 7,779 kg (17,150 lb)  
B 8,664 kg (19,100 lb)  
**Max ramp weight:**  
A 7,870 kg (17,350 lb)  
B 8,754 kg (19,300 lb)  
**Max landing weight:**  
A, B 7,121 kg (15,700 lb)  
**Max zero-fuel weight:**  
A, B 5,897 kg (13,000 lb)

Cessna Citation II, with additional side view (centre) of the smaller Citation I (Pilot Press)



**PERFORMANCE** (estimated, at max T-O weight except where indicated. A: Transcontinental; B: Intercontinental):

Cruising speed at average cruising weight:  
 A, B 470 knots (871 km/h; 541 mph) TAS

Stalling speed at max landing weight:  
 A, B 93 knots (172 km/h; 107 mph) CAS

Max rate of climb at S/L:  
 A 1,623 m (5,325 ft)/min  
 B 1,430 m (4,690 ft)/min

Rate of climb at S/L, one engine out:  
 A 497 m (1,630 ft)/min  
 B 418 m (1,370 ft)/min

Max certificated altitude:  
 A, B 13,715 m (45,000 ft)

Service ceiling, one engine out:  
 A 9,050 m (29,700 ft)  
 B 8,230 m (27,000 ft)

FAA T-O field length:  
 A 1,216 m (3,990 ft)  
 B 1,466 m (4,810 ft)

Landing run at max landing weight:  
 A, B 1,036 m (3,400 ft)

Range, 45 min reserves:  
 A 2,397 nm (4,442 km; 2,760 miles)  
 B 2,996 nm (5,552 km; 3,450 miles)



Westland Wisp remotely piloted reconnaissance helicopter

#### WESTLAND

WESTLAND HELICOPTERS LTD; Head Office, Works, and Aerodrome: Yeovil, Somerset BA20 2YB, UK

Westland Helicopters Ltd began work on RPHs (remotely piloted helicopters) in 1968, with a series of studies covering configuration, electronics, vehicle performance, control systems, and vulnerability. Experimental work began in 1972 using models for wind tunnel work and the measurement of radar, optical, and infra-red signatures. At the same time simulated flights were made using a computer to check the stability and controllability of the RPH.

Much of this ground work had been completed by 1974, and was followed in mid-1975 by the start of a flight development programme, using a small flying testbed aircraft known as the Mote to prove the aerodynamic characteristics and to continue development work on the control system. This led to a Ministry of Defence development contract for the Wisp, a small RPH for the British Army.

By the Spring of 1976 Westland had been

selected as the winner of the competition, referred to briefly under the Ministry of Defence heading in previous editions of *Jane's*, to develop a second RPH, known as Wideye, for battlefield reconnaissance for the British Army. This RPH is also being developed under contract.

#### WESTLAND WISP

A small number of Wisps are being built for trials purposes, and the third of these was displayed publicly for the first time at the Farnborough International air show in September 1976, when first details of the Wisp were also released. Flight testing was scheduled to begin later that month.

As the accompanying photograph shows, the Wisp has a small, flattened-sphere-shaped body, which is of glassfibre construction and contains the power plant and mission payload. A fixed, four-legged landing gear is fitted to the underside of the body. The power plant drives a pair of two-blade coaxial counter-rotating rotors. Directional control of the RPH is by differential chang-

ing of the collective pitch of the rotors. The Wisp can be carried in a standard Land-Rover vehicle, and the modular construction of the body enables a variety of payloads to be accommodated. These payloads can be removed or installed very quickly when a change of role is required.

#### DIMENSIONS, EXTERNAL:

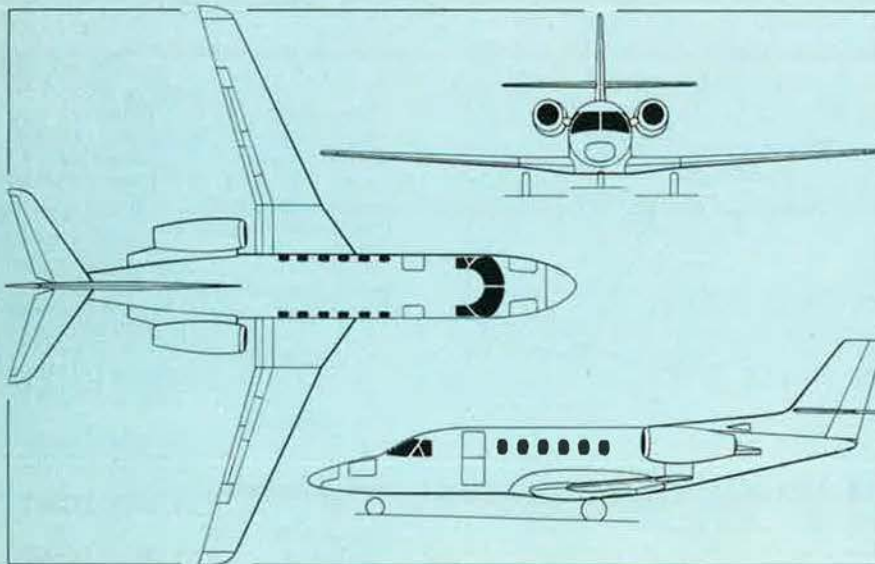
Rotor diameter (each)	1.52 m (5 ft 0 in)
Body diameter	0.61 m (2 ft 0 in)
Body depth	0.41 m (1 ft 4 in)

#### WESTLAND WIDEYE

Wideye, which is at the design definition stage, is a larger and more advanced RPH, capable of carrying out a wide variety of operational roles. It has a co-axial rotor system, like that of the Wisp, a similar remote control system, and low radar, noise, and infra-red signatures.

The Electro-Optical Systems Division of Marconi-Elliott Avionic Systems Ltd has been appointed by the MoD as electronic systems contractor, to work in conjunction with Westland Helicopters on Wideye for the British Army. This work will draw substantially upon MEASL's experience of various electronic surveillance systems, including daylight and low-light sensors, stabilised sensor mountings, signal processors, secure data and command links, specialised displays, vehicle tracking and target location systems, and ground control stations.

Cessna Citation III twin-turboprop sweptwing business jet (Pilot Press)



#### VTI/CIAR

VAZDUHOPLOVNO-TEHNICKI INSTITUT, 11132-Zarkovo, Yugoslavia; and CENTRALA INDUSTRIALA AERONAUTICA ROMANA, Bucharest, Romania

#### VTI/CIAR ORAO (EAGLE)/IAR-93

The Orao is a single-seat twin-jet ground attack fighter under development to meet a joint requirement of the air forces of Romania and Yugoslavia. It was originally referred to as the 'Jurom' (from Jugoslavia-Romania).

The Orao is believed to have flown for the first time in August 1974, and to have made about 10 flights by the end of that year. On 15 April 1975 it was demonstrated publicly during the Victory Day parade at Batajnica military airfield near Belgrade. A



*Wisp has a 1.52 m (5 ft) diameter co-axial rotor system and a body 0.61 m (24 in) in diameter and 0.41 m (16 in) in depth*

second prototype is believed to have been completed in Romania, and a pre-series batch was reportedly under construction in early 1976. The Oraq has the Romanian designation IAR-93.

The following expanded structural description is based upon further study of available photographs, and the specification data upon reports appearing in the international press during 1976:

**TYPE:** Single-seat ground attack fighter.

**WINGS:** Cantilever shoulder-wing monoplane, of low aspect ratio. Anhedral approx 4° from roots. Sweepback approx 43° on leading-edges. Leading-edge slats. Wide-chord Fowler-type trailing-edge flaps. Trim tab on each aileron.

**FUSELAGE:** All-metal semi-monocoque structure. Door-type perforated airbrake under each side of lower front fuselage, forward of main-wheel bays. 'Pen-nib' fairing above exhaust nozzles. Space provision in nose for ranging radar.

**TAIL UNIT:** Cantilever metal structure, with sweepback on all surfaces. Low-set all-moving tailplane, with tip-mounted anti-flutter weights which project forward of leading-edge. Fin has a small dorsal fairing. Trim tab in rudder. Auxiliary ventral fin on each side beneath rear fuselage.

**LANDING GEAR:** Messier-Hispano retractable tricycle type, with single-wheel nose unit and twin-wheel main units. All units have oleo-pneumatic shock-absorbers. Hydraulic actuation, all units retracting forward into fuselage. Braking parachute in bullet fairing at base of rudder.

**POWER PLANT:** Two 17.8 kN (4,000 lb st) Rolls-Royce Viper Mk 632 non-afterburning turbojet engines in prototypes, mounted side by side in fuselage, with lateral air intakes and twin exhaust nozzles. Internal fuel load approx 2,500 kg (5,510 lb). Production aircraft to be fitted with Rolls-Royce-developed afterburners, increasing power of each engine to approx 26.5 kN (5,950 lb st).

**ACCOMMODATION:** Pilot only, on ejection seat beneath rear-hinged, upward-opening canopy. Production aircraft expected to include tandem two-seat operational training version.

**SYSTEMS AND EQUIPMENT:** Graviner Fire-wire and BCF fire detection and extinguishing systems. Fairey Hydraulics filters and sampling valves. Landing light under nose. Ram-air scoop aft of cockpit on each side; smaller air scoops on top of fuselage, aft of canopy and at front of dorsal fin, and below rear fuselage.

**ARMAMENT:** Two 30 mm cannon in lower front fuselage, aft of nosewheel bay; one underfuselage and four underwing stations for external stores. Max external load approx 2,000 kg (4,410 lb) on prototypes, approx 3,000 kg (6,615 lb) on production version.

**DIMENSIONS, EXTERNAL (estimated):**

Wing span	7.56 m (24 ft 9¾ in)
Wing aspect ratio	3.22
Wing area, gross	18.00 m <sup>2</sup> (193.75 sq ft)
Length overall	12.90 m (42 ft 3¾ in)
Height overall	3.78 m (12 ft 4¾ in)

**WEIGHTS AND LOADINGS (estimated; A: prototypes, B: production version):**

**Weight empty, equipped:**

A	4,300 kg (9,480 lb)
B	4,700 kg (10,360 lb)

**T-O weight 'clean':**

A	7,000 kg (15,430 lb)
B	7,300 kg (16,095 lb)

**Max T-O weight with external stores:**

A	9,000 kg (19,840 lb)
B	10,300 kg (22,700 lb)

**Wing loading:**

A at T-O weight 'clean'	388.8 kg/m <sup>2</sup> (79.6 lb/sq ft)
A at max T-O weight	500.0 kg/m <sup>2</sup> (102.4 lb/sq ft)
B at T-O weight 'clean'	405.5 kg/m <sup>2</sup> (83.0 lb/sq ft)
B at max T-O weight	572.2 kg/m <sup>2</sup> (117.2 lb/sq ft)

**Power loading:**

A at T-O weight 'clean'	196.6 kg/kN (1.93 lb/lb st)
A at max T-O weight	252.8 kg/kN (2.48 lb/lb st)
B at T-O weight 'clean'	137.7 kg/kN (1.35 lb/lb st)
B at max T-O weight	194.3 kg/kN (1.91 lb/lb st)

**PERFORMANCE (estimated; A: prototypes, without afterburning; B: production aircraft with afterburning):**

**Max level speed at low level:**

A	Mach 0.92 (609 knots; 1,128 km/h; 701 mph)
B	Mach 1.0 (662 knots; 1,226 km/h; 762 mph)

**Max level speed at high altitude:**

A	Mach 0.95 (544 knots; 1,009 km/h; 627 mph)
B	Mach 1.6 (917 knots; 1,699 km/h; 1,056 mph)

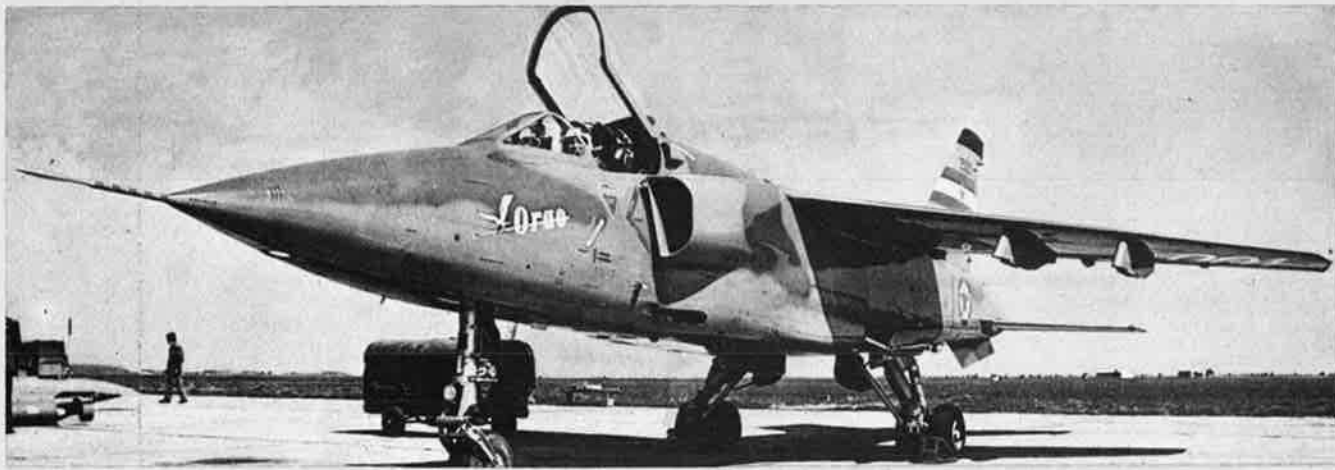
**Landing speed:**

A, B	121 knots (225 km/h; 140 mph)
------	-------------------------------

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

A	5,520 m (18,110 ft)/min
B	12,000 m (39,370 ft)/min

*The Oraq/IAR-93 single-seat tactical fighter, built in partnership by Romania and Yugoslavia*





Second prototype of the RFB/Grumman American Fanliner, with integral ducted propeller

Time to 11,000 m (36,000 ft):	
A	5 min 0 sec
B	1 min 36 sec
Service ceiling:	
A	14,000 m (45,925 ft)
B	16,000 m (52,500 ft)
T-O run:	
A at 8,500 kg (18,740 lb) A UW	925 m (3,035 ft)
B at max T-O weight	1,000 m (3,280 ft)
Landing run:	
A at 8,500 kg (18,740 lb) A UW	1,000 m (3,280 ft)
B at max T-O weight	1,000 m (3,280 ft)
Combat radius with 2,000 kg (4,410 lb) external stores:	
A, lo-lo-lo	108 nm (200 km; 124 miles)
B, lo-lo-lo	175 nm (325 km; 202 miles)
A, hi-lo-hi	216 nm (400 km; 248 miles)
B, hi-lo-hi	350 nm (650 km; 404 miles)
g limits:	
A	+6.8
B	+7.5

**RFB**  
**RHEIN-FLUGZEUGBAU GmbH; Head**  
 Office: D-4050 Mönchengladbach, Flugplatz, Postfach 408, Germany

RFB has been engaged for some years in the development of specialised applications for ducted fan propulsion systems for aircraft. Current programmes resulting from this work include the construction of two prototypes of a military multi-purpose training aircraft known as the Fantrainer AWI 2, and flight testing of the Fanliner two-seat lightplane, of which brief details follow:

#### **RFB/GRUMMAN AMERICAN FANLINER**

Announced in April 1974, the Fanliner is a two-seat lightweight aircraft developed jointly by RFB of Germany and Grumman American Aviation of the USA. The original

prototype (D-EJFL) flew for the first time on 8 October 1973, powered by a Wankel-type engine driving an RFB integral ducted propeller. Its airframe construction drew heavily upon adhesive bonding experience gained with the Grumman American Trainer and Traveler, and a number of components are common between these aircraft and D-EJFL.

A second prototype (D-EBFL), with a considerably refined airframe and more powerful (112 kW; 150 hp) RFB-modified Audi/NSU Wankel-type engine, made its first flight on 4 September 1976 and is shown in the accompanying illustration. Its flush cabin was styled by industrial designer Luigi Colani and now provides an exceptional field of view. The wings and tailplane are similar to those of the Grumman American Cheetah. Landing gear fairings and rear fuselage lines have been improved, and all radiators are aft of the cabin.

By the time this aircraft entered the flight programme, the original prototype had logged a total of 420 flights. These had proved that the ducted propulsion system offers a more efficient utilisation of engine power than does a conventional propeller. In addition, the rear-mounted engine with central, ducted pusher propeller provides improved view, lower cabin noise level, more convenient access for pilot and passenger and, with the propeller shrouded by a duct, a reduced ground hazard.

RFB expects to make a decision this year on whether or not to proceed to series production of the Fanliner in 1978. The following details apply to the first prototype with a lower-rated engine:

**TYPE:** Two-seat lightweight experimental aircraft.

**WINGS:** Cantilever mid-wing monoplane of light alloy construction, similar to those of Grumman American Traveler. Dihedral from roots. No sweep. Constant chord. Ailerons and trailing-edge flaps of light alloy bonded construction. No tabs.

**FUSELAGE:** Semi-monocoque forward struc-

ture of light alloy, comprising nose, cockpit, and enclosed engine mounting. Aft fuselage, to carry tail unit, consists of a narrow-section structure continuing the upper and lower lines of the forward fuselage, with a bracing beam extending from the trailing-edge of the wing centre-section to the tail unit on each side.

**TAIL UNIT:** T-tail of light alloy construction, with swept vertical surfaces. Rudder and elevators of light alloy bonded construction.

**LANDING GEAR:** Non-retractable tricycle type. Cantilever main-gear legs. Single wheel and speed fairing on each unit.

**POWER PLANT:** One 85 kW (114 hp) Audi/NSU Ro 135 Wankel-type two-chamber rotating-piston engine, driving a pusher propeller, with three plastics blades, mounted within an annular duct.

**ACCOMMODATION:** Two seats side by side in enclosed cockpit. Individual upward-opening transparent cockpit canopies, hinged on centreline. Dual controls standard. Baggage space aft of seats. Provision for coat locker in nose.

#### **DIMENSIONS, EXTERNAL:**

Wing span	7.45 m (24 ft 5 1/4 in)
Wing aspect ratio	6.0
Length overall	6.10 m (20 ft 0 in)
Height overall	2.03 m (6 ft 8 in)

#### **AREA:**

Wings, gross	9.30 m <sup>2</sup> (100.1 sq ft)
--------------	-----------------------------------

#### **WEIGHTS AND LOADINGS:**

Weight empty	520 kg (1,146 lb)
Max T-O weight	750 kg (1,653 lb)
Max wing loading	80.64 kg/m <sup>2</sup> (16.5 lb/sq ft)
Max power loading	8.82 kg/kW (14.50 lb/hp)

#### **PERFORMANCE (at max T-O weight):**

Max level speed at S/L	119 knots (220 km/h; 137 mph)
Max cruising speed at S/L	97 knots (180 km/h; 112 mph)
Max rate of climb at S/L	198 m (650 ft)/min
Range	356 nm (660 km; 410 miles)

# The Bulletin Board

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

## Benefits Battle Continues

The "battle of the benefits" grew more heated last year. Larger numbers of service people reacted to what they viewed as the government's drive to trim their pays and benefits. Amid their charges of "benefits erosion," many looked to the new Administration to change course, to support new and improved projects even though they carry significant price tags.

That could happen in a very few cases. But overall, people expecting a broad new look are likely to be disappointed. The Carter Administration appears as alarmed as the Ford team over the fact that personnel costs account for fifty-eight percent of the Defense budget. The new leadership is looking just as hard for ways to trim the spiraling cost of personnel outlays.

Pays, pensions, medical care, travel expenses, commissary-exchange stores, and other people-type items will get critical looks, new Defense Secretary Harold Brown has indicated.

The new Defense leader hopes to cut PCS travel and thereby reduce the estimated \$1.7 billion outlay for that account this year. But, like others before him, he may find it next to impossible to pare the many built-in moves, change the remote-duty rotation base, and overcome other roadblocks to travel savings.

An interesting development, meanwhile, occurred at press time: The outgoing Administration—the one that fought the commissary subsidy tooth and nail for more than two years—withdrawed its objections and recommended full commissary funding in the FY '78 budget. But with the new team now in office, that places the explosive commissary issue squarely in its lap.

## Fair Market Plan Called "Pay Cut"

Military families in government housing would take a pay cut if the Defense Department rams through its plan to place the units under a "fair market value" system. That's the USAF's conclusion following a recent test of the FMV proposition—paying rent in lieu of surrendering BAQ—at twenty military bases. Eight of them were Air Force sites.

Professional appraisers examined 11,663 units at these USAF bases: Davis-Monthan, Dover, Bolling, Eglin, Pease, Minot, Tinker, and Hill. Included were various types of appropriated fund, Capehart, and Wherry housing.

The appraisers found that the monthly FMV ranged from \$205 for a two-bedroom unit at Eglin to a high of \$645 for a four-bedroom unit at Minot. This averages out to \$291 with utilities included, \$229 without. But present married quarters allowances range from \$128.40 to \$269.10 for all grades through major. In other words, most service people would take a financial licking under the FMV scheme Defense has been pushing for more than a year. It "would be tantamount to a reduction in pay," USAF said in reiterating its opposition to FMV in a recent letter to the Assistant Secretary of Defense (Installations and Logistics).

The USAF letter noted, for instance, that at Bolling AFB an E-4 family would have to pay \$1,836-\$3,192 annually in excess of its BAQ to live in quarters.

Congress last summer rejected Defense's first pitch to begin a fair rental plan for occupants of base quarters, but the Department has been cranking up for another try ever since. Another Air Force objection to FMV is that it would pro-

duce more than 2,000 separate rental rates USAF-wide, thus creating an administrative headache.

Hq. USAF, meantime, is continuing to supervise a sizable base housing improvement program, mainly involving Wherry quarters. Improvements include enlarging rooms (sometimes making one sizable unit out of two old ones), modernizing kitchens, and providing more storage space.

Improvement projects, involving nearly 5,000 units, are slated to be completed during 1977 at the following bases: Air Force Academy, Bolling, Carswell, Clark, Edwards, Elmendorf, Holloman, Lackland, March, Mather, McClellan, McGuire, Misawa, Offutt, Ramstein, Shaw, Sheppard, Wright-Patterson, and Yokota. Eleven more projects are scheduled for completion during 1978.

These refurbishings are funded by a special \$55 million appropriation in FY '75 and FY '76. But there is no improvement money in the current, FY '77 budget. Officials are making a pitch for about \$13 million in the FY '78 budget, however, in order to complete the Wherry improvements by about 1980.

By 1980, USAF housing officials hope to start modernizing Capehart housing, some of which is showing considerable wear and tear. About 50,000 Capeharts were put up at USAF bases starting some twenty years ago, but the service has lost nearly 10,000 through base closings.

Of its 21,000 remaining Wherries, about 16,000 are—or soon will be—considered adequate, leaving some 5,000 that need attention.

Approvals of new family housing projects have come to a halt.

## New Outstanding EM Coming Up

Impressive job knowledge or leadership qualities . . . significant self-improvement through off-duty schooling . . . leadership in social, cultural, or religious activities . . . awards . . . demonstrated ability as an articulate spokesman for the Air Force.

These are among the criteria commands and separate agencies will apply in selecting nominees for the twelve Outstanding Airmen of the Air Force 1977. Nominations are due at the Military Personnel Center, Randolph AFB, Tex., by March 31. The winners will be an-

# The Bulletin Board

nounced in early July, and they and their spouses will be honored guests at the AFA Convention in Washington, D. C., in September.

Nominations must contain specific facts and examples "that clearly show that the nominee is exceptional and accomplished something that distinguishes him or her from their peers," Headquarters said in a lengthy all-commands message.

Since the program honors persons for their accomplishments during the twelve months of 1976, not for a full career, nominations should include only information pertinent to that year.

Persons not planning to remain in the Air Force for at least two more years are ineligible.

## **USAF to Troops Overseas: Learn Language**

Saying it has "revitalized its interest" in foreign language study, Hq. USAF has ordered overseas commanders to urge members and their families to learn their "host country" tongue. The new push is directed at civilian employees abroad as well as most of USAF's 106,900 blue-suiters stationed outside the fifty states.

The major impact will be in Germany, where, according to recent Defense Department statistics, 28,900 USAF military members are stationed. Next is the United Kingdom, with 17,700 USAF people, but where the language push obviously won't be applicable. The next largest numbers of USAF people abroad are located as follows: Japan-Okinawa 14,000; Philippines 8,900; South Korea 7,100; Turkey 5,600; Spain 5,200; Guam 3,700; Italy 2,900; and Greece 2,400.

Speaking the local language will "enrich the overseas experience" and help promote "a positive image with many of our friends and allies overseas," USAF said in advising commanders to get people enrolled in language classes soon after their arrival.

Approximately 107,000, or 18.5 percent, of USAF's 580,000 members serve abroad or in US territories

and possessions. This is far below the US Army's overseas total of 236,500, or about thirty percent of its 780,000 total military membership.

Air Force has conducted previous "learn-the-language" drives. One, pushed hard by Chief of Staff Gen. Curtis LeMay in the early 1960s, called for all officers to learn "a second language." It was not particularly successful.

## **USAF: "No RIF in FY '77"**

There will be no involuntary RIF for USAF officers, at least through next September, end of FY '77. The voluntary exit and reduced procurement programs will help make a RIF unnecessary, Hq. USAF said in late December. Earlier, the service had budgeted for a 1,100-member RIF.

Still in the works this year are some 1,000 involuntary officer separations being triggered by promotion failures. These, of course, helped influence the no-RIF decision, as they play an important role in the service's reducing officer strength to its end-FY '77 target of 96,100.

The no-RIF decision gives non-Regular officers a breathing spell (Regular officers are immune from RIF), though just how long the dispensation may last is highly uncertain. Should the new Administration order manpower cuts below those already being applied, it's possible the non-Regulars could come under the gun again. Under such circumstances they would get the required six months' notice, but exits could follow in FY '78, which begins next October.

## **3,225 Make Major; 2,400 Fail**

Unlike officer promotions in lower grades, where nearly everyone makes it, the annual temporary majors board is very choosy. And the possibility of taking that broad jump from company-grade to field-grade status intensifies the quest for gold leaves.

The recent O-4 go-around was no exception. Out of 5,625 primary zone captains eligible, just 3,225, or fifty-seven percent, got the nod. Some of the 2,400 not selected will hang up their uniforms soon, while others remain for further consideration.

In the fast-burner department,

150 of the 170 secondary zone selections went to line officers.

Of the primary zone line officers considered for the first time, seventy-two percent (2,696 of 3,759) were selected. Then comes the sharp dropoff—only twenty percent (122 of 620) considered for the second time made it. The plunge continued, e.g., only two of 132 considered for the fifth time made it.

The competition is intense, and it figures to remain that way.

In a related development, Air Force said that 3,533 officers are in the official consideration zone for permanent Regular colonel; that board meets February 7. But Headquarters has confirmed that the actual selections will be made only from the 1,647 officers who are serving in, or selected for, the temporary grade of colonel or higher. That is SOP for this annual panel. Permanent eagles are essential for officers eyeing star rank.

## **Muscle Applied, Taxes Rescinded**

Dover, Del., enjoys an economic shot in the arm via the proximity of Dover AFB and its payroll. Nevertheless, in mid-1975 the city hit nonresident service members living in trailers with a special \$30 tax. USAF promptly protested, calling the tax illegal, but the city persisted.

So Air Force went to the Justice Department for a suit wrapped with the power and prestige of the US Government. Rather than face litigation, Dover backed down and lifted the tax late last year, according to Air Force's JAG headquarters. The city also agreed to refund previously collected taxes to service people who submit an affidavit stating they were nonresidents when the tax was paid. Proof of payment is also required.

Air Force lawyers pointed out two other recent cases where the service, citing protection under the Soldiers' and Sailors' Civil Relief Act, also succeeded in overthrowing unfair taxes on service members. One was in Wyoming, where nonresidents were required to pay county auto licensing fees. The other was a mobile home tax collected in Illinois.

JAGs "at all levels" are aware of the Act's provisions, and "when taxes are unlawfully being imposed on servicemen . . . they take action



to have collection of the tax terminated," USAF said.

### Reserve Pay Overhaul Eyed

So broad is the Reserve Compensation System Study that team

members are even examining the pay systems of foreign countries. Reason: They hope to pick up tips the US Reserve Forces can use to advantage. The main aim of the study is to come up with a pay structure that will attract and re-

tain enough quality people in all the Reserve components.

There are thirty-five members of the Reserve pay study group, including eight from the USAF. They are looking at Reserve mobilization manpower needs and compensation

Ed Gates . . . "Speaking of People"

## Solid Progress in JAG Manning

More than three years ago in this space (January '74 issue of AIR FORCE), we reported on the then critical manpower situation in USAF's 1,200-member Judge Advocate General department. Recruiting was difficult, retention dismal. Only eight of every 100 new Air Force lawyers remained in uniform beyond their service commitments, we noted at the time. The other services endured similar shortfalls.

It all meant that the JAG experience level had fallen dangerously low. Officials had begun to question the ability of the department to dispense reasonably competent legal services.

The armed forces at the same time unfurled danger flags on Capitol Hill. "Unless measures are taken to make careers as military attorneys more attractive and more competitive in the job market, the experience deficit will continue to worsen," Pentagon authorities told a House Appropriations subcommittee in 1973.

They were appealing specifically for both extra monthly pay and annual bonuses, something on the idea of the services' doctor bonuses, but with a \$4,000 yearly ceiling. Well, the extra pay and bonus proposals, like similar ones advanced by JAG groups and supporters in previous years, got nowhere. The Administration and Congress wouldn't go along. But the bottom hasn't dropped out. Indeed, we learned from a recent visit to USAF's JAG headquarters, located in the Forrestal Building in the nation's capital, that there's a new ball game. Overall, JAG manning in the Air Force "has definitely improved," officials declared. Applications for JAG commissions now far exceed openings, the caliber of the applicants is remarkably high, and retention at long last has begun to climb, they reported.

Col. C. Claude Teagarden, the Executive to the JAG of the Air Force, Maj. Gen. Harold R. Vague, explained what has happened the past couple of years:

"With professional pay apparently out of the question, we had to do things on our own. This included putting our people on a separate promotion list and considering them for major a year ahead of line officers," he said. Under this program, first-time eligibles for temporary major enjoy a ninety-two percent chance of making it.

New JAGs, of course, continue to enter service as captains.

USAF's practice of sending about a dozen JAGs a year to school for master of law degrees and many others to special short legal courses, including some at civilian universities, has proved popular. All these projects are designed to polish and improve legal skills.

A related new device that improves professionalism, according to Colonel Teagarden, involves legal education courses Headquarters is putting on videotape. The tapes are sent to legal officers Air Force-wide. One of the most recent tapes covers the Tax Reform Act of 1976, which affects many military members.

Congress, meanwhile, gave JAG manning a major boost, effective two years ago, by permitting each service to send selected line officers to law school at government expense. Each earns full pay while spending three years in pursuit of the degree, and normally acquires a six-year service obliga-

tion. Virtually all will serve until retirement, authorities believe. For officers with two through six years of service, this program is attracting five applications for every vacancy; many present outstanding academic and other credentials, Colonel Teagarden said. This program will soon crank out the maximum twenty-five law school graduates a year that USAF is permitted; they are expected to form the future "hard core" of the Air Force's JAG establishment.

An allied procurement avenue, except that it's "not funded," is now providing Air Force about twenty new JAGs annually. Selected active-duty line officers enter an "excess leave" status to earn law degrees, after which they return to extended active duty. At school, they surrender normal pay and allowances, but can use their GI Bill entitlements. While they assume only four-year service obligations, most participants are likely to remain for full careers. This, too, is a tough program to crack, as applicants outnumber spaces two to one.

AFROTC until recent years provided up to 200 new JAGs annually. No more. Only fifty-two are slated to enter service during FY '77. And if projections hold, input from AFROTC will plunge to a mere sixteen in three years. Improved retention hopefully will take up much of the slack.

Colonel Teagarden also reported considerable interest in active-duty JAG service from law school seniors generally, and from Reserve officers who participate in USAF Reserve legal activities and want to be recalled. About twenty-five lawyers will come aboard in FY '77 from these two sources, he said. The following year, Air Force plans to take in another 130 JAGs, but the portion from AFROTC will drop to fifty-five and direct appointments will rise.

Late last year, Air Force JAG strength stood at 1,164, against an authorization of about 1,200. That's about the same as three and a half years ago. The significant change over that period is in retention—from the extremely low eight percent in 1973 to seventeen and one-half percent in late 1976. Prospects of further increases in the next few years are "favorable," Colonel Teagarden said.

The official retention goal is thirty-five percent. In other words, of the 130 new JAGs entering the Air Force each year, officials anticipate eventually retaining forty-five to fifty of each year group.

It's slow going, of course, and not accomplished overnight. Officials also acknowledge that the current "soft" job market for new lawyers is probably contributing to USAF's improved legal staffing picture. In any event, JAG leaders feel they are headed in the right direction.

They're pleased with the improvement in the overall experience level. Our January 1974 report showed a shortage of 328 field-grade officers and a corresponding overage of young, mostly inexperienced lawyers. The latest report, however, shows that the experience-level deficit has decreased—from the previous 328 field graders to 240 (twenty-five colonels, ninety-one lieutenant colonels, and 124 majors). The excess, all in the grade of captain, dropped to 224.

It all represents solid progress and an important step toward solution of one of USAF's most difficult personnel problems. ■

# The Bulletin Board

from every conceivable angle. The members convened last spring and will issue their final report next September. If they meet their timetable, they will hammer out draft legislation by December 31, 1977.

At the end of 1976, the group issued an interim report that was long on what it's doing—looking into everything from what may be needed to improve Reserve-Guard recruiting, to what to do about the adverse impact of the last military pay raise on Reservists (since the latter don't receive BAQ in their drill pay, they got a lesser pay boost than active-duty people).

The interim report, though short on specifics of what might materialize, does suggest that the final recommendations probably will favor an extremely flexible Reserve pay system, to meet different recruiting-retention situations in different skills, geographical areas, and even components.

## Schafer Scores Meddling in Health Care

The Air Force's top medical officer, Lt. Gen. George E. Schafer, has blistered the government for

leaning on the services to revamp and cut health care programs. The drive, he recently told AFA's Alamo Chapter in San Antonio, threatens eye and dental care at Air Force facilities, parts of CHAMPUS, aeromedical evac operations, residency training, and other health projects.

His main targets were the Office of Management and Budget and the Defense Department. The outspoken USAF Surgeon General said that during the previous eighteen months various OMB-DoD-GAO planners conducted sixty studies and surveys aimed at reducing military health care costs. As a result, erosion of benefits has set in and "we are losing the capability to take care of our own," General Schafer said.

Schafer was equally candid during a fall meeting of OMB and DoD executives, and his remarks were published in the November-December *USAF Medical Service Digest*, an official service publication. OMB, he stated, erroneously assumed that military medicine is no different from civilian medicine and that the latter source can provide it at less cost. He also disputed an OMB claim that retiree and dependent medicare can be immediately transferred to the civilian community in wartime.

OMB and other government quarters have charged that the military community has too many fringe benefits and has become a "privi-

leged class." Not so, Dr. Schafer declared, adding that there must not be "tampering with . . . [existing] benefits or eroding of contracted promises to military families."

## Report From the VA

From the Veterans Administration comes word that:

- It will pay a record \$403.4 million in GI insurance dividends this year. The largest share, \$368 million, goes to 3,500,000 World War II veterans who held on to their policies; they'll average \$104. The 114,300 WW I policy-holding vets will average \$202, while the 550,000 Korean Conflict veterans involved will receive an average of \$22. As usual, the payments will be made on the anniversary dates of the policies.

- Late last year some 500,000 of the 1,200,000 low-income veterans drawing nonservice-connected pensions had not responded to VA questionnaires about their incomes. Those who didn't respond by January 1 will find their checks suspended and receive a letter explaining that by law the agency must have the data to continue sending the pension.

- The Agency has more than 12,000 John Smiths on file, including 1,200 with no middle name or initial. This is VA's way of asking all veterans, when they write about a problem, to give full information for identification purposes.

## Recruiting Effort Intensified

The Air Force, facing various recruiting woes but determined to sign up the 76,000 quality enlistees it needs in FY '77, has intensified its recruiting drive since our last report in the November "Bulletin Board." Chief of Staff Gen. David C. Jones has called on all USAF members, commanders especially, to support the effort and smoke out great numbers of good prospects for area recruiters to work on.

The Recruiting Service late last year sent letters plugging the Air Force to 1,500,000 prospects, mostly male high school seniors. To follow last month were letters to their parents, and, during March and April, USAF will send a "final pre-graduation reminder letter" to a refined listing of the seniors.

Other potential enlistees are be-



Sen. Barry Goldwater discusses the B-1 strategic bomber with SAC Commander in Chief Gen. Russell E. Dougherty during a recent visit to SAC headquarters in Omaha, Neb. The Arizona Republican was the guest of honor at a luncheon hosted by AFA's Ak-Sar-Ben Chapter.

ing contacted. And the service has asked 65,000 first-term airmen to recommend personal friends for enlistment.

Meanwhile, recruit-the-recruiter teams interviewed more than 1,000 potential recruiters at thirty bases late last year and generated 275 "firm applications." Team members—from the Recruiting Service and the Military Personnel Center—have been hitting two bases a week where they interview NCOs and make "on-the-spot" assignment reservations for those accepted. This cuts three months off the normal application process and gets the new recruiter on the job sooner.

General Jones, in an all-commands message, said normally only one of every five serious USAF applicants enlists. Therefore, achieving this year's goal will require a tremendous effort. "Recruiting must become a fundamental responsibility of every Air Force member. The continued vitality of the Air Force depends on it," he said.

### Short Bursts

NORAD's **Gen. Daniel (Chappie) James, Jr.**, presided over the recent board that **picked thirty-four BGs for temporary major general**. His eleven board members were all three-star officers. Only six of the thirty-four selectees are Academy graduates, a pretty good indication that no "West Point Protective Association" exists within the Air Force hierarchy.

Going into effect March 1 are important **rules for airmen eyeing NCO status**. One requires E-4 senior airmen to be **eligible to reenlist** in order to become an NCO, while a second states that those denied that status will be **ineligible to re-up** at the next reenlistment opportunity. The changes, designed to improve quality, should result in about 450 additional denials of reenlistment annually.

With community housing dwindling and on-base projects being renovated, the **Clark AB, P. I., housing situation** has become bleak. USAF's recent message to people heading for the base: "delay movement of dependents." The base may be forced to disapprove concurrent travel.

One woman, **Col. Norma E. Brown**, made the new temporary brigadier generals list (see below). She commands the 6940th Security

Wing, Goodfellow AFB, Tex. No blacks on the forty-four-member one-star list, USAF said.

Investigators checked seven USAF base hospitals recently and discovered that various parents, parents-in-law, brothers and sisters, and other relatives of USAF people had received **medical care they were not entitled to**. So the Air Force Surgeon has called for a tightening-up of procedures. Don't feel you are being "hassled" when asked to show your ID card in applying for military medical care, his office told dependents recently. It's to protect your benefits.

### Senior Staff Changes

**PROMOTIONS:** To be **Brigadier General:** Walter J. **Bacon**, II; James I. **Baginski**; Merton W. **Baker**; Jerome R. **Barnes, Jr.**; Tommy I. **Bell**; Theodore D. **Broadwater**; Norma E. **Brown**; John R. **Budner**; Richard A. **Burpee**; William J. **Campbell**; Melvin F. **Chubb, Jr.**; Cecil D. **Crabb**; Edward L. **Ellis**; Alonzo L. **Ferguson**; Paul E. **Gardner**; Allison G. **Glover**; Irwin P. **Graham**; Patrick J. **Halloran**; Paul H. **Hodges**; Charles B. **Jiggetts**; Robert W. **Kennedy**; Frederick C. **Kyler**; Charles W. **Lamb**; Joseph R. **Lowry**; John B. **Marks, Jr.**; William E. **Masteron**; Robert F. **McCarthy**; Forrest S. **McCartney**; Robert G. **McIver**; Edward **Mendel**; Kenneth R. **Milam, Jr.**; Alfred M. **Miller, Jr.**; Russell E. **Mohney**; William H. L. **Mullins**; Kenneth L. **Peek, Jr.**; James C. **Pfautz**; Robert D. **Russ**; Vernon H. **Sandrock**; Richard K. **Saxer**; Casper T. **Spangrud**; Dennis B. **Sullivan**; James **Taylor, Jr.**; Mele **Vojvodich, Jr.**; Larry D. **Welch**.

**RETIREMENTS:** M/G Colin C. **Hamilton**; M/G George J. **Keegan, Jr.**; M/G Maurice R. **Reilly**; M/G Kendall **Russell**.

**CHANGES:** M/G **Benjamin R. Baker**, from Dep. Surg. Gen., Hq. USAF, Washington, D. C., to Dep. Asst. Sec. of Def. for Health Resources & Programs, OASD (Health Affairs), Washington, D. C. . . . **Col. (B/G selectee) Merton W. Baker**, from V/C, AF Contr. Mgmt. Div., AFSC, Kirtland AFB, N. M., to Cmdr., AFCMD, AFSC, Kirtland AFB, N. M., replacing retiring M/G Maurice R. Reilly. . . . **Col. (B/G selectee) Richard A. Burpee**, from Dir. of Trng, DCS/Ops., Hq. SAC,

Offutt AFB, Neb., to Cmdr., 19th Air Div., SAC, Carswell AFB, Tex. . . . **B/G Frank M. Drew**, from USAF Member, US Delegation, JBUSMC, Rio de Janeiro, Brazil, to V/C, USAFTFWC, TAC, Nellis AFB, Nev., replacing B/G (M/G selectee) James R. Hildreth. . . **B/G Don M. Hartung**, from Cmdr., AFETR, AFSC, Patrick AFB, Fla., to Cmdr., SAM-TEC, AFSC, Vandenberg AFB, Calif.

**B/G (M/G selectee) James R. Hildreth**, from V/C, USAFTFWC, TAC, Nellis AFB, Nev., to Dep. to Cmdr., USAFTFWC for Tests/Exercises, TAC, Nellis AFB, Nev. . . . **B/G (M/G selectee) Doyle E. Larson**, from Dir. for Intel., J-2, PACOM, Camp Smith, Hawaii, to DCS/Intel., Hq. SAC, Offutt AFB, Neb., replacing M/G Eugene F. Tighe, Jr. . . . **B/G (M/G selectee) George D. Miller**, from Asst. DCS/Ops., Hq. SAC, Offutt AFB, Neb., to DCS/Ops. Plans, Hq. SAC, replacing B/G (M/G selectee) Jerome F. O'Malley. . . **B/G (M/G selectee) Jerome F. O'Malley**, from DCS/Ops. Plans, Hq. SAC, Offutt AFB, Neb., to Vice Dir., J-3, Ops., Joint Staff, OJCS, Washington, D. C. . . . **B/G John R. Paulk**, from V/C, Ogden ALC, AFLC, Hill AFB, Utah, to DCS/Log., J-4, NORAD & DCS/Log., ADCOM, Peterson AFB, Colo.

**B/G Andrew Pringle, Jr.**, from IG, Hq. ATC, Randolph AFB, Tex., to Cmdr., Lowry TTC, ATC, Lowry AFB, Colo. . . . **B/G Irving B. Reed**, from Dir., Comd. Con., DCS/Ops., Hq. SAC, Offutt AFB, Neb., to Asst. DCS/Ops., Hq. SAC, replacing B/G George D. Miller. . . . **M/G Eugene F. Tighe, Jr.**, from DCS/Intel., Hq. SAC, Offutt AFB, Neb., to ACS/Intel., USAF and Cmdr., AF Intel. Service, Washington, D. C., replacing retiring M/G George J. Keegan, Jr. . . . **B/G Robert F. Titus**, from Asst. DCS/Plans & Programs, J-5, Hq. NORAD, and Asst. DCS/Plans & Programs, Hq. ADCOM, Peterson AFB, Colo., to IG, Hq. NORAD/ADCOM, Peterson AFB, Colo., replacing retiring B/G William P. Comstock.

**SENIOR ENLISTED ADVISOR CHANGES:** **CMSgt. Stanley F. Dorman**, from NCOIC, Resource Utilization Branch, 3507th Airman Classification Sq., USAF Recruiting Service, Lackland AFB, Tex., to Senior Enlisted Advisor, Air Force Recruiting Service, Randolph AFB, Tex., replacing **CMSgt. Robert W. Carter**. ■

# Flying the Early Birds

## THE P-36

BY BRIG. GEN. ROSS G. HOYT, USAF (RET.)

**T**HE years 1935 and 1936 saw completion of the fighter plane's transition from a wood-and-fabric biplane with fixed landing gear and open cockpit to an all-metal, low-wing monoplane with retractable landing gear and closed cockpit. The change had been gradual.

There had been the switch from the wooden fuselage frame to steel and aluminum tubing, while retaining the wooden wing frame; the use of stressed dural in tail surfaces; the P-26 airplane, an all-metal, low-wing monoplane, but still with fixed landing gear and open cockpit. Then came the Curtiss P-36 and its competitor, the Seversky P-35. Both had adopted all the latest refinements. With silvery, sparkling, unpainted

metal skin, they were the fighter pilot's conception of what a fighter airplane should look like. The P-36 added a retractable tail wheel and a landing gear that was also fully retractable by rotating the gear struts through ninety degrees as they retracted aft, the wheels fitting into wells, flush with the bottom of the wing.

Despite more powerful engines and other refinements, the armament in the original P-36 remained the same as the first P-26s: two .30-caliber guns firing through the propeller disc. Succeeding P-36s had four or six .30-caliber guns—an expensive vehicle for inferior firepower.

As a member of the Air Corps Pursuit Evaluation Board in 1936, I flew the

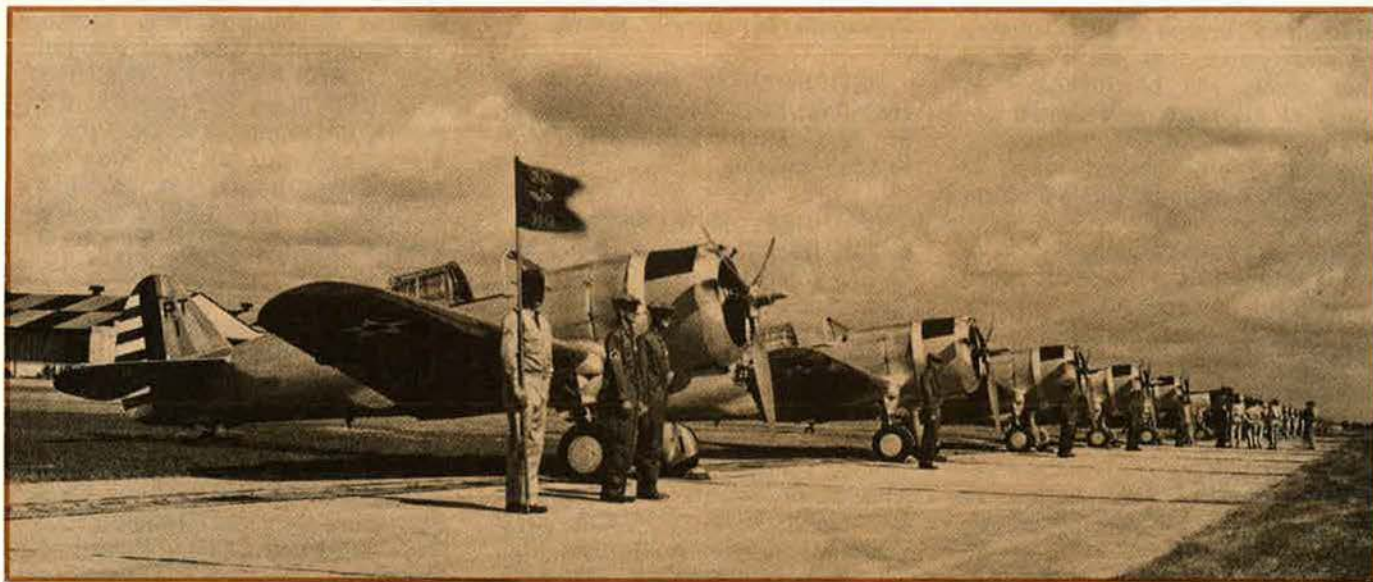
Curtiss Hawk 75, later designated P-36 (it had no armament) and the Seversky P-35 (it had one .30- and one .50-caliber gun mounted in the cowl and synchronized to fire through the propeller). As a result of Board action, Curtiss was awarded a contract for three service test 75s; Seversky won a contract for seventy-seven P-35s as a result of the fighter's performance and its .50-caliber gun (the first since the service test of the MB-3).

Tests of the Curtiss 75s resulted in a contract for 210 P-36s at a cost of slightly more than \$4 million. Deliveries began in early 1938 and concluded a year later. All but the last thirty were P-36As, powered by the 1,050-hp. Pratt & Whitney R-1830-13, double

row radial engine. Curtiss had switched from in-line, liquid-cooled engines to the radial. The last thirty were P-36Cs with the P&W R-1830-17 1,200-hp. engine and an additional free-firing .30-caliber gun mounted in each wing—a start in the right direction. An export model known as the Hawk 75-A8 was built for the Norwegian government, but delivered to Canada when Norway fell. Later bought back by the USAAF and redesignated P-36G, this model had six .30-caliber guns—two synchronized and two free-firing in each wing.

Later experimentation produced armament of two .50-caliber guns synchronized in the cowl and two .30-caliber guns in each wing. Another version had one .30-caliber and one .50-caliber synchronized gun and a 23-mm gun under each wing. These did not reach tactical units.

After the "bugs" were worked out, the P-36s were assigned to Elmendorf Field, Alaska, and Wheeler Field, Hawaii. Although most of the latter were destroyed on the ground in the Japanese attack on Pearl Harbor, a few got off from



Lined up, ready for inspection, are the Curtiss P-36s of the 20th Fighter Group, commanded at the time (1939) by the author.



General Hoyt was active in military aviation from 1918 until his retirement at the end of World War II. His reports on the SE-5, the Curtiss Hawks, and the P-26A have appeared in recent issues as part of a continuing series on aircraft of the early era.

at the reviewing party. The ground-looping tendency had been reported to him as Chief of the USAAF, and to the Materiel Division. When all but one plane had landed, General Arnold turned to me and said, "Hoyt, you reported these planes as ground-loopers?"

P-36s began reaching Air Corps pursuit squadrons in April 1938. A few saw combat in WW II.

Wheeler Field and destroyed two Japanese bombers.

During my four-year tenure, from 1937 to 1941, as commander of the 20th Fighter Group, the unit was equipped with three different fighters: P-26s, P-36s, and P-40s, the last nicknamed the "Warhawk." In 1939, while equipped with P-36s, the 20th changed stations from Barksdale Field, La., to Moffett Field, Calif., a Navy lighter-than-air installation. When our fifty-seven P-36s were housed in the tremendous airship han-

gar, you had to look twice to locate them.

The 7th Bombardment Group moved from Hamilton Field, Calif., to Salt Lake City, Utah, in 1940 and the 20th Fighter Group moved to Hamilton. The prewar expansion program was under way. The 20th furnished the cadre for the newly organized 35th Fighter Group and turned its P-36s over to the 35th when P-40s were received as replacements.

Basically, the P-40 was a P-36 fitted with an Allison V-1710-19 in-line engine re-



The P-36's design competition was the Seversky P-35, shown here.

placing the shorter radial engine. With the extra weight well out in front, the early P-40 was a ground-looper if allowed to wander too far in the landing roll. This became a problem when large numbers of recent graduates of the flying schools began arriving.

There is an interesting sidelight on the ground-looping proclivities of the P-40 and, incidentally, on human nature. During an inspection visit by Gen. H. H. Arnold, I led the group in formation flying and mass gunnery. At the conclusion, I put all fifty-seven planes in a "rat race" to land individually on the only runway. I landed first and reported to General Arnold

His tone of voice and inflection indicated a doubt in his mind. I replied, "They are not all down yet, General." Whereupon the last youngster landed, let it get away from him, ground-looped, and went up on his nose and over on his back. I said, "See what I mean, General?" I was glad the pilot was not injured and sorry a plane was damaged, but I lost no sleep over the incident.

When the fuselage of the P-40 was lengthened and the fin and rudder area increased, its ground-looping tendency was reduced. This offspring of the P-36 served in almost every war zone and was manufactured, literally, by the thousands. ■

### The P-36 at a Glance

	P-36A	P-36C
<b>Manufacturer</b>	Curtiss Aeroplane Div. of Curtiss Wright Corp.	
<b>Type</b>	Single-seat fighter.	
<b>Power Plant</b>	R-1830-13 1,050 hp.	R-1830-17 1,200 hp.
<b>Wingspan</b>	37 ft. 4 in.	37 ft. 4 in.
<b>Length</b>	28 ft. 6 in.	28 ft. 6 in.
<b>Height</b>	12 ft. 2 in.	12 ft. 2 in.
<b>Wing Area</b>	236 sq. ft.	236 sq. ft.
<b>Weight, Empty</b>	4,567 lbs.	4,620 lbs.
<b>Gross Weight</b>	6,010 lbs.	6,150 lbs.
<b>Maximum Speed</b>	300 mph at 10,000 ft.	311 mph at 10,000 ft.
<b>Cruising Speed</b>	270 mph.	270 mph.
<b>Rate of Climb</b>	3,400 ft./min.	4.9 min. to 15,000 ft.
<b>Service Ceiling</b>	33,000 ft.	33,700 ft.
<b>Range</b>	825 mi.	820 mi.
<b>Armament</b>	2 .30-cal. guns	4 .30-cal. guns

# Airman's Bookshelf

## A Guide to Introspection

*Memoirs of My Services in the World War, 1917-1918*, by Gen. George C. Marshall, with a Foreword and Notes by Brig. Gen. James L. Collins, Jr. Houghton Mifflin, Boston, Mass., 1976. 268 pages, with appendices, index. \$10.

When he sailed for France on June 14, 1917, George Marshall was a thirty-seven-year-old captain with sixteen years of service. Little could he have realized that another thirty-five years would elapse before he would retire from public service; still less could he have envisaged the heights to which his future responsibilities would carry him—Chief of Staff (in 1939, directly from brigadier general), *de facto* leader of the wartime JCS, Secretary of State, Secretary of Defense, and, finally, in 1953, Nobel laureate.

This memoir, only recently discovered by his stepdaughter in the attic of the family's Leesburg, Va., home, was written between 1919 and 1923 and draws its special significance from the light it sheds on Marshall's thinking following "the war to end all wars." The war just concluded, he was convinced, had been marked by both extraordinary sacrifice and endurance on the part of the soldiers involved, and by shameful unpreparedness on the part of the Army and the government; that he went so far as to offer the manuscript for publication—uncharacteristic of the man—may stand as definitive proof of his concern on both issues.

"There was an abundance of courage available," he wrote, "but too little technique to secure its most advantageous employment." (The unnamed Houghton Mifflin editor who rejected the manuscript in 1923 allowed as how it needed

more work; a simultaneous reassignment to the 15th Infantry in China caused Marshall, in his typical first-things-first manner, to drop the matter.)

Other than on its anecdotal level, the memoir reveals little of substance that was not already known about the affairs of the 1st Division, GHQ of the AEF, and the First Army—in each of which Marshall served as G-3 or operations officer. Of the tribulations of the principal staff officer for what was less a division than "the raw material for one shipped over to France for assembly at the front," however, we find a great deal, much of it presaging his firm resolve in a later war to keep the visiting firemen from higher headquarters out of the hair of those charged with the execution of operations. Most important, however, and most revealing of the future Chief of Staff's style are the occasional observations revealing his demanding view of men and war, of which two examples must suffice. On the selection of staff officers:

It was more a question of picking out men who could be impersonally direct in their dealings, concise in their speech, and, if necessary, brutally frank in expressing their opinion. . . . It should be obvious that the successful handling of such situations required a very special type of man, a type that frequently is in difficulties in a peace regime (pp. 24, 172).

And on the vicissitudes of personal fortune and success in war:

The development of the AEF was marked by a series of personal tragedies suffered by officers assigned important tasks and who, with the limited means at their disposal, and the short time usually available, were unable to produce the desired result. . . . But war is

a ruthless taskmaster, demanding success regardless of confusion, shortness of time, and paucity of tools. Exact justice . . . is quite impossible. One man sacrifices his life on the battlefield and another sacrifices his reputation elsewhere, both in the same cause. The hurly-burly of the conflict does not permit commanders to draw fine distinctions; to succeed, they must demand results, close their ears to excuses, and drive subordinates beyond what would ordinarily be considered the limit of human capacity. Wars are won by the side that accomplishes the impossible. Battles are decided in favor of the troops whose bravery, fortitude, and, especially, whose endurance surpasses that of the enemy; the army with the higher breaking point wins the decision (p. 138).

The photographs, maps, and especially the notes provided by General Collins make of this a handsome and carefully wrought package, eminently deserving of a place on the shelf alongside Forrest Pogue's monumental biography of General Marshall, now at three volumes (Viking Press, 1963, 1966, and 1973) with another forthcoming. As a guide to introspection for field-grade officers, this book has few equals.

—Reviewed by Lt. Col. David MacIsaac, Department of History, USAF Academy.

## New Books in Brief

*Aeroplane Scrap Book (1910-1941)*, compiled by D. D. Hatfield. America's early aeronautical achievements are revealed in advertising from that era. First in a series, this volume includes little-known aircraft and engines along with the more famous. The author, who spent a lifetime compiling the *Hatfield History of Aeronautics* at Northrop University, has included his comments on the contribution of each product to America's advancement in the field. Northrop University Press, 1976. Order from Aviation Book Co., 555 W. Glenoaks Blvd., Glendale, Calif. 91202. 246 pages. \$4.50 paperback. \$7.50 hardcover.

*Armaments and Disarmament in the Nuclear Age*, Stockholm International Peace Research Institute (SIPRI). This compendium of information and analysis on world armaments and their implications is

published to commemorate SIPRI's tenth anniversary. The Institute's main concern is the growing arms race and failure of the international community to control it. Humanities Press, Inc., Atlantic Highlands, N. J., 1976. 308 pages. \$20.

*China's Scientific Policies: Implications for International Cooperation*, by Charles P. Ridley. Scientific development in China has been affected by internal political pressures that began with the Cultural Revolution in 1966. The author says this is evident in the shift away from basic research that was showing promise prior to 1966. Chinese interest in scientific exchange, the author concludes, will probably be limited to fields having direct applications to national development. Selected bibliography. American Enterprise Institute for Public Policy Research, Washington, D. C., 1976. 92 pages. \$3.

*Controlling the Conventional Arms Race*, United Nations Association of the United States of America (UNA-USA). A product of two years' deliberations by the Association's National Policy Panel, the book concludes that conventional arms control is an important subject for international negotiations, and that it is time to launch parallel efforts to limit both conventional and nuclear arms. Topics include approaches to conventional arms control; quantitative, qualitative, and budget limitations; deployment and transfer limitations; and defense economics. UNA-USA, 345 East 46th Street, New York, N. Y. 10017, 1976. 87 pages. \$2.

*The Focke-Wulf FW 190*, by Gordon Swanborough and William Green. Complete design, development, and operational history of the Luftwaffe's sturdy, all-purpose fighter by two authoritative aircraft writers. Photos and three-view drawings. Arco Publishing Co., New York, N. Y., 1977. 152 pages. \$11.95.

*Fokker Fighters of World War I*, by Peter L. Gray and Ian R. Stair. History, photos, and scale drawings cover the E-111 Eindecker, D-1 to D-VII biplanes, Dr-1 triplane, and D-VIII monoplane. Wingspan Publications, VAP House, Station Field Industrial Estate, Kidlington, Oxford, England, 1976. 20 pages. \$1.85.

*How Much Defense Spending Is Enough?*, by Jack Kemp and Les Aspin. Two congressmen with differing views on how to determine the size of the defense budget debate the matter in this recent addition to the Rational Debate Series. While Kemp says expenditures should be determined by Soviet military capability, Aspin says it depends on what is needed for what he calls "vital national security interests." American Enterprise Institute for Public Policy Research, Washington, D. C., 1976. 64 pages. \$2.

*In Defense of the Public Liberty*, by Samuel B. Griffith II. A thorough examination of America's fight for independence based on correspondence, diaries, and newspaper accounts of the time. A vivid view of events as seen by the participants themselves emerges. Illustrations, notes, portraits. Doubleday & Co., New York, N. Y., 1976. 725 pages. \$14.95.

*Jets*, by John W. R. Taylor. "It would be difficult to imagine a more beautiful and simple shape," the book begins. It continues with the story of jets, how they work, how they are built and flown, their history, specifications, and use in peace, war, and in the future. The author is Editor of *Jane's All the World's Aircraft* and a Contributing Editor to *AIR FORCE Magazine*. Photos, illustrations, index. J. M. Dent and Sons, Ltd., Aldine House, Albemarle Street, London, 1976. 64 pages. \$4.10.

*Museum and Display Aircraft of the United States*, by Bruce W. Orriss. This comprehensive guide to American museums having aerospace collections was prepared under the auspices of the American Aviation Historical Society. Listed are the locations, hours, admission fees where applicable, and holdings of 103 museums. The book has more than 200 photos of historic military and civilian aircraft in museum collections, with detailed descriptions of each. (The AAHS—annual membership \$12.50—also publishes an impressive quarterly *Journal* and a newsletter for members.) American Aviation Historical Society, Box 99, Garden Grove, Calif. 92642, 1976. 76 pages, large format with index. \$5 postpaid.

*The Observer's Book of Aircraft*, by William Green. Twenty-fifth edition of this annual pocket reference to the world's aircraft in production, under test, or scheduled for testing during the year. Specifications, three-view drawings, photos. Frederick Warne Books, 40 Bedford Square, London, WC1B 3HE, 1976. 254 pages. \$1.50.

*The Only Way to Fly*, by Robert J. Serling. Comprehensive history of Western Airlines, which celebrated its fiftieth anniversary in 1976. One year before Lindbergh flew the Atlantic, Western began flying the mail. Photos, index. Doubleday & Co., New York, N. Y., 1976. 494 pages. \$10.95.

*Stonewall in the Valley*, by Robert C. Tanner. Stonewall Jackson's Shenandoah Valley Campaign in 1862, which defeated the largest army ever assembled on the American continent, is analyzed by the author. Based on letters, diaries, and other written accounts, the book reveals remarkable human endurance against unbelievable odds. Doubleday & Co., New York, N. Y., 1976. 436 pages. \$10.

*The System for Educating Military Officers in the U.S.*, edited by Lawrence J. Korb. Contributors discuss the qualities officer military education should produce, and the system as it now exists. Topics covered are the service academies, problems and prospects of ROTC, and junior officer education in the Air Force. International Studies Association, University Center for International Studies, University of Pittsburgh, Pa. 15260. 172 pages. \$4.75.

*Wernher von Braun*, by Erik Bergaust. This biography of the German-born scientist who has had an important part in developing US missile and space systems is complete with anecdotes and stories only a friend would know. The author has been a hunting and fishing companion, associate, and friend of von Braun for twenty-five years. Proceeds will go to the National Space Institute's educational programs. Genealogy, bibliography, appendices, photos, index. National Space Institute, Washington, D. C., 1976. 589 pages. \$13.95.

—Reviewed by Robin Whittle

# AFA News

By Don Steele, AFA AFFAIRS EDITOR



Sen. George S. McGovern (D-S. D.) recently visited Ellsworth AFB, S. D., where he was briefed on the mission of the 28th Bomb Wing and the 44th Strategic Missile Wing; given an overview of housing and personnel needs; inspected the base facilities from a helicopter; and visited the base hospital and child-care facilities. Shown with the Senator, right, are, from left, Col. Clint Winne, 28th Bomb Wing Commander; Hoadley Dean, Vice President for AFA's North Central Region; Col. Jud Faurer, 44th Strategic Missile Wing Commander; and Mrs. McGovern.



AFA's first Community Partner—the Varsity Cleaners of Highland Park, Mich.—was recruited by the James H. Straubel Chapter. Chapter President Leonard W. Isabelle, left, presented the official certificate to Edward S. Papelian, owner of the establishment, during a recent Chapter meeting at which AFA Executive Director James H. Straubel was the guest speaker. Mr. Papelian is a retired USAF lieutenant colonel and a member of the Chapter's Executive Council.



AFA President George M. Douglas, left, recently visited permanent AFA National Director Arthur C. Storz, Sr., center, in his Omaha, Neb., home where he is recuperating from a bad fall. During his visit, Mr. Douglas, assisted by Lyle O. Remde, right, Vice President for AFA's Midwest Region, presented Mr. Storz an AFA Citation "for a lifetime devotion of his vast talent and energy to the cause of aerospace power, to the growth and development" of USAF and SAC in particular, and in deep appreciation of his many contributions to AFA "while serving as a Chapter President, a National Director, a member of many national committees, and a highly respected and admired leader."



Retired Air Force Gen. Bruce K. Holloway, former Commander in Chief of SAC and a native Knoxville, was the guest of honor at a dinner recently sponsored by AFA's Knoxville, Tenn., Chapter to announce the official renaming of the Chapter as the General Bruce K. Holloway Chapter. More than 150 members and guests attended the dinner in the McGhee-Tyson AB Officers' Club at which Gen. Russell E. Dougherty, CINCSAC, was the guest speaker. Shown welcoming General Dougherty, left, on his arrival at the Base, are, from left, Col. Robert Akin, McGhee-Tyson Base Commander; General Holloway; and Chapter President William Terry.



# chapter and state photo gallery



More than 350 members and guests attended the Third Annual Joint Dinner cosponsored by the Scott Memorial and Greater St. Louis Chapters at which Gen. Paul K. Carlton, Commander, Military Airlift Command, was the guest of honor and speaker. During the program, Lyle O. Remde, at right in left photo above, Vice President for AFA's Midwest Region, presented AFA Medals of Merit to: Capt. Monroe S.

"Buddy" Sams, left photo above, assigned to MAC Headquarters at Scott AFB, a former Chairman of AFA's Junior Officer Advisory Council Executive Committee; Hugh L. Nyart, center photo above, Illinois State AFA President; and Donald K. Kuhn, right photo above, Past President, Greater St. Louis Chapter. Scott Chapter President C. W. Scott, seated in left photo above, was the dinner host.



Mrs. Nita Ashcraft, Assistant Secretary of the Air Force (Manpower and Reserve Affairs), was the guest speaker at a recent Middle Georgia Chapter luncheon meeting. During the program, AFA's Medal of Merit was presented to CMSgt. Jack H. Steed, Senior Enlisted Advisor, Warner Robins Air Logistics Center, and H. C. "Butch" Strawser, immediate Past President of the Chapter. Shown following the presentation are, from left, Sergeant Steed, Mrs. Ashcraft, Mr. Strawser, and Dr. Dan Callahan, Vice President for AFA's Southeast Region. Distinguished guests included Congressman-elect Bill Lee Evans (D-Ga.); Maj. Gen. William R. Hayes, Commander, Warner Robins ALC; Maj. Gen. William Lyon and Maj. Gen. Richard Bodycombe, AFRES Commander and Vice Commander, respectively; and the Hon. Buck Melton, Sherrill Stafford, and James McKinley, the mayors of Macon, Centerville, and Perry, respectively.



**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

Rep. Dale Milford (D-Tex.) was the guest of honor and speaker at a recent Dallas Chapter meeting. Following his address, Mr. Milford, center, received a Chapter plaque of appreciation from Chapter President Troy Sampley, left, assisted by Vic Kregel, right, Vice President for AFA's Southwest Region.

# AFA News



Tennessee State AFA President Tom Bigger, right, a lieutenant colonel in the Air Force Reserve, recently was honored as the most outstanding Reserve Officer in the Air Force Academy's Liaison Officer Program. The award was presented by Maj. Gen. William Lyon, left, Commander of Air Force Reserve, during the awards banquet at the annual liaison officer coordinator conference recently held at the Academy.



Clifford J. Lawrence, right, a colonel in the Air Force Reserve and overall project officer for the Utah State AFA's annual Air Force Academy Day and Air Force Academy Appointee Banquet, accepts a plaque from Lt. Gen. James R. Allen, left, Superintendent, USAF Academy, designating him the outstanding Air Force Academy Liaison Coordinator in the nation. Colonel Lawrence also was awarded the Air Force Commendation Medal for innovative and dynamic leadership.



Lt. Col. Uri Yaari, left, Assistant Israeli Air Force Attaché at the Israeli Embassy in Washington, D. C., was the guest speaker at a recent meeting of AFA's Llano Estacado Chapter in the Cannon AFB, N. M., Officers' Club. Colonel Yaari is shown visiting with, from left, Chapter President Owen Huffaker; Col. Peter Kempt, 27th Tactical Fighter Wing Vice Commander; and Col. James Ryan, 27th Combat Support Group Commander.



During the Queens Chapter's annual luncheon in the International Hotel at the JFK International Airport, Jamaica, N. Y., an AFA chapter citation and membership were presented to CAP Cadet 2d Lt. Lorraine C. Swife, left, who was chosen the Outstanding CAPer in Queens. Chapter President Ruth Stern, right, made the presentation with the assistance of Past Chapter President Edward Keil, center.

# chapter and state photo gallery



During a joint meeting of the Albuquerque, N. M., Chapters of the Air Force Association and the Reserve Officers Association, Don Frank, left, President of AFA's Albuquerque Chapter, presented an AFA chapter citation to Dr. Ted Marrs, center, a former Special Assistant to President Ford, in appreciation of his many contributions to the Air Force and the Air Force Association. Maj. Gen. J. Milnor Roberts, right, Executive Director of the Reserve Officers Association, was the guest speaker.



Maj. John Gura, left, Chief, USAF Midwest Office of Information; Al Field, center, President, AFA's Chicagoland Chapter; and Bob Burckle, right, Vice Chairman, Illinois Aerospace Education Committee, examine the remnants of a Russian satellite that had been tracked by NORAD's Spacetrack System and survived reentry to earth. The trio is part of a group of Chicago area civic and AFA leaders who recently visited NORAD and the Air Force Academy.

Illinois State AFA President Hugh Enyart, right, presents Rick Monday, first baseman for the Chicago Cubs, an AFA citation which reads, "In grateful recognition of his deep sense of patriotism and his keen foresight and quick action in preventing the desecration of the American flag at a public gathering in Los Angeles, Calif., on April 25, 1976." Chicagoland Chapter Publicity Chairman Kathleen Miley then presented Mr. Monday an Honorary Membership in the Chicagoland Chapter. The presentations were made during ceremonies at a late-season game.



Col. Garvin McCurdy, Office of the Deputy for Surveillance & Navigation Systems, Electronic Systems Division (AFSC), Hanscom AFB, Mass., conducted a defense posture briefing for members of the Amoskeag Chapter during a recent dinner meeting in Manchester, N. H. Shown are, from left, R. L. Devoucoux, Vice President for AFA's New England Region; Colonel McCurdy; New Hampshire State AFA President William W. McKenna; and Chapter President John Ulricson.

# MOVING?

Let us know your new address 6 weeks in advance, so you don't miss any copies of AIR FORCE.

Your Name

(PLEASE PRINT)

New Address

(CITY)

(STATE)

(ZIP)

Mail To:

**Air Force Association  
Attn: Change of Address  
1750 Pennsylvania Ave.,  
N.W.**

**Washington, D. C. 20006**

Please include mailing label.

**ALMOST EVERYONE  
reads**



**AH**  
AEROSPACE  
HISTORIAN

Send for your free sample copy to:  
**AEROSPACE HISTORIAN (AFA)**  
Eisenhower Hall  
Manhattan, KS 66506, U.S.A.

## AFA News photo gallery



Brig. Gen. Jack Watkins, Commander, 45th Air Division (SAC), Pease AFB, N. H., was the guest speaker at the recent Salute to the Air Force and to the Air Force Association, cosponsored by the Air Force Mothers', Greater Pittsburgh, and Joe Walker Chapters. Master of ceremonies was Pittsburgh news commentator Dave Kelly. Shown are, from left, Lt. Candy Silver, Information Officer, 171st Refueling Wing, Pennsylvania ANG; Air Force Mothers' Chapter President Mary Coyne; AFA National Director Bob Carr; General Watkins; Greater Pittsburgh Chapter President Tillie Metzger; and William Rapp, Vice President for AFA's Northeast Region.



A total of \$500 in prize money from the Robert H. Goddard Chapter's recent golf tournament at Vandenberg AFB, Calif., was donated in the name of the tournament winners to the Lompoc Chapter of the American Heart Association, the Vandenberg Big Brothers program, and to other local charitable organizations. Chapter Past President Bob Hull, left, is shown presenting winners' certificates to first-place winners Fon Randrup, center, and Joe Mathis.

# 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): **Dwight M. Ewing**, P. O. Box 737, Merced, Calif. 95340 (phone 209-722-6283).

**COLORADO** (Aurora, Boulder, Colorado Springs, Denver, Ft. Collins, Grand Junction, Greeley, Littleton, Pueblo, Waterton): **Edward C. Marriot**, 11934 E. Hawaii Cir., Aurora, Colo. 80012 (phone 303-934-5751).

**CONNECTICUT** (East Hartford, North Haven, Stratford): **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 302-697-6943).

**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): **John H. deRussy**, 529 Andros Ln., Indian Harbour Beach, Fla. 32937 (phone 305-773-2339).

**GEORGIA** (Athens, Atlanta, Rome, Savannah, St. Simons Island, Valdosta, Warner Robins): **James D. Thurmond**, 219 Roswell St., Marietta, Ga. 30060 (phone 404-422-7452).

**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**, 4055 Kingman, Des Moines, Iowa 50311 (phone 515-255-7658).

**KANSAS** (Topeka, Wichita): **Albin H. Schweers**, 7221 Woodward St., Overland Park, Kan. 66204 (phone 816-374-4267).

**KENTUCKY** (Louisville): **Charles R. Head**, 9412 Habersham Dr., Louisville, Ky. 40222 (phone 502-425-9237).

**LOUISIANA** (Alexandria, Baton Rouge, Bossier City, Monroe, New Orleans, Shreveport): **Norman L. Gunn**, 4510 Willowick Blvd., Alexandria, La. 71301 (phone 318-487-2431).

**MAINE** (Limestone): **Alban E. Cyr**, P. O. Box 160, Caribou, Me. 04736 (phone 207-492-4171).

**MARYLAND** (Andrews AFB, Baltimore): **James W. Poutney**, P. O. Box 31, Garrison, Md. 21055 (phone 301-363-0795).

**MASSACHUSETTS** (Boston, Falmouth, Florence, Hanscom AFB, Lexington, Taunton, Worcester): **Frederick J. Gavin, Jr.**, 38 Tremlett St., Boston, Mass. 02124 (phone 617-282-2059).

**MICHIGAN** (Detroit, Kalamazoo, Lansing, Marquette, Mount Clemens, Oscoda, Petoskey, Sault Ste. Marie, Southfield): **Dorothy Whitney**, 3494 Orchard Lake Rd., W. Bloomfield, 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): **Jack R. Thibaudeau**, P. O. Box 2247, Great Falls, Mont. 59403 (phone 406-727-3807).

**NEBRASKA** (Lincoln, Omaha): **Lyle O. Remde**, 4911 S. 25th St., Omaha, Neb. 68107 (phone 402-731-4747).

**NEVADA** (Las Vegas, Reno): **Dale O. Smith**, 3055 Heathridge Ln., Reno, Nev. 89502 (phone 702-786-7791).

**NEW HAMPSHIRE** (Manchester, Pease AFB): **William W. McKenna**, RFD #5, Strawberry Hill Rd., Bedford, N. H. 03102 (phone 603-472-5504).

**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): **Leonard Schiff**, 246 Franklin Ave., Cliffside Park, N. J. 07010 (phone 201-861-2950).

**NEW MEXICO** (Alamogordo, Albuquerque, Clovis): **William J. Denison**, 2615 Vista Larga Ave., N. E., Albuquerque, N. M. 87110 (phone 505-264-1733).

**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): **Edward H. Nett**, 1449 Ambridge Rd., Centerville, Ohio 45459 (phone 513-461-4823).

**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, Harrisburg, Homestead, Horsham, King of Prussia, Lewistown, 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**, Box 374, Charles-town, R. I. 02813 (phone 401-364-6019).

**SOUTH CAROLINA** (Charleston, Columbia, Greenville, Myrtle Beach, Sumter): **Roger K. Rhodarmar**, 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 (phone 605-342-3128).

**TENNESSEE** (Chattanooga, Knoxville, Memphis, Nashville, Tullahoma): **Thomas O. Bigger**, ARO, Inc. (SE/WA), Arnold AFS, Tenn. 37389 (phone 615-455-2611, ext. 247).

**TEXAS** (Abilene, Austin, Big Spring, Commerce, Corpus Christi, Dallas, Del Rio, El Paso, Fort Worth, Houston, Kerrville, Laredo, Lubbock, San Angelo, San Antonio, Waco, Wichita Falls): **E. F. Faust**, 1422 E. Grayson, San Antonio, Tex. 78208 (phone 512-223-2981).

**UTAH** (Brigham City, Clearfield, Ogden, Provo, Salt Lake City): **James H. Taylor**, 629 N. 1st E., Farmington, Utah 84025 (phone 801-825-9511, ext. 2373).

**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): **John Pilot**, 807 Whitney Rd. N. W., Apt. A306, Roanoke, Va. 24012 (phone 703-563-5879).

**WASHINGTON** (Port Angeles, Seattle, Spokane, Tacoma): **Margaret A. Reed**, P. O. Box 88850, Seattle, Wash. 98188 (phone 206-575-2875).

**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): **Tom Watson**, 908 Arapahoe, Cheyenne, Wyo. 82001 (phone 307-638-3348).



Bob Stevens'

# "There I Was ..."

TAKING A YOUNG NEWLY-MINTED, and OFTEN TIMID AVIATOR and MOLDING HIM INTO A ROARING TIGER OF A FIGHTER JOCK REQUIRES A LOT OF PATIENCE, PRACTICE and PRUDENCE ...ASK ANY R.T.U. INSTRUCTOR (WHO STILL HAS ALL HIS MARBLES).

DAMMIT! LT. YA GOTTA BE MORE AGGRESSIVE!

EVERY MAN A TIGER!

1ST WEEK

YOU CALL *THAT* A DIVE BOMB RUN? MY GRANDMOTHER'S GOT MORE GUTS!!

2ND WEEK

OKAY, PUSSYCAT, SO YER GETTIN' WARM-HOW 'BOUT KEEPIN' YER G\*WINGTIP OUTTA MY LAP THIS TIME?

FIGHTER PILOTS DO IT BETTER

3RD WEEK

OKAY OKAY LT.! THAT'S LOW ENOUGH!

4TH WEEK

Oooh THE G's! -- AND THAT KID ON MY TAIL AGAIN! I MUST BE SLIPPIN'!

5TH WEEK

HMMM, TOO BAD. HE SEEMED LIKE A GOOD MAN, TOO.

HEE HEE HE TRIED TO KILL ME!

EVERY MAN A TIGER?

6TH WEEK

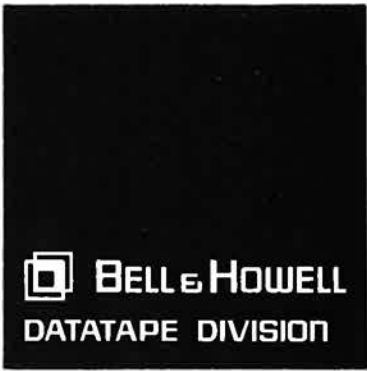
BIG 224 PP BOOK OF "THERE I WAS..." HARDBOUND, ONLY \$10.95 CHECK OR M.O. VILLAGE PRESS, BOX 310, FALLBROOK, CA. 92028

THANKS TO LT WILLY WILSON & CAPT TONY BULAT-ARIZ ANG Bob Stevens

Right now, Bell & Howell gives you the industry's largest selection of **STANDARD instrumentation magnetic tape recorder/reproducers** — for wideband direct, FM, and digital high density operation in airborne as well as shipboard, portable and laboratory environments. □ Having such a selection will save you time and money. The Space Shuttle program, for example, has chosen the field-proven MARS™ Modular Airborne Recorder for use on the avionics package and booster and the M-14G militarized portable recorder/reproducer for the ground simulator. □ Selecting Bell & Howell recorder/reproducers also assures you of the latest available technology. Bell & Howell is the only manufacturer, for example, to offer standard 42 track performance and 80 megabit/second digital high density capability. □ Depth of standard products plus technological leadership — only Bell & Howell can give you both.



Right now.

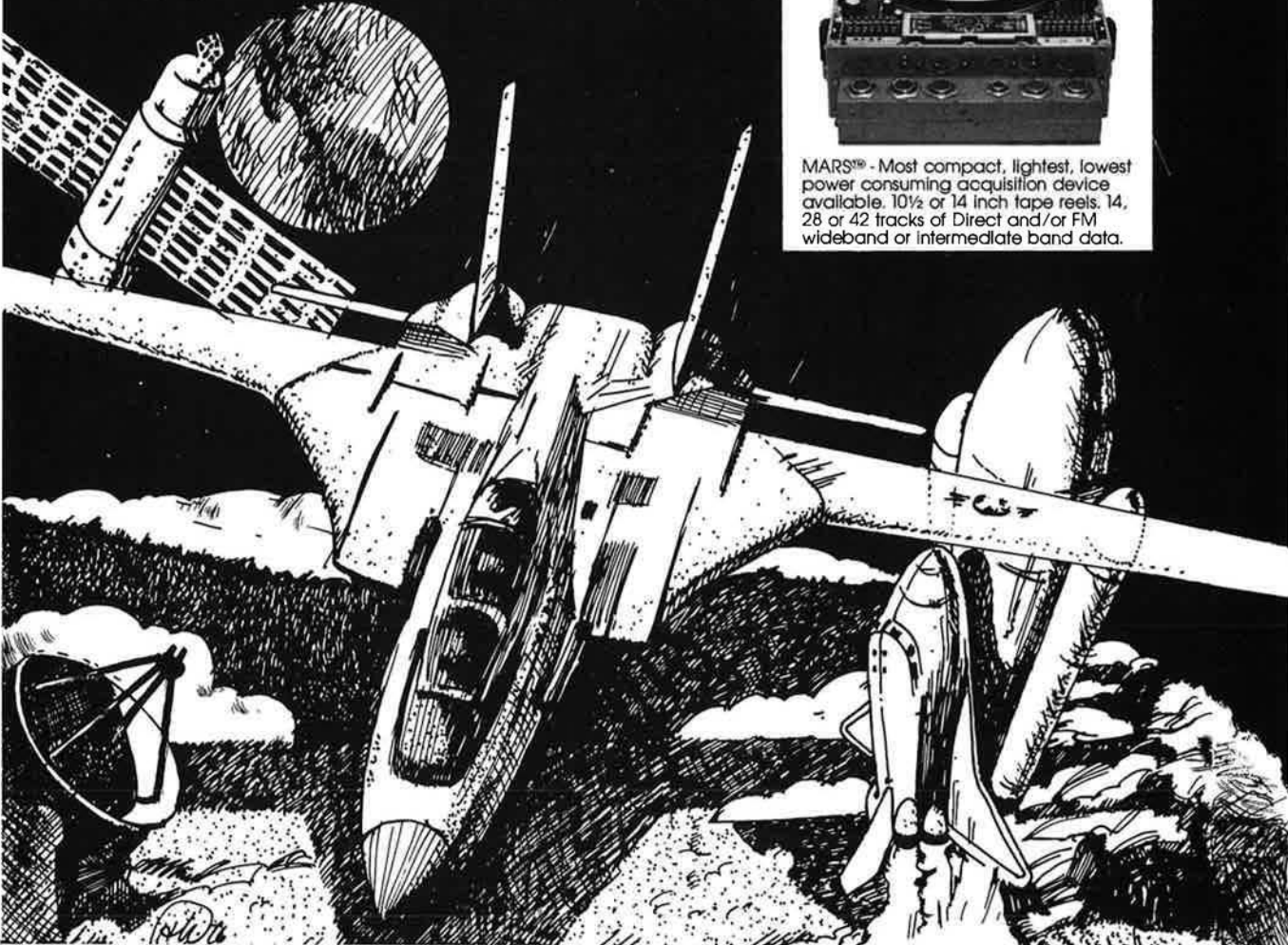


MARS and M-14 are trademarks of Bell & Howell Company. DATATAPE is a registered trademark of Bell & Howell Company.

# AIRBORNE DATA TAPE RECORDER/REPRODUCERS



MARS™ - Most compact, lightest, lowest power consuming acquisition device available. 10½ or 14 inch tape reels. 14, 28 or 42 tracks of Direct and/or FM wideband or intermediate band data.



# Getting muscle to the front.

The USAF/McDonnell Douglas YC-15 is a tactical STOL transport prototype. It can fly 40% faster than the C-130 it is designed to replace. It can take off or land on short unimproved combat airstrips with typical payloads of:

6 cargo pallets and 40 troops at one time.

Or, a 203 mm (8-inch) self-propelled howitzer.

Or, a 175 mm self-propelled gun.

Or, an M113A1 armored personnel carrier, an M551 armored recon/airborne assault vehicle, and a jeep.

Or, 8 jeeps.

Its mission? To help the U.S. Army get muscle when and where it needs it.

At the front.

**The YC-15**  
MCDONNELL DOUGLAS



USAF 01876

