OCTOBER 1973 / $1

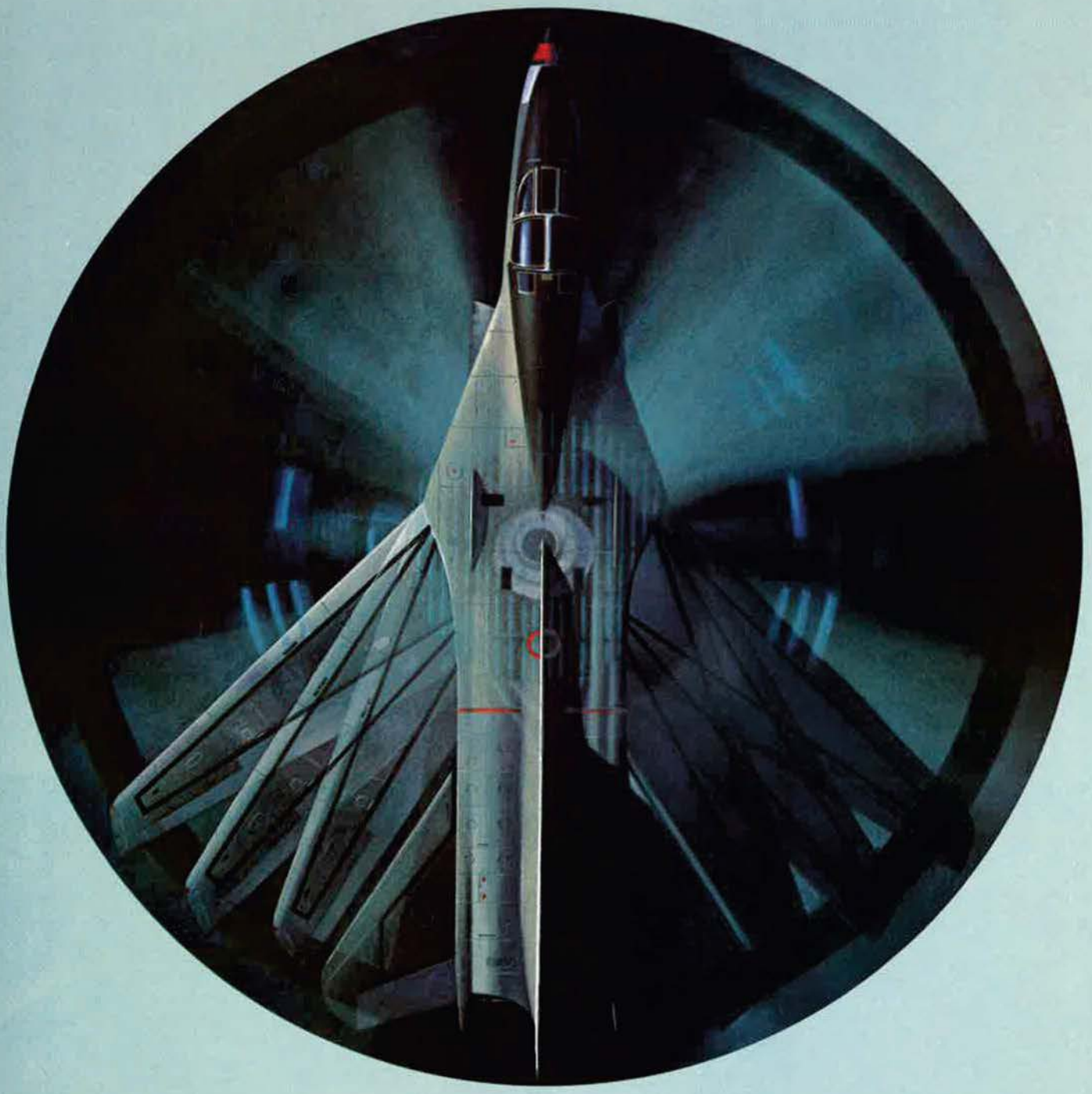
# AIR FORCE

PUBLISHED BY THE AIR FORCE ASSOCIATION

MAGAZINE

## USAF's Remotely Piloted Aircraft Take on Tough New Missions

# Garrett considers the possibilities



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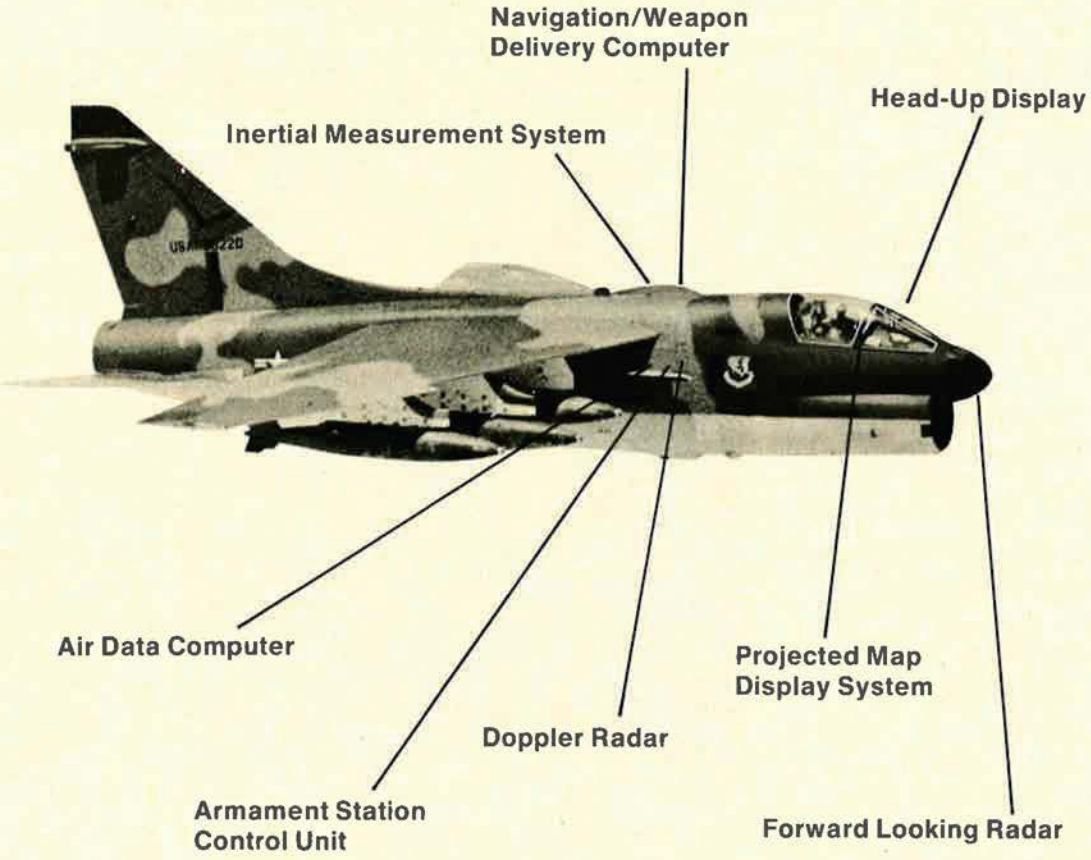


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VOUGHT SYSTEMS DIVISION
LTV AEROSPACE CORPORATION

AIR FORCE MAGAZINE

PUBLISHED BY THE AIR FORCE ASSOCIATION

VOLUME 56, NUMBER 10

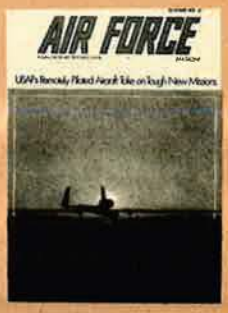
OCTOBER 1973

## THIS MONTH



THIS MONTH'S COVER . . .

*Remotely Piloted Vehicles have been operational for some time, mostly as recce aircraft. But now USAF plans to extend their capability to a strike role. See special report beginning on p. 24.*

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**AIR FORCE Magazine** (including SPACE DIGEST) is published monthly by the Air Force Association, Suite 400, 1750 Pennsylvania Ave., N.W., Washington, D.C. 20006. **Phone:** (202) 298-9123. 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; $2 additional for foreign postage. Single copy $1. Special issues (Spring and Fall Almanac Issues) $2 each. **Change of address** requires four weeks' notice Please include mailing label. Publisher assumes no responsibility for unsolicited material. 

# "Lost time is never found again."

*John H. Aughey.*

# SRAM.
# 600 missiles to the U.S. Air Force.
# And every one on time.

Boeing turned over the first Short Range Attack Missile to the Air Force on March 1, 1972.

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SRAM deployment to B-52s and FB-111s of the Strategic Air Command also is right on schedule.

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SRAM is just one example of being on time. Our most consistent on-time record is 11 straight years with Minuteman. Our latest Minuteman assignment came in $4,515,000 under cost target.

BOEING

# The Shadows of Détente

By John L. Frisbee, EXECUTIVE EDITOR, AIR FORCE MAGAZINE

IN HIS August editorial, the Editor of this magazine commented on the euphoric elements of détente that were spotlighted during Mr. Brezhnev's spring visit to Washington—trade agreements, statements of mutual intent, and so on. All the while, the military, technical, ideological, and economic threats that have to be dealt with before a genuine and lasting détente can be achieved were relegated to the shadows.

The shadows have been partially dispelled in the intervening months. Some of the light has come from a quite unexpected source—American scientists, humanists, writers, and commentators who are generally considered to be liberals. These influential opinion-makers traditionally have been quick to downgrade the Soviet threat, enthusiastic and uncritical supporters of détente, and consistently critical of our defense policies.

The pivot on which America's liberals have done their turnabout is the current Kremlin-directed persecution of Soviet intellectuals who have dared to question the system. A wide and thorough Soviet crackdown has centered on the USSR's leading novelist, Alexander Solzhenitsyn, and the Russian physicist, Aldrei Sakharov, who was instrumental in developing the Soviet H-bomb. In an unprecedented press conference at his Moscow apartment on August 21, Sakharov warned the West against entering into a détente on Soviet terms. He believes that extending credits and technical assistance to the Soviet government with few if any strings attached, will only strengthen the Soviet military and increase authoritarianism, secrecy, and isolation, to the peril of free nations.

The fact that a number of intellectuals are losing their enthusiasm for détente does not necessarily make them supporters of US defense policy. Their influence on public opinion does, however, help inject a note of caution into our government's continuing pursuit of what, so far, has been a lopsided détente arrangement. Caution, we feel, is needed. It is becoming more and more clear that, while we have been dealing from a strong bargaining position with Soviet leaders, who are in economic trouble and badly in need of US technology, we have given more than we got in return.

Implicit in Sakharov's warning is a lesson that isn't new, but that we have to keep relearning: Détente does not mean in Moscow what it does in Washington. The Soviet view of détente is tactical (a temporary relaxation of tension in order to gain strength for pursuing long-term goals); our view is strategic (a lasting environment in which individual freedom and national self-determination have a chance to flourish).

We, like the liberals mentioned, are skeptical of a government that jams broadcasts, persecutes dissidents, renews ideological propaganda, and restricts freedom of information and movement while talking détente. But in the final analysis, negotiations should not be keyed to an opponent's domestic situation, but rather to his military capabilities—still the ultimate arbiter in this imperfect world. There is plenty of evidence, some very recent, that Soviet military power is expanding at a disquieting pace. Two examples provide sufficient documentation.

Most noteworthy is Secretary of Defense James R. Schlesinger's revelation on August 17 that the Soviets have achieved a MIRV capability while simultaneously developing four new intercontinental missiles. The implications of these developments and the range of US countering options will be examined in these pages next month.

A second example: On September 7, the authoritative International Institute for Strategic Studies released its 1972–73 analysis of "The Military Balance," which we will publish in this magazine in December.

The Institute estimates that the Soviet defense budget, publicly announced to be some eighteen billion rubles, or about $9 billion, actually falls between $87 and $90 billion, compared to the current (FY '73) US defense budget of $80.9 billion. One wonders why this backbreaking effort by a nation with a GNP half that of the US if the Soviets are sincerely dedicated to a meaningful détente. The wonder is increased by Secretary Schlesinger's judgment that Soviet defense spending has been growing at an annual rate of three percent in constant rubles while the US now spends considerably less in constant dollars than we did a decade ago.

We are hopeful, though not exactly optimistic, that a secure "strategic" détente can be achieved. It will take much time, patience, and public support based on a realistic evaluation of the military/political balance. Détente can be reached safely only through much tougher US bargaining than has taken place thus far, backed by military forces that have not been allowed to continue their decline toward inferiority.

In his second State of the Union message, President Nixon said that the US is "already at the razor's edge in defense spending"; that further cuts would be "dangerously irresponsible." We agree, and we oppose such cuts.

We urge, also, that the still substantial US bargaining power be used more effectively in future negotiations with the USSR than it has been in the past. ■

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Hercules is helping build our nation's economy by bringing in more than $1 billion in foreign payments.

So far, over 1200 Hercules have been sold to the U.S. and other countries. They buy Hercules because it can do a lot of things other planes can't.

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Once it lands, Hercules needs no fancy ground-handling equipment to unload. Its huge rear doors (9' x 10') open and a rear ramp lowers to the ground. So bulldozers, trucks and tractors can be rolled out intact and go right to work.

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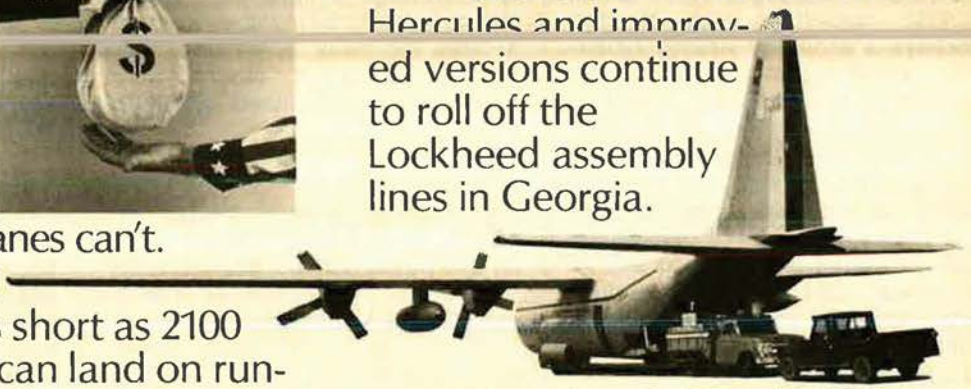
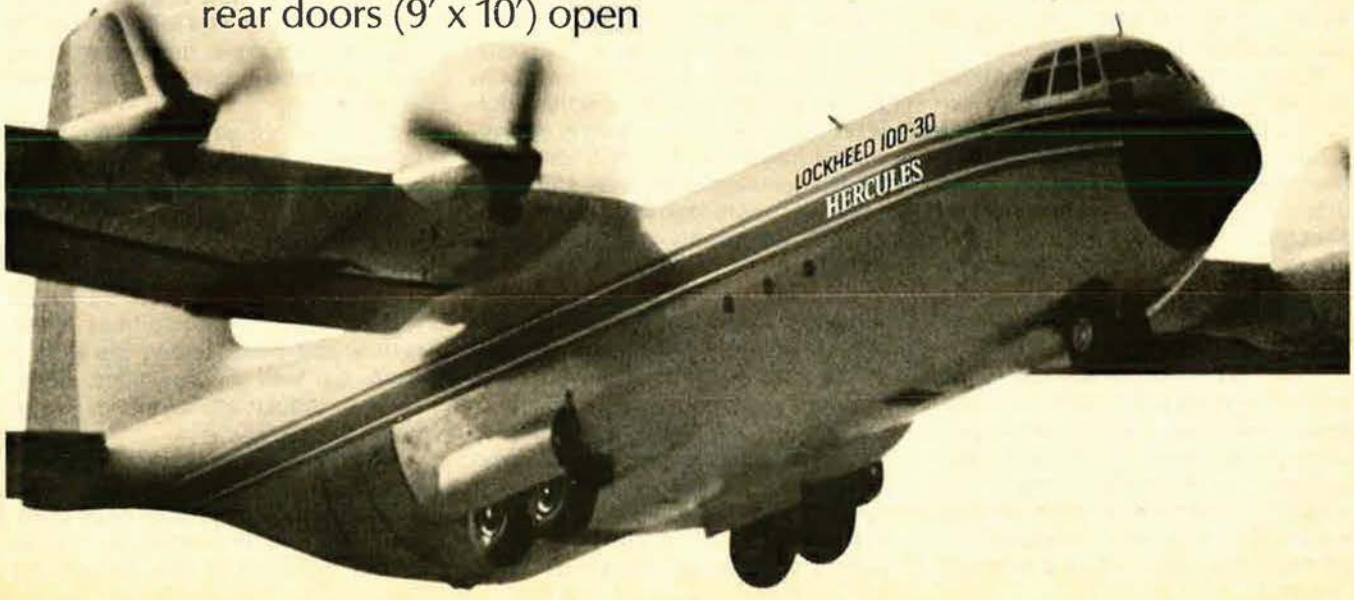


Hercules: helping build 31 foreign nations, while it's helping build our nation's economy.

**LOCKHEED-GEORGIA**
A Division of Lockheed Aircraft Corporation,
Marietta, Georgia



# Airmail

**One of Our Editors Is Missing!**
*Gentlemen:* Enclosed you will find two Xerox copies of photographs, one of which appeared in your publication and the other in *Aviation Week & Space Technology.*

I would be interested in knowing which is the original photograph and why the other was altered.

Sebastian Pagliarello
Hartford, Conn.

• *Reader Pagliarello has a sharp eye. The picture to which he refers appeared in the August issue of* AIR FORCE *magazine, page 29, and portrays a group of visiting American aerospace writers standing in front of a Soviet Tu-144 (SST) at the manufacturing facility at Voronezh. The same picture appeared in the June 25 issue of* Aviation Week, *page 15, with James E. Skinner, News Director of* Aerospace Daily, *cropped from the left end of the photo, and our Senior Editor, Edgar Ulsamer, carefully airbrushed out, for reasons that are not clear to us.*—THE EDITORS.

**Opposing Arguments**
*Gentlemen:* As an AFA member, I urge you to vigorously oppose DoD's retirement proposal. Here are my *personal* views.

DoD argues that pay cannot rise at its past rate, yet says that since pay *can be expected to continue to be competitive,* the notion of "deferred compensation" (the retirement system) is no longer justified.

If pay is not expected to continue to rise as it has—and there is evidence that some people are taking a hard look to see that it doesn't—then it won't stay competitive, and that's reason to *increase* other benefits.

Are costs too high? The following is from the report to the Secretary of Defense by the DoD Retirement Study Group:

". . . retirement costs under the present system will initially increase, level, and then decline as a percentage of both GNP and DoD budget. . . . Projected costs of the present retirement system, though substantial, will not represent an unreasonable demand as a percentage of either the GNP or DoD budget—if the present system is not too costly today, it should not be too costly in the future."

The report shows costs leveling off to eight percent in FY 2000. Eight percent of a civilian corporation's budget at that time is not considered too high.

Defense holds up its proposal as a personnel management tool. Yet the plan is not in tune with the personnel policies of all the services. It is *"fundamental"* to DoD's intent to encourage a thirty-year career. Yet only a limited number ever get to stay for thirty. Even under the DOPMS legislation, tenure would *still* not be guaranteed for thirty years.

The plan offers no incentive anyway. DoD would increase the retirement multiplier to seventy-eight percent at thirty years of service. Yet an E-9 would only get $33 more per month (present pay scales) at thirty years. Most have to work after "retirement," and, after thirty years, they enter the job market at a less advantageous age. The extra money will not be a credible incentive.

Here are some other points:

The proposed cut in the retirement multiplier for twenty years of service to thirty-five percent is a thirty percent *cut in pay,* not fifteen percent (*e.g.,* a $500 annuity becomes $350—a thirty percent loss).

The proposal has a "save-pay" clause that is misleading. Here's why: DoD, unlike most economists, does not use "current" or "constant" dollars. It uses absolute dollars. In terms of *purchasing power,* the GI loses. (An E-7 with ten years in at implementation who steps out at twenty years loses $60 per month; an O-5 at twenty-six years loses $110.)

Civilian retirement is figured on *total* pay. Under Defense's plan, one would get only twenty-six percent of his total pay at twenty years.

Here's a potentially serious shortcoming to Social Security integration. The proposal does not take away Social Security payments. It reduces one's retirement annuity at age sixty-five by a percentage resulting from what the government kicked in during military service for Social Security.

Will that percentage remain constant? One can posit a time when Social Security benefits will double. When benefits increase, will a GI's retirement annuity be reduced more? (One recent CBS News projection showed Social Security payments at $1,500 per month by the year 2000.)

"Vesting," or the plan to pay something to all who get out either voluntarily or involuntarily after either five or ten years of service, is likely to aggravate the already irksome problem of keeping highly qualified people on board. An option to get out with pay may hasten the exit of those DoD needs most.

In its pamphlet to the troops, Defense says it would average "basic pay during [the] last 12 months preceding retirement." What about the enlisted man who held a commission and now may retire in the highest grade held? It's unlikely he held that grade during his last twelve months. Yet the difference in pay would be significant. Does he fall under "save pay"? It is a situation that could not be answered at the briefing I attended.

DoD hasn't made *public* specific names of companies to which it has compared its plan. It also has not made public any data on projected civilian benefits for the fifteen/twenty-year period after implementation when savings will accrue. By the time we save money, we may find ourselves behind the power curve again!

DoD has not addressed the trend in organized labor to concentrate more these days on fringe benefits —especially in a controlled economy, when wage guidelines or controls exist.

I recommend AFA press in all forums for DoD to address these issues and make *public* the data it used as well as specifics about civilian industries to whom we've been compared.

If there are sound answers to the issues I've raised, I'd like bluesuiters and Congress to hear them. Once any law is passed, we'll have to live with it. The time to be thor-

ough, open, and honest is now! Let's not assume anything!

Maj. Robert W. Hunter
Annandale, Va.

**Ve Vun Dis Vun Anyvay**

*Gentlemen:* . . . The anecdote, "Vors Are Not Vun Dis Vay," on page 59 of the August issue, submitted by Dr. Murray Green, placed General Knudsen and Mai. Robert S. McNamara at Wright-Patterson AFB, Ohio, sometime before the invasion of North Africa on November 8, 1942.

The facts are that General Knudsen was Director of Production in the office of the Under Secretary of War in Washington, D. C., from 1942 to 1944 and did not move to Wright-Patterson to take over the newly established Air Technical Service Command until September 1, 1944. Meanwhile, in 1942 Robert S. McNamara was teaching business administration at Harvard. He didn't enter the AAF until 1943, when he was given a direct commission as a captain. . . .

Allan R. Scholin
Tampa, Fla.

*The author replies:*

I am grateful to Allan Scholin for raising that point of order about my published anecdote.

The source of the story is a retired major general now living in Colorado Springs. We taped an interview—with his permission, of course—in connection with my work on General Arnold. Today, my source confirmed by telephone the story as you printed it in every detail save the date it took place.

He apologized for that and said that some events in his wartime career were so hectic they tended to telescope in his memory. The General is very certain that the briefing took place many months into his tour at Wright Field, as he would not have had the know-how or the courage to ask McNamara such a pointed question in a crowded conference room earlier in his tour.

My source is quite certain that the briefing preceded a major amphibious operation in the European Theater, and is now disposed to believe that it took place around February or March 1944, which would place it in time during the logistic buildup for OVERLORD. If that is true, it would make for a better story of Major McNamara's neat conception of military logistics: using up the last bomb dropped by the last aircraft on the last day of the war.

Referring to Mr. Scholin's further argument that General Knudsen didn't take over ATSC until September 1944, my source said that General Knudsen made some trips to Dayton before he took over the whole supply setup. He seems firm on placing the date before September 1944, especially when I pointed out that no maior amphibious operations in ETO (except for the Rhine crossing) occurred after that date.

Many humble apologies. Lengthy explanations always spoil a good story. However, a full explanation seems necessary to straighten out any readers who still care.

May I say that in case I am required to return the $10 payment for the anecdote, please be informed that I sent $5 to my informant, delivered to him in a suitcase, in small bills, by a third party, in a telephone booth at the foot of Pikes Peak. Moreover, he is prepared to deny it.

Murray Green
Silver Spring, Md.

**Military Medical Coverage**

*Gentlemen:* Your article, "Holding the Line on USAF Health Care," [by Maj. Robert W. Hunter], in the August '73 edition, fails to deal with the underlying multitudinous problems that prevent the retention of qualified medical doctors in all of the military services.

The first and most important decision that must be made by all of the military services is: "Should the military services provide medical care to dependents and retired personnel or should these patients be referred to appropriate civilian facilities through the CHAMPUS Program?" No one questions the validity of providing this fringe benefit to members of the military services; however, it makes little sense to bring pediatricians, obstetricians, and other specialties into the military to perform services they can perform more efficiently and at less cost to the government in their own civilian offices.

Now is the time that the military services should make the cutting decision to provide full medical coverage for all dependents and retired personnel under the CHAMPUS Program with no deductible or copayment factor involved. A recent HEW study, "The Cost of Standard Medical Services Under Alternative Delivery Systems," October 1972, has shown conclusively that care in private physicians' offices is cheaper and more efficient than that provided in clinics, regardless of who sponsors the clinic.

When the services are willing to stop the empire building, stop the profusion of duplicate hospital facilities, and limit the medical care that the active services must provide to active-duty members only, only then will we bring the demand in line with the projected supply of physicians who choose to be military doctors. Only then will military doctors be true military officers and not displaced civilians handling civilian dependents and retired personnel.

Maj. Edward R. Jenkins,
MC, USAFR
Assistant Clinical Professor,
School of Medicine
University of California—Davis
Davis, Calif.

**More Than One First**

*Gentlemen:* John Frisbee's fine article on "The A-7D in Combat" [August '73 issue], notes that the 354th was the first unit to use the A-7D in combat. Coincidentally, the 354th was also first to use the P-51 in combat, and with that aircraft, the 354th set the WW II record of downing 701 enemy aircraft in aerial combat.

Sidney G. Depner
354th TFW Historian
Myrtle Beach AFB, S. C.

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## UNIT REUNIONS

**Flying Class 40-G**

USAAC Flying Class 1940-G will hold its annual reunion at the Del Coronada Hotel in San Diego, Calif., November 9–11, 1973. For additional information, contact

Lt. Col. Lee A. Chenoweth
410 Carlotta
Newport Beach, Calif. 92660

**75th Fighter Squadron**

A reunion of the 75th Fighter Squadron, 23d Fighter Group, 14th Air Force, is being held in St. Louis, Mo., October 26–27. For further information please get in touch with

"Mouse" Carter
314 Williamsburg Rd.
Brentwood, Tenn. 37027
Phone: (615) 834-2008

or

Jack Gadberry
43 Young Dr.
Fairborn, Ohio 45324
Phone: (513) 879-1458

# Airpower in the News

By Claude Witze
SENIOR EDITOR, AIR FORCE MAGAZINE

## Peace Also Costs Money

Washington, D. C., September 10

It would be nice to report that the Watergate scandal is fading as a factor in political Washington, but it just ain't so. Congress returned last week from its holiday. The newspapers say Senators and Representatives alike were told at home that the voters are more concerned with their own welfare than they are with what crimes, if any, grew out of the 1972 presidential campaign. But the impact of Watergate continues, however indirectly that impact is felt. In no area is this more obvious than in its effect on the Department of Defense and the impending debate on Capitol Hill over the defense budget.

At the top, there was the cabinet shuffle that moved Secretary Elliot L. Richardson from Defense to Justice and Secretary James R. Schlesinger from the Central Intelligence Agency to Defense. The first man was there three months, the second confirmed as recently as June 28. That puts a strain on leadership, and it was not until ten days ago that Mr. Schlesinger started to speak up, in strong language, about his requirements for Fiscal 1974. There is an extraordinary amount of obfuscation surrounding the early stages of the debate, and it has Mr. Schlesinger, a man with some distinction as a clear thinker, in a state of alarm. The people who are pushing for big defense cutbacks seem to have gained vigor from the sight of an Administration reeling—and there is no other word for it—from the revelations of the Sam Ervin committee. There are flaws in White House credibility, the reasoning goes, and there must be flaws in Pentagon credibility as well.

Such outfits as the Brookings Institution, the Center for Defense Information, the Federation of American Scientists, the Members of Congress for Peace Through Law, and a new band that calls itself the Liberation Task Force are grinding out opinions and ignoring factual records. The Senate Armed Services Committee, alone, is publishing eight heavy volumes of Defense Department testimony in support of the proposed procurement program. The attention paid to it in the press is negligible, considering the time, effort, and talent that went into its compilation.

The Defense Secretary's reaction was to attack the "phoniness" of the critics. He detects "demagoging" and "know-nothingism." He says it is an "enchanting illusion" to think that further cuts can be made without severing muscle in our defense program.

As reported last month, the House passed a defense authorization bill with a figure of $20.5 billion for buying weapons, research, and development. That was $1.5 billion less than the Administration's request. Now we are ready for Senate action. Within the past day, at this writing, its Armed Services Committee has released an authorization report that comes up with a total not far removed from the House recommendation. The Senate committee recommends an authorization of $20,447,968,000. The House has voted an authorization of $20,445,255,000.

Hence, there is little news in the final arithmetic. So far as the Air Force is concerned, attention should focus on what the Armed Services Committee had to say about the B-1 bomber project. The House approved a request for $473.5 million. The Senate committee favors cutting this by $100 million to $373.5 million. It says it is not satisfied with the progress and management of the program and expects USAF to show marked improvement. Some of the comment is the roughest in the memory of this reporter:

"The reduction of $100 million recommended by the committee is not identified with any specific actions to be taken by the Air Force; rather, it is an expression by the committee with its dissatisfaction and serious concern regarding the management of this program. . . . The committee is convinced that the B-1 development program must show marked improvement in both management and cost control and in technical progress if it is to be continued as a viable program. The Air Force is encouraged to seriously consider other alternatives to the B-1 program in the event that such an alternative becomes necessary."

USAF moved to meet the challenge a couple of weeks before the committee came up with its indictment. Changes in the B-1 development schedule had been reported to the committee by Air Force Secretary John L. McLucas in late July. (*See* AIR FORCE *Magazine for September, p. 35.)* Now the Secretary has ordered a review of the program management by a panel headed by Dr. Raymond L. Bisplinghoff, a veteran troubleshooter and official of the National Science Foundation, who once conducted a similar chore in the C-5A transport case. The B-1 study will be completed in early fall.

The tone set in this example is common in the entire authorization report. After acknowledging that "the growth of technology has made the world a much more dangerous place than it was either between the World Wars or between World War II and Korea"—and that this holds even in a period of détente—the report demands "a change in the way we [must] analyze military requirements and budgets." It calls on both "the executive branch and the Department of Defense to admit their mistakes, to make economies and improve efficiency, to resist proposing excessively expensive weapon systems, and to reform their procedures to make economies possible."

The report promises more interference by Congress in the procurement process, because the committee

is not satisfied with the way policy is implemented. The report points again to evidence in the hearing transcripts that there is too much industrial capacity, and demands that the Pentagon "address this situation on a priority basis." It says there is too much concurrency and that concurrency, besides being expensive, lowers our combat capability.

While the Air Force concern will center on the B-1 challenge, the committee is more upset about the Navy's F-14 fighter program. The request was for $703 million to pay for fifty F-14As and ten Marine Corps F-4Js. The House authorized the full amount. The Senate committee recommends a cut of $505 million. It appears to be unhappy with everything about the program except the performance of the F-14 itself. The aircraft is behind schedule, cost has escalated, the contract with Grumman has been tattered, an effort to provide an improved engine has run into development problems. So far as the committee is concerned, the attitude is similar to the one taken on the B-1, despite the fact that the F-14's performance is good. It recommends that the Navy consider an alternative, a new airplane that is smaller and cheaper.

The report says, at one point, that "the committee

# The Wayward Press

*It [the press] cannot insist on policing the power of government without policing itself. It cannot deny the right of outsiders to monitor the power of the press unless it establishes some professional standards of its own.*

It may be hard to believe, but this quotation is from the New York *Times* of September 9, 1973. The author is James Reston, one of the more prestigious editors of that paper.

Mr. Reston's thought is one that has been reiterated, sometimes month after month, in this space over the past four years. The lament of the Wayward Press, as readers know, has been the lack of any standard of professional excellence and any effort to enforce such a standard in the media. We print horrible examples of what results from this anarchy in the newsroom. Our case histories have been taken entirely from newspaper, magazine, radio, and television accounts of matters in the area of national security. Confined as it is to this single small part of the news spectrum, the impact has not staggered the institution we recognize as the Free Press.

It is essential now to depart from the format to report progress. Mr. Reston's declaration, welcomed above, is part of a new trend. It is a trend that has grown, not out of sloppy reporting of defense affairs, but out of the slow realization that the press is becoming a menace to itself.

**Item:** Two journalists—Mrs. Lucianne Cummings Goldberg and Seymour Freidin—used their press credentials to travel with the McGovern campaign party in 1972, while actually working for the Nixon reelection committee. The lady was paid $1,000 a week and collected more than $10,000 in expense money, according to the Washington *Star-News*. Mr. Freidin, who now is head of the Hearst newspaper bureau in London, admits he collected $11,000. Neither one is repentant. They can see nothing wrong with what they did. At least a minority of their press colleagues disagree. Jules Witcover wrote in the Washington *Post:* "In the current climate of Watergate, the press has been riding high. But the press lives constantly with a credibility problem of its own, and the Lucy Goldbergs of this world only compound it."

**Item:** Not satisfied with violating the integrity of grand jury proceedings in pursuit of the Watergate scandal, certain newspapers have gone on to disclose secrets from the investigation of Vice President Agnew's conduct. The Vice President screamed that he was being indicted in the press. The newspapers sympathized with him and did not blame him for being annoyed. "There hasn't been such a suspiciously conspicuous display of civic virtue," wrote David Broder in the Washington *Post*, "since a San Francisco madam led her string of girls to the Red Cross blood bank during World War II." The newspapers that felt sorry for Mr. Agnew said the blame rested entirely with the persons who provided the leaked information. Mr. Broder pointed out that Spiro Agnew is innocent until proved guilty in a court of law, "and that is a process in which the press interferes, not only at its own peril, but at hazard to the most important of everyone's fundamental rights."

**Item:** Mr. Agnew suggested that the leaks were in the Justice Department. Later, and reluctantly, the Attorney General, Elliot Richardson, said he was beginning to think the Vice President was right about that. How did he find that out? Reporters who received the leaks told him they came from the Justice Department. Nobody pointed out that these same reporters are working hard on Capitol Hill these days in behalf of what they call a "shield" law. They want the shield law to protect their leaks.

**Item:** Kenneth Crawford, an esteemed journalist whose career goes back far before the days of advocacy journalism, was sickened by the performance of the White House press corps at a recent Nixon press conference at San Clemente. He found the reporters did not stand up well when exposed to public view. They showed "a degree of hostility unprecedented between the working press and successive Presidents." They were "needlessly offensive." They attempted "to display their own censorious opinions rather than to elicit information. . . . It would seem that the reporter's function either has been changed by television," wrote the veteran Crawford, "or that it is misunderstood by some of the trade's current practitioners." Mr. Crawford thinks the President won that bout, with ease, and suggests he can improve his poll standings by more frequently boxing the ears of his inquisitors.

Scotty Reston's acknowledgment that the press no longer can ignore its monitors is significant. What the profession, if that is what it is, needs most is leadership. There are organizations of the publishers, of the editors, of the newsmen. So far, all of them have lacked the guts to do anything about their own failings or attempt to exercise any form of discipline within the ranks. Next month, the Wayward Press will return to its job as a monitor of national-security news.

is concerned with the status of the F-14B engine program." The engine in question is the Pratt & Whitney F401-PW-400, a derivative of the F100, also intended to power the USAF F-15 air-superiority fighter. Yet, the committee's action on the F-15 stands in contrast to its alarm over the F-14. Where the House cut $330.9 million from the request, adding that it will reconsider when the F100 engine test results are known, the Senate committee recommends full funding for the F-15. Again, the potential performance is called outstanding. So far as the engine is concerned, the committee says, there is nothing unusual about its qualification problems, "nor do they appear unsolvable." Then there is this comment:

"Durability always takes time to build into a new engine, yet invariably it is achieved. Likewise, the engine operating problems [with the F100] are not unique, and they have been mastered before. The F-15 development program is very conservative, with a long flight-test period yet to go before production airplanes are delivered. The committee believes that the Air Force has set forth reasonable and achievable schedules to resolve the current problems within the present development and production schedule and that no change to that schedule is necessary at this time."

There are a couple of items recommended for purchase that the Air Force did not ask for. One is the addition of $158.8 million for a dozen F-111F tactical fighters. The House already had voted to seek $172.2 million for the same purpose. The determination in Congress is to keep the F-111 line hot. The Senate report also inserts $70.1 million to be spent for two dozen A-7D aircraft. The conflict here involves the USAF effort to continue the A-10 program, designed to perfect the air-support mission. The House approved the requested $142.4 million for the A-10. The Senate committee would cut this by $50 million, eliminating all production money and four of ten aircraft for R&D purposes. The report then "directs the Air Force to conduct a flyoff between the A-7D and A-10 to obtain the opinions of operational pilots on their relative suitability for close air support and interdiction." The observation has been made that both the A-7D and the F-111 are made in Texas. The A-10, which would be made in New York and Maryland, was the winner in a prototype contest. In order to keep the A-7D line busy until the "directed" flyoff with the A-10 is held, the committee ordered the unrequested A-7Ds for Air National Guard modernization.

USAF took another scolding in the report on the subject of SCAD (Subsonic Cruise Armed Decoy). It is a decoy designed to help in the penetration to strategic targets by the B-52. The committee, two years ago, told USAF to develop a SCAD that carried a warhead.

"It is generally recognized," the Senate committee said, "that the Air Force has resisted pursuing SCAD with an armed warhead because of its possible use as a standoff launched missile. This application could jeopardize the B-1 program because it would not be necessary to have a bomber penetration if a standoff missile were available as a cheaper and more viable alternative."

SCAD, of course, is subsonic and turbofan powered. But the concept goes back more than fifteen years, to the ALBM (air-launched ballistic missile), first realized in the weapon known as Skybolt. An armed SCAD would not be ballistic; it could carry a nuclear warhead and operate with superior guidance. The committee is critical because, it says, USAF was ordered to develop a SCAD weapon and failed to do so.

Now, the report says, the costs have gone out of sight. At one million dollars a copy, about twice what USAF said it would cost a year ago, SCAD "is hardly a cost-effective value." The total amount requested for SCAD, $72.2 million, was deleted, along with $15.2 million sought by the Navy for its cruise missile, the SCM.

A critical item, of concern to all armed forces, is the report's proposal that all defense forces be reduced by seven percent. The Pentagon would apportion the slash of 156,100 men, with no ceiling on the number of troops overseas. The committee claims this would save $1.6 billion a year.

There are other details in the report worth attention, for which we lack space. President Nixon, only today, has threatened to veto any defense appropriations bill that includes "dangerously irresponsible" cuts.

Meanwhile, détente is being pursued in Moscow by more flagrant suppression of individual rights, already protested by American scientists. And North Vietnam, according to news reports, is building new and finer runways at Khe Sanh, a place we once defended with blood, that is not far from Hué, where the Communists, a few years ago, buried a few thousand citizens alive in trenches.

Peace, in this kind of world, will cost money. ■

# "Success of the Design-to-Cost philosophy

ultimately rests with our ability to predict the impact of trade-offs between performance and price.

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"As systems become increasingly complex, we at Teledyne Ryan are developing parametric estimating techniques to relate costs to historical data on speed, altitude, payload and other performance factors. This, then, supports our detailed estimates.

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# Aerospace World

*News, Views & Comments*

**By William P. Schlitz**

ASSISTANT MANAGING EDITOR, AIR FORCE MAGAZINE

WASHINGTON, D. C., SEPT. 7

It was an historic day for the men of SAC's 72d Strategic Wing, Andersen AFB, Guam—and, in fact, for all US airmen who flew combat in Southeast Asia.

Said Col. Nathaniel Gallagher, Commander of the 72d, "I'm sure that we all have our private emotions and thoughts on this occasion. But one thing we can agree on is that August 15, 1973, is a date we will all remember." It was on that day that US air combat operations ceased in SEA.

The last flight of three B-52s took off from Guam and attacked a truck park and storage area some ninety miles northeast of Phnom Penh in Cambodia.

Crewmen of the "last aircraft" in the final cell of three B-52s were Maj. Richard C. Nelson, aircraft commander; Capt. Mort A. Katz, pilot; Maj. James E. Warren, radar navigator; Capt. James P. Marcotte, navigator; and Sgt. Dana J. Quackenbush, gunner. All were on temporary duty from Blytheville AFB, Ark.

SAC flew its first conventional bombing mission in Southeast Asia on June 18, 1965. Thirty B-52Fs participated.

Summing up eight years of SAC operations in SEA was the dramatic understatement of Lt. Col. John Franta, participating in the premission briefing of the last B-52 crew: "There will have been two cells on targets in front of you. There will be no aircraft following you."

☆

NASA announced that as of now it is all systems go for the third manned Skylab mission—Skylab-4—due for launch from the Kennedy Space Center on or about November 9.

One interesting aspect of the mission is the scheduled observation of the comet Kohoutek, which will be clearly visible from the earth that time of year. In fact, during late December and early January, it is expected to be the brightest object in the night sky other than the moon.

Its most important scientific characteristics, obscured from earth-bound observers by the atmosphere, will be visible to Skylab's specially designed equipment.

In a related matter, US and Soviet space officials agree that all major milestones for the manned Apollo/Soyuz joint flight scheduled to take place in mid-1975 are being met.

Prof. Konstantin D. Bushuyev of the USSR and Dr. Glynn S. Lunney of the US said that:

- Familiarization of US flight crews with Soviet equipment will take place in November 1973 in the Soviet Union.
- Cosmonaut training in the US is tentatively set for April 1974 and February 1975; astronaut training in the USSR will take place in July 1974 and March 1975.
- The final selection of joint experiments will occur in October 1973.

☆

This summer, four Air Force Junior ROTC cadets, representing the winning high school and the two runners-up in the B-1 Presentation Contest sponsored by AFA's Aerospace Education Foundation *(also see p. 76),* were treated to a cross-country trip.

The trip was one of the contest's prizes *(see July '73 issue, p. 102)* and took the cadets to SAC Headquarters at Offutt AFB, Neb.; the Air Force Academy; Los Angeles; and Washington, D. C. (More than 100 high school JROTC units around the world participated in the contest, each preparing a pre-

*Lt. Gen. Robert J. Dixon, USAF Deputy Chief of Staff/Personnel, left, presents the first Career Education Certificate awarded by the Community College of the Air Force to SMSgt. William L. Rushing, as Mrs. Rushing looks on. Sergeant Rushing is a personnel superintendent assigned to the Air Force Recruiting Service at Randolph AFB, Tex.*

*Winners of AFA's B-1 Presentation Contest pose with Gen. John C. Meyer, SAC Commander. From left, USAF JROTC Cadets James Bassich, Paul Graugnard, General Meyer, Charles Knight, and John McCance. On the right is Lt. Col. B. J. Sifford, USAF (Ret.), escort on the contest-award tour (see item).*

*On their trip, which took them from SAC Headquarters to the Nation's Capital, the JROTC cadets stopped at the Air Force Academy and in Los Angeles. Here they pose with Maj. Gen. Douglas T. Nelson, Systems Program Director for the B-1. The four cadets represented their respective units as the contest winners.*

sentation on the role of the B-1 in the nation's deterrent force.)

On the trip, Cadet Charles Knight represented Harrison County High School, Cynthiana, Ky., winner of the contest. Cadets James Bassich and Paul Graugnard of St. Paul's High School in Covington, La., represented the first runner-up. Second runner-up was the Niceville, Fla., High School, represented by Cadet John McCance.

At SAC Headquarters, the cadets discussed their schools' winning entries with Gen. John C. Meyer, SAC Commander, and toured the Command's underground and airborne command posts. Following this, the cadets spent a day at the Air Force Academy.

In Los Angeles, the group visited Rockwell International, prime contractor for the B-1, where they saw the full-scale mockup of the B-1 and were briefed on the bomber's General Electric F101 engine. While in Los Angeles, the cadets also were the guests of AFA at Disneyland.

Ending their trip at Washington, D. C., the cadets were the honored guests at a luncheon attended by AFA's AFROTC Advisory Council and many high-ranking USAF and industry people. Maj. Gen. John D. Roberts, USAF's Assistant DCS/Personnel, addressed the group, and the cadets discussed what the contest and the trip had meant to them.

Lt. Col. B. J. Sifford, USAF (Ret.), aerospace education instructor from the Harrison County High School unit, escorted the cadets on their tour.

☆

Gen. Lucius D. Clay, Jr., has been named to succeed retiring Gen. Seth J. McKee as Commander in Chief of the North American Air Defense Command (NORAD).

General Clay was to assume his new post in October. Previously, he commanded PACAF, Hickam AFB, Hawaii.

General Clay, with more than thirty years in uniform, will also serve as Commander of the Continental Air Defense Command—the US element of NORAD—and as Commander of the Aerospace Defense Command, USAF's component in both NORAD and CONAD.

General Clay will be responsible for the air defense of North America, global space surveillance, and warning of an enemy attack from the atmosphere.

A graduate of West Point, General Clay served in combat areas in Europe during World War II and in

*Gen. Lucius D. Clay, Jr., is succeeding Gen. Seth J. McKee as Commander in Chief of NORAD (see above).*

*General McKee, head of NORAD since 1969, plans to live in Phoenix, Ariz., following his retirement.*

# Aerospace World

Vietnam, where he commanded the Seventh Air Force and was responsible for all USAF combat air strike, air support, and air defense operations in mainland Southeast Asia.

General McKee, with more than thirty-five years of active service, had commanded NORAD since August 1969. A fighter pilot in Europe during World War II, he had been Assistant Vice Chief of Staff, Hq. USAF, before being named CinC of NORAD in 1969. General and Mrs. McKee plan to live in Phoenix, Ariz.

*On leaving NORAD for another post, Canadian Forces Maj. Gen. William K. Carr receives a "Master of Missilery" plaque from USA Lt. Gen. R. L. Shoemaker, Commander of the Army Air Defense Command, Colorado Springs.*

☆

NORAD's new space object identification (SOI) facility at Colorado's Cheyenne Mountain complex went into operation on September 1.

The facility centralizes the essential task of monitoring objects orbiting the earth.

Previously, analysis of radar "signatures" took place at sites operated by the 14th Aerospace Force in NORAD's global Space Detection and Tracking System. The results were then forwarded to Cheyenne Mountain's Space Defense Center for final identification.

Now, through a centralized computer system, the entire program is consolidated. The radar signatures received at remote sites are transmitted over communications circuits directly to the Space Defense Center.

Centralization of SOI operations in Cheyenne Mountain means more accurate, timely, and thorough identification of space objects for NORAD and other agencies. It also cuts the number of people required at outlying radar sites with a saving to the Air Force of perhaps $80,000 in Fiscal Year 1974 and an estimated $370,000 through FY '76.

*Beverly E. Howard, Jr., left, presents his father's Buecker Jungmeister biplane to the Smithsonian Institution's Louis S. Casey. The plane, flown by famed aerobatic pilot Bevo Howard, was reconstructed after Howard Senior's death in a 1971 crash.*

☆

NATO's $300 million, 3,000-mile NADGE computerized air defense system *(see June '73 issue, p. 79)* has now gone fully operational.

With the turning over of the last four radar sites in the eastern Mediterranean, installed by the United Kingdom-based international consortium of electronic firms, NATO now has an integrated system of radar defense that stretches from above the Arctic Circle to Asia Minor.

NADGE (for NATO air defense ground environment) is described as the largest infrastructure project ever undertaken by NATO. It involved building a complex system of radars, computers, and other electronic subsystems to create a radar umbrella over much of Europe.

For all that, there is already talk of improvements: perhaps extension of the system to embrace the shipboard defenses of the US Seventh Fleet on duty in the Med; integration of US defenses; and inclusion in the network of existing radars not yet tied into the system.

☆

You have a flat tire while driving at night and reach for that flashlight you keep for such emergen-

## Index to Advertisers

*Captain Carson, left, uses pilots' talk to explain tricky aerial maneuver.*

### New Staff Member Under EWI Program

This month, Capt. Donald D. Carson joins the editorial staff of AIR FORCE Magazine for a one-year period under the Air Force Education With Industry program.

Captain Carson is a graduate of the Virginia Military Institute, where he was commissioned in 1964. He has completed Squadron Officers School and is an honor graduate of the Department of Defense Information School.

A senior pilot with extensive experience in both fighter-bomber and fighter-interceptor aircraft, he flew 131 combat missions in SEA as an F-105 Wild Weasel pilot. Captain Carson has published many articles on aerial combat tactics (*see March '73* AIR FORCE). His pilot report on the F-106 appears on p. 38 of this issue.

Captain Carson replaces Maj. Robert W. Hunter, who is now assigned as Deputy Assistant for Policy and Programs, Internal Information Division, Secretary of the Air Force.

cies. Of course, it doesn't work—dead or dying batteries.

But—good news—the problem of deteriorating flashlight or radio batteries might be a thing of the past.

GTE Laboratories, Waltham, Mass., working under Navy contract, has produced a "revolutionary compact, high-powered electrochemical cell that lasts many times longer than conventional dry-cell batteries."

It seems that "certain inorganic liquids can be used in alkali metal battery systems both as solvents and oxidizers for the energy source, permitting a dense storage of energy." This energy apparently is only used up when the battery is actually discharging. Shelf life of the battery is said to be extraordinary.

Voltage stability is another characteristic. This means no irritating dimming of a flashlight or fading of a radio as the battery life runs out.

One advantageous feature for military use, according to the Navy, is that the new energy source can withstand temperatures ranging from minus seventy-six degrees to nearly 150 degrees Fahrenheit. Besides its obvious military applications, the battery might be utilized in wristwatches, portable TV sets, cameras, and hearing aids, to mention a few.

☆

Indeed reminiscent of the movie "Fantastic Voyage" is a tiny radio transmitter pill developed by NASA. It, too, is dependent on the effectiveness of a specialized battery—a miniaturized one with a lifespan of between fifty-one and seventy-six days.

Once swallowed, the pill can transmit data about body temperatures deep within the human system. Minute temperature changes may often reveal infections and other ailments, aiding doctors in their diagnoses.

Designed by Ames Research Center, Moffett Field, Calif., the pill has been used to monitor subjects during simulated spacecraft travel.

About the size of a vitamin capsule, the pill transmitter can also effectively broadcast data about other internal body conditions such as stomach acidity, intestinal pressure, or the presence of chemicals in the gastrointestinal tract.

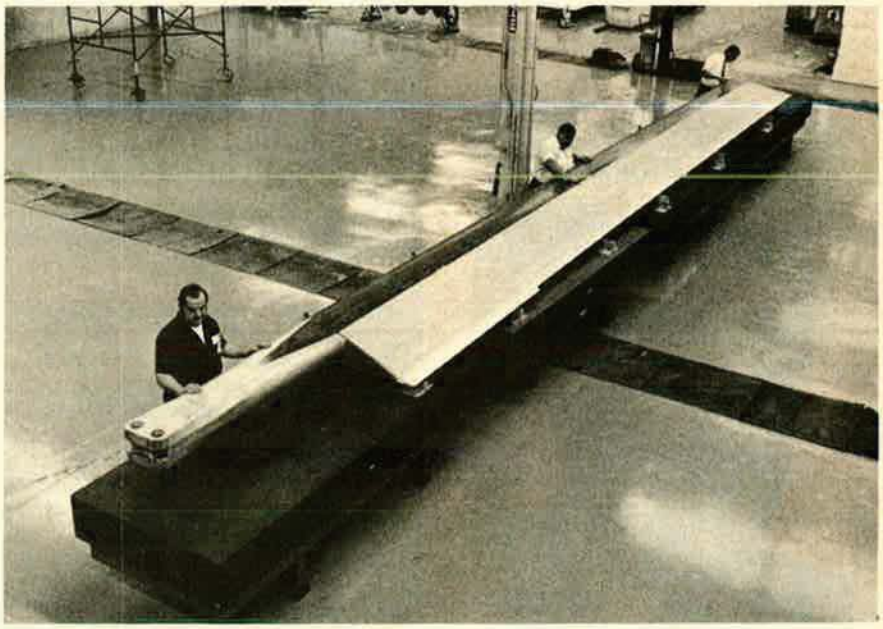
Ames engineers believe that, with continued advances in miniaturization, as many as five factors will be able to be monitored simultaneously by one such device.

☆

USAF has announced program changes for several Reserve flying units for FY '74.

Two units, the 301st and 304th ARRS at Homestead AFB, Fla., and Portland IAP, Ore., respectively, will convert from HH-34 Choctaws to more modern HH-1H Iroquois helicopters in January 1974. Each unit will receive eight. *(See also "The Bulletin Board," p. 81.)*

Another rescue unit, the 302d at



*What you're looking at is neither the world's largest windshield wiper nor straight razor, but "the free world's largest composite rotor blade," according to Boeing Vertol Co., Philadelphia, Pa. The blade was built for US Army's XCH-62 Heavy Lift Helicopter, capable of thirty-five-ton lift.*

# Aerospace World

Luke AFB, Ariz., will convert from HH-34s to CH-3E Sea Kings in April 1974. The unit will be redesignated the 302d Special Operations Squadron and receive six of the CH-3Es. TAC will become the gaining command for the 302d.

The Reserve's only Aerospace Defense Command-gained flying unit, the 79th Airborne Early Warning and Control Squadron, Homestead AFB, Fla., will convert from EC-121D to EC-121T Constellation aircraft.

Five tac airlift units will have equipment authorizations increased from six to eight C-130B aircraft, effective in June 1974: the 919th Tactical Airlift Group (TAG), Eglin AFB, Fla.; 904th TAG, Hamilton AFB, Calif.; 940th TAG, McClellan AFB, Calif.; 926th TAG, New Orleans NAS, La.; and the 905th TAG, Westover AFB, Mass.

Four special ops groups flying A-37s will be redesignated attack groups during the first quarter of FY '74: the 910th Special Operations Group (SOG), Youngstown Municipal Airport, Ohio; 917th SOG, Barksdale AFB, La.; and the 930th SOG and 931st SOG, Grissom AFB, Ind.

In another matter, the Senate Armed Services Committee recently approved legislation that would earmark $70 million to purchase twenty-four A-7Ds specifically for the ANG. If approved by the full Congress and if funds are appropriated, it will be the first direct "buy" authorized for the Air Guard since the Korean War.

☆

In a mystery of thirty years' duration, the wreckage of a B-25 lost during World War II has been discovered. An unusual factor in the case is that the two-engine medium bomber remained hidden all these years in an overgrown and steep ravine near Big Sur in California.

Found by hikers in mid-August,


*A lighthearted Air Force poet is the 8th Tactical Fighter Wing's Capt. John Doerr, who became celebrated throughout SEA as the "Pave Poet" as a result of his whimsical, impromptu recitations over the airwaves to SAC tanker crews and others.*

### Lewis E. Turner

Lewis E. Turner, Acting Secretary of the Air Force (Installations and Logistics), died of a heart attack in August. Mr. Turner, a career civil servant long involved in Air Force affairs, was the recipient of numerous awards, including three USAF Exceptional Civilian Service Awards and an AFA citation in 1969.

### The USAF Family Practitioner

Remember the last time you took a member of your family to a military hospital and got the feeling of being passed from one specialist to another like a battle casualty being triaged in television's "M*A*S*H"?

You didn't think twice about seeing several doctors for your military induction physical, but you probably don't want it for your family. The Air Force doesn't, either. USAF now is developing a family-practice program that will bring patients the personalized general medical care of television's Dr. Marcus Welby. Family practice could change the way of health care throughout the Air Force.

Family practice is the newest of twenty medical specialties recognized by the American Medical Association. This field was created because no one physician was fully trained: (1) to provide primary medical care as an entry point into the health-care system; while (2) providing comprehensive, continuous, integrated medical care for the whole family, including referral to other specialists; and (3) serving as an advisor to the family, not only in the area of health, but also in its associated fields. The family practitioner can take care of ninety percent of the problems that he sees, knows when to refer a patient to another specialist and how to work with the community agencies that may aid his patient.

Model family-practice clinics have been set up at Scott AFB, Ill.; Wright-Patterson AFB, Ohio; and Andrews AFB, Md. At these clinics, a limited number of Air Force families have their own "regular doctor." He takes care of every member of the family, from prenatal checkups and deliveries to medical problems of aging. By limiting the number of families involved, doctors have adequate time for each patient.

The clinics are also involved in training new family-practice specialists so that family practice may be expanded to more bases. Some family practitioners may be trained in aerospace medicine, a natural extension of family medicine in the Air Force.

The Air Force has been pleasantly surprised at how many doctors want to enter family-practice training programs. Many of the newer generation of doctors want a medical practice that includes problems from several areas of medicine, and the reward of caring for a whole family. Entrance into the program has become quite competitive.

Air Force family-practice residents include young officers who have been chosen because they have an interest in the Air Force beyond a two-year draft obligation. This, in part, represents successful planning to increase the retention rate among Air Force physicians and to transform the medical corps into an all-volunteer force. However, increasingly, the young medical school graduate views a military practice with favor. The Air Force has made significant advances in medical research and is keeping up to date in patient care.

*Col. James H. Macia, Jr., the last active-duty member of Doolittle's Tokyo Raiders, was to retire on October 1 after a twenty-seven-year career.*

the plane's debris was strewn over a one-mile area with the remains of what is presumed to be its crew.

Authorities are checking to determine the identities of the ill-fated flyers.

☆

With women moving into many areas that were once considered exclusively the male domain, it was bound to happen. But who would have believed a female paratrooper?

Yes, folks, Joyce Ann Kutsch, nineteen, of Sarver, Pa., will be attending the Army's jump school at Fort Benning, Ga., once she completes basic training at the WAC Center at Fort McClellan, Ala.

Trooper Kutsch joined the Army after completion of a year at Butler Community College because she faced unemployment in her college major of secondary school athletic education. During high school, she participated in basketball, field hockey, track, volleyball, and golf.

After graduation from jump school, the Army said, she'll be qualified to make jumps in emergencies or natural-disaster assistance, or perhaps with the Army demonstration jump team. She is not eligible for combat jumps.

☆

If you will pardon the expression, the US is slowly inching toward conversion of its standards of weights and measures to the metric system.

The metric system is made up of the simple "times-ten" approach: ten millimeters make a centimeter, 100 centimeters make a meter, 1,000 meters make a kilometer. TRW, Inc., in a "Science and Man" report on the subject, points out that ninety percent of the world's population currently is using this system and, with Great Britain planning to convert to metric by 1975, the US will be the only industrial power on earth still measuring in inches, pounds, and miles.

This has and will continue to provide a drawback in the US's ability to compete in the world marketplace. "We no longer set market specifications," says W. Andrew Wright of Sun Oil Co. "The situation is now reversed and is becoming one of the prominent factors in the trade imbalance."

TRW's Dr. A. P. Mattay goes further: "Conversion to the metric system is not simply an economic problem, but a political must."

The cost of converting the US to metric has been estimated at $11 billion, but advocates insist that over a time span of sixteen years the savings in grade-school education alone would make that up.

California's public schools are to be metric by the fall of 1976, and the job of preparing new textbooks to reflect the change is under way.

In industry, General Motors has begun to convert all production facilities to metric, according to TRW, and Ford is well into production of the first US metric engine for its new Mustang.

If and when the metric system is finally introduced in the nation's schools, the generations of school children to come will reap an added benefit: No more fractions!

☆

**NEWS NOTES**—ADC's third annual **weapons loading competition** is set for October 1–6 at Tyndall AFB, Fla., with sixteen active-duty and Air Guard teams contending.

The **403d TAW** (Reserve), Selfridge AFB, Mich., has won a TAC award for its eleven-year accident-free flying record. ■

**By Capt. (Dr.) Douglas Everett, USAF**

It is comforting to the doctor to know that the patient in a military hospital need not worry about expense. The military doctor is also challenged by the exotic diseases to which his patients are exposed.

An important part of the family-practice program is the problem-oriented medical record developed by Dr. Lawrence Weed. This type of record facilitates the management of a patient with medical problems involving several specialties. Each problem is coded so that all patients with a particular problem can be immediately identified. For example, when a consultant who is an expert in diabetes of pregnancy visits the clinic, the charts of all the patients with that diagnosis can be retrieved the day before his visit. He will then be able to evaluate how the cases were handled and make suggestions for improvement.

The problem-oriented medical record has a problem list that acts as an index to the patient's record. This index is important in the Air Force community, where a patient may move from base to base. A family doctor can rapidly become acquainted with the medical history of a new family, and visits to other specialists and the emergency room are cut down. This reduces the number of patient visits, giving each doctor more time to spend with each patient.

But why should the Air Force furnish a "family doctor" when the family will be reassigned to another base every few years? In the civilian community, the family doctor may live in one place his entire life and get to know a family over several generations. The fact that the Air Force is so mobile means that the military family needs the stability of a family practitioner even more than its civilian counterpart. When a young man goes into the armed forces and takes his new wife away from home, he needs a family physician who can help his family make the transition to a strange community. And the family physician will care for and support that family when the sponsor goes away on temporary duty.

In the Air Force, family-practice specialists will take an increasingly active role in providing primary health care to the Air Force community. In many cases, these specialists will be young, career-minded graduates of the Air Force family-practice training programs. Many of the doctors will be flight surgeons, and all will be capable of providing comprehensive, continuous health care to the entire family.

*Captain Everett is a resident in family practice at the US Air Force Medical Center, Wright-Patterson AFB, Ohio. He is a 1968 graduate of the Air Force Academy and was granted his medical degree from the University of Washington School of Medicine in 1972.*

# CHALLENGE:

## Find the most flexible manufacturer o

Whether you want a cheap, simple system or an expensive, sophisticated one, Motorola has a system for the job. One flies mini-drones at sixty knots within 15 miles of control. Another lets an F-4 acting as a chase plane ferry other targets as far as you want. Or, when droned, range 250 miles from control, or weave patterns in the sky with the jet trails of supersonic drones flying under simultaneous control.

We even have a system to tailor our systems to your needs. Because we learned, the hard way, that each range has different requirements due to geography, mission and equipment.

### There's no need to pay for anything you don't need.

Now there's something new. You can get less and pay less. The first generation of the Integrated Target Control System (ITCS) line has been delivered. These stations offer the latest in drone control, tracking and telemetry. But some target drone missions do not require that degree of sophistication. So now we can scale these designs down and configure a more simplified system to meet limited range requirements. Ask about it...or tell us exactly what your needs are and we'll put together a station with only the specific functions required on your range.

For ground control requirements pick and choose hardware from the short range Foxcart system to the long range, full capability multiple drone control AN/TSW-10 station or anything in between. Or for airborne control our capabilities range from simple chase plane units to complete multi-drone airborne stations.

You'll get proven components, sub-assemblies, sub-systems and systems. You'll also get an ITCS system with lots of growth capability... the fastest data rate around... and a console any ITCS controller can handle without refamiliarization. You'll get a system that's more sophisticated than anything except a more expensive ITCS.

For multiple drone control, a production model of Motorola's versatile Totalscope II display can replace plotting boards. This digital display is fully computer-interactive—you can use your mainline computer or the display's internal 16-bit arithmetic register controller—for overlaying real-time sensor data on computer-derived alpha-numerics and graphics.

The fully integrated state-of-the-art AN/TSW-10 multiple dro

And, there are enough options available to gladden a car dealer's heart. But this is not purely kindness on our part. Because in time we expect to update the system designed for today's needs as those needs change Without band-aiding. Without a big hassle if you want options, or without high cost when you want to change

### Some people thought ITCS was too expensive for drone retrofitting.

We now have an airborne package that elimi nates hassle or need for a big budget. One man can make an early model BQM-34A or MQM-34D compatible with ITCS overnight. With the drone staying home for its face-lifting. And the package cost is under $10,000. The same package with a little tinkering before we send it to you works on an MQM-74A, BQM-34E/F or QT 33. It replaces the DRW-29 and TM4-31A, without in

# modern drone control systems.

trol station now in military use.

Take out two boxes. Replace with one of ours that does the work of both, in less space.

terface units. This new unit is now in fabrication. It's just the first of a series. Tell us your needs and we'll give you the operational excellence you need for today and for a decade from today at a price that's surprisingly reasonable.

## What else have we done besides cut ground station and retrofit costs?

We're working with each ITCS customer to customize systems to meet his needs. For example, one range thinks our system is too simple. But we built growth capability into ITCS while it was still on paper, so moving up is easy.

And that's why you can do things with our systems that other people only dream about. You'll be able to fly formation and group flights with one plane flown by a ground controller while a computer makes the rest follow the leader. Preprogrammed flights will be as simple as flicking a switch. Simultaneous control of multiple drone flights is something only ITCS has actually done. And with ITCS you'll even be able to make repeatable flights for weapons evaluation. MICATS, our mini-drone system, fits into four footlocker size suitcases. Even though it's the only integrated system specifically designed for mini-drones with a C-band TV link.

## The advantages of simplifying a complex system.

With our simple systems you get the high technology you want, thanks to our complex ones. Because we've simplified without sacrificing the best points of the big ITCS systems.

**You can get Mil Spec if you need it. You get the best telemetry in the business—a full 102 kilobits—plus the lowest false command probability around. It's $10^{-11}$** even though we only give each command once, instead of wasting critical time with repeats like everyone else. Add our 90 per second frame rate, 1 mil accuracy, and you get far more information to and from your bird... for far finer control, than with any other system. To be exact, we're at least nine times faster than any other system now in military use.


AN/MSW-10 **Fox** Cart control station.

## All you have to do...

is let us know you're interested, and what your needs are. Because unless you do, we'll never know how to turn one of our systems into *your* system. So call (602) 949-3263 or write C.W. "Bill" Swindell, Motorola Government Electronics Division, 8201 E. McDowell Rd., Scottsdale, AZ 85257, USA. Or contact any of our offices in Canada, England, France, Germany, Holland or Italy. If you're involved with a range, targets, or requirements, you'll get data on the system we'll configure to meet your needs.

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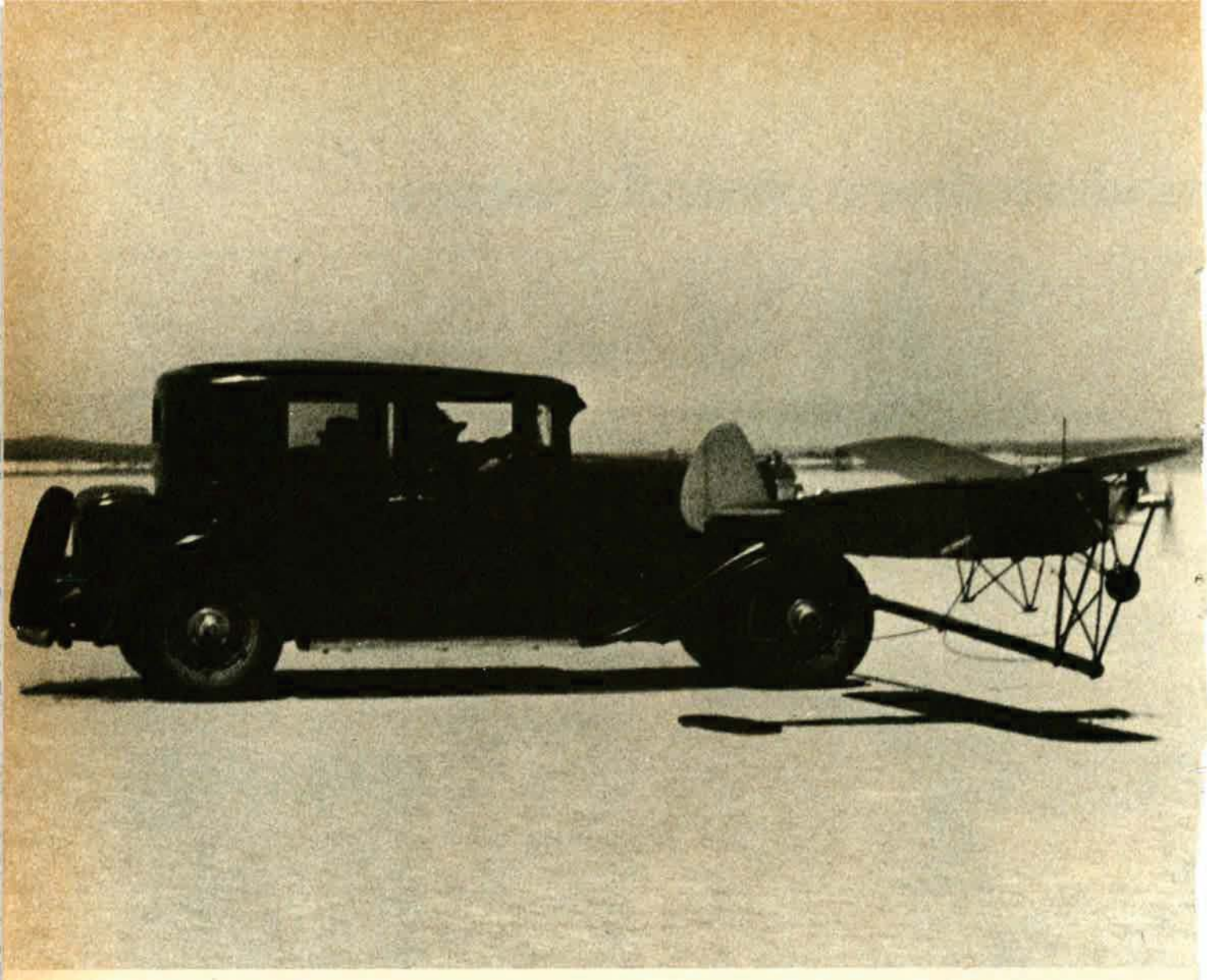


# RPV: It all started here.

On California's Mojave Desert. By a few men with a big idea. Their test bed was often a stripped down Packard. They were called the Radioplane Company. And they flew an unmanned remotely-controlled aircraft in 1939. The RP-4 Drone.

The first use: Target Drones. Anti-aircraft gunners in W.W. 2 practiced on the OQ-2. The first parachute recovery system was created. So was the OQ-19, first out of sight drone. And the KD2R-5, still in use in 16 nations. Radioplane merged with Northrop. And in 1955, we developed the Q-4, first supersonic drone. In 1958, the RP-76, first rocket powered drone. With the late Sixties came the MQM-74/Chukar. First low-cost jet-powered target system. So far we've built 65,000 vehicles.

*MQM-74/CHUKAR. The first low-cost jet-powered drone.*

Massive experience. Yet that's only one of the diverse capabilities needed to create the low-cost, advanced-technology RPV systems now being planned. And only Northrop can put all the capabilities together: Airframes of all sizes. Target-seeking sensors, other optical devices. Complex data links using advanced displays and new protective command and control techniques like fast frequency hopping. Airborne computers. Electronic countermeasures. Navigation systems. Simulators. And more.

More. That about says it. In RPV: Expect more from Northrop.

**NORTHROP**

# MIA/POW Action Report

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

## On Behalf of MIA/POWs

The League of Families followed up its recent national convention *(see September '73 issue, p. 47)* with a meeting of its Board of Directors in late August. The central objective: To nail down the details of a program the League leaders believe is essential in emphasizing the issue of the men still missing in Southeast Asia.

The program is extensive and imaginative. One key feature is a proposed television network documentary concerning the MIA situation. Included in it, if the League can interest one or several of the networks, might be film footage shot by personnel of the Joint Casualty Resolution Center (JCRC). This film is a record of the actual recovery of the remains of Americans killed in SEA and starkly makes its point about the difficulties entailed in the casualty-recovery effort. Segments of it were shown at the League convention by US Army Brig. Gen. Robert C. Kingston, Commander of the JCRC.

The League program also calls for the use of a public-relations tool that League officials believe has been of resounding success in the past—a letter-writing campaign. (The League is convinced that the mountains of letters written to North Vietnamese leaders and others protesting the treatment of Americans in captivity *did* have the desired effect in helping to ease the situation for US POWs.)

The letter campaign's first shot in what might later become a barrage will be mailed to all US congressmen, making them aware of the MIA families' frustration with the stalemate in the accounting process. (Preliminary groundwork for this was laid by visits of family members to congressmen who were at home for the summer recess.)

Then, too, the League is hard at work pressing for open hearings on Capitol Hill of both the Senate Foreign Relations and Armed Services Committees, once Congress returns from its recess. Another drive is aimed at procuring a joint congressional Special Resolution condemning North Vietnam's failure to live up to its responsibilities to account for the missing, a major element of the Paris accords.

The point of all this is that, until the issue is resolved, 1,300 US families remain in limbo as regards their missing men.

## MAC Airlift Tribute

In September, Military Airlift Command forces were honored by the National Defense Transportation Association for the planning and execution of the Operation Homecoming flights, which returned the POWs.

The ceremony was to take place in Washington, D. C., in September, with Gen. Paul K. Carlton, MAC Commander, accepting for the command.

In what is regarded as one of the most thoroughly planned airlift operations in history, MAC flew 118 missions, all of which reportedly went off like clockwork. These brought the POWs from Hanoi to Clark AB, Philippines, and then to Stateside hospitals.

Homecoming airlifted to freedom 566 US military, twenty-five civilians, and nine nationals of other countries.

## POW Book

Currently in production is a book devoted to the returned POWs. One page has been set aside for each POW wishing to participate and includes his picture and a personal message written by the POW since his return.

Proceeds from the book's sale are to go into a trust fund for the college education of the children of men killed, missing, or totally disabled in the Vietnam War.

With an introduction written by Ronald Reagan, Governor of California, the book contains more than 500 pages. It will be available in both hard and soft cover.

The trust fund's scholarship committee is composed of Dr. John R. Hubbard, President of the University of Southern California; Dr. William Banowsky, President of Pepperdine University; Dr. Leslie Koltai, Chancellor of the eight Los Angeles Community Colleges; POW wives Mrs. Marlene McGrath and Mrs. Bette Estes; Carole Hanson, a former Chairman of the League of Families whose husband is MIA in SEA; Barbara P. Wyatt, who originated the idea for the book and is acting as editor; and J. Noel Dennis, publisher.

Sponsors of the book hope that sale proceeds establishing the trust fund will be supplemented by additional contributions. The POW book can be ordered from Dennis-Landman, 2111 Wilshire Blvd., Santa Monica, Calif. 90403. Hardbound edition $10, softbound $5. ■

—Wide World Photos

*There's no place like home: Ex-POW USAF Maj. "Mac" McDaniel and wife Jean happily together after a six-year separation.*

RPV—A SPECIAL REPORT

# THE ROBOT AIRPLANE IS

By Edgar Ulsamer, SENIOR EDITOR, AIR FORCE MAGAZINE

**Advances in electro-optics, avionics, and data links, on the one hand, and the need to reduce the casualty rate encountered in penetrating heavily defended areas, on the other, have given impetus to an entirely new kind of air vehicle—the remotely piloted robot airplane. USAF's comprehensive approach to this new technology, first revealed in AIR FORCE Magazine three years ago, is beginning to pay off in new families of operational RPVs.**

*Teledyne Ryan strike drone and its HOBOS missile.*

# HERE TO STAY

AIR FORCE MAGAZINE
OCTOBER 1973

LAST year, Secretary of the Air Force John L. McLucas told a group of military and industrial leaders that, although the Air Force's manned systems weren't likely to become obsolete in the foreseeable future, "we expect Remotely Piloted Vehicles [RPVs] to be a significant force in our future inventory." Considerable progress in the startling technology of flying robots is lending new force to the Secretary's forecast.

Two principal qualities, unattainable in any other way, make drones and RPVs attractive to military and intelligence system designers: They are cheap and they are safe. If shot down, no one dies or is captured.

The Air Force has talked very little about the extent to which drones and RPVs have been and are being used in Southeast Asia. It is known, however, that, over the past eight or nine years, reconnaissance drones have carried out a major part of the Southeast Asian photo recce mission and have performed many other electronic intelligence missions. Most of the photos used by Adm. Thomas Moorer, JCS Chairman, to brief the Congress following the B-52 strikes in December 1972 were obtained by low-flying RPVs. The vehicles were often seen by pilots of manned recce aircraft who had been shot down and were awaiting release in Hanoi. Just the sound or sight of these vehicles on their daily flights provided much encouragement to the POWs. (The terms drone and RPV are often used interchangeably, but there is a difference: Drones are preprogrammed and remotely controlled by a monitor/operator only if there is trouble, such as veering off course. RPVs, on the other hand, are constantly controlled by an operator who "flies" them from a remotely located cockpit with the help of a television screen or other sensors. *See October '70 issue of* AIR FORCE *Magazine, "Remotely Piloted Aircraft—Weapon Systems of the Future."*)

Col. Ward H. Hemenway, Program Manager of the Air Force's Drone/RPV System Program Office at Wright-Patterson AFB, Ohio, told AIR FORCE Magazine, "While the RPV or drone is not intended to replace the manned aircraft, they can and will augment the manned force in those roles where high attrition due to enemy action may occur. For example, these vehicles proved over and over in Southeast Asia that they can operate in the most hostile environment, going in at a very low altitude and coming back regularly with excellent data."

A drone's survivability hinges on its ability to stay down on the deck. Early drone designs could not sustain low-altitude flight for long, because at low level, fuel consumption is extremely high. To conserve fuel, they had to climb out to higher altitudes while they were still well within the enemy's air-defense zone and most vulnerable to interception, according to Colonel Hemenway. This problem has been removed by increasing the fuel capacity of the vehicle, and drones now can stay on deck until they are well outside of the danger zone.

The Air Force also learned that the DC-130s that launch, and in some instances also control, the drones must stay far enough away from the combat zone to avoid attack. (It is, of course, possible to provide the control aircraft with fighter cover, but this defeats the Air Force's basic rationale behind drones and RPVs: the reduction of operating costs and manpower requirements, plus the desire to perform high-risk missions with minimum crew risk and/or loss.) Because Air Force DC-130s have operated at "respectable" distances from enemy MIG fields and SAM sites, none of them has been lost.

Further steps can be taken to protect launch and control aircraft. Their normal standoff range of fifty to 150 miles in Southeast Asia can be extended to between 300 and 400 miles. This additional range can be obtained by using relay drones, flying at high altitude, to link ground-control stations or control aircraft to the RPV. Other options are technically more difficult and, therefore, not likely to become available very soon. These other options could include use of F-111s or F-4s as control aircraft to provide an intrinsic self-defense capability; another alternative replaces the relay aircraft with a satellite, a technique that Colonel Hemenway believes is "certain to come but will take some time."

### Small Investment, High Return

The Air Force's R&D investment in drones and RPVs during the current year is a modest $15 million. "We get an enormous amount of mileage out of the money we put into this effort because, so far as the DC-130s and drones are concerned, we are dealing essentially with sunk costs. The drones, with some exceptions, are the product of modifications of our basic target drones." The modification

process began with converting target drones to high-altitude recce vehicles. The next step was to modify these vehicles as low-altitude drones. Some of these vehicles, following further modification, are being tested as strike vehicles.

"While my job is to manage the acquisition of drone/RPV systems, it is exceptionally important that the 'low-cost' features of unmanned vehicles be exploited. For example, the necessity to determine the proper blend of reliability to do the job—but not overdo it—requires constant attention. Clearly, the high-cost item in system acquisition and operation is manpower. We must constantly examine the requirements for people in our drone/RPV systems, striving to reduce both the numbers required and the skills of those needed. The total problem of reducing the cost of ownership of Air Force systems must be under constant consideration, and our method of solving this problem involves total involvement with AFLC, SAC, TAC, and other users.

"All of the techniques of design-to-cost, life-cycle costing, and logistic-support analyses tailored by very frequent inputs, discussions, and visits to drone operators assist the SPO in solving the problem," Colonel Hemenway said. "In particular, our concentrated effort at manning the SPO with both officers and airmen with operational drone flying, maintenance, and logistic experience shows a very high payoff."

*Col. Ward H. Hemenway, the Program Manager of the Air Force's Drone/RPV System Program Office at Wright-Patterson AFB, Ohio, foresees a linkup of satellites and RPVs.*

While the Air Force's drone/RPV program is cautiously moving toward ground-launching, present techniques involve, almost exclusively, air launches from DC-130s. The launching aircraft usually carries and, in some cases, controls two drones. Three Air Force commands operate DC-130 drone launch and control aircraft: TAC, through the 11th Drone Squadron at Davis-Monthan AFB, Ariz.; SAC, through the 100th Strategic Recon Wing and operating units in the Far East; and AFSC, through its 6514th Test Squadron, which has just moved from Edwards AFB, Calif., to a special facility at Hill AFB, Utah. Among them, these three commands operate only a handful of DC-130s, but the Air Force plans to increase that number by seven or eight over the next two or three years.

The Air Force's RPVs are controlled in several ways. One method involves ground-based microwave data-link systems; in the other method, a similar system in the DC-130 acts as controller. The next step, already under development, will use high-altitude drones for the data-relay mission.

Initially, the accuracy of the Air Force's drones was "measured in miles" because only a simple programmer and doppler radar were used. "There was no low-cost navigation system available to put the vehicle where we wanted it. Since then, we have found a number of techniques to operate with high accuracy. One of them is through the use of LORAN [long-range navigation] systems. The trouble with this approach is that a ground-based LORAN system must exist in a relatively benign environment. It can be jammed or destroyed," Colonel Hemenway told AIR FORCE Magazine.

A promising new approach is known as TERCOM, for Terrain Contour Matching System, and involves preprogramming the drone's computer with geographic information about the target area. This data is then matched against on-board sensor information to determine location. This control system is impervious to jamming or other external influences since it requires no electronic data link commands to the drone. Test of the TERCOM system will begin this fall, to establish whether a drone or RPV can position itself accurately in a TERCOM grid, Colonel Hemenway said. The cost of the on-board computer, a relatively modest $10,000, does not detract from the cost-effectiveness of the drone approach.

### Bringing Down Recovery Cost

Currently, operational drones and RPVs are generally recovered by a combined system of parachutes and CH-3 or CH-53 helicopters. The recovery system uses two chutes, a twenty-four-foot engagement and a 100-foot main chute. The actual "catch" of the RPV is made by the helicopter. The Air Force has achieved exceptional reliability with this system after a long period of growing pains. Certainly, the skill and dexterity of the recovery pilots have been vital to the success. However, the Air Force would like to improve this system because it is costly and requires too many people.

"We are currently refining our techniques for soft-landing RPVs, using a dual parachute system. The damage to a $150,000 to $350,000 vehicle right now averages about $20,000, due to ground impact. We are developing ways to attenuate the shock caused by ground impact, such as deployable air bags, and hope that we will be able to reduce the damage to just a few hundred dollars or perhaps eliminate it altogether," Colonel Hemenway explained.

### The Versatile Robot

While the Air Force RPV program is primarily concerned with recce activities, its potential for wider use is great and expanding. "We get suggestions almost daily of how we might use RPVs in new roles," according to Colonel Hemenway. Recent studies concluded that RPVs are ideally suited for reconnaissance against heavily defended targets, deep penetration against fixed-point targets, and assisting fighter forces in penetrating heavily defended

areas. The latter function can already be performed by TAC's Combat Angel task force based at Davis-Monthan AFB, Ariz., using RPVs as the electronic-warfare support element of manned fighter forces. These RPVs use conventional chaff or ECM pods to confuse or deceive the enemy, similar to the role of manned EW aircraft.

Lately, both the Army and the Air Force have become interested in drones and RPVs for real-time battlefield reconnaissance, including weather recce just prior to strikes by manned aircraft.

About a year ago, Gen. George S. Brown, USAF's Chief of Staff, who was then Commander of the Air Force Systems Command, became concerned over the proliferation and limited coordination of drone- and RPV-related activities within AFSC. As a result, the Air Staff, in conjunction with AFSC, set up a special Drone/RPV Mission Analysis Group. This task force, headed up by a steering committee of nine general officers chaired by Maj. Gen. John Burns, head of TAC's Twelfth Air Force, is currently analyzing Air Force missions that could be performed by RPVs. The group is looking at specific technological requirements, pinpointing areas that require additional research by either the Air Force laboratories or industry, examining and validating trade-offs, and laying out individual development programs.

The mission analysis group is expected to complete its job by the end of this year. Its conclusions, if approved, will serve as the master plan for future Air Force-funded RPV research and development.

One mission for which RPVs show great promise and which is being pursued with the approval of the mission analysis group is air strike. Last year, the Drone/RPV Program Office demonstrated at Edwards AFB, Calif., that a DC-130-launched strike drone firing a Maverick air-to-ground missile can acquire and destroy such targets as radars, control vans, and bunkers. By the end of 1973, Colonel Hemenway told AIR FORCE Magazine, the Air Force expects to have completed tests with the next generation of strike vehicles, which can be controlled from aboard the DC-130, rather than from the ground. This means that we will be able to load two strike RPVs aboard, fly to a target area, enable the pilot—via the TV data link—to identify targets and fire guided weapons while the RPV loiters in the area to perform the bomb-damage assessment mission. A combined effort by Philco-Ford and Teledyne Ryan Corp., he said, "has already resulted in an RPV system that can both designate a target and deliver ordnance against it."

A second RPV in this test program has been

*A Teledyne Ryan Model 234 RPV armed with a Shrike missile and a Mark IV bomb.*

*A Northrop-Ventura Division concept of an attack RPV.*

*Midair helicopter recovery of a Ryan 154 RPV.*

*Colonel Hemenway during rollout of Ryan BGM-43B RPV.*

*Northrop concept of a battlefield surveillance RPV.*

*Boeing's entry into the Compass Cope long-endurance, high-altitude recce RPV program.*

*Ground-control cockpit of Boeing's Compass Cope.*

*Ryan's Model 235 high-altitude, long-duration RPV.*

equipped with enlarged control surfaces that permit asymmetrical payloads. In a practical sense, this means that the remotely located pilot can release ordnance against a target, check his TV screen as to whether he has actually destroyed the target, and, if he hasn't, direct his RPV back to the target for another attack.

The Teledyne Ryan BGM-34 strike RPVs under test are extensively modified BQM-34 target drones; the modifications include additional fuel capacity and a larger engine. Upon completion of this AFSC test program, the vehicles will be turned over to the Tactical Air Command for operational testing, according to Colonel Hemenway.

A number of questions associated with the operation of strike RPVs remain unanswered, but are being very actively examined as the subject of an Air Force-sponsored research program known as the Drone Control and Data Retrieval System and involving three separate contracts. Two of these studies involve teams, Hughes working with Teledyne Ryan and Univac with Boeing, while the third is being conducted by RCA. A key economic question is, "How can we control many RPVs at the same time?" Colonel Hemenway explained. The three contractors are exploring solutions in the areas of ground-station layout, data-link design, and on-board equipment.

A touchy problem is the requirement for a strike RPV to "come in very, very low, pop up, and acquire, strike, and hit the target rapidly, and then get out in a hurry," before the enemy can shoot it down, according to Colonel Hemenway. While the on-board avionics to do this are now available, costs would be high. The Air Force, therefore, is drawn to new technology and is sponsoring a wide range of activity that will enable the RPV to locate the target rapidly and accurately. This work is being conducted by industry and the Air Force Avionics Laboratory, Wright-Patterson AFB, Ohio.

There is another issue at stake in the control of strike RPVs that the Air Force considers both important and potentially vexing. This is the threat of the enemy jamming the drone. Future adversaries can be expected to take more energetic countermeasures against RPVs that directly attack them than the milder reaction provoked by recce photo drones. Data links are vulnerable to jamming, especially since the frequency ranges available to RPVs in combat zones are limited because of other traffic. Several Air Force laboratories and contractors are exploring ways to reduce the data flow that takes place in encrypted, digital form and thereby cut the effectiveness of jamming. The Human Resource Laboratory and the Avionics Laboratory, Colonel Hemenway said, are trying to find out, for instance, how much a TV picture can be degraded and still supply the information required by an RPV pilot. Indications so far are that much detail can be eliminated, and the amount of data carried by the data link sharply reduced without operational impairment. According to Colonel Hemenway, "The prospects are very good that we will be able to go to digital avionics and digital data links on future RPVs," to cut both cost and vulnerability.

In a broad sense, the current Drone Control and Data Retrieval System program is meant to "produce the basic nerve systems for RPVs for the next ten or fifteen years," Colonel Hemenway explained.

### The Man in the Loop

The results of current work will have a decisive influence on man's role in future RPV operations. At present, the controllers, or "pilots," depending on the threat level of the operating environment, are either aboard a DC-130 or on the ground.

As the Air Force moves toward systems for simultaneously controlling many high-performance RPVs from one location, combined with the trend toward ground launch, the man's role is bound to change. To help drive down costs, the Air Force studies are considering using senior enlisted personnel with medium skill levels to launch the RPVs, then hand them off to lower skilled people who would monitor the vehicles on their more or less automatic flight to the target area; control would then be turned over to highly skilled, rated people for ordnance delivery and flight direction in the combat zone.

### Compass Cope

About two years ago, the Air Force launched a $25 million program dubbed Compass Cope, involving development of high-altitude, long-endurance recce RPV prototypes by Boeing and Teledyne Ryan. The Boeing vehicle weighs about 13,000 pounds, is powered by a single General Electric J97 engine, and is equipped with aircraft-type tricycle landing gear for conventional takeoff and landing. (After a successful first flight, and a four-hour, high-altitude mission, on its second flight the ninety-foot-wingspan vehicle crashed and burned while landing, in August of this year.)

The Teledyne Ryan Aeronautical Compass Cope prototype is derived from the company's AQM-91A high-altitude reconnaissance RPV and has a wingspan of eighty feet. Both vehicles are expected to be capable of long-endurance missions of up to twenty-four hours' duration at altitudes above 50,000 feet. The Ryan vehicle will be powered by a special prototype engine developed by Garrett AiResearch in conjunction with the Air Force

Propulsion Laboratory. The engine is not yet flight rated, but has undergone major tests at the NASA Lewis facility in Cleveland, Ohio. Flight test of the two designs is to be completed by mid-1974. The Air Force plans to prepare a set of specifications based upon data from the prototype hardware validation phase and hopes to enter a full-scale engineering development program that may lead to production. In that case, Colonel Hemenway predicted, it may well be necessary "to invest in the development of a new family of engines tailored to this particular type of vehicle."

The Compass Cope vehicle, with a payload of just under 1,000 pounds, is viewed by the Air Force as a candidate for missions by SAC, TAC, the Air Weather Service, and other national agencies. Specific payload and operating requirements of these diverse, potential users are currently being examined by the mission analysis team. A common standard will have to be agreed on before the Air Force can proceed with full engineering development.

Both the Boeing and the Teledyne Ryan prototypes appear to be well suited for ocean surveillance. Also, they could be equipped with side-looking radar. The latter, combined with high cruise altitude, would permit these vehicles to reconnoiter along the periphery of sensitive areas without having to penetrate.

While Air Force and industry experts remain optimistic about Compass Cope's eventual ability to perform conventional landings, they are keeping fallback positions open. These involve a number of new recovery systems, including the use of an "earth anchor," to be dropped when the vehicle has reached low altitude and speed; arresting gears fashioned after the US Marine Corps's SATS system for short-field operations; and a system of dollies and skids used in an Australian RPV design. Almost all of these approaches share a common drawback, however: They require special means, such as flatbed trucks, to return the RPV to its base, a factor that increases costs and manpower needs.

While the Compass Cope long-endurance, high-performance RPV is relatively expensive, another Air Force program, to be launched next year, will concentrate on a truly low-cost vehicle. About a year ago, after preliminary studies, the Drone/RPV System Program Office asked a number of industrial contractors for ideas about expendable RPVs.

Price of these vehicles, Colonel Hemenway said, is not expected to exceed $50,000, but "we hope—and according to recent studies by Calspan (formerly Cornell Aeronautical Laboratories) this is a realistic figure—to keep costs in the $30,000 to $40,000 range." He said the Drone/RPV Program Office hopes to create this new generation of "throw-away" vehicles that can be deployed in large quantities to help a tactical force penetrate heavily defended airspace, such as that in Europe.

Industry has said that all the technologies needed to build such low-cost vehicles in quantity are available now. A new approach to engine design, premised on a useful engine life of no more than five hours, appears to bring engine costs down to about $12,000. Avionics packages might not cost more than $15,000 per copy. These expendable drones would not be armed, but would serve only as jammers and decoys. (The Department of Defense is considering an alternate approach using guided glide vehicles, fashioned after the Air Force's guided glide bombs. The Institute for Defense Analyses is currently examining the cost-effectiveness of that approach.)

### RPV Training and Test Needs

As RPV systems move from the status of hush-hush novelties to operational maturity, training the people who "fly" them becomes an important cost factor. The Drone/RPV Program Office and the Avionics Lab have installed a special strike RPV simulator at Hq. Aeronautical Systems Division, at Wright-Patterson. TAC pilots are training on the simulator, which duplicates the terrain over which the actual flights at the Hill/Dugway range will take place. The pilot sees the same picture on his TV screen that he would see in actual operation. Colonel Hemenway predicts significant O&M (Operation and Maintenance) savings from this and other simulators.

Economy and lack of airspace were also the reasons for the recent consolidation at Hill AFB, Utah, of RPV test operations, previously scattered over a number of bases and test centers. The availability of a dedicated test range should enable realistic test and evaluation of drone/RPV systems before production decisions are made.

Colonel Hemenway looks forward with confidence to a steady growth in RPV technology. "The present state of technology is such that we can perform all missions that RPVs are being considered for except air-to-air. Coupled with laser designators, guided weapons, low-light and IR target identification, our CEP [circular error probable] can be about the same as that of manned systems. As long as we can identify the target, we can hit it. On the recce side, our LORAN navigation system can place us precisely over point targets on the first attempt and allow us to return to the same target with equal accuracy. We do not, however, have this kind of confidence yet with respect to air-to-air combat. We don't have the sensor sophistication to do the job of man in the air-superiority role. Also, even if we could reach such a high technology level, the costs might be prohibitive." ■

Although unique in many respects, to a significant degree the Air Force Academy shares with civilian institutions the societal stresses that have beset the nation. A former senior editor of AIR FORCE Magazine reports on the changing—sometimes conflicting—attitudes and goals of cadets, administration, and faculty at the . . .

# AIR FORCE ACADEMY: A Time of Transition

*A panoramic view of the Air Force Academy.*

**By William Leavitt**

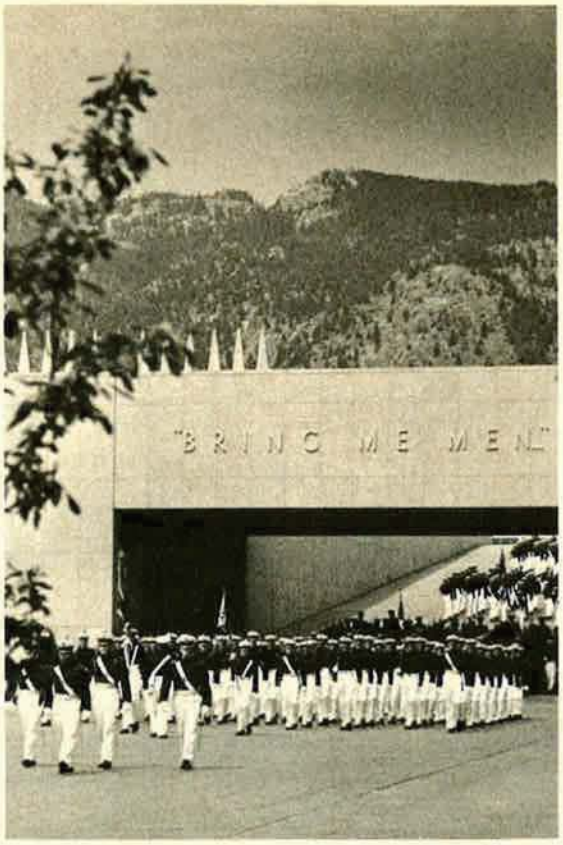
WHETHER it's your first visit or your twentieth, the toy-like vista of the United States Air Force Academy against its Colorado mountain backdrop seems unreal from the winding approach road. Only when you reach the buildings do you believe this is a real place, inhabited by real people who daily grapple with the meaning and the mission of a young institution.

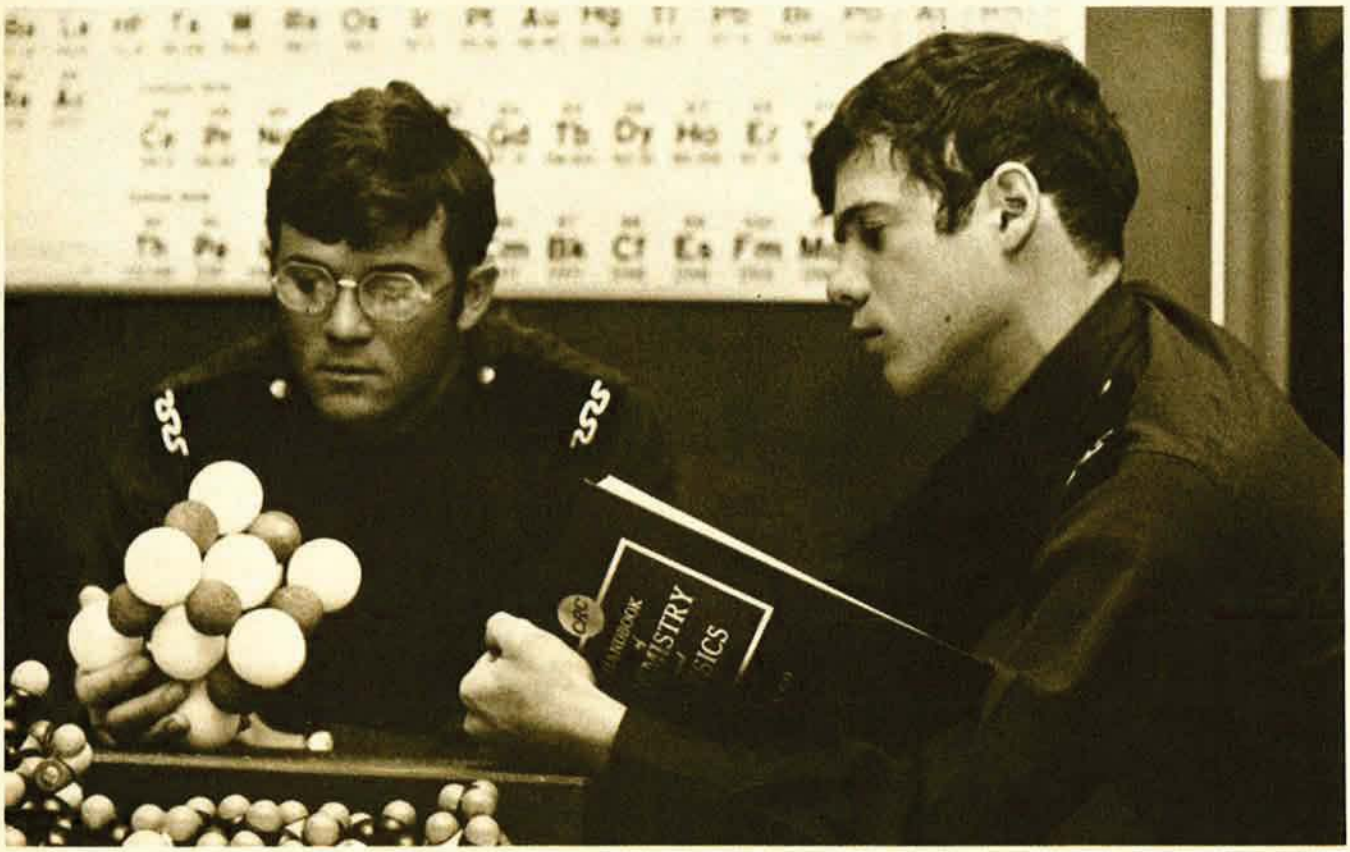
In simpler times, at the Academy's birth, the role of the military as the dedicated physical protector of American society went virtually unquestioned. That role today is, to say the least, controversial.

The battering the US military has taken in

*Attendance at chapel is now voluntary, the outgrowth of a recent Supreme Court decision.*

*"The cadets of the 1970s and their attitudes represent a healthy reflection of the times we live in," according to the author.*




*"Today's cadets are somewhat more sophisticated, certainly more prepared to question 'the system' . . ."*

recent years, largely a consequence of the Vietnam War, has wounded the Air Force Academy too. There is the irreplaceable loss of the ninety Academy graduates who died in Indochina. But beyond that human void, there is the conscious search by the Academy for the crucial intangibles of image and style to meet the needs of the Air Force in a new and confusing era.

Clearly, now is a time of difficult transition at Colorado Springs. The impression is unavoidable. One senses the soul-searching in conversations with the leaders and the led, from the Superintendent, Lt. Gen. Albert P. Clark, on down.

I visited the Academy a few months ago for most of a working week. It was a quiet time, before graduation. Physically, little had changed since the very first time I was there, a full ten years ago. The Academy plant is truly a triumph of design and craftsmanship in an era of sloppy workmanship. In the season of ferment through which the Academy is now passing, that sense of physical beauty, permanence, and solidity offers comfort.

### The Key Question

But the Academy is not just buildings. It is people. Today's cadets—I talked with some of them quite freely—seem different from those cadets I interviewed back in 1963. Not better, not worse in any particular way, but different. It wasn't just the longer sideburns or the slightly longer hair. Today's cadets are somehow more sophisticated, certainly more prepared to question "the system" than their predecessors.

Clearly, the greater sophistication and the willingness to question are somewhat unnerving to some of the people whose responsibility it is to run the Academy. At the same time, to others in responsible positions, the cadets of the 1970s and their attitudes represent a healthy reflection of the times we live in. They say that the day of automatic obedience is gone and that the "why" of orders is now as important as the orders themselves.

In these two different perceptions is rooted a key question about the future of the Academy. How can it best adjust to the new era? If there is any easy answer, the Academy hasn't found it yet. Whether you are talking with Superintendent Clark, faculty people, the military administration, or the cadets, no one has the complete answer. In that sense, the Academy is not much different from most of our institutions.

The question transcends such matters as the degree of "regimentation," or whether chapel ought to be compulsory (the Supreme Court has made it voluntary and the chapel did not fall down), or whether auto-owning privileges should be granted earlier than they are now. Such questions are important to the cadets and the administration. But, without belittling their significance, they are not crucial to the future of the Academy.

For that matter, even the real possibility of the admission of women cadets, which could happen if the Equal Rights Amendment is ratified, is not crucial. Important, but not crucial.

Let me proceed to some impressions gathered during my five-day visit.

### Signs of Tension—Signs of Change

• Item: In contrast to earlier visits, there is a certain uptightness. For example, although it was not absolutely crucial to my reportorial purposes, the only access I had to cadets was on the premises of the public information offices, which is not a cadet's natural habitat. On the other hand, the interviews *were* private and the cadets were urged to be candid by the public-information people who did *not* monitor the conversations, as they did the interviews with top Academy officials.

• Item: Some of the administrative people I talked with seemed embarrassed that a tiny number of the approximately 8,000 graduates of the Air Force Academy—some twenty graduates serving on active duty—had applied for conscientious-objector status during the Vietnam War. (Twelve were granted by the Air Force and two by court action. Only one cadet has been granted CO status.) There was a message of "where did we fail?" as if the independent judgment, right or wrong, of a small number of graduates somehow reflected on the Academy itself.

• Item: In sharp contrast, one faculty member, personally opposed to the war, said he would have considered it a *greater* failure if, among all the graduates, there had been no conscientious objectors.

• Item: One senior Academy official expressed a preference for less-questioning minds that don't concern themselves with the larger problems of society.

He suggested that dissent tended to be a hallmark of the brighter and more questioning cadets. In contrast, he noted, "Those people who are quite simple in their orientation toward the world don't worry about those things. We've got a certain number of kids here who simply want to fly airplanes and serve their country, and it's real simple. They don't worry about all these things. . . ."

• Item: The current program that offers immediate civilian graduate school opportunities to a selected number of graduates is on its way

*Lt. Gen. Albert P. Clark, Superintendent of the Air Force Academy, has headed the Academy's staff since August of 1970.*

out. Costs are high, and it is felt that all graduates should get direct exposure to the "real Air Force" before going on to graduate school. Under the new plan, qualified cadets will retain a "blue chip" for government-financed graduate programs, which can be cashed in from four to eight years after graduation. The prime reason for the change is a worry that such graduate students will fall prey to temptations from industry or academia and leave the Air Force early.

There are good arguments for and against. There is a real risk of losing such people from the Air Force. At the same time, there is an equally compelling argument that the intellectual eagerness of the bright grad who has to wait for advanced studies will flag under the pressures of the wife and family he will probably have acquired by the time he thinks about cashing in his blue chip.

• Item: It is hard to measure, but there is at least some interest in sacrificing the dogma of the all-military faculty. The official position remains that the all-military faculty is crucial to the concept of the "whole-man" officer/scholar. Ten years ago, I was far more persuaded by that argument than I am now. The traditional position also includes the idea that a mixed faculty might tend to concentrate civilian professors in the humanities and military officers in the so-called hard sciences and engineering. But that need not be the case. The mix could be in any proportion desired. Other arguments for the all-military faculty include the proposition that the Academy could become saddled with a collection of tenured civilians who would be hard to dislodge if their work was not satisfactory. This worry has substance and to avoid it would require careful planning.

This is not to suggest that a strong admixture of civilians on the faculty would be any sort of panacea. Far from it. The main advantage would be to help ensure that the Academy would not be isolated from the day-to-day impact of ideas and events. Of course, the Academy is not isolated now by any means. The communication media and fast jet travel both assure a flow of news and visitors.

## Freedom and Responsibility

There are those who say the Academy—affected by Vietnam—has quite consciously decided to reduce contact with the noisy mainstream of political and social change as a way of maintaining the purity of the institution's mission. Others say the current effort is not on isolation but on stability. There are signs of a conflict between those who insist on change, not for change's sake but to meet the require-

*Rigorous physical training is an integral part of the Academy's program to develop the "whole-man" officer/scholar.*


*Athletic activities play an important part in cadet life. The Academy Board determines the allocation of cadet time for activities.*

ments of the times, and those who want things to stay pretty much as they are, permitting only those alterations in style and policy that are absolutely necessary. To the advocates of greater change, stability carried too far can degenerate into stagnation.

The problem of how to meet the needs of the present, let alone the future, is complex, to say the least. In the area of "cadet power," for example, policy appears to favor giving cadets more responsibility in managing their own operations. That policy has been encouraged by Brig. Gen. Hoyt Vandenberg, Jr., the Commandant of Cadets. But, in his view, there are limitations to the "freedom" that can be handed over to cadets. He made some candid comments:

"I think the military, in order to maintain its capability to discharge its mission, cannot react to the same extent that society does. I'm convinced that the military must make logical accommodations, but not to the extent that the basic fundamentals or the military ethic are degraded. I think that self and group or unit discipline must be taught in an institution like this . . . and if the product we graduate does not have very well ingrained, by the time he graduates, a good code of military fundamentals such as self-discipline, integrity, loyalty, duty, service above self, then I think we're guilty of defrauding the American public.

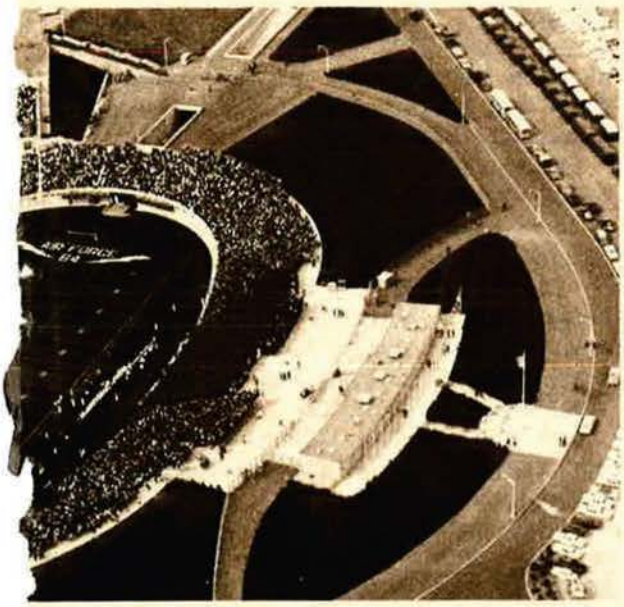
"We have a unique situation, in that the cadet wing here does manage itself. Now, by that I don't mean they make policy. Of course, the senior staff here is still responsible for making policy. But, back in 1971, a revolutionary concept developed for service schools when the air officer commanding was pulled out of the direct chain of command and assumed more of an advisory role. I think I'm still seeing the manifestations of an overreaction by cadets to their concept of what was involved in cadet management of the wing. . . ."

General Vandenberg sees a quieting down of what he described as overreactions. In his view, a tightening up was necessary and is working. Critics see the tightening as part of a general pattern desire to get back to the "old days."

If anything is clear about the Air Force Academy of 1973, it is the fact that, because it is part of the world, it will change to reflect the world, whether changes are introduced from the inside or outside. The place cannot rest on its laurels.

*The USAFA Prep School readies many promising young men who require academic coaching in order to meet the demanding entrance standards of the Academy.*

*Brig. Gen. Hoyt Vandenberg, Jr., Commandant of Cadets, favors giving the cadet corps more responsibility in managing its own operations.*



### Attraction and Attrition

For one thing, the Academy now has to compete more than ever for the cream of motivated American youth. It has an attrition rate

running close to forty percent. That has to be reduced. In the face of rising costs, the Academy has to be surer than ever that the applicants who are accepted are really motivated for the full four years in a grueling academic and physical grind, and are willing to stay on in the Air Force long enough to justify the taxpayers' investment. The high costs of college education can be a recruiting plus of course—attracting youths who might have gone elsewhere a few years ago. And, these days, the Academy has to attract more minority youth—blacks, Chicanos, Indians, Orientals. That in itself is a major task.

One approach being used with success is the Academy Prep School. The Prep School, in forced-draft, no-frills fashion, readies promising youngsters who need academic coaching to qualify for admission to the Academy.

Recruitment of minority cadets has become a major function. There are certain ironies. For example, where the opportunity for blacks to come to the Academy might once have seemed spectacular to them, it is not necessarily so now. The brightest and most qualified blacks now have multiple college options and scholarships open to them.

*Without the draft, Dean Woodyard believes the Academy will be getting a different kind of student—one who fully recognizes the purpose of the institution.*

But Capt. William Wade, a black officer who runs the Academy's minority recruitment operation, notes: "Surprisingly, there are an awful lot of young Americans in this country who still want a military career although we have just gotten out of an unpopular war, we have ended the draft, and a lot of young people don't have to worry about these things now. I've got a thick roster of guys who have applied. The largest percentage is blacks; others are Orientals, Indians, and Puerto Ricans and Chicanos. There are young men out there who are interested. I see it firsthand, I go into high schools. . . . Flying is attractive to a lot of minority young men. A lot of them have never been in a plane but they can look up in the sky and see one. . . ."

Captain Wade says the hardest problem is finding minority youth academically qualified and that the Academy depends strongly on the Prep School to do that job. The minority recruitment operation, Captain Wade said, uses a number of approaches. "We use our liaison officers [Reservists representing the Academy in their communities] to help us open doors. We use national minority organizations, such as the Chicano Federation, the NAACP, the Urban League, Bureau of Indian Affairs. We've got contacts . . . in North Dakota with the United Tribes."

What are some of the greatest problems among the minority cadets? Captain Wade believes that "the biggest problem is adjusting to the regimentation, adjusting to this area. Not having girls in the area. Being so isolated from Colorado Springs. It's hard to pinpoint any one thing. . . . Usually, if he doesn't have academic problems, the minority student will hang in there. We find so often that when the liaison officers talk about the Academy and the summer training and how rough it's going to be . . . the average minority kid, whether he's middle class or not, that's Mickey Mouse to him, because he does that for survival with his peers. . . . It's not really a big hassle for a guy to take on the running and the physical things we do with cadets here. . . ."

### The Academic Side

Stability, stagnation, academic freedom. I talked with Brig. Gen. William T. Woodyard, Dean of the Faculty:

On cadet reaction to the Vietnam War, General Woodyard said quite firmly that statistics did *not* bear out suggestions that the more academically inclined cadets tended to be dissidents. But he suggested, too, that many came to the Academy during the war to avoid the draft. There is a certain irony here. With the draft pressure off, Dean Woodyard believes that the Academy will be getting "a different kind of student, someone who does recognize fully the purpose of the institution. Hopefully, attrition among graduates, as well as among cadets, will not be very high."

The Dean pointed out that it is not until the second-class (junior) year that cadets must commit themselves to serve in the Air Force after graduation. Some leave at that point. "I think some of these people have looked upon the Academy as a two-year junior college. . . . They have many hours of extremely transferable credit and a bank balance of about $800. So they can then go on and finish their education at other places without a commitment to the service."

General Woodyard went on: "At our institution, I think we have a degree of academic freedom equal to any school." He noted the comment of a civilian professor who taught on California campuses during the most turbulent days of the sixties and who says, "It's a great tragedy that in higher education the last vestiges of academic freedom now reside at the service academies."

The professor was talking about the fact that classes at the Academy could be conducted without disruption.

"But," said the Dean, "on the other hand, we *are* a military organization. The Superintendent is our commander, and I am the commander of the faculty. There are certain things that are military. For example, we wear uniforms. . . . I don't consider that to be a

violation of the faculty's academic freedom. We define academic freedom here this way. An instructor may discuss anything which is in his area of expertise. And we ask that all of our people not only accept but fully support the purpose of the institution, that is, to train and educate young men for careers in the Air Force. . . . Members of the faculty must accept and support the purpose of the institution. I don't see any great conflict here between academic freedom and the military-command relationship."

On the question of exchange professorships between civilian campuses and the Academy, General Woodyard sees no objection: "If we could work an arrangement of that kind—one which would not cost us a lot of money—I would have no objection at all."

Asked about the suggestions that there is a tightening-up policy on the part of the military administration of the Academy as the best way to avoid "problems," the Dean said, "I agree, not as the best way of avoiding problems—but I have sensed over the years that there has been an erosion of the military quality of our graduates.

"Why this has happened, I don't know. I think cadets, while they do have a great deal of responsibility in governing the cadet wing, in some cases have not picked up the responsibility that goes along with that authority. I think there could be an improvement in military training that would require that when they are given authority, they also assume the responsibilities for management. Now that cadets have cars early in the first class year, you don't see many first classmen around here on the weekends. . . ."

To ensure that the first-classmen seniors do fulfill their responsibilities for training the lower classmen, the Commandant of Cadets has started so-called Commandant's Weekends that require seniors to be available for cadet wing management duties on weekends.

"We have not relaxed our academic standards here over the years," the Dean said, "although the cadets have from time to time made proposals along those lines. The questions I've tried to resolve with them are: Will it make you a better cadet? Will it make you a better Air Force officer? And will it enhance learning? If the answers to these are clearly no, then there can be no reason to do this."

As to the academic program generally, the Dean believes that the load of semester hours should be reduced slightly, "not with the idea that the cadets do less but that they do a little better job of what we ask them to do." (In some years, cadets carry close to twenty semester hours of academic work, excluding physical education and military training.)

"We're not faced with the problem of establishing the prestige of this place as an academic institution. We're not backing off from the excellence of the current heavy semester load . . . but we ask the cadets to do too many kinds of things. . . . With a slightly lessened load we'll ask them to do fewer kinds of things but do a little better job of what they do."

As to those who want to do even more, the Dean says portions of the graduate-level work that would have been done on civilian campuses under the phasing-out graduate-school program will be offered on the Academy campus. So will the optional enrichment courses that have been a feature of the Academy program for many years.

### A Future Not Without Pain

Although, as I stated earlier in this report, no one can answer precisely the question of how well the Academy is handling its present period of adjustment, Dean Woodyard offers this view:

"We have matured as an institution, I think, and we have the Academy Board, which makes policy with respect to allocation of cadet time. We have representatives from the department of athletics, the Commandant, and faculty, and the Board is presided over by the Superintendent. In the old days, we did not have this central body that looked as carefully as it does now with respect to the establishment of new courses, new training programs . . . as a matter of fact, they cannot be established without the concurrence of the Academy Board. I think that some of the problems of the old days were because we *were* a new institution. People were vying for what they felt was an adequate share of the cadet time."

I started this report with the question of coping. Can the Academy—no longer virginal, scorched as we all have been by the fires of the age we live in—cope with its mission without freezing itself into outmoded traditions *or* losing its unique identity?

That the answer is far from clear does not mean the answer won't be found—over a period of years and not without pain.

Ten years ago, I opened my report on the Academy on these pages with a quote from John Milton, written in his *Tractate on Education* in 1644:

"I call a complete and generous education that which fits a man to perform justly, skillfully, and magnanimously, all the offices, both private and public, of peace and war."

For the Academy, Milton's words are even more significant now. ■

*A single 24,500-pound-thrust engine propels the F-106 skyward.*


**GOOD YEARS LEFT FOR THE F-106**

The General Dynamics/Convair F-106 Delta Dart has been USAF's first-line interceptor for the past fifteen years. But like a fine wine, some airplanes—the F-106 among them—actually improve with age. An Air Force pilot describes what it is like to fly the "Six" in both intercept and air-superiority roles, and tells about some of its improved capabilities in this account of . . .

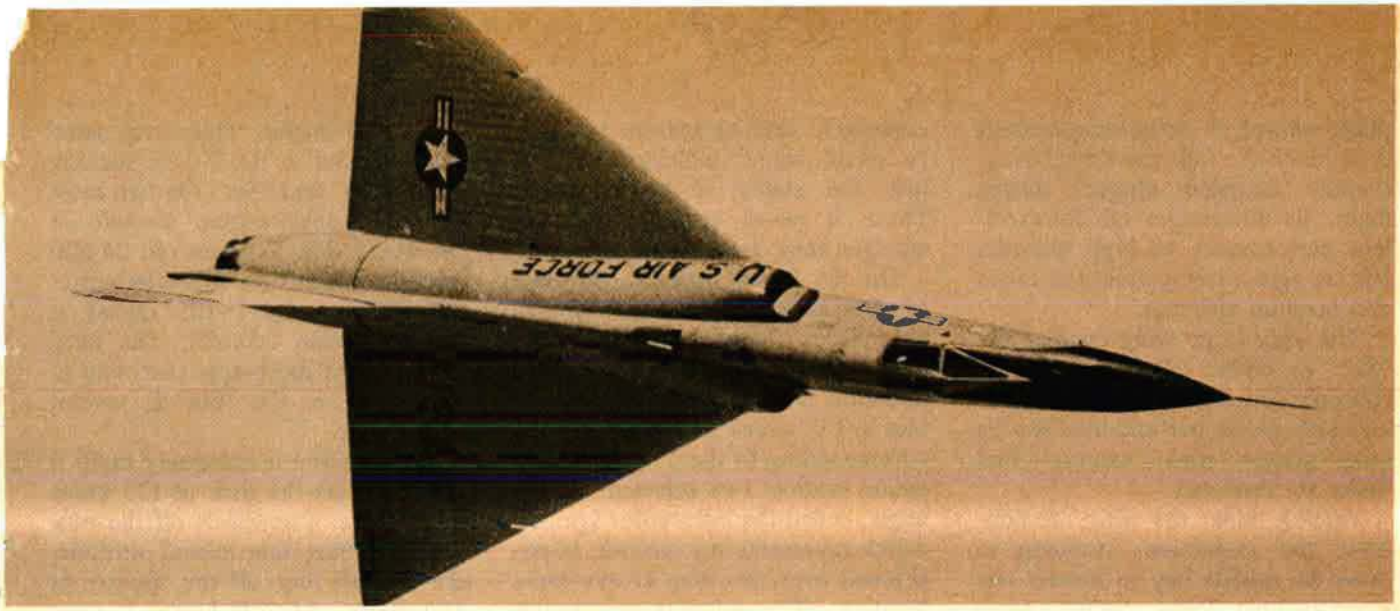
# FLYING THE SIX

**By Capt. Donald D. Carson, USAF**
CONTRIBUTING EDITOR, AIR FORCE MAGAZINE

*The author, Capt. Donald D. Carson, is assigned to AIR FORCE Magazine under the Education With Industry (EWI) program. See p. 17 of this issue for more about his background and special qualifications to write about fighter aircraft.*

HOW does an aircraft perform after fifteen years of hard use? The men who fly the F-106 Delta Dart think it has improved with age. Many say the "Six" is one of the truly great airframe designs of modern aviation. The "Six" can perform its mission far better today than it could when introduced in 1959 because the systems have been continually refined.

The physical beauty of the F-106




*The large sweptback wings gave the F-106 its name, Delta Dart.*


*Aerodynamic braking helps bring the F-106 to a halt. The lack of wing flaps causes the 'Six" to fly final approach at speeds nearing 200 knots. Speed brakes and drag chute further cut the landing distances.*

is immediately apparent. Its sleek fuselage and its tall, sweptback tail give an indication of the aircraft's great speed. The F-106 established several altitude records, and, in 1959, set a world's official speed record of 1,525.9 mph, which is impressive even today. The F-106 has been the first-line interceptor of ADC and NORAD since 1959.

To give you an idea of what it is like to fly the F-106, let me take you along on two typical training missions. The first demonstrates its abilities as an interceptor. The second shows its potential in aerial combat.

Externally, the "Six" has remained basically unchanged from its beginning and has not been fattened with the added weight and drag of "bolt-on modifications," which so often plague fighter aircraft with sloth-like performance as they grow older.

Our walk-around inspection starts with the lance-like pitot tube at the very front of the aircraft. This provides an air-pressure input for the central air data computer (CADC), which in turn provides accurate airspeed and altitude information to the flight instruments and main aircraft computer.

Behind the pitot tube is the large black conical radome—the nose of the aircraft. Housed here are the radar antenna and a nose full of "magic black boxes" to power the radar, infrared (IR), and fire-control systems.

The huge delta wing is the most prominent feature of the F-106. A delta-winged aircraft is unique. It has no horizontal stabilizer or elevators. The movable portion of the wings serve as both elevator and aileron and are appropriately called "elevons." The elevons operate differentially (in opposite directions) to produce roll, and together for

pitch control. A delta-wing aircraft feels much the same as any conventionally designed aircraft during flight. Its advantages are its excellent performance at high altitudes and an agile turning ability at lower and medium altitudes.

The very large wing enables the "Six" to cruise efficiently at high subsonic and supersonic speeds. The aircraft's cruise performance can be even greater when external fuel tanks are removed.

Passing under the wing, we continue the inspection, stopping to open the missile bay to inspect our weapons load. Today, we'll be firing live AIM-4 Falcon missiles on the air-to-air range over the Gulf of Mexico, near Tyndall AFB, Fla. A full weapons load consists of two IR and two radar-guided missiles and an AIR-2A Genie rocket. Today's firing load is two AIM-4F radar missiles. The three types of air-to-air weapons give the F-106 an excellent capability against either manned bombers or maneuvering fighters at both high and low altitudes. All armament is carried internally.

### Gauges and Gadgets

Our exterior inspection complete, we climb the ladder into the cockpit. Our first check is the vertical tape instruments, which are used instead of conventional round gauges. Once you've flown a "taped" bird, you are forever spoiled. Tapes present all necessary information in such a clear manner that it is almost impossible to misread altitude or airspeed.

Centered above the aircraft instruments is a special "daylight" radarscope. The scope background is a bright green with white target returns, easily visible in broad daylight. Older scopes needed a hood to shade them, or else the pilot had to lean forward to see the scope displays. Flying with your head in a radarscope while trying to conduct a low-altitude intercept is not the way to gain another cluster for your longevity ribbon.

A unique feature of the "Six" is the "annunciator" for the armament, computer, and navigation systems. A small, round indicator window tells the status of each system. There is never any doubt as to whether they are operating or not.

On the lower pedestal, between my feet, is one of the most remarkable pieces of navigation equipment ever put into a fighter—the Tactical Situation Display (TSD). It resembles a TV screen and shows a map corresponding to the TACAN navigation station I've selected. A triangle, called the interceptor symbol, which represents my aircraft, is positioned over this map at our exact location. The advantages of this versatile system become evident especially during a night weather penetration.

After we're strapped in, I depress the engine ignition button and move the throttle outboard and then back in to fire the starter motor and provide ignition. The engine can be started without external power by using internally stored high-pressure air and the aircraft battery. This enables the F-106 to operate from dispersed airfields with a minimum of support.

Once started, I turn on the single MA-1 fire-control power switch, which operates all of the weapons, radar, computer, navigation, and communication equipment. I dial in a grid reference setting to tell my computer the location and aircraft heading. The aircraft computer has tremendous capabilities, and one of them is dead-reckoning navigation. Once the grid reference setting has been inserted, I can fly to any predetermined fix on my TSD without receiving information from a TACAN station or any other type of navigation aid.

### Ready to Roll

I close the canopy and taxi to the runway. Everything looks good, so I "hack" the clock, release the brakes, and put the throttle in afterburner. Suddenly, everything gets quiet for a moment as the EPR drops while the engine eyelids open. I'm jolted forward by a solid kick in the back and a loud bang as I get the "hard light" so characteristic of the J75 engine. This is the same engine found in the F-105, making the "Thud" and "Six" the two most powerful single-engine aircraft in the world. The J75 puts out 24,500 pounds of thrust in full afterburner (26,500 for the F-105 during a water-injection takeoff). The hard light is even more apparent than in the F-105, as the "Six" is several tons lighter.

Acceleration is extremely rapid. I ease back on the stick at 135 knots to raise the nosewheels off the runway. Holding this takeoff attitude, the aircraft flies off the runway at 184 knots. At 250 knots, I come out of afterburner long before crossing the end of the runway. Moving almost 42,000 pounds from a standing start to more than 250 knots in about 7,000 feet is quite impressive. The F-106 is a thrill to fly, and the novelty never wears off. I accelerate out to 400 knots and begin to climb at a steeper rate, maintaining this speed until reaching Mach .93, which I hold to level off. I kick my rudders to fishtail the aircraft—a signal to my wingmen that I want them to move out into route formation.

After contacting the ground-controlled intercept (GCI) director who will control the mission, I separate my flight. Each aircraft begins to follow the "Data Link" commands sent from the intercept director. Under Data Link direction, the computer at the Semi-Automatic Ground Environment (SAGE) or Backup Interceptor Control (BUIC) center transmits information to each aircraft. The MA-1 aircraft computer displays data as heading, airspeed, and altitude commands. I also receive target heading, speed, altitude, range, and bearing information.

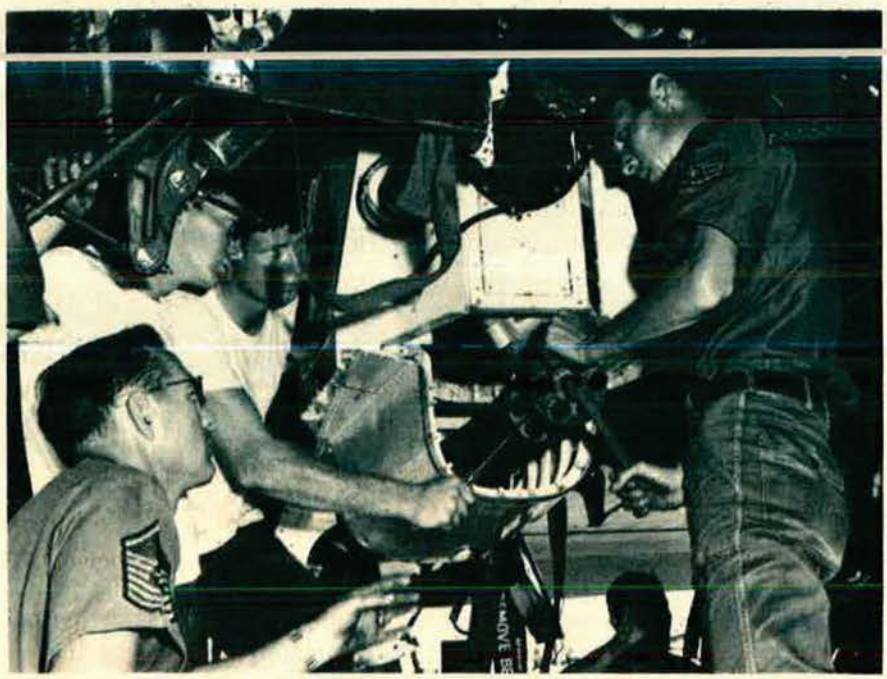
Once I've checked in with my intercept director, giving my armament safety check, the remainder of the intercept can be conducted without either of us saying a word. I receive all commands on my "tapes" in the form of white markers that appear over the speed, altitude, and heading I'm to fly. There is also information displayed on the Tactical Situation Display (TSD), which

*The author and a wingman climb toward the overwater range at Tyndall AFB, Fla., where ADC weapons firings are conducted.*


depicts the entire intercept on my map display. I can see my position in relation to that of the target, and the type of intercept I'll be conducting. Today, for range safety, I'll call my contact with the target and get verbal clearance to fire from my GCI controller.

When the target-marker indicator moves up on the altitude tape, and I begin to receive target range, I know I've been committed against a specific target. At this time I arm my missiles.

I search the sector of my radarscope that corresponds to the target bearing and distance being sent by



*Weapons loaders install a new 20-mm gun on an F-106 prior to test firing at a drone aerial target. The gun has proved highly accurate.*

*The F-106 radarscope shows brightly and may be seen without a hood or sun screen.*

the Data Link. I position my radar antenna elevation to search the altitude at which my target is flying. Today, I'll be directed to make a 10,000-foot front "snap-up" attack against a Firebee drone target flying at 40,000 feet.

### Scratch One Drone

I'm turning toward the drone, which is now thirty miles ahead, coming directly at me. I select afterburner to gain speed for the snap-up. The snap-up manuever is used against targets at very high altitudes. This drone will not be above 45,000, but I'll still use a snap-up since it is a more demanding intercept and provides very realistic training. The afterburner quickly pushes me through the transonic area into supersonic flight. There is no difference in the feel of the aircraft as it goes supersonic. Your only indication is a slight movement in the altitude tape, which quickly settles back down to normal.

I spot my target five degrees left at the top of my scope and call a "contact." Grasping the left half of the "split stick," which controls both the aircraft and the radar system, I'm positioning the antenna beam and "range gate" over the radar return. The radar locks on. "Red Lead . . . Judy," I call to the GCI controller to indicate I'm assuming full control of the intercept.

The MA-1 computer now takes over and computes the intercept steering geometry. I can either select the "auto-attack" mode, which will take the computer inputs and steer me to the target, or fly it manually. The autopilot doesn't need the practice! I'm turning to center the steering dot depicted on the radar attack displays. The target is moving rapidly down the scope. I'm selecting the expanded sixteen-mile radarscope display, which gives more precise information.

At approximately fourteen miles, the scope tells me it's time to begin the snap-up. I'm smoothly pulling the nose above the horizon into a steep climb as the outer radar range circle on the radarscope begins to shrink. When this circle shrinks to the same size as the smaller steering circle, the missiles will fire. A steering dot and another smaller circle on the scope provide directional information. The aircraft is turned to put the "dot in the hole," thus positioning the aircraft for an accurate missile launch.

Looking up, I see the drone dead ahead and well above me. Squeeze the trigger! Wait for the computer to fire the missiles at the correct moment! The steering dot is "pegged" directly in the center of the steering circle. When the fire signal appears on the scope, there is a loud rush of air as the weapons bay doors rapidly slam open.

Now a roar as two Hughes Falcon missiles accelerate away from me as if I were sitting still. They're heading toward the drone with a closure rate almost three times the speed of sound. It's a hit!

My fascination is interrupted by the jolting realization that I must execute my breakaway maneuver to avoid flying through the debris of the target. I begin following the Data Link commands for RTB (return to base). I look down and follow the parachute attached to the crippled drone, now thousands of feet below, slowly falling into the Gulf of Mexico.

Back in the airfield traffic pattern, I'm reminded of one disadvantage of the delta wing—the absence of wing flaps. This causes the "Six" to have relatively high final approach and landing speeds. A normal weight final approach (2,000 pounds of fuel remaining) is flown at 181 knots, with touchdown at 149 knots. Landing speeds can exceed 200 knots on final with a heavy fuel load on board. However, the drag chute and high drag generated by the delta wing during aerodynamic braking enable you to stop the F-106 in very short distances. Aerodynamic braking is accomplished by slowly raising the nose of the aircraft—up to a maximum of seventeen degrees —once your main landing gear have touched the runway. It gives you the feeling that you're going to topple over backwards.

All F-106 live armament firings are done on the Tyndall AFB ranges under direction of the Air Defense Weapons Center. Each F-106 squadron deploys to Florida annually for at least a week of weapons firing. Daily training missions are flown against high- and low-altitude targets, using chaff and electronic countermeasures (ECM). The chaff and ECM emitted by target aircraft test the antijamming capabilities of the F-106, which are second to no other interceptor flying. Countering the ECM of a well-equipped bomber is beyond the ability of most fighters, but not the F-106. There is almost always a way for the "Six" to get an "MA" (mission accomplished) or a kill.

### The Other Role: Air-Superiority Fighter

The aerial-refueling modification added in the late 1960s gave the F-106 unlimited range and the abil-

## F-106 Delta Dart—Facts and Figures

| | |
|---|---|
| **Designer and Manufacturer** | Convair Div. of General Dynamics Corp. First flew on December 26, 1956. First USAF flight on April 29, 1957. In production from 1955 to 1961. Number produced: 340 (277 single-place A models and 63 two-place trainer variant B models). |
| **First Operational Squadron** | 498th Fighter-Interceptor Sqdn., Geiger Field, Wash. May 1959. |
| **Major Subcontractor** | Hughes Aircraft Co.—MA-1 electronic guidance and fire-control system. |
| **Wingspan** | 38 feet, 3½ inches. |
| **Length** | 70 feet, 8¾ inches. |
| **Height** | 20 feet, 3⅓ inches. |
| **Weights** | Basic weight, A model: 25,130 pounds; B model: 26,200 pounds. Weight with full external fuel tanks and armament, A model: 41,831 pounds; B model: 42,720 pounds. |
| **Speed** | Maximum: Mach 2.3 (1,525 mph) at altitude. |
| **Service Ceiling** | 57,000 feet. |
| **Powerplant** | One Pratt & Whitney J75-P-17 axial-flow turbojet, with afterburner. Thrust: 16,100 pounds (24,500 pounds in afterburner). |
| **Armament** | Two AIM-4F radar-guided Super Falcon missiles; two AIM-4G infrared-homing Super Falcon missiles; one AIR-2A Genie nuclear-capable rocket; all carried internally. Current modification provides M-61 Vulcan 20-mm cannon. |

ity to respond to emergencies anywhere in the world. In 1968, F-106s were flown across the Pacific to Korea in response to the North Korean seizure of the USS *Pueblo*. This worldwide capability increased the possibility that the F-106 will come in contact with enemy fighters. To prepare for this contingency, all F-106 pilots are given extensive training in air combat tactics (ACT), a mission at which the "Six" excels.

To demonstrate what it's like to fly an F-106 during an ACT engagement, I'd like to now take you to the 48th Fighter-Interceptor Squadron at Langley AFB, Va., where you will observe a mission flown against a flight of Navy fighters from Oceana Naval Air Station, Va. Much of the ACT training in the F-106 is conducted against different types of fighters, to obtain more realistic training and expose the pilots to the tactics of others.

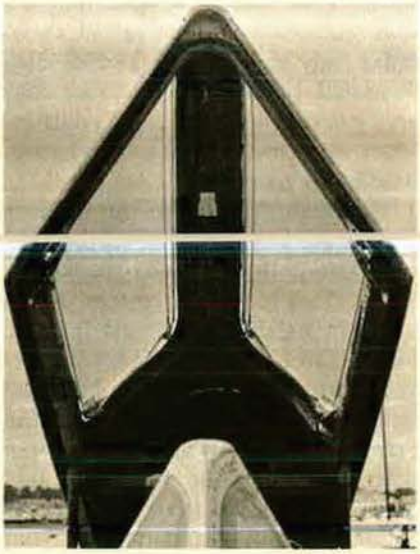
As I lead my flight of two into the ACT training area just west of Cape Hatteras, N. C., I check in and wait for the Navy flight to come up on my frequency. I usually arrive in the training area first since the F-106 normally flies with external fuel tanks and has approximately forty minutes more fuel than the Navy fighters, which fly without external tanks.

I set up an orbit at the western edge of the training area and spread my wingman out into patrol formation. The Navy flight checks in on my frequency—their call sign is "Ripper." I answer, "Hello, Rippers. This is Red One. . . . We are in an orbit over lake at twenty thousand."

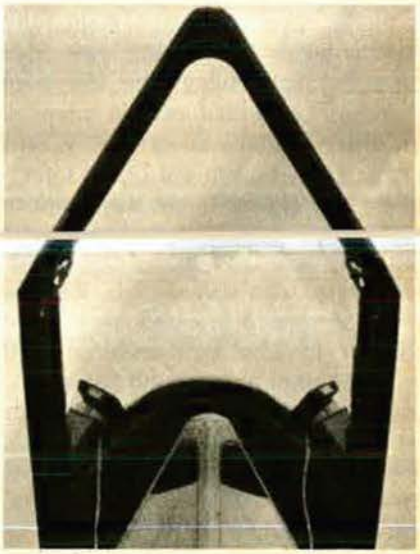
Ripper lead answers, "Roger, Red . . . we are heading east to the Cape." With one flight positioned over Cape Hatteras and the other over Lake Matamuskeet, we have a fifty-mile separation for the first setup.

"Red flight, vector, 120 degrees," directs the GCI controller. "Ripper flight, go port to 300 degrees. Ripper, you will be the first bogey." You pick up the heading and push up the throttle to gain a little speed.

On an ACT mission, the initial setup is either "head on" or from the beam. The flights alternate being the bogey (target flight) and the interceptor flight. The flight acting as bogey will receive only one heading and altitude to fly until they obtain visual contact with the interceptors. At this time, they are free to maneuver to defend or, if possible, take the offensive during an ensuing engagement. The interceptor flight receives full GCI support and is vectored toward the bogeys under radar control.



*Old-style F-106 canopy greatly restricted the pilot's visibility.*



*The new bubble canopy gives pilots the long-sought overhead view.*

"Red flight is steady 120," I transmit.

"Roger, Red . . . target is five degrees right at thirty miles."

I pick up a radar blip five degrees right at about thirty miles on my scope and lock on to it. The radarscope indicates 1,200-knot overtake on the bogeys. I advise the GCI controller that we have a "Judy" (radar lock on).

"Go, Gate," I call to my wingman, to select afterburner. The Mach tape rapidly climbs to 1.4 as we nose over to unload and let our aircraft accelerate while maintaining zero G. By "unloading" and flying with less than one G, the aircraft is free from the drag caused by producing lift with its wings. All engine thrust is now used to propel the aircraft forward, greatly increasing acceleration. The discomfort of hanging against the lap belt as you float under a lack of gravity is well worth the speed gained during the few moments of this maneuver. We are now closing at almost 2,000 miles per hour. Turning into their beam, we visually pick up two F-4s at eight miles.

I call, "Tally ho! . . . twelve o'clock . . . about 5,000 feet high." My wingman answers that he's got them in sight too. The bogeys are flying straight ahead, so we know that they haven't spotted us as we slide into their stern at four miles, closing quickly.

The bogeys see us and suddenly begin a defensive turn into us. As we close, the Navy flight is still in a turn when they call their "split." Ripper lead dives in afterburner to pick up speed and keep us out of range. His wingman climbs to gain separation and cover the leader. If we follow his leader, the wingman will be in a good position to come in from behind and sandwich us between them.

I decide to drive the low man out of the flight and then double-team

the high man. "Red, let's take the low man," I call to my wingman, as I head down after Ripper lead. Ripper leader sees us getting into good firing position and breaks into a very hard spiral to get us off his tail. I pull back on the stick. The G meter climbs to six Gs, and the aircraft shudders slightly as I climb rapidly.

### Two on One

"OK, Two. He is out of the fight for a while—let's take the high man," I call. When the low man "broke," he killed off his airspeed in order to make an extremely hard turn. This got him out of his immediate predicament, but also temporarily destroyed his ability to get back up into the fight to support his wingman, who stayed high. We had used our speed to climb back up to Ripper Two, rather than bleed it off in an attempt to turn with the leader.

Ripper Two is now three miles at our two o'clock and slightly high. This gives us a "two-on-one" situation, which was what we had prebriefed to attain.

"Red Two, stay high—I'm going in on Ripper Two," I call to my wingman.

"Roger, lead," he answers.

I know from where Red Two is flying that he'll be able to cover my six o'clock during the attack. Ripper Two starts a turn into us. We pass almost head on with only a few hundred feet separating our aircraft. I start a steep climbing turn into him. We pass canopy to canopy. Every time I pass that close to an aircraft, I'm amazed at the sensation of speed you feel. The other aircraft is only a blur as you pass him at over 1,200 mph.

Ripper Two continues in a level turn as I climb rapidly almost straight up. As the airspeed begins to bleed off, I roll my aircraft on its back and hang inverted, watching our bogey still in his turn below. Putting in full left rudder and pulling back on the stick, I rapidly roll straight down behind Ripper Two, picking up the airspeed I had lost in the climb.

"Red One is sliding into Ripper Two's six-o'clock. . . . Where is Ripper lead?" I ask my wingman.

My wingman answers, "He's low and still out of it . . . no threat. I'll keep him out of the fight."

The perspiration runs down into my eyes as I increase the Gs to more than five to cut Ripper off in his turn. I move my left hand from the throttle over to the radar hand control. It's a struggle. G-forces always seem to add to the tension of a dogfight. This added weight requires that you exert an extra effort to make any movement. You're also squeezed tightly through your legs and stomach as your anti-G suit inflates, to prevent all the blood from rushing to your legs.

Continuing to close on Ripper Two, I get an infrared head-up lock-on without looking into the radarscope. This is a great system. It enables an F-106 pilot to get a quick lock-on to a hard maneuvering target without taking his eyes from the fight. Moving closer, I squeeze the firing trigger at three-quarters of a mile and feel the weapons bay doors open as the inert missiles are extended into the airstream and quickly retract after tracking the target.

"Red One . . . 'MA' on Ripper Two." I transmit as I pull the throttle out of afterburner. Easing off the Gs, I "roll off" and head away from Ripper Two. "Red is disengaging and heading toward the lake," I call. Looking right, I see my wingman still in excellent position. We head west to the lake to set up for another engagement. This time it will be our turn to be the bogeys and to be on the defensive.

Checking fuel, we both have 5,500 pounds remaining. Enough for two more engagements and the return trip home of more than 100 miles. It is now that the long legs of the F-106 become of value. You can get in a lot of good flying in the "Six" and still have plenty of fuel for the trip home.

### The Future Is Bright

We're finally seeing long-overdue changes in the F-106. Many "Sixes" are now flying with a new clear bubble canopy that eliminates the great visibility problem presented by the old canopy. The F-106 fleet is also getting the composite boresight modification. This is the head-up lock-on capability mentioned earlier.

There will also be greatly increased reliability built into the MA-1 fire-control system as it is updated to increase its capabilities and accuracy. Many MA-1 components have already been converted to solid-state technology, replacing the older and less reliable equipment.

The present F-106 engine accessory drive and generator system is made up of four separate and independent generators. This will soon be replaced by the single multiphase F-111 generator. It has proved to be extremely reliable and will provide all F-106 electrical power, with a saving in total aircraft weight.

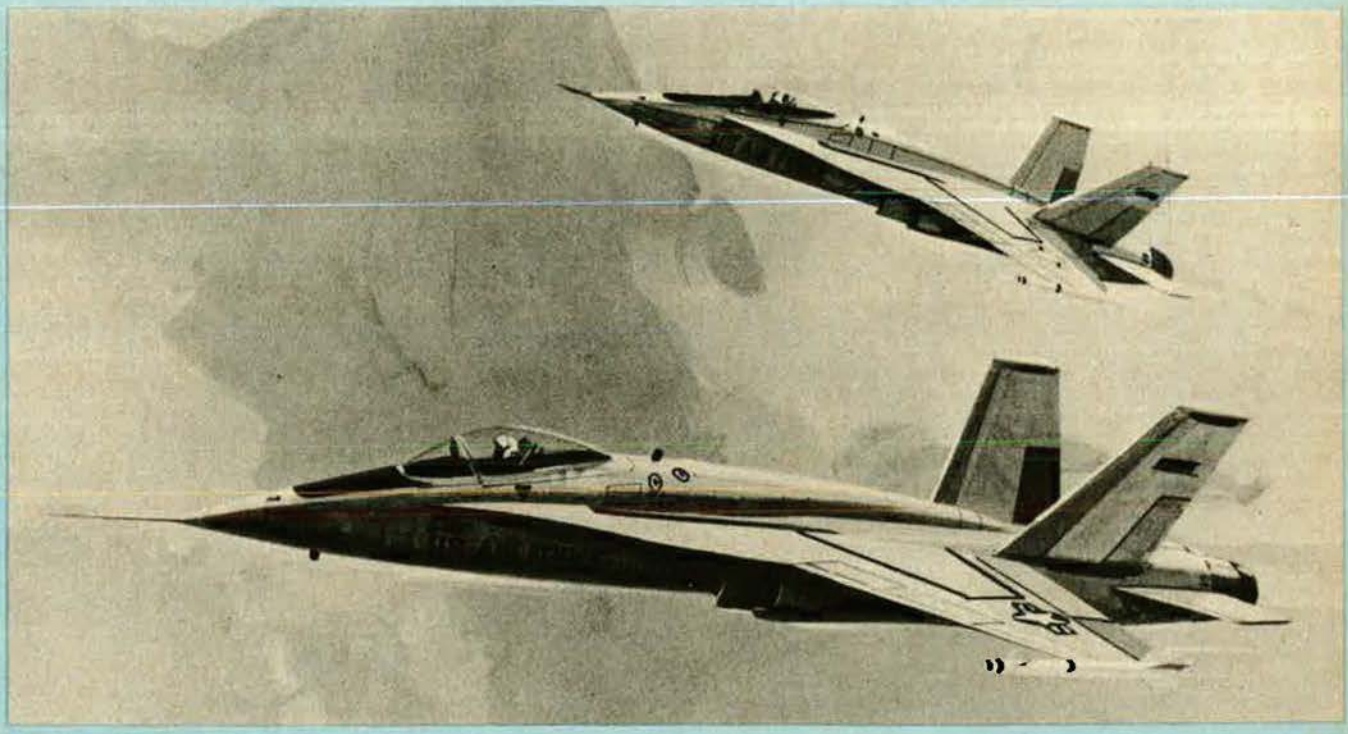
Probably the most significant modification since 1959 is installation of the M-61 Vulcan, 20-mm cannon "Six-Shooter" package in the missile bay of the aircraft. It will not interfere with the Falcon missiles, which will be retained along with the gun. The only noticeable change will be a slight bulge along the centerline of the weapons bay doors where the M-61 rotating gun barrels exit the fuselage. All F-106s will soon have the gun.

The "Six-Shooter" package will also include the "Snap-Shoot" gunsight, one of the most advanced and accurate sights ever developed. This system, specially designed for the F-106, has proved to be deadly accurate in more than a hundred test firings against drone and dart airborne targets.

With this renewed interest and increased emphasis on upgrading the F-106, it will be around for many years to come. Together with an improved manned interceptor (IMI), the over-the-horizon backscatter (OTH-B) radar, and the Airborne Warning and Control System (AWACS), the F-106 will continue to provide a viable deterrent to any airborne aggressor. There are many good years left for the F-106. It is an even better interceptor today than when it entered the ADC inventory fifteen years ago. ■

# JANE'S

## ALL THE WORLD'S AIRCRAFT SUPPLEMENT



*Artist's impression of the Northrop YF-17 lightweight fighter prototypes*

**NORTHROP**

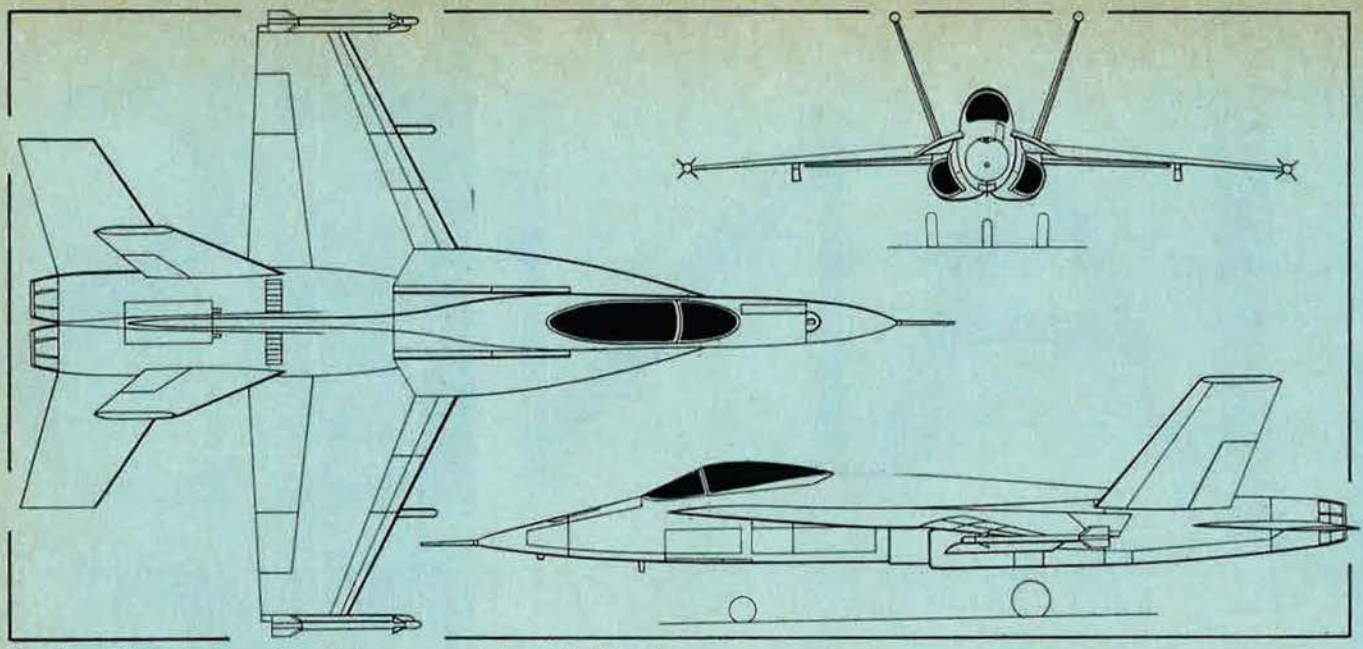
*NORTHROP CORPORATION; Head Office: 1800 Century Park East, Century City, Los Angeles, California 90067, USA*

**NORTHROP YF-17**

Reverting in 1970 to the pre-World War II concept of prototype competition, the USAF's Aeronautical Systems Division (ASD) hoped that this would allow manufacturers a greater degree of flexibility when designing aircraft to meet a particular Air Force requirement. By awarding fixed-price contracts for procurement of the competing prototypes, the ASD planned also to place a specific limit on R and D costs.

One of the first programmes initiated under this concept was for a lightweight fighter, and requests for proposals resulted in submissions from The Boeing Company, General Dynamics Corporation, Lockheed Aircraft Corporation, LTV Aerospace Corporation, and Northrop Corporation. Computer studies which had been completed and evaluated by the Prototype Programs Office before receipt of the manufacturers' proposals, in February 1972, simplified preliminary appraisal of the designs. Contractors who had built models were requested to make them available to the ASD, which carried out independent wind tunnel tests at the USAF's Flight Dynamics Laboratory.

In April 1972, the ASD selected for development the designs submitted by General Dynamics and Northrop, and these companies were awarded contracts valued at $37.9 million and $39.2 million respectively. Each was required to build two prototypes for evaluation in fly-off competition,



*Northrop YF-17 single-seat lightweight prototype fighter* (Pilot Press)

with the understanding that these aircraft are to be regarded as technology demonstrators rather than definitive weapon systems.

External configuration of Northrop's YF-17 is very similar to that of the P-530 Cobra multi-rôle tactical fighter which this company is developing under its international industrial consortium programme, and which was evolved in a six-year company-funded research project involving some 900,000 man-hours and 5,000 hours of wind tunnel and simulator tests. It is now expected that the P-530 will be developed as a total weapons system following the aerodynamic evolution and testing of the YF-17.

Since award of the YF-17 contract, a further 500,000 man-hours and 5,000 hours of wind tunnel and simulator tests have been carried out, and reports suggest that about 70% of the design work had been completed by mid-1973. That which remains concerns the refinement of subsystems. In consequence, orders have been placed for all materials, equipment, and systems, and by early July 1973 the first prototype was approximately 20% assembled in a full fuselage jig. Initial assembly work on the second prototype had also begun, and this was expected to replace the first on the full fuselage jig in October 1973.

A significant feature of the design is the hybrid wing planform, the highly-swept leading-edge root extension of which adds 10% to the wing area. It is claimed that this hybrid configuration generates 50% more lift than a conventional wing shape. The leading-edge extension generates a low-pressure airflow over the wing which prevents spanwise movement of the boundary layer, delaying wing stall and offering exceptional manoeuvrability at high angles of attack. The use of graphite composite material for wing leading- and trailing-edge surfaces, flap panels, leading- and trailing-edges of the vertical fins, access doors, and some fuselage panels offers a weight saving of 30% by comparison with conventional materials.

The fins and rudders are set forward of the all-moving tailplane, which is located below the plane of the wing to provide increasing longitudinal stability at high angles of attack approaching maximum lift, and to preclude buffet from the wing wake under high *g* flight conditions. The vertical tail surfaces are sized and located to provide positive directional stability beyond the maximum trimmed angles of attack across the speed range. The forward location was chosen to eliminate reduction of horizontal tail surface effectiveness due to the outboard cant of the vertical surfaces, and to provide low supersonic drag through favourable influence on the area distribution of the aircraft.

Location of the engine intakes beneath the wing minimises flow angularity, placing them also in a position to take advantage of the compression effects of the wing leading-edge root extension during supersonic flight. A key feature of airframe/intake integration is a longitudinal slot through the wing root, which allows a proportion of the fuselage boundary layer air to flow over the upper surface of the wing. Thus, a narrow fuselage boundary layer gutter can be used, which results in a low-drag installation.

The power plant will consist of two General Electric YJ101 turbojet engines, developed from the F101-GE-F100 engine for the Rockwell International B-1 bomber, the YJ101 being based on a reduced-scale version of the hot core section of the F101 turbofan.

Outstanding visibility for the pilot is achieved by the canopy shape and location, with full aft vision at eye-level and above.

TYPE: Single-seat lightweight prototype fighter.

WINGS: Cantilever mid-wing monoplane, primarily of light alloy construction, with stainless steel or titanium used only in areas of high stress. Anhedral 5°. Sweepback at quarter-chord 20°. Hybrid wing planform, with highly-swept leading-edge root extension. Multi-spar wing structure. Sealed-gap ailerons. Single-slotted trailing-edge flaps, inboard of ailerons, and continuous-hinge leading-edge manoeuvring flaps, all constructed of graphite composite material.

FUSELAGE: Semi-monocoque basic structure, primarily of light alloy. Some fuselage panels and access doors constructed of graphite composite material. Stainless steel and titanium used only in areas subjected to high stress or heat. Airbrakes mounted in under-surface of fuselage. Fail-safe pressurised cockpit section.

TAIL UNIT: Cantilever structure, primarily of light alloy, with swept vertical and horizontal surfaces. All-moving tailplane. Leading- and trailing-edges of the outward-canted twin fins are of graphite composite material.

LANDING GEAR: Retractable tricycle type, main units retracting aft, nose unit forward. Single wheel on each unit.

POWER PLANT: Two General Electric YJ101 high by-pass ratio two-shaft turbojet engines with afterburning, each in the 15,000 lb (6,804 kg) st class.

ACCOMMODATION: Pilot only, on ejection seat, in pressurised, heated, and air-conditioned cockpit. Upward-opening canopy, hinged at rear.

ARMAMENT: One General Electric M-61 multi-barrel 20 mm cannon mounted in fuselage nose. One Sidewinder infra-red air-to-air missile mounted on each wingtip.

DIMENSIONS, EXTERNAL:

| | |
|---|---|
| **Wing span** | **35 ft 0 in (10.67 m)** |
| **Length overall** | **55 ft 6 in (16.92 m)** |
| **Height overall** | **14 ft 6 in (4.42 m)** |
| **Tailplane span** | **22 ft 2½ in (6.77 m)** |
| **Wheel track** | **6 ft 10¾ in (2.10 m)** |
| Wheelbase | 17 ft 1¼ in (5.21 m) |

AREA:

| | |
|---|---|
| Wings, gross | 350 sq ft (32.5 m²) |

WEIGHT:

| | |
|---|---|
| Max T-O weight | 21,000 lb (9,525 kg) |

## SAAB-SCANIA

*SAAB-SCANIA AKTIEBOLAG; Head Office: S-581 88 Linköping, Sweden*

Two reconnaissance versions of the Saab 37 Viggen multi-purpose combat aircraft were announced in early 1973, instead of the single S 37 version previously announced. These are as follows:

### SAAB SF 37 and SH 37 VIGGEN

**SF 37.** Single-seat all-weather armed photographic reconnaissance version, to replace the S 32C version of the Saab 32 Lansen. A production contract was awarded in early 1973, and the first SF 37 flew for the first time on 21 May 1973.

Intended normally for overland reconnaissance, the SF 37 is fitted with cameras and other equipment permitting reconnaissance at any hour of the day or night, at high or low altitudes, and at long distances from the target.

**SH 37.** Single-seat all-weather armed sea surveillance version, to replace the S 35E Draken. Production ordered at same time as the SF 37. Primarily intended to survey, register, and report activities in the neighbourhood of Swedish territory. Can also be used for attack missions.

ARMAMENT AND OPERATIONAL EQUIPMENT (SF 37 and SH 37): Both reconnaissance versions carry two air-to-air missiles, on the outboard wing stations, for self-defence. Equipment in the SF 37 includes a special optical sight, data camera, tape recorder, and other registration equipment. The data camera collects and stores on its film co-ordination figures, aircraft position, course, altitude, target location, and other data. Four vertical or oblique low-level cameras, one long-range vertical high-altitude camera, and an infra-red camera are installed in the nose, together with the camera sight and ECM registration equipment. Systems configuration also makes possible the detection of camouflaged targets and horizon-to-horizon (180°) photo coverage. Typical external mission equipment, in addition to air-to-air missiles, includes a drop-tank and two night reconnaissance pods (night cameras and illumination equipment) on the under-fuselage stations, and an active or passive ECM pod on each of the inboard underwing pylons. Internal equipment of the SH 37 includes a nose-mounted surveillance radar, a camera for photographing the radar display, ECM registration equipment, and various other registration systems including a data camera and a tape recorder. The inboard and outboard wing pylons will be occupied, respectively, by active or passive ECM pods and air-to-air missiles, as in the SF 37; the underfuselage attachments will carry a drop-tank on the centre-line pylon, a night reconnaissance pod on the port pylon, and a camera pod on the starboard pylon.

*Saab SF 37 Viggen single-seat all-weather armed photo-reconnaissance aircraft*

## CIAR, ICA, and IRMA

*Addresses: Brasov and Bucharest, Romania*

*CIAR (CENTRALA INDUSTRIALA AERONAUTICA ROMANA; Industrial Centre for Romanian Aviation); Headquarters: 133 Calea Victoriei, Sector 1, Bucharest, Romania*

Romania has had a tradition of aviation since the earliest days of flying, dating from the first monoplane built in France in early 1906 by the Romanian engineer Traian Vuia; the original monoplane of Aurel Vlaicu which, on 17 June 1910, became the first nationally-designed aeroplane to be flown in Romania; and the famous aeroplanes designed and built in France and Britain by Henri Coanda in 1910–14.

Since that time, the Romanian aircraft industry (IAR) has produced some 80 different types of landplane (of which 70 were Romanian-designed) and three types of seaplane (two being of Romanian design), and has developed and manufactured 39 different types of sailplane. In addition, many other achievements in the fields of theoretical and experimental aerodynamics have been made by teams of Romanian engineers led by Prof Elie Carafoli, Prof Ion Stroiescu, Prof Ion Grosu, Prof Tipei, Dipl Ing Radu Manicatide, Dipl Ing Iosif Silimon, and others.

Before the second World War, the Romanian aircraft industry employed more than 20,000 people, the most important centres being the IAR (Industria Aeronautica Romana) at Brasov, with 8,000 employees; SET at Bucharest; and ICAR, also at Bucharest. The IAR factory, destroyed by bombing in 1944, was rebuilt after the war, and resumed its aeronautical activities with the IAR-811 training aircraft designed by Dipl Ing Radu Manicatide and flown for the first time in March 1949. Known until 1959 as URMV-3 (aircraft component repair factory 3), the Brasov factory during that period produced more than 200 aircraft of 10 different types (designed by Dipl Ing Manicatide) and more than 20 types of sailplane (designed by Dipl Ing Silimon). At the same time, a number of training and other sailplanes were produced at the Combinatul de Lemn (wood factory) at Reghin by Vladimir Novitzchi; and two repair factories, subordinate to the Ministry of Military Forces, were set up at Medias (ARMV-1) and Bucharest (ARMV-2).

A major reorganisation took place in 1959, when the URMV-3 at Brasov was dissolved and its staff were divided into two teams. One of these was placed under the leadership of Dipl Ing Manicatide at ARMV-2, which was then renamed IRMA (Intreprinderea de Reparat Material Aeronautic). The other, led by Dipl Ing Silimon, was set up at Ghimbav as a division of IIL-Brasov, to concentrate on sailplane design. During the next nine years, IRMA, which was then responsible to the Ministry of Transport, built more than 140 aircraft, including seaplanes, for ambulance, training, agricultural, and other duties.

The Romanian aeronautical industry was reorganised in 1968, and its activities are now undertaken, within the Ministry of Machine Tools Building and Electrotechnics Industry, by the CIAR (Industrial Centre for Romanian Aviation).

The major activities of CIAR are carried out in two factories: Intreprinderea de Reparat Material Aeronautic **(IRMA-Bucuresti)** and Intreprinderea de Constructii Aeronautice **(ICA-Brasov).** In mid-1973, an outline agreement was concluded between the Romanian aircraft industry and Zentralgesellschaft VFW-Fokker which provides for the possible future production in Romania of the VFW 614 twin-turbofan transport aircraft. Research and development in the aeronautical field are undertaken by the Institute of Fluid Mechanics and Aerospace Construction **(IMFCA-Bucuresti).** The IRMA and ICA factories currently have a work force of about 5,000 persons. Principal current products are summarised as follows:

### IRMA-Bucuresti

This factory currently specialises in the repair and overhaul of various types of large and small aircraft on behalf of various airlines, including Tarom, the Romanian state airline. It was responsible for series production of the IAR-818 ambulance and agricultural aircraft (1965–66 *Jane's*) and, more recently, of the IAR-821 and -821B, described in the 1973–74 edition; and of the prototypes of the IAR-822 and -822B, now in production by ICA-Brasov and also described in the 1973–74 *Jane's.* In addition, IRMA-Bucuresti is manufacturing under licence the Britten-Norman BN-2A Islander, and by the beginning of 1973 had completed 84 of an initial commitment of 215 Islanders. A further 30 were scheduled for completion during 1973, with production increasing to 40 in 1974 and 50 in 1975. The first IRMA-built Islander flew for the first time on 4 August 1969.

### ICA-Brasov

ICA-Brasov, created in 1968, continues the work begun in 1926 by IAR-Brasov and continued in 1950–59 as URMV-3 Brasov. Today it manufactures aircraft and sailplanes of its own design, including the IS-23A and IS-24 cabin monoplanes, and the IS-28 and IS-29 series of sailplanes (see 1973–74 *Jane's*).

In addition, ICA-Brasov undertakes the repair and overhaul of light aircraft on behalf of IRMA; participates in the latter's manufacturing programme for the Britten-Norman Islander; manufactures the Aérospatiale SA 316B Alouette III helicopter under licence in Romania (an initial quantity of 50 is being built); and is also responsible for building the production-series IAR-822 and -822B agricultural and training aircraft. Production of 200 IAR-822-series aircraft is under way, of which 20 had been completed by the beginning of 1973; from 1973, this aircraft is also available in all-metal form under the designation IAR-826. All of these aircraft are described in the 1973–74 *Jane's.*

One of the latest products of ICA-Brasov (which in 1970 was awarded a Diploma of Honour by the FAI for its work in the field of aeronautical construction) is the prototype of a two/five-seat cabin monoplane known as the IAR-823, a description of which follows:

### IAR-823

The IAR-823 is a two/five-seat training or touring light aircraft, with a retractable landing gear. It was designed at IMFCA,


*Model of IAR-823 two/five-seat light aircraft (290 hp Lycoming IO-540-G1D5 engine)*

work beginning in May 1970, by a team led by Dipl Ing Radu Manicatide. Construction of a prototype began at ICA-Brasov in the Autumn of 1971, and this aircraft was scheduled to make its first flight during 1973. The first production aircraft was due to fly by the end of 1973.

As a two-seater, the IAR-823 is fully aerobatic and is intended for training duties. With a rear bench seat for up to three more persons it is suitable for use as an executive, taxi, or touring aircraft. Provision is made for two underwing pylons for the carriage of external stores.

TYPE: Two/five-seat cabin monoplane.

WINGS: Cantilever low-wing monoplane. Wing section NACA 23012 (modified). Dihedral 7° from roots. Incidence 3° at root, 1° at tip. All-metal structure, with single main spar and rear auxiliary spar; three-point attachment to fuselage. Riveted spars, ribs, and skin of corrosion-proof aluminium alloy. Leading-edges riveted, welded, and sealed to ribs and main spar to form main torsion box and integral fuel tanks. Electrically-actuated all-metal single-slotted flaps and fabric-covered metal ailerons. Ground-adjustable tab.

FUSELAGE: All-metal semi-monocoque structure. Glassfibre engine cowling.

TAIL UNIT: Cantilever metal structure. Two-spar duralumin-covered fin and tailplane; fabric-covered duralumin balanced rudder and elevators. Controllable and automatic trim tabs in elevators; ground-adjustable tab on rudder.

LANDING GEAR: Retractable tricycle type, with steerable nosewheel. Electrical retraction, main units inward, nose unit rearward. Emergency manual actuation. Oleo-pneumatic shock-absorbers. Main-wheel tyres size 6.00-6, pressure 42.5 lb/sq in (3.0 kg/cm²). Nosewheel tyre size 355 x 150 mm. Independent hydraulic main-wheel brakes, pedal-controlled from left front seat.

POWER PLANT: One 290 hp Lycoming IO-540-G1D5 six-cylinder horizontally-opposed air-cooled engine, driving a Hartzell two-blade constant-speed metal propeller. Fuel in four integral wing tanks, total capacity 55 Imp gallons (250 litres). Provision for two 15.4 Imp gallon (70 litre) drop-tanks on underwing pylons.

ACCOMMODATION: Fully-enclosed cabin, seating two persons side by side on individual adjustable front seats, with removable bench seat at rear for two or three more people. Upward-hinged door on each side of cabin, which is soundproofed, heated, and ventilated. Space at rear of cabin for 88 lb (40 kg) of baggage. Equipment and layout can be varied for use as air taxi, executive or freight transport, ambulance, liaison, or photographic aircraft.

SYSTEMS AND EQUIPMENT: Electrical system, including 50A alternator and 24V 30Ah battery, for engine starting, flap and landing gear actuation, radio communications, landing and navigation lights, and cabin and instrument lighting. Dual controls standard in training version, optional in other versions. Other standard equipment includes VFR instrumentation and Bendix RT 221-AE transceiver. Optional equipment, according to mission, includes blind-flying instrumentation and, in civil transport version, marker beacon, nav/com radio, VOR/ILS, ADF, and autopilot.

DIMENSIONS, EXTERNAL:

| | |
|---|---|
| Wing span | 32 ft 9¾ in (10.00 m) |
| Wing chord at c/l | 6 ft 6¾ in (2.00 m) |
| Wing chord at tip | 3 ft 3¼ in (1.00 m) |
| Wing aspect ratio | 6.66 |
| Length overall | 27 ft 0¼ in (8.24 m) |
| Height overall | 8 ft 3¼ in (2.52 m) |
| Wheel track | 7 ft 4¼ in (2.24 m) |
| Wheelbase | 6 ft 1¼ in (1.86 m) |
| Propeller diameter | 7 ft 4 in (2.23 m) |

AREAS:

| | |
|---|---|
| Wings, gross | 161.5 sq ft (15.00 m²) |
| Ailerons (total) | 12.92 sq ft (1.20 m²) |
| Trailing-edge flaps (total) | 19.16 sq ft (1.78 m²) |
| Horizontal tail surfaces (total) | 35.52 sq ft (3.30 m²) |
| Vertical tail surfaces (total) | 16.15 sq ft (1.50 m²) |

WEIGHTS AND LOADINGS (A: Aerobatic; U: Utility category):

| | |
|---|---|
| Weight empty: | |
| A | 1,940 lb (880 kg) |
| U | 1,984 lb (900 kg) |
| Max T-O weight: | |
| A | 2,614 lb (1,186 kg) |
| U | 3,042 lb (1,380 kg) |
| Max permissible weight for special missions | 3,307 lb (1,500 kg) |
| Max normal wing loading: | |
| A | 16.2 lb/sq ft (79.0 kg/m²) |
| U | 18.8 lb/sq ft (92.0 kg/m²) |
| Max normal power loading: | |
| A | 9.15 lb/hp (4.15 kg/hp) |

PERFORMANCE (estimated, at 3,086 lb; 1,400 kg AUW):

| | |
|---|---|
| Max level speed at S/L | 162 knots (186 mph; 300 km/h) |
| Cruising speed (75% power) at 5,750 ft (1,750 m) | 151 knots (174 mph; 280 km/h) |
| Econ cruising speed (60% power) at 10,000 ft (3,050 m) | 145 knots (168 mph; 270 km/h) |
| Max permissible diving speed (limited) | 215 knots (248 mph; 400 km/h) |
| Stalling speed, flaps up | 65 knots (75 mph; 120 km/h) |
| Stalling speed, 30° flap | 54.5 knots (62.5 mph; 100 km/h) |
| Max rate of climb at S/L | 1,378 ft (420 m)/min |
| Service ceiling | 19,025 ft (5,800 m) |
| T-O run | 755 ft (230 m) |
| Landing run | 656 ft (200 m) |
| Range, according to mission and payload | 377–728 nm (435–838 miles; 700–1,350 km) |
| Endurance, according to mission and payload | 2½–5 hr |

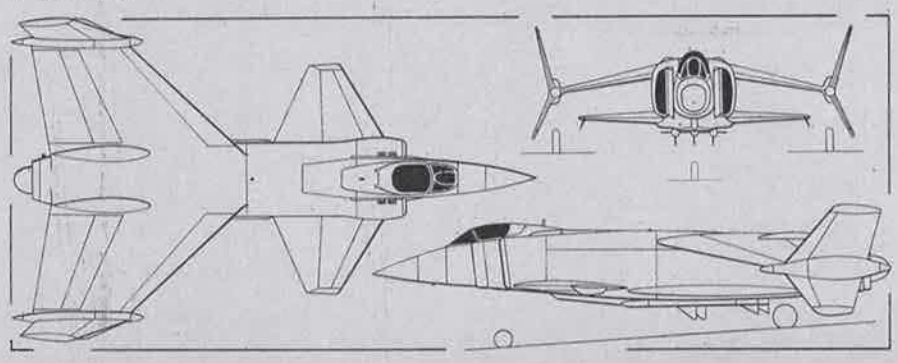
## ROCKWELL INTERNATIONAL

*ROCKWELL INTERNATIONAL CORPORATION; General Office: 1700 East Imperial Highway, El Segundo, California 90245, USA*

### ROCKWELL XFV-12A

For some time the US Navy has been studying the potential of a sea control ship (SCS), a vessel of around 14,000 tons displacement, with a small carrier deck that would have neither catapult nor arrester gear. Such a configuration assumes the availability of a V/STOL fighter/attack aircraft, and whilst the US Marine Corps' Hawker Siddeley AV-8A Harrier is being studied for such a rôle, the Navy is also

*Rockwell International XFV-12A single-seat V/STOL interceptor/attack prototype* (Pilot Press)



investigating other types of aircraft with V/STOL capabilities.

This, briefly, is the background to the $249,000 study contract awarded by the Navy to General Dynamics Convair Aerospace Division for a three-engine lift-plus-lift/cruise supersonic VTOL fighter, and the $46 million contract awarded to Rockwell International's North American Aerospace Group/Columbus Aircraft Division to develop and test-fly two single-seat single-engine all-weather V/STOL interceptor/attack prototypes, which have been allocated the designation XFV-12A.

Each of these aircraft will be roughly the size of a McDonnell Douglas A-4 Skyhawk, will employ an augmentor-wing concept with forward canard and aft semi-delta wings, and will be powered by a single, special version of the Pratt & Whitney F401-PW-400 advanced-technology turbofan engine.

The augmentor system will utilise a diverter valve to block off the turbofan nozzle and divert the exhaust gases through ducts to nozzles in the wings and canards. A full-span ejector-flap system on each wing and canard will enable ambient air to be drawn in over the flaps and ejected downward, mixed with the primary exhaust flow in a 7.5 : 1 ratio to provide the required jet-lift.

To keep the development costs to a minimum, several major assemblies from existing types of aircraft are incorporated in the XFV-12A, including the forward fuselage, nosewheel unit, and main landing gear of the A-4, and the engine intakes and wing box of the F-4.

Similar cost considerations limit the amount of test hardware associated with the development programme. To evaluate thrust augmentor components, a cutaway section of the wing, complete with diffuser flaps, has been mounted on a rotary test rig that can be operated at speeds of up to 150 knots (173 mph; 278 km/h). It was planned to mount in this rig by August 1973 a refurbished ground test version of the F401 engine, so that engine exhaust air ducted along the rig and blown over the wing components while the rig was rotating at high speed would permit evaluation of the thrust augmentor system.

Similarly, it is planned to use a "free air wind tunnel", by mounting one of the prototype aircraft, complete with engine, in flying attitude on a flat railway truck. Travelling at speeds of up to 70 knots (81 mph; 130 km/h), this will enable the aircraft's controls to be put through a full transition to harmonise them.

A design verification article (DVA), or full-size mock-up, has been constructed, embodying the existing airframe assemblies from other aircraft that were selected to limit development costs. They were assembled in their correct physical relationship, allowing full and careful study of the integration of the structures, systems, and power plant, before construction of the flying prototypes was started.

First conventional take-off and flight test of an XFV-12A prototype is scheduled for October 1974, with the first vertical take-off following in January 1975.

TYPE: Single-seat all-weather V/STOL interceptor/attack prototype.

WINGS: Cantilever high-wing monoplane. Semi-delta configuration, forward portion of wing structure embodying an F-4 wing box. Full-span trailing-edge flaps provide a lifting force for manoeuvrability in high-speed flight. Vertical endplate surfaces are mounted at each wingtip, comprising a fixed outward-canted fin below the wing, and a fixed outward-canted fin and rudder above the wing. Wing augmentor (ejector) flaps extend almost full span. They provide control of the vertical lift propulsion, acting as thrust vectors and so giving attitude and height control in hover and low-speed flight. The aft ejector flaps (together with those in the canard surfaces) serve as conventional flight controls in cruising flight. The forward ejector flaps can be used also as speed brakes.

CANARD SURFACES: Cantilever low-wing monoplane. Full-span trailing-edge flaps provide a lifting force for manoeuvrability in high-speed flight. Full-span augmentor (ejector) flaps function in combination with those on wings.

FUSELAGE: Forward fuselage, to aft of cockpit, is that of an A-4. Broad-section fuselage aft of cockpit to house engine intake ducts and augmentor system ducting. Engine mounted in aft fuselage.

LANDING GEAR: Retractable tricycle type. Main units retract rearward into wingtip fairings, nosewheel unit forward. Oleo-pneumatic shock-absorption. Hydraulic nosewheel steering. All units as for McDonnell Douglas A-4.

POWER PLANT: One modified Pratt & Whitney F401-PW-400 turbofan engine in the 20,000 lb (9,070 kg) thrust class. A special electro-hydraulically actuated diverter valve, designed by Pratt & Whitney, will be installed in the tailpipe of the engine. When open, in the horizontal flight mode, it will allow free passage of engine exhaust air for conventional propulsion. When closed, for vertical flight, the exhaust air will be diverted to the ducts that feed the wing and canard augmentor nozzles.

ACCOMMODATION: Pilot only, on Douglas Escapac zero-zero ejection seat.

DIMENSIONS, EXTERNAL:

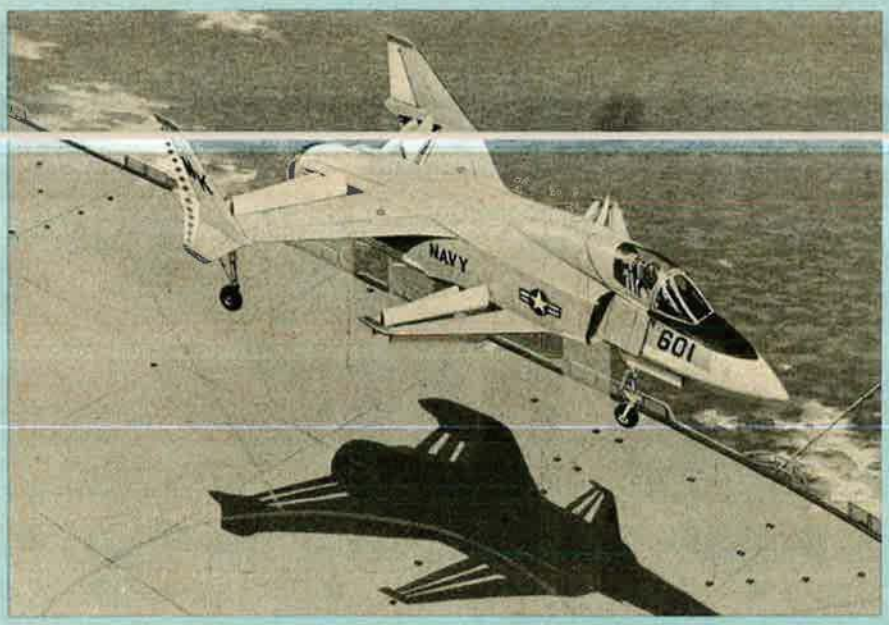
| | |
|---|---|
| Width overall | 28 ft 0 in (8.53 m) |
| Length overall | 43 ft 2 in (13.16 m) |
| Height over fins | 9 ft 3 in (2.82 m) |
| Wheel track | 23 ft 10¾ in (7.28 m) |

WEIGHT:

| | |
|---|---|
| Max vertical T-O weight | 19,500 lb (8,845 kg) |

PERFORMANCE:

| | |
|---|---|
| Max speed | in excess of Mach 2 |




*Artist's impression of Rockwell International XFV-12A taking off from a sea control ship*

## MARSHALL

*MARSHALL OF CAMBRIDGE (ENGINEERING) LTD; Head Office and Works: Airport Works, Cambridge CB5 8RX, UK*

### MARSHALL (LOCKHEED) HERCULES W. Mk 2 CONVERSION

The Hercules W. Mk 2 is a long-range meteorological aircraft, adapted by Marshall from a Lockheed Hercules C. Mk 1 (XV208) which has been procured by the Ministry of Defence for the RAF's Meteoro-

*Hercules W. Mk 2, modified from a C. Mk 1 by Marshall of Cambridge for the RAF's Meteorological Research Flight*

logical Research Flight at Farnborough, Hampshire. It will replace a Vickers Varsity at present used by the Flight.

The outward appearance of the W. Mk 2 is shown in the accompanying photograph. Extensive modification to the nose of the aircraft, to incorporate an 18 ft (5.49 m) long instrumentation boom, necessitated mounting the weather radar scanner in a pod above the flight deck. Instrumentation pods can also be fitted on the wings, outboard of the engine nacelles.

The interior of the aircraft contains a large number of scientific recording instruments including an air sampling boom, thermometers, closed-circuit television, and a sophisticated installation for the ejection of radio sondes. A fully-instrumented mobile laboratory for the controlling and monitoring of in-flight experiments is installed in the main fuselage compartment. Much of this instrumentation is of British manufacture.

The W. Mk 2 flew for the first time on 21 March 1973 and is due to enter service during this Autumn.

The dimensions, weights, and performance of the Hercules C. Mk 1 (Lockheed C-130K), as given in the US section of *Jane's*, apply generally also to the W. Mk 2, except in the following respects:

LANDING GEAR: Main-wheel tyres size 54 x 20.5 - 24.25, pressure 105 lb/sq in (7.38 kg/cm²). Nosewheel tyres size 37 x 13.5-18.5, pressure 60 lb/sq in (4.22 kg/cm²).

DIMENSIONS, EXTERNAL:

| | |
|---|---|
| Length overall | 120 ft 0 in (36.58 m) |
| Height overall | 38 ft 5 in (11.71 m) |

WEIGHTS:

| | |
|---|---|
| Weight empty | 70,678 lb (32,059 kg) |
| Weight empty, equipped | 81,900 lb (37,149 kg) |
| Max normal T-O weight | 155,000 lb (70,310 kg) |
| Max zero-fuel weight | 128,800 lb (58,422 kg) |
| Max landing weight | 130,000 lb (58,970 kg) |

## CERVA (G.I.E.)

*CONSORTIUM EUROPÉEN DE RÉALISATION ET DE VENTES D'AVIONS (GROUPEMENT D'INTÉRÊTS ÉCONOMIQUES); Address: 13 rue Saint-Honoré, 78-Versailles, France*

### CERVA CE.43 GUÉPARD (CHEETAH)

The CE.43 Guépard is basically an all-metal derivative of the Wassmer WA Super 4/21, retaining the general features of that aircraft. The prototype (F-WSNJ) flew for the first time on 18 May 1971 and was exhibited at the Paris Air Show later that month. It was followed by a second flying prototype, which was delivered to the SFA, and a further airframe for static testing by the CEAT at Toulouse.

Following certification by the SGAC, on 1 June 1972, an initial production series of ten Guépards was laid down, with the aim of establishing a delivery rate of four aircraft per month. Like the prototypes, and the WA Super 4/21, these aircraft have a 250 hp Lycoming engine and are basically four-seaters. Development of the aircraft to have six seats and a more powerful engine (*e.g.*, 285 hp Teledyne Continental Tiara or 290 hp Lycoming) is projected, together with a light cargo-carrying version with the rear seats removed.

The basic airframe of the Guépard is manufactured by Siren at Argenton-sur-Creuse. Equipment installation, final assembly, and flight testing are performed by Wassmer at Issoire.

TYPE: Four-seat all-metal light aircraft.

WINGS: Cantilever low-wing monoplane. Wing section NACA 63-618. Dihedral 6° from roots. All-metal structure, with main spar at 33% chord, light plate front spar at 3.2% chord, and light rear spar at 65% chord to carry ailerons and flaps. Each wing contains 13 ribs, four top-surface stringers, and three bottom-surface stringers, and is covered with AU4G alloy sheet. All-metal unslotted ailerons, with top hinges. Electrically-actuated slotted flaps of all-metal construction. No trim tabs. Landing and navigation lights in wingtips.

FUSELAGE: All-metal "boat-type" cabin structure of heavy frames, stringers, and skin. Conventional semi-monocoque rear fuselage. Engine cowling and cabin door of polyester plastics.

TAIL UNIT: Cantilever metal structure, with vertical surfaces swept back at 37°. All-moving horizontal surfaces, with anti-tab at root on each side. Controllable tab on rudder.

LANDING GEAR: Retractable tricycle type, with steerable nosewheel. Main wheels retract inward into wing roots, nosewheel rearward. Electrical retraction. Oleo-pneumatic shock-absorbers. Main-wheel tyres size 420 - 150. Nosewheel tyre size 360 - 125.7. Hydraulic brakes. Small tail bumper.

POWER PLANT: One 250 hp Lycoming IO-540-C4B5 six-cylinder horizontally-opposed air-cooled engine, driving a Hartzell two-blade variable-pitch propeller. Main fuel tank in centre of each wing, aft of main spar; auxiliary tank in each wing outboard of main tank. Total capacity of main fuel tanks 48.4 Imp gallons (220 litres). Total capacity with auxiliary tanks 90.2 Imp gallons (410 litres). Refuelling point above each tank.

ACCOMMODATION: Two adjustable seats side by side at front, with dual controls. Rear bench seat for two persons. Upward-hinged door on starboard side. Baggage compartment aft of cabin, with upward-hinged door on starboard side.

ELECTRONICS AND EQUIPMENT: Comprehensive electronics and IFR instrumentation to customer's requirements, including dual VOR, DME, etc. Rotating beacon at tip of fin.

DIMENSIONS, EXTERNAL:

| | |
|---|---|
| Wing span | 32 ft 9½ in (10.00 m) |
| Wing chord (constant) | 5 ft 3 in (1.60 m) |
| Length overall | 27 ft 6½ in (8.40 m) |
| Height overall | 9 ft 2¼ in (2.80 m) |
| Tailplane span | 11 ft 4 in (3.46 m) |
| Wheel track | 10 ft 10 in (3.30 m) |
| Wheelbase | 6 ft 10½ in (2.10 m) |

DIMENSION, INTERNAL:

| | |
|---|---|
| Cabin: Max width | 3 ft 7 in (1.09 m) |

AREA:

| | |
|---|---|
| Wings, gross | 172 sq ft (16.0 m²) |

WEIGHTS AND LOADINGS:

| | |
|---|---|
| Weight empty | 1,863 lb (845 kg) |
| Max T-O weight: | |
| Utility category | 3,220 lb (1,460 kg) |
| Normal category | 3,527 lb (1,600 kg) |
| Wing loading: | |
| Utility category | 18.69 lb/sq ft (91.25 kg/m²) |
| Normal category | 20.48 lb/sq ft (100 kg/m²) |


*CERVA CE.43 Guépard four-seat light aircraft (250 hp Lycoming IO-540-C4B5 engine)*

PERFORMANCE (at max T-O weight):

| | |
|---|---|
| Max level speed | 172 knots (198 mph; 320 km/h) |
| Max cruising speed | 167 knots (192 mph; 310 km/h) |
| Econ cruising speed | 140 knots (161 mph; 260 km/h) |
| Min flying speed | 50 knots (58 mph; 93 km/h) |
| Max rate of climb at S/L | 1,080 ft (330 m)/min |
| Service ceiling | 17,400 ft (5,300 m) |
| Range with max fuel | 1,565 nm (1,800 miles; 2,900 km) |

## VALMET

*VALMET OY TAMPERE WORKS; Address: Box 387, 33101 Tampere 10, Finland*

### VALMET LEKO-70

The Leko-70 is a two/three-seat all-metal light aircraft, a prototype of which was ordered by the Finnish Air Force on 23 March 1973. A first flight date of 23 September 1974 has been set for this aircraft, and a second prototype will be built for structural testing.

The Leko-70 is designed for aerobatic flying as a two-seater; for Normal or Utility category flying it will seat two or three persons, depending upon the amount of baggage carried.

TYPE: Two/three-seat training and touring light aircraft.

WINGS: Cantilever low-wing monoplane. Wing section NACA $63_2A615$ (modified).

Dihedral 6° from roots. Constant-chord aluminium alloy wings. Leading-edges swept forward at roots. Slotted flaps and slotted ailerons, of aluminium alloy, on trailing-edge. No tabs.

FUSELAGE: Conventional aluminium alloy semi-monocoque structure.

TAIL UNIT: Cantilever aluminium alloy structure, with slight sweepback on vertical surfaces. Shallow dorsal fairing from rear of canopy to base of fin. Balanced elevators and rudder. Combined trim and balance tab in elevators; trim tab in rudder.

LANDING GEAR: Non-retractable tricycle type. Cantilever sprung main legs. Telescopic nosewheel strut. Disc brakes.

POWER PLANT: One 200 hp Lycoming IO-360-A1B6 four-cylinder horizontally-opposed air-cooled engine, driving a two-blade constant-speed propeller. Two fuel tanks in wings, total normal capacity 33 Imp gallons (150 litres), max capacity 41.8 Imp gallons (190 litres).

ACCOMMODATION: Side-by-side seats for instructor and pupil, in trainer version, under one-piece rearward-sliding fully-transparent canopy. Third seat to rear, which can be removed to make room for additional baggage. Cabin heated and ventilated, but not pressurised.

[illegible] 28V DC electrical system

ELECTRONICS AND EQUIPMENT: Two VHF, one ADF and VOR/ILS standard.

PERFORMANCE (estimated):

Max level speed at S/L
129.5 knots (149 mph; 240 km/h)

Stalling speed, flaps up
57 knots (66 mph; 105 km/h)

Max rate of climb at S/L
1,180 ft (360 m)/min

## SCOTTISH AVIATION

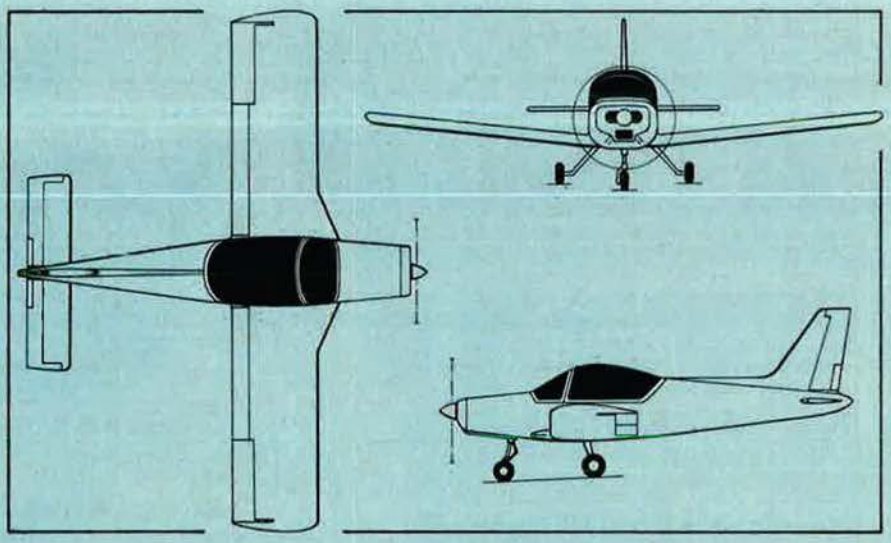
*SCOTTISH AVIATION LTD; Address: Prestwick International Airport, Ayrshire KA9 2RW, Scotland*

### SCOTTISH AVIATION JETSTREAM SERIES 200

**RAF designation: Jetstream T. Mk 1**

The original H.P. 137 Jetstream was designed and developed between 1966 and 1970 by Handley Page Ltd, and was described in *Jane's* at that time. A number of Handley Page built Jetstream Mk 1s are currently in service with operators in Canada, France, the UK, and the USA.

The current version of the Jetstream is the Series 200. This model originated with Handley Page, was developed subsequently by Jetstream Aircraft Ltd (see 1972–73 *Jane's*), and is now in production by Scottish Aviation. A full UK type certificate in the Transport category (passenger), for operations in performance group C, was awarded on 22 November 1972.



*Valmet Leko-70 two/three-seat training and touring aircraft* (Roy J. Grainge)

DIMENSIONS, EXTERNAL:

| | |
|---|---|
| Wing span | 30 ft 6¼ in (9.30 m) |
| Wing chord (constant) | 5 ft 0¼ in (1.53 m) |
| Wing aspect ratio | 6 |
| Length overall | 23 ft 11½ in (7.30 m) |
| Tailplane span | 11 ft 9¾ in (3.60 m) |
| Wheel track | 7 ft 6½ in (2.30 m) |
| Wheelbase | 5 ft 3 in (1.60 m) |

AREAS:

| | |
|---|---|
| Wings, gross | 150.70 sq ft (14.00 m²) |
| Ailerons (total) | 15.07 sq ft (1.40 m²) |
| Trailing-edge flaps (total) | 23.68 sq ft (2.20 m²) |
| Fin | 9.69 sq ft (0.90 m²) |
| Rudder, incl tab | 6.46 sq ft (0.60 m²) |
| Tailplane | 20.45 sq ft (1.90 m²) |
| Elevators, incl tabs | 10.76 sq ft (1.00 m²) |

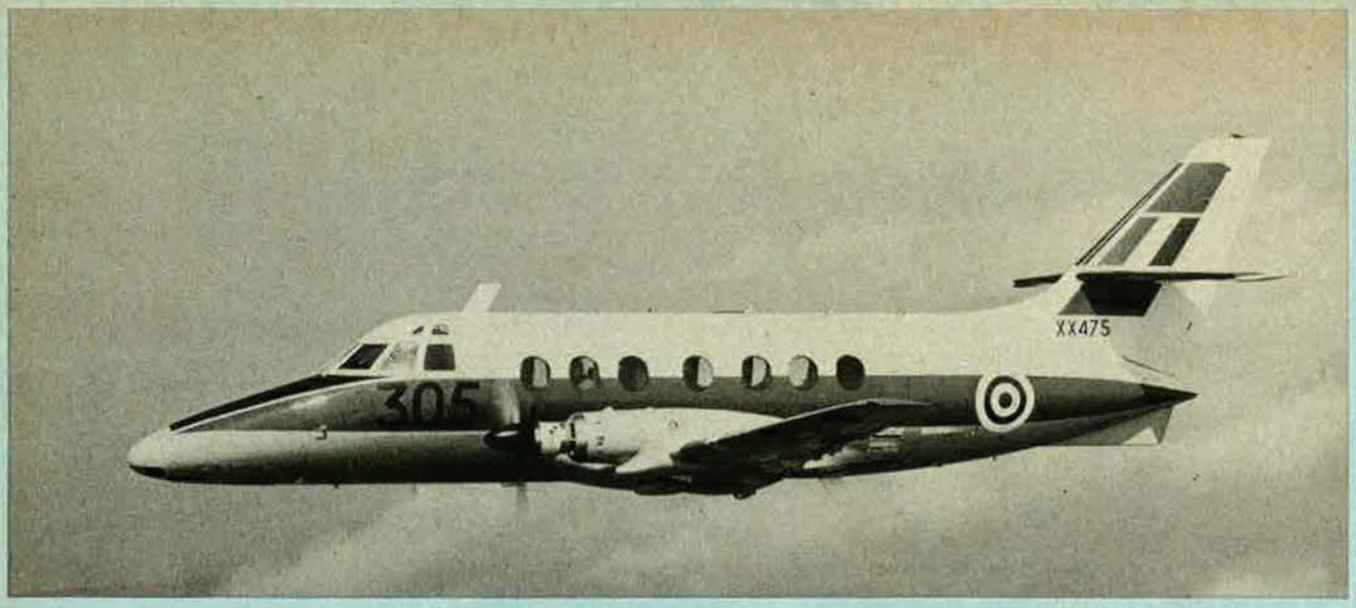
WEIGHTS:

Weight empty, equipped, without fuel
1,521 lb (690 kg)

Max T-O weight (Normal category)
2,535 lb (1,150 kg)

Scottish Aviation will offer the civil Jetstream Series 200 for sale from 1974. Meanwhile, production is centred on 26 military Series 200s (Model 201) for the Royal Air Force, ordered in February 1972. The first of these (XX475) flew for the first time on 13 April 1973, eight months after construction began, and was delivered to the A & AEE, Boscombe Down, in July 1973. The RAF aircraft, which are designated Jetstream **T. Mk 1,** are generally similar to the civil Series 200 except for having Astazou XVID engines, "eyebrow" windows above the flight deck, and different instrumentation and avionics installations. They will be used as trainers for pilots of multi-engined aircraft, superseding the Vickers Varsity in this role. The third production Model 201 will be delivered to the Central Flying School at Little Rissington and thereafter to No. 5 FTS, Oakington.

TYPE: Twin-turboprop light transport and aircrew trainer.




*Scottish Aviation Jetstream T. Mk 1 multi-engined pilot training aircraft for the Royal Air Force*

WINGS: Cantilever low-wing monoplane. Wing section NACA 63A418 at root, NACA 63A412 at tip. Dihedral 7° from roots. Incidence 2° at root, 0° at tip. Sweepback 0° 34′ at quarter-chord. Aluminium alloy fail-safe structure. Aluminium alloy manually-operated Frise-type ailerons. Hydraulically-operated aluminium alloy double-slotted flaps, with glassfibre slat. No slots or leading-edge flaps. Trim tab in each aileron. Goodrich pneumatic rubber-boot de-icing system for leading-edges.

FUSELAGE: Conventional aluminium alloy semi-monocoque fail-safe structure, with chemically-milled skin panels. Fully pressurised.

TAIL UNIT: Cantilever two-spar aluminium alloy structure. Fixed-incidence tailplane. Manually-operated control surfaces. Trim tabs in rudder and each elevator. Goodrich pneumatic rubber-boot de-icing system for leading-edges.

LANDING GEAR: Retractable tricycle type, with nosewheel steering. Hydraulic retraction, main wheels inward into wings, twin nosewheels forward. Electro-Hydraulics oleo-pneumatic shock-absorbers. Dunlop wheels and tyres on all units. Mainwheel tyres size 28 x 9.00-12, pressure 34 lb/sq in (2.39 kg/cm²). Nosewheel tyres size 6.00-6, pressure 57 lb/sq in (4.01 kg/cm²). No brake cooling. Dunlop disc brakes and anti-skid units.

POWER PLANT: Two 996 ehp Turboméca Astazou XVIC2 turboprop engines (Astazou XVID in Model 201), each driving a Hamilton Standard Type 23LF-371 three-blade variable- and reversible-pitch fully-feathering metal propeller. Fuel in integral tank in each wing, total capacity 384 Imp gallons (461 US gallons; 1,745 litres). Refuelling point on top of each outer wing. Oil capacity 2.09 Imp gallons (2.51 US gallons; 9.50 litres) per engine. Hot-air de-icing of engine air intakes, electrical de-icing of propellers and spinners.

ACCOMMODATION: Two seats side by side on flight deck, with provision for dual controls, though aircraft can be approved (subject to local regulations) for single-pilot operation. Main cabin can be furnished in executive layout for up to 12 passengers, with individual swivel seats and settees and full galley and toilet facilities; or in airliner layout, for up to 18 passengers at 29 in (74 cm) seat pitch, with toilets but no galley. RAF T. Mk 1 accommodation includes two pilot seats, four passenger seats, and toilet. Universal seat rails fitted. Downward-opening passenger door, with integral stairs, at rear of cabin on port side. Emergency exit over wing on starboard side. Baggage compartment in rear of cabin, aft of main door. Entire accommodation pressurised, heated, ventilated, and air-conditioned. Windscreen de-iced electrically.

SYSTEMS: AiResearch dual air cycle air-conditioning system, using engine bleed air. Cabin pressure control, with rate of pressure control which can be set to either 6.5 or 5.5 lb/sq in (0.46 or 0.39 kg/cm²). Duplicated hydraulic systems, each of 2,000 lb/sq in (140 kg/cm²) pressure, for actuation of flaps, landing gear, brakes, and nosewheel steering. Electrical system includes two 3kW 28V DC starter/generators, two 7.5kVA 208V AC 400Hz alternators and two 25Ah batteries, all of Plessey manufacture. Piped oxygen system, with optional drop-out masks.

ELECTRONICS AND EQUIPMENT: All instruments and avionics to customer's specification. Equipment in RAF T. Mk 1 includes Sperry STARS flight director system, Plessey PTR 175 VHF/UHF communications system, Collins 51-series VOR/ILS with marker beacon, Marconi-Elliott AD 370B ADF, RCA AVQ-75 DME, Bendix M.4C autopilot, Cossor 1520 transponder, and S.G. Brown intercom.

DIMENSIONS, EXTERNAL:

| | |
|---|---|
| Wing span | 52 ft 0 in (15.85 m) |
| Wing chord at root | 7 ft 2½ in (2.19 m) |
| Wing chord at tip | 2 ft 7¼ in (0.80 m) |
| Wing aspect ratio | 10 |
| Length overall | 47 ft 1½ in (14.37 m) |
| Length of fuselage | 43 ft 5 in (13.20 m) |
| Height overall | 17 ft 5½ in (5.32 m) |
| Fuselage: Max diameter | 6 ft 6 in (1.98 m) |
| Tailplane span | 21 ft 8 in (6.60 m) |
| Wheel track | 19 ft 6 in (5.94 m) |
| Wheelbase | 15 ft 1 in (4.60 m) |
| Propeller diameter | 8 ft 6 in (2.59 m) |
| Passenger door: | |
| Height | 4 ft 8 in (1.42 m) |
| Width | 2 ft 10 in (0.86 m) |
| Emergency exit: | |
| Height | 3 ft 0 in (0.91 m) |
| Width | 1 ft 10 in (0.56 m) |

DIMENSIONS, INTERNAL:

| | |
|---|---|
| Cabin, excluding flight deck: | |
| Length | 24 ft 0 in (7.32 m) |
| Max width | 6 ft 1 in (1.85 m) |
| Max height | 5 ft 11 in (1.80 m) |
| Floor area | 90 sq ft (8.35 m²) |
| Volume | 638 cu ft (18.05 m³) |
| Baggage compartment volume (according to layout) | 40–60 cu ft (1.13–1.70 m³) |

AREAS:

| | |
|---|---|
| Wings, gross | 270 sq ft (25.08 m²) |
| Ailerons, aft of hinge line (total) | 16.4 sq ft (1.52 m²) |
| Trailing-edge flaps (total) | 35.0 sq ft (3.25 m²) |
| Fin | 33.3 sq ft (3.09 m²) |
| Rudder, incl tab | 23.0 sq ft (2.14 m²) |
| Tailplane | 55.25 sq ft (5.13 m²) |
| Elevators, incl tabs | 27.55 sq ft (2.56 m²) |

WEIGHTS AND LOADINGS:

| | |
|---|---|
| Manufacturer's weight empty | 7,562 lb (3,430 kg) |
| Max payload | 3,814 lb (1,730 kg) |
| Max T-O and landing weight | 12,566 lb (5,700 kg) |
| Max ramp weight | 13,228 lb (6,000 kg) |
| Max zero-fuel weight | 12,250 lb (5,556 kg) |
| Max wing loading | 46.3 lb/sq ft (226 kg/m²) |
| Max power loading | 6.3 lb/ehp (2.86 kg/ehp) |

PERFORMANCE (at max T-O weight, ISA):

| | |
|---|---|
| Max permissible diving speed (structural) | 300 knots (345 mph; 555 km/h) |
| Max level and cruising speed at 10,000 ft (3,050 m) | 245 knots (282 mph; 454 km/h) |
| Econ cruising speed at 15,000 ft (4,575 m) | 234 knots (269 mph; 433 km/h) |
| Stalling speed, flaps down | 76 knots (87.5 mph; 141 km/h) |
| Max rate of climb at S/L | 2,500 ft (762 m)/min |
| Rate of climb at S/L, one engine out | 600 ft (182 m)/min |
| Service ceiling | 26,000 ft (7,925 m) |
| Service ceiling, one engine out | 10,000 ft (3,050 m) |
| Min ground turning radius | 25 ft 0 in (7.62 m) |
| T-O run | 1,900 ft (579 m) |
| T-O to 50 ft (15 m) | 2,500 ft (762 m) |
| Landing from 50 ft (15 m) | 2,310 ft (702 m) |
| Range with max fuel, reserves for 45 min hold and 5% total fuel | 1,200 nm (1,380 miles; 2,224 km) |

**SOVIET DEVELOPMENTS**

In this, the third and final installment of a report covering an AIR FORCE Magazine tour of Soviet aerospace facilities, the author reports on route- and equipment-planning of Aeroflot, the Soviet state airline, and a visit to "Star City," the Soviet cosmonauts' home base and the future, temporary home of the US astronauts assigned to the upcoming joint Apollo-Soyuz Test Program . . .

# THE SOVIET SPACE EFFORT: Still Increasing

**By Edgar Ulsamer,** SENIOR EDITOR, AIR FORCE MAGAZINE

AEROFLOT, the Soviet Union's state airline, is the world's largest and possibly most versatile air carrier. Its aircraft number in the "tens of thousands." This year, Aeroflot will transport about ninety million people to and from some 3,500 terminals inside the Soviet Union, and handle international traffic with sixty-five foreign countries. Its annual growth rate of about fifteen percent is decreed by the Soviet Union's five-year economic plan and is premised on the fact that air is the USSR's principal, and in many places only, form of transportation.

Lt. Gen. Alexei Semenkov, the Soviet Union's Deputy Minister of Civil Aviation and Aeroflot's second in command, told AIR FORCE Magazine matter-of-factly that "no country in the world relies on aviation to the extent that we do. Of course, our job goes beyond flying passengers and cargo. Aeroflot handles aerial fire fighting, crop dusting, prospecting, the transportation of fishermen and trappers, and other activities requiring air transportation." (Aeroflot also operates in direct support of the Soviet Air Force, as evidenced during the 1968 invasion of Czechoslovakia.)

During the current five-year plan (1971–75), Aeroflot is scheduled to carry about 500 million passengers, compared to about 300 million during the preceding five-year period. While the state planning committee has not yet set the goals for the 1976–80 time period, General Semenkov indicated that the past growth rates would probably be continued.

Admitting that Aeroflot's passenger-carrying capacities are already "overtaxed during the summer months," he pointed out that the airline had a pressing need for new and larger equipment.

The Tu-144 SST, he said, is expected to carry a large part of the domestic long-haul traffic between European Russia and Siberia as well as some medium-range traffic, beginning in 1975. Aeroflot's initial requirement is about seventy-five SSTs, but that is likely to grow as larger and more productive second-generation supersonic transports become available.

Aeroflot does not plan to impose a surcharge for domestic SST flights (airline tickets by governmental ukase must equal the price of comparable railroad fares), but would abide by IATA (International Air Transport Association) rulings on pricing in international traffic.

The Tu-144's seat-mile costs, General Semenkov said, would be "close to those of the Il-62M," the long-haul subsonic jet that resembles BAC's VC-10 and carries up to 186 passengers.

### Another New Aircraft

Augmenting the Tu-144 in Aeroflot's re-equipment plans is another new aircraft whose existence was not known until recently: the Il-86, expected to enter Aeroflot's inventory in 1976. Between 200 and 250 of these wide-bodied, four-engine aircraft are to be built, according to the Ministry of Aircraft Industry. With a maximum range of just under 2,000 miles—or about 2,800 miles with reduced loads—the new aircraft will be used on Siberian routes, and eventually in intra-European traffic, according to General Semenkov. The

*The Il-86, the Soviet airbus, will accommodate up to 350 passengers, mainly on domestic routes.*

aircraft will be operated with a maximum of 300 passengers in Siberian, and 350 in European traffic, according to Genrikh Novoshilov of the Ilyushin Design Bureau.

The Il-86's engines are improved versions of those of the Soviet Union's new cargo carrier, the Il-76, and of the Il-62M, and produce about 26,500 pounds of thrust. The engine is known as the D-30KB. The aircraft's most conspicuous feature is its innovative carry-on baggage system. Passengers enter the lower deck, place their luggage in racks, and then ascend to the three passenger compartments above.

This technique is expected to speed up passenger handling and aircraft turnaround, especially in airports with limited ground-handling facilities. Like other Soviet commercial jetliners, the Il-86 is designed for operation from rough fields. General Semenkov predicted that the Il-86 would have operating costs comparable to those of the European A-300 Airbus.

### Yak-42 Mockup Displayed

The third new aircraft to enter Aeroflot's inventory in the second half of the 1970s is the Yak-42, a mockup of which was shown for the first time to Western visitors, including this writer, in June 1973. (The six visiting US aerospace journalists were not permitted to take pictures of the mockup.) The new short-to-medium-range trijet, which bears some resemblance to the Yak-40 aircraft, is to enter service in 1976–77, according to General Semenkov.

It is scheduled for first flight by the end of this year. With a gross weight of 110,000 pounds, the aircraft accommodates between 100 and 120 passengers and has a range of up to 1,200 miles with full payload. Takeoff roll, fully loaded, is about 2,400 feet.

The Yak-42 will be powered by three D-36 high bypass ratio engines designed by V. A. Lotarev. They produce 14,850 pounds of thrust on takeoff. With a bypass ratio of 5.35 to 1, this engine appears to be the first example of a new third-generation engine technology in the Soviet Union. The D-36 engine, General Designer Alexander S. Yakovlev told AIR FORCE Magazine, is scheduled to undergo initial flight-testing aboard a Tu-16 Badger bomber by the end of this year. He also revealed that the Yak-42 will be the first Soviet aircraft designed from the outset to meet the certification requirements of the US Federal Aviation Administration.

A fourth new aircraft, which made a fleeting Western debut at the 1971 Paris Air Show,

—Novosti Press Agency

*Computer installation, of the Minsk type, is used to automate and control Tu-144 fabrication.*

and which is expected to enter into Aeroflot operation within a year, is the Il-76, a cargo carrier that bears some resemblance to USAF's C-141. The four-engine cargo-carrier has a payload of about 90,000 pounds and a range of about 3,000 miles. It is apparently meant to replace the An-22, a turboprop design almost equal in size to the C-5, which did not prove overly successful. General Semenkov said that the only user of the An-22 is the Soviet Air Force.

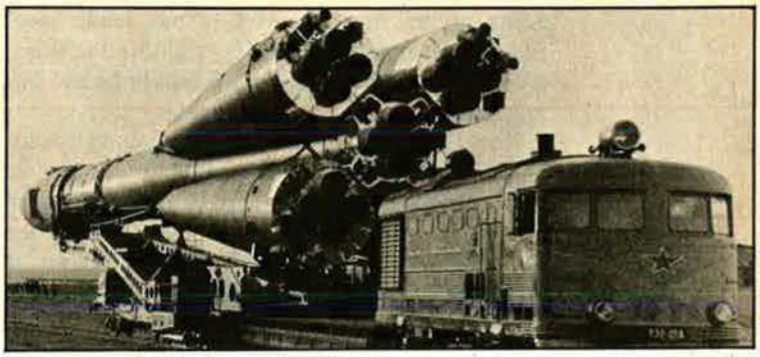
Easily one of the most impressive specialized air vehicles operated by Aeroflot is the world's largest helicopter, the V-12. The giant copter, which is believed to serve also as an ICBM transporter, has a maximum payload of 88,450 pounds, a range of up to 300 miles with reduced payload, and is of tandem rotor design. It is powered by four Soloviev D-25VF engines, which produce 6,500 shaft horsepower each. The copter is a compound and uses a rudimentary wing to provide about twenty percent of the required lift at about 140 mph, its normal cruise speed.

General Semenkov expressed dissatisfaction and chagrin about the small number of flights between the USSR and the US. He bemoaned the fact that the initially envisioned frequency of six flights a week each by Pan American World Airways and Aeroflot was cut to two each and that Pan Am reduces it even further during the winter months. Among the new routes to the US sought by Aeroflot, he said, are flights to Washington, D. C., via New York, and flights to Alaska in exchange for operating rights into Siberia on the part of Alaska Airlines. (From the US point of view, Soviet refusal to permit Pan Am to operate 747s on its flights to Moscow is vexing and apparently based on the fact that no comparable Soviet superjet is currently in existence.)

## A Visit to "Star City"

Some forty miles northeast of Moscow, shielded from the curious by massive fencing, lies what the Soviets call Zvezdnoy Gorodok, or Star City. On first glance, the sprawling complex of modern, dormitory-like buildings and the sylvan setting suggest an out-of-the-way campus or, because of the predominance of uniforms, a military academy. This illusion is quickly dispelled, however, once the visitor is inside the buildings, which are crammed with the paraphernalia of space. Mockups or actual models of Salyut and Soyuz spacecraft, flight simulators, centrifuges, and other assorted training devices abound.

Until recently, Star City, home and training base of the Soviet cosmonauts, their families, and the legion of scientists, technicians, and medical experts who support them, has been a "forbidden city," its existence barely known in the West. But the agreement between President Nixon and Chairman Kosygin of the USSR Council of Ministers on May 24, 1972, on ASTP, the joint US-Soviet Apollo-Soyuz Test Project, has already made Zvezdnoy Gorodok something of a household word in the US aerospace community. Beginning next year, it will serve as the home of the American astronauts participating in joint training for the experimental Apollo-Soyuz rendezvous and docking mission in mid-1975.



—Novosti Press Agency

*Workhorse of the Soviet space program, civilian as well as military, is the Soyuz launcher, shown here mounted on special railroad equipment. The launcher is modular, permitting flexible use.*

The enthusiasm with which the Soviets have responded to this challenge is obvious in Zvezdnoy Gorodok. New construction includes a large building to be used exclusively for simulating Apollo-Soyuz docking maneuvers. (According to present plans, only Apollo will be performing an active role, while Soyuz is to remain passive during docking maneuvers.) Although ASTP is being planned as a one-time, two-day experiment to test space-rescue capabilities, the Soviets consider it a springboard for long-term arrangements in US-Soviet space cooperation.

Maj. Gen. Vladimir Shatalov, Director of Cosmonaut Flight Training, told AIR FORCE Magazine that the present population of Star City is approximately 3,000 and includes "about" fifty cosmonauts. (Curiously, there are no women among the current cosmonaut contingent. In the past, the presence of women in the cosmonaut corps and the fact that one of them actually flew in earth orbit used to be cited as evidence of Soviet sexual egalitarianism.)

The arrival of the US astronauts next year and a slight expansion of the Soviet manned space program, General Shatalov explained, will result in a modest population increase at Star City. The amount of construction in progress seems to suggest more than just a slight expansion, however. A large hotel is

going up on the shores of a man-made lake. Elsewhere, new laboratories, training facilities, and housing and recreational buildings are being built.

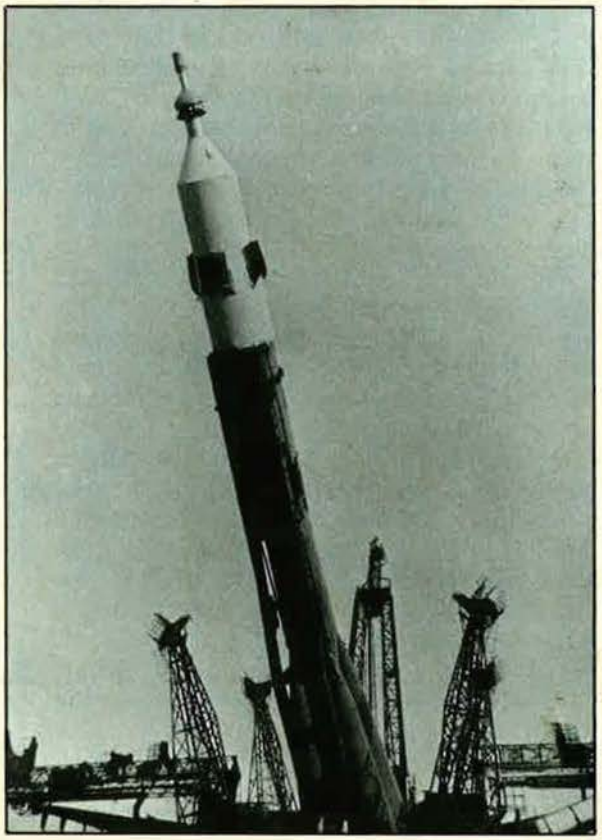
Star City's role in the Soviet manned spaceflight program differs from that of its closest US counterpart, the Lyndon B. Johnson Space Center in Houston, Tex., in that it performs no direct mission control. This function is performed at the Tyuratam launch complex, some 1,500 miles southeast, in the Soviet republic of Kazakh. But it is at Star City that all manned Soviet spaceflights start and end, according to General Shatalov. All training, mission briefings, and medical checkouts take place there, and so do all debriefings and postflight medical checks. Star City also serves as the training base for the technical and medical support personnel. (The Soviet Union has no equivalent to the US National Aeronautics and Space Administration. The Academy of Sciences of the USSR, combined with military organizations, oversees the Soviet manned spaceflight program.)

Among the currently operational facilities shown to the visiting US journalists were Soyuz-to-Soyuz docking and flight trainers, docking simulators for Soyuz-Salyut missions (Salyut is the USSR's space station similar to but considerably smaller than Skylab), computer-driven real-time spacecraft simulators that provide realistic stellar and earth views and depict other spacecraft, and full-scale mockups of the Salyut space station, as well as a recovered Soyuz spacecraft.

At Space City, an imaginative, miniaturized docking simulator provides docking training by means of either TV images or optically, through use of the Soyuz periscope. Brig. Gen. Thomas P. Stafford, the commander of the US flight crew of ASTP, and Neil Armstrong, the first man on the moon, tried out the miniature simulator on recent visits and "had no trouble at all, which goes to show that both our procedures and our standards are pretty similar," General Shatalov said.

In addition to spaceflight training, the cosmonauts get a lot of time in the Delfin, the

*Maj. Gen. Vladimir Shatalov, a former Cosmonaut, briefs US reporters on Soviet spacecraft.*



*Soyuz-9 is shown emplaced on its launch vehicle at the Tyuratam launch complex in Kazakh.*

—Novosti Press Agency

Czech-built jet trainer used by Warsaw Pact countries. A number of Delfins were in the air over Zvezdnoy Gorodok during our visit.

Discussions with General Shatalov as well as an interview with Member of the Academy of Sciences Oleg G. Gazenko, an internationally recognized space biologist, produced some general information about the USSR's space program:

- The Proton program, involving large, unmanned, automated space stations used for high-energy physics experiments in space, has apparently been terminated.
- The Soviet Union claims to have no active development program under way on either a Space Shuttle or a nuclear space propulsion system. Theoretical or exploratory research appears to be going on in both areas, however.
- The Soviet Union plans to maintain a mix of manned and unmanned space programs, recognizing that "both are important and each has special advantages, depending on differing objectives." Toward the end of this century, manned moon landings might again become useful. The Soyuz and Salyut programs will be continued for some time to come. Salyut-12 has not yet been given a specific date, but will be longer than twenty-four days. The present basic Soviet space booster, which can be modified for different requirements and is being used for both military and nonmilitary missions, is adequate for all foreseeable requirements.
- Manned, deep-space missions, in the view of Soviet scientists, will require that space vehicles be provided with artificial gravity involving "a relatively high rate of rotation." The interiors of such long-duration spacecraft "will look like a doctor's office" because medical aspects take on overriding importance.
- Selection criteria for cosmonauts have undergone considerable change over the past decade. Originally, the standards were formulated "in the actuarial sense, with the emphasis on age, perfect health records, perfect vision, and so on. We have since learned to become much more flexible and found out that the ability to adjust to a space environment is not easily measurable. As a result, we now have cosmonauts who are in their forties and wear glasses. We still have not discovered a reliable way of picking the perfect cosmonaut. We are making progress, however, in our work on chemical pills that help in the adjustment process."

The maturity and flexibility emphasized by Academician Gazenko may have meaning beyond the USSR's space program. If they turned out to be the qualities that underlie the Soviet Union's changing relationship with the West, this would be good news indeed. True, the omnipresent portraits of Lenin stare down just as hard as ever on every Soviet citizen, whether he be a Chief Designer, factory manager, or cosmonaut, exhorting him to work ever harder for the glory of the Communist revolution.

At the same time, there seems to be some willingness to substitute the pragmatism of coexistence for yesterday's lethal dialectics, which held that confrontation was inevitable and the burial of capitalism foreordained. Aerospace may well be the most visible manifestation of the new pragmatism. ■

## WRY ON THE ROCKS

One day while exploring by boat along the shores of the Air Force recreational area at Apache Lake in Arizona, I discovered an unusual rock —a rose and white conglomerate of granite and quartz. To a rock hound like me, it was irresistible, but too heavy to lift. I managed to roll it down to the shore and onto the bow of the boat.

Back at the boat dock, two strong young airmen helped me load the rock into the trunk of my car. Driving to my home at Scottsdale, I wondered how I'd ever get it out. However, as I drove up to the house, there stood a brand-new second lieutenant, fresh out of the Academy.

I said, "Lieutenant, you're just the man I need. If I get a wheelbarrow, will you help me lift this rock out of the trunk?" Visibly flexing his youthful muscles, he agreed.

After a few minutes of futile tugging and sweating, the lieutenant straightened up and wiped his brow.

"Sir," he said, "what you need is a *first* lieutenant."

—CONTRIBUTED BY COL. RALPH A. REDBURN, USAF

(AIR FORCE *Magazine will pay $10 for each anecdote accepted for publication.*)

# NOW THERE'S A BELL & HOWELL TAPE RECORDER FOR ALL ENVIRONMENTS.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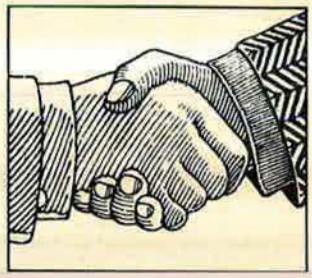
As leaders in laboratory grade magnetic tape recorders/reproducers, we've been keeping an eye out for a colleague with a track record of success in "hostile environments." We've found the perfect organization: Astro-Science, No. 1 in lightweight, small-volume, low-power consumption, high-performance tape recorders.



## Our new "high" performance recorders.

Astro-Science has brought under the Bell & Howell banner the remarkable MARS family. There's nothing like 'em. Take the MARS 1400. This precocious little baby is the smallest and lightest multi-speed, lowest power consumption, 14-inch reel airborne recorder going. Hostile environment? It can really take it. All the time. Providing six speeds of operation in 14-28 and 42-channel configurations.

Sharing honors with the dazzling 1400 is the even slimmer and trimmer MARS 1000. It's also state-of-the-art in ruggedness and reliability. Six speeds of wideband data. 14-28 or 42 channels.

Cousin MARS 2000 bears a family resemblance. Developed in an Intermediate and Wideband configuration, this small fry has six speeds and records 14 channels of intermixed direct, FM, and digital data.

Another high flyer, our M-14E, is ideal for airborne tasks. But you're *also* likely to find it in shipboard and mobile applications. It has no competition as a 2MHz direct, FM, and digital wideband unit using 1-inch tape on 14-inch reels and operating at 7 tape speeds.

## Taking notes at 50 fathoms plus.

Many recorder characteristics that are appreciated in the wild blue yonder are equally admired in the deepest briny deep. Lightweight, for one thing. Compactness. Reliability. Our Model M-14G has them all. Designed for sub-surface, land or mobile environments, this wonder "gets it on" where portability and ease of maintenance are important. With 14 or 28 tracks of analog, FM, or digital electronics, the unit has 7 electrically selectable tape speeds.

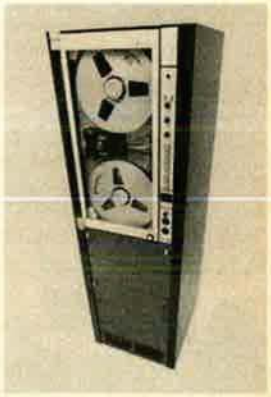
## Meanwhile back on terra firma.

Need laboratory-caliber performance in rugged and remote field applications? Call on our CPR-4010. This portable has up to seven channels on half-inch and up to 14 channels on 1-inch tape. Seven speeds are standard. Easy maintenance and repair are among its sterling qualities.

The CPR-4010's brother, the wideband CPR-4040, is known in certain select circles as the No. 1 in price-to-performance ratio. Co-planar, portable, this versatile unit features seven bi-directional speeds providing up to 1MHz frequency response at 60 ips.

## We made it big in laboratory grade.

Solving customers' problems is our job. The industry leader, our VR-3700B, is a superb laboratory problem solver. This workhorse recorder/reproducer operates in a wide range of speeds and frequencies. It's available in 7, 14, 28, and 42-channel configurations. It's easy to maintain. With proven reliability. Low cost. All electronics are modular, electrically switchable, and capable of operating at any 8 speeds in Direct or FM modes. High-density PCM/HDDR signal electronics available on order.



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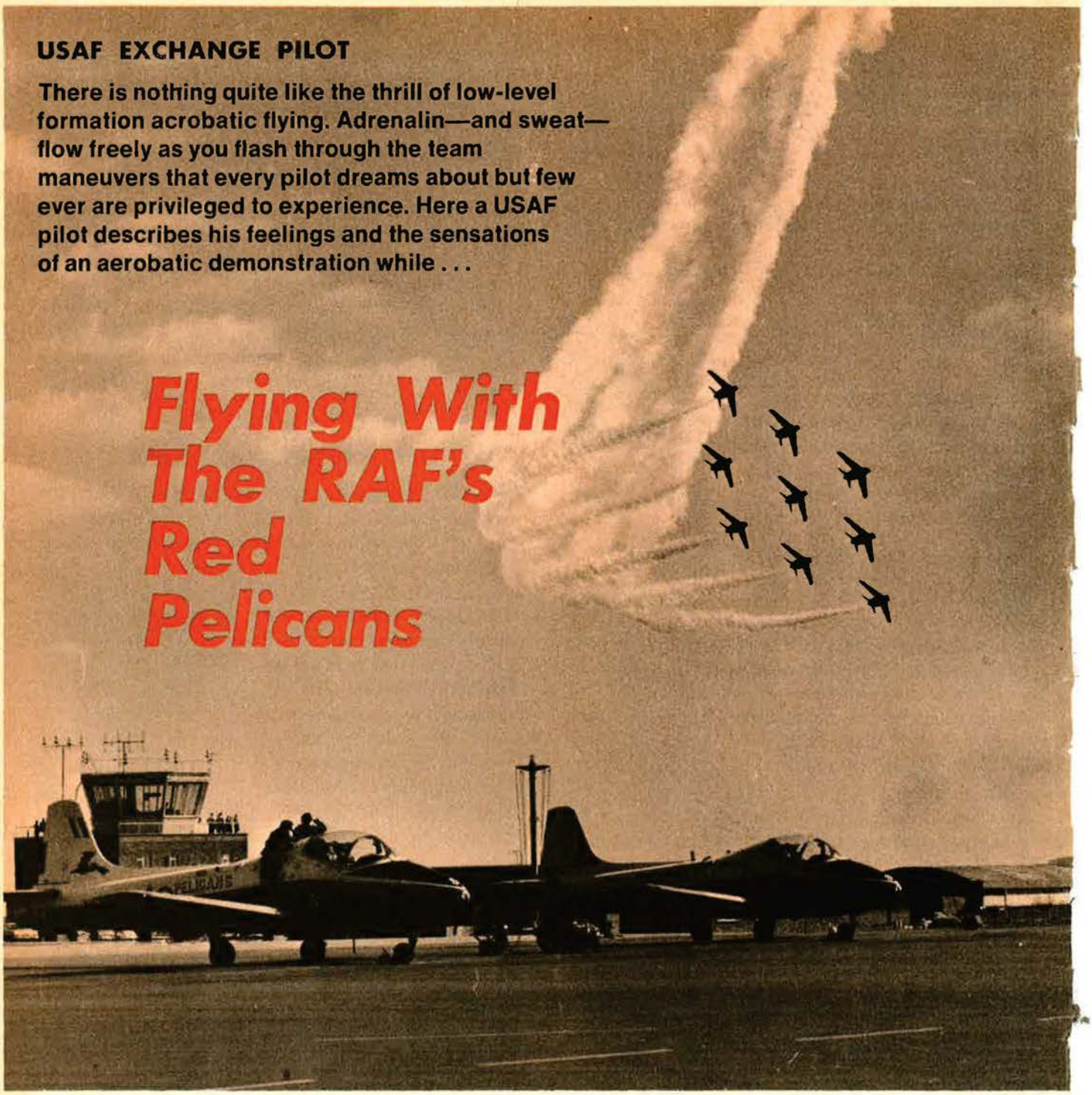
WE'RE REWRITING THE BOOK.

**USAF EXCHANGE PILOT**

**There is nothing quite like the thrill of low-level formation acrobatic flying. Adrenalin—and sweat—flow freely as you flash through the team maneuvers that every pilot dreams about but few ever are privileged to experience. Here a USAF pilot describes his feelings and the sensations of an aerobatic demonstration while . . .**

# Flying With The RAF's Red Pelicans



*Two Red Pelicans, on the ground, wait their turn as the Red Arrows pull out of a loop in Diamond Nine formation.*

*—Photo courtesy of Flight Internation*

**By Capt. Richard F. Lord, USAF**

FLYING formation aerobatics for show is one of the most exhilarating experiences for a pilot. Unfortunately, the thrill of flying for display is available to only a few USAF pilots—the Thunderbirds and one or two USAF/Royal Air Force Exchange pilots in every decade. I am one of those lucky exchange pilots who has had the opportunity to fly low-level formation aerobatics. For the past two seasons, I've been a member of an RAF aerobatic team, the Red Pelicans.

The Red Pelicans fly four Jet Provost Mk 5 aircraft, the RAF's basic trainer, much like USAF's T-37, but single engined and with a little more poke. The team has been part of the Central Flying School (CFS) formation aerobatics scene for the past thirteen years. (The Pelicans are direct descendants of

earlier CFS aerobatic teams, going back to the early 1920s.) Each team member is an instructor on the staff of CFS—the oldest military air training establishment in the world—whose primary task is to teach rated pilots to become flying instructors.

The formation aerobatic training is a spare-time occupation with practice outside normal working hours. The displays are on weekends. As a staff member at Central Flying School, I competed in a flyoff for team membership. Good fortune was on my side; last season I flew "left wing" and this year I am flying "right wing." The display season is from May through September, and we normally do about thirty-five shows a season throughout England and on the Continent.

Aside from the Red Pelicans, the RAF has four Jet Provost four-ship teams and one synchronized pair located at the Flying Training Schools. The Red Arrows, the premier and official RAF team, fly nine red Gnats and are a full-time team like the USAF Thunderbirds. In 1972, a total of 297 air displays were flown in the United Kingdom and in nine overseas countries. The Red Arrows, with ninety displays (some in the US and Canada), did the lion's share, while the station teams did the remainder. If all low-level aerobatic display pilots in the world were in a single air show, the RAF would probably make up nearly half of the program.

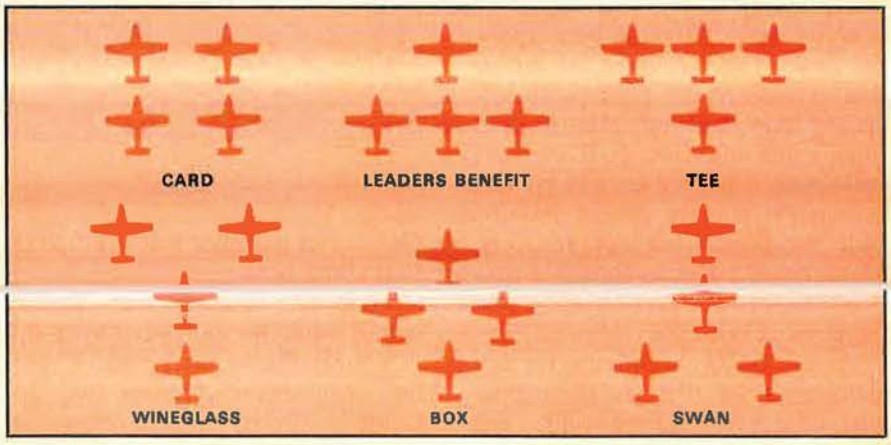
## Display Day

This is what it's like in the cockpit of a Provost, flying a typical display with the Red Pelicans.

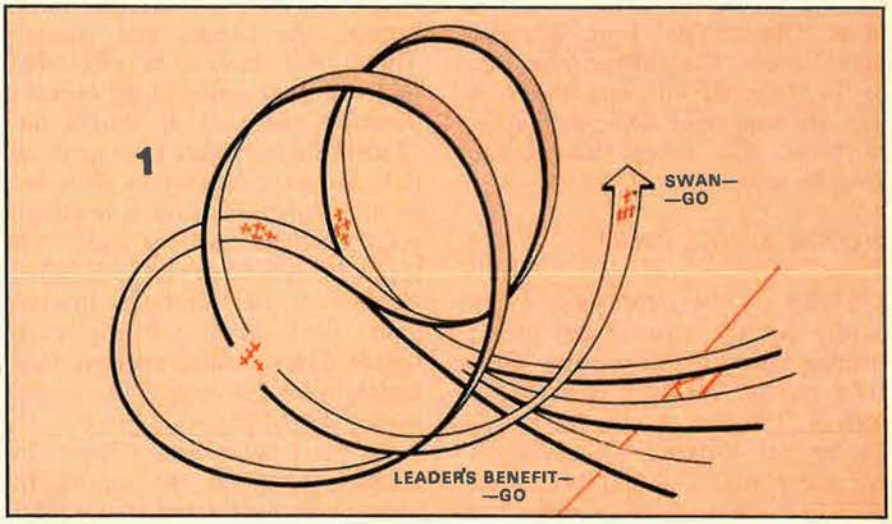
It is late on Friday afternoon as we arrive at RAF Farnborough for our Saturday show. After a short arrival show and a beer at the Officers Mess, we all hit the rack early. On display day, we are briefed by the display organizer on the occasion, airfield, and other essential details. Today, we open the show because we must get "turned around" in time to close another show at Plymouth, our second for the day.

As we go to our aircraft, approximately fifteen minutes before display time, the adrenalin is at its highest level. As the Leader signals for simultaneous engine start, flap check, airbrake check, and canopy closures, the adrenalin starts subsiding. We release brakes simultaneously and taxi out to the runway, ready to roll for a four-ship Box takeoff. I look back to Number Four, the box man, to get his "thumbs-up" ready signal for relay to the Leader. Number Four's aircraft is bouncing up and down in the turbulence of the Leader's jet wash. The Leader calls "Pelicans, Rolling, Rolling—GO!" As we release brakes for the "Box" takeoff *(see formations diagram)*, our touch of nerves subsides into the ultimate of pilot concentration.

After takeoff we come back over the field from behind the crowd at about 300 mph in a wide Box formation and very low—a "surprise attack." As we pass over the crowd, the Leader pulls up for a join-up loop *(maneuver diagram No. 1)*. During the pull-up, he calls "Pelicans Box—GO!" We wingmen ram on full power and join into a tight Box just as we go over the top of the first loop. Getting stopped and ending up in a perfect tight Box at the top of a loop is a bit tricky, requiring airbrakes, bank, and back-pressure changes at ex-




*The diagram shows the basic formations flown by the Red Pelicans, who change from one to another during a maneuver.*




*In the join-up loop, the team starts out in Box formation, switches to Leader's Benefit, and comes out in Swan.*

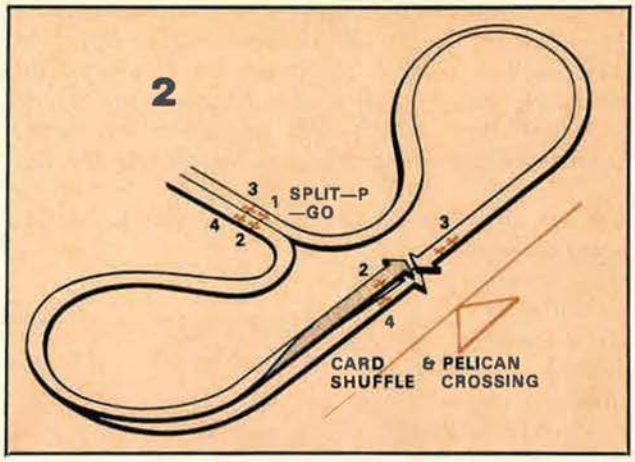
actly the right moment. The other tricky bit is for the three of us to arrive at precisely the same time and keep the join-up symmetrical. Today is good; we all arrive perfectly, and Number Four calls, "All-aboard!"

Our work is on for the next fifteen minutes. Concentration and flying must be at their peak; we must not budge from our positions. This is easier said than done because the Jet Provost is not ideal for formation aerobatics. Its poor power response and lack of electric trim force *much* anticipation. If we don't anticipate, it is very easy to err and get caught slightly out of position with no power left for recovery. Many times I feel as though I may bend the throttle lever trying in vain to get more power.

As our display continues, we pull about four or five Gs throughout our wingovers, barrel rolls, and loops in order to keep the display tight and in front of the audience. There is much more radio chatter than during a normal tactical or training formation, but the Leader is doing most of it. His warnings of "pulling up—now," "rolling—now," "slackening," "tightening," "straightening," and "increasing" or "decreasing" power help us to anticipate his every move and maintain perfect formation. The only radio calls we make are to acknowledge by saying "two," "three," "four" as we change from Box to the formations used for display: Leader's Benefit, Swan, Card, Line Astern, Wine Glass, Tee, Line Abreast, and Shadow. The change from Box to Leader's Benefit and Swan to Tee are both done while pulling up in loops. The other changes are done in wingovers.

### Inverted on the Deck

Flying on the right wing, I can hardly see the ground and crowd rushing toward us as we dive vertically on the backside of the loop with 1,500 feet on the altimeter. In the Jet Provost we can do a full show with a 3,000-foot cloud base and normally go over the top of a loop with 2,700 feet on the altimeter. However, with a lot of Gs we can get over below a 2,200-foot cloud base.




*This intricate maneuver comes about halfway through the Pelicans' show—a good opportunity for the author to see the ground upside down at low altitude.*

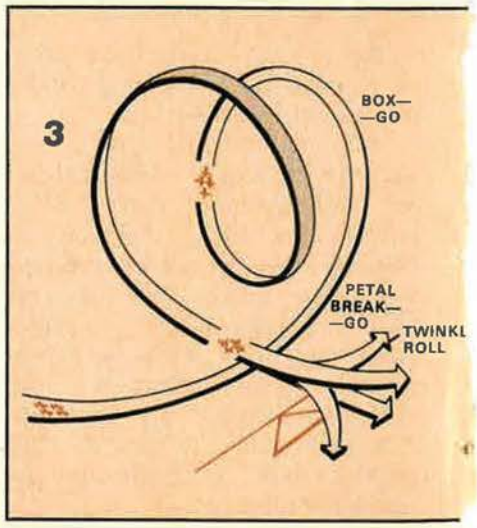
Halfway through the display comes what we call our "Split P," "Card Shuffle," and "Pelican Crossing" (*maneuver diagram No. 2*). Coming directly at the crowd in Card formation, the Leader with Number Three in close trail breaks left and I break right with Number Four tucked into close trail behind me. We then do wingovers in opposite directions so that the two-plane elements are approaching each other head-on directly in front of the crowd. As the Leader calls, "Contact," I call, "Shadow—GO," and roll inverted while Number Four flying upright snaps into formation on me. He becomes my "shadow." This is my first good look at the ground, and it is upside down at a very low altitude.

Just as our "Shadow" is nicely formed, the Leader and Number Three, still tucked in close line astern, pass us going in the opposite direction and pull up into a half "Cuban-Eight." Since I am inverted, it is his responsibility to clear me, so all I concentrate on is holding a good level inverted attitude. The approximately fifteen seconds (which is right at the aircraft's inverted limit) while hanging in my straps upside down pushing negative G to maintain level is one of the longest fifteen-second periods I know.

As the Leader calls, "Tops," indicating he is at the top of his loop, I roll upright and start a wingover to join the other pair in line astern as they pull up from their half Cuban-Eight. Joining into Number Three in close trail as we turn toward the crowd can be very tricky, especially with Number Four in close line astern behind me. Often, I must use the airbrakes several times. Today is good and one application of airbrakes puts us into tight line astern. Number Four calls, "All aboard," as the Leader turns to give us a low "belly-up" pass in front of the crowd.

### Petal Break

Now all that remains is a Wine Glass and Card Loop, followed by a looping Petal Break with a Twinkle Roll (*maneuver diagram No. 3*). The idea of the Petal Break is to give an explosion effect with




*A pretty maneuver is the Petal Break and Twinkle Roll, diagrammed here.*


—Photo courtesy of Flight International

Here, the author, Dick Lord, is flying inverted with Lt. Marcus Edwards making the Shadow formation.

*The author, Capt. Dick Lord, a graduate of Willamette University, Salem, Ore., is serving as an exchange instructor pilot with the Royal Air Force's Central Flying School in England. Captain Lord has flown C-141 Star-Lifters and completed a SEA tour in AC-47 Dragonships. Prior to his RAF exchange tour, he was an ATC flight examiner at Randolph AFB, Tex. This is his second year as a member of the Red Pelicans.*

*The Pelicans' international flavor shows in this photo. From left: Sqdn. Ldr. Ivor Gibbs, RAF, leader; Capt. Dick Lord, USAF, right wing; Flt. Lt. Bruce Byron, RAAF, left wing; Lt. Marcus Edwards, RN, box; Flt. Lt. Adrian Wall, RAF, commentator, manager.*

all the aircraft breaking into different directions and rolling simultaneously on the Leader's command. The final trick is to rejoin before the Leader is on initial approach for our final break and landing. We all converge rapidly to join in a Box, sometimes with up to 100 knots' overtake speed and only fifty yards to go. We have to use engine idle, airbrakes, and cross controlling to get slowed down and into position.

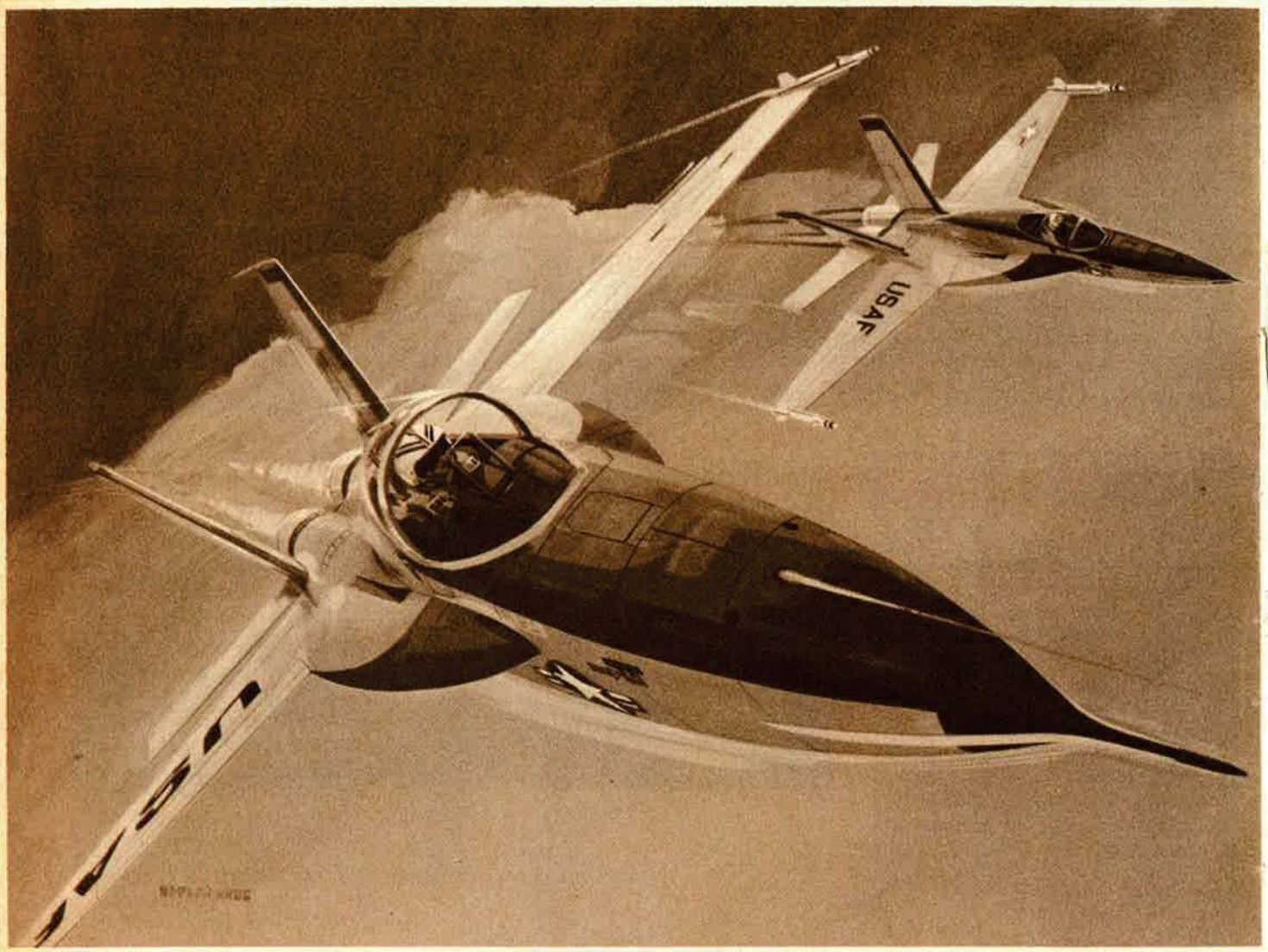
The join-up is quick today, and we are all aboard as the Leader turns a one-mile initial at 300 mph and calls for our break and landing. As we shut down the engines and raise the canopies, still in unison, and climb out of the aircraft, I notice for the first time that I am sweating profusely. The back of my red flying suit is soaked. What an exciting fifteen minutes!

We have time for a quick coffee and congratulations on a good show. But we must not linger; in two hours we display at Plymouth. That will be an interesting and beautiful show. We fly over the water with the crowd on the shoreline and in boats. Sunday is another show, this time at Greenham Common and RAF/USAF Upper Heyford. After that, we fly home for a week of teaching RAF pilots to be instructor pilots. Then we're off again, this time to Germany for two displays.

So it goes, and so it has gone with RAF aerobatic teams for more than half a century. But formation aerobatics is not an end in itself. It is a means to an end. The aim is to display the flying expertise of the country's air force so the public will have confidence in its airpower. Since weapons delivery is almost impossible to demonstrate publicly, formation aerobatics is the ideal method. The formation teams make the RAF's impressive image visible, just as the Thunderbirds enhance the image of the USAF both at home and abroad.

There is nothing quite like flying low-level formation aerobatics for show. And for me—a guest in a friendly land—it has been an honor to share the excitement and professionalism of one of the RAF's great aerobatic teams. I'll always be grateful for the opportunity to have been a member of the Red Pelicans. ■

**NORTHROP'S YF-17**




By the end of the 1960s, mainly because of some calamitous results of the then prevalent DoD policy of going directly from unproven paper study to series production, the Air Force reinstituted and refined the so-called prototype approach. The foremost example of this "fly-before-buy" concept is the development of test vehicles that point the way to new generations of fighter aircraft that provide relatively high performance at low cost . . .

# THE LIGHTWEIGHT FIGHTER HALTS THE COST SPIRAL

**By Edgar Ulsamer,** SENIOR EDITOR, AIR FORCE MAGAZINE

*See also the item on the Northrop YF-17, on p. 45 of this issue, in the "Jane's All the World's Aircraft Supplement."*

IN THE spring of 1972, the Air Force selected General Dynamics' Convair Aerospace Division and Northrop Corp. to design, manufacture, and flight-test two lightweight fighter prototypes each. While the Lightweight Fighter Program was undertaken to build up the Air Force's and DoD's reservoir of proven new technologies, a fallout benefit may well be the strengthening of the US competitive stance in the international military aircraft market.

Because the program is meant to explore new and disparate technologies in such key areas as flight controls, aerodynamics, materials, and propulsion, the two aircraft—General Dynamics' YF-16 and Northrop's YF-17—are as much complementary as competitive. (A report on General Dynamics' YF-16 will appear in a later issue of this magazine.) The Air Force doesn't plan on a normal flyoff between them, but will subject both designs to lengthy flight testing. So far, the government hasn't decided whether this prototype program will lead to the development of an operational fighter; if it does, the resultant aircraft is likely to incorporate technologies from both designs.

Thomas V. Jones, president and chairman of the board of Northrop Corp., along with other key Northrop program officials, recently discussed with AIR FORCE Magazine the status of the YF-17 program and that of the closely related P-530 Cobra (Northrop's proposed multinational multirole fighter, which the company hopes to enter into production by next year).

### YF-17 Moves Toward First Flight

Because the Air Force views the lightweight fighter prototypes primarily as the means for advancing the technological state of the art, the program is being managed in an "open-ended manner, and the contractors have been given broad freedoms to exercise their creativity," according to Mr. Jones. This latitude, he claimed, has paid off already in lower costs that result from "fine-tuning" design and fabrication features right up to the time when metal cutting starts. (At this writing, the basic design task is more than seventy percent complete, as is production of the first of the two prototypes.)

Northrop began the P-530, designed for the export market, in 1966, when the company assigned its fighter design team and considerable resources to the creation of a new generation of lightweight fighters. The airframe and engine of the P-530 and the YF-17 are identical; the main difference in the two aircraft is that the P-530 is to be a complete weapon system, while the YF-17 will be a prototype. To date, Northrop has invested almost 1.5 million engineering and more than 10,000 wind-tunnel-simulation hours in the two aircraft.

The aircraft that resulted from this massive research includes these basic features: a single-seat, air-superiority fighter capable of Mach 2 speeds; an excellent 1.3 : 1 thrust-to-weight ratio; a usable lift coefficient reminiscent of transport aircraft; and an advanced aerodynamic design resulting in exceptional maneuverability and stability during air-to-air combat.

The YF-17 prototype aircraft will weigh slightly more than 21,000 pounds on takeoff, counting the M-61 rapid-fire cannon, ammunition, and two heat-seeking missiles. It will be powered by two General Electric YJ101 engines producing almost 15,000 pounds of thrust each. The engine is derived from General Electric's F101 engine, which is to power the B-1 strategic bomber. The YJ101 uses the latter's gas generator (core engine) in scaled-down form. It is expected to be certified for preliminary prototype flight rating later this year, and the first engine is to be delivered to Northrop early next year.

Three basic criteria have guided the design and concept of the YF-17: It will be a daytime fighter that operates in clear weather; it must be optimized for transonic acceleration and maneuverability (the speed regime where aerial dogfights usually take place); and, perhaps most important, it must use advanced technology to hold procurement and operating costs down, rather than as a lure for unneeded sophistication.

A principal aerodynamic feature of the YF-17 is a moderately swept-wing design, which Northrop claims assures spin resistance, coupled with a highly swept, leading edge extension that increases the wing surface area by only ten percent but boosts maximum lift by some fifty percent. The leading edge extensions delay wing stall and give the aircraft excellent maneuverability at high angles of attack, according to Northrop officials. The extensions also reduce center of pressure travel during transitions between subsonic and supersonic flight, thereby decreasing supersonic trim drag. Other noteworthy design features include differential area ruling to enhance turning capability, an integrated airframe and underwing engine inlet design, and automatic variable camber (maneuver flaps), which adjusts to angle of attack and Mach number.

Because the design is so aerodynamically stable, the YF-17 needs only minimum stability augmentation. Northrop is breaking with the present trend toward control configured (CCV) and fly-by-wire designs, which achieve stability through active flight-control techniques. The YF-17's flight controls, by contrast, are conventional and consist of dual, mechanical/hydraulic systems. The merit of this approach, according to Northrop, is elimination of redundant electronics, which drive up cost as well as complexity.

### YF-17 Uses Advanced Composites

One of the crucial questions to be answered by the Lightweight Fighter Prototype Program is what constitutes the most cost-effective materials makeup of future high-performance aircraft. The YF-17 designers are using new technologies as a principal means for cost reduction; therefore, they stick mainly

*About eight percent of the YF-17's structure is made of low weight graphite composites.*

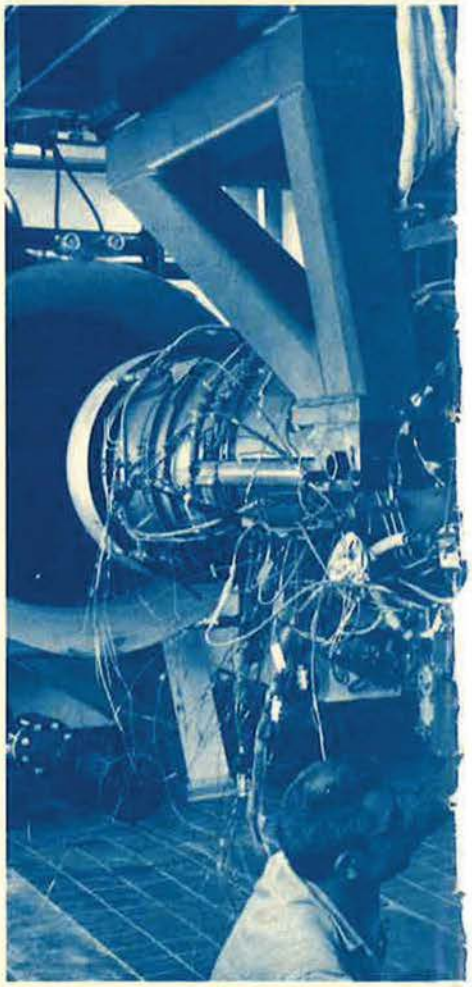
to traditional materials although low-cost graphite composites are used to a limited degree. Basic materials used in the Northrop aircraft are seventy-three percent aluminum, eight percent carbon graphite advanced composites, seven percent titanium, ten percent steel, and two percent assorted other metallic and nonmetallic materials.

The carbon graphite advanced composite, furnished by Hercules Inc.'s Magna, Utah, plant, is used in honeycomb form in some of the YF-17's secondary structures. These include access doors, part of the fuselage, wing leading and trailing edge surfaces, and elements of the vertical stabilizers. Northrop designers told AIR FORCE Magazine that, in series production, graphite composites will cost $20 per pound, compared to "considerably more" than $100 per pound for boron, the more exotic advanced composite favored earlier. (Advanced composites were first developed by the Air Force Materials Laboratory at Wright-Patterson AFB, Ohio, about ten years ago.) Carbon graphite composites are about half the weight of aluminum, yet are both stronger and stiffer and offer better fatigue resistance.

### Northrop Opts for Twin-Engine Configuration

One of the most important choices confronting the Northrop design team was between single-engine and twin-engine configurations. Pragmatic considerations, Mr. Jones told AIR FORCE Magazine, favored the latter approach: "Most of the Chiefs of Staff [of those foreign air forces that are likely to become customers of the P-530] seem to favor twins over single-engine designs. Further, people who like single-engine designs better than twins will, under certain conditions, settle for two engines. The reverse is not true, however."

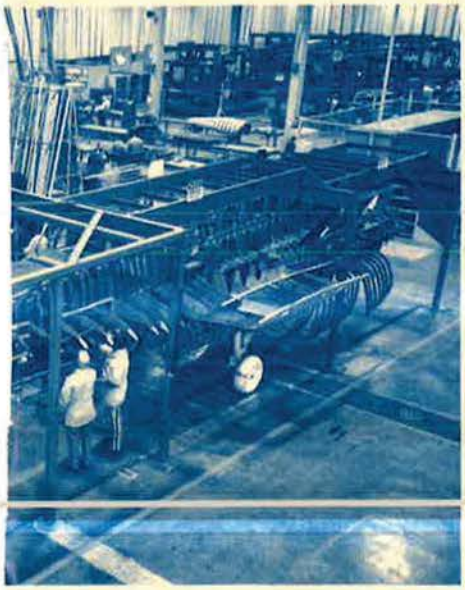
Almost as persuasive, in favor of a twin-engine design, was the availability of the General Electric YJ101 engine, which combines highly advanced technologies with light weight and a relatively low cost. Selection of a 15,000-pound-thrust-class engine did, of course, necessitate a twin-engine configuration. The YJ101 is a turbojet engine while the Pratt & Whitney F100 engine, which the single-engine YF-16 shares with the F-15, is a turbofan. The GE engine is the world's first self-cooled turbojet and, "because it has higher pressure levels than a fan engine, provides for better performance at high altitude," according to Northrop officials.



Because GE and Northrop cooperated on and strictly adhered to a tight design-to-cost plan in the development of the engine, there is reportedly no significant difference in cost between one large F100 and two smaller YJ101 engines. Northrop designers point with pride to the fact that, in the interest of cost control, they declined GE's offer of a ten percent improvement on the YJ101's thrust-to-weight ratio.

Northrop engineers also claim that the YF-17 pays no weight penalty for its twin-engine configuration, and they attribute the greater weight of their aircraft—about 2,000 pounds above that of the YF-16—to basic design differences. According to Mr. Jones, "There is about one-third less rotating machinery in the YJ101 than there is in the F100." While he declined to

*YF-17 prototype engineering/ manufacturing mockup nears completion at Northrop's Los Angeles plant.*



*Two YJ101 advanced turbojet engines, derived from the engines of the B-1 bomber and manufactured by GE, power the Northrop prototype.*

name a price for the YF-17 in series production, he did say that the engine costs would account for about one-third of the price of the aircraft.

In an overall assessment of the YF-17, Mr. Jones claimed that the aircraft will outperform the best and most recent F-4, the slat-winged F-4E, in key areas of the air-superiority mission, including energy maneuverability and range. While he skirted a direct comparison with the F-14 and F-15, he did say that "once our aircraft is in the area where it can meet the enemy, it won't give anything away." He added that the aircraft is inherently capable of accommodating offensive radar systems with a thirty-mile range "if the capability to acquire targets electronically rather than visually should be needed." (The radars of the F-14 and F-15 can acquire targets at greater than seventy-five-mile ranges.)

The prototype program funded by the Air Force stipulates an austere avionics suit except for a highly efficient sight system combining a flexible digital computer and a head-up display that will give the YF-17 a snap-shoot capability.

The two YF-17 prototypes are scheduled to begin a twelve-month flight-test evaluation at Edwards AFB, Calif., in April of next year.

### The P-530 Cobra Program

Northrop's P-530 Cobra, the progenitor of the YF-17 and one of the few US highlights of the 1973 Paris Air Show, exists only in mockup form. It is, nevertheless, potentially a formidable factor in the international market and will be backed up palpably by the YF-17 program.

As envisioned by Northrop, the differences between the YF-17 and the Cobra are minor. There will be commonality in the configuration, engines, and flight controls of the two aircraft. Performance will be roughly equal, except that Northrop is prepared to provide the Cobra with slightly higher speed—up to Mach 2.5 compared to Mach 2 for the YF-17—if the purchaser wants it. The Cobra will use some fiber glass and is likely to incorporate a smaller percentage of carbon composites than the YF-17. The two aircraft will differ in mission, avionics, and weapons. The Cobra, in line with the prevailing European philosophy, will be a multirole aircraft capable of close-support, tactical-intercept, and air-superiority missions. It can be equipped with Maverick electro-optically guided air-to-ground missiles, Sparrow and Sidewinder air-to-air missiles, the YF-17's M-16 rapid-fire gun, and possibly some European weapons.

The aircraft, Northrop officials predict, will have a unit price of about $4 million (in 1973 dollars). Its avionics suite will rely "on the fantastic progress in electronics in the last couple of years, especially in LSI [large-scale integrated circuits]; our whole avionics system will be smaller and weigh less than the F-4's radar by itself," according to a Northrop spokesman. The avionics will be based on digital multiplexing and extensive computerization, and provide the aircraft with a high degree of automation and flexibility.

The Cobra is meant to replace the F-104s, Mirage IIIs, and older F-4s of foreign air forces. Principal potential candidates are said to be Holland, Norway, Belgium, Australia, and, to a lesser degree, Canada. The Swedish Saab-Scania Viggen and France's Mirage F-1 are the key competitors for a worldwide market that Northrop believes may exceed 3,000 aircraft by the end of the next decade.

The Cobra is to be produced on a multinational basis at a fixed price. Research and development is also to be conducted on a joint basis. Initial operational capability (IOC) could be attained within fifty months from the time of start-up of the program, Northrop claims. The company believes that a decision to launch this multinational program could come early next year. Northrop's sanguine attitude on the Cobra was summarized by a ranking company executive: "If we sell one, we'll sell a thousand." ■

There is mounting evidence of a trend toward curtailment or elimination of some traditional and recent military benefits and incentives. This threat to military morale and well-being comes at a time when the all-volunteer force already faces serious problems. The author reviews the considerable gains of the past few years and examines with concern recent actions and proposals that add up to . . .

# THE ATTACK ON MILITARY BENEFITS

**By Ed Gates**
CONTRIBUTING EDITOR,
AIR FORCE MAGAZINE

"THOSE benefits that once made military life a good deal are being steadily eroded. . . . Sure, the government finally has gotten pay up to a respectable level, but now it's going after things like retirement pay, flight pay, and space-A travel. Every week, some congressman clobbers the military. . . . The future looks gloomy. . . ."

These are typical of comments surfacing with some regularity from the service community. Many active-duty and retired members obviously are disenchanted with present trends.

Are such criticisms valid? It's hard to give an unequivocal answer. While pay and personnel benefits have increased dramatically in the past decade, there also have been curtailments, some of them unexpected and painful.

Is there, as the rather large number of gripes suggests, cause for alarm about the future of basic pay and career incentives, which, taken together, make up the military compensation of service people?

Right now, "alarm" may be too strong a word. Certainly there is cause for concern. As John Loosbrock pointed out in his September editorial, "The military man himself, not his equipment, is becoming the new target" for unfriendly eyes on Capitol Hill, as personnel costs have climbed to more than half of the defense budget.

Let's check the facts and examine the trends.

## Targets and Trends

Tending to shift the spotlight—at least temporarily—from the retirement change plan on which criticism was focused earlier this year *(see August '73 issue, p. 60)* is a new wave of antimilitary rhetoric on Capitol Hill.

Rep. Otis G. Pike (D-N. Y.) and Sen. William Proxmire (D-Wis.), whose earlier proposals, if adopted, would have sabotaged the services' promotion programs, have continued their attacks on various personnel practices. Mr. Pike, at one uninspired point recently, declared that service members are too soft, have too much living space, and too many creature comforts, and need to toughen themselves up.

Coming on strong as another arch foe of established military programs, meanwhile, is Rep. Les Aspin (D-Wis.). At mid-year, Mr. Aspin talked Congress into refusing to extend the May 31 cutoff of flight pay for high-ranking rated officers not serving in flying billets.

In recent months, Aspin has also attacked commissaries. He is sponsoring a bill to eliminate space-A travel. He has been criticizing officers who, on retirement, check the Veterans Administration for a possible disability rating that might prove more profitable than their military retirement pay. Yet the practice is entirely proper.

In July, this highly vocal critic, moreover, pushed through an amendment to the military procurement bill that would cut weapons funds by nearly a billion dollars this fiscal year.

Mr. Aspin's success in killing the flight-pay extension holds ominous portents for the future. The House Armed Services Committee, of which he is a member, had recommended extension. This committee for years has been a powerful pro-service group; it sponsored most of the major military benefits and incentives on the books today, and its recommendations to the full House were almost never rejected.

No more, it would seem. On the key vote

on flight-pay extension, the House lined up 238 against, only 175 for!

Flight pay is probably the most sensitive traditional USAF personnel benefit currently under attack. The space-A travel program is next in line. Senator Proxmire's recent blast at space-A surfaced about the same time the House Appropriations Committee recommended charging fares and other curbs. The Defense Department, understandably, strongly opposes the recommendations.

While a small segment of the legislature now regularly excoriates the services and their "people" programs, certain other lawmakers, who formerly supported the military community four-square, appear to be backing away.

Several have taken up the "grade-creep" chant. Some legislators talk of making service people contribute to their retirement fund. Members of the Senate Armed Services Committee, led by Sen. Stuart Symington (D-Mo.), a former Secretary of the Air Force, recently voted to slash military manpower by a staggering 156,000 persons this fiscal year!

Such a crippling blow by that Senate group, with its RIF and promotion slowdown implications, would have been unthinkable a few years ago. Fortunately, a House-Senate conference was expected to modify that cut substantially.

### The Cost Crunch

Behind such threats is growing concern over mounting military personnel expenditures. The executive and legislative branches have joined forces in recent years to provide a series of long-needed basic-pay raises. In late 1971, to lay groundwork for the all-volunteer force, Uncle Sam finally gave lower-ranking enlisted members a living wage. That same legislation also contained the largest basic allowance for quarters (BAQ) increase in history.

Retirement pay, meantime, has risen sharply as the retired roster lengthens and as a result of higher pay and inflation. Only a few years ago, it cost the taxpayers $1.5 billion annually. The tab this year is $5 billion, and the projections indicate significant increase ahead.

All these raises carry stiff price tags. Defense Department authorities and members of Congress make a big point of the fact that fifty-six percent of the military budget now goes for pay and other people benefits.

The Department says it will spend about $20 billion more on people this fiscal year than it did a decade ago, when there were 350,000 fewer members. Inflation, of course, accounts for much of the extra outlay, but far from all of it.

The immediate look ahead calls for continuing active-duty and retired-pay increases under the automatic cost-of-living adjustment systems adopted in 1958 (retired raises) and in 1967 (active-duty raises under the so-called "Rivers" act). But there is some question about the longer view.

Lt. Gen. Leo E. Benade, the Pentagon's top military personnel executive, on several occasions has cautioned the service community not to expect pay increases of the "same size and frequency" (as the recent annual advances) to continue indefinitely.

Figuring out where larger personnel funds, plus money for essential R&D, hardware, and operations-maintenance costs, will come from is of growing concern to Pentagon and Capitol Hill authorities. This concern is evident, to a degree at least, in DoD's current sponsorship of (1) changes to the retirement system, and (2) a key amendment to the Rivers act.

The latter would permit the President to spread future basic-pay raise money into BAQ and basic allowance for subsistence (BAS). Under both proposals, projected increases in retirement-pay outlays would be reduced, since retirement pay is computed on basic pay only.

### Counting the Pluses

While perplexing money problems lie ahead, the forecast is not all bad. Far from it.

The government's main thrust in the military benefits-incentives area for many years was to add new programs and, frequently, improve old ones. Many were painfully slow in surfacing, however.

Yet, most of these remain in operation and should continue. Besides greatly improving levels of basic pay, BAQ, and retirement pay, the Defense Department has added many other substantial items over the past twenty years.

Included are such highlights as proficiency pay (including superior performance pay), the new Survivor Benefit Plan, the ten percent interest overseas savings plan, monthly payments for service widows, increased GI insurance and education payments, officer RIF pay, ROTC scholarships, dislocation allowance, family-separation allowance, combat pay, and combat-zone tax exemptions.

The creation of CHAMPUS medicare—and subsequent improvements—was an important addition to the benefits list. Numerous service members, however, view the cuts in family medical care at in-service hospitals as overshadowing the value of CHAMPUS.

Elsewhere, the government recently authorized waiver of erroneous overpayments for all service people. It extended the $100-per-month Social Security retroactive wage credits for military people back ten years, to 1957; that's a noteworthy new retirement benefit.

The Pentagon, meanwhile, added muscle to the all-volunteer force effort by extending ex-

The author, Ed Gates, became a Contributing Editor of AIR FORCE Magazine earlier this year, after his retirement as Editor of *Air Force Times*. Mr. Gates is widely recognized as an authority on military personnel matters.

change privileges to Reservists on their drill days.

The appearance of a few on-base motels charging reasonable prices also is a long-needed addition. The drawback, of course, is that the government, bowing to pressure from commercial motel interests, has approved only a handful of these facilities. Many more are essential if in-transit families are to reduce their steep travel outlays.

For thousands of service members, their wives, and children working in nonappropriated fund activity jobs, Uncle Sam recently set up an improved pay system.

The large basic pay and BAQ raises account for an added benefit sometimes overlooked—the "tax advantage." DoD considers it, along with basic pay, BAQ, and BAS, one of the four elements of "Regular Military Compensation," or RMC, which, in effect, is the service member's total salary.

## KEY PERSONNEL BENEFIT STATUTES

| *Benefit* | *Year* |
|---|---|
| • 20-year active-duty retirement, "age-60" Reserve retirement authorized | 1948 |
| • Pay scales revamped, increased; disability retirement-separation pay rules adopted | 1949 |
| • Low-ranking EM given quarters allowances | 1950 |
| • Pay raised, allowances increased fourteen percent | 1952 |
| • Reenlistment bonuses approved | 1954 |
| • Pay raised; increases modest | 1955 |
| • RIF pay okayed for active-duty Reservists | 1956 |
| • Dependent medical care improved | 1956 |
| • Pay raised, featured by big boosts for higher graders; retired-pay recomputation dropped; retiree cost-of-living raise adopted | 1958 |
| • Trailer allowance instituted | 1961 |
| • Per diem, travel allowance increased | 1962 |
| • Quarters-allowance rates boosted | 1962 |
| • Pay raised, retiree COL increases made automatic | 1963 |
| • Pay raised modestly | 1964 |
| • Combat pay tax exclusion for officers begun | 1966 |
| • Overseas ten percent savings program launched | 1966 |
| • Pay raised via new program linking military pay with Civil Service pay raises; has resulted in annual increases | 1967 |
| • GI insurance program improved for several groups | 1970 |
| • Service widows' compensation raised | 1971 |
| • Special (all-volunteer force) pay raise boosted pay of lower graders over 100 percent, gave all members largest BAQ increase in history | 1971 |
| • Survivor Benefit Plan approved | 1972 |

The tax advantage materializes because BAQ and BAS are not taxable. Take a nonrated lieutenant colonel with twenty years' service and two exemptions, for example. He currently draws $22,948 a year in basic pay and the two allowances. But since the latter are tax free, his RMC really equals $24,322. The difference—$1,384—is his tax advantage.

Some years ago there were demands on the government to strip BAQ and BAS of their tax-free status. But not lately. In fact, it is possible the tax advantage could increase. This would occur if Congress, as the Pentagon has recommended, authorizes the shift of future basic-pay increases into allowances.

Some service people with sizable total incomes would welcome this move, for obvious reasons. Others, like occupants of government quarters who forfeit their BAQ, might feel differently. Their "raise" wouldn't be visible. Shifting such monies would tend to curb future retired pay increases a bit, a move the Defense Department favors, but one that would not be welcomed by future retirees.

### Something Old, Something New

Still going strong, though somewhat battered by rising prices and shortages, are such traditions as commissaries and base exchanges. Dues and prices at military clubs have also risen, yet the clubs remain a good deal. Prices on the "outside" have shot up, too, and shortages are commonplace. So, the service members' relative position compared with civilians generally has not suffered.

Women in the service are recent beneficiaries of new privileges and entitlements, at long last assuring them equity with male personnel.

The best recent addition to the benefits list? Some say it's the Survivor Benefit Plan, which allows retired members to establish, at reasonable cost, a widow's annuity of up to fifty-five percent of the member's retirement pay.

Less-publicized people proposals that, if enacted, will enlarge the benefits-incentives list also are before Congress. They include measures to reduce the Reserve/Guard retirement age from sixty to fifty-five or lower; allow retirees three years, instead of one, to choose a retirement home; exclude retirees' Survivor Benefit Plan payments from taxable income; give POWs more tax and other monetary breaks; and sweeten several programs for veterans.

Overseas, in some areas, it's a different story. In Germany, inflation of the local currency and devaluation of the dollar have combined to hit many US service families severely. Increases in housing and cost-of-living allowances have not kept pace with the cost hikes there.

Meantime, the Pentagon's ambitious plan to

revamp key features of the retirement system still awaits attention on Capitol Hill. Also before Congress is the Uniformed Services Special Pay Act, a DoD-backed bonus package. It includes bonuses of varying size for enlistees and reenlistees of the regular forces and the Reserves, line officers in shortage skills, and physicians and other officers of the medical services. The Defense Department considers the bonus package vital to the success of the all-volunteer force drive.

### Gone, But Not Forgotten

The services in recent years, as critics claim, have cut or eliminated some attractive personnel programs, and changed a few rules suddenly. Some members got hurt.

A good example is the fairly recent policy that denies reenlistment to members who have not attained certain rank. Similarly, the Air Force several years back laid on the controversial "White Charger" program, which forced several hundred senior Regular officers into early retirement. Crudely established and administered, Charger not surprisingly embittered many people and touched off suits against the government.

A more recent rules change adversely affecting military members lengthened accompanied tours abroad from three to four years. Laid on without warning, it created problems for many families.

Similarly, Uncle Sam not long ago decreed that he would not pay for shipment of members' foreign-made autos and household goods from overseas to the States. This quick turnaround—the government earlier had approved payment for such shipments—was the result of the Pentagon knuckling under to congressional pressure. The result: lighter pocketbooks for many service members.

Perhaps the most fuss ever generated in the service community over the cancellation of a traditional benefit stemmed from the government's 1958 decision to cease recomputing retired military pay whenever active-duty rates increase.

A new program raising retired pay periodically, to reflect increases in the Consumer Price Index (CPI), replaced the "recomp" formula. This proved generally satisfactory to the retired community until about five years ago. Retired organizations then launched a drive to reinstate recomp; it would pay more than the CPI arrangement.

Recomputation supporters held their breath late last year when the Senate approved a partial recomp plan, but it was erased in a House/Senate conference. Now the Administration is sponsoring a modified recomp bill, though with a noticeable lack of enthusiasm. It is similar to last year's Senate measure.

### Keeping the Balance Positive

That about accounts for the recent pluses and minuses in major military benefits. The balance sheet adds up to many more advances than setbacks. But there is cause for concern; new threats to traditional programs are worrisome. The service community and military-oriented organizations must keep a close eye on developments.

Particularly disturbing are the reckless anti-military attacks by a small segment of Congress. Hopefully, the Defense Department will not be intimidated by these adversaries nor cowed by a defeat such as the one it suffered on the flight-pay extension measure.

Most importantly, the government must not become so hypnotized by the cost factor that it fails to adequately finance personnel projects.

Actually, a people program supported by a full slate of career incentives very likely will pay the country large dividends in money and strengthened security through improved retention of top-quality people, reduced training and retraining outlays, and greater operational effectiveness. ■

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### TRIP OVER IT?

In the years immediately after World War II, long before supply staffs were introduced to computers, an amusing incident occurred at Fairfield-Suisun Air Force Base, Calif. (now Travis AFB), during the dreaded annual inventory. We had a diesel locomotive switch engine physically present, but no paperwork of any kind to show where it came from, how it got there, or how long we had had it.

Finally, a bright, young second lieutenant, fresh out of Supply School, came forth with the solution to the accountability problem. It was duly recorded in the inventory books: "One locomotive, diesel, switch engine—found on base."

*—Contributed by Lt. Col. Bert McDowell, Jr., USAF (Ret.)*

(AIR FORCE *Magazine will pay $10 for each anecdote accepted for publication.)*

# Airman's Bookshelf

## The Soviets in Space

*Soviet Space Programs, 1966–1970,* Library of Congress Research Service, US Government Printing Office, Washington, D. C., 1971. 670 pages with sketches and tables. $3.00.

*The Kremlin and the Cosmos,* by Nicholas Daniloff. Alfred Knopf, New York, N. Y., 1972. 253 pages, illustrated. $6.95.

*Russians in Space,* by Evgeny Riabchikov, translated by Guy Daniels. Doubleday, Garden City, N. Y., 1971. 300 pages, illustrated. $10.00.

*The Russian Space Bluff,* by Leonid Vladimirov. Dial Press, New York, N. Y., 1973. 188 pages, illustrated. $5.95.

The space race is back in the news this year. Both the US's Skylab and the unsuccessful Russian Salyut space stations have helped revive public interest in the manned exploration of space, an interest that had begun to fade almost immediately after the triumphal first step on the moon four years ago.

Since that year, the Apollo moon shots have completed a series of landings, each one more perfect (with the rule-proving exception of Apollo-13) and to the general public less interesting than the last. The Soviets, in the meantime, pressed on in their own space-station development, meeting a series of heartbreaking disappointments. The failure of Salyut-2 in its mission to upstage Skylab was only the latest of many expensive disasters.

A number of fascinating accounts have been published in the last two years which describe the Soviet space program from various points of view. In the absence of much public interest in the subject, these remarkable books have not had the reception they deserve. Perhaps this year's events will encourage many bookstores to send in some quick back orders.

The authoritative and lengthy final word on the subject, *Soviet Space Programs, 1966–1970* (which actually chronicles events through the Soyuz-11 disaster in mid-1971), is another volume in the continuing study under the direction of Dr. Charles Sheldon II, of the Library of Congress Research Service. Dr. Sheldon is the nation's foremost civilian expert on this subject, and his staff's thorough and well-written report is a must for any aerospace bookshelf.

The more casually interested reader will find in Daniloff's *The Kremlin and the Cosmos* a readable and incisive analysis of both the actual accomplishments of the Soviet space program and the political, economic, and military principles and policies that shaped it. Mr. Daniloff was a UPI correspondent in Moscow during the early 1960s, and his experience with managed news helps him see through much of the official smokescreen, which, to a greater or lesser degree, surrounds most aspects of Russian space efforts.

The Russians' own version of their space program also appeared late in 1971. *Russians in Space,* written by the chief Soviet space correspondent, Evgeny Riabchikov, has much to offer to an interested reader: a wealth of detail, many personal sketches of space personalities, a fine selection of photographs. However, its sweeping theme of the inexorable Soviet advance into outer space, pictured as consisting of glorious triumphs and occasional tragic (but always temporary) setbacks, will ring strange in the ears of Western readers unaccustomed to such a dramatic approach. Riabchikov's comments on the Salyut-2 failure are unavailable.

The necessary companion piece to this official side is the version of another Soviet aerospace journalist, Leonid Vladimirov, who defected to England in 1966. His book is concerned with the early years of the Russian program. *The Russian Space Bluff* is full of behind-the-scenes descriptions of human Russian space scientists, descriptions which sound so much more true than those in the official version. His book casts light into corners purposefully kept dark by official Soviet news sources.

Together, these volumes hold almost the complete body of general knowledge about the Russians in space. Anyone interested in the developments leading up to this year's abortive Russian space shot can find in these books all that is available to the public about the subject.

*—Reviewed by Capt. James E. Oberg, USAF, DoD Computer Institute.*

## In the Beginning

*Most Probable Position: A History of Aerial Navigation to 1941,* by Monte Duane Wright. University Press of Kansas, Lawrence, Kan., 1972. 280 pages. $13.50.

This crisp, compelling narrative takes us from pre-World War I marine navigation to 1941, when the David-like US Army Air Corps was faced with the gigantic task of employing long-range bombers. "The story of air navigation," says the author, "is largely one of the transfer of knowledge and skills from one medium to another," from ship to balloon to dirigible to airplane.

Monte Duane Wright has a Ph.D. in history from Duke University; he is also an Air Force lieutenant colonel and a master navigator with years of solid experience. The research involved in this book was prodigious. Publication was assisted by the American Council of Learned Societies, under a grant from the Andrew W. Mellon Foundation. [Colonel Wright retired from the Air Force in August to become Director, NASA Historical Office.]

Colonel Wright's opening chapter succinctly summarizes the fundamental navigational techniques used by late nineteenth century mariners. The thoughtful reader will have little or no trouble grasping the basic principles involved, for the illustrations, as they do throughout the book, admirably reinforce the text.

The second chapter deals with balloonists and their development

of charts, devices for measuring groundspeed, the magnetic compass, sextant, and early altimeter. Here the author's sources are British, French, and German. In this section, as throughout the book, Colonel Wright is probably the first to use foreign sources extensively in this field.

In the chapter on World War I, dirigible navigation—especially the Zeppelin raids against England—makes fascinating reading, and the chapters on overland and transoceanic airlines and radio and celestial navigation between wars are equally gripping and informative. The author's tone is objective and witty, and delightful flying stories abound whenever a point needs to be made. He enlivens a potentially deadly dull subject with the microcosm of clever, stupid, dedicated, thoughtless human beings who move through his pages.

Indeed, the book is overall a loving tribute to human ingenuity, for there is as much wonder in Wright's tone as there is thoroughness in his scope. We meet all the pioneers—Harold Gatty, Wiley Post's navigator; Philip Weems, the father of modern celestial navigation; Col. Thomas Thurlow, the early Army Air Corps innovator, and many others.

The author's complete mastery of his material is especially evident in a classically simple structure that moves chronologically and logically toward the high point of the book, the state of the art as it was known and practiced by the US Army Air Corps in 1941.

Along the way, we see Billy Mitchell making grand and grandiose statements about the capabilities of long-range bombers, but giving almost no thought to how those bombers are to navigate to the target and back at night or in adverse weather.

We are told of the lack of foresight, the result of years of "military-bureaucratic bungling," that forced the Air Corps to cast about in all directions for methods of training navigators to meet the coming challenge of World War II.

We learn that Lt. Curtis LeMay is allowed only an hour a week of student time for navigation training of pilots in his school at Honolulu. And we are finally encouraged by the 500 navigators the Air Corps somehow manages to graduate from its new schools at Kelly, Mather, and Turner before the eve of Pearl Harbor.

Students of airpower and national defense will find this final chapter both perceptive and thought-provoking. Here Colonel Wright's tone becomes coolly critical—he obviously dislikes what he feels truth compels him to tell us. And it is in this strong conclusion that we suddenly discover what he has been doing all along; he has been navigating. As he says in his Preface, navigation as a science uses a variety of instruments and techniques to determine a present position and the direction to steer to reach a desired point.

As a historian, he shows us where navigation has been; where it goes from here quite simply depends on which direction we take, and we must not repeat the mistakes of the Air Corps commanders of the 1930s.

*—Reviewed by Maj. Joseph F. Tuso, Department of English, US Air Force Academy.*

## Through a Glass, Darkly

*Strategic Forces: Issues for the Mid-Seventies,* by Alton H. Quanbeck and Barry M. Blechman. The Brookings Institution, Washington, D. C., 1973. 94 pages with appendices. $1.95 paperback.

When this study was released in June, it sparked quite a flurry of attention in the press. It bears the imprimatur of the prestigious Brookings Institution. One of the authors —Alton Quanbeck—is a retired Air Force colonel, and the paper suggests that, by Fiscal Year 1980, the cost of US strategic forces can be cut from a projected $20.2 billion a year to $15.9 billion with no loss in their ability to perform assigned missions.

The $4.3 billion a year that the authors propose to save "without jeopardizing any of the essential objectives that should . . . govern the nation's choices" would be achieved by:

- Ruling out improvements in strategic missile accuracy and payload and planning to eliminate land-based missiles by the early 1980s;
- Retiring older B-52s, the FB-111, and their associated tankers;
- Slowing development of the B-1 and beginning parallel development of a standoff bomber, with decision on which way to go deferred until later;
- Slowing the pace of development of the Navy's Trident ballistic missile submarine; and
- Reducing air defenses below their present, barely visible level.

The authors' discussion of the relative merits of a B-1 contrasted to a C-5 or Boeing 747-type standoff bomber is reminiscent of Sen. George S. McGovern's "Report on the B-1 Bomber," prepared two years ago for the Members of Congress for Peace Through Law.

The authors assume, for example, that only 120 standoff bombers would be needed for effectiveness equal to 240 B-1s, since each standoff bomber could carry three times as many missiles as a B-1. The size and complexity of a 1,500-mile-range missile for the standoff bomber would more likely result in fewer, rather than more, missiles per aircraft.

The authors compute the unit cost of the standoff bomber's long-range missile at $0.5 million (the cost of a SRAM, which the B-1 will carry), while DoD and Air Force people who have studied the technical complexities of such a missile put the cost at $5 million per copy.

Some telling arguments in favor of retaining land-based missiles have been completely ignored or, as in the case of an enemy's targeting problem created by a Triad of land- and sea-based missiles and bombers, dismissed with a short paragraph.

Nor have the authors informed the reader that their proposed force for the 1980s, made up of sea-based missiles and presumably standoff bombers, would be an almost totally inflexible force, useful only for destroying cities.

*Strategic Forces: Issues for the Mid-Seventies* presents an alternative strategic posture, appealing to the layman because of its apparent economy and effectiveness. The authors have not tried to disguise the shortcomings of their proposed force. They have simply ignored them.

*—Reviewed by John L. Frisbee, Executive Editor,* AIR FORCE *Magazine.*

## New Books in Brief

*American Defense Policy* (third edition), edited by Lt. Col. Richard G. Head and Maj. Ervin J. Rokke. The Air Force Academy's political scientists have done it again. This new edition includes a foreword by Col. Richard Rosser (until recently head of the Academy's Department of Political Science), nearly sixty essays on all aspects of defense policy with each section introduced by either the editors or another

## Airman's Bookshelf

member of the faculty, and comprehensive bibliographies. Authors of the essays include such well-known figures in the field as Richard Nixon, Henry Kissinger, Melvin Laird, Tom Schelling, Charles Hitch, and Alain Enthoven, as well as several Academy political scientists. A section on "The Military and American Society" has been added. In all, this is the best edition of the book that has become a standard college text on defense policy. Johns Hopkins University Press, Baltimore, Md., 1973. 696 pages with index. $17.50 hardback; $6.50 paperback.

*International Air Cargo Strategy,* by John C. Cook. Mr. Cook attacks the myth that air shipping is vastly more expensive than surface. He explains how cargo should be analyzed to minimize packaging costs and obtain maximum benefits from the complex airline rate system. It is the first book that explains exactly how to determine the cost of air cargo, with forty pages of computer-produced numbers from which a company can arrive at a comparative cost analysis that otherwise would take innumerable man-hours. A glossary containing all commonly used terms in the air-freight business is included. Arco, New York, N. Y., 1973. 427 pages with glossary and appendix. $21.95.

*Mars and the Mind of Man,* by Ray Bradbury, Arthur C. Clarke, Bruce Murray, Carl Sagan, and Walter Sullivan. In November 1971, the day before Mariner-9 arrived at Mars, five panelists (the authors) met to exchange their personal impressions of Mars and its meaning in the mind of man. This discussion constitutes the first section of the text. The balance of the text presents the opinions of the five panel participants following the Mariner-9 broadcast in October 1972, looking backward at their original statements in the light of the information transmitted by Mariner during its circumnavigations of the planet. A wealth of extraordinary photographs, also sent back to earth from Mariner-9, illuminates the final conclusions of the authors. Harper & Row, New York, N. Y., 1973. 143 pages. $7.95.

*The National Aeronautics and Space Administration,* by Richard Hirsch and Joseph John Trento. A book about the future, about exploration, and about NASA—its successes and its failures. Included are: NASA's traumatic birth; the sudden impetus given to space research; the space race; and the agency's international programs. Praeger, New York, N. Y., 1973. 245 pages with appendices, index, and bibliography. $9.50.

*Sailplanes & Soaring,* by James E. Mrazek. A step-by-step guide for the beginner to the widest frontier—the sky. Clarifies soaring signals, finding and using thermals and air flows, controls and their effects, flight patterns, traffic patterns, launching, crewing, flying, certification, clubs, buying or renting sailplanes, and kits to build one. Stackpole Books, Harrisburg, Pa., 1973. 192 pages. $5.95.

*Soviet Strategy for the Seventies: From Cold War to Peaceful Coexistence,* edited by Foy D. Kohler (former US Ambassador to the USSR), Mose L. Harvey, Leon Gouré, and Richard Soll. This monograph traces in analytical and documentary form the evolution and application of the Soviet concept of peaceful coexistence between states with different social systems, including the views expressed by the Soviet leadership following the Moscow Summit Meeting of May 1972 and up to the end of that year. The purpose of the study is to provide the reader with an opportunity to familiarize himself with what Soviet leaders and spokesmen have publicly said and written on the subject of peaceful coexistence, and to interpret in a series of brief analyses the implications of these pronouncements as they relate to current Soviet policies and as they seem likely to bear on Moscow's strategy for the remainder of the 1970s. Center for Advanced International Studies, University of Miami, Suite 1213, 1730 Rhode Island Ave., N. W., Washington, D. C. 20036, 1973. 241 pages with index. $4.95 paperback, $5.95 hardback.

*So You're Going To Shoot Newsfilm,* by Leo G. Willette. The purpose of the book is to acquaint the reader with concepts and techniques that produce better newsfilm —not with the "how to open the lens" phase of motion-picture photography. The author states that "Better newsfilm is film which tells the audience the true story, in the most graphic and understandable manner the knowledge and skill of the cameraman can create. The newsfilm cameraman must never forget that he is, first and foremost, a reporter." Seven Seas, Arlington, Va., 1973. 96 pages with glossary. $4.50.

*Spies in the Sky,* by John W. R. Taylor and David Mondey. The expanding scope and techniques of aerial reconnaissance — the men, machines, infrared "eyes," and electronic "ears" that help maintain an uneasy but universally desired state of peace. Included is information on the Foxbat, ECM, AEW, ASW, the SR-71A Blackbird, and the U-2, among others. Charles Scribner's Sons, New York, N. Y., 1972. 128 pages with index. $6.95.

*Threshold: The Blue Angels Experience,* by Frank Herbert. *Threshold* is about the six men who make up the Navy's Blue Angels demonstration flying team and about the superbeing called "a team" that they created. The text is from the narrative script by Frank Herbert for the Gardner-Marlow-Maes film of the same name. More than 100 brilliant four-color photographs. Ballantine, New York, N. Y., 1973. 153 pages. $2.95 paperback.

*World Armaments and Disarmament, SIPRI Yearbook 1973,* edited by John Stares. An analysis of and facts on the arms race and disarmament, the yearbook describes the major quantitative and qualitative changes that take place in the world's arsenals and analyzes the efforts made to control these arsenals. The subjects are divided into four parts: (1) Strategic Arms Limitation; (2) Special Topics (European security, the prohibition of inhumane and indiscriminate weapons, and UN peace-keeping forces); (3) The Development and Spread of Arms Races; (4) Developments in Arms Control and Disarmament. Stockholm International Peace Research Institute, Stockholm, Sweden, 1973. Distributed by Humanities Press, New York, N. Y. 510 pages. Complete with index and appendices. $15.00.

—BY CATHERINE BRATZ

Air Force Magazine
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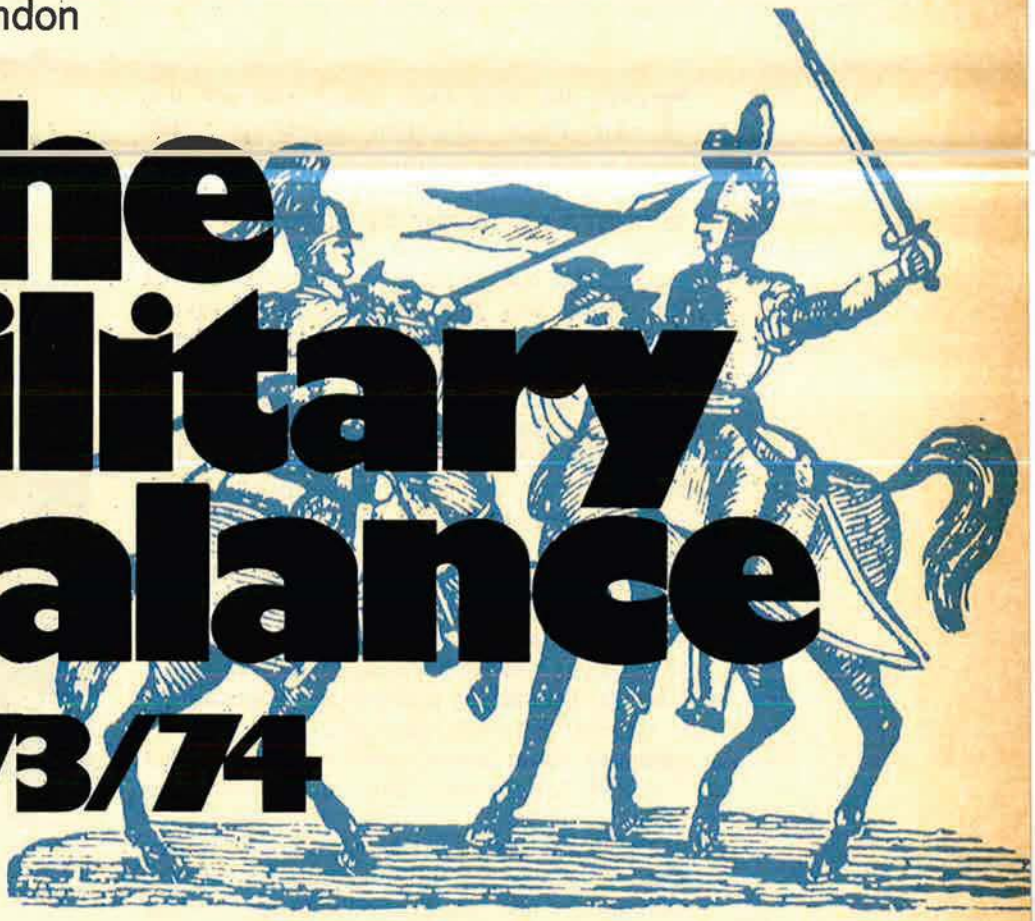
Studies, London

# The Military Balance 1973/74



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AIR FORCE MAGAZINE

PUBLISHED BY THE AIR FORCE ASSOCIATION

**AFA'S AEROSPACE EDUCATION FOUNDATION**

A pioneer in the transfer of USAF educational methods and technology to the civilian classroom, the Aerospace Education Foundation has recently completed one of its most ambitious undertakings. Through a series of related projects, the Foundation has disseminated USAF instructional materials to more than 200 civilian school systems in thirty-nine states and Canada as part of its continuing work in . . .

# Sharing Air Force Educational Know-How

By **Michael J. Nisos**
MANAGING DIRECTOR, AEROSPACE EDUCATION FOUNDATION

THERE has long been ample evidence that Air Force education experience could make a significant contribution to civilian education, but little was done about it until 1967, when AFA's Aerospace Education Foundation began its current program in this area. Since the educational technology developed by the Air Force was paid for by US taxpayers, Foundation officials believed that this technology should be shared by all citizens through their educational communities.

Further, major aerospace installations have most of the elements of large cities—housing, hospitals, fire and police departments, public utilities, etc. Thus, the Air Force training establishment represents a vast resource of concepts, techniques, and course materials to prepare young men and women for a wide variety of occupational careers, almost all of which have a direct counterpart in civilian life. This was the military resource, developed under a systems approach, that had gone virtually untapped these many years despite the fact that it is, for the most part, in the public domain.

The Air Force's systems approach to education begins with the task analysis of a man-to-man and/or man-machine relationship, leading to the definition of specific job performance requirements. Learning objectives are established and criterion tests are developed to measure how well students achieve course objectives. From these steps flow teaching and learning activities, which determine the content, the media to be used, and the sequencing of instruction. Materials, methods, and media all are validated against objectives. Evaluations and revisions are based on a never-ending feedback of data from actual job performance. This process is known as Instructional Systems Development, or ISD.

The Foundation effort resulted in seven Air Force instructional systems being made available in the autumn of 1972 to the civilian education community, on a nonprofit, cost-plus-handling basis. An eighth instructional system was made available in July of this year. The sequence of events that led to this pioneering project follows.

*Visual materials used in an Air Force vocational course are reproduced by the author.*

## Sequence of Development

Our experimental work began as a US Office of Education project, consisting of classroom testing of three Air Force course segments in five public schools in Utah. In institutions ranging from a high school to a four-year college, portions of Air Force courses in basic electronics, medical fundamentals, and aircraft

maintenance were measured against their conventional counterparts. Independent evaluation, supported by empirical data, determined that the Air Force courses were superior in terms of student achievement and retention, student attitude, and, generally, that equal or better results were achieved in a shorter period of time with the Air Force material.

As a follow-up to the Utah project, the Office of Education asked our Foundation to screen *all* Air Force courses for materials and techniques immediately adaptable for civilian use. This led to publication of an Air Force Inventory—a 228-page encyclopedia documenting eighty-two Air Force instructional systems, covering twenty-four major occupational career areas, and representing more than 26,000 hours of instruction. The inventory includes more than 400 hours of motion visuals—film and video tape—31,000 still visuals, fifty-six hours of audio tape, and about 200,000 pages of printed material.

Next, the Office of Education asked the Foundation to retrieve, for demonstration purposes, all materials used in seven Air Force courses:

| | *Hours* |
|---|---|
| Auto/Truck Mechanic | 295 |
| Nurse's Aide | 290 |
| Medical Service Fundamentals | 62 |
| Food Inspector | 315 |
| Structural Engineering Assistant | 491 |
| Aircraft Maintenance Fundamentals | 52 |
| Apprentice Carpenter | 206 |
| *Total Hours* | 1,711 |

The retrieval project provided an interesting challenge. The course materials had to be "dug out" of Air Force classrooms and duplicated without interfering with the training programs. With these multimedia courses involving a wide range of visuals, a preview system had to be developed that would permit the courses to be reviewed without the wide assortment of audio/visual equipment actually used in the classrooms.

A two-man Foundation team, equipped with the necessary reproducing or "mastering" equipment, spent several weeks at Air Force Training Centers. They set up shop near the bases and, usually working between classes or at night, first reproduced all 35-mm slides. They then converted all other still visuals (transparencies, charts, diagrams, and film strips) to a 35-mm format. Next, *all* the visuals (motion pictures, video tapes, and stills) were placed on half-inch video tape for preview. All printed materials were placed on microfiche. Thus, with only two pieces of equipment—a video tape player and a microfiche reader—an entire course could be previewed rapidly and effectively.

### Seven USAF Instructional Systems

With the value of Air Force courses for civilian use established, with an encyclopedia of information on eighty-two Air Force courses, and a system to preview them, the Foundation finally pursued what had been its major objective from the beginning—dissemination of Air Force instructional materials to civilian schools.

Late in 1972, the seven selected Air Force courses listed above were offered to civilian schools as a test project. Each package available for purchase, at cost-plus-handling expenses, included:

- All printed material—including texts, workbooks, and programmed units utilized in each course—on high-resolution microfiche or in printed form.
- A complete "Plan of Instruction," spelling out sequentially the learning objectives, with

### THE AEROSPACE EDUCATION FOUNDATION MISSION

The Aerospace Education Foundation is a nonprofit organization affiliated with the Air Force Association. The Foundation is dedicated to the application of aerospace technology to the advancement of education. It is engaged in the transfer of Air Force-developed concepts, techniques, and course materials to civilian classrooms. The Foundation's operations are financed by income from AFA Chapter fund-raising activities, from government project grants, and from private donations. All contributions are tax deductible.

The Aerospace Education Foundation grew out of AFA's pioneering work in aerospace education during the 1950s, when the Association sponsored seminars for college and public school educators who sought to integrate aerospace technology and data into their curriculums.

In response to a continuing interest in this area, AFA established its educational affiliate on May 1, 1956. The Foundation has its own Board of Trustees, a majority of whom must be members of AFA's National Directors. Its president is always an educator.

Among the most noteworthy of the many conferences and teachers' workshops sponsored by the Foundation, in cooperation with state officials and the US Office of Education, have been the National Laboratories for the Advancement of Education. The second of these, held in Washington in 1970, was attended by more than 3,000 people who met to exchange ideas on "Education for the World of Work," and to learn about advanced educational technology.

The projects for applying aerospace technology to civilian education, described in the accompanying article, began in 1967.

support materials and instructional methodology keyed to the objectives and presented in manual format.

- A complete set of "Lesson Plans" (instructor's guides) for each instructional system, on high-resolution microfiche or in printed form.
- A summary of the key elements in each system, including a list of equipment essential to the course.
- An audio/visual "Materials Availability Summary," listing titles, prices, and sources for the stills and motion visuals utilized in each system.

This new program is a private venture of the Foundation and involves at present a low-key marketing effort. Although only a few thousand copies of the sales brochure were distributed and only the seven Air Force courses were offered, four hundred course packages have been purchased, representing 88,000 instructional hours. The demand for Air Force courses in civilian education—in high schools, technical institutes, and community colleges—has been clearly demonstrated.

It will take some months for the purchasers to integrate this Air Force material into their curriculums, but initial comments indicate a positive reaction. An Occupational Resource Center refers to the material as a "gold mine," and has purchased the Plans of Instruction for all eighty-two of the Air Force courses inventoried by the Foundation.

Other schools, plus some industrial firms, are plunging directly into curriculum development. A Canadian College of Applied Arts and Technology is using the Air Force Food Inspector course as the basis for a new four-semester course. An Eastern county school system is using the Air Force Auto/Truck

*Here is the stack of instructional materials used by the Air Force in its Nurse's Aide course. When reduced to video tape for preview purposes, the entire collection forms the relatively small package held by Jackie Mashin, a member of the Foundation staff.*

*USAF's Electronics Principles course, the focal point of the Foundation's Utah project, is now available to civilian school systems.*


## ACKNOWLEDGMENTS

Credit for the success of the various projects conducted by AFA's Aerospace Education Foundation belongs to many organizations and people.

First, to the US Office of Education for sponsoring and funding the projects up to the dissemination of materials.

Second, to the US Air Force and its Air Training Command, including hundreds of individuals, for the continuing and cordial cooperation furnished.

Third, to the Utah Department of Education for having the foresight and innovativeness to test the Air Force materials and then purchase them for their own use.

And, finally, to the members of the Air Force Association directly involved and to the Board of Directors, AFA, and the Board of Trustees of the Foundation for approving the projects.


For additional details on the eight instructional systems available, contact the Managing Director, Aerospace Education Foundation, 1750 Pennsylvania Avenue, N. W., Washington, D. C. 20006. Telephone: (202) 298-9123.

Mechanic course in minipackages for its adult education program. A Western community college, aided by a state grant, has individualized the Air Force Machinist course for use in six community colleges. A major steel plant is using the Air Force Auto/Truck Mechanic course to train maintenance and repair personnel. And a large automotive manufacturing corporation is using the same course to develop a full curriculum for its new Automotive Technology Institute.

As expected, initial reports indicate particular interest in the Plan of Instruction for each Air Force course. This unique document spells out sequentially, module by module, unit by unit within each module, and step by step within each unit, the learning objectives required to achieve the student behavior desired, the teaching techniques to be employed, the content to be covered, and the supporting resources available to both teacher and student.

As a result of the Foundation's program, dozens of civilian school systems are using these Plans of Instruction—as a beginning—to catalog occupational objectives or as curriculum guides. Since writing effective performance objectives is a difficult task at best, these schools testify that they are saving months of hard work and sizable sums of money in the process.

## An Eighth Instructional System

The value of Instructional Systems Development in civilian settings has been best demonstrated by the Air Force Basic Electronics course—the focal point of our Utah project—a course that the Foundation made available to civilian school systems in July of this year.

This 512-hour instructional system includes 115 individual TV tapes; more than 1,400 35-mm slides; student texts, workbooks, study guides, laboratory manuals, programmed lessons, reference documents, circuits, diagrams, and other printed materials amounting to 2,589 pages; and a complete 312-page plan of instruction. For the convenience of purchasers, print materials will be supplied both in hard copy and high-resolution microfiche formats. On an individual basis, the ten blocks, including all software, range in cost from $134 to $1,565 per block, depending on the quantity and type of learning materials utilized.

## The Impact

When an Office of Education evaluation team asked a group of Utah teachers for their appraisal of this Air Force course (which is in use there), they reported that, without any modification, it met about eighty-five percent of their curriculum requirements. Teachers were asked for specific reactions. One explained that by using the Air Force course he was able to include a second class in his program without adding teachers. He could run the classes concurrently, serve both of them, and give more personalized attention to his students, because the video tape was doing the basic instructional job. The teacher could then serve as "classroom manager," overseeing and guiding the instruction.

In Utah today, the Air Force Electronics course, purchased with state funds, is being phased into a statewide curriculum to replace the conventional course. This Air Force course has formed the basis for an electronics curriculum articulated between secondary and post-secondary schools. It is featured in a mobile classroom that reaches isolated rural areas, and is used to update teachers through a statewide educational television series emanating from the University of Utah.

The Office of Education evaluation team concluded that the Air Force electronics course, as demonstrated in Utah, has the following advantages over conventional instruction:

- Increases teacher production.
- Generates a faster learning pace.
- Provides greater retention.
- Permits student self-tutoring and self-paced remedial work.
- Allows more instructor time for individualized attention to students.

These latter points—individualizing, student self-tutoring, and student self-pacing—are worthy of special mention.

It means that the military—at least the Air Force—often regarded as autocratic and "lockstep" in its methods, actually is flexible and progressive in its approach to the learning process.

It means, further, that applying systems analysis to education—regarded by some educators as a mechanistic approach to problem-solving—can result in more individualized, more student-centered, more humanistic education than the conventional way of doing things in the classroom.

What has been accomplished thus far in transferring aerospace technology into the civilian classroom has opened many eyes. To expand and develop this valuable work is the number-one priority of the Aerospace Education Foundation. ■

# HIGHLIGHTS

# 1974

## MAY AIR FORCE MAGAZINE

Annual Air Force Almanac issue—exclusive articles by the Secretary and Chief of Staff, USAF . . . in-depth reports on all major Commands . . . complete Gallery of USAF Weapon Systems. Must reading . . . important reference issue throughout the year.

## JULY AIR FORCE MAGAZINE

"The Electronic Air Force"—special editorial coverage on what is happening now and plans for the future. Must reading throughout the Air Force, particularly in AFSD, ASD, and the Labs, as well as all user Commands.

## SEPTEMBER AIR FORCE MAGAZINE

Annual Convention, Fall Briefings and Display issue. Bonus distribution at event, including all military and civilian executives attending by special invitation for briefings. Marketing plus . . . inclusion of advertisement in "Industry Salutes the Air Force" display at show.

## NOVEMBER AIR FORCE MAGAZINE

Convention Briefings and Displays Report issue. (Widely read for its comprehensive reports on seminars, industry briefings on latest technical developments, and addresses by key USAF leaders.)

## DECEMBER AIR FORCE MAGAZINE

*"The Military Balance"*—The major report from the International Institute for Strategic Studies, London, England, which documents, country by country, the world's military forces and equipment. A desk-top reference sought after and referred to by military decision-makers in the U.S. Air Force, DoD, NASA, the Congress, and other military services.

AIR FORCE MAGAZINE

PUBLISHED BY THE AIR FORCE ASSOCIATION

# The Bulletin Board

## Readiness Goals

In an unusually forceful memorandum of August 23, Secretary of Defense James R. Schlesinger has directed that Selected Reserve units be brought to their readiness goals. Staff elements and Defense agencies primarily concerned were told to provide support on a priority basis. The memorandum outlines both procedures and organizational arrangements for rapidly achieving full readiness capability, and the Secretary again stressed that "Guard and Reserve Forces *will* be used as the initial and primary augmentation of the active force."

The memorandum, one of the most significant recent documents pertaining to the Reserve Forces, is reprinted in full below:

THE SECRETARY OF DEFENSE
WASHINGTON, D. C. 20301

MEMORANDUM FOR: Secretaries of the Military Departments
Chairman, Joint Chiefs of Staff
Director, Defense Research and Engineering
Assistant Secretaries of Defense
Director, Defense Program Analysis and Evaluation
Directors of Defense Agencies

SUBJECT: Readiness of the Selected Reserve

An integral part of the central purpose of this Department—to build and maintain the necessary forces to deter war and to defend our country—is the Total Force Policy as it pertains to the Guard and Reserve. It must be clearly understood that implicit in the Total Force Policy, as emphasized by Presidential and National Security Council documents, the Congress, and Secretary of Defense policy, is the fact that the Guard and Reserve Forces *will* be used as the initial and primary augmentation of the active forces.

Total Force is no longer a "concept." It is now the Total Force Policy which integrates the active, Guard, and Reserve Forces into a homogeneous whole.

As a result of this policy, the Selected Reserve has moved toward timely responsiveness and combat capability. Application of this policy has improved equipping, funding, facilities, construction, programing, and some training areas.

I recognize and appreciate the great amount of effort that has been made to develop the Guard and Reserve. Progress has been made.

However, gross readiness measurements (which should be improved) indicate that we have not yet reached a level consistent with the objective response times. It is clear that we should move as much post-mobilization administration as possible to the premobilization period and streamline all remaining post-mobilization administrative and training activities.

We must assure that the readiness gains in the Selected Reserves are maintained and that we move vigorously ahead to reach required readiness and deployment response times in areas still deficient.

I want each Service Secretary to approach affirmatively the goals of producing Selected Reserve units which will meet readiness standards required for wartime contingencies. Each Secretary will provide the manning, equipping, training, facilities, construction, and maintenance necessary to assure that the Selected Reserve units meet deployment times and readiness required by contingency plans. You will have my support and personal interest in overcoming any obstacles in these areas.

The Assistant Secretary of Defense for Manpower and Reserve Affairs is charged by statute and by Defense policy and Directives with the responsibility for all matters concerning Reserve Affairs. It is my desire that the Assistant Secretary of Defense for Manpower and Reserve Affairs, as a matter of priority, take such actions as are necessary to bring the Selected Reserve to readiness goals. In this respect, the Services, the other Assistant Secretaries of Defense, the Joint Chiefs of Staff, the Director of Defense Program Analysis and Evaluation, and other Defense Agencies will provide support on a priority basis. Particular emphasis will be placed on assistance in manning, equipping, and training. The Deputy Assistant Secretary of Defense (Reserve Affairs) will continue to function in accord with current statutes and directives.

To emphasize and to strengthen Selected Reserve management, I suggest a civilian Deputy Assistant Secretary for Reserve Affairs in the office of each of the Assistant Secretaries of the Military Departments for Manpower and Reserve Affairs. This Deputy should be supported by an adequate staff and be assigned responsibilities and functions similar to those assigned the Deputy Assistant Secretary of Defense for Reserve Affairs.

At the military level, the Navy has been given specific guidelines for

*Then AFA National President Martin M. Ostrow presents an AFA Presidential citation to Edith E. Caffrey "in recognition of her more than thirty-one years of exceptional service to the USAF and the nation and in appreciation of her outstanding support of AFA." Mrs. Caffrey retired recently after a career as personal secretary to four USAF Chiefs of Staff.*

developing the new office of Chief of Naval Reserve. The Air Force and Marine Corps management structure has produced combat readiness and that is the vital test. I expect that the Army's reorganization, with strong command emphasis and good selection of leaders, will produce demonstrably visible improvement, and I shall follow the results with interest.

The Chiefs of the National Guard and Reserve components will be the staff level managers of the Guard and Reserve programs, budgets, policy, funds, force structure, plans, etc. They will be provided the authority, responsibility and means with which to accomplish their functions effectively. The overall management responsibility of the Chiefs of the Selected Reserve, under the Service Chiefs, will be supported by all other appropriate staff agencies.

In addition to the foregoing emphasis on Reserve Force policy and management, I am asking my Deputy Assistant Secretary for Reserve Affairs, with your support, to manage a study covering the issues of availability, force mix, limitations, and potential of Guard and Reserve Forces.

In summary, strong management with achievement of readiness levels in the Selected Reserve is among our highest priorities—we must and will accomplish this objective as soon as possible.

J. R. Schlesinger

### Senate Study Points Up All-Vol Issues

In a report prepared for the Senate Armed Services Committee by the Brookings Institution and recently released, progress, problems, and prospects of an all-volunteer armed force have been highlighted.

Using statistical data and mathematical models, authors Martin Binkin and John D. Johnston conclude that the Administration's goal of about three million citizens under arms is possible if timely measures are taken to reevaluate manpower requirements and standards and to deal with foreseeable recruiting shortfalls.

Discussing progress to date, the authors note that the quality of volunteers has generally improved since Fiscal Year 1970. There has been a steady, but modest, decline in those with above average qualifying scores, a modest increase in those with average scores, and a steady decrease in those with below average scores. They found, however, that the percentage of the Army's high school graduates dropped from almost sixty percent in Fiscal Year 1972 to under fifty percent early in Fiscal Year 1973. The proportion of minority groups enlisting has grown significantly between 1970–73.

The proportion of nonwhite volunteers increased from 14.4 percent in FY '70 to 19.8 percent in FY '72 and then remained fairly constant for the first nine months of FY '73.

Before using the broad powers to pay bonuses that are contained in the Uniformed Services Special Pay Act of 1973, currently before the Congress, the authors ask that the question of "qualification" for service be explored in more depth. They observe that the armed forces could wind up buying more quality than is necessary.

To get the numbers involved in current goals, the study says that one of every three qualified and available men would have to volunteer.

Some of the options that might reduce the need for male enlisted volunteers are: reduce military manpower in overhead activities; recruit more women; replace military men with civilians; decrease the first-term/career ratio and appropriately adjust reenlistment rates; and/or lengthen initial terms of service.

To increase the supply of male enlisted volunteers, the options are: attract men in the over age twenty-two group, both those with and without prior service; attract full-time students by offering to pay for their college education; relax certain physical standards; adjust educational and testing standards that may be unnecessarily high for certain functions.

In arguing for a cautious use of monetary incentives, the study points up a more fundamental issue —the need to evaluate the military compensation system itself—a patchwork of more than 200 elements of pay, allowances, and fringe benefits. The authors contend that "the military pay structure is already so complex that military personnel understandably have difficulty in evaluating accurately the various compensation elements. Adding the additional elements included in the proposed Uniformed Services Special Pay Act would compound the problem."

As one example of the kind of data used to support their recommendations, the authors noted on the reduced-manpower issue that, for each one-month increase in average tour length, about 8,000 nonproductive billets could be eliminated. These billets are part of 88,000 authorized for FY '73 to keep units fully manned while other personnel are moving people into, out of, and within the services.

Finally, the authors call for certain questions to be addressed immediately and suggest that, until they are, Congress should establish machinery to monitor the progress of the all-volunteer force. The questions are:

- What is the quality, how should it be measured, how much does it cost, and how much is enough?
- What measures are available for increasing efficiency in the use of military manpower, particularly in the labor-intensive support establishment?
- What are the relative merits of using women and civilians in jobs traditionally filled by military men? To what extent can such substitution take place?
- To what degree can volunteers who are not "combat fit," but who are otherwise healthy, be absorbed into the military services for limited-duty assignments?
- What constitutes an appropriate career pattern, and what alternatives are open?
- What is the right mix of career and first-term personnel?
- What are the relative merits of alternative lengths of initial enlistment?
- How would the recruitment of those beyond the seventeen- to twenty-two-year-old age group—perhaps at higher grade levels—affect service manpower programs?
- How are Reserve strengths related to national security policy, and how do Reserve shortages affect it?
- What is the capability of Reserve components to recruit manpower—both new recruits and personnel with prior service? What is the relation between enlistment rates and incentive programs?

# USAF DUTY IN EXOTIC LANDS

*USAF men assigned to Sixth ATAF relax in the 1,700-year-old amphitheater at Ephesus, which once seated 25,000 people. In the same area are St. John's Basilica and Meryemana.*

*A favorite mode of transportation in Izmir, Turkey, is the "Araba," or horse carriage, shown here picking up American school children.*

*A Sixth ATAF Turkish major looks over a map while other NATO aircrew members look on.*

*Personnel from Turkey, Greece, the United Kingdom, and the United States form in front of Sixth ATAF headquarters for a change-of-command ceremony.*

Ephesus. Bergama. Meryemana. Cannakale. Pergamum. These are geographical names not familiar to Air Force men and women whose tours of duty normally rotate only between USAF's major components. Yet these names of ancient areas steeped in biblical history are among the widely sought attractions for members of NATO's Sixth Allied Tactical Air Force, including the some 200 assigned US Air Force people.

USAF people do serve outside of normal Air Force channels, yet one seldom hears of their work. Here, then, is a short profile of this one NATO assignment.

Activated in Izmir, Turkey, October 14, 1953, Sixth ATAF's original mission was to organize airpower in Greece and Turkey. Since then, the command has grown to three complete tactical air forces, two in Turkey and one in Greece.

Sixth ATAF's area of responsibility is the largest of any allied tac air force in NATO. Geographically, it runs 1,500 miles from east to west and about 850 miles north to south, covering the Black Sea approaches to the Dardanelles Straits, the Aegean Sea, and a big chunk of the Mediterranean.

Its NATO mission is to support any allied counter-air campaign, to provide for the air defense of the southeastern NATO region, and to conduct tactical air operations in support of ground forces. Air defense of Greece and Turkey became part of Sixth ATAF's mission in 1955.

To do the job, Sixth ATAF has F-84s, RF-84s, F-100s, F-102s, F-5s, F-104s, and should soon have the F-4, since Greece and Turkey plan to buy Phantoms.

Sixth ATAF headquarters is located in Sirinyer, a suburb of Izmir, Turkey. A former private school and government-run institute for teacher training houses the Sirinyer garrison.

Most USAF personnel assigned to headquarters are working for the Joint Signal Support Group at Disko Hit, Turkey, Sixth ATAF's emergency war headquarters. A small number are part of Detachment 5, 1141st USAF Special Activity Squadron, providing personnel support to Air Force members in Sixth ATAF.

At the headquarters itself, blue suiters help supervise activities of the First and Second Turkish Tactical Air Forces and the 28th Hellenic Tactical Air Force, and are supported by personnel from Greece, Turkey, the United Kingdom, and Italy, as well as the US Army and US Navy.

Americans and their dependents involve themselves in a number of interests during this assignment. For example, many become members of the Turkish-American Asso-

## The Bulletin Board

ciation, learning languages and customs and exchanging ideas and foods. TAA also is one group that arranges for trips to those exotic historic places mentioned above. USAF people also support a girls' orphanage in Buca, a village near the headquarters. Dependent wives support two other orphanages, an old folks home, and other charitable organizations.

So, while contributing to the NATO mission, gaining the experience of working with other countries in the defense treaty arena, and sampling the pleasures of the Aegean region, these Air Force people are on the spot in unique jobs outside the Air Force's normal area of operations. ■

### Senior Staff Changes

**L/G Lew Allen, Jr.**, from Dep. to the Dir., Central Intelligence for the Intelligence Community, Washington, D. C., to Dir., NSA, Ft. Meade, Md., replacing Gen. Samuel C. Phillips . . . **Gen. Lucius D. Clay, Jr.**, from CinC, Hq. PACAF, Hickam AFB, Hawaii, to CinC, NORAD/CONAD, Ent AFB, Colo., replacing retiring Gen. Seth J. McKee . . . **B/G Clyde R. Denniston, Jr.**, from Dep. Dir., Programs, DCS/P&R, to Dep. Dir., Ops, DCS/P&O, Hq. USAF . . . **Col. (B/G selectee) William D. Gilbert**, from DCS/Civil Engineering, Hq. MAC, Scott AFB, Ill., to DCS/Civil Engineering, Hq. PACAF, Hickam AFB, Hawaii, replacing B/G John D. Peters.

**B/G Abbott C. Greenleaf**, from DCS/Ops, Hq. AFSC, Andrews AFB, Md., to Dep. Dir., Programs, DCS/P&R, Hq.

### Ed Gates . . . Speaking of People

## New Airman Education and Commissioning Program

Air Force enlisted men now enjoy improved chances of winning commissions. In a move of considerable significance, Hq. USAF recently announced a consolidation of its three commissioning programs (the original Airman Education and Commissioning Program, Bootstrap, and the Airman Commissioning Program) under which airmen pursue second lieutenant bars. This merger, now beginning to be phased in, stands to eliminate the confusion created by the separate programs and provide an assist to the Project Volunteer effort.

More important for the individual airman aspiring to officer status, the project extends the age limit slightly (thirty-five is the new ceiling) and boosts the annual EM commissioning quota by 300 slots. Instead of providing only 700 new commissions annually for airmen who have competed under the three separate programs, the new system, when fully operational in 1975, earmarks 1,000 commissions for qualified airmen each year.

The new program, called simply the Airman Education and Commissioning Program (AECP), will furnish USAF more new officers than the Air Force Academy, whose annual production goal is 825. It is possible that the AECP, in a few years, could become USAF's second largest source of new officers. This would be contingent on further cuts in USAF's annual commission quotas for new college graduates not associated with either AFROTC or airmen commissioning.

AFROTC production, meantime, remains USAF's largest officer source by far, though with total officer strength being scaled back year after year, Air Force is experiencing growing difficulty digesting all such graduates.

AFROTC production is dropping to about 3,500 this fiscal year, according to Hq. USAF authorities, although about 700 of that number are slated to be offered a chance to serve only ninety days of active-duty training, to be followed by transfer to nonactive Reserve unit duty.

The fact that Air Force is boosting its annual airmen-to-officer quota by nearly forty-three percent (700 to 1,000), while at the same time total new officer intake is dwindling, is not only significant in regard to the composition of the officer force of the future, but speaks volumes for the performance of officers who previously won their status via the airman commissioning route.

Hq. USAF authorities are high on them, on their effectiveness, career-mindedness, and dedication. As a group, these ex-airmen have chalked up the best retention record of any officer category. So, under the new project, the service will welcome considerably larger numbers of them.

Commissions for enlisteds were a big thing during World War II, as thousands of selected enlisted men and women were sent directly to officer candidate school. College degrees were not required then, but later the young Air Force decided that all its future officers, regardless of their source of commission, must possess a bachelor's degree. This policy has been severely questioned over the years. "Why must all pilots be college graduates?" critics have asked—but the Air Force has held firm.

Thus, for many years, all new USAF officers have held college sheepskins. Meanwhile, the World War II officers, many of whom were not college graduates, are just about retired off, leaving Air Force with about a ninety percent college grad officer force.

When the degree requirement for new officers was adopted, only a handful of airmen owned the admission ticket. USAF's answer, for officer-minded EM, was to lay on the original AECP. Promising airmen with some college education were sent to universities at government expense to earn degrees, then complete Officer Training School and enter active duty as second lieutenants.

Later, the Bootstrap Commissioning Program (BCP) and the Airman Commissioning Program (ACP) were added. AECP has involved degree

USAF, replacing B/G Clyde R. Denniston, Jr. . . . **L/G Richard M. Hoban,** from V/C, Hq. AFLC, Wright-Patterson AFB, Ohio, to Cmdr., 2d AF, SAC, Barksdale AFB, La., replacing L/G James M. Keck . . . **M/G (L/G selectee) Warren D. Johnson,** from Dep. Dir. (Ops & Admin.), to Dir., Defense Nuclear Agency, Washington, D. C. . . . **L/G James M. Keck,** from Cmdr., 2d AF, SAC, Barksdale AFB, La., to Vice CinC, Hq. SAC, Offutt AFB, Neb.

**B/G Phillip N. Larsen,** from Cmdr., Rome Air Dev. Ctr., AFSC, Griffiss AFB, N. Y., to V/C, ESD, AFSC, L. G. Hanscom Fld., Mass. . . . **B/G Robert C. Mathis,** from Systems Program Dir., F-111 Program, to Dep. for Recon/Strike/Electronic Warfare, ASD, AFSC, Wright-Patterson AFB, Ohio . . . **L/G Sanford K. Moats,** from V/C, Hq. 16th AF, USAFE, Torrejon AB, Spain, to Cmdr., 6th ATAF, Det. 5, 1141st USAF Sp. Acty. Sqdn., Turkey . . . **L/G Edmund F. O'Connor,** from V/C, Hq. AFSC, Andrews AFB, Md., to V/C, Hq. AFLC, Wright-Patterson AFB, Ohio, replacing L/G Richard M. Hoban.

**Gen. Samuel C. Phillips,** from Dir., NSA, Ft. Meade, Md., to Cmdr., Hq. AFSC, Andrews AFB, Md., replacing Gen. George S. Brown . . . **B/G Walter D. Reed,** from Dir., Civil Law, OJAG, to Asst. JAG, Hq. USAF, replacing B/G (M/G selectee) Harold R. Vague . . . **L/G Donavon F. Smith,** from Cmdr., 6th ATAF, SHAPE, Izmir, Turkey, to Spec. Asst. to the Chief of Staff, Hq. USAF . . . **B/G Robert F. Titus,** diverted from Asst. DCS/Ops, to DCS/Ops, Hq. AFSC, Andrews AFB, Md., replacing B/G Abbott C. Greenleaf . . . **B/G (M/G selectee) Harold R. Vague,** from Asst. JAG, to JAG, Hq. USAF . . . **B/G Jasper A. Welch, Jr.,** from Spec. Asst., DCS/R&D, Hq. USAF, to Spec. Asst., Asst. to the Secretary of Defense for Atomic Energy, Washington, D. C.

**PROMOTIONS:** To **General:** Samuel C. **Phillips.** To **Lieutenant General:** Lew **Allen,** Jr.; Warren D. **Johnson;** Sanford K. **Moats.** To **Major General:** Harold R. **Vague.**

**RETIREMENTS:** L/G Earl C. **Hedlund;** L/G Glen W. **Martin;** Gen. Seth J. **McKee;** L/G Robert N. **Smith.**

*—Compiled by Catherine L. Bratz*

completion and OTS for up to 300 airmen annually. ACP has covered OTS for 100 airmen a year who already held degrees, while BCP was concerned with degree completion and OTS for up to 300 members a year who already had at least one full enlistment behind them.

Only the BCP had the thirty-five-year-age ceiling; the others were thirty-two.

In merging the three commission avenues, Air Force has promised to streamline the procedures and provide a single application form (AF Form 56) and a single directive (revised chapter five to AFM 50–5). Headquarters has also called for greater efforts by base education offices to work with airmen in improving their educational credentials, so they can qualify for the expanded AECP.

Key features of the new program, many of which are fixtures from the old programs, include these:

- Applicants must have at least one year of active duty. However, before that, they should contact their local education office for counseling on such things as what academic discipline to pursue and what specific off-duty courses to take. To apply, hopefuls must have at least thirty college semester hours, although up to fifteen credit hours may be obtained through the Community College of the Air Force.
- Selectees are sent to colleges (USAF decides which ones) for up to thirty-six months, as E-5s (or higher if they already hold higher grades), to earn their degrees, which most do while maintaining excellent marks. Dropouts are rare, officials say.
- Then follows officer training and commissioning, at what Air Force now calls the School of Military Sciences, Officer, at Lackland AFB, Tex. Three hundred of the 1,000 annual slots are for pilot and navigator applicants.

USAF's official instructions state that "selections will be made on a best qualified basis with emphasis on military performance, academic background, and the unit commander's recommendation." Selection boards will meet quarterly. The 700 annual nonrated vacancies will be designated by skill specialty, with the Air Force Institute of Technology preparing periodic lists based on USAF's projected needs.

Tips not in the official instructions may prove helpful to individuals. A person's academic major, for one thing, is all-important. If it is in engineering or some other relatively scarce skill area, his chances are much better than if he were pursuing liberal arts or business administration.

Important too is the number of credit hours accumulated. While thirty—the equivalent of one college year—is the minimum needed to apply, it won't impress the selection board. Most applicants can present many more hours, so that other things being equal, the more credit hours obtained the better a person's chances.

Good grades are particularly significant, an authority explained. He noted that if two persons were competing for a particular skill quota slot, and one presented sixty credit hours of excellent grades while the other offered ninety hours of mediocre grades, the former undoubtedly would win out.

Some quarters have found it puzzling that age and long service, which the private sector generally recognizes via the pay check, job titles, or privileges, receive no consideration when veteran NCOs enter the commissioned ranks.

Air Force has insisted that they start as second lieutenants and serve the same length of time for their promotions as ROTC and Academy products. Yet such veterans may have served twelve, fourteen, and even more years in responsible jobs while attaining lofty NCO rank. They could be nearly forty by the time they make captain, a situation that individuals quite understandably find embarrassing.

A change that would permit such "old-timers" to begin their officer careers as first lieutenants, or reduce the normal two-year period for promotion to that rank, has been suggested. But the present policy will not be changed, a Headquarters official made clear.

Except for that lone shortcoming—which admittedly affects very few prospects—Air Force's revised commissioning system should draw applause throughout the service. Increasing the number of outstanding airmen who will advance to officer status and serve out productive careers as officers figures to add strength to the entire officer corps. ■

# 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, Tuscaloosa): **Cecil Brendle,** 3463 Cloverdale Rd., Montgomery, Ala. 36111 (phone 269-7252).

**ALASKA** (Anchorage, Fairbanks, Kenai): **Charles W. Lafferty,** 1045 Pedro St., Fairbanks, Alaska 99701 (phone 456-5167).

**ARIZONA** (Phoenix, Tucson): **H. J. Bills,** 50 S. 45th Ave., Phoenix, Ariz. 85031 (phone 272-3272).

**ARKANSAS** (Blytheville, Fort Smith, Little Rock): **Frank A. Bailey,** 605 Ivory Dr., Little Rock, Ark. 72205 (phone 988-3432).

**CALIFORNIA** (Apple Valley, Burbank, Edwards, Fairfield, Fresno, Harbor City, Hawthorne, Long Beach, Los Angeles, Merced, Monterey, Novato, Orange County, Palo Alto, Pasadena, Riverside, Sacramento, San Bernardino, San Diego, San Francisco, Santa Barbara, Santa Clara County, Santa Monica, Tahoe City, Vandenberg AFB, Van Nuys, Ventura): **Ben F. Snell,** 11 Sharon Dr., Salinas, Calif. 93940 (phone 422-7571).

**COLORADO** (Boulder, Colorado Springs, Denver, Ft. Collins, Pueblo): **James C. Hall,** P. O. Box 30033, Lowry AFB Station, Denver, Colo. 80230 (phone 366-5363, ext. 459).

**CONNECTICUT** (East Hartford, Torrington): **John McCaffery,** 117 Bridge St., Groton, Conn. 06340 (phone 739-7922).

**DELAWARE** (Dover, Wilmington): **Franklin R. Welch,** Greater Wilmington Airport, Bldg. 1504, Wilmington, Del. 19720.

**DISTRICT OF COLUMBIA** (Washington, D. C.): **George G. Troutman,** 1025 Connecticut Ave., N. W., Washington, D. C. 20002 (phone 659-3900).

**FLORIDA** (Bartow, Broward, Daytona Beach, Ft. Walton Beach, Gainesville, Homestead, Jacksonville, Key West, Miami, Orlando, Panama City, Patrick AFB, Redington Beach, Sarasota, Tallahassee, Tampa, West Palm Beach): **A. W. Haymon,** 1421 S.E. 3d Ave., Ft. Lauderdale, Fla. 33316 (phone 525-4161).

**GEORGIA** (Athens, Atlanta, Savannah, St. Simons Island, Valdosta, Warner Robins): **Donald L. Devlin,** 1651 McKinnon Dr., Savannah, Ga. 31404 (phone 234-0109).

**HAWAII** (Honolulu): **Campbell Palfrey, Jr.,** E. F. Hutton Co., Inc., 700 Bishop St., Honolulu, Hawaii 96813 (phone 521-2961).

**IDAHO** (Boise, Burley, Pocatello, Twin Falls): **Clarence E. Hall,** 3531 Windsor Dr., Boise, Idaho 83705 (phone 344-7283).

**ILLINOIS** (Belleville, Champaign, Chicago, Deerfield, Elmhurst, O'Hare Field): **William A. Johnston,** 302 Harvard Dr., O'Fallon, Ill. 62269 (phone 632-2021).

**INDIANA** (Indianapolis, Lafayette, Logansport): **Oliver K. Loer,** 268 S. 800 W., Swayzee, Ind. 46986 (phone 922-7136).

**IOWA** (Des Moines): **Ric Jorgensen,** P. O. Box 4, Des Moines, Iowa 50301 (phone 255-7656).

**KANSAS** (Topeka, Wichita): **Don C. Ross,** 10 Linwood, Eastborough, Wichita, Kan. 67201 (phone 686-6409).

**LOUISIANA** (Alexandria, Baton Rouge, Bossier City, Monroe, New Orleans, Ruston, Shreveport): **Louis Kaposta,** 2808 Stonewall, Shreveport, La. 71109 (phone 635-8168).

**MAINE** (Limestone): **Alban E. Cyr,** P. O. Box 160, Caribou, Me. 04736.

**MARYLAND** (Baltimore): **James W. Poultney,** P. O. Box 31, Garrison, Md. 21055 (phone 363-0795).

**MASSACHUSETTS** (Boston, Falmouth, Florence, Lexington, L. G. Hanscom Fld., Taunton, Worcester): **Arthur D. Marcotti,** 215 Laurel St., Melrose, Mass. 02146 (phone 665-5057).

**MICHIGAN** (Dearborn, Detroit, Kalamazoo, Lansing, Marquette, Mount Clemens, Oscoda, Sault Ste. Marie): **Stewart Greer,** 18690 Marlowe Ave., Detroit, Mich. 48235 (phone 273-5115).

**MINNESOTA** (Duluth, Minneapolis, St. Paul): **Victor Vacanti,** 8941 10th Ave., Minneapolis, Minn. 55420 (phone 854-3456).

**MISSISSIPPI** (Biloxi, Columbus, Jackson): **Wm. Browne,** P. O. Box 2042, Jackson, Miss. 39205 (phone 352-5077).

**MISSOURI** (Kansas City, Knob Noster, Springfield, St Louis): **Robert E. Combs,** 2003 W. 91st St., Leawood, Kan. 66206 (phone 649-1863).

**MONTANA** (Great Falls): **George Page,** P. O. Box 3005, Great Falls, Mont. 59401 (phone 453-7689).

**NEBRASKA** (Lincoln, Omaha): **Lyle O. Remde,** 4911 S. 25th St., Omaha, Neb. 68107 (phone 731-4747).

**NEVADA** (Las Vegas, Reno): **Floyd White,** 3578 Algonquin Dr., Las Vegas, Nev. 89109 (phone 384-8077).

**NEW HAMPSHIRE** (Manchester, Pease AFB): **R. L. Devoucoux,** 270 McKinley Rd., Portsmouth, N. H. 03801 (phone 669-7500).

**NEW JERSEY** (Andover, Atlantic City, Belleville, Camden, Chatham, E. Rutherford, Fort Monmouth, Jersey City, McGuire AFB, Newark, Trenton, Wallington, West Orange): **Amos L. Chalif,** 162 Lafayette, Chatham, N. J. 07928 (phone 635-8082).

**NEW MEXICO** (Alamogordo, Albuquerque, Clovis): **John J. Dishuk,** 8204 Harwood Ave., N.E., Albuquerque, N. M. 87110 (phone 298-0788).

**NEW YORK** (Albany, Bethpage, Binghamton, Buffalo, Chautauqua, Elmira, Griffiss AFB, Hartsdale, Ithaca, Long Island, New York City, Niagara Falls, Patchogue, Plattsburgh, Riverdale, Rochester, Staten Island, Syracuse): **Gerald V. Hasler,** P. O. Box 11, Johnson City, N. Y. 13760 (phone 754-3435).

**NORTH CAROLINA** (Charlotte, Fayetteville, Goldsboro, Greensboro, Raleigh): **Monroe E. Evans,** 607 Tokay Drive, Fayetteville, N. C. 28301.

**NORTH DAKOTA** (Grand Forks, Minot): **Kenneth A. Smith,** 511 34th Ave., So., Grand Forks, N. D. 58201 (phone 722-3962).

**OHIO** (Akron, Cincinnati, Cleveland, Columbus, Dayton, Newark, Toledo, Youngstown): **Robert L. Hunter,** 2811 Locust Dr., Springfield, Ohio 45504 (phone 255-5304).

**OKLAHOMA** (Altus, Enid, Oklahoma City, Tulsa): **Edward McFarland,** Suite 1100, Shell Bldg., Tulsa, Okla. 74119 (phone 583-1877).

**OREGON** (Corvallis, Eugene, Portland): **John G. Nelson,** 901 S. E. Oak St., Portland, Ore. 97214 (phone 233-7101).

**PENNSYLVANIA** (Allentown, Beaver Falls, Chester, Erie, Homestead, Horsham, Lewistown, New Cumberland, Philadelphia, Pittsburgh, Washington, Willow Grove, York): **Frank E. Nowicki,** 280 County Lane Rd., Wayne, Pa. 19087 (phone 672-4300, ext. 62).

**RHODE ISLAND** (Warwick): **Matthew Puchalski,** 143 Sog Riang, Warwick, R. I. 02886 (phone 737-2100, ext. 27).

**SOUTH CAROLINA** (Charleston, Columbia, Greenville, Myrtle Beach, Sumter): **Burnet R. Maybank,** P. O. Box 126, Charleston, S. C. 29402 (phone 722-4735).

**SOUTH DAKOTA** (Rapid City): **Kenneth Roberts,** P. O. Box 191, Rapid City, S. D. 57701 (phone 342-0191).

**TENNESSEE** (Chattanooga, Knoxville, Memphis, Nashville, Tullahoma): **James W. Carter,** Williamsburg Rd., Rt. 3, Brentwood, Tenn. 37027 (phone 834-2008).

**TEXAS** (Abilene, Austin, Big Spring, Corpus Christi, Dallas, Del Rio, El Paso, Fort Worth, Houston, Laredo, Lubbock, San Angelo, San Antonio, Sherman, Waco, Wichita Falls): **Stanley L. Campbell,** 119 Bluehill, San Antonio, Tex. 78229 (phone 342-0006).

**UTAH** (Brigham City, Clearfield, Ogden, Provo, Salt Lake City): **Verl G. Williams,** 435 N. Fort Ln., Layton, Utah 84041 (phone 777-5370).

**VERMONT** (Burlington): **R. F. Wissinger,** P. O. Box 2182, S. Burlington, Vt. 05401 (phone 863-4494).

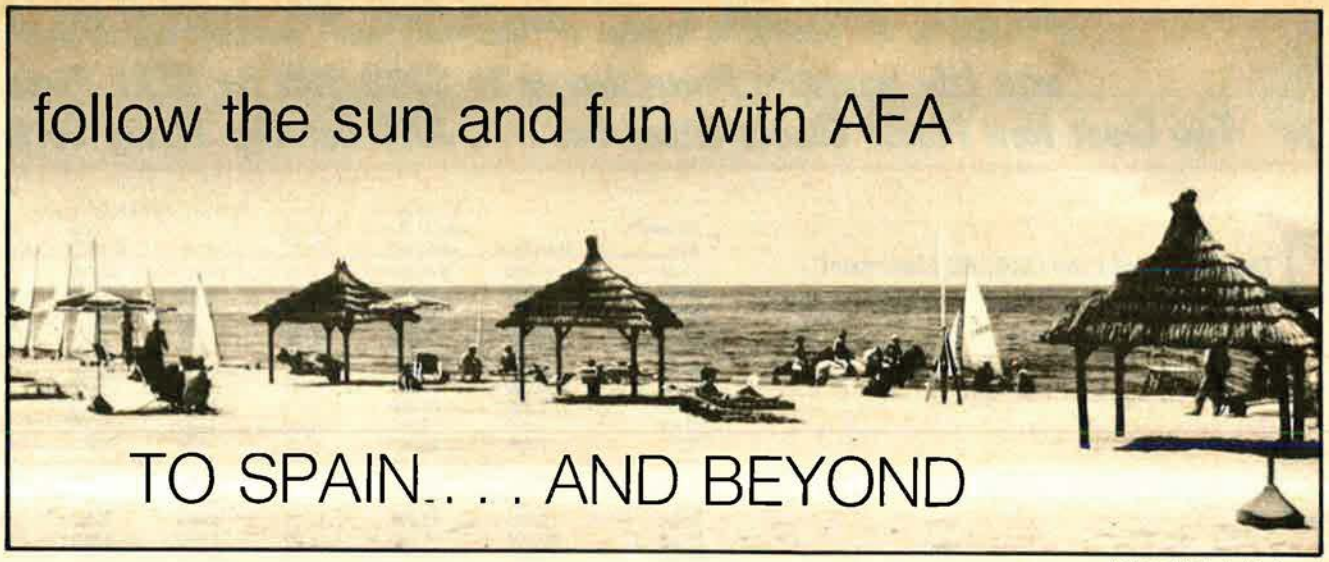
**VIRGINIA** (Arlington, Danville, Harrisonburg, Langley AFB, Lynchburg, Norfolk, Petersburg, Richmond, Roanoke): **Orland J. Wages,** 210 W. Bank St., Bridgewater, Va. 22812 (phone 828-2501, ext. 91).

**WASHINGTON** (Bellevue, Port Angeles, Seattle, Spokane, Tacoma): **V. Lee Gomes,** P. O. Box 88850, Seattle, Wash. 98188 (phone 534-3860).

**WISCONSIN** (Madison, Milwaukee): **Kenneth Kuenn,** 3239 N. 81st St., Milwaukee, Wis. 53222 (phone 757-5324).

**WYOMING** (Cheyenne): **Elmer F. Garrett,** 109 E. 19th St., Cheyenne, Wyo. 82001 (phone 632-9314).

# follow the sun and fun with AFA



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# AFA's FIRST OVERSEAS REUNION TRIP

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The Air Force Association has made arrangements with a U.S. chartered airline, a number of hotels, and an experienced travel agency for an unusual vacation trip, exclusively for AFAers and their families, with these features:

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**DELUXE ACCOMMODATIONS AT MINIMUM COST**

(At 1973, pre-dollar devaluation rates, with all taxes and service included)

- Basic Tour (first week)—including hotel room (double occupancy), American breakfast and deluxe dinner daily, free swimming, tennis and golf, all transfers, and including round trip air fare (per person): from Los Angeles/Dallas ($522.15) and from Chicago/Washington ($437.15).
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- Deadline for selecting second-week tours: January 1, 1974.

**FOUR DEPARTURE POINTS**

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To Spain and return in two World Airways Super DC-8s, each equipped with only 219 seats for added comfort and with special services aboard

**EASY PAYMENT PLAN**

- Down payment to insure reservation: $100.00 by November 15, 1973.
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- For second week optional tours: payment in full by April 15, 1974.

No refunds can be made on cancellations postmarked after March 15, 1974.

**RESERVATIONS LIMITED**

Only 438 people can be accommodated on the trip. Reservations will be honored on a first-come, first-served basis.

For Detailed Information (and brochures) write:
AFA Overseas Reunion Trip, Air Force Association
1750 Pennsylvania Ave., N.W., Washington, D.C. 20006

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## with Life Insurance Protection up to $100,000 for USAF Personnel

## Two Great New Plans! Choose Either One . . . AND Get Big, Strong Coverage

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| Insured's Age | Coverage | Extra Accidental Death Benefit* | Monthly Cost | Optional Family Coverage Spouse | Each Child** | Monthly Cost Family Coverage |
|---|---|---|---|---|---|---|
| 20-24 | $ 66,000 | $12,500 | $10.00 | $6,000 | $2,000 | $2.50 |
| 25-29 | 60,000 | 12,500 | 10.00 | 6,000 | 2,000 | 2.50 |
| 30-34 | 50,000 | 12,500 | 10.00 | 6,000 | 2,000 | 2.50 |
| 35-39 | 40,000 | 12,500 | 10.00 | 6,000 | 2,000 | 2.50 |
| 40-44 | 25,000 | 12,500 | 10.00 | 5,250 | 2,000 | 2.50 |
| 45-49 | 15,000 | 12,500 | 10.00 | 4,050 | 2,000 | 2.50 |
| 50-59 | 10,000 | 12,500 | 10.00 | 3,000 | 2,000 | 2.50 |
| 60-64 | 7,500 | 12,500 | 10.00 | 2,250 | 2,000 | 2.50 |
| 65-69 | 4,000 | 12,500 | 10.00 | 1,200 | 2,000 | 2.50 |
| 70-75 | 2,500 | 12,500 | 10.00 | 750 | 2,000 | 2.50 |
| 20-24 | $100,000 | $12,500 | 15.00 | $6,000 | $2,000 | $2.50 |
| 25-29 | 90,000 | 12,500 | 15.00 | 6,000 | 2,000 | 2.50 |
| 30-34 | 75,000 | 12,500 | 15.00 | 6,000 | 2,000 | 2.50 |
| 35-39 | 60,000 | 12,500 | 15.00 | 6,000 | 2,000 | 2.50 |
| 40-44 | 37,500 | 12,500 | 15.00 | 5,250 | 2,000 | 2.50 |
| 45-49 | 22,500 | 12,500 | 15.00 | 4,050 | 2,000 | 2.50 |
| 50-59 | 15,000 | 12,500 | 15.00 | 3,000 | 2,000 | 2.50 |
| 60-64 | 11,250 | 12,500 | 15.00 | 2,250 | 2,000 | 2.50 |
| 65-69 | 6,000 | 12,500 | 15.00 | 1,200 | 2,000 | 2.50 |
| 70-75 | 3,750 | 12,500 | 15.00 | 750 | 2,000 | 2.50 |

* In the event of an accidental death occurring within 13 weeks of the accident, the AFA plan pays a lump sum benefit of $12,500 *in addition to* the benefit, except as noted under AVIATION DEATH BENEFIT, above.

** Each child is covered in this amount between the ages of six months and 21 years. Children under six months are provided with $250 protection once they are 15 days old and discharged from the hospital.

**AVIATION DEATH BENEFIT:** A total sum of $22,500 under the High-Option Plan or $15,000 under the Standard Plan is paid for death which is caused by an aviation accident *in which the insured is serving as pilot or crew member of the aircraft involved.* Under this condition, the Aviation Death Benefit is paid in lieu of all other benefits of this coverage.

### CHECK THE ADVANTAGES OF THESE AFA PROGRAMS

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**Keep your coverage at the low, group rate to age 75, if you wish.**

**Full conversion privilege.** At age 75 [or at any time, on termination of AFA membership] the amount of insurance shown for your age group at the time of conversion may be converted to a permanent plan of insurance, *regardless of your health at that time.*

**Disability waiver of premium,** if you become totally disabled for at least nine months, prior to age 60.

**Convenient premium payment plans.** Pay direct to AFA or by monthly government allotment.

**Reduction of cost by dividends.** Net cost of insurance to AFA insured persons has been reduced by payment of dividends in eight of the last eleven years. However, dividends cannot, of course, be guaranteed.

**Administered by insurance professionals on your Association's staff,** for excellent service and low operating cost.

### EXCEPTIONS:

Group Life Insurance: Benefits for suicide or death from injuries intentionally self-inflicted while sane or insane shall not be effective until your coverage has been in force for 12 months.

**The Accidental Death Benefit and Aviation Death Benefit** shall not be effective if death results: [1] From injuries intentionally self-inflicted while sane or insane, or [2] From injuries sustained while committing a felony, or [3] Either directly or indirectly from bodily or mental infirmity, poisoning or asphyxiation from carbon monoxide, or [4] During any period a member's coverage is being continued under the waiver of premium provision, or [5] From an aviation accident, military or civilian, in which the insured was acting as pilot or crew member of the aircraft involved, except as provided under AVIATION DEATH BENEFIT.

The insurance will be provided under the group insurance policy issued by United of Omaha to the First National Bank of Minneapolis as trustee of the Air Force Association Group Insurance Trust. However, because of certain limitations on group insurance coverage in those states, nonactive-duty members who reside in Ohio, Texas, Florida, and New Jersey are not eligible for AFA group life insurance coverage.

### EFFECTIVE DATE OF YOUR COVERAGE

All certificates are dated and take effect on the last day of the month in which your application for coverage is approved. Coverage runs concurrently with AFA membership. AFA Military Group Life Insurance is written in conformity with the Insurance Regulations of the State of Minnesota.

Yes, now the Air Force Association offers members of the United States Air Force their choice of two great new life insurance plans, both designed to meet the special requirements of Air Force personnel.

**Planned for You**

Both plans have been specifically designed to fill your particular needs. This is full-time, worldwide protection. There are no war clauses—no hazardous-duty restrictions, or geographical limitations on AFA life insurance protection. At AFA, our policy is to provide the broadest possible protection to our members, including those in combat zones.

**Low Group Rates**

And, as a member of AFA, you are able to secure this outstanding protection at low group rates. What's more, there's no increase in premiums for flying personnel. In fact, in most cases, flying personnel are entitled to full death benefits. Only when death is caused by an aircraft accident in which the insured was serving as pilot or crew member does the special Aviation Death Benefit take effect.

**Higher Benefits for Young Families**

The higher benefits for younger members make both plans particularly outstanding buys for the young family. The young family breadwinner can make a substantial addition to his life insurance estate at a time when his family is growing up—when his financial obligation to his family is at its greatest!

**CHOOSE EITHER OF THESE GREAT PLANS! MAIL THIS APPLICATION TO AFA TODAY!**

# BREAKS THE BENEFIT BARRIER!

## APPLICATION FOR AFA MILITARY GROUP LIFE INSURANCE

United of Omaha

Group Policy GLG-2625
United Benefit Life Insurance Company
Home Office: Omaha, Nebraska

Full name of member _____
Rank Last First Middle

Address _____
Number and Street City State ZIP Code

| Date of birth Mo. Day Yr. | Height Weight | Social Security Number |
|---|---|---|
| | | |

Please indicate category of eligibility and branch of service.

- ☐ Extended Active Duty
- ☐ Ready Reserve or National Guard
- ☐ Air Force Academy
- ☐ Air Force
- ☐ Other _____ (Branch of service)
- ☐ _____ Academy
- ☐ ROTC Cadet _____ Name of college or university

Name and relationship of primary beneficiary

Name and relationship of contingent beneficiary

This insurance is available only to AFA members

- ☐ I enclose $10 for annual AFA membership dues (includes subscription ($9) to AIR FORCE Magazine).
- ☐ I am an AFA member.

Please indicate below the Mode of Payment and the Plan you elect.

| HIGH OPTION PLAN | | Mode of Payment | STANDARD PLAN | |
|---|---|---|---|---|
| Members Only | Members and Dependents | | Members Only | Members and Dependents |
| ☐ $ 15.00 | ☐ $ 17.50 | **Monthly** government allotment. I enclose 2 months' premium to cover the period necessary for my allotment to be established. | ☐ $ 10.00 | ☐ $ 12.50 |
| ☐ $ 45.00 | ☐ $ 52.50 | **Quarterly.** I enclose amount checked. | ☐ $ 30.00 | ☐ $ 37.50 |
| ☐ $ 90.00 | ☐ $105.00 | **Semiannually.** I enclose amount checked. | ☐ $ 60.00 | ☐ $ 75.00 |
| ☐ $180.00 | ☐ $210.00 | **Annually.** I enclose amount checked. | ☐ $120.00 | ☐ $150.00 |

| Names of Dependents To Be Insured | Relationship to Member | Dates of Birth Mo. Day Yr. | Height Weight |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

Have you or any dependents for whom you are requesting insurance ever had or received advice or treatment for: kidney disease, cancer, diabetes, respiratory disease, epilepsy, arteriosclerosis, high blood pressure, heart disease or disorder, stroke, venereal disease or tuberculosis? Yes ☐ No ☐

Have you or any dependents for whom you are requesting insurance been confined to any hospital, sanitarium, asylum or similar institution in the past 5 years? Yes ☐ No ☐

Have you or any dependents for whom you are requesting insurance received medical attention or surgical advice or treatment in the past 5 years or are now under treatment or using medications for any disease or disorder? Yes ☐ No ☐

IF YOU ANSWERED "YES" TO ANY OF THE ABOVE QUESTIONS, EXPLAIN FULLY including date, name, degree of recovery and name and address of doctor. (Use additional sheet of paper if necessary.)

_____

_____

_____

I apply to United Benefit Life Insurance Company for insurance under the group plan issued to the First National Bank of Minneapolis as Trustee of the Air Force Association Group Insurance Trust. Information in this application, a copy of which shall be attached to and made a part of my certificate when issued, is given to obtain the plan requested and is true and complete to the best of my knowledge and belief. I agree that no insurance will be effective until a certificate has been issued and the initial premium paid. I understand United reserves the right to request additional evidence of insurability in the form of a medical statement by any attending physician or an examination by a physician selected by United.

Date _____, 19 ____ _____
Member's Signature

10/73
Form 3676GL App

Application must be accompanied by check or money order. Send remittance to: Insurance Division, AFA, 1750 Pennsylvania Avenue, NW, Washington, D.C. 20006

By Don Steele
AFA AFFAIRS EDITOR

# THE TEXAS STATE ORGANIZATION . . .

cited for effective programming in support of the mission of AFA, most recently exemplified in their 1973 State convention in San Antonio.

Due to a change in the operating year for AFA's field units, from a calendar year to a fiscal year of July 1 through June 30, most AFA State conventions were held during the months of April, May, and June. This month's "AFA News" will be devoted almost entirely to reporting on those conventions.

Hailed as the greatest convention in the history of the **Texas AFA,** the State AFA's 1973 convention, held in San Antonio June 29 through July 1, was a "shirt-sleeves" working convention, with sport shirts and slacks the uniform of the day.

The informative and productive program featured briefings by some of the top leaders of the Air Force on the missions of their respective commands, with emphasis on their requirements and an explanation of how AFA could best support them.

Presentations were made by AFA National President **Martin M. Ostrow** and Board Chairman **Joe L. Shosid; Lt. Gen. George S. Boylan, Jr.,** Deputy Chief of Staff, Programs and Resources, Hq. USAF; **Maj. Gen. John W. Hoff,** Commander, Central Air Force Reserve Region; **Brig. Gen. Conrad S. Allman,** Commander, US Air Force Recruiting Service; **Brig. Gen. Robert M. White,** Commandant, AFROTC; **Brig. Gen. John J. Pesch,** Deputy Director, Air National Guard; and **Gerald C. Henckel, Jr.,** Vice President, Ray Ellison Industries and the State AFA's Command Support Director.

**Dick Agnich,** a Dallas attorney and former legislative aide to Sen. John Tower (D-Tex.), was the luncheon speaker. He described how AFA units should deal with their congressional leaders in supporting AFA objectives.

An AFA Fiesta featured an authentic Mexican buffet complete with strolling Mariachis. After the Fiesta, some 2,000 people attended the evening program in San Antonio's Theater for the Performing Arts, where they were entertained by the Happy Jazz Band, a local Dixieland group, and The Chordsmen, a men's choral ensemble. A spectacular audiovisual presentation entitled "The Texas Air Force Association Because" and an awards program led up to the highlight of the evening and the convention, an address by **Gen. John D. Ryan,** USAF Chief of Staff, his last public address before his retirement on July 31.

**Col. H. J. Dalton, Jr.,** Director of Information, Hq. Air Training Command, received the State AFA's "Air Force Officer of the Year" award, while **Vic Kregel,** a Vice President of the Texas AFA, was named the State AFA's "Man of the Year" and "Civilian of the Year." The **Wichita Falls Chapter** was named the Texas AFA's "Unit of the Year," and **Southwestern Bell Telephone Co.** received its "Organization of the Year" award. These awards were presented during the evening program.

At the awards luncheon, **Lt. Col. Royce Moser, Jr.,** was named the State AFA's "Doctor of the Year"; **Capt. Myriam Santiago** received the "Nurse of the Year" award; and **SMSgt. Henry D. Green** and **TSgt. Alvin A. Schlueter, Jr.,** were named "Texas Air Reservist of the Year" and "Texas Air National Guardsman of the Year," respectively.

AFA National President **Martin M. Ostrow** presented four National AFA awards: the "ATC Pilot Instructor of the Year" to **Capt. Charles E. Huff;** the "ATC Navigator Instructor of the Year" to **Capt. Randall M. Crook;** and the two "ATC Technical Instructor of the Year" awards to **TSgt. Evariste J. Bisson** and **SSgt. Robert N. Allwine.**

During the brief but productive business session, delegates re-elected incumbent President **Stanley L. Campbell.** Others elected to serve for FY '74 are: **T. A. Glasgow, A. D. McCall, Jr., V. R. Kregel, A.**

*With sport shirts and slacks the uniform of the day, Air Force Chief of Staff Gen. John D. Ryan, center left, joins in the fun at the Texas AFA's Convention Fiesta with AFA National President Martin M. Ostrow, left, San Antonio Chamber of Commerce President Roane Harwood, center right, and Texas AFA President Stanley Campbell.*

*Shown at the opening reception at the Texas AFA's recent convention in San Antonio are, from left, Jerry Henckel and Stanley Campbell, Texas AFA Vice President and President, respectively; Mrs. McBride; Lt. Gen. William V. McBride, Commander, Air Training Command and Military Host to the convention; Maj. Gen. William A. Jack, Commander, San Antonio Air Materiel Area; Maj. Gen. William H. Reddell, USAF (Ret.), convention chairman; and Alamo Chapter President Arthur O. de la Garza, the host Chapter.*

**J. Statser, Elton E. Welchel, Jerry Henckel, E. F. Faust, Jack Newman,** and **Gerald D. Blatherwick,** Vice Presidents; **Jack Kelly,** Secretary; and **Jerry D. Bryant,** Treasurer.

To wind up the convention activities, AFA members and their families toured the C-5A Galaxy and maintenance facilities at Kelly AFB on Sunday morning.

Our heartiest congratulations to Texas AFA President **Stan Campbell;** to **Maj. Gen. William H. Reddell,** USAF (Ret.), convention chairman; to the officers and members of the **Alamo Chapter** who hosted the convention; and to all the committee chairmen and workers who contributed so much to make this convention one that will be remembered for a long, long time. In recognition of their outstanding efforts, we are proud to name AFA's Texas State Organization as AFA's "Unit of the Month" for October.

*Alaska AFA President Victor R. Davis, left, AFA National President Martin M. Ostrow, center, and Anchorage Chapter President William M. Mack discuss the Alaska AFA's convention agenda. Mr. Ostrow was the speaker at the Anchorage Chapter's annual awards banquet, which was held in conjunction with the convention.*

Hosted by the **Columbus Chapter** at the Ramada East Inn on March 31, the **Ohio AFA's** 1973 convention featured a briefing on "The Air Force of the Future." The briefing was given by **Col. Carl F. Arantz, Jr.,** Director of Strategic and Defense Systems Planning, Deputy for Development Planning, Aeronautical Systems Division at Wright-Patterson AFB.

At the awards banquet, the Ohio AFA's Aerospace Power Award went to **Mark Sloan,** former Curator of the Air Force Museum. **Edward H. Nett, Wright Memorial Chapter** President, was named the State AFA's "Man of the Year," and his wife received the "Patient Wife" award.

Delegates elected **Robert L. Hunter** to succeed **Robert H. Maltby** as President for FY '74. Other officers elected are: **Gerard W. Kaufhold,** Executive Vice President; **Edward Nett, Melvin Gerhold,** and **Dale Hornung,** Area Vice Presidents; **Charles B. Spencer,** Secretary; and **Kenneth E. Banks, Jr.,** Treasurer.

Delegates to the **Alaska AFA's** 1973 convention, March 31, elected **Dr. Charles Lafferty** of Fairbanks to succeed **Vic Davis** of Anchorage as their President for FY '74. Also elected at the meeting were: **Vernon R. Johnson** and **Edward S. Philleo,** Vice Presidents; and **Vernon R. Johnson,** Secretary/Treasurer.

The **Anchorage Chapter,** host to the convention, held its annual awards banquet in conjunction with the convention at Elmendorf AFB. AFA President **Martin M. Ostrow** was the guest speaker. During the program, **Maj. Gen. Donavon F. Smith,** Commander, Alaskan Air Command, presented the Chapter's Lt. Gen. Glen R. Birchard Award to **Maj. Robert H. Robinson,** a helicopter pilot who saved the life of a seriously ill Russian seaman.

**Col. and Mrs. Calvin C. Chapman,** from Eielson AFB, received the Chapter's award for outstanding contribution to the Air Force community. In making the presentation, **Sen. Ted Stevens** (R-Alaska) said, "It is hard to find an event at Eielson AFB that at least one member of the Chapman family isn't involved in."

The third major award, named for **Bob Reeve,** President of Reeve Aleutian Airways and a Past President of the Alaska AFA, went to the **25th Tactical Air Support Squadron** at Eielson. In citing the squadron for its contributions to aviation in Alaska, Mr. Reeve said that the squadron modified their O-2A aircraft in several ways to allow successful and safe operations in the arctic environment.

**William J. Tobin,** President of the Anchorage Chamber of Commerce, was master of ceremonies for the banquet and awards program.

The Riviera Hotel in Palm Springs was the site of the **California AFA's** gala twenty-fifth anniversary convention, April 6–8.

The convention program, which opened with a Friday night reunion party, also featured a continental breakfast; a business session; an AFA awards luncheon; AFA workshops on Chapter management, public relations and publicity, and membership; a ladies' tour of the city; and a twenty-fifth anniversary banquet.

**Maj. Gen. J. G. Brown,** Director, Air National Guard, and AFA President **Martin M. Ostrow** were the principal speakers, with former AFA National Director **Milton Caniff,** creator of the popular syndicated comic strip "Steve Canyon," and TV personality **Bob Duggan** serving as masters of ceremonies.

The late AFA National Director **Will Bergstrom** was posthumously named the California AFA "Man of the Year." The award was accepted by Will's widow, **Lois.** The State AFA's "Outstanding Programming" award went to San Francisco's **Golden Gate Chapter,** while the **Fresno Chapter** received the "Outstanding Chapter Activities" award.

**Lt. Gen. William F. Pitts,** Commander, Fifteenth Air Force (SAC), was the Military Host, and **Lt. Gen. Clarence S. Irvine,** USAF (Ret.), was honorary chairman.

Honored guests included **Col. John A. Macready,** USAF (Ret.), who made the first nonstop transcontinental flight from New York to San Diego on May 2–3, 1923; several former POWs and their wives; and the wives of several MIAs.

**Ben Snell** of Salinas was elected President of AFA's largest State Organization, succeeding **Stanley Hryn** of Monterey. The following were elected to serve with Ben: **Arthur F. Trost** and **Barbara Rowland,** Vice Presidents; **Carolyn Carter,** Secretary; and **Gordon E. Meinert,** Treasurer.

"Fiction–Fact–Freedom" was the theme of the **Massachusetts AFA's** twenty-fifth anniversary convention, April 27–28.

Principal speakers at the conven-

tion, held in the L. G. Hanscom Field Officers' Club, were **Maj. Gen. Albert R. Shiely, Jr.,** Commander, Air Force Electronic Systems Division (AFSC); and **Col. William K. Moran, Jr.,** Commander, Air Force Cambridge Research Laboratories (AFCRL) at Hanscom Field. AFA's Director of Field Organization, **Don Steele,** was master of ceremonies at the awards banquet.

A special Massachusetts AFA plaque was presented to **Betty Topjian** "for her exemplary service to the State AFA and local Chapters." The State AFA's "Golden Citation" was presented to **Norma James, Arthur A. Snow,** and **Wayne Pueschel. Taunton Chapter** awards went to **Louis W. Brezinski, Fred Replenski, Ted Replenski,** and **Jerry LaChance.**

**Arthur Marcotti** was elected to succeed **James Fiske** as the State AFA President for FY '74. Other newly elected officers are: **Frederick J. Gavin, Jr.,** and **Betty Topjian,** Vice Presidents; **Mary Connors,** Secretary; and **Doris Stone,** Treasurer.

In conjunction with the convention, **Edward T. Nedder,** Vice President for AFA's New England Region, conducted a regional meeting on Sunday morning, the highlight of which was a surprise visit and brief remarks by **Maj. Gen. Daniel "Chappie" James, Jr.,** then the Deputy Assistant Secretary of Defense for Public Affairs. (General James is now a lieutenant general and Principal Deputy Assistant Secretary of Defense for Public Affairs.)

The **Illinois AFA's** 1973 convention, held in the Reserve Facility at O'Hare International Airport on May 5, featured a Reserve Forces seminar.

**John O. Gray,** AFA's Assistant Executive Director and a retired Air Force Reserve brigadier general, was the moderator for the seminar. Panelists were: **Raymond S. Webster,** Staff Director, Office of the Deputy Assistant Secretary of Defense for Reserve Affairs; **Maj. Gen. Donald J. Smith,** Chief of Staff, Illinois Air National Guard; **Col. Warren E. Bristow,** Commander, 126th Air Refueling Wing, Illinois Air National Guard; and **Col. Sam Bianco,** Commander, 928th Tactical Airlift Group (Reserve).

At the evening banquet, General Gray spoke on the history of AFA, the initial action taken by AFA through an article in AIR FORCE Magazine to make the public aware of the plight of our POWs and MIAs and their families, and AFA's efforts through the magazine and AFA units in the field to help obtain humane treatment for our POWs.

During the program, **Charles Harriss, Scott Memorial Chapter** President, accepted an Illinois AFA Certificate of Merit in recognition of the Chapter's outstanding membership solicitation efforts in obtaining more than 300 new AFA members during the year.

At the business session, delegates elected **William A. Johnston** to succeed **M. Lee Cordell** as President for FY '74. Other newly elected officers are: **Mr. Cordell,** Vice President; **William P. Turk,** Secretary; and **Charles Oelrich,** Treasurer.

*William A. Johnston, left, the newly elected President of the Illinois AFA, is congratulated by John O. Gray, center, AFA's Assistant Executive Director and guest speaker at the Illinois AFA convention, and outgoing State President M. Lee Cordell.*

The **Florida AFA's** 1973 convention was held in Cocoa Beach, May 18–20. Early arrivals were given a choice of a Friday afternoon tour of the Kennedy Space Center or a round of golf at the Patrick AFB golf course.

**Maj. Gen. David M. Jones,** Commander of the Air Force Eastern Test Range, and his wife were guests of honor at the Friday night poolside luau.

Principal speakers were **Gen. Bruce K. Holloway,** USAF (Ret.), an AFA National Director and a former Commander in Chief of the Strategic Air Command; and **Maj. Gen. Leslie W. Bray, Jr.,** Director of Doctrine, Concepts, and Objectives, Hq. USAF.

During the convention reception at the Top O' the Cape Restaurant, delegates and guests were treated to a special added attraction, the launch of a Poseidon missile from a submerged nuclear submarine some thirty miles out at sea.

Delegates elected **Albert Haymon** to succeed **Troy Jones** as President of the Florida AFA for FY '74. Other officers elected are: **Robert Schissell,** Executive Vice President; **Hal Mason, Wayne Hilton, Marion Chadwick,** and **Robert O'Connor,** Vice Presidents; **Gerald Frewer,** Executive Secretary; **Joseph Bachman,** Secretary; and **Lewis Green,** Treasurer.

The convention closed with a Sunday morning AFA leaders workshop.

Meeting at the Seattle Hyatt House, delegates to the **Washington AFA's** 1973 convention, May 11–12, elected **Lee Gomes** of Spokane to succeed **John Gayton** of Tacoma as President of the State Organization during FY '74.

**Maj. Gen. Leo C. Lewis,** Vice Commander, Fifteenth Air Force (SAC), March AFB, Calif., was the guest of honor and speaker at the convention awards banquet. Washington AFA Vice President **Sherm Wilkins** gave a presentation on the "Boeing Story Updated" as a special feature at the style-show luncheon.

At the awards banquet, the **Northwest Region's** "Member of the Year" award went to **Dr. Clayton Gross** of Portland, Ore. The Washington AFA's "State Officer of the Year" award went to **Dave Levitch** of Spokane; **Ted Wright,** President of the **Seattle Chapter,** was named the "Chapter President of the Year", and **Clyde Stricker,** a Past President of the State AFA, received the "Outstanding State Member of

the Year" award. The **Alaska AFA** received a "Good Neighbor Award," which was accepted by **Vic Davis,** Alaska AFA President.

Other officers elected to serve with Mr. Gomes are: **Sherm Wilkins, Mario Iafrate,** and **Dave Levitch,** Vice Presidents; **Peg Reed,** Secretary; and **Ken Glassburn,** Treasurer.

**The Colorado AFA's** third annual convention, hosted by the **Pueblo Chapter** on May 12, opened with the State AFA's second annual nine-hole golf tournament, followed by afternoon briefings and a business session.

**Lt. Gen. A. P. Clark,** Superintendent, US Air Force Academy, was the guest speaker at the convention banquet. During the program, AFA National Director **George M. Douglas** was named the Colorado AFA's "Man of the Year," while the **Front Range Chapter** of Denver received the State AFA's "Chapter of the Year" award. Other awards went to **Sgt. Ira E. Stanley,** Colorado Springs, "Recruiter of the Year"; **Sgt. Michael P. Wilbur,** Air Reserve Personnel Center, "Airman of the Year"; and **Linda Wilson,** Denver, "CAP Cadet of the Year."

Citations "for substantial contributions to the Colorado AFA" went to **Maj. Gen. A. S. Slay,** Commander, Lowry Technical Training Center; **Brig. Gen. Larry M. Killpack,** Commander, Air Force Accounting and Finance Center; **Brig. Gen. E. S. Wittbrodt,** USAF (Ret.), Colorado AFA Vice President; **Col. B. S. Catlin III,** Commander, Air Reserve Personnel Center; and **Col. S. I. Godkin,** Vice Commander, 26th Air Division, Luke AFB, and the former Director of Information at Aerospace Defense Command.

**Col. R. V. Mitchell** and **Capt. H. A. Pearce,** from the Aerospace Defense Command, gave a briefing on AWACS, and **Lt. Col. J. W. Swan,** Armament Program Manager F-15, Wright-Patterson AFB, Ohio, briefed on the F-15.

At the business session, delegates elected **James C. Hall** to succeed **Roy A. Haug** as President for FY '74. Elected to serve with Mr. Hall are: **E. J. Churches** and **W. C. Golladay,** Vice Presidents; **Bee Armstrong,** Secretary; and **L. H. MacDonald,** Treasurer. **N. A. Bullock** was appointed the State AFA's Director of Aerospace Education for a term of five years.

The first convention of the year-old **New Hampshire AFA** was held at Pease AFB, May 19–20, with the **Pease Chapter** serving as host.

*Three of the principals in the Colorado AFA's third annual convention are shown here. They are, from left to right, Roy A. Haug, Colorado AFA President; James C. Hall, newly elected State AFA President; and Jack C. Price, Vice President for AFA's Rocky Mountain Region.*

*Shown at the New Hampshire AFA's first annual convention are, from left, award recipients Col. Alan L. Hichew and AFROTC Cadet Frank Field; Judge Howard T. Markey, guest speaker; State AFA President R. L. Devoucoux; and Brig. Gen. Richard M. Baughn, Commander, 45th Air Division.*

The **Hon. Howard T. Markey,** Chief Judge of the US Court of Customs and Patent Appeals, an Air Force Reserve major general and a former AFA National President and Board Chairman, was principal speaker. Judge Markey's speech was especially well received by an audience that included twenty-one AFROTC cadets from the University of New Hampshire.

One program highlight was a brief statement by **Capt. Joseph Milligan,** a former POW, who then answered questions from the floor.

The New Hampshire AFA's "Man of the Year" award went to **Lt. Richard Knapp** for his work on State and Chapter levels as Pease/AFA Liaison. The State AFA's "Unit of the Year" award went to the 509th Bombardment Wing, and a Golden Achievement Award was presented to **Col. Alan L. Hichew,** former 509th Bomb Wing Commander.

**R. L. Devoucoux,** the State AFA's incumbent President, was reelected for another term. Others elected to serve with Mr. Devoucoux were: **Raymond Chase,** Vice President; **Harold W. Carter,** Secretary; and **Donald P. Huston,** Treasurer.

**The South Carolina AFA's** 1973 convention was held at the Charleston AFB Officers' Open Mess, May 25–26, and was hosted by the **Charleston Chapter.**

The area's only former POW, **Lt. Samuel Vaughn;** the state's first woman commissioned through AFROTC, **Lt. Carol Ann Beavers;** and former South Carolina **Gov. Robert E. McNair** were among the honored guests.

**Lt. Gen. William V. McBride,** Commander, Air Training Command, was the luncheon speaker, and the banquet address was given by **Gen. Jack J. Catton,** Commander, Air Force Logistics Command.

During the luncheon program, awards were presented to honor AFROTC graduates, **Lieutenant Beavers** of Newberry College, **Lt. Michael Swain** of The Citadel, **Lt. Gregory Langston** of Clemson, and **Lt. George B. Patrick III** of the University of South Carolina. Newly elected Charleston Chapter President **H. Foster Hamilton** was named the State AFA's "Man of the Year."

Following briefings on Air Force hardware, personnel, and intelligence, by **Col. Francis McNamara,** Deputy for Development Planning, Aeronautical Systems Division (AFSC); **Capt. John H. Pronsky,** Office of the Deputy Chief of Staff for Personnel, Hq. USAF; and **Lt. Kenneth Schoonover,** Foreign Tech-

# AFA News

nology Division, respectively, delegates elected **Burnet R. Maybank** to succeed **Grady L. Patterson, Jr.,** as President for FY '74. Others elected are: **Lattie A. Ritter, Jr.,** and **Robert J. Cavendish,** Vice Presidents; **Theodore W. Swain,** Secretary; and **Clemence D. Turbeville,** Treasurer.

The **Oregon AFA's** sixth annual State convention was held at Bowman's Mt. Hood Resort, June 2–3.

The convention program, entitled "The Air Force in Oregon," included presentations by representatives of the Air Force, Air National Guard, Air Force Reserve, Civil Air Patrol, Air Force Academy, and Defense Investigative Service.

The convention banquet, dedicated to all MIAs, featured an address by **Brig. Gen. Edgar G. Harris, Jr.,** Commander, 14th Air Division (SAC). Former POW **Capt. James Sehorn** and his wife, **Darlene,** and **Mrs. Donna Silver,** wife of **Maj. Edward Silver,** who has been MIA since July 4, 1968, were honored guests.

Special guests included **Maj. Gen. Gordon L. Doolittle,** Chief of Staff, Oregon Air National Guard; **Brig. Gen. Patrick O'Grady,** Deputy Chief of Staff, Oregon Air National Guard; and **Sherm Wilkins** and **Peggy Reed,** Washington AFA Vice President and Secretary, respectively.

At the business session, delegates elected **John G. Nelson** to succeed **John R. Nall** as President for FY '74. Other officers elected at the meeting are: **John R. Fisley, William W. Gleaves,** and **Fred W. Renstrom,** Vice Presidents; **Walter Wright,** Secretary; and **Fred L. Decker,** Treasurer.

Although convention headquarters and most convention functions were at the Treadway Inn, Niagara Falls, N. Y., the **New York AFA's** twenty-sixth annual convention, June 8–9, went "international" with an awards luncheon at the Royal Tower in Niagara Falls, Ontario, after which delegates and their families toured the Canadian falls before returning to the US for the balance of the convention program.

The convention banquet, which followed a champagne reception, featured an address by **Joe Higgins,** TV's popular "Safety Sheriff" and a Past President of AFA's **Los Angeles Chapter.** (Mr. Higgins was to be named AFA's "Man of the Year" at the AFA National Convention in Washington, D. C., in September.)

During the banquet program, AFA National Director **James W. Wright** presented an AFA charter to **William G. Gisel,** President of the newly organized **Lawrence J. Bell Chapter.** Mr. Gisel is also President of the Bell Aerospace Co. Also, Mr. Wright and New York AFA President **Gerald V. Hasler** presented a New York AFA plaque honoring all those who served in the armed forces of the United States during the Vietnam War. The plaque was accepted by Niagara Falls **Mayor E. Dent Lackey** and will be installed in the city's new Convention Center. Marine Corps **TSgt. Frank Cius,** a former POW, was an honored guest.

State President **Gerry Hasler** was named the New York AFA's "Man of the Year"; the **Iron Gate Chapter** received the "Unit of the Year" award; and **Col. (Brig. Gen. selectee) Philip Larsen,** Commander, Rome Air Development Center, received the State AFA's "Exceptional Service Citation."

The New York AFA's incumbent President, **Gerald V. Hasler,** was reelected for another term. Others elected to serve with Mr. Hasler are: **Kenneth C. Thayer** and **John Dolan,** Vice Presidents; **John R. Homin,** Secretary; and **Robert E. Sieloff,** Treasurer.

(An AFA Citation of Honor and a Presidential Citation were to be presented to **Mr. Hasler** and the **New York AFA,** respectively, at the AFA National Convention in Washington, D. C., in September, in recognition of the major breakthrough they achieved in bringing **Junior ROTC training back to the New York state schools.** The AFA State Organization, under Mr. Hasler's outstanding leadership, mounted a well-planned, comprehensive campaign to gain passage by the New York State Legislature, and gubernatorial approval, of a bill lifting the ban against Junior ROTC in New York. This achievement is of far-reaching, national importance and represents a major milestone in the Association's support of the AFJROTC program.)

At its 1973 convention, held in Roy on June 16, the 1,700-member **Utah AFA** elected **Verl Williams** as its new President for FY '74.

Other newly elected officers are: **Charles R. Kelley, Ace Allred,** and **Larry Barton,** Vice Presidents; **Ray Dunn,** Secretary; **Wayne Gamble,** Treasurer; **Les Richardson,** Judge Advocate; and, as Directors, **Lynn Summers, Robert Foster, Gloria Denner,** and **Cecil Childs.**

Following the business session, an AFA awards banquet was held at Weber State College in conjunction with the **Ogden Air Materiel Area Chapter** of the **National Association of Supervisors. Sen. Frank E. Moss** (D-Utah), guest speaker, talked about America's space programs.

**Robert H. Bowman** was named the Utah AFA's "Man of the Year," and the **Ogden Chapter** received the State AFA's "Chapter of the Year" award. A special citation was presented to **Olympus High School** for the most outstanding AFJROTC program in Utah.

Held in Harrisonburg's Holiday Inn on June 16, the **Virginia AFA's** 1973 convention featured an address by **Col. Wesley D. Kimball,** Vice Commander, 4500th Air Base Wing, Langley AFB.

The State AFA's "Chapter of the Year" award went to the **Langley Chapter** (at the AFA National Convention in Washington, D. C., in September, the Langley Chapter was to be named AFA's "Unit of the Year"). **Lester Rose** was named the State AFA's "Member of the Year" and the "President's Award" went to **Kenneth A. Rowe.**

Incumbents **Orland Jack Wages, Lester Rose** and **Kenneth Rowe,** President and Vice Presidents, respectively, were reelected. **George McKay** was elected Secretary/Treasurer.

**Lt. Gen. Eugene B. LeBailly,** USAF, Chairman, Inter-American Defense Board, Washington, D. C., was guest of honor and speaker at the **Wisconsin AFA's** 1973 convention at the Brookfield Marriott Inn on June 16.

During the business session, delegates elected **Kenneth Kuenn** to succeed **Gene M. Grobschmitt** as President for FY '74. Other newly elected officers are: **Kenneth W. Jacobi,** Vice President; **Kathryn E. Arthur,** Secretary; and **Cecelia Stanton,** Treasurer.

The **Pennsylvania AFA's** twenty-fifth anniversary convention, held June 22–23 in Pittsburgh at the Viking Motor Inn, got off to a flying start with a Friday evening reunion reception and buffet, complete with entertainment by the **Drastic Art Players** from the Brookline Post 540 of the **American Legion.**

*Brig. Gen. Robert L. Moeller, Commander, 437th Military Airlift Wing (MAC), welcomes delegates, members, and guests to the South Carolina AFA's convention luncheon. Head-table guests are, from left, Gen. Jack J. Catton, Commander, Air Force Logistics Command; Mrs. Moeller; Brig. Gen. George Keeler, USAF (Ret.), convention chairman; General Moeller; Lt. Gen. William V. McBride, Commander, Air Training Command; Mrs. Hackler, wife of AFA National Director James Hackler, Maj. Gen., USAF (Ret.); and South Carolina AFA President Grady Patterson.*

*Outgoing Utah AFA President Lynn Summers, right, turns the gavel over to newly elected President Verl Williams at the State AFA's recent convention in Roy.*

*Shown following the Pennsylvania AFA's convention banquet are, from left, AFA Board Chairman Joe L. Shosid, the guest speaker; the State AFA's "Woman of the Year," Tillie Metzger; newly elected State President Francis Nowicki; Gilbert Petrina, the State AFA's "Man of the Year"; and outgoing State President Thomas Fry.*

*Joe Higgins, left, TV's popular "Safety Sheriff" and speaker at the New York AFA's 1973 convention, accepts a painting of Niagara Falls from convention chairman Dick Waring, Niagara Falls Mayor E. Dent Lackey, and New York AFA President Gerald V. Hasler.*

An awards luncheon featured a presentation on the B-1 by **Col. Robert H. Gallavan,** B-1 System Program Office in Los Angeles. Awards were presented to *The Pittsburgh Press, South Hills News Record,* and radio station **WTAE.** The State AFA's Aerospace Science Award went to **Peter W. Boerner** of North Allegheny High School. The award —a trophy and a check for $200— was presented by AFA National Director **Carl J. Long.**

AFA's Board Chairman **Joe L. Shosid** was guest speaker at the convention's aerospace banquet. During the program, Past State President **Gilbert Petrina** was named the State AFA's "Man of the Year," and the State AFA's first "Woman of the Year" award went to **Tillie Metzger,** President of the **Greater Pittsburgh Chapter,** the convention's host Chapter. Entertainment was provided by the **US Steel Chorus.**

At the business session, delegates elected **Francis E. Nowicki** to the office of State President, succeeding **Thomas Fry.** Other officers elected are: **Dominic R. Lettieri** and **Fran M. Sigmund,** Vice Presidents; **Mary J. Bakaitis,** Secretary; and **Mike Lunardini,** Treasurer. Past State President **Robert Carr** was the convention chairman.

The **North Carolina AFA's** second annual convention, held at the Pope AFB Officers' Open Mess on June 29, opened with a round of golf, followed by a joint Tactical Air Force-Army demonstration, then a brief but productive business session.

The evening banquet featured an address by **Maj. Gen. Jess Larson,** USAF (Ret.), a former AFA National President and Board Chairman. General Larson was introduced by **Maj. Gen. John A. Lang,** USAF (Ret.), Vice Chancellor for External Affairs, East Carolina University, and chairman of AFA's Civilian Personnel Council.

Delegates to the convention elected **Monroe E. Evans** to succeed **Wade T. Fox** as State President for FY '74. Other newly elected officers are: **Elton Edwards** and **James D. Whetstone,** Vice Presidents; and **W. H. Ross,** Secretary/Treasurer.

Hosted by the **Middle Georgia Chapter,** the **Georgia AFA's** 1973 convention, June 30 and July 1, was dedicated to MIAs and former POWs.

The convention banquet, held in the Robins AFB Officers' Club, featured an address by Sen. Sam Nunn (D -Ga.).

**Cal Garing,** President of the **Savannah Chapter,** was named the State AFA's "Man of the Year." Other awards went to **Senator Nunn;** AFA National Director **Dr. Dan Callahan;** Middle Georgia Chapter President **Bill Powell;** Middle Georgia Program Chairman **Ken Greer;** and the **Savannah and Middle Georgia Chapters.**

**Don Devlin** of Savannah was elected to succeed **H. L. Everett** as State President. Others elected to serve as State AFA officers during FY '74 are: **Cal Garing, Fritz Verhulst,** and **H. L. Everett,** Vice Presidents; and **Bob Moreman,** Secretary/Treasurer.

The convention was concluded with a Sunday morning golf tournament at the Perry Country Club. ■

Bob Stevens'

# "There I was..."

Rest and Recreation was its official name
Now the title's changed -tho' the purpose is the same.
To the men it's R and R - those letters stand for fun.
But to the friendly natives, it means "Romp and Run".

REMEMBER HOW IT WAS *GOING* ON R and R?...

AND COMING BACK?


EINSTEIN WAS RIGHT- TIME and DISTANCE CAN CHANGE MATTER.

IN THE PACIFIC THEATER IT WAS HARD TO TELL WHEN A GUY HAD BEEN ON R and R-


Bob Stevens

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# The USAF F-15 Eagle: The Fighter Pilot's Fighter.

F-15 test pilots are finding they have an airplane that's built to win.

It has a versatile mix of air-to-air armament combined with performance and staying power to engage and beat any adversary. It has the acquisition systems needed to find and sort out targets. It has the maneuverability and acceleration to gain the advantage in the air battle arena. It has the warning systems needed to evade enemy defenses.

Test flights are proving that the F-15 can acquire, identify, engage, and defeat any type of enemy aircraft, in any weather—not only in the projected combat environment of the theorist but in the real world where the fighter pilot must do his job.

MCDONNELL DOUGLAS