

AIR FORCE

PUBLISHED BY THE AIR FORCE ASSOCIATION

MAGAZINE

Keeping Control of the Air

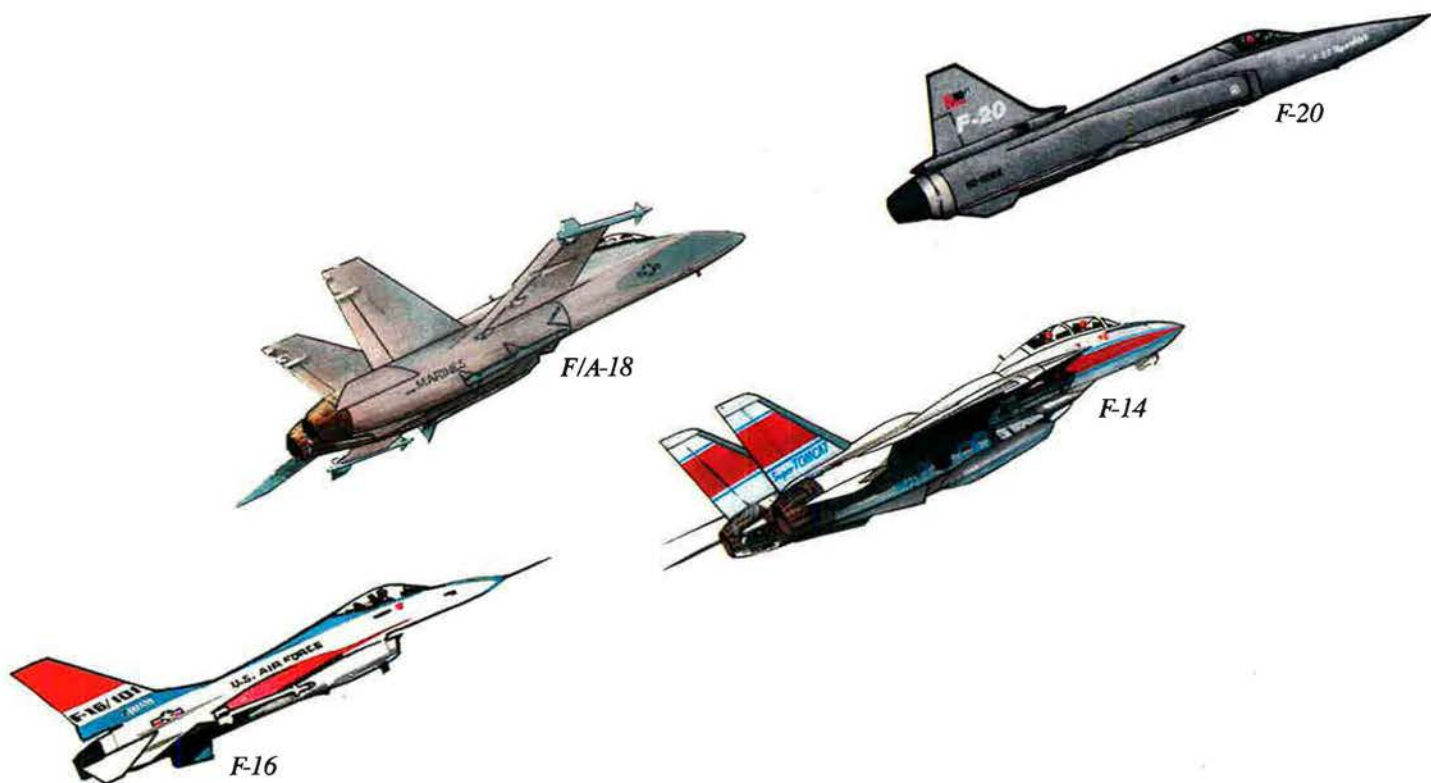
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USAF's New Trainer

***Pilot Report:
AFTI/F-16***



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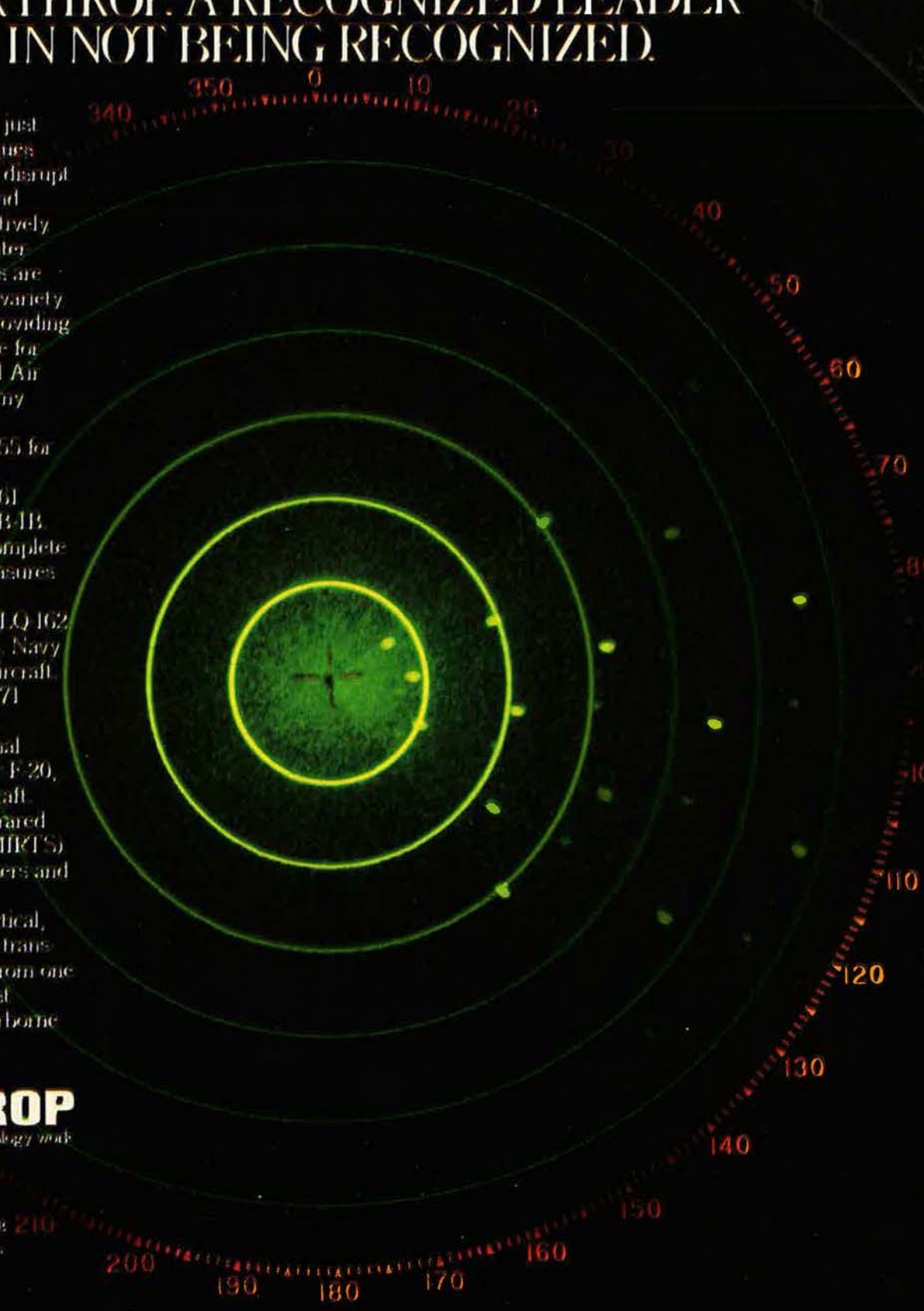
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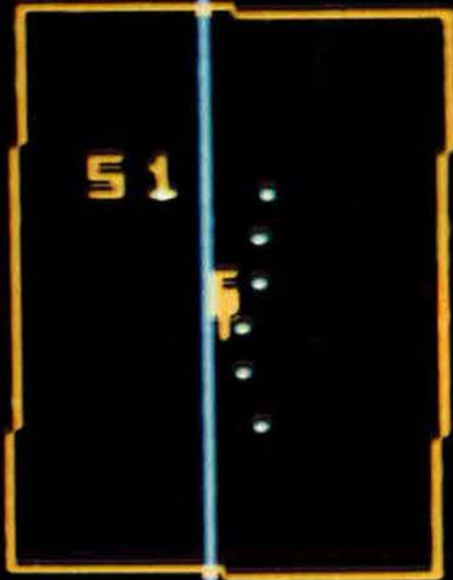
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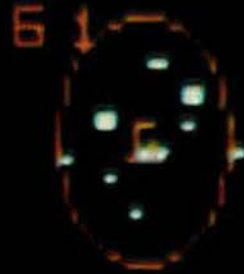
**IF IT
MOVES
AT ALL,
WE
PICK IT UP**

**IF IT
DOESN'T
MOVE,
WE STILL
PICK IT UP**

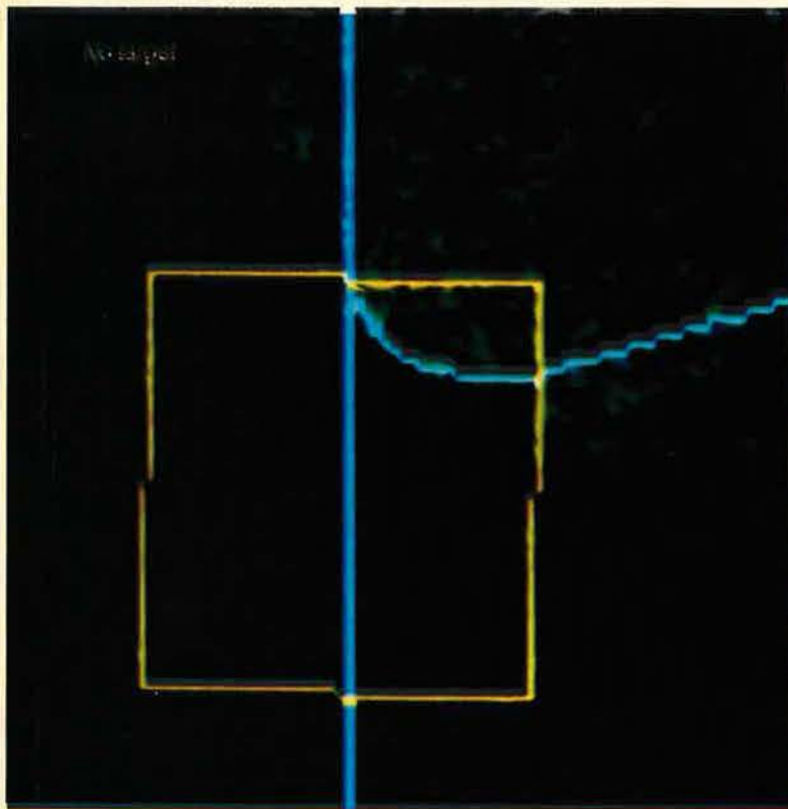
March 12, 1954 (A)



March 12, 1954 (B)



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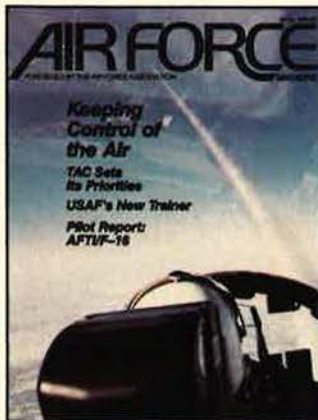




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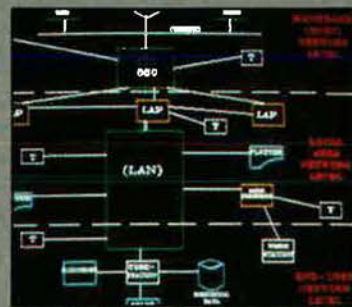


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AN EDITORIAL

Deficits and Defense

By Russell E. Dougherty, PUBLISHER

IN A LETTER published in the March issue of AIR FORCE Magazine, an Air Force officer—and a Life Member of the Air Force Association—says “we must cut the deficit” and asks where AFA would begin cutting the defense expenditures in the federal budget. Capt. Glenn A. Walsh, a KC-135 crew member, observes that our security cannot be measured in terms of military equipment alone but is also reflected in our high standard of living and our continued economic prosperity. He asks, “If . . . we cannot sustain that, then what are we defending?”

Captain Walsh likens the government's deficits to those of a family on a budget but continuing to spend more than it takes in. He insists that the deficit must be reduced, and adds that “to me, it is obvious that the Defense Department must do its part.” He acknowledges that he does not have the answers, but still is convinced that the greater national good requires personal sacrifices (which he is willing to make, if everyone else makes them, too) and substantial cutbacks in the defense budget. He asks: “How does the Air Force Association feel about this? . . . AFA, where would you start?”

Notwithstanding his premise, Captain Walsh's concern is sincere, and the questions he asks are being asked often these days by a great many sincere Americans. We think these questions can be answered (see AFA's *Statements of Policy in our November '84 issue*).

First, we would start by making sure that we do not stop in our determination to fix our defense inadequacies. We do not agree that the national good—or the federal deficit—requires further reductions, program stretch-outs, or cancellations within the Administration's budget requests for defense. To assert that the Defense Department “must do its part” in volunteering budget reductions makes a mockery of the serious business of preparing relevant military defenses. We agree with Secretary of Defense Caspar W. Weinberger: “If our nation is to remain safe, prosperous, and free to pursue our other important priorities, we cannot slight our security, for a nation's security is its government's first responsibility.”

We do not think the United States is involved in an arms race or even—in the broader context—in a defense buildup. AFA's basic recommendations for force improvements are designed to maintain an essential balance with the Soviet Union in some areas of relative strength and to redress serious imbalances in some other important areas of deterrence. This is not a buildup—it is a catch-up.

We agree that the economy of the nation is, indeed, a vital factor in national security. It is also a fact that the economic prosperity and the general standard of living of the United States are the envy of the world. What would cause Captain Walsh to doubt that we can sustain these, *if we can remain alive and free?* The US economy is growing, inflation is down, employment figures are headed in the right direction, and interest rates are substantially more favorable than they were. The deficit notwithstanding, the American economy is hardly a

basket case. And the deficit cannot be laid at the doorstep of defense expenditures.

Deficit reductions through increased taxation, or salary reductions, elimination of planned increases, withholding of cost-of-living adjustments, and the like are workable only when they are widely applied and are not borne exclusively by any category of citizens or employees. To focus only on the military or other categories of employees of the government is self-defeating, and AFA opposes targeting such limited groups for reductions.

In a recent editorial about the deficit, the *Washington Post*—no advocate of excessive military budgets—said: “Defense spending in the mid-1980s is not nearly as high, as either a share of the budget or of the country's total output, as it was in the late 1960s. The Reagan proposals would not raise it to that level even by the end of the decade.” The facts behind this editorial comment by the *Post* are that defense's percentage of total federal spending declined steadily from 44.9% in 1969 to a nadir of 23.7% in 1979, then began a slight climb each of the next six years to an estimated 28.2% in 1985. The strategic force spending pattern (for ICBMs, SLBMs and submarines, and bombers—including spending for MXs, B-1s, and Captain Walsh's own tankers) is even more dismal. Spending for strategic forces declined from an inadequate 10% of the total Defense budget in 1969 to a low of 6.6% in that disastrous budget year of 1979. It has edged up each year to an estimated 11% in 1985.

Herbert Stein, former chairman of the Council of Economic Advisors, gets it right in a *Wall Street Journal* article: “The question of fairness involved is whether it is fair to risk the lives, fortunes, and freedom of future generations in order to raise the consumption level of this generation by two percentage points or so.”

From our vantage point, we know that the Defense Department has worked hard in recent years to spend its money more wisely and to improve its management of resources. There is plenty of room left for more improvement, but the ill-conceived notion that vast sums can be saved through curbing of waste and fraud and bloat within DoD is an illusion. In general—and despite headlines to the contrary—few large organizations, in or out of government, can match the diligent management record of the Defense Department. Marginal reductions in the Defense budget can and will be made, but it is wishful thinking to believe that responsible managers can offer up sweeping cuts unless the nation consciously and willingly accepts reductions in its national security objectives—or accepts the risks of leaving some of its security and policy interests unprotected.

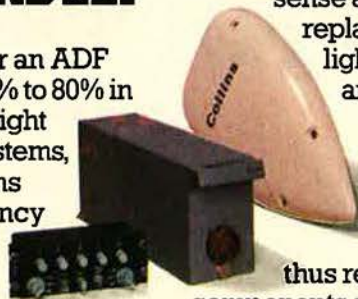
You and I cannot make determinations of this sort, Captain Walsh, just as we cannot determine whether to increase taxes or reduce benefits and entitlements. In our system, this is the ultimate responsibility of our Congress—and I hope Congress is never permitted to forget this responsibility. We, the people, can only stay informed, counsel, recommend—and vote. We in AFA promise you that we will continue to do all four of these things—vigorously. ■



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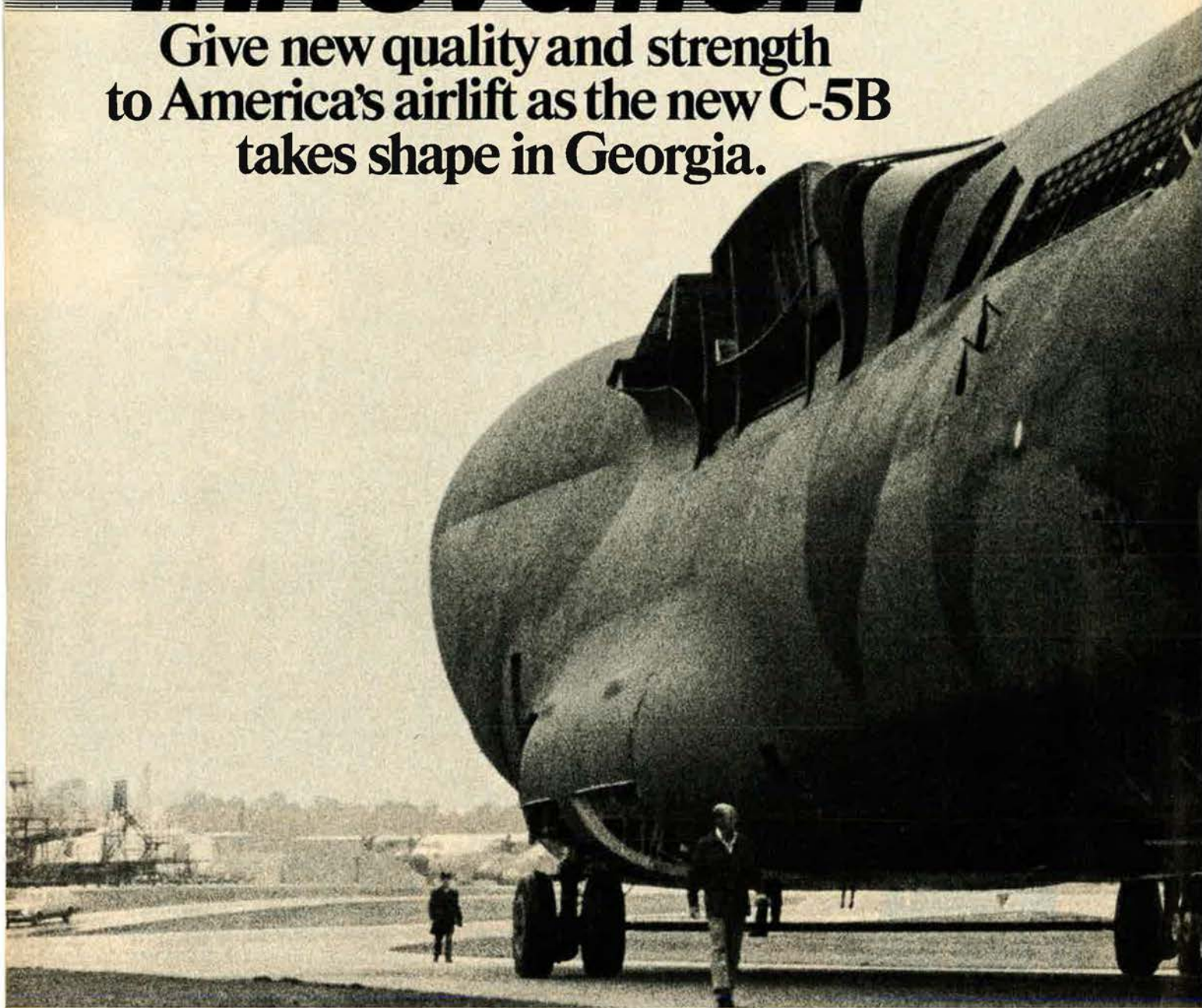


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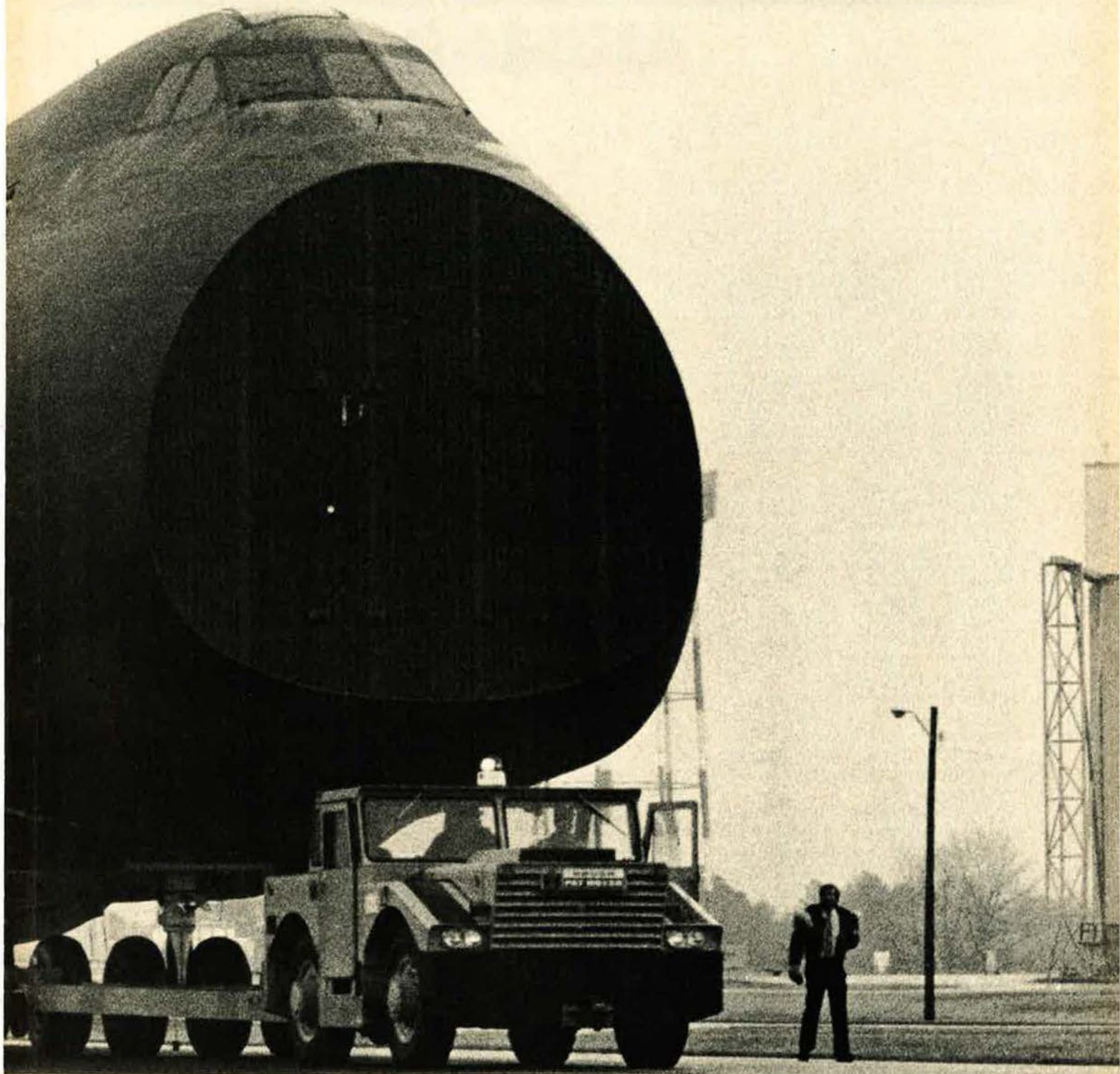


 **Lockheed-Georgia**
Giving shape to imagination.

Marietta— April 1985

The fuselage of the first of the USAF's new C-5B aircraft has passed its pressure testing with flying colors and has donned its battle colors. Shown on its way to final assembly, C-5B #1 now is receiving at a rapid rate its wings, engines, tail section and other major components.

When this historic C-5B rolls out



this summer, it will be an aircraft virtually ready for check flights and delivery. It also will set new standards of quality and reliability while still meeting budget and schedule targets.

A modern, improved airlifter, the C-5B is a superior example of innovation in aircraft design, materials, and manufacturing. It has *improved* avionics, engines with increased reliability, and new alloys with greater

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Among the advanced techniques used in C-5B manufacturing is the new L&F Stretch Forming Press for fabricating large skins and heavy aluminum extrusions such as the huge C-5B wing root caps much more quickly and efficiently.

The fixed-price C-5B program will increase America's outsize cargo capacity by 65%. Airlift, vital to deterrence, will be greatly

enhanced, increasing the nation's ability to move troops and all of their equipment anywhere in the world they are needed.

As the first C-5B approaches rollout, the men and women at Lockheed-Georgia, along with the thousands of employees at Lockheed's C-5B suppliers in 45 other states, take pride in their contributions to the quality and success of the C-5B program.

AIRMAIL

SDI and National Security

I want to convey my enthusiasm for the editorial you published in the February '85 AIR FORCE Magazine (see "Research and Technology vs. Operational Reality," p. 6). You've articulated a point that's often muddled—that we're *not* ready to field an ABM system now and that talk about doing so confuses rather than clarifies the steps we have to take to maintain national security.

SDI's great potential is twofold: to stimulate us to take advantage of truly advanced American technology in planning our defense future and to start us to think about alternatives to our total reliance on offensive nuclear weapons to maintain the peace.

Obviously, SDI isn't a competitor but a complement to strategic modernization, which the President undertook as a mandatory step to maintain the effectiveness of our deterrent. For that reason, the President has steadfastly supported both modernization and SDI as elements of his near-term and long-term vision for national security.

Unfortunately, as you point out, some enthusiasts for strategic defense are so eager to move quickly to deployment of something that they convey the impression that strategic defense is already here and that we should be focusing the bulk of our efforts on defensive systems. I think this problem will be eased during the next year, because the R&D program that the Director of the SDIO, Lt. Gen. James Abrahamson, is putting together should clearly establish the proper context for SDI.

Our major concern now is to secure full support in Congress for the program being proposed for FY 1986 so that we can move quickly to definition and even demonstration of the technologies on which to build the effective SDI the President is calling for.

G. A. Keyworth
Science Advisor to the
President
Washington, D. C.

Once again, in the editorial in the February '85 issue, Publisher Russell

E. Dougherty's insight into a complex and controversial subject is remarkable for its simple cogency. SDI, like other elements of modernization, must evolve from a disciplined and realistic coalescence of the political, programmatic, and operational processes. Pursuit of a capability without political reason, developmental and budgetary objectivity, or operational feasibility will fail, no matter how noble the dream.

One (I hope insignificant) aspect of the editorial gave me pause. In the last paragraph, the Advanced Technology Bomber (ATB) is noticeably missing from the series of weapons required to achieve strategic offensive and retaliatory modernization. Surely I'm wrong, and there is no message in the omission. . . . Though ATB is mentioned later in the issue, its omission from the editorial is disquieting. Tell me I'm wrong!

Lt. Col. Frank K. Bryars,
USAF
Papillion, Neb.

● *That's right—you're wrong!*—THE EDITORS

Bite the Bullet?

The letter in the February '85 issue by James J. Goebel, Jr. (p. 9), concerning spare-parts pricing and obvious bad management probably represents the sympathies of the overwhelming majority of citizens in and out of the armed forces, whether Air Force or not.

And he was right!

It is criminal that there are people in high positions who allow the

purchasing practices detailed in Mr. Goebel's letter and in the media. Your response to "horror stories" and your comment that remedy of these practices shouldn't be very high up on a priority agenda are "cute," but defensive.

Why not bite the bullet and do an article on the inefficiency and stupidity that would tolerate such actions as paying \$7,622 for a coffee maker?

Your magazine is needed and appreciated, as is the Air Force Association.

John E. Bills, Jr.
Nashville, Tenn.

Standing Up for Bands

Re: Capt. Paul G. Hough's February '85 "Airmail" letter on Air Force bands (p. 9).

In my previous position as electronic media manager for the Air Force Reserve Recruiting Service, I had the unique opportunity to work with several Air Force bands, notably the 581st (the Band of the Air Force Reserve) at Robins AFB, Ga. No doubt many of your readers have seen several elements of this organization on television or have heard them on the radio, for they were the folks who answered my call when I needed a new commercial jingle for my recruiting service spots.

This is exactly the point I fear the good Captain misses: Military bands play an important part in the support of both active and Reserve recruiting. Whether they're doing commercials or just playing a series of high school gigs, bands are one of the methods we recruiters have of bridging the generation gap and getting the blue-suit story out to that ever-decreasing nonprior-service pool. They are also in great demand for community relations functions. The old saying that music has charms honestly does apply.

In my six years at AFRES Recruiting, I also got to listen to and work with other Air Force bands, all of which displayed the same brand of dedication and professionalism that our troops on the line or in the air

Do you have a comment about a current issue? Write to "Airmail," AIR FORCE Magazine, 1501 Lee Highway, Arlington, Va. 22209-1198. Letters should be concise, timely, and legible (preferably typed). We reserve the right to condense letters as necessary. Unsigned letters are not acceptable, and photographs cannot be used or returned.

demonstrate. Indeed, I considered it a privilege to have worked with them. I'm saddened by the fact that the Captain has yet to hear one of these musical organizations, for they mirror the pride and versatility of the Air Force.

I don't doubt for one minute that extra authorizations might improve our capabilities, but pulling the bands would do more than harm morale. Not all battles are waged in the air, and not all campaigns are won with high-tech weapons.

The bands are very much a part of our Air Force, and I dread the day that I have to recruit without their support.

MSgt. Pete Snyder, USAF
Travis AFB, Calif.

I object strenuously to the letter by Capt. Paul G. Hough in the February '85 issue concerning musicians in the military.

With thirty-four years in the military behind me, including service with the infantry in World War II and Korea and the remainder with the Air Force, I can't understand how anybody could make such an asinine observation. Music has been an integral part of every military organization from the beginning of time. Captain Hough obviously doesn't approve of morale unless it concerns his own unit.

God bless the excellent band leaders and accomplished musicians in all branches of the service who fill us with a feeling of pride for country and flag and who maintained our desire to live when living was on a minute-to-minute basis.

Remember General Jimmy Doolittle's famous remark to Capt. Glenn Miller on July 29, 1944: "Captain Miller, next to a letter from home, your music is the greatest morale booster in the European Theater of Operations."

Lt. Col. R. M. Wray,
USAF (Ret.)
Colonial Heights, Va.

First Woman WC-130er?

This is in response to Capt. Harry DeBruhl's letter in the February '85 issue regarding the first woman WC-130 crew member (p. 10).

As a member of the 53d Weather Reconnaissance Squadron from June 1972 to September 1974, I had the privilege of flying with Sgt. Vicki Esposito, dropsonde system operator, on WC-130s. If memory serves correctly, Sergeant Esposito was a weather observer cross-trainee who became interested in flying with the "Hurricane Hunters" while supporting that unit as a weather observer at Ramey AFB, Puerto Rico. She was assigned to the 53d WRS after the unit

moved to Keesler AFB, Miss., during the 1973 round of base closings.

It is my belief that she was one of the first, if not *the* first, women WC-130 crew members. Her first flight as a crew member would have been in the late '73 or early '74 time frame.

I recall some heated discussions at the time about the "limited" ability of females to perform aircrew duties, the lack of privacy and facilities on the C-130, and the total absence of enlisted female aircrew transient quarters. As it turned out, Sergeant Esposito was an outstanding dropsonde system operator, and she more than held her own when it came to the bag drag tasks (on the WC-130, the "drop," as the aircrew position was called, also doubled on loadmaster tasks).

The only real contention resulted from TDYs, when Sergeant Esposito was given officers' quarters, single occupancy. In those days, that was reserved for field grade. We all understood the necessity, but it still went against the grain.

Dewey R. Myers
Gainesville, Ga.

MOH in Europe

The unrecorded, spoken word is illusory, subject to the winds of change and the frailties of memory. The written word is recorded history, nourishment that scholars yet to come copy and repeat as fact.

A year or so ago (see the November '83 issue), a "Valor" article appeared in AIR FORCE Magazine that cited Brig. Gen. James H. Howard, USAF (Ret.), as the winner of the only Medal of Honor awarded to a fighter pilot in Europe during World War II. This statement was repeated, not once, but twice, in the article "Eagle Talk" in the February '85 issue of the magazine.

The statement is not true.

Lt. Raymond Knight was awarded the Medal of Honor posthumously for combat action in northern Italy in April 1945.

I intend in no way to denigrate General Howard's extraordinary valor. However, I feel students at the Air Command and Staff College deserve to be exposed to the factually correct record.

Charles E. Gilbert II
East Holden, Me.

Although Brig. Gen. James Howard's exploits, which earned him the Congressional Medal of Honor, are legendary, the fact is that he was not the only World War II fighter pilot in Europe who earned the Medal of Honor.

Lt. Raymond Knight, a P-47 pilot fly-

ing out of Italy, was awarded the Congressional Medal of Honor posthumously for actions in April 1945. He was the only P-47 pilot in Europe who was awarded the Medal of Honor.

I would hope that students at the Air Command and Staff College will note the correction for future classes.

Harvey Victor
Woodland Hills, Calif.

● *John Frisbee reported correctly in his November '83 "Valor" that General Howard was "the only fighter pilot in the European theater" to be presented the Congressional Medal of Honor. Lt. Raymond L. Knight, who was also awarded the Medal of Honor, was assigned to the Mediterranean theater. Unfortunately, we did not make the distinction clear in the February '85 article "Eagle Talk."*—THE EDITORS

Gross Weight Error

In the article "Protecting the Priorities" in the February '85 issue, a rather gross error was made on page 57.

The article states that the small ICBM is being "designed to take a 10,000-pound payload 6,000 miles." The missile is going to weigh only 33,000 pounds. It will be lucky to deliver a payload of 1,000 pounds.

Lt. Col. Steve Ho,
USAF (Ret.)
Fullerton, Calif.

● *Colonel Ho is correct. The payload of the small ICBM is more likely to total around 1,000 pounds.*—THE EDITORS

Doolittle's Chute

I have just received the January '85 issue of AIR FORCE Magazine and was drawn immediately to the picture of the bust of General Jimmy Doolittle on the cover.

On close inspection of the picture of the bust, I have to wonder about the authenticity of the details of the parachute he is wearing, especially the snap showing at the lower left of the bust. I find it hard to believe that such light-duty hardware ever existed on parachutes.

I would be happy to eat my words if someone better informed on the parachutes of the time could verify the existence of such hardware.

Howard L. Selleck
Santa Ana, Calif.

● *The parachute on the bust was modeled after the Type S-1 parachute seat pack and harness used by the Army Air Corps in 1928. Though the bust is not an exact scale reproduc-*

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tion, sculptor John Lajba consulted period photographs of General Doolittle and sketches of flying gear of the time in rendering the bust.—
THE EDITORS

Journey to Java

I read John L. Frisbee's "Valor" article in the November '84 issue, "Journey to Java," with great interest. Although it may be true that the AAF's Java campaign is but little remembered in the United States, I would like to point out that, in my country, the AAF's contribution to the defense of the then Netherlands Indies is well remembered. Accordingly, I would like to add a few notes to Mr. Frisbee's article.

Only a limited number of airfields in the Indonesian archipelago could accommodate the heavy B-17 Flying Fortresses. According to one source, fourteen of these aircraft reached Singosari, north of Malang. Mr. Frisbee describes these bombers as "obsolescent B-17Cs and -Ds." The author of a 1946 book on the battles in the Netherlands Indies must have been deeply impressed when he first saw them, however. He writes of them as "fast, heavily armed, with a tremendous range of action and a formidable bomb load!"

Mr. Frisbee writes of 1,500-mile missions. A remarkable feat was accomplished by seven B-17s that flew from Java to Palembang, whence they executed a mission against Soengei Patani on the next day—a distance of some 750 miles. This high-level attack caused severe damage to the airbase at Soengei.

With respect to the mission against Kendari on February 8, a Dutch report indicates that the group of B-17s was particularly vulnerable because they did not fly in close formation. The lesson was learned quickly by the remaining crews. On February 12, a formation of seven B-17s attacked and damaged a Japanese carrier and was itself attacked on the way back by a formation of twenty-four Zero fighters. Nine of the Zeros were shot down against the loss of only one B-17—the result of staying close in.

By the end of January 1942, three groups of P-40s had arrived on Java. They were stationed at Ngoro and Singosari. In the next few weeks, more P-40s were flown into the Netherlands

Indies, but the long and dangerous ferry flights took a heavy toll. The Japanese dealt a particularly heavy blow when, on February 27, they sank the carrier *Langley*. She was on her way from Freemantle to the Javanese harbor of Tjilatjap with a number of operational P-40s and thirty-two pilots. A freighter carrying a number of crated P-40s reached Tjilatjap a few days later, but these aircraft never flew. They were destroyed before the Japanese could take Tjilatjap and capture them.

In addition to the B-17s and P-40s, a limited number of B-24 Liberators also operated in the Netherlands Indies. Also, the Dutch Naval Air Arm in the Indies was reinforced by Patrol Wing 10 and its some fifteen Catalina flying boats that had escaped from the Philippines.

Mr. Frisbee has done well in directing the spotlight once again on the heroic battles that were fought in the Netherlands Indies by a multinational force of Americans, British, Australians, and, of course, the Dutch East Indies Air Force.

Col. Mozes W. A. Weers,
RNethAF (Ret.)

Apeldoorn, the Netherlands

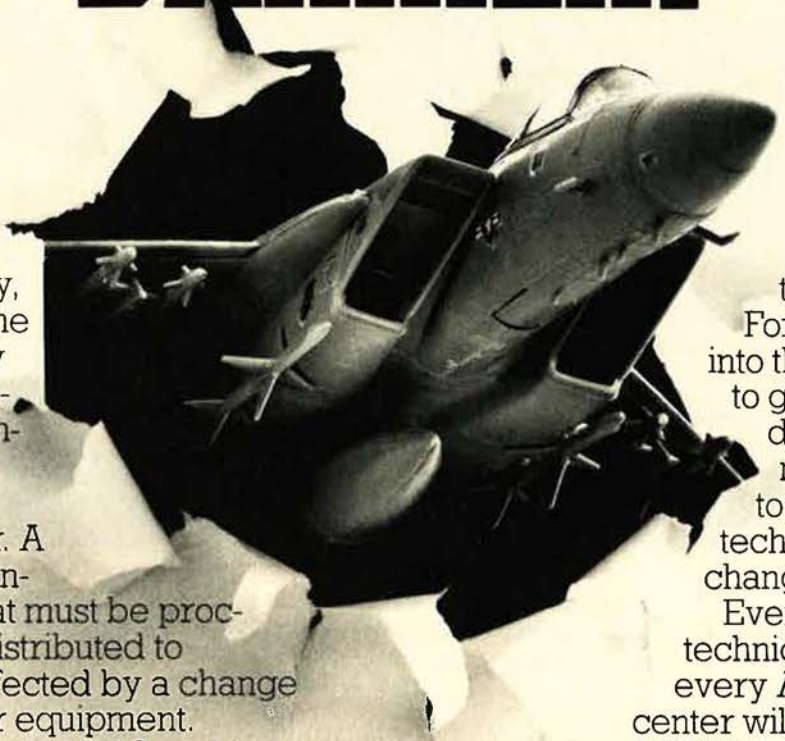
Dear David Stockman

An open letter to Budget Director David Stockman: Please forgive me for being part of such a scandal, such an outrage, as the military retirement system. For the past three decades, I have proudly served as a part of that military which you attack as "more concerned about their retirement benefits than they are about protecting the security of the American people."

Before you were even "a twinkle in your old man's eye," I served as a trained volunteer in the Army's World War II Civilian Aircraft Observer Corps, reporting aircraft movements to the Boston Air Defense Sector. While you were learning your ABCs, I was working my way through college, coincidentally earning the position of cadet wing commander of the university's Reserve Officer Training Corps unit. About the time you were sheltered behind your 4D draft deferment at Harvard Divinity School, I was studying the theology of prayer for a safe tour completion while I flew nearly 700 combat sorties in Vietnam.

Strange as it may seem, no one preached "scandal and outrage" of the retirement system while my associates and I winged through enemy fire or tried to catch a bit of nervous sleep between mortar attacks. No one put retirement before national security when we were ordered to remote

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To learn more about the technology challenges at RCA, contact our Director of Marketing. To become involved in the technology challenges at RCA, send your resume to our Manager of Employment. RCA Missile and Surface Radar, Moorestown, New Jersey 08057.

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overseas tours, separated from our families and frequently under hostile fire.

Yet, when we "signed on" for our career, certain promises were made. Although military compensation was low, there was an implied input to a retirement system to compensate for the low pay. At that time, an airline pilot flying the same basic aircraft about sixty hours a month earned more than twice what we did for flying the maximum allowable 100 hours per month, month after month. (Today, that airline pilot, retiring at thirty years, earns thirty-three percent more than I do. He won't be forced to retire at thirty years, nor will he be involuntarily recalled to active duty in case of a national emergency.) Despite the low pay, we didn't neglect the security of the American people. We trusted that they would fulfill their part of the contract in our commitment to their defense.

In the mid-1950s, the military was brought under the Social Security system. One-time good deal! Then, in the early 1980s, we learned that if our retirement pay and Social Security benefits exceeded a given baseline, we must sacrifice part of our benefits. In the past four years, Congress has changed the system further: calculating retirement pay on the average of basic pay for the highest thirty-six-month period of service, rather than on the highest attained basic pay; adjusting cost of living annually instead of semiannually; and delaying COLA allowances, just to name a few. Each time, there has been a perceived erosion of the benefits established to compensate for this unique way of life, the military service.

Three-fourths of today's Air Force retirees are enlisted personnel. Two-thirds of those retirees earn retirement pay below the poverty level for an urban family of four—\$9,860. Unfortunately, the word doesn't get out about these people, because it's far more popular for the would-be military reformers to concentrate on the "bloated" benefits for the colonels and general officers—who make up about five percent of the Air Force retirees. Incidentally, only about thirteen percent of those who enter the services will stay on to earn retirement benefits.

Yes, there are probably ways that the military retirement system could be changed to help stem the rising tide of budget deficits. However, those changes should be based on national security requirements and force management needs and should take into consideration the contracts—actual and implied—between

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the American people and the servicemen and women who have dedicated their lives to the defense of this great country. We don't need frustrated bureaucrats losing their cool in the bull ring without studying the impact of their outbursts on those who serve so honorably.

If there is a scandal, if there is an outrage in the military retirement system, it is that so many of these dedicated retirees should have to subsist below the poverty level. Let's not impugn their dedication with scandalous, outrageous, and ill-conceived horse biscuits!

Col. Charles D. Cooper,
USAF (Ret.)
Springfield, Va.

After the intemperate and totally unjustified public attack against the uniformed armed services relative to their pension systems, the United States uniformed military must be relieved of having David Stockman sit in any judgmental capacity over its pay or pensions.

No excuse or apology, from any source, can justify the retention of a Vietnam draft dodger who hid behind the shield of "student" in Harvard's Divinity School (for which he failed justification by ordination) and who now has the unmitigated gall to question the patriotism of soldiers and sailors whose shoes he is not fit to polish.

Over the past forty-five years, I have watched civilian bureaucrats like Stockman—as well as some know-nothing congressmen—whittle away at promises made to the military. Promises made should be promises kept.

Active-duty personnel cannot even speak out in their own defense, so I invite all retirees and reservists to join in demanding the firing of David Stockman—and all others of his ilk.

Lt. Col. Curtis H. Mees,
USAFR (Ret.)
Atlanta, Ga.

This letter is in response to Budget Director David Stockman's recent comment that the military is more concerned with defending its pension benefits than it is with protecting the security of the American people.

Sen. Barry Goldwater labeled the remark "distasteful." I consider it of-

fensive and grossly inaccurate. I believe America's military personnel are characterized by a willingness to defend this country and its ideals. We're motivated by a strong sense of patriotic responsibility, *not* by anticipated retirement benefits!

But be at ease, Mr. Stockman. Our continued dedication, regardless of motivating factors, will preserve your right to make equally inept statements in the future.

MSGT. John H. Appleton,
USAFR
Harleysville, Pa.

Women and Vietnam

During World War II, it was considered an honor and a privilege for a mother or wife to give up her "man" for military service to his country. It was the patriotic thing to do. Wives and mothers of the men who served in Vietnam faced a totally different situation.

As the wife of an Air Force Vietnam veteran and the mother of a Marine Vietnam veteran, I experienced a variety of mixed emotions. Why were they really there? What could they expect to accomplish? What was happening to the wife and mother at home? Twenty years later, how does that wife and mother feel about the circumstances surrounding the Vietnam experience?

There are three categories of women involved: the wife or, to a lesser extent, the girl friend; the mother; and the mother and wife—the woman who had both a husband and a son serving in Vietnam, sometimes at different times, sometimes at the same time.

These are the women I would like to contact. I believe there is a small number of women who fit into the third category—a very select group that should form its own organization for the purpose of sharing experiences, for recording what the Vietnam War was to us and how it changed our lives and the lives of our family members, for sharing our feeling, frustrations, and hopes with those who have "walked the same mile."

Let's begin to pull our story together. Let's tell what has happened to us, in our own thoughts and words. Let's share the mothers' and wives' Vietnam experiences.

If you would like to be a part of this undertaking, please write to me at the address below.

Ira Mae Myers
6119 Idlebrook Dr.
Charlotte, N. C. 28212

Vietnam Air War

I am the author of a recent book on

the F-4 Phantom that was made possible, in part, by responses to a letter in AIR FORCE Magazine several years ago. A volume on the Vought A-7, due out later this year, also owes much to assistance by readers.

How many readers, especially senior officers and NCOs, realize that they are sitting on the stuff of history? The color slides you misplaced during your last change of station, those logbooks up in the attic, that photo album down in the basement, the diaries you haven't glanced at in a decade—all are priceless to the work being done by many researchers who want to create an accurate record of what it was really like, on the spot, when it happened.

I am now working on a major volume about combat operations against North Vietnam that is to be published in 1986 by Aerospace. This will be an encyclopedia-size history, and an attempt will be made to fill it with illustrations and facts not previously published.

I need to hear from any Air Force people involved in aircraft missions "up North" at any stage in the war in order to obtain personal recollections and reminiscences. Again, an important need is for a few brave souls willing to entrust their personal color slides for copying. Material loaned will be well cared for, acknowledged, and promptly returned.

No praise seems strong enough for readers who dig into their cupboards and crannies to give of themselves for the preservation of history. To ask for such help is to accept a high obligation. Like hundreds who've been published on these pages over the years, I will try to be worthy of readers' trust. To all who've helped, thank you, and let's do it again.

Robert F. Dorr
American Embassy
Box 40
FPO New York 09510

B-29s and B-50s

I am working on a project that covers the use of B-29 and B-50 aircraft in Strategic Air Command from 1946 to 1955. My intent is to have a brief history of each group and wing and at least one picture of a B-29 or B-50 that clearly shows unit markings and insignia.

Specifically, I am looking for information and photos of B-29s and B-50s from the following units: 2d Bomb Group, 1947-49; 9th Bomb Group/Wing, 1950-54; 6th Bomb Wing, 1951-52; 40th Bomb Wing, 1952-54; 44th Bomb Wing, 1951-53; 93d Bomb Group/Wing, 1947-54; 106th Bomb Wing, 1951-52; 303d Bomb Wing,

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1951-53; 305th Bomb Wing, 1951; 306th Bomb Wing, 1948-51; 307th Bomb Group/Wing, 1946-54; 308th Bomb Wing, 1951-53; 310th Bomb Wing, 1952-54; 320th Bomb Wing, 1952-53; and 376th Bomb Wing, 1951-54.

I would appreciate any information on these or any other SAC B-29 and B-50 units. All materials will be handled very carefully, and I will pay any copying costs and postage. Also, I will cite all sources in any publication.

Maj. Richard A. Rodrigues, USA
13 Burnham Ct.
Fort Leavenworth, Kan. 66027

F-105 Thunderchiefs

I am currently compiling histories on each F-105B/D/F/G aircraft and hope to include bases assigned, squadrons and wings, dates of assignment, personalized markings, pilots, crew chiefs, MiG kills, and any other significant data related to the aircraft. The purpose is to form a central location for "Thud Trackers" to find information on individual F-105s.

Any information, slides, or photographs would be greatly appreciated. All information and other materials submitted will be well cared for, copied, and returned. If I can be of assistance to anyone seeking information on the F-105, please contact me.

"Beetle" Bailey

P. O. Box 72

Highland Springs, Va. 23075

Phone: (804) 737-4350

I am an F-105 researcher and am looking for 8-mm or 16-mm amateur films of F-105 combat missions in Southeast Asia as well as other films pertaining to F-105 activities on the ground and in the air in Thailand and Vietnam, PACAF, USAF, and the CONUS, including gun camera film, from 1958-74.

I would like to buy such films from ex-Thud drivers and ground crew or borrow them for transfer to my own VHS tapes. Borrowed films will be handled carefully and returned properly, with postage refunded.

All films are for a private collection and will not be reproduced. Please contact me at the address below.

Bauke J. Douma
Bonifacijsstraat 7
3768 CR Soest
The Netherlands

Air Battle Hanoi

Macmillan Publishing Co. has commissioned me and coauthor Alfred Price to write a book on the May 10, 1972, air strikes against North Vietnam. This was the heaviest MiG day of the war and one of the biggest air battles. The working title is *Air Battle Hanoi*.

I would like to hear from anyone involved with operations that day, from ground crews and support personnel to pilots and commanders. This will be a men-and-machines effort patterned after our book on the Falklands War, *Air War South Atlantic*.

Jeff Ethell

Rte. 1, Box 3154

Front Royal, Va. 22630

Phone: (703) 636-1816

POWs in Germany

During World War II, a number of American airmen shot down and taken prisoner in Germany acquired "inside" information on German prisoner-of-war camps.

Information is needed on the electrified fencing systems used by the Germans at their POW camps, particularly information on the POW camp at Sachsenhausen. Sachsenhausen was primarily a POW camp for British and Soviet prisoners, but a few Americans were held there.

If you were a POW at Sachsenhausen on April 13 and 14, 1943, information that you could provide could be most helpful in resolving a leftover problem from WW II. If you know of or knew a German officer named Hartfich, I would like to hear from you.

If you know of anyone who touched an electrified fence at any German POW camp, your information would be most useful. Please contact me at the address below.

Waller A. Hurtt

6099 S. Elati St.

Littleton, Colo. 80120

Sydney Bridge

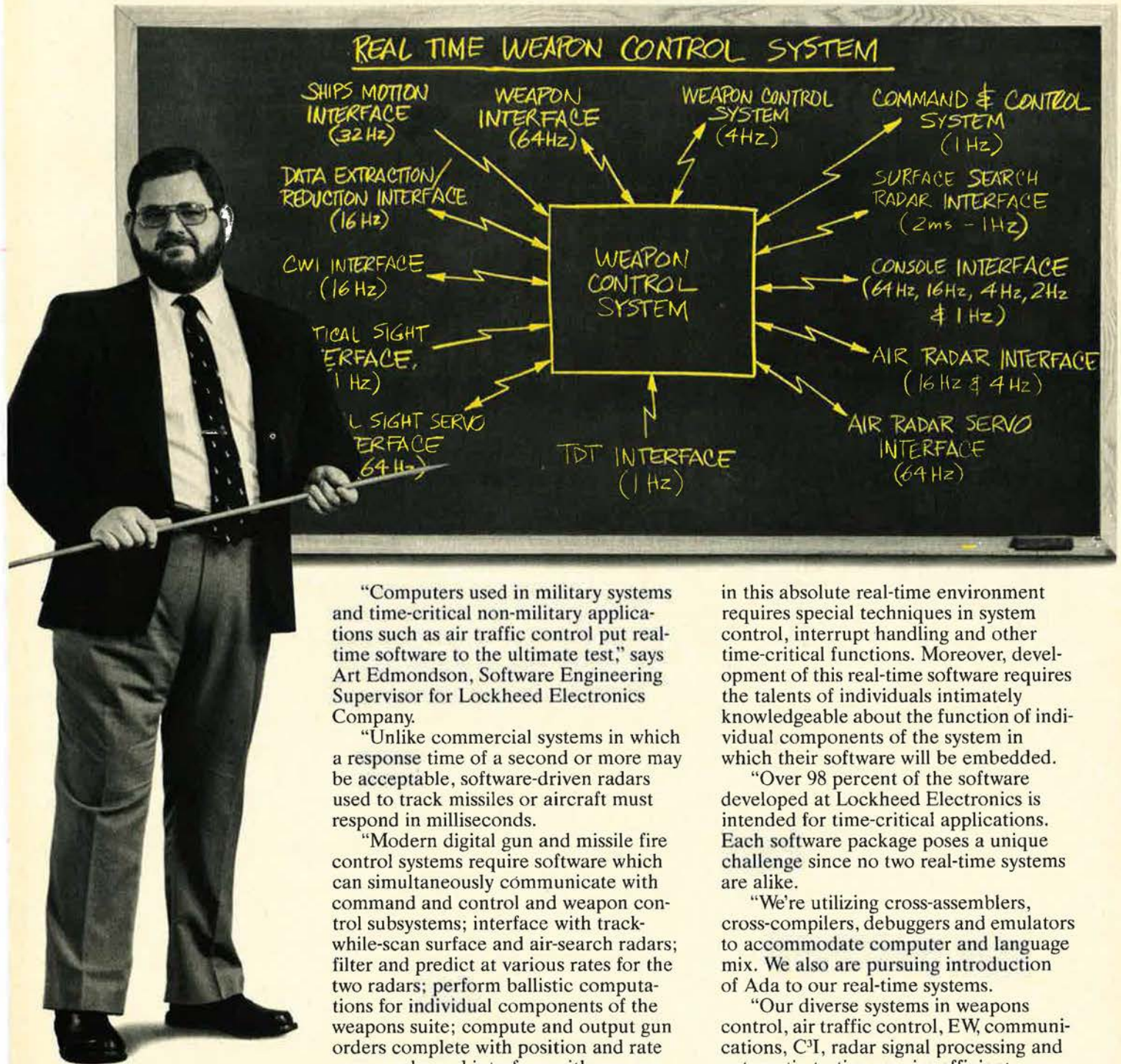
As a member of the staff at Fifth Air Force headquarters in the Southwest Pacific during 1943 and 1944, it was a part of my duty to investigate breaches of flying regulations. The most frequent violation at that time was flying under the Sydney Bridge.

I feel sure that the statute of limitations has long since run out. I would like to hear from anyone who pulled this stunt. When the "kids" saw that bridge, they couldn't resist the temptation.

In my files, I had a stack of these violation reports. To my knowledge, none were ever followed up. We had more important things to do, and so did these young pilots!

Innovation

Art Edmondson on advances
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"To develop software for application

in this absolute real-time environment requires special techniques in system control, interrupt handling and other time-critical functions. Moreover, development of this real-time software requires the talents of individuals intimately knowledgeable about the function of individual components of the system in which their software will be embedded.

"Over 98 percent of the software developed at Lockheed Electronics is intended for time-critical applications. Each software package poses a unique challenge since no two real-time systems are alike.

"We're utilizing cross-assemblers, cross-compilers, debuggers and emulators to accommodate computer and language mix. We also are pursuing introduction of Ada to our real-time systems.

"Our diverse systems in weapons control, air traffic control, EW, communications, C³I, radar signal processing and automatic testing require efficient, reliable real-time software to meet their specific performance requirements."

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Please contact me at the address below.

Lt. Col. James M. Wylie,
USAF (Ret.)
205 Calhoun St.
Clover, S. C. 29710

Aircraft Restoration

The Pueblo Historical Aircraft Society, a nonprofit organization, would like to extend an invitation to bring your tools and manuals and spend your vacation in Pueblo, Colo., helping us to restore the aircraft at our airport museum. We offer a free camping area, just a short walk from the museum, for those working on the airplanes.

We have the following aircraft: A-4D, B-26, B-29, RB-37, B-47E, C-47, C-119, F6A, F-8, F9F, F-80, F-84, F-100D, F-101A, CH-21B, HC-131A, P2V, SH-34J, T-28C, T-33B, Bell TH-13T, and a Bomarc missile. Although some airplanes need very little work, others will require a great deal of repair.

For further information, contact the address below.

William Feder, Sr.
P. O. Box 7433
Pueblo West, Colo. 81007

Lend-Lease Aircraft

I am currently researching material for a book about the Lend-Lease aircraft of World War II.

I would like to hear from any aircrew members who flew and delivered such aircraft, including those retained for USAAF use (such as the Bell P400), and from those who participated in activities at such locations as Ladd Field and Roosevelt Field. Details of deliveries to the Soviet Air Forces are sought, as are details of deliveries to Europe by air or sea. I would also be interested to hear from anyone who has details on some of the "reverse Lend-Lease aircraft" that equipped American units.

I would be delighted to hear from anyone who can help. Please contact me at the address below.

W. A. Harrison
71 Mill Hill Lane
Derby DE3 6SB
England

406th TFTW

The 406th Combat Support Group has established a gallery in the headquarters building to display photographs of former 406th Tactical Fighter Training Wing commanders. To date, I have only been able to obtain photographs of the most recent commanders.

I would like the help of readers in obtaining photographs of any of the

AIRMAIL

following 406th TFTW commanders: Col. William S. Harrell, 1954-56; Lt. Col. Harry G. Sanders, 1953-54; Lt. Col. Arthur F. Jeffrey, 1952-53; Lt. Col. Delynn E. Anderson, 1952; Col. Earl H. Dunham, 1946; Lt. Col. Arvis L. Hilpert, 1946; Lt. Col. Robert C. Brown, 1945-46; Lt. Col. Converse B. Kelly, 1945; Col. Anthony V. Grossetta, 1943-45; and Lt. Col. Bryan B. Harper, 1943.

If any readers have photographs that could be loaned on a temporary basis, I would copy them and return them immediately. Please contact me at the address below.

MSgt. Mark A. Bryant, USAF
Wing Historian
406th TFTW/HO
APO New York 09286-5094

Nuclear Weapons

I am a filmmaker working on a film entitled "Nuclear Weapons—Where Does the Danger Lie?" This is the first of a series of films designed to press for a strong defense, including SDI, and also for a renewed civil defense program.

I am concentrating on three areas: nuclear war with the USSR (especially Soviet war plans, tactics, and weapons), nuclear war between Third-World countries, and possible terrorist nuclear activities.

I'm interested in hearing from AFA members who could supply unclassified information on these topics.

Please contact me at the address below.

Dean Engelhardt
404 N. Danehurst Ave.
Covina, Calif. 91724

93d Bomb Group

A committee is being formed to facilitate the placing of a memorial to the men of the 93d Bomb Group (H) at Hardwick, England. We are soliciting contributions to finance the memorial. Any donations can be sent to the 93d Bomb Group Memorial Fund, % Charlie Weiss, 21 Moran Dr., Waldorf, Md. 20601.

Anyone who would like to participate on the memorial committee should contact me at the address below.

Lt. Col. Gene P. Alvord,
USAFR (Ret.)
4902 N. McBride
Tacoma, Wash. 98407

Gunlaying System

I am looking for information on the AN/APQ-37 universal airborne gunlaying system, comprising an APG-35 tracking radar and an APS-46 search radar.

A full test set was installed on B-17G 44-85784 in 1950-51. I need to know for what aircraft this system was intended, how far development progressed over that period, and why the system was never put into production.

This data is needed for a forthcoming history of US airborne defensive fire control systems. Please contact the address below.

Chuck Hansen
1086 S. Bernardo Ave.
Sunnyvale, Calif. 94087

Intelligence on USSR

I am collecting material for a book on US intelligence collection operations against the Soviet Union from the years 1945-60. I would be interested in hearing from anyone involved in airborne peripheral photographic or electronic reconnaissance missions during those years as well as from anyone involved in collection operations concerning Soviet nuclear testing.

Please contact me at the address below.

Jeffrey Richelson
The American University
4400 Massachusetts Ave., N. W.
Washington, D. C. 20016

F-84 Crash

I am seeking information concerning an F-84F jet fighter that crashed into Petenwell Lake in central Wisconsin on March 7, 1962.

The pilot, 1st Lt. Otto S. Brock of Mansfield, Ohio, was killed. He was with the 121st Tactical Fighter Wing. He had been at Volk Field, Wis., for a five-day training mission at the Air National Guard's bombing and gunnery range.

Any assistance readers can provide will be greatly appreciated. Please write to me at the address below.

David J. Jensen
1610 18th Ave.
Arkdale, Wis. 54613

Carrier Flight Operations

I am presently collecting information and photographs for a book on the *Nimitz*-class aircraft carriers. Specifically, I am interested in flight operations and procedures for the USS *Nimitz*, USS *Eisenhower*, and the USS *Carl Vinson*.

Any firsthand accounts of flight operations or life on board one of these ships would be useful, and any other information, firsthand accounts, or

photos would be most welcome. Please contact me at the address below.

Steven Howell
P. O. Box 409
New Cumberland, Pa. 17070

General Quesada

I would like to correspond with anyone who knew Lt. Gen. Elwood R. "Pete" Quesada, either personally or professionally, during the prewar and World War II years. I am writing an article that I hope someday to expand into a book. I am interested in his leadership style as well as his innovative ideas.

Anyone with such information is invited to contact me at the address below.

Michael J. Reed
Rte. 1, Box 530
Lynchburg, Tenn. 37352

SEA War

I am writing a book on the Southeast Asia air war and would like to hear from anyone who served in that theater. I would particularly like to hear from pilots or other aircrew who served between 1962 and 1973 and who might have photographs of aircraft in use in SEA, whether on the ground or in the air.

I will answer all responses. Please contact me at the address below.

Philip D. Chinnery
70 Carnarvon Dr.
Hayes, Middlesex UB3 1PX
England

B-25 for Sale?

The 321st Association is a non-profit, tax-exempt organization comprising more than 250 members nationwide who are members or former members of the 321st Bomb Group, Bomb Wing, or Strategic Missile Wing. The Association's purpose is to promote the heritage of the 321st, further the bonds of camaraderie between past and present members, and promote good public relations.

We are looking for any leads on a B-25 for sale or that could be donated to us. The aircraft does not have to be in flyable condition.

If you have any information on an available B-25, please contact the address below.

Lt. Col. Jim Smith, USAF
1613-B Hickam
Grand Forks AFB, N. D. 58205
Phone: (701) 594-9123

Who Said It First?

I have been trying unsuccessfully to nail down the source, approximate date, place, and occasion of the following statement:

AIRMAIL

"The mission of the US Air Force is to fly and fight, and don't you forget it!"

Any assistance from readers will be most appreciated.

James F. Smith
Historian
60th MAW/HO
Travis AFB, Calif. 94535-5004

Collectors' Corner

I am an F-16 pilot stationed in Germany. I collect pilot wings from air forces and navies around the world. I currently have about forty in my collection, with my pride and joy being a pair of Soviet Air Force first-class pilot wings.

I am interested in hearing from anyone who shares my hobby. Any foreign pilots who would like to exchange wings—or even just to donate wings from their country to my collection—are invited to contact me at the address below. I have a few spares that I would be willing to trade as well, and, though I am not a patch collector, I have several cigar boxes full of squadron patches from around NATO and the four corners of the globe that I would be happy to barter for pilot wings.

Please contact me at the address below.

Capt. Drew Metcalf, USAF
PSC Box 3877
APO New York 09109

I am hoping that some reader will be able to help me in my effort to obtain the squadron insignia of my old World War II outfit. I was a member of the 72d Fighter Squadron of the 21st Fighter Group. The 72d was stationed near Pearl Harbor at the beginning of the war. We were assigned to the Seventh Air Force for a while, and we were stationed on Iwo Jima with the Twentieth Air Force when the war ended.

A company in New York has agreed to make an insignia for my flight jacket if I can furnish them with a drawing of it, preferably in color. If anyone knows where I can find a drawing of the 72d insignia, I would be most grateful.

Please contact me at the address below.

Ellsworth M. Murley, Jr.
4531 Belfair Ct.
Toledo, Ohio 43623

I am interested in collecting military patches and unit crests. I have a lot of Army unit patches, but Air Force and Army Air Forces patches are very hard to find.

If anyone has any Air Force squadron, wing, or group patches or any Army Air Forces patches, I would like to hear from them for the purpose of purchasing or trading patches.

Please contact the address below.

Michael S. Hertel
2202 Uranus
Las Cruces, N. M. 88001
Phone: (505) 522-6206

I am a serious collector and historian of USAF air police and security police items. I am interested in obtaining anything related to this subject—from squadron patches to decorated helmets.

I am willing to buy, trade, or accept donations of items in hopes of preserving air police history.

Please contact me at the address below if you are able to help me out.

MSGT. Paul A. Block, USAFR
5718 Cambridge Lane, #1
Racine, Wis. 53406

I am interested in and am a great fan of US military aviation. About a year ago, I started collecting US Air Force wing and squadron patches. I would like to expand my collection.

I would like to solicit contributions from anyone who may have patches to spare. I am willing to cover any expenses.

Please contact me at the address below.

Roy Behrend
104 Chisholm Ave.
Toronto, Ontario
Canada M4C 4V7

I have twenty-three original issues (volumes 1, 2, and 3) of *Impact* magazine, which was issued by the Office of the Chief of Staff, Intelligence, between June 1943 and October 1945. These are *not* commercial copies.

Any collector, historian, writer, librarian, or anyone interested in obtaining these magazines is invited to make an offer to me for the entire collection.

Please contact the address below.

Lt. Col. William R. Gadow,
USAF (Ret.)
1101 Chelsea Rd.
Absecon, N. J. 08201

I am looking for a poem entitled "Low Flight," a tongue-in-cheek version about helicopter pilots of John Gillespie Magee's well-known "High Flight."

If you can help me find a copy of this

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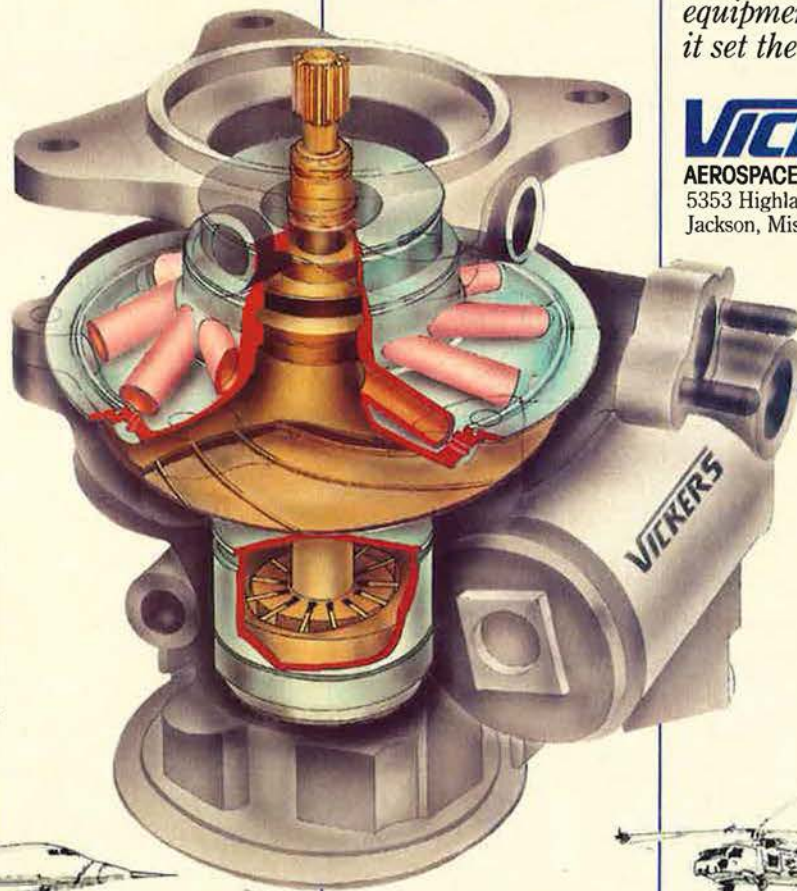
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GENERAL DYNAMICS

poem, please contact me at the address below.

J. Matthew Lyons
P. O. Box 1616
USAF Academy, Colo. 80841

Looking for . . .

I have been asked by a family from the Cambrai area to help in finding some information on an American serviceman who spent some time near there in 1944-45.

He served, evidently, with units of the Ninth Air Force, probably with the 394th Bomb Group when it was stationed at Cambrai-Niergnies from October 1944 to May 1945. I have very little information about him. His name is Leyland. The family looking for him lived originally in Caullery, a small village about seventeen kilometers southeast of Cambrai. They had a bakery.

Any readers having any information about this man are asked to contact me at the address below.

Michel Bacquet
7, Place du 9 octobre
59403 Cambrai Cedex
France

On May 12, 1984, I stood in a wheat field in West Germany, holding a shattered military-issue wristwatch and a piece of a propeller from my brother's B-17G bomber, which was downed on May 12, 1944. I spent forty long years researching what happened to Lt. Robert Simons's B-17 *The 7th Son* and its crew, which included my brother, TSgt. Harland B. Paul.

I interviewed German farmers who witnessed the air battle that day, and specifically the farmer in whose field the bomber blew up. This farmer, Walter Welsch, gave me the Elgin wristwatch that he had kept for forty years. My long search is now the basis for a television documentary being researched and a book being written entitled *Whatever Happened to The 7th Son?*

I am trying to locate the following men: 1st Lt. Merlin L. Miller, 2d Lt. Kenneth V. Lessinger, Capt. Marvin K. Peterson, Sgt. Mike G. Chavez, and Sgt. Troy F. Thrash. These men flew with the 339th Bomb Squadron, 96th Bomb Group, out of Snetterton Heath. Captain Peterson was a staff officer in the 96th. Miller and Lessinger were the last persons to see *The 7th Son* go down while on their mission to Brůx, Czechoslovakia.

I would appreciate hearing from anyone knowing these men.

A. Fred Paul
3510 N.E. 134th
Portland, Ore. 97230

Phone: (503) 252-0358

AIRMAIL

I am a faculty member with the University of Oklahoma's Political Science Department, currently researching the Vietnam War. In this connection, I wish to contact the following people:

Capt. Michael J. Heck of Chula Vista, Calif., a B-52 pilot operating out of U-Tapao, Thailand, in 1972-73; Capt. Dwight J. Evans, Jr., of Tulsa, Okla., an F-4 pilot with the 34th Tactical Fighter Squadron in 1972-73; Capt. Michael E. Flugger of New York, N. Y., a B-52 copilot operating from Andersen AFB, Guam, in 1973; Capt. James H. Strain of Chickasha, Okla., a B-52 navigator operating from Andersen in 1973; Lt. Arthur Watson of Rome, N. Y., a B-52 electronics warfare specialist operating from Andersen in 1973; Capt. Donald E. Dawson, a B-52 pilot out of Andersen in 1973; and anyone connected with a group called the "B-52 Wives" in Westover AFB, Mass., around 1973.

I would be grateful to anyone who can help me contact these people. Please contact me at the address below.

Howard Tamashiro
Dept. of Political Science
University of Oklahoma
Norman, Okla. 73019

Phone: (405) 325-2061

I would like to hear from anyone—enlisted man or officer—who served with me in the 377th Fighter Squadron, 362d Fighter Group, in the USA, England, France, and Germany during World War II.

Please contact me at the address below.

Sy Weisman
101 Summit Lane, H-1
Bala-Cynwyd, Pa. 19004

I'm trying to locate members of my crew aboard the *Woodschopper*—a B-24H of the 718th Bomb Squadron, 449th Bomb Group, out of Grotaglie, Italy, from January through July 1944.

Specifically, I'm looking for Sylvan Lubin, Williard E. Granowski, Norbert J. Kneis, Gilbert H. Smith, and Harry C. Smith. Please write or call. Forty-one years is a long time to be out of touch.

Donald R. Currier
Rte. 1, Box 430
Smithsburg, Md. 21783

Phone: (301) 824-5374

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CAPITOL HILL

By Kathleen G. McAuliffe, AFA DIRECTOR OF LEGISLATIVE RESEARCH

Washington, D. C., Feb. 22 FY '86 Defense Spending

Secretary of Defense Caspar Weinberger continues to defend the proposed \$314 billion Pentagon budget as a "bare minimum," amid congressional calls for significant reductions. The FY '86 defense budget, up 5.9 percent, is the first installment of a \$2 trillion five-year defense plan. Chances of adoption are bleak.

A three percent growth is about the most DoD can hope for in a realistic compromise between the request and a budget freeze. Only congressional insistence that the NATO allies increase defense expenditures by three percent a year is seen as blocking even deeper cuts. Last year, the allies met the three percent increase commitment for the first time, averaging 3.1 percent growth. There is fear that a US budget falling short of the three percent mark would cause the allies to follow suit and to abandon attempts to beef up conventional force structure and sustainability in Europe.

Congress will probably follow its past pattern in cutting defense by hitting O&M, limiting personnel hikes, stretching out procurement (which is earmarked for \$107 billion), and shaving programs in the R&D account, which is set to increase by twenty percent in real terms over FY '85.

Research on the Strategic Defense Initiative (SDI) is scheduled to grow by 160 percent, to \$3.7 billion, and is a likely target for reduction. The MX/Peacekeeper program, with \$4.1 billion, will probably be cut, assuming Congress releases the FY '85 MX funds. A stretchout of MX may be in the offing. Holding MX to twenty-one missiles, the FY '85 level, is a real possibility and might save up to \$1 billion now, but raise costs in the long term.

Air Force Budget

The Air Force gets the largest share of the defense budget—\$110 billion, \$10 billion more than in FY '85. USAF expects to buy 357 aircraft—including forty-eight B-1Bs, sixteen C-5Bs, twelve KC-10s, and eight TR-1s—about seventy more aircraft than last

year, despite a six percent decrease in aircraft procurement funds. The FY '86 funds will buy 6,970 missiles—ninety-five GLCMs, forty-eight MX ICBMs, and substantial numbers of Mavericks and HARMs. No ALCMs will be bought. The budget also increases research and development by eleven percent.

The rise in procurement to 228 tactical fighters in FY '86—180 F-16s and forty-eight F-15s—will help meet the goal of forty tactical fighter wings with an average aircraft age of ten years, but not until 1991.

The R&D increase is consumed primarily by the Advanced Tactical Fighter, the C-17 transport, USAF's \$1.4 billion share of SDI, as well as the \$1.6 billion ICBM modernization program, including the small missile and its mobile launcher.

The Air Force budgeted \$11 billion for space programs, including Shuttle operations and ten complementary expendable launch vehicles. Twelve Titan IIs will be converted to space launchers as well.

Rudman Suggests Savings

Sen. Warren Rudman (R-N. H.) offered a plan to achieve \$21 billion in defense savings over three years while not affecting force structure or readiness. The Senator's plan would hit military pay and civilian and military end strengths for a \$4.5 billion reduction in FY '86.

The proposal, which is attracting interest in the Senate, would eliminate the scheduled three percent military pay hike and thus save \$6 billion through FY '88 and would deny the increase of 36,000 in the number of civilian and military personnel. Finally, the Senator wants to reduce by ten percent the number of military personnel and DoD civilians performing auxiliary or support jobs outside of the strategic, tactical, and mobility forces. This means a reduction of about 76,000 military personnel and 105,000 civilians, the Senator estimated. The military personnel cut may be satisfied through normal attrition, Senator Rudman believes, but the civilian cut would probably re-

quire some individuals to be laid off.

Soviet Nationwide ABM System


A senior DoD official informed a Senate panel that the Soviets may be preparing to break out of the ABM Treaty and deploy a nationwide ABM system. Richard Perle, Assistant Secretary of Defense for International Security Policy, said a pattern of Soviet activity—including deployment of six large phased-array radars in violation of the ABM Treaty and two new types of surface-to-air missiles (SAMs), which could also intercept some strategic ballistic missiles—supports this conclusion. The USSR probably violated the ABM Treaty by testing these SAMs in an ABM mode, he claimed.

The Soviets are also devoting considerable sums to extensive R&D on ABM systems. A new study by the Heritage Foundation asserts that, since signing the 1972 ABM Treaty, the Soviets have "spent more on defensive weapons research than on offensive weapons."

NATO vs. Warsaw Pact Spending

Sen. Sam Nunn (D-Ga.), senior Democrat on the Armed Services Committee, is concerned that Warsaw Pact systems greatly outnumber those of NATO, despite NATO's superior and innovative technology and its expenditure of \$123 billion more than the Warsaw Pact over the last ten years. Gen. John Vessey, USA, Chairman of the Joint Chiefs of Staff, said the disparity results in part from the Soviet Union's ability to control Warsaw Pact production and standardize all systems.

The disparity in numbers is especially disturbing, since new CIA data shows that the Soviet Union increased defense expenditures by only two percent per year since 1976. Prior to that, the Soviets averaged about five percent, a CIA report to Congress estimated. The reason for the slower growth rate was "stagnation in spending for military procurement after 1976," the report disclosed, but substantial growth in R&D spending offset that stagnation. ■


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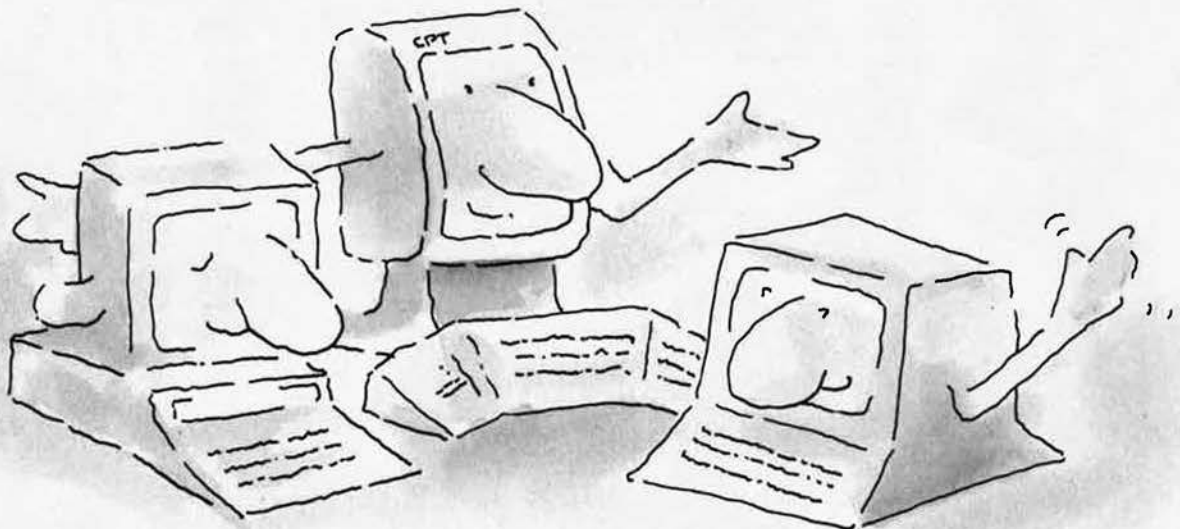
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IN FOCUS...

The Great Soviet Sneak-out

By Edgar Ulsamer, SENIOR EDITOR (POLICY & TECHNOLOGY)

New revelations about breaches of arms accords and exploitation of treaty loopholes point to an increased Soviet strategic advantage and serious threats to global security.

Washington, D. C., March 4



Administration, with refreshing candor, reported to Congress on Moscow's dismal record of compliance with existing arms accords. A troika of senior arms-control experts—the Assistant Secretary of Defense for International Security Policy Richard Perle, the Director of the State Department's Bureau of Politico-Military Affairs, Lt. Gen. John T. Chain, Jr., USAF, and US Arms Control and Disarmament Agency Director Kenneth L. Adelman—recently reported to the Senate Armed Services Committee on continuing, flagrant Soviet breaches of a host of international and bilateral arms accords that Moscow had pledged to abide by.

The facts and analyses provided by the three officials in the open portion of the proceedings were decidedly frank and highlighted how the Soviet violations and their aggressive exploitation of technical loopholes of past accords worked to the detriment of this country's national-security posture. As Secretary Perle told the Senate committee, for instance, Soviet circumventions of the ABM Treaty in the form of substantial deployments of "prohibited ABM defenses can have great military significance."

Terming the present lack of a Soviet nationwide and effective ABM defense "really the missing link of the Soviet warfighting potential," he

pointed out that "Soviet doctrine and military plans call for developing a warfighting capability, in contrast to US defense doctrine, which is based on development of sufficient capability for effective deterrence of war."

Stressing that the Soviet Union's strategic offensive forces are capable of effective counterforce strikes against hard targets, that her fielded massive bomber-defense forces are being expanded "almost daily," and that the enormous scale of the Soviet civil defense program has the potential to reduce Soviet population losses substantially, even in an all-out nuclear exchange, he asserted that, nevertheless, "only through the deployment of large-scale ballistic missile defense can [they] hope to prevent—rather than limit damage from—retaliatory attacks against important military [and] political targets."

Potential Soviet breakouts or "sneak-outs from the ABM Treaty" projected by the intelligence community, Secretary Perle testified, are a serious threat to US security and global peace. As a result, the US is looking at a "series of military response options [that] run the gamut from an increase in our strategic force capability inside or outside of existing arms-control constraints to actions that would result in improvements of our near-term deployment potential for missile defenses of our own." Warning that the Soviets could "sneak out" surreptitiously from the ABM Treaty of 1972, he suggested that the US must be prepared to react not only to clear but also to ambiguous evidence of Soviet deployment of a nationwide ABM system, because Moscow probably will "choose a covert deployment approach."

Confirming information first published in this space last year, Secretary Perle said the US has found six new large phased-array radars (LPARs) in the USSR that are capable of supporting a "large ABM program." In the case of one of them located deep in the interior of the Soviet Union near the city of Krasnoyarsk, the Administration has charged that

"it constitutes a violation of legal obligations under the Antiballistic Missile Treaty . . . in that, in its associated siting, orientation, and capability, it is prohibited by the Treaty."

In addition, Secretary Perle told the Senate Armed Services Committee, two new Soviet surface-to-air missiles (SAMs), the SA-10 and SA-X-12, can be used to intercept some types of US ballistic missiles and can provide point defense when linked to the large phased-array radars. The US has determined that "the number of incidents of concurrent operation of SAM and ABM components indicates that the USSR probably has violated the prohibition on testing SAM components in an ABM mode [and] may be preparing an ABM defense of its national territory."

He reported also that the Soviet Union—not satisfied with boosting the number of warheads aimed at this country by about eighty percent since SALT II was signed in 1979—is flight-testing, in violation of that treaty, both a new solid-fuel ICBM similar to MX, the SS-X-24, as well as a Minuteman-size solid-fuel missile, the SS-X-25. Moreover, he disclosed, "They have other new ICBMs under development, and we are concerned that they, too, might violate SALT II limitations."

In the latter group is, as reported in this space last year, an ICBM weighing around 260,000 pounds. Some intelligence experts believe now that this new system is being designed for a fractional orbital bombardment system (FOBS) role, a concept that the Soviet Union had pursued but seemingly dropped in the early 1970s. The launch of such systems could be carried out in a deliberately masked or clandestine fashion, with the weapon approaching the US from an unexpected direction. Theoretically, at least, such weapons would provide the USSR with staggering blackmail leverage, because, once launched, Moscow could either order the warhead to descend on targets in this country or to splash down harmlessly in some remote ocean area.

Secretary Perle also disclosed the Soviet plan to make their new MX-size

missile rail-mobile and capable of re-fire in relatively fast fashion. They are also equipping their new smaller missile with the same capabilities, he added. With a three-to-one advantage in ballistic missile throw-weight and an almost comparable lead in time-urgent hard-target kill capability, Soviet violations of the SALT II qualitative restrictions take on added, ominous importance—especially when linked to Soviet breaches of the Threshold Test-Ban Treaty (TTBT). These violations are designed to “provide the warheads for these new missiles,” according to Secretary Perle.

The US government has reason to believe that Soviet testing of nuclear weapons has exceeded the 150-kiloton limit of TTBT and has “resulted in the development of improved warheads for their strategic weapon systems,” he said. The US, on the other hand, is “precluded from developing new weapons of comparable yield because of our compliance under the treaty.” He linked numerous Soviet violations of the 1963 Limited Test-Ban Treaty—the first significant arms-control agreement between the US and the USSR—to a “deliberate policy.”

Asserting that he was “personally appalled by the lack of US media reaction to disclosures of these Soviet violations,” he pointed out that “the same individuals and organizations that have virtually waged war against the US nuclear power industry are [strangely] silent in the face of . . . the deliberate contamination of our environment by the USSR.” The Limited Test-Ban Treaty prohibits the “venting” of nuclear contaminants in the air, especially in a fashion that allows this fallout to reach other countries.

Elsewhere in his testimony, Secretary Perle reported that the Soviets have gained militarily significant advantages in chemical weapons and a monopoly in biological weapons: “Advanced biological weapons utilizing genetic engineering could result in weapons of a type that do not currently exist and against which we would have no defenses.” He found Congress’s “failure to fund the chemical weapons modernization program [sought by the Administration] particularly striking in view of the increasing evidence of large-scale Soviet activities in the biological warfare area and massive chemical warfare capabilities.”

Soviet violations in this area are “atrocities,” he charged, for “these weapons have been used against defenseless human beings in an organized effort to drive them from their homes by killing thousands of them.

IN FOCUS...

The apparent decline in the use of these weapons does little for the thousands who have died and nothing to absolve the Soviets from eight years of cruel and inhumane attacks with lethal mycotoxins.”

Calling for a bipartisan effort to bring Soviet arms-control violations to an end, he urged this country to “create penalties for violations that [would] deny the Soviets the benefit of the advantage they gain from a violation, [for] we cannot continue to impose upon ourselves a double standard that amounts to unilateral treaty compliance.”

General Chain, in his testimony, warned that Soviet violations undermine the confidence “essential to an effective arms-control process in the future [and could] have grave repercussions on the strategic balance and on our ability to maintain our deterrent.” The illegal withholding of information by the Soviets that is needed to establish compliance with arms-control provisions, he charged, “calls into question our future ability to constrain the qualitative aspects of their forces that hold the greatest potential for instability.”

Washington Observations

★ Defense Secretary Caspar W. Weinberger disclosed before the Senate Armed Services Committee that the number of deployed Soviet ICBMs as large as or larger than MX has now reached 808. Conversely, after a cumulative investment of almost \$13 billion spanning a gestation period of twelve years, the MX Peacekeeper program is still in the flight-test stage.

★ The Air Force is examining steps to counter the increasing Soviet air-breathing strategic threat, especially nuclear-armed cruise missiles. The underlying notion is that the strategic defense mission can’t wait until the high-technology, long-term strategic defense architecture SDA-2000 program becomes an operational reality. Instead, currently available assets should be brought into play as soon as possible.

Included here are forward deployment of fighter-interceptor and E-3A AWACS aircraft and expeditious completion of the so-called North Warning System, which will replace the obsolescent DEW Line with a combina-

tion of long- and short-range radars for contiguous coverage from the northern slopes of Alaska, across Canada, and down the west coast of Greenland.

★ Profits from illegal drug trafficking in the US are running at a rate of about \$80 billion a year, and this vast amount could tempt international terrorist organizations to tap these funds for purposes inimical to the national interest of this country. This prospect has caused the Pentagon and especially the Air Force to volunteer vigorous and active support of border surveillance operations aimed at intercepting the flow of illegal drugs into the US.

★ The Department of Energy FY '86 budget request includes about \$1,868 million for weapons research, development, and testing; about \$570 million for naval reactor development; and about \$4,830 million for defense production and support. The subcategory of weapons production is pegged at \$2,626 million, up by about \$59 million from last year. Nuclear materials production funding is increased by \$225 million from last year to \$1,959 million in FY '86.

Basic goals of DoE’s defense-related programs are to maintain modern manufacturing capabilities for the future production of weapons and to put the nuclear weapons stockpile in a high state of readiness and reliability. Weapons in production include the B61-3 bomb, B61-4 bomb, W76 Trident warhead, W79 eight-inch artillery-fired atomic projectile warhead, W80-0 sea-launched cruise missile warhead, W80-1 air-launched cruise missile warhead, B83 bomb, W84 ground-launched cruise missile warhead, the W85 Pershing II warhead, and the W87 MX Peacekeeper warhead. In addition, the budget request envisions preproduction efforts during FY '86 involving the W81 Standard Missile-2, the W82 155-mm artillery-fired atomic projectile, and the W88 Trident II warhead.

The need for a separate warhead for the Trident II SLBM—rather than a system shared with MX, as originally planned—suggests that the Navy requires a higher-yield weapon, probably in the 500-kiloton range, than the MX warhead, whose yield (330 kilotons) is slightly less than that of the Mk 12A warhead carried by Minuteman III.

The weapons R&D portion of DoE’s new budget supports unspecified activities associated with the Strategic Defense Initiative (SDI) as well as the Inertial Confinement Fusion program



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that has "weapons physics applications." Under the rubric of Defense Nuclear Energy, DoE in FY '86 "will concentrate on the development of reactor technology for space applications in the 100-kWe [kilowatt electric] range [the SP-100 Project] and on the development of a fifteen-kWe terrestrial reactor as an alternate power supply to update" the North Warning System.

The SP-100 Project will initiate systems design and facility modification efforts in support of a ground test of a single concept selected during late FY '85 and will evaluate the feasibility of extending SP-100 technology into the multimegawatt power range. Principal user of the SP-100 technology might well be space-based elements of SDI.

The North Warning System's ground-based reactor, eventually meant for deployment at about two dozen sites—mainly in northern Canada—is apt to cause significant political and environmental problems. The nightmare of terrorists overcoming even advanced security measures in a remote, unmanned location to purloin a nuclear reactor weighs heavily on the minds of US and Canadian officials.

IN FOCUS...

★ The feud between NASA and the Defense Department over the Air Force's expendable launch vehicle (ELV) program (see "Assuring Access to Space," November '84 issue, p. 80) has been resolved by the White House through the issuance of a Presidential directive.

The Air Force's ELV program, in line with the Defense Space Launch Strategy promulgated early in 1984, provides for the acquisition of ten unmanned launch systems to back up the Space Shuttle in case of technical or operational problems and to provide "launch-on-demand" flexibility for key national-security payloads. NASA chose to interpret this limited standby capability as a threat to the economic viability of the Shuttle and took its case to the press.

The White House was forced to step into the fray and ruled that the Air Force indeed was authorized to buy ten ELVs, but would also utilize the

Space Shuttle. Specifically, the Pentagon will use one-third of all the available Shuttle flights over the period of the next ten years.

To prevent a recrudescence of the squabble, the Presidential order makes clear that the President himself will resolve any future disputes between NASA and DoD concerning space-launch issues. The fate of the ELV program now rests with Congress.

★ The Administration's FY '86 federal budget includes about \$60 billion for R&D, according to the President's Science Advisor, Dr. G. A. Keyworth, II. Two-thirds of this amount is to be spent by the Defense Department, reflecting a twenty-two percent boost over last year.

In addition to the Strategic Defense Initiative—purely a technology effort—and other program-oriented R&D work, the Pentagon's science and technology program for FY '86 calls for increased basic research support to universities. DoD's spending on basic research is to go up by about sixteen percent over the current budget. Included in the new science and technology budget are funds for a long-term government-

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wide study effort of the consequences of large-scale nuclear war on the global environment, especially the so-called nuclear winter phenomenon.

The Administration's proposed \$60 billion investment in science and technology, combined with an estimated outlay of about \$100 billion for R&D by the private sector, was termed sufficient by Dr. Keyworth to ensure America's continued preeminence in science and technology.

★ In a highly unusual Pentagon press conference involving CIA and Defense Intelligence Agency (DIA) officials who, under the ground rules, could not be named, the two agencies sought to allay public concern over their seemingly divergent estimates of Soviet defense spending trends. At the crux of the issue is the CIA's estimate that Soviet defense spending growth from 1982 to 1983 had slowed to between one and two percent while the DIA pegged the growth rate at between five and eight percent.

Both of these intelligence agencies agreed that since then the growth rate has accelerated, but cautioned that it was too early to come up with precise figures.

The representatives of both agencies agreed that estimates of growth rates in Soviet defense spending, whether measured in rubles or dollars, are a "very uncertain business." What is certain, on the other hand, is that—in spite of a markedly smaller Gross National Product (GNP)—the Soviet Union continues to outspend the US in the defense sector, allocating between thirteen and seventeen percent of its GNP for national security, compared to about six percent on the part of this country.

Another hard fact is that, between 1977 and 1983, Soviet forces received about 1,100 ICBMs, more than 700 SLBMs, 300 bombers, 5,000 fighters, some 15,000 tanks, and "substantial numbers of new additional major surface combatants, nuclear-powered submarines, and attack submarines." During the same period, between 1977 and 1983, the US added 135 ICBMs, 390 SLBMs, no bombers, 3,000 fighters, 5,000 tanks, and 106 major warships to its inventory. In addition, the Soviet Union leads by a wide margin in the number and variety of new weapon systems about to enter the operational inventory.

★ Two senators, James A. McClure

(R-Idaho) and Steven D. Symms (R-Idaho), formally requested the White House to initiate programs to protect the civilian population from the threat of "international terrorists using biochemical weapons."

In a public letter to the President, the two lawmakers pointed out that over the past five years the US "has become one of the top three nations victimized by terrorist activities." At the same time, there has been mounting evidence of lax control of substances associated with biochemical weapons. Their letter cited one incident late in 1984 when botulism cultures potentially capable of wiping out an entire city were mailed from a research facility to two people who were subsequently arrested.

According to Senators McClure and Symms, both the information and material needed to assemble biochemical terror weapons are readily available in this country. The letter theorized that the release of just fifty kilograms of anthrax spores in a large American city could "cause several hundred thousand deaths." The two Senators warned that "the US must respond to this threat before, not after, a segment of our population is placed in jeopardy by terrorism." ■

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News, Views & Comments

By James P. Coyne, SENIOR EDITOR

Washington, D. C., March 4

★ A total of \$10.4 billion has been requested from Congress by the Department of Defense for the Fiscal Year '86 military construction program. The money would be spent for a broad range of facilities needed by all services, certain defense agencies, and for NATO infrastructure.

Of the total request, \$7.3 billion is for actual construction. The rest of the money would be spent for planning and design (\$500 million) and for operation and maintenance of the existing 406,000 military family housing units (\$2.6 billion). Included in the request was authority to improve or construct 42,600 bachelor housing spaces and 27,400 family housing units as well as construction related to fielding such new weapon systems as the Patriot air defense missile, the Peacekeeper (MX) missile, the B-1, the ground-launched cruise missile, and the Trident submarine.

By service, \$3.65 billion was requested for the Army, \$2.8 billion for the Navy, and \$3.0 billion for the Air Force. Defense agencies, including overseas dependents schools, would receive \$362.9 million, while Guard and Reserve forces would receive \$428.6 million.

★ Simulation equipment and techniques have advanced to the point where the Air Force could "substantially enhance" pilot combat training by using more visual systems that let them see, hear, and feel the results of their actions, a new report signed by Maj. Gen. Thomas S. Swalm, Commander, Tactical Air Warfare Center (TAWC), Eglin AFB, Fla., states.

The report covers a series of tests in which forty-eight pilots flew a Goodyear-built F-15 simulator with a twenty-foot-diameter dome mounted over it, onto which scenes generated by computers were projected to simulate various combinations of flying and combat conditions realistically. Included in the test were many tasks "that cannot be practiced adequately in aircraft because of unacceptable risk," the report said.

Two unexpected results emerged.



A pilot in a Goodyear Aerospace F-15 simulator prepares to fire on a simulated enemy vessel as his leader breaks off his attack after scoring hits on the target, which is presented in a three-dimensional environment.

First, it was discovered that pilots tend to wait too long before ejecting in emergency situations, "resulting in a significant number of fatalities," the report said. Therefore, it is possible to use the simulator to save lives by allowing a pilot to find out for himself exactly when the decision must be made to eject.

The second unexpected result was the mission rehearsal training provided by the simulator, which the pilots thought was "very valuable" preparation for complex tactical sce-

narios. These included combinations of tasks, such as low-altitude flying, navigation, tactical formation, detecting and responding to threats, weapon deliveries, and multiship enemy and friendly formations.

The evaluation was directed by Lt. Col. Maston E. O'Neal III, who is assigned to TAWC. Pilots from twenty-three Air Force organizations flew in the tests.

Scenes projected for the pilots inside the dome included full-color day, dusk, and night scenes, landing-light

illumination effects, weather, real-world terrain, generic terrain, and such highly detailed features as airfields, tactical ground targets, conventional and nuclear practice ranges, airborne threat targets, and friendly aircraft, including high-detail, close-formation lead aircraft.

"Should the tactical air forces decide to substantially enhance the training effectiveness of F-15, F-16, and A-10 simulators . . . visual systems with at least the same capability as the system evaluated should be acquired," the report said.

Goodyear Aerospace has been building F-15 flight simulators for the Air Force since 1975 and has thirteen of them in service or on order. Saudi Arabia and Japan are also buying the simulators.

★ This year's procurement of engines for the F-15 and the F-16 will be split, with fifty-four percent of the engines coming from General Electric Co. and forty-six percent from Pratt & Whitney, Secretary of the Air Force Verne Orr announced.

General Electric receives orders for 184 F110 engines while Pratt & Whitney receives orders for 159 improved F100 engines. This is the second year that procurement of engines for the F-15 and F-16 has been split between the two companies; last year, GE was awarded seventy-five percent of the engine program while P&W was awarded twenty-five percent.

The F-16 can accept either of the two engines. The F-15 at present can accept only the P&W F100 engine, but future F-15s will be configured for either. The new F100 engine incorporates several improvements, including a Digital Electronic Engine Control (DEEC), a new gear-type fuel pump, and a new, extended-life core.

As a result of intense competition between the engine manufacturers last year, the Air Force forecast savings of between \$2 billion and \$3 billion. As a result of program refinements and improvements, savings of up to \$4 billion over the twenty-year life cycle of the engines are now expected.

The P&W F100 engine was originally designed for the F-15 and was then adapted to the F-16. General Electric's F110 is a derivative of the F101 engine powering the B-1B strategic bomber combined with the fan and low-pressure turbine developed from a Navy engine, the F404.

Secretary Orr expressed great pleasure at the performance of the two engine manufacturers. "The contractors' proposals were very responsive and demonstrated that General

Electric and Pratt & Whitney are working hard to reduce costs," he said. "It is clear that competition has caused them to stress productivity enhancements while at the same time improving the reliability of their products. We have truly gained all the classical benefits of competition.

"We now have management responsiveness and technical innovation. We have price benefits, warranties, and the data that will allow us to buy spare parts directly from subcontractors," he said. The contracts are managed by Aeronautical Systems Division's Deputy for Propulsion at Wright-Patterson AFB, Ohio.

★ For the first time, the Department of Defense will review proposed exports of high-technology equipment and information to fifteen non-Communist nations. This right to review is a result of a recent decision by President Reagan that settled a long-standing, bitter dispute between DoD, the Department of State, and the Department of Commerce. The President stepped in after two years of unresolved interdepartmental infighting.

The fifteen countries are those that DoD feels are likely to reexport the technology to the Soviet Union. The list can be changed by the Defense Department.

A directive signed by Robert C. McFarlane, White House national security advisor, permits DoD to receive information on export license requests being processed in the computers of the Department of Com-

merce. The Pentagon has fifteen days in which to object to a proposed export. If Commerce does not concur in the objection, the proposed license is referred to a committee chaired by a deputy national security affairs advisor. Either department secretary could appeal the matter to the President.

The decision is viewed as another victory for Richard N. Perle, Assistant Secretary of Defense for International Security Policy, who has led a continuing fight against the export of high-technology information and equipment that could have military uses by the Warsaw Pact.

★ Air Force Explosive Ordnance Disposal (EOD) people have successfully disarmed a live bomb and recovered the fuze by using "Robbie Robot" and a Remote Control Recovery System (RCRS) developed over a four-year period by MSgt. Charles H. McClenahan at Armament Division (AFSC), Eglin AFB, Fla.

Armament Division was testing a BLU-106/B runway defeat weapon, which is designed to penetrate a runway surface and detonate, creating a large crater. In the test, the weapon was fired from a 150-foot tower into the target runway. It penetrated deep under the runway surface, but failed to detonate.

The EOD personnel brought Robbie Robot to the scene. The RCRS has six major components: a backhoe, an armored personnel carrier, a metal detector, a remote powersaw, an unexploded round transporter, and the



A radar-guided AIM-7F Sparrow air-to-air missile is fired from a Northrop F-20 Tigershark against an MQM-74C drone target thirteen miles away. The Sparrow, launched by USAF test pilot Maj. Doug Pearson, scored a direct hit over the ranges of the US Naval Weapons Center, China Lake, Calif. The Tigershark, which has flown more than 1,100 sorties in its flight-test program out of Edwards AFB, Calif., is carrying another Sparrow and two wingtip-mounted AIM-9 heatseekers.

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robot. The robot is a remotely controlled, tracked vehicle about the size of a golf cart, equipped with television "eyes" and a manipulator arm.

The RCRS was placed at the recovery site manually, after locating the unexploded round precisely with the metal detector. The backhoe was fitted with a spike to break up the runway over the recovery site. The backhoe was operated remotely by EOD personnel inside the armored personnel carrier. After a fifteen-by-ten-foot section of concrete had been broken up, the spike was replaced with a power shovel, which was used to dig down to the weapon.

The weapon was brought to the surface by the shovel. Robbie then used his manipulator arm to pick it up and place it in front of the remote controlled saw. The saw cut off the section of the warhead containing the fuze and an explosive booster charge.

After a safe interval, the warhead and fuze were loaded into the unexploded round transporter and removed from the scene.

There was no explosion, but if there had been, no one would have been injured. In the past, unexploded munitions have always been destroyed in place for personnel safety reasons. With the new RCRS, these live munitions can now be recovered for analysis. Armament Division is building a new RCRS with a more capable robot and a larger remote-controlled backhoe.

★ The Army has announced it wants to press ahead with what appears to be its own version of a joint Army-Air Force research program that would give the Army a powerful conventional attack capability against enemy second echelon forces far in the rear of the battlefield.



"Robbie Robot," its manipulator arm at the ready, rolls along its own tracks to the site of an unexploded warhead. This remotely controlled vehicle, about the size of a golf cart, safely retrieves unexploded munitions for analysis.

In budget testimony before the House Armed Services Committee, Army Chief of Staff Gen. John A. Wickham, Jr., said the new Joint Tactical Missile System—a program that has been under way for several years—is now on the verge of a quantum leap in capability. As a result, the Army wants to double the program's research and development funding from \$76.4 million in the current fiscal year to \$154.8 million in Fiscal 1986.

The joint program is based on the Air Force's advanced cruise missile, which utilizes Stealth technology. The Army is apparently now considering developing its own Lance or Patriot missiles to carry the new system and believes such a system can be developed over the next five years.

Discussing the new system, General Wickham said, "We can build in the next four or five years conventional weapons which will approximate nuclear weapons in lethality."

An Army technical expert, Maj. Don Maple, said General Wickham was talking about a weapon system that can carry a large number of submunitions, each independently targetable, and that would knock out a large number of targets on an individual basis, thus approximating in total killing power the capability of a small tactical nuclear weapon.

Either the new system or the joint system would give NATO an alternative to nuclear weapons for defense against a possible overwhelming attack by Warsaw Pact forces.

★ "Rivet MILE," a program for the initial reconditioning and modification of Minuteman missile launch and launch-control facilities near Air Force bases in Missouri, Montana, North Dakota, South Dakota, and Wyoming, has begun. The "MILE" in "Rivet MILE" stands for "Minuteman Integrated Life Extension."

This integrated program will make several approved weapon system modifications at significantly less expense than if the mods were carried out individually. It will improve safety, maintainability, and reliability of the Minuteman facilities, which date from the 1960s.

During Minuteman's first two decades, major upgrades and modifications were accomplished to improve effectiveness. But since the late 1970s, no major upgrades have been performed, and weapon system depot maintenance has consisted primarily of modifications. Increasing age and expected extensions of service life of the systems have made it essential that on-site reconditioning be accomplished.



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Ogden Air Logistics Center's Directorate of Maintenance at Hill AFB, Utah, will perform the major field re-conditioning effort. Verification of new procedures and equipment and orientation of participating personnel are being accomplished now. Work at all six Minuteman wings, including those at Minot and Grand Forks AFBs, N. D., Ellsworth AFB, S. D., and White-man AFB, Mo., will begin in June.

Four launch facilities and one launch-control facility will be worked on at each wing simultaneously. At F. E. Warren AFB, Wyo., only two launch facilities at a time will be re-conditioned in order to accommodate Peacekeeper deployment at that base.

The depot maintenance team at each wing will consist of approximately seventy-five technical and maintenance people, of whom fifty to sixty percent will be hired locally.

Rivet MILE will be a continuing program funded in three-year cycles. It is currently funded through 1987.

★ The Air Force has awarded two contracts for the development of advanced gun and ammunition technology for the next generation of fighter aircraft.

The contracts specify that the gun will be of simple construction, compact design, lightweight, and repairable within thirty minutes. It will use cased telescoped ammunition.

The new ammunition is called "cased telescoped" because the projectile, instead of being in front of the cartridge, as with conventional ammunition, is enclosed within a cylinder-shaped steel case and surrounded by a high-density propellant charge. Ignition of a small charge behind the projectile accelerates it into the barrel of the gun just before ignition and combustion of the main propellant charge. This increases muzzle velocity to 5,000 feet per second. The velocity of today's standard round fired from a 20-mm M61A gun is 3,500 feet per second.

The new ammunition concept, which has been under development for eight years, not only permits higher muzzle velocities without an appreciable increase in the size of the round but also permits simplified gun designs with fewer moving parts and higher rates of fire.

Contractors were directed to develop both 20-mm and 30-mm gun designs. Ares Inc., Port Clinton, Ohio, was awarded a \$3.58 million contract, and General Electric's Armament and Electrical Systems Department in Burlington, Vt., was awarded a \$3.1 million contract.

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★ Proposals are expected this month to fulfill communications and automation requirements for the modernization of Thailand's air defense system. The work will be done under the US Foreign Military Sales program.

Working with the Royal Thai Air Force, the Electronic Systems Divi-

sion (AFSC), Hanscom AFB, Mass., will automate Thailand's existing air defense system and at the same time expand its communications capabilities. The Royal Thai Air Force's Air Operations Center (AOC) will be automated and a backup sector facility will be constructed as key parts of the program.

Contract award is expected this summer. MITRE Corp., of Bedford, Mass., is providing systems engineering support for the program.

★ Four distinguished US Air Force figures will be enshrined in the Na-



USAF Lt. Col. Carlan W. Silha, program manager (left), Wing Commander (Lt. Col.) Charach Pansuwan of the Royal Thai Air Force, and RTAF Special Group Captain (Brig. Gen.) Sawana Pornlert discuss modernizing the Thai air defense system.

tional Aviation Hall of Fame in Dayton, Ohio, on July 20.

They are Gen. George S. Brown, USAF (Ret.), former Chairman, Joint Chiefs of Staff, and Chief of Staff, US Air Force; Maj. Gen. Michael Collins, USAFR (Ret.), former astronaut and command module pilot on Apollo XI, which made possible man's first landing on the moon; Col. Carl Benjamin Eielson, USAF (Ret.), pioneer Arctic aviator; and Col. (Dr.) John P. Stapp, USAF (Ret.), pioneer in research on the effects of high G-forces on the human body.

The ceremony will take place during the International Air Show and Trade Exposition at Dayton International Airport.

★ The Smithsonian's National Air and Space Museum and the University of Cambridge, England, are offering a course on "The History of Air Power" that covers the evolution of airpower from the beginning of World War II to the present. The course will be offered July 10-28, 1985, and will explore the impact of military aviation on modern warfare.

Participants will spend the first three days of the course at the Air and

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Space Museum in Washington for an introduction and brief historical background. They will spend July 14-28 in Britain.

In addition to classes at Cambridge, the group will visit Eighth Air Force fields in England, the well-known Shuttleworth Collection of aircraft near Cambridge, and the Imperial War Museum in London. Some of the lecturers and guides will be provided by the Air Ministry.

For information, write: Smithsonian Associates Travel Office, Capital Gallery 454, Washington, D. C. 20560, or call (202) 287-3362.

★ The Air Force's McDonnell Douglas F-15 Eagle continues to set new records. Warner Robins Air Logistics Center, Ga., reported a fully mission capable (FMC) rate in November of 80.2 percent for the entire USAF F-15 fleet. This FMC rate means that, on a

given day, 80.2 percent of all USAF F-15s were fully combat-ready and available to fight.

Two bases reported exceptionally high FMC rates for their F-15s. Eglin AFB, Fla., recorded an FMC rate of 88.7 percent, and Langley AFB, Va., recorded an FMC rate of 86.7 percent.

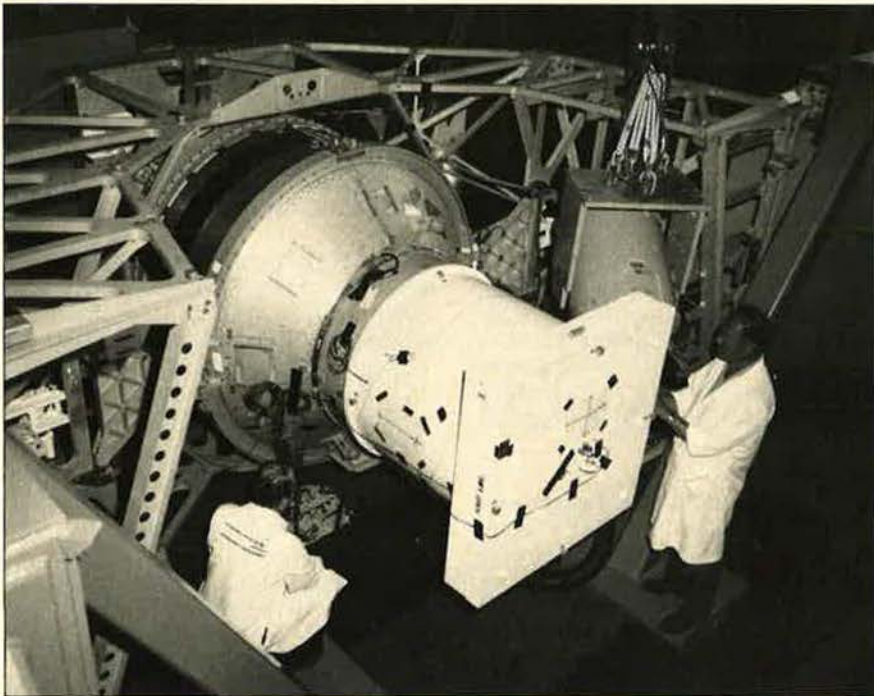
The Eagle has also established itself as the safest fighter ever built. After ten years and one million flight hours, the F-15 has compiled a loss rate of only four aircraft losses per 100,000 flight hours, according to the Air Force Inspection and Safety Center at Norton AFB, Calif. The next lowest loss rate was also set by a McDonnell Douglas fighter, the F-4 Phantom, with 5.3 losses per 100,000 flight hours.

Originally built as an air-superiority fighter, the F-15 was picked last year to fill the Air Force requirement for a new dual-role fighter. The Eagle has also been selected as USAF's short takeoff and landing and maneuvering technology demonstrator (SMTD).

Since beginning deliveries in November 1974, McDonnell Douglas has built 875 F-15s for the air forces of the United States, Israel, Japan, and Saudi Arabia.



A flight of four F-15 Eagles armed with air-to-air missiles maintains close formation over historic Fort Monroe, Va., near their Langley AFB home. The Eagle recently established a fully mission capable (FMC) rate of 80.2 percent and became the safest fighter ever built, with a loss rate of only four aircraft per 100,000 flight hours.



McDonnell Douglas Corp. technicians perform final calibration adjustments on one of twenty-eight Payload Assist Modules (PAM-DII), which are upper-stage rockets to be used in launching Navstar Global Positioning System (GPS) spacecraft.

★ Twenty-eight upper-stage rockets to launch a series of new navigation satellites will be built under a \$169.4 million contract awarded to McDonnell Douglas Corp.

The company will build Payload Assist Modules (PAM-DII) to launch Navstar Global Positioning System (GPS) spacecraft from the Space Shuttle starting in 1986. This brings to thirty-five the number of firm missions for the commercially developed PAM-DII, which is more powerful than McDonnell Douglas's PAM-D now in use.

The PAM-DIIs will be delivered to the Air Force beginning in 1985 and continuing through 1989. The first GPS/PAM-DII flight is scheduled for 1986 from a Shuttle launched at the Kennedy Space Center in Florida.

Like the PAM-D, the PAM-DII consists of a single solid-fuel rocket motor and the supporting structures and avionics needed to deploy the satellite from the Shuttle bay. Its larger rocket motor will boost the 4,000-pound GPS spacecraft into a 10,900-mile-high transfer orbit.

When the unique eighteen-satellite GPS navigation system becomes operational near the end of the decade, it will enable land, sea, and air forces at any point on the earth to obtain instant, accurate navigation information. It will also be available for civilian use.

★ The Joseph A. Moller Library, a "living memorial" to those who

served in the 390th Bombardment Group (Heavy), later the 390th Strategic Missile Wing, will open next month in Tucson, Ariz., according to Brig. Gen. Robert W. Waltz, USAF (Ret.), President of the 390th Memorial Museum Foundation. General Waltz is a former president of AFA's Tucson Chapter.

Joseph A. Moller was commander of the 390th in World War II. He led more heavy bomber combat missions in the European theater of operations than any other air commander, General Waltz said.

Assigned to Eighth Air Force and equipped with B-17s, the 390th flew missions out of England. It was deactivated in August 1945 and reactivated in January 1962 at Davis-Monthan AFB, Ariz., as a strategic missile wing equipped with the Titan ICBM. The 390th Strategic Missile Wing was deactivated July 31, 1984.

The 390th Memorial Foundation was created in 1980 with a main objective of establishing a library and museum. The library and museum are located on the grounds of the Pima Air Museum at Tucson, the third largest air museum in the United States.

The 390th is exhibiting a B-17 aircraft and a Titan missile on loan from the Air Force Museum. They will be housed in a large structure later this year. The foundation has published Volume I of the *390th Bomb Group Anthology* and is printing Volume II. Copies of Volume II are available for

\$22 from the 390th Memorial Museum Foundation, P. O. Box 15087, Tucson, Ariz. 85708-0087.

★ Col. James G. Gallagher, USAF (Ret.), who last year was invested as an Aerospace Education Foundation Jimmy Doolittle Fellow in honor of his 1949 feat, the first nonstop flight around the world, died of cancer at Walter Reed Army Medical Center on February 24.

He was a captain when he took off from Carswell AFB, Tex., on February 26, 1949, in his B-50, the *Lucky Lady II*, on the 23,452-mile flight, which terminated back at Carswell on March 2 after four aerial refuelings. The mission took ninety-four hours and one minute. Captain Gallagher and his crew were awarded the Distinguished Flying Cross and won the Mackay Trophy for the year's most meritorious flight. Stuart Symington, then Secretary of the Air Force, called the flight "an epochal step in the development of airpower."

Colonel Gallagher retired from the Air Force in 1972.



Then-Capt. James B. Gallagher is greeted by Secretary of the Air Force Stuart Symington and USAF Chief of Staff Gen. Hoyt Vandenberg, after his historic 1949 round-the-world flight. (See item.)

★ The first two launches of the GBU-15 Precision Guided Weapon in an operational environment were successfully carried out during a Red Flag exercise at Nellis AFB, Nev., in January. Each scored a direct hit.

Although the weapon has proved highly successful in a wide variety of tests and practice range missions, said Lt. Col. Charles F. Jolly, Director

of Armament Plans and Analysis at the Tactical Air Warfare Center, Eglin AFB, Fla., "it was the first time an operational Tactical Air Command wing launched the weapon in a scenario that was just like real combat."

The GBU-15 is a standoff attack precision guided weapon for interdiction and defense suppression. The 2,000-pound high-explosive warhead can be fitted with a television or imaging infrared guidance control module and contains a data link that gives the pilot the option of guiding it automatically or manually to the target. Tactical aircrews can launch the weapon from low or high altitudes and long ranges in order to avoid enemy defenses.

Each GBU-15 was launched from an F-4E flown by aircrews of the 4th Tactical Fighter Wing, Seymour Johnson AFB, N. C. The weapons were launched at low level and guided to targets several miles from the launch points.

The GBU-15 is operational at several USAF bases. Armament Division (AFSC) at Eglin is developing an extended-range version of the weapon, designated the AGM-130.

Recently, the GBU-15 was cited as an example of a weapon system that costs less to buy now than it did when first coming into the inventory in 1980. The original cost was \$194,000 each. Today, according to Armament

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Division, the cost is \$127,000, despite inflation. "The Air Force attributes much of this cost reduction to a close working relationship with our contractors, careful scrutiny of production practices, and focused efforts to reduce costs," said Lt. Col. Herb LaFlamme, AFSC GBU-15 program manager.

★ The 55th Aerospace Rescue and Recovery Squadron (MAC) at Eglin AFB, Fla., celebrated twenty years of accident-free flying last month. Currently equipped with four-engine HC-130 Hercules transports specially configured for rescue and recovery work and with UH-60 Black Hawk helicopters, the 55th was activated in 1952 at Thule, Greenland.

The squadron was subsequently transferred to Kindley AFB, Bermuda, McCoy AFB, Fla., and finally to Eglin in 1971. Since being stationed at Eglin, the squadron has been credited with saving 100 lives and assisting in saving many more. It also carried out the grim task of recovering more than 900 bodies from the mass

suicide site in Jonestown, Guyana, in 1978.

The 55th is the only Air Force squadron to be equipped with the UH-60 Black Hawk. These helicopters are currently undergoing modification to install an in-flight refueling capability by mid-summer.

★ The 3d Tactical Fighter Wing, Clark AB, Philippines, has flown thirty-three months and 40,000 hours without an accident. This accomplishment, a considerable one for any wing, is all the more significant because of the wing's activities during the accident-free period.

During the thirty-three months, the wing carried out twenty deployments, participated in sixteen Cope Thunder exercises (the Pacific Air Forces' version of Red Flag), was responsible for another thirty-two deployments by the 26th Aggressor Squadron, and underwent one Operational Readiness Inspection (ORI). The 3d is equipped with F-4 and F-5 fighters.

★ USAF's new Combined Effects Munition has passed its first article acceptance flight test.

The CEM is a 1,000-pound, free-fall cluster munition consisting of a tactical munitions dispenser filled with 202 submunitions. Each submunition contains a fragmentation case for materiel targets, a shaped charge for

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antiarmor effectiveness, and a zirconium ring for incendiary effects. The weapon can be delivered at any speed—including supersonic—at altitudes from 200 to 40,000 feet.

CEM was given a ninety-six percent submunition function rate during tests on ranges at Eglin AFB, Fla. Other tests will include component, subsystem, and preproduction acceptance tests.

Developed at a cost of \$27 million, a \$3.2 billion procurement program will be initiated upon completion of preproduction testing. Effectiveness of each CEM is warranted over a ten-year period. The munition is to provide a major portion of the Air Force's air-to-ground capability into the next century.

★ As a result of the new open trade policy with the Peoples' Republic of China (PRC), an integrated air traffic control communications system will be delivered to China's Guangzhou (formerly Canton) Airport next month by Denro Laboratories of Gaithersburg, Md.

The \$250,000 contract was negotiated by Denro representatives during Aviation Expo/China '84 in Beijing. The US system was chosen over candidate systems from England, France, and Australia.

The system is similar to those installed by Denro at San Francisco International Airport and Dulles International Airport, Washington, D. C.

★ A world record of 2,000 hours in the FB-111 was set in January by Lt. Col. Dale E. Wolfe, Chief of Training Devices for the 380th Bomb Wing, Plattsburgh AFB, N. Y.

More than half his FB-111 flying time—1,170 hours—was logged as instructor pilot. "Of all the aircraft I've flown," said Colonel Wolfe, "the FB-111 is the best. It is an excellent weapon system because of its accuracy, its ability to successfully penetrate high-risk target complexes, and its high-speed, low-level flight capabilities."

★ The Air Force Aerospace Medical Research Laboratory (AFAMRL) will celebrate fifty years of research and at the same time change its name during a week-long schedule of activities beginning June 5 at Wright-Patterson AFB, Ohio.

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The name of the laboratory will officially be changed to the Harry G. Armstrong Aerospace Medical Research Laboratory. General Armstrong was a cofounder of the laboratory on May 18, 1935, when he was a captain in the Army Air Corps. It was then called the Physiological Research Unit.

"General Armstrong's forward thinking recognized the need for focused research and development efforts dealing with problems of aircrew

safety during Air Force missions," said Col. George C. Mohr, current AFAMRL Commander. "His death on February 5, 1983, marked the end of an era in aerospace medicine."

During the celebration week, the laboratory will dedicate one of its buildings to another, as yet unannounced, aerospace medicine researcher. There will be specially designed exhibits depicting laboratory milestones and accomplishments, a symposium, and a banquet. ■

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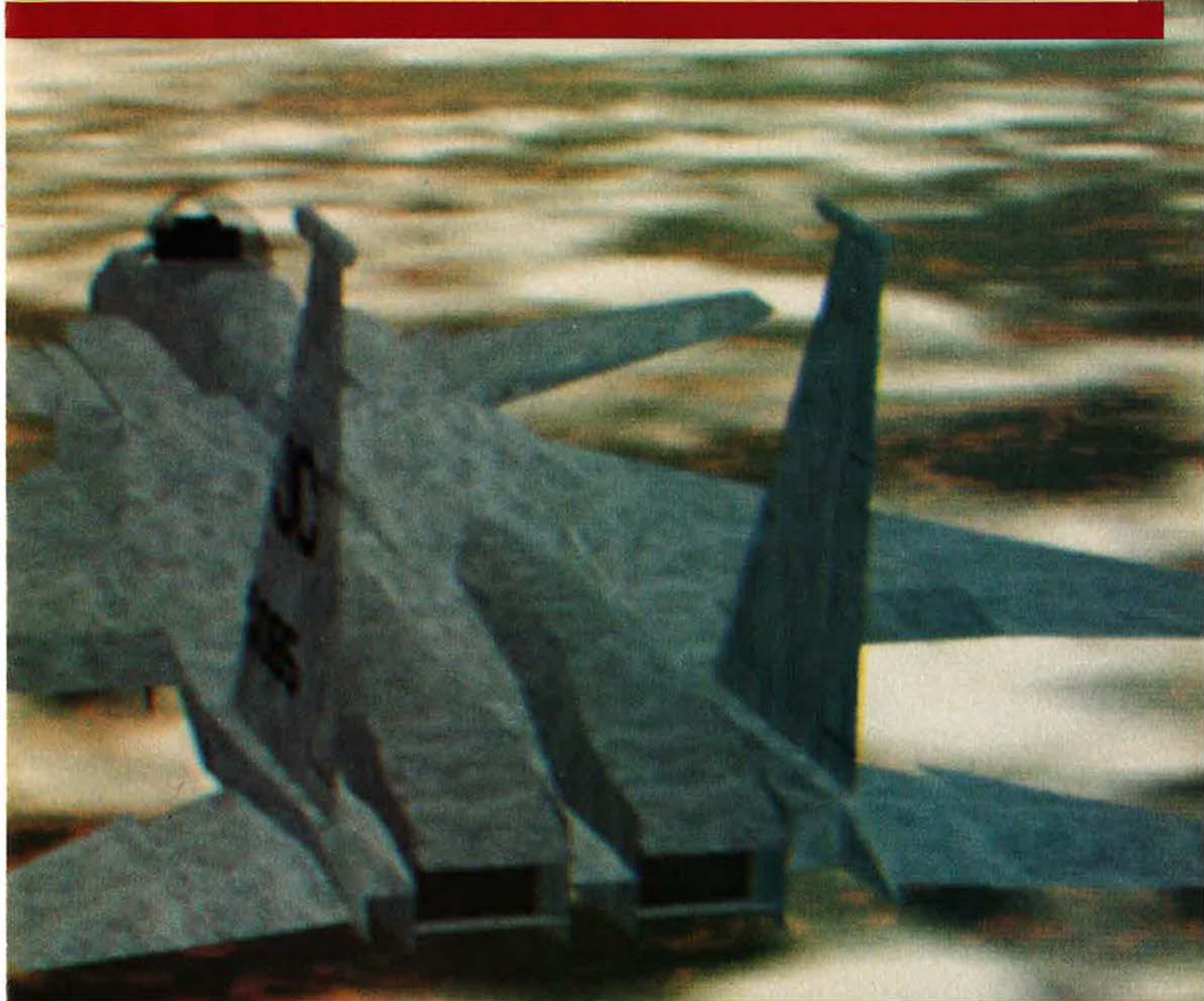


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■ (left to right)
F-5 Mission Simulator System, 1981
C-130 Weapon Systems Trainer, 1982
F-16 Digital Radar Land Mass Simulator, 1984
Advanced Visual Technology System, 1984



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Soviet fighters are making a strong bid to control the air by the 1990s, but TAC is determined that it won't happen that way.

At the Edge on Air Su

THE cardinal mission of the tactical air forces is to control the air. USAF fighter forces must clinch air superiority whenever and wherever called upon in order to carry out all other combat missions, such as close air support and interdiction.

Those fighter forces can do that today. They are stronger than ever. Take the word of Gen. Jerome F. O'Malley, Commander of Tactical Air Command (TAC).

The harsh question, however, is whether or not they will maintain their capability in the face of the sharply mounting Soviet challenge for the skies. That challenge, in the formidable form of highly capable new fighters, weapons, and radars, is for real.

At its present pace of modernization, the already numerically superior Soviet fighter force could lay claim to the air over Europe, for example, in the early 1990s and could compete for it with growing confidence sooner than that.

If TAC can build on its current strength, it will be in good shape to keep that haunting prospect from coming to pass. That "if" is a big one! TAC cannot afford to falter in fulfilling a great many requirements for modernizing and adding to its combat wings—with the accent more and more on those charged with controlling the air.

With a bow to his predecessors in command of TAC at Langley AFB, Va., for their work at having made TAC top-notch, General O'Malley declares that the tactical air forces



Bristling with air-to-air missiles, a flight of F-15s prowls the sky. Tactical Air Command faces a growing problem of maintaining air superiority against new, high-quality Soviet fighters, radars, and missiles. The threat is for real.

priority

BY JAMES W. CANAN, SENIOR EDITOR

(TAF) are "in their best shape ever—better than they were in World War II, in Korea, or in Vietnam" in terms of combat capability. A TAC staff analysis shows, General O'Malley says, that such capability has improved "by at least two and a half times" over what it was five years ago.

The tactical air forces include TAC itself, USAFE, PACAF, AAC, and Reserve Forces tactical squadrons. TAC organizes and trains tactical units for all and feeds combat-ready forces to other commands.

TAC's fighters perform far better and are more reliable than those they have been replacing and will continue to replace. F-15s and F-16s now constitute almost one-half of fighter forces. Modernization is moving right along.

Flying hours are way up. Crew training is "as close to combat as we can make it," General O'Malley asserts, and crews are about as combat-ready as they can be. Electronic combat capability, nearly nonexistent five years ago, is now very good.

Maintenance crews are experienced and capable. Spare parts are more abundant and more readily accessible on flight lines, although engine spares are becoming worrisome once again (*see box on the following page*). Morale is high.

Trouble Ahead?

Yet big trouble may lie ahead for TAC. Its plan to buy enough new fighters to build up from thirty-six combat-coded fighter wings to forty

such wings by 1991 will be in jeopardy if, as expected, defense spending sags. So will its plans to modernize its tactical reconnaissance, defense suppression, and forward air control (FAC) units.

Affordability will be crucial. TAC will stick with off-the-shelf airframes and modifications to keep costs down in all such modernization.

For greater flexibility of reconnaissance, it is considering outfitting newer fighters with podded sensors and appropriate signal processors to replace its aging RF-4Cs. The idea is to make reconnaissance capability organic to fighter units and not to exercise it in the form of reconnaissance-dedicated squadrons in the present fashion of the RF-4Cs. Integrated thusly, the reconnaissance aircraft "could go right back to the fighter mission" if need be, General O'Malley says.

Nothing is definite on that. "We have many decisions to make on the reconnaissance mission over the next few years," the General says. "I would like to think American technology can produce a pod to do the job, and I would love to do it with fighters."

For forward air control in the close air support mission, TAC plans to replace its relatively slow, short-range O-2A, OV-10, and OA-37 aircraft with a more survivable aircraft, perhaps a missionized variant of the T-46. (*For more on the T-46, see "The T-46A Is Here" on p. 106 of this issue.*) For operations in high-threat environments, there

may be a requirement for a "fast FAC" variant of a fighter now in production.

In the context of aircraft planned for near-future production, USAF is avid for the F-15E. It intends to begin ordering that dual-role fighter in FY '86, which begins next October 1, and to buy 392 of them—enough for four wings—into the early 1990s.

It also plans to begin ordering swing-role F-16Fs in FY '88 and to mix a presently undetermined number of them with F-16Cs and F-16Ds in procurement through that same time frame.

There may be a hitch in this, however.

The F-16F will closely resemble the F-16XL, which lost out to the F-15E in USAF's selection of the dual-role fighter last year. The F-16Fs, conceived as primarily ground-attack fighters, will feature cranked-arrow wings and a slightly elongated fuselage for longer range and bigger payloads than existing F-16 variants can manage. But they will also be more expensive than those variants, and that's the rub.

Numbers vs. Cost

USAF's overriding goal in its procurement of all types of F-16s is to have 2,795 of the fighters deployed by September 1993. It must have those numbers above all, and it cannot afford to let procurement of the F-16F, with its top-of-the-line price, keep it from getting them.

If buying the F-16F means that USAF would have to cut deeply



A crew chief gets co-star billing on a 1st Tactical Fighter Wing F-15 at Langley AFB, Va. The pilot's name is stenciled on the other side. Pride in maintenance is the big payoff of this practice.

The Shrinking Supply of Engine Spares

Spare parts pricing "reforms" create a backlash in operational squadrons.

The tactical air forces (TAF) are beginning to feel a pinch once again in the availability of vital spare parts for fighter engines.

Reacting to criticism of its alleged overpayments for many types of spares, USAF turned away last year from its practice of buying them from or through prime contractors. Instead, it put them out for competitive bidding by subcontractors and took the primes out of the loop as middlemen.

Now it seems that the Air Force may have overreacted and overdone it. The evidence for this is a shrinkage of supplies of replenishment spares for the Pratt & Whitney F100 engines on F-15s and F-16s. As a result, declares Gen. Jerome F. O'Malley, Commander of Tactical Air Command: "One of my main worries in TAC right now is the supportability of the F100 engine."

Tactical air forces "engine shops are saying they have one or two spare engines, and if they had the parts, they'd have twelve more," General O'Malley adds. "The engines are sitting in the shops, waiting for parts."

The General expressed confidence that Pratt & Whitney "will help us out of the immediate problem."

To address that problem for the far term, General O'Malley suggests that USAF adopt the practice of letting the engine contractors, P&W and General Electric, bid on providing replenishment spares for their fighter engines "up front," at the same time they bid on providing the engines themselves.

Unless the problem is solved, sto-

ries of F-15 "hangar queens" may once again abound as they did in the mid and late 1970s. Readiness will take a ripping.

There is regrettable irony in this. The spares problem looms again even as the performance of TAF maintenance and supply units keeps getting better and better.

TAF fighters had a highly satisfactory average utilization rate of 28.7 hours a month last year. This was thirty-six minutes better than the rate they had achieved the year before and a smashing improvement on the twenty-four hours a month they had managed four years ago.

Since FY '80, TAF utilization rates have gone up steadily. The major reason has been the increasingly crisp execution of TAF's maintenance and supply units. This is due in large measure to the decentralization of those units in 1980. They had been organized to function at wing levels, and their command structures and personnel were not accountable to—and did not identify with—any particular squadrons or fighters.

TAC replaced this sluggish setup with the Combat-Oriented Maintenance Organization (COMO) and the Combat-Oriented Supply Organization (COSO). In them, Aircraft Maintenance Units (AMUs) are teamed with specific squadrons, and each fighter now has its own crew chief, whose name is stenciled, along with the pilot's, beneath its canopy.

Payoffs in unit pride and performance are very high. Now, if only adequate engine parts were available.

—J.W.C.

into its planned procurement of F-16Cs, for example, it will say no deal. It has three aircraft priorities at least as high as the one for the F-16F. They are the F-15E, getting on with the Advanced Tactical Fighter, and maintaining the total fighter acquisition quantities it believes it needs.

TAC is getting anxious for the ATF. Even if the ATF arrives in the mid-1990s as now planned, it may be too late to counter the Soviet air threat it is being designed to face. There is a danger, moreover, of the ATF program schedule slipping some more.

Slippage is already a grave problem with the Advanced Medium-Range Air-to-Air Missile (AMRAAM) program. TAC fighters need launch-and-leave, multiple-engagement AMRAAMs as quickly as they can get them, and that is beginning to look like maybe never. AMRAAMs were originally scheduled for initial delivery next year. Now the very best that can be expected for AMRAAM is initial delivery in 1988.

Last January, AMRAAM's costs and technical troubles caused Secretary of Defense Caspar W. Weinberger to come very close to killing the program. Instead, at USAF's pleading, he ordered it restructured. It remains wobbly.

"I am very worried about AMRAAM," General O'Malley declares. Adds Maj. Gen. John M. Loh, TAC's Deputy Chief of Staff for Requirements, "I'm confident we'll get AMRAAM, because we have to have a missile with its characteristics. If we don't, I'll just have to turn around and write a requirement for a missile just like it. We've got to have what it can give us."

Absent AMRAAM, TAC's ability to control the air could well erode to a slim margin in the short term and could disappear, with the devil to pay, in the early 1990s—well before the ATF is due on the scene.

This is why TAC, looking to the future, is concentrating more and more on meeting air-superiority exigencies.

Explains General Loh: "When we look at what is happening on the other side in terms of their ability to challenge our control of the air, clearly we need to step up to our air-superiority mission again."

Air-to-Ground Prospects

Even so, ground-attack missions and requirements are not being slighted at Langley. Their continuing importance in the scheme of things is evident in TAC's ranking of its research, development, and acquisition priorities (*see box below*).

Number one on that list is the Low-Altitude Navigation and Targeting Infrared for Night (LANTIRN) system. Coming along better now after a rocky start, LANTIRN will give TAC's ground-attack aircraft the means of operating at night and under all but the foulest weather.

They need such capability badly in the face of Soviet land forces' doctrinal proclivity for maneuvering at night and to gain the enormous advantage of generating sorties around the clock.

"Our most serious deficiency today, as opposed to the longer term, is our inability to be effective at night," General Loh asserts. "We're not much better at it than we were at the end of Korea, even though we now have the F-111s with Pave Tack IR pods. LANTIRN is the linchpin of our night attack requirement."

USAF's stated purpose for LANTIRN is to put it on F-16s, F-15Es, and A-10s. General O'Malley has some misgivings about this. "We have agreed," he says, "that LANTIRN will go on the F-15E. That's roughly 400 of them. We may put some on A-10s and some on F-16s."

There may be a problem, however, in giving less-experienced single-seat F-16 pilots enough training time to enable them to handle the demanding tasks of low-altitude targeting and navigation at night—all by themselves.

Operational testing and evaluation of the targeting pod on a single-seat F-16 will begin next August. That testing will go a long way toward answering the question. Meanwhile, LANTIRN's navigation pod now seems to be in good shape, and TAC is confident that the full-up LANTIRN system, consisting of the two pods and a head-up display (HUD), is on a surer, faster track to production.

"We're feeling pretty good about LANTIRN," General O'Malley says. "The only issue is which airframes we'll put it on."

A related issue is how many seats to build into the F-16F. If it has two seats, it will have the same appeal as the F-15E as far as LANTIRN is concerned. USAF's idea was that the F-16F would evolve as a modernization improvement over the single-seat F-16C. But the option remains to put two seats in the F-16F.

Not Another DRF

The attributes and missions of the F-15E dual-role fighter and of the F-16F swing-role fighter will differ markedly. For USAF, this is an important consideration in terms of justifying its need for both aircraft.

It has to do with the distinction between dual-role and swing-role aircraft.

On any given day, the F-15E should be capable of either the air-superiority mission or the interdiction mission. Its two-man crew will have been trained to be equally proficient at both. It will be capable of carrying the full range of weaponry required for either.

The F-16F may be nearly a match for the F-15E in the versatility, if not the plenitude, of its air-to-air and air-to-ground weaponry. But its pilot, like the pilots of existing F-16s, will have been trained primarily for the ground-attack role and only sec-

The TAF's Top Twenty

Each year, the tactical air forces (TAF) determine their priorities jointly. The priority list recently agreed upon by TAF commanders and presented to Hq. USAF ranks a total of 151 different systems. Here are the first twenty.

1. LANTIRN. The Low-Altitude Navigation and Targeting Infrared for Night system will enable ground-attack aircraft to attack targets around the clock under all but the very worst of weather. It consists of a navigation pod, a targeting pod, and a head-up display. USAF intends to buy up to 720 sets for the F-15E, F-16, and A-10.

2. AMRAAM. The Advanced Medium-Range Air-to-Air Missile will replace the radar-guided AIM-7 as primary armament for aerial engagement. It will go on the USAF F-15 and F-16 and on first-line Navy fighters. Its key features are the ability to attack several targets on the same pass and its "launch-and-leave" capability, which greatly increases the survivability of the attacking fighter.

3. F-15/F-15E Development and Procurement. Goals for the F-15 program are to increase the annual production rate of the F-15, to continue the development of the F-15E Dual-Role Fighter, which will complement the F-111 for long-range interdiction while retaining full air-to-air capability, and to proceed with modest upgrades to already fielded F-15s.

4. Enhanced JTIDS System (EJS). Threat advances and exercises reinforce the requirement for jam-resistant voice and data communications. EJS employs JTIDS technology to produce a high anti-jam voice radio capable of countering jammers well into the 1990s and beyond.

5. F-16 Procurement. The F-16 program continues to add numbers and capability. The F-16C, with improved systems for both air-to-air and air-to-ground missions, is now entering the inventory. TAC is pursuing a follow-on derivative F-16F for increased range/payload applications.

6. Advanced Tactical Fighter (ATF). The ATF is a follow-on air-superiority fighter for the 1990s and beyond that will ensure USAF's preeminence in the vital air-superiority mission. Development efforts continue to refine the configuration and subsystems in order to provide an operational capability in the 1990s.

7. PLSS/TR-1. PLSS will locate enemy air defense radars. Standing off at high altitudes, TR-1 surveillance aircraft with PLSS will detect enemy radar emissions and will feed data on their location to a PLSS ground station.

8. AGM-130. This powered (boosted) version of the GBU-15 glide bomb will increase standoff employment range significantly, allowing launch aircraft to stay out of range of enemy defenses.

9. Compass Call Conversion. These EC-130Hs will be responsible for jamming the enemy's command control and communications networks, thus increasing the survivability of attacking forces.

10. Fighter Aircraft Identification. This program is developing several techniques that will allow positive identification of enemy aircraft at long ranges.

The Second Ten. Priorities eleven through twenty are as follows: EF-111A conversion (forty-two) and simulators; air-to-air missile procurement (AIM-7/AIM-9); modular control equipment (MCE) and ground attack control capability (GACC); chaff, flares, and dispensers; AIM-9L capability for fighter/attack aircraft; AWACS and airborne battlefield command and control center; High-Speed Antiradiation Missile (HARM); IR Maverick and Maverick alternate warhead procurement; air-to-ground munitions and handling equipment; and the follow-on recce program.

ondarily for the air-superiority role.

In his primary role, the F-16F pilot will perform excellently. In his secondary role, he will perform adequately. USAF won't have the air time and the training time to make him equally proficient at both missions. That would be possible only with two crew members who can share the many tasks required for dual-role excellence.

If the F-16F winds up with two seats, it too could become a dual-role fighter. This is unlikely, however, given the increasing costs of manpower and training and the ever-present need to retain skilled, experienced pilots.

(Retention has been very high for the past four years, but is starting to slip again. TAC is very concerned about that.)

There was never any doubt that the F-15E would need two seats. Some of its missions will take it very far for a very long time, deep into enemy airspace at night and in bad weather. Typically, each F-15E will go it alone, not in formation, on such forays. All the more reason, explains General Loh, why the F-15E "will have to have two crew members to share the work load and to benefit from what we call 'peer reinforcement'—backing each other up when the going gets tough in very hostile conditions."

The F-15E's extension of normal F-15 range will be made possible by conformal fuel tanks and by drag-reducing, tangential carriage of weapons under the fuselage.

The 1st Tactical Fighter Wing at Langley already knows firsthand about the excellent aerodynamic properties of those fuel tanks. The wing has them in abundance because its F-15Cs are on call to US Central Command (USCENTCOM), which is responsible for operations in far-flung Southwest Asia and the Middle East. The wing learned that when it leaves its conformal fuel tanks out in the open, it had better lash them down. In high winds, they take off and fly quite nicely.

The F-16F will get its additional range from a greater abundance of internal fuel. But it will not match the range of the F-15E.

Getting to the War

The idea with both aircraft is to increase range not just to go deep but also to get to the war and to allow for greater flexibility of basing for that purpose. Getting to the fight may well involve more than an as-the-crow-flies round trip.

In planning the F-16F, TAC rejected the Israeli approach of giving earlier-model F-16s greater range and payload by beefing up their landing gear and affixing larger external fuel tanks. This alteration provides payload and range, but it does not allow for growth of the airplane, because it does not provide any extra internal space, and it adds drag. It is cheaper in the short run, but not in the long run.

USAF has decided that both the F-15E and the F-16F will need more thrust than is now provided by either of its newest fighter powerplants—the Pratt & Whitney F100-



TAC has decided that its future swing-role F-16F fighter will look like this F-16XL prototype with cranked-arrow wings and a slightly longer fuselage than that of existing F-16s. TAC badly needs the launch-and-leave, multiple-engagement AMRAAM radar-guided missiles shown under the F-16XL's fuselage, along with heat-seeking Sidewinders at its wingtips.

PW-220 and the General Electric F110. Both were developed with a sterner eye to their reliability than to their thrust. Now, in planning derivatives of both for the F-15E and the F-16F, TAC is aiming for a ten to fifteen percent increase of their thrust ratings across the board. USAF is convinced that, by incorporating advanced materials and cooling techniques, this can be achieved at no sacrifice of reliability. Such changes will make it possible for the engines to run at higher temperatures and thus give higher thrust.

TAC's sustained emphasis on improving its ground-attack capability is also exemplified by its tight cooperation with the US Army's Training and Doctrine (TRADOC) Command at nearby Fort Monroe, Va. Their mutual goal is to bring the AirLand Battle concept to maturity through full-blooded teamwork. In this, they will jointly determine the requirements for night operations and are working together on such programs as IFF (identification, friend or foe), the Joint Surveillance and Target Attack Radar System (JSTARS), and the Precision Location Strike System (PLSS). All are high among TAC priorities.

Ground-Attack Weapons

Air-to-ground weapons also rate high among those priorities. Much emphasis is given to the AGM-130 bomb—a GBU-15 glide bomb to which thrust capability has been added to give far greater standoff range.

Also in dominant positions—numbers seventeen through nineteen in TAC's listing of 151 RD&A priorities—are the High-Speed Antiradiation Missile (HARM) for defense suppression, the Imaging Infrared Maverick missile system and warheads, and, all inclusively, "air-to-ground munitions and handling equipment."

All will team with LANTIRN. Decrying the misconception in some circles that LANTIRN is designed to work almost exclusively with Mavericks in the antitank role, General Loh emphasizes that it will, instead, bring to bear "the full array of our air-to-ground weapons."

Acquiring many more and much better standoff weapons is extremely important to TAC. Its F-16s

do very well at dropping dumb bombs. General O'Malley claims it is "not uncommon for an F-16 squadron to have an average CEP of only twelve meters for all the bombs it drops in an entire year." Dropping dumb bombs means flying dangerously close to targets, however, and TAC would like its ground-attack fighters to forgo such tactics whenever possible.

Implicit in Air Force-Army teamwork is TAC's unflagging attention to fulfilling all such ground-attack modernization requirements. But the prerequisite of ground attack will always be control of the air.

"Battlefield-area interdiction and close air support are indispensable to the AirLand Battle concept," General O'Malley asserts, "and we are totally committed to them. But the AirLand Battle is overarched by air superiority. You'd better have it, or you're not going to do anything else very well.

"In every battle the US Army has fought since Kasserine Pass, it has enjoyed air superiority. Consequently, air superiority is often taken for granted by the Army—and by the Air Force, too. We are getting to the point where we can't take it for granted."

Soviet Fighters Coming On

As soon as the end of this decade, Air Force fighters could meet their match in such new Soviet fighters as the Su-27 Flanker, the MiG-29 Fulcrum, and the MiG-31 Foxhound. By then, all will have been copiously deployed and upgraded in avionics and weaponry that are already surprisingly good.

USAF's beyond-visual-range (BVR) Sparrow radar-guided missiles will almost certainly be equalled before long by Soviet AA-9 and AA-10 missiles abetted by quality, look-down/shoot-down radars.

Compounding the problem of defeating these fighters and missiles is the advent of the Soviet Il-76 Mainstay aircraft, called SUAWACS, for early warning and command and control.

All the while, numbers remain heavily in the Soviets' favor. The USSR has built an inventory of more than 5,000 fighter and attack aircraft, and their production rates are still outpacing those of USAF by far.

General O'Malley is troubled by these developments. "The appearance of the MiG-29 and the Su-27 so quickly, and their characteristics, was startling. The Soviets' new look-down/shoot-down threat worries the hell out of us.

"Their next generation of fighters will definitely require us to have something better than the F-15 air-to-air. That means the Advanced Tactical Fighter. I would love to have it in the early '90s, but we're pointing at a mid-'90s IOC for it, and I think we're going to be about five years too late."

The game is not up, not yet. TAC is confident that its training, tactics, and leadership of fighter units will continue to provide an edge over the Soviet fighter arm, though Soviet tactics have become more flexible and thus somewhat more difficult to counter. (See also "Another Look at the Soviet Pilot" on p. 83 of this issue.)

But demonstrable Soviet success in sharply narrowing TAC's lead in quality of fighters, missiles, and radars threatens to trump TAC's ace.

Quality Edge Threatened

"Quality has always been our strong suit," General Loh says. "Our ability to dominate rests on our combination of equipment, training, and tactics. Now seriously jeopardized in that triad is the quality edge of our equipment in the air-superiority mission.

"We see the Flanker and the Fulcrum, the Mainstay, the AA-10 missiles coming in, the emergence of no-kidding look-down/shoot-down, pulse-Doppler radars.

"The Flanker and the Fulcrum are about the equal of the F-15 and the F-16, although, of course, we are continuing to upgrade them. We can make a safe bet that there will be follow-ons to [the new Soviet fighters] well before 1995. And we can't get the ATF before then, even if we stay on our current program schedule."

Not getting AMRAAM would be just as dire for the near term. With AMRAAMs, says General Loh, "it would take only one F-15 [in a flight of two F-15s] going up against two [Soviet fighters], firing two missiles, and turning away without ever exposing himself to return fire—and it's all over.

"Without AMRAAM, we can envision two [F-15s] on two [Soviet fighters] in a standoff. They will essentially be on a par with us. It is happening right now."

As advertised, AMRAAM's attributes are world-beaters. The missile is expected not only to allow fighter pilots to engage multiple targets simultaneously, but also, as TAC describes it, to provide "a larger launch envelope, increased velocity, ECM resistance, and high probability of kill."

In view of its current problems, was all this too much to ask of AMRAAM? General Loh says no. "Its technology is doable," he declares. "We were too ambitious in terms of its schedule. We overcommitted on that. Now we're doing with AMRAAM what we've done with LANTIRN—reworking it and taking the risks out. We'll get it later than we should, but it will have the same capabilities we said it would have back in 1981."

TAC is hoping against hope that it has not overcommitted on the Advanced Tactical Fighter's schedule as well. The ATF concept must still go through about three years of demonstration validation before its requirements and technologies are firmly fixed. During that period, it will undoubtedly ascend from its current sixth place to the very top of TAC's list of RD&A priorities, TAC officials predict.

Given the ATF's promise of speed, maneuverability, small radar signature, and long-range sensors and weapons, it is expected to provide TAC with a much-coveted, unbeatable capability for "first look, first kill in all environments," says a TAC briefing paper.

Moreover, the ATF is being designed for high sortie-generation rates, greater reliability of airframe, avionics, and engines, long combat radius, supersonic cruising without using fuel-gulping afterburners, short turnaround times, and much less dependence on external fuel tanks to get to and stay in far-ranging battles.

As TAC puts it, the fighter must also be "capable of sustained operations from battle-damaged airfields." Enhanced ground survivability will make it much more difficult to foreclose it from the fight by attacking air bases.

The Cost Hurdle

Perhaps above all, however, the ATF must be affordable. If it is not, it may never be built.

USAF now pegs the ATF's flyaway cost—in 1981 dollars—at \$40 million, which approximates the cost of the US Navy's F-14 Tomcat carrier-based interceptor. But the ATF's affordability must also take into account its projected life-cycle cost—and on that score, TAC is highly optimistic.

"We believe the life-cycle cost of the ATF will be lower than [that of] the F-15," General Loh declares.

There are many reasons for such optimism. High among them is the promise of total or near-total integration of the ATF's fire controls and flight controls by dint of extremely fast yet supremely reliable microcircuitry. The aircraft is expected to be loaded with very-high-speed integrated circuit (VHSIC) semiconductor chips on thin, compact circuit boards of great staying power and easy accessibility for maintenance.

In addition, the efficient engines being designed for the ATF are expected to take maximum advantage of highly heat-resistant, lightweight materials for unsurpassed durability and to embody significantly fewer stages in their cores for the selfsame purpose.

"All ATF characteristics translate into the same thing—fewer parts and fewer people needed to support the aircraft," says General Loh. "This means reliability and maintainability. Those features translate into sortie generation, and we're going to build them into the ATF *first*." In fact, adds the General: "We are willing to give up some performance, to a point, in order to achieve reliability and maintainability of the ATF."

This, he says, should get across and underline TAC's view that "we don't have a manpower problem or a spare parts problem. What we have is a reliability problem."

Strong Signal on R&M

This message is being thundered throughout the Air Force. At the Pentagon, for example, Lt. Gen. Leo Marquez, USAF's Deputy Chief of Staff for Logistics and Engineering, also ties it squarely to the ATF program.

"Industry has heard us say over and over that we're serious about R&M [reliability and maintainability]," says General Marquez. "and its reaction has been, 'We hear you, but we don't believe you.' The ATF program should change that. It will be the strongest signal to industry that we mean what we say about R&M."

That signal will resound when USAF picks winners for full-scale development of the ATF. Seven contractors—Boeing, General Dynamics, Grumman, Lockheed, McDonnell Douglas, Northrop, and Rockwell International—are in the running. The Air Force will choose three of them to stay in it, and they may well be the three who proffer the most persuasive proposals for ensuring the reliability and maintainability of their ATF designs.

Hewing to high standards for ATF R&M has already given USAF some problems in scheduling ATF. The first hint of such problems came when a Defense Systems Acquisition Review Council (DSARC) session on the ATF scheduled for last December was put off until 1985. The purpose of that session was to elicit a decision by the Office of the Secretary of Defense on whether or not to permit the Air Force to move into the next phase of ATF development. It slipped, at least partly because the R&M ramifications and requirements of the ATF development program had not, at the time, been thoroughly expounded.

"That wasn't the sole reason the DSARC was postponed, but it was a major reason," a Pentagon official affirmed. At this writing, ATF program slippage is again apparent.

What are the stakes in keeping the ATF program on true course? A TAC paper delineating the Soviet threat states without qualification that "the ATF is needed to allow the USAF to gain and maintain air superiority in the 1990s and beyond." And then, starkly:

"These threat advances, unless countered by the ATF, will affect our current tactics and deny air superiority in hostile airspace."

Such a denial would mark a historic turning point for US tactical air forces. It is one that, in any future confrontation with Soviet air forces, TAC is determined to preclude at all costs. ■



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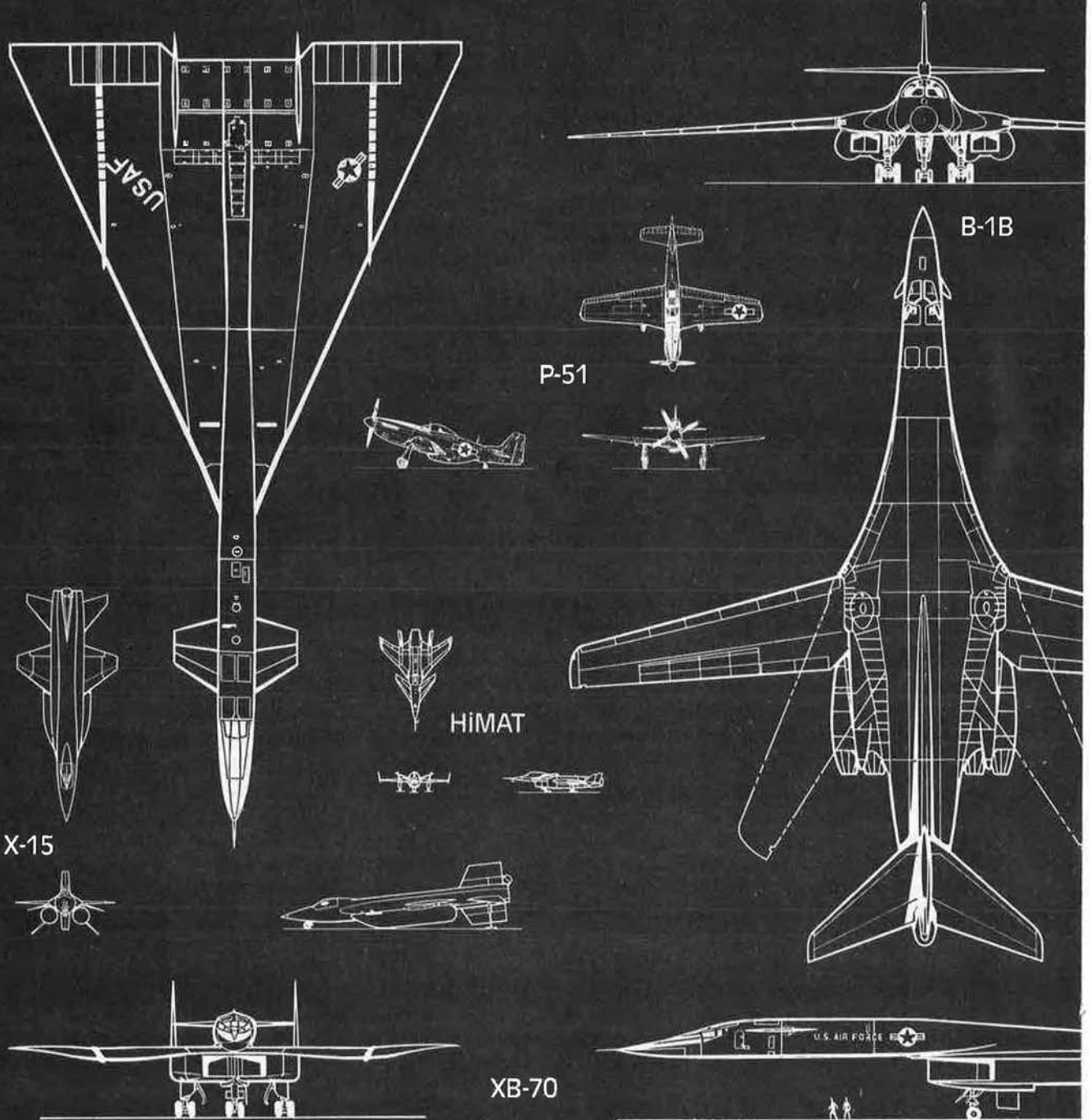
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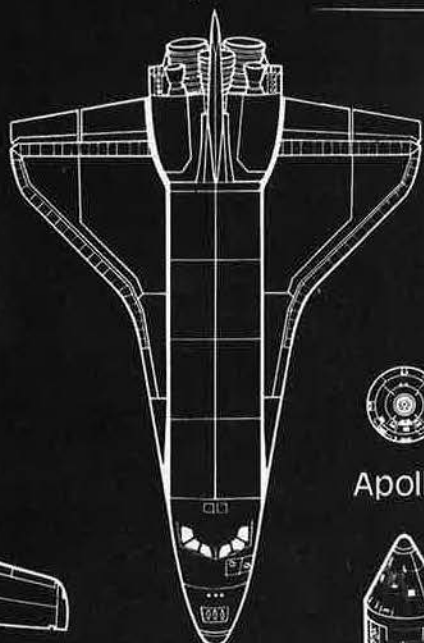
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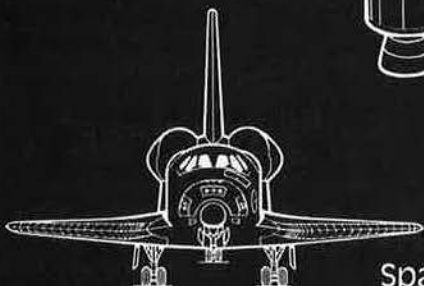
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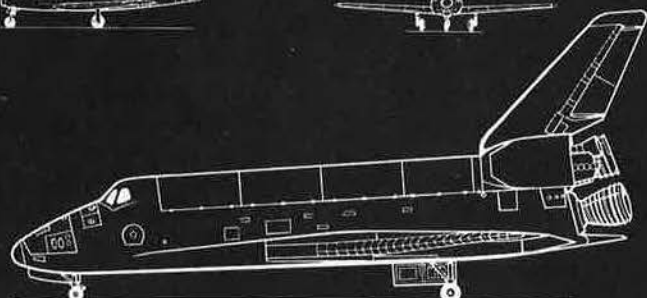
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Over the last ten years, the mission-capable rate of the F-15 Eagle has doubled. But by improving the reliability of navigation, weapons, and other internal systems, USAF expects to increase the mission-capable rate of the dual-role F-15E by another twenty percent over the current Eagle rate.

**Reliability is the big worry—
but not the only one.**

Down-to-Earth Concerns About Tactical Air

BY EDGAR ULSAMER, SENIOR EDITOR (POLICY & TECHNOLOGY)



THE Air Force's long-standing concern with readiness and sustainability is being broadened by the addition of a new criterion that is clearly destined to influence how and from whom the service buys what kinds of weapon systems.

Although the importance of reliability and maintainability (R&M) has obviously been understood for some time, its fundamental impact on the size and effectiveness of the forces that can fight on a sustained basis is just now raising a battle cry among operational users, acquisition managers, and logisticians throughout the Air Force. (*For more on R&M, see "Fourth Wheel on the Acquisition Wagon," March '85 issue, p. 122.*)

The Air Force Association's na-

tional symposium entitled "Tactical Air Warfare—Status and Prospects," held in Orlando, Fla., January 17–18, 1985, served to underscore USAF's determination to change R&M from a public-relations buzzword to a way of life.

TAC Commander Gen. Jerome F. O'Malley, the event's co-host and keynote speaker, drove home this pivotal point: "In the Air Force today, we don't have a spares or manpower problem; we have a reliability problem." The time has come to treat R&M with the same priority as performance, he added.

The Commander of Air Force Logistics Command, Gen. Earl T. O'Loughlin, announced that the Air Force had just decided to create an "R&M czar" and henceforth will



treat this criterion on a par with cost, schedule, and performance factors in its acquisition decisions.

USAF's Deputy Chief of Staff for Research, Development and Acquisition, Lt. Gen. Robert D. Russ, told the AFA meeting that the Air Force's leadership has decided to give R&M an "institutional identity, tied to operational factors, in the same way that we have institutionalized flying safety." The problem, he explained, is that the Air Force and its industrial partners have seen the issue "as a big 'M' and a small 'R,' with the result that things break too often and need too much maintenance."

By way of a benchmark, he pointed out that one in three of the service's almost 500,000 enlisted peo-

ple is assigned to aircraft maintenance, that the Air Force is forced to maintain a spare-parts inventory containing 835,000 different line items that in the aggregate are worth more than \$40 billion, and that it takes between \$5 billion and \$6 billion a year to replenish this congeries of spare parts.

Other symposium speakers pointed out that riding herd on the myriad of picayune line items included in the spares inventory to the extent necessary to prevent occasional "horror stories" about overpricing from cropping up would simply drive up too much the cost of doing business.

General Russ stressed that "if we fix the reliability problem, the others will go away," adding, "We

know how to do R&M. The F-15 requires about two-thirds of the maintenance time per flying hour of the F-4, and in the case of the F-16, the maintenance is down to one-third." If the Air Force succeeds in doubling the mean time between failure (MTBF) on the F-16's engine and fire-control system, "this would allow us a cut in spare parts by forty-five percent and in maintenance personnel by forty percent. We would save more than \$3 billion in spare parts alone."

Since the first F-15s entered the operational inventory ten years ago, the mission-capable rate of this weapon system has been doubled, which equates in an operational sense to a correspondingly larger force, according to General Russ.

The F-15E dual-role fighter, slated to enter the inventory in about three years, is expected to have a mission-capable rate twenty percent better than that of the current F-15 models, he said.

In the case of the F-15's inertial navigational system (INS), the MTBF is currently about 150 hours. The Air Force expects to score an almost tenfold improvement—a 1,400-hour MTBF—by going to a ring laser gyro navigation system that will cost less than a present-generation INS, he said.

By structuring the Alternate Fighter Engine program on a competitive basis that includes specific reliability and maintainability criteria, the Air Force was able to reduce life-cycle costs by between \$2 billion and \$3 billion in the first go-around, with an additional cut of \$1 billion in the offing. These new engines, General Russ pointed out, "will go back to the depot once every eight years" as specified by industry warranties.

Exhorting industry to heed the Air Force's focus on R&M, he put the several hundred company executives attending the AFA meeting on notice that "if you want Air Force business, you better start worrying about R&M." He said the Air Force was very disappointed with the reaction to a letter it sent to industry that was signed jointly by the Secretary and the Chief of Staff of the service. The letter asked forty-two top aerospace industry executives for a firm commitment to help solve the R&M problem. Only a handful of industry leaders bothered to respond, according to General Russ.

The Importance of Joint Doctrine

While R&M clearly was the central theme of the symposium, speakers from the Air Force as well as the other services also broadly underscored the imperative of joint operations and doctrines. General O'Malley, seconded by the head of the US Army's Training and Doctrine (TRADOC) Command, Gen. William R. Richardson, invoked President Dwight D. Eisenhower's postulate of 1959 that "separate ground, sea, and air warfare is gone forever. If ever again we should be involved in war, we will fight in all elements,

with all services, as a single concentrated effort."

TAC and TRADOC recently agreed on a joint doctrine called J-SAK, for Joint-Second Echelon Attack. As General O'Malley pointed out, J-SAK assigns to relevant ground commanders the responsibility for nominating and prioritizing targets that have near-term effect on their scheme of maneuver. But in deference to "time-proven principles," General O'Malley pointed out, "the air commander continues to maintain centralized control over all air assets."

Although the Army's "AirLand Battle" concept has not yet become joint Army-Air Force doctrine, the Air Force strongly endorses this approach and is working with TRADOC to make it joint doctrine, he said. General Richardson defined the AirLand Battle concept as a scheme for attacking the enemy throughout the full depth of his formations, including deep into his second echelon and beyond, in a thoroughly orchestrated fashion. Premised on increased use of maneuver warfare, combined arms operations, and offensive operations against the enemy's flanks and rear, the AirLand Battle concept seeks to find and intercept the enemy's reinforcements before they reach the forward line of troops (FLOT). The key requirements are obviously to find the enemy—even under night and adverse weather conditions—by means of a host of sensor systems that reach 150 kilometers or more into his second echelon and then to attack these targets by air as well as with missiles and long-range artillery.

No "Techno-Babble"

As General O'Malley pointed out, the Air Force is the principal tool for going after the enemy's follow-on forces because of its ability to penetrate the Warsaw Pact's sophisticated air defenses—the make-or-break feature of the AirLand Battle. Responding to recent claims by Sen. Gary Hart (D-Colo.) that AirLand Battle was merely a warmed-over version of attrition warfare masked by "techno-babble," the TAC Commander acknowledged that Senator Hart and other members of the defense reformist movement in Congress tend to assume



that manned aircraft are no longer able to penetrate heavily defended areas. He stressed that the Air Force is convinced that this is not so, given the service's ability to roll back even the most sophisticated defenses.

USAFE Commander in Chief Gen. Charles L. Donnelly, Jr., told the AFA meeting that "our new combat and combat support systems now give us the capability to beat the air defense system at all altitudes. Recent Green Flag exercises have demonstrated how effective our air defense suppression can be, as has the Israelis' success in beating the SAM threat in Lebanon." He added that "we are going to upgrade our training and tactics to move toward a balance of pen-

NATO, in its follow-on forces attack (FOFA) concept, will depend principally on air forces to identify and attack Warsaw Pact follow-on forces before they can reach the front lines. Using three-dimensional, real-time intelligence gathered from a variety of sources—such as the NATO AWACS (below right) operated by multinational crews (below left)—commanders will be able to develop an accurate, timely picture of the air-land battle situation quickly and thus plan responses accordingly.



etration tactics that use all of our options, from the surface to as high as we can get."

Relating these capabilities to the FOFA (follow-on forces attack concept, NATO's plan for fighting the AirLand Battle), he said USAFE is coming up with the means for identifying the Warsaw Pact's follow-on forces by developing a system to "combine, correlate, and display" battle information rapidly from a variety of sources. Central here is the "Joint Tactical Fusion-Limited Operational Capability for Europe," or LOCE, test-bed that makes it possible to share the "near real-time ground situation picture among Air Force, Army, and NATO battlefield commanders."

LOCE, he said, is tailor-made for

the coordinated use of air and land forces operating in support of the FOFA concept and takes full advantage of such near real-time sensors as the TR-1 and its side-looking radar. When LOCE or full-fledged follow-on ground intelligence fusion systems are combined with the three-dimensional intelligence provided by the British Nimrods and the US and NATO AWACS aircraft, the result is "a very accurate and timely picture of the air-land battle."

The Army, General Richardson stressed, needs organic systems that can "stop the second wave" in staggered fashion over a distance of up to 150 kilometers, meaning advanced artillery and rocket launchers with a range of up to forty kilo-

meters, certain types of cruise missiles that can be launched from the MLRS (Multiple Launch Rocket System) and that can reach out about 100 kilometers from the FLOT, and cruise missile replacements for the Lance system that can go the full distance of around 150 kilometers.

Ruling out any interest on the part of the Army to take over operation of the Air Force's A-10 aircraft, he did confirm that, in line with a request by the Joint Chiefs of Staff, the Army was looking at the possibility of transferring its Patriot air defense missiles to the Air Force. That service, General O'Malley said, "remains committed to the close fight and close air support [CAS] mission."

In line with increasing concern by both services over rear area close air support and air base security, TAC and TRADOC are working on relevant joint doctrines and procedures. General O'Malley termed this a milestone undertaking, "the first to address rear area command and control of joint forces and [a formalization of] the Air Force's commitment to provide close air support in . . . the rear battle area."

Hardware Challenges

In his generally upbeat assessment of TAC's combat capabilities—an aircraft inventory made up predominately (seventy percent) of modern A-10s, F-16s, and F-15s, sharp boosts in fully supported war-time sortie rates, and marked increases in guided munitions stocks—General O'Malley acknowledged some serious trouble spots. For one, the advanced medium-range air-to-air missile (AMRAAM) "was supposed to be in the inventory next year—but it won't be."

Explaining that the program has already slipped twice, he said that "now we are beginning to question whether we will see AMRAAM at all." If the program's problems are not resolved soon, AMRAAM "will be in deadly serious trouble." There

is no alternative to AMRAAM, and both the Air Force and the Navy need the new missile "beyond doubt," according to the TAC Commander.

Trouble also cropped up in connection with the Advanced Tactical Fighter program, he told the AFA meeting, adding that "we are about five years behind in getting on with ATF." Even under the most optimistic threat assumptions for the 1990s, we must expect the Soviets to bring into their operational inventory aircraft that can "seriously challenge the F-15," he pointed out.

In setting the requirements for ATF, the Air Force leaned toward conservative goals that are well within industry's ability to meet. ATF, General O'Malley said, isn't "stealthy-stealthy, it isn't superfast, and we haven't picked off the knees of the curve." The requirement for supersonic speed without use of afterburners does not tax the state of the art unduly, he suggested.

General Russ added that the Air Force delayed submission of a decision memorandum—tantamount to a request for program go-ahead—to the Defense Systems Acquisition Review Council (DSARC) last December for a variety of reasons. He expressed optimism that eventually the program "will go, don't worry.

ATF is a big step, and we owe it to the American people to give it our best thinking."

He expressed the personal opinion that ATF will be equipped with a gun, although probably not a new design, since "our current Gatling gun is okay. We don't need all new gadgets on ATF."

Generals O'Malley and Russ were guardedly optimistic concerning the Low-Altitude Navigation and Targeting Infrared for Night (LANTIRN) system, especially so far as the system's navigation pod is concerned. The targeting pod, previously the source of some problems, is now in better shape, after the Air Force eased off on some of the tougher performance requirements, according to the TAC Commander.

General O'Malley added that TAC had not yet decided whether or not LANTIRN could be used on single-seat F-16s, but "we know darn well that it is indispensable" for the F-15E. The R&M traits of LANTIRN could prove crucial because "if it takes three C-141s' worth of support equipment [to maintain] the system, then even I—possibly one of its strongest advocates right now—[would] get flutters of the heart," he said.

General O'Malley, seconded by Vice Adm. Robert F. Dunn, Commander of the US Atlantic Fleet's Naval Air Forces, rejected the notion of some defense analysts that "the tactical recce [reconnaissance mission] is dead—that it can be done from space, or from high-flying platforms, or from soon-to-be-designed [systems]."

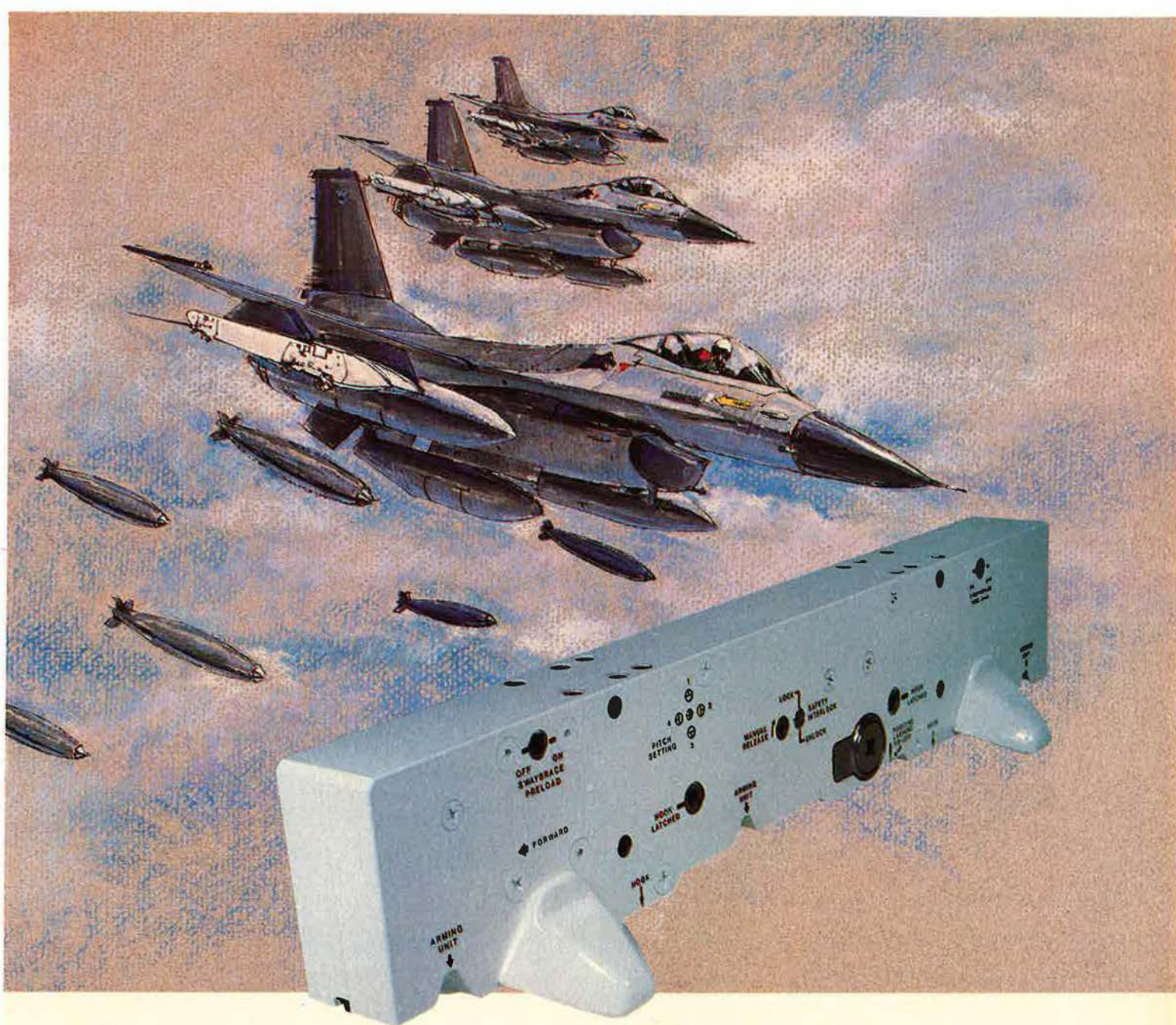
He suggested that the national systems that could theoretically perform some tactical recce are overloaded by too many other requirements. The Navy, Admiral Dunn stressed, simply can't rely on space or other external sensors, but requires a dedicated recce aircraft.

The Air Force, General O'Malley pointed out, is not yet far enough along "to know if the recce mission can be done with pods carried by either standard F-15s or F-16s or will require a dedicated two-seater aircraft."

AFA's next national tactical air warfare symposium is scheduled for January 30–31, 1986, again in Orlando, Fla. ■

Front-line surface-to-air missiles (SAMs) like the US Army's Patriot system pictured below will make it extremely difficult for Warsaw Pact aircraft to punch through NATO air defenses.





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flight.*



What it's like to fly an airplane that does things no airplane has ever done before.

Pilot Report: AFTI/F-16

BY CAPT. DON McMONAGLE, USAF

A FLIGHT in the Advanced Flight Technology Integration (AFTI) F-16 is an opportunity to peer into the next decade of fighter aircraft. The AFTI/F-16 is an F-16 that has been modified to demonstrate and validate the latest technology applications. Although there is no intent to put the AFTI/F-16 into production, the results of this test program have been used to improve our current-day fighters, and the lessons learned will be invaluable in designing next-generation fighter aircraft.

(For a basic description of the AFTI/F-16, its "new ways to fly," and voice controls in the cockpit, see "The Future Forms Up at ASD," January '83 issue, p. 40.)

The first phase of flight-testing, from July 1982 through July 1983, concentrated on an innovative Digital Flight Control System (DFCS) and several avionics systems improvements. After a year of extensive aircraft modifications, the current phase of flight-testing began in July 1984. It will investigate a variety of innovations, including an Automated Maneuvering Attack System (AMAS) and interactive voice capability.

Many of the concepts employed in the AFTI/F-16 involve aircraft motions and cockpit controls and displays that are unconventional—to say the least—for fighter aircraft. Such things as pointing the nose of the aircraft left and right and up and down without turning, turning without banking, and talking with the aircraft can seem absolutely alien to pilots with thousands of hours of conventional experience. The AFTI/F-16 pilots find it exciting and challenging to investigate such capabilities and to project applications for these concepts.

Mission preparation is a key element to a productive flight. In a quiet room, the voice system is "trained" for recognition of the individual pilot's voice as he dons an oxygen mask and repeats the voice system's vocabulary four or five times. Ideally, this laborious process is required only once, and the "data" that characterizes all the words and phrases is loaded into a cartridge about the size of a hand calculator. The cartridge is then carried to the cockpit, and the data is loaded into the voice system for each subsequent flight.

By loading another data cartridge during mission planning, the pilot can program steerpoint and target information, arrange the cockpit and aircraft sensor displays, inventory the weapons to be carried for that flight, and assign radio frequencies to preset channels. This "tailoring" of aircraft systems to the upcoming mission has traditionally been accomplished in the cockpit while the engine was running, burning precious fuel—and time. With the programming accomplished on the ground, the pilot can "plug in" the information in the cockpit in a matter of seconds.

Helmet-Mounted Sight

The only AFTI-unique equipment the pilot must take with him to the cockpit (other than the two data cartridges) is the helmet-mounted sight. This is a lightweight visor assembly that attaches to the top of the helmet. The visor protects the pilot's eyes from ground or aircraft reflections from his own laser rangefinder, and a small projector under the visor projects a fixed sight (plus sign shape) onto the visor, in front of the pilot's right eye. An electrical

cable from the visor assembly mates with an aircraft cable at an attachment block on the left side of the parachute harness, similar to the way the oxygen hoses mate.

Preflight inspection of the aircraft is, for the most part, the same as a production F-16 preflight except for the two canards mounted fifteen degrees left and right of vertical on the bottom of the engine intake. These canards move in tandem to produce side force or toe in (snowplow) to create drag. They are used to accomplish the unique left and right nose motions and the "flat" (no wing banking) turns.

After engine start, many of the checks before taxi and takeoff can be performed by automated computer built-in tests (BITs). The flight-control system runs its BIT in about two and a half minutes and requires only four pilot switch actions. Each of the major avionics systems (there are ten of them) runs its own BIT either at power up or with one pilot switch action. Problems discovered during BITs are displayed to the pilot in text on cockpit displays and are logged using more detailed codes into a maintenance fault list for postflight troubleshooting.

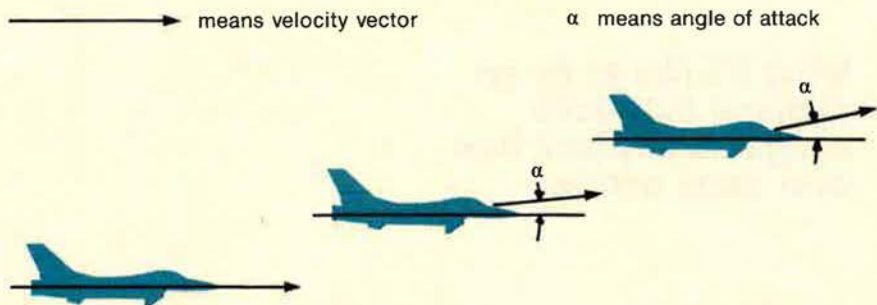
The cockpit is a formidable front of TV screens and projected displays. The head-up display (HUD) is a clear glass "gunsight" that shows critical flight information (airspeed, altitude, heading, attitude, etc.) and target and weapon delivery information. All of this information is focused at infinity (collimated) so that the pilot need not refocus his eyes from "outside" to read the display. Three TV screens can show eight different information/sensor displays.

Twenty buttons around each of these displays manipulate functions presented on the displays. Two of the TV screens are four-inch-square green monochrome displays and are mounted high on the left and right sides of the instrument panel. These are used to display and manage weapons, the flight-control system, avionics systems faults, and radar, infrared, and threat sensors.

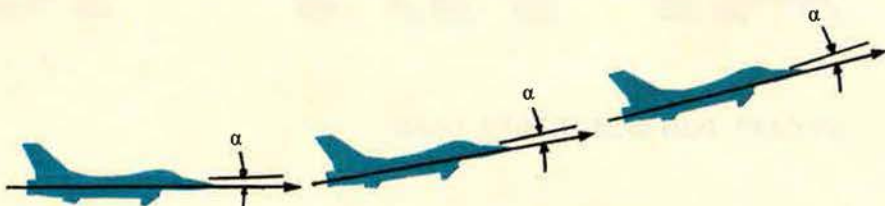
The third TV screen is a five-inch-square color display mounted on the center pedestal between the pilot's knees. This display replaces the primary cockpit flight instru-

As the AFTI Moves

These are AFTI/F-16's decoupled modes in its longitudinal or vertical flight path:



VERTICAL TRANSLATION: During this mode, AFTI/F-16 flies up or down without raising or lowering the point of its nose. This might be called AFTI/F-16's elevator effect, since the aircraft's nose attitude never changes.



DIRECT LIFT: The AFTI/F-16 can change altitude without changing angle of attack as a normal aircraft must do. This direct-lift mode will permit accurate target alignment and will be especially useful for delivering bombs.



PITCH AXIS POINTING: During this mode, AFTI/F-16's flight path does not change, but its nose can be pointed up or down. This mode can be used to make small pointing adjustments for aligning the aircraft's gun accurately during air-to-air or air-to-surface gunnery.

ments (airspeed, altitude, attitude, and horizontal situation indicator) and presents the same information electronically, in color. It can also display a color map of the aircraft's current position (the map "moving" with the aircraft) or another area of interest. Radio frequency/channel, steerpoint coordinates, and a myriad of other mission information can

be managed through a small LED-type display above a keyboard at the forward end of the left console. From all of these displays, it's easy to get the feeling that the aircraft is "peering back" at the pilot!

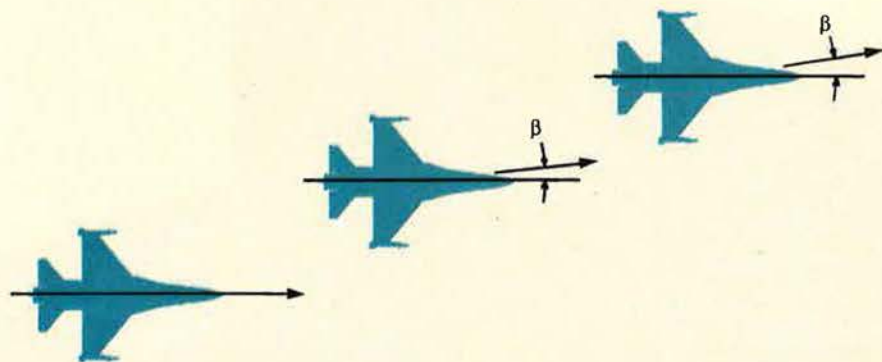
Rock Steady

Takeoff airspeed is slightly higher than that of the production F-16 be-

These are AFTI/F-16's decoupled modes for flying laterally, or sideways, as it also flies forward:

→ means velocity vector

β means sideslip angle



LATERAL TRANSLATION: AFTI/F-16 moves sideways while its nose continues to point directly forward.



DIRECT SIDEFORCE: In this wings-level, or flat, turn, AFTI/F-16 turns without banking or rolling. The aircraft simply changes direction without any rotation about its roll axis.



LATERAL (YAW) POINTING: AFTI/F-16 points its nose in a direction different from its flight path. The aircraft performs a skidding-type maneuver: The aircraft flight path (direction of flight) remains unchanged while the pilot is able to point the nose right or left.

cause the canards add some weight to the nose. But once the takeoff pitch attitude is set, the flight-control system holds that attitude rock steady through liftoff and landing gear and flap retraction. The flaps come up slowly and automatically as airspeed increases, so the "sinking" feeling associated with a rapid flap retraction is avoided.

The first step during any AFTI/F-16 test mission is to confirm that the data collection instrumentation and the telemetry transmission of that data to the ground control room are functioning properly. The AFTI/F-16 is perhaps the most extensively instrumented fighter aircraft testbed in the world. An on-board recorder collects great amounts of

data. In addition, the control room monitors hundreds of parameters as well as everything the pilot hears and says. The control room can also see what the pilot sees in front of the aircraft through the head-up display. This control room "awareness" is essential in accomplishing test objectives and sorting out problems. And it's reassuring to know that the engineers are standing by, ready to provide assistance.

There are some unique sensations in using the AFTI—unique control motions to fly in close formation with another aircraft. Lateral translation (controlled by using the rudder pedals) is like being parked next to the lead aircraft and then sliding the aircraft sideways, left and right, to move closer or farther away. The aircraft continues to point straight ahead, however, while the pilot can command upwards of thirty knots of lateral velocity.

Vertical translation is even more interesting. The nose of the aircraft does not point up or down, but the aircraft moves vertically as commanded through a twisting motion of the throttle. The cockpit sensation is like that of an elevator; throttle twist up—you just selected the tenth floor!

One-Button Transition

Transitioning to air combat is simply a matter of one button action on the head-up display control panel or, if there is no time to look into the cockpit, one thumb switch action on the throttle. Either of these actions completely arranges the cockpit displays and sensors as pre-programmed and selects an air combat mode in the flight-control system. In fact, there is a one-button "mastermode" selection for each of the multirole fighter aircraft tasks: navigation, air combat, gunnery, and bombing.

The digital flight-control system offers several flight-control modes without increasing size or weight. Each flight-control mode can make the aircraft feel or "handle" in a different way. Thus, individual control modes can be optimized for the various fighter aircraft mission tasks, *i.e.*, air combat, bombing, landing, etc. Traditional multirole fighter aircraft have been forced by a single flight-control mode to compromise the aircraft "handling qual-

ities" among the several mission tasks.

The safety chase aircraft, usually a T-38 or a NASA-owned F-104, serves many purposes during an AFTI/F-16 mission. One such role is to be the target for simulated aerial gunnery. Getting the radar or infrared sensor locked on to either an aircraft or a ground target is simply a matter of a head movement to place the helmet-mounted sight on the target and a push of the designator button on the sidestick. If the sensors (radar or infrared) are already locked on and the pilot needs to find the target visually, the helmet-mounted sight can indicate the direction to look. This is a most effective integration of what may be the pilot's best sensor—his own eyes.

The ease with which the AFTI/F-16 can maneuver to the target aircraft and track the target with the gunsight is a definite benefit of the air combat flight-control mode. By measuring the difference between the actual aircraft turn rate and the turn rate the pilot is commanding on the control stick, the aircraft essentially "knows" when the pilot wants a fast turn to point at the target and "knows" when he wants to "finesse" the aircraft to track precisely. The unconventional "nose pointing" controls can also be used smoothly to assist in this precise tracking, but the limited improvement over simpler conventional aircraft control doesn't justify the extra work load required to use those controls.

Bombing and Strafing

The unconventional "flat turn" capability, however, turned out to be very useful for the bombing and strafing tasks. Normally, maneuvering an aircraft to put a bombsight or a strafing gunsight on a target requires the pilot to aim with the control stick by rolling toward the target, pulling the nose in that direction, and then rolling back to wings level to check how well he did. Often, several of these small corrections may be required to sight the target accurately.

The flat turning motion simplifies this problem to a procedure similar to steering a car. By using the right and left rudder pedals, the aircraft turns right and left without any need to bank the wings. The pilot gets an



immediate look at where the sight is pointing while staying in a wings-level attitude. Even though the pilot feels some slight side forces in the cockpit (as if riding in a turning automobile), the result is quicker, more accurate weapons delivery.

The precision of pitch (nose up and down) control in the bombing flight-control mode should not go unmentioned. This mode produces very stable "flight path" control. Since ground targets do not usually move at hundreds of knots like airborne targets, the pilot wants the aircraft to fly straight once he gets the sight near the target to allow him to make small "flight path" corrections to get the sight exactly on target. Once the AFTI/F-16 is "trimmed" for straight flight, changes in airspeed, pitch attitude, and roll attitude (even inverted) do not affect that straight path. This provides a stable platform from which small corrections can be made.

Voice Control

A promising avionics innovation is the capability to use voice commands to interface with aircraft systems. In the first phase of testing, the performance of voice recognizers was tested in the unforgiving fighter cockpit environment. Recognition accuracy was tested

against effects of cockpit noise and vibration and physiological effects of G forces on the pilot's voice. That system incorporated a thirty-four-word vocabulary, which the pilot used to activate cockpit switchology. The pilot merely pushed a switch on the throttle to make the system listen while he gave an oral command.

Early voice-recognition programs were sensitive to details of how the pilot said the word. In a sense, the system trained the pilot to use consistent speech patterns. The frustration of having a command not recognized—or worse, misunderstood—could aggravate the pilot's inflection in his next command, setting up a deteriorating cycle. But as improvements were made, the voice systems became more tolerant. It became apparent that the convenience of throwing switches without looking inside the cockpit to find the switch and without taking a hand off the flight controls was a good thing. Applications for such voice command could range from selecting radio frequency changes (which can be difficult while flying in close formation in the clouds) to selecting weapons and weapons delivery options.

In a few months, a revised voice system will be tested. It will be tai-



The author, Capt. Don McMonagle, at the controls of the AFTI/F-16. The head-up display allows the pilot easy reference to critical flight information and target and weapon delivery information. (USAF photo by TSgt. Donald L. Wetterman)

lored to the AFTI/F-16 cockpit so that its utility can be evaluated. It will incorporate the capability for pilot-aircraft interaction—that is, it will “talk back.” This system functions as a cockpit assistant. In addition to carrying out oral commands for cockpit switchology, it will report desired information orally. In one application, it will provide warnings and cautions for problems with aircraft systems, along with a brief problem description. In another, it will alert the pilot to pre-requested advisories on fuel and altitude. And it will retrieve requested information, such as current fuel state and weapons status. In the heat of air combat, the time taken to check fuel could be fatal.

Another interesting note: Based on ground demonstrations of this system, pilots have requested that the system’s synthesized “voice” be female, since a female voice would be less likely to be confused with incoming radio transmissions.

Automatic Tracking

Of course, this is not the only new system about to be demonstrated by the AFTI/F-16 program. Soon, the pilot’s work load for aerial gunnery will be reduced to designating the target (with the helmet-mounted sight) and engaging the automated

maneuvering attack system. Under this concept, the infrared tracker and laser ranger will send precise target position and velocity information to the fire-control computer. The fire-control computer will, in turn, calculate where the aircraft needs to be pointed for an accurate gunshot. This information will be displayed to the pilot and, when the automated system is engaged, fed directly to flight-control computers for automated attack. The pilot then need only consent for the gun to be fired by depressing the trigger to the first of two detents.

Small biasing commands may also be entered manually through the flight-control system to increase the accuracy of the automated system. When the system determines that the target is in range, the gun will be fired automatically. The system will perform an automated breakaway maneuver at the appropriate moment to avoid midair collision. By having only to monitor rather than perform this aerial gunnery task, the pilot will have time to watch other aircraft or targets in his vicinity and plan his next maneuver.

In similar fashion, the bombing task will be automated into a continuously turning delivery, which will be less predictable for enemy ground fire. The pilot will select how far away from the target he wants to be when the bomb is released. The rest is a matter of designating the target (*i.e.*, by looking through the helmet-mounted sight), engaging the automatic system, and holding the weapon release “pickle” button down to consent for automatic release.

After bomb release, a low-altitude radar autopilot will take the aircraft back down to a preselected height above the ground (as low as 200 feet), and the pilot will then take over. If desired, he may turn to the desired direction and let the low-altitude autopilot fly the aircraft while he concentrates on navigation or putting aircraft sensors on the

next target. The low-altitude autopilot is only for demonstration purposes, however, and is limited to essentially flat terrain.

The Moving Map

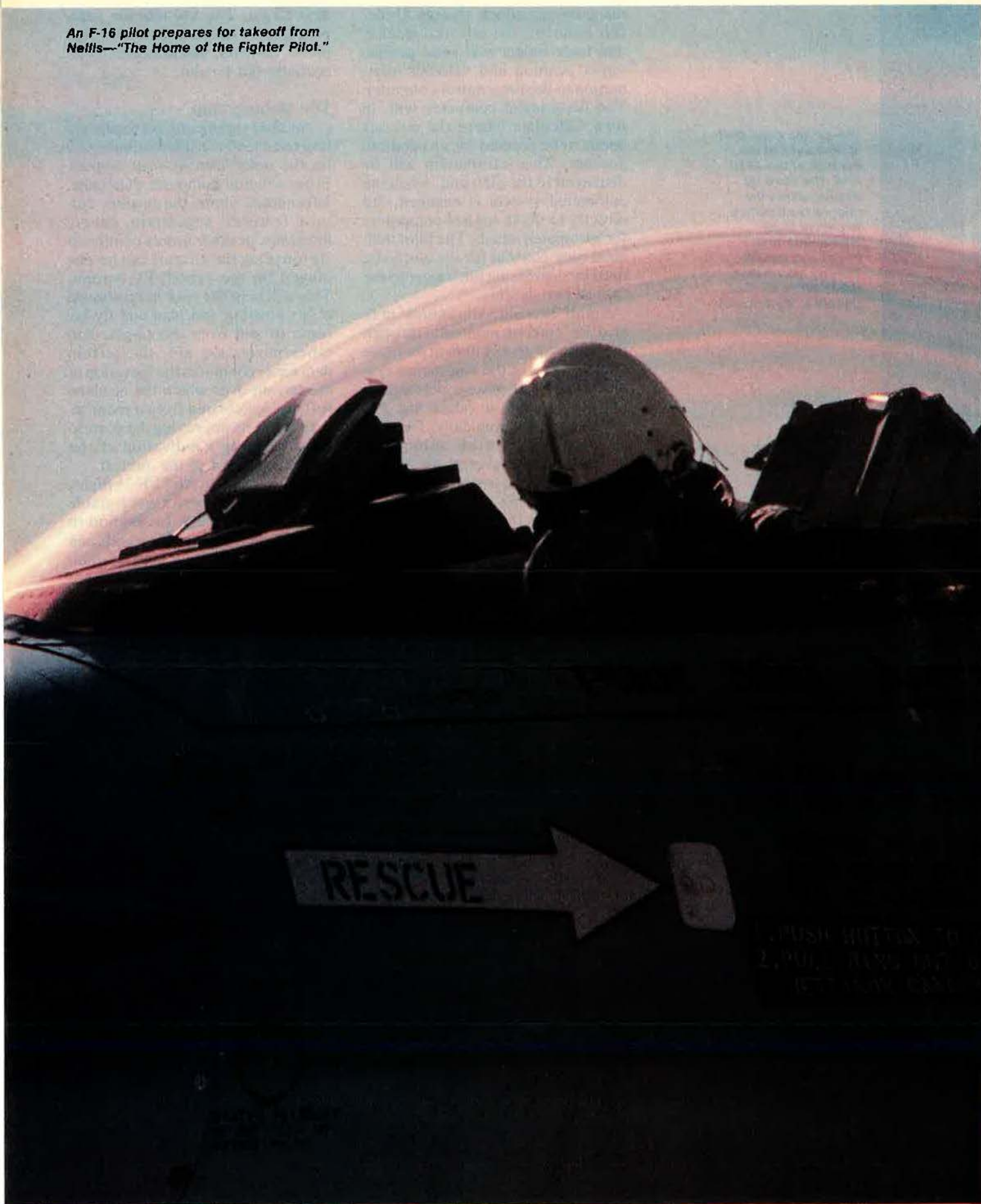
Another significant aid to navigation to be tested in a few months will be the color moving-map display. From a digital computer data base, information about the terrain, cultural features, vegetation, enemy locations, or other points of interest surrounding the aircraft can be displayed on the center TV screen. This will help the pilot keep abreast of his position and plan and fly his route to and from the target. Another navigation aid, the terrain data base, compares the elevation of the terrain over which the airplane is flying (calculated from a radar altimeter), thus improving the accuracy of the map’s indication of the present position of the aircraft.

At the end of an AFTI/F-16 flight, the pilot can expect a very stable approach to landing. In addition to the ease with which the aircraft can be trimmed to hold a desired pitch attitude, the canards are used in toe-in (snowplow) fashion to modulate drag, making it easier to hold the desired airspeed. All too soon for the pilot, the aircraft is on the ground, and the flurry of activity to analyze data and prepare the test runs for the next flight is under way.

Initially, a pilot can’t help but feel overwhelmed by all the new capabilities integrated into this one aircraft, many of which belie previous fighter aircraft experience. To evaluate such an aircraft requires an attitude that “different ain’t necessarily bad.” The challenge for the pilot is to decide where new technologies have been applied advantageously and where they only increase complexity. In this pursuit, the AFTI/F-16 has proven to be a valuable demonstration tool. Those who work with the program are excited by the new horizons of flight technology. ■

With more than 2,000 hours of flying experience, mostly in the F-4, F-15, and F-16, Capt. Donald R. McMonagle served as an instructor pilot in the F-15 at Luke AFB, Ariz., prior to attending USAF Test Pilot School in 1981. He graduated in 1974 from the USAFA with a B.S. degree in aeronautical engineering and is presently pursuing an M.S. in mechanical engineering at California State University. He is completing three years as a project pilot with the AFTI/F-16 program and is currently posted as Operations Officer of the AFTI/F-16 Joint Test Force at Edwards AFB, Calif.

An F-16 pilot prepares for takeoff from
Nellis—"The Home of the Fighter Pilot."



Out of the Vietnam experience came Red Flag, the Aggressor units, better tactics and training, and a fuller understanding of the adversary.

FIGHTEROLOGY

BY CAPT. NAPOLEON B. BYARS, USAF, CONTRIBUTING EDITOR

'KICK the tires, light the fire, first man in the air is the lead!" Anybody who thinks that's a description of the modern fighter pilot has seen too many late-night movies on television.

Warrior spirit is important, of course, but derring-do is not a substitute for solid knowledge and realistic training. The modern fighter pilot wants a full bag of effective tactics to employ—and also a good understanding of the enemy and *his* tactics. He wants experience in combat-style airmanship, not training hours spent flying around the flagpole.

Knowledge and training are the twin products of the USAF Tactical Fighter Weapons Center (TFWC) at Nellis AFB, Nev., often billed as "The Home of the Fighter Pilot." In the post-Vietnam years, both the knowledge and the training dispensed by Nellis have taken on a new look.

Central to the change is the 57th Fighter Weapons Wing. Commanded by Brig. Gen. Joseph W. Ashy, the 57th consists of the Adversary Tactics Directorate (which manages the 64th and 65th Aggressor Squadrons); the USAF

Fighter Weapons School; the 4440th Tactical Fighter Training Group (Red Flag); the Tactics and Testing Directorate; the 4513th Adversary Threat Training Group (Intelligence); the USAF Air Demonstration Squadron, the Thunderbirds; and a large, diverse maintenance organization.

Aside from the Thunderbirds, the Aggressor pilots boast the highest public profile among 57th units. They steep themselves in the wiles and ways of Soviet fighter pilots so that they can emulate MiG-style tactics in their F-5E aircraft. They teach other USAF pilots about the adversary, doing it most dramatically when they fly in the Aggressor role in training exercises.

Prior to the Vietnam War, United States air forces had always managed to realize significantly favorable aircraft loss exchange ratios. In World War I, the ratio of kills to losses was approximately 2.5 to one. The ratio in World War II—approximately three to one—was even more favorable. The Korean War saw a dramatic increase, with US pilots knocking down ten enemy aircraft for every American loss.

Then came Vietnam.

Why the Difference?

In Vietnam, the air war exchange ratio fell to an alarming two to one. Even before that conflict ended, studies were under way to determine what had gone wrong. How could superior air forces suffer a near-standoff against a technologically inferior enemy? Extensive analysis identified several explanations.

To begin with, it was a different kind of war. In previous wars, both sides usually launched large numbers of aircraft simultaneously and engaged in big air battles. In Vietnam, there were relatively few large air battles. The Vietnamese chose to maximize surface-to-air missile (SAM) defenses and to avoid costly air-to-air combat. Also, the primary US air-to-air effort in Vietnam was escorting and protecting bombers, fighters, and attack aircraft delivering ordnance on enemy targets—not the most likely way to run up kills against an elusive enemy.

Additionally, a number of political constraints and restrictive rules of engagement (ROE) often prevented Air Force fighter pilots from destroying enemy targets in the air and on the ground. For example, the



F-15s airborne above the Nellis range. The range, with its 3,000,000 acres of land, the airspace above it, plus a huge volume of adjacent airspace, is ideal for dissimilar air combat training.

requirement for US fighter pilots to identify targets visually before firing air-to-air missiles compromised their advantage in air-to-air combat. Restrictions on attacking enemy SAM sites also worked to the benefit of the North Vietnamese.

Finally—and most revealing—the Air Force identified several training deficiencies that reduced the effectiveness of its fighter force.

“We found that we had been training against similar airplanes only,” said Col. Kerry G. Herron, an Aggressor pilot and Commander of the Adversary Tactics Directorate. “F-4s were training against F-4s, F-105s against F-105s, and we were not doing any dissimilar air combat training. And we never put together large packages of airplanes where jammers, bombers, and air cover were all integrated.”

The inquiry also found that some training literature was outdated and that air tactics had not evolved into the supersonic and beyond-visual-range air-to-air missile arena. Put simply, the Air Force had not kept up with the changes in air-to-air and surface-to-air combat.

Training also failed to educate aircrews adequately about the enemy.

On the whole, USAF pilots knew very little about North Vietnamese training, their mind-set, what sort of tactics they flew, or under what conditions they would or would not engage.

Senior Air Force leaders decided to correct training deficiencies and to improve the preparation of its fighter pilots. At the same time, they also pledged that, thereafter, the Air Force fighter pilot would be schooled in modern air tactics and ready to deal with anybody else in the air.

Bigger Envelope

The most significant change in tactics since Vietnam is that the combat envelope—the range at which fighter pilots engage one another—has gotten much larger, stretched out by such improved air-to-air missiles as the AIM-7F Sparrow and by enhanced on-board radars that see miles beyond visual range.

As one senior pilot put it: “Rarely in Southeast Asia did the systems on board the airplane allow us in a formation of four F-4s to find and sort out—well in advance—a formation of enemy planes. Also, our tac-

tics were not precisely preplanned so that we could react tactically prior to visually engaging the enemy.

“Today, an F-15 flight of four taking on a larger number of Aggressors has a game plan before they take off. They may have decided that One and Three will deploy high, and Two and Four will go low. When they split up in two elements of two, the F-15 leader will take the leader of the enemy formation, the wingman will take the trailer, and each man has a designated preplanned responsibility.

“They’ll be closing with a sorted enemy—a targeted enemy—and with missiles in the air prior to visual sighting. The plan is practiced in a realistic training arena, and the tally is testament to the superb capabilities of the pilots, their equipment, and their tactics. It’s a whole new ball game, where preplanned tactics have become essential to survival and victory.”

To preclude stagnation of the kind that caused trouble in Vietnam, the Tactics and Testing Directorate of the 57th evaluates fighter weapon systems, armament, and tactics continuously against realistic combat needs. A major responsibility of

Tactics and Testing is to recommend annual updates of Multi-Command Manual (MCM) 3-1—the “how to go to war” document for fighter pilots.

“The tactics today are light-years ahead of where we were in Vietnam,” said Col. Richard E. Perlotto, Deputy Commander for Tactics and Testing. “When I was a lieutenant, we emphasized stick and rudder flying skills a lot more than tactical realism. Today, the emphasis is on a depth of knowledge, an understanding of tactics, and employment of those tactics during realistic training exercises.”

In addition to working with the major commands and the other schools at Nellis AFB in recommending revision of MCM 3-1, Tactics and Testing is the “consumer report” office for fighter weapon systems. Here, new software improvements for the F-4, F-15, F-16, F-111, and A-10 are tested before full employment by the tactical air forces (TAF).

The Aggressors

To help fighter pilots learn more about their potential adversary, the 57th operates four Aggressor squadrons. Aggressor pilots are skilled in Soviet tactics and knowledgeable in Russian doctrine. They are equipped with F-5Es camouflaged in patterns typical of Warsaw Pact air forces. They fly MiG-style maneuvers in providing dissimilar air combat training to TAF pilots worldwide.

Two squadrons are located at Nellis, a third is at Clark AB, the Philippines, in support of PACAF, and the fourth squadron is based at RAF Alconbury, England, in support of USAFE. The two Aggressor squadrons at Nellis travel throughout the United States to provide local training for Tactical Air Command pilots and for fighter pilots assigned to the Air National Guard and Air Force Reserve.

“Our mission is to know the potential adversary and how he says he will fight,” Colonel Herron said. “We fly like the adversary, and in so doing, we train US forces to defeat his tactics and equipment.”

Since Vietnam, much effort has gone into learning about the Russian pilot and his training. Insights from both classified intelligence and openly published literature have

been integrated into Aggressor operations.

Soviet air defense forces have historically tended to be unimaginative and dependent on ground controllers. Soviet tactical air forces are guided by an inflexible doctrine that determines how Russian pilots will react during air-to-air combat. The Soviet wingman is known to be short on experience, and his ability to press the fight, once his flight leader is taken out, is questionable. *(This assessment is being reexamined by some. For more on the topic, see “Another Look at the Soviet Pilot” on p. 83 of this issue.)*

Since their activation in 1972, the Aggressors have provided an eye-opening education for many F-15 and F-16 pilots who thought that their superior aircraft were invincible. As it turned out, they had much to learn about the Soviet way of fighting. As a result, many a pilot today is better prepared to go against the MiGs, if ever he has to.

The education, however, is becoming outdated.

The F-5E does a fine job of imitating older aircraft like the MiG-21.

But it cannot perform all the tricks of such newer Soviet fighters as the MiG-29 Fulcrum, the MiG-31 Foxhound, and the Su-27 Flanker. A new Aggressor aircraft has often been discussed, but the whats, whens, and ifs about it are still open questions. Although the F-5E cannot simulate all features of the newer fighters, avionics and aircraft upgrades should allow the F-5E to provide adequate adversary training for several more years.

Another key player in the effort to correct previous aircrew training deficiencies is the USAF Fighter Weapons School (FWS), which had its beginnings in the late 1940s as the Fighter Gunnery School. FWS is the graduate-level school for fighter pilots and air weapons controllers.

The students sent to FWS have been recognized by their home squadrons as the best pilots in their respective weapon systems. They are at Nellis to become graduate-level instructors and experts in their aircraft and weapons and in tactical training.

“In our graduates, we’re looking for a person who is an expert weap-

Controllers inside the Range Operations Center receive training and monitor air combat exercises. One function of the Center is to provide range mission data so that aircrews can know how they performed during training missions.





Aggressor F-5Es are camouflaged in patterns typical of Warsaw Pact air forces. Avionics and aircraft upgrades should allow the F-5E to provide adequate adversary training for several more years.

ons instructor," said Col. Joseph E. Merrick, FWS Commandant. "He must also be a technical expert on how the system operates and be able to advise his commander on the best method to build squadron training programs effectively."

At FWS, fighter pilots also learn to handle the complexities of operations where a number of dissimilar aircraft fly as a composite force to execute a mission.

"Our emphasis is on the academic classes and technical skills as well as on the flying," Colonel Merrick said. "We are not out to make the 'ace of the base.' If we go to war, we expect our graduates to do well—and they will. Our job here is to develop an instructor pilot who can go back to his squadron and bolster the training program.

"You can't find a fighter pilot who's been around fifteen to twenty years and who believes that the

combat capability of our fighter forces was better before than it is today. If we continue to train with quality, like we're doing today, the outstanding pilots and crews will always be there."

Red Flag

The showcase of improved training programs is the world-famous Red Flag operation. Studies of air combat in Vietnam found that the survival rate for aircrews—and aircrew effectiveness—jumped significantly once the ten-mission threshold was crossed. Red Flag exercises allow aircrews to reach the ten-mission threshold through realistic peacetime training.

Five times a year, up to 100 aircraft fly into Nellis from far-flung tactical units and allied air forces just prior to each Red Flag exercise. Support personnel also come to maintain the aircraft and to take

part in the training. Few outsiders realize that Red Flag exercises provide training for 13,000 munitions and maintenance people annually.

These visitors make up the Blue Forces, which battle the Red Forces, which consist primarily of the Aggressors, electronically simulated SAMs and antiaircraft artillery, and communications-jamming forces. Air battles take place over the northwestern portion of the Nellis range. The total range complex consists of 3,000,000 acres of land, the airspace above it, plus a huge volume of adjacent airspace.

An enemy "country" is set up and furnished with mock tank divisions, SAMs, airfields, and obsolete airframes brought in from the Military Aircraft Storage and Disposition Center—the Air Force's "boneyard" at Davis-Monthan AFB, Ariz. There are also bogus factories to represent the industrial warmaking capacity of the Red Forces. A full assortment of aircraft is pressed into battle—fighters, bombers, tankers, reconnaissance aircraft, and AWACS.

"We want our forces to train like they'll fight in combat," declared Col. Charles L. Henn, Commander of the 4440th Tactical Fighter Training Group (Red Flag). "That's the whole idea behind Red Flag. When we're called upon, it'll give us the game scrimmage edge to win."

Less than two percent of all line aircrews in active-duty USAF squadrons have combat experience. With that low an experience level, the importance of Red Flag becomes apparent.

"It's impossible to tell how a pilot will react in combat," Colonel Henn said. "Notwithstanding, I will say unequivocally that we are 100 percent better trained than when I was in combat, what with the training capabilities that exercises like Red Flag offer."

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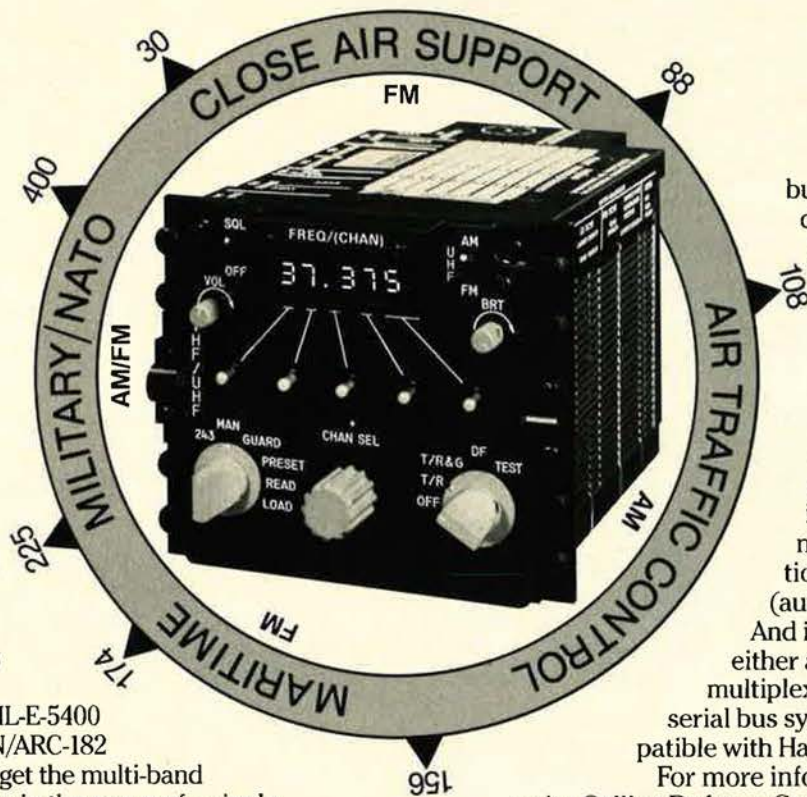
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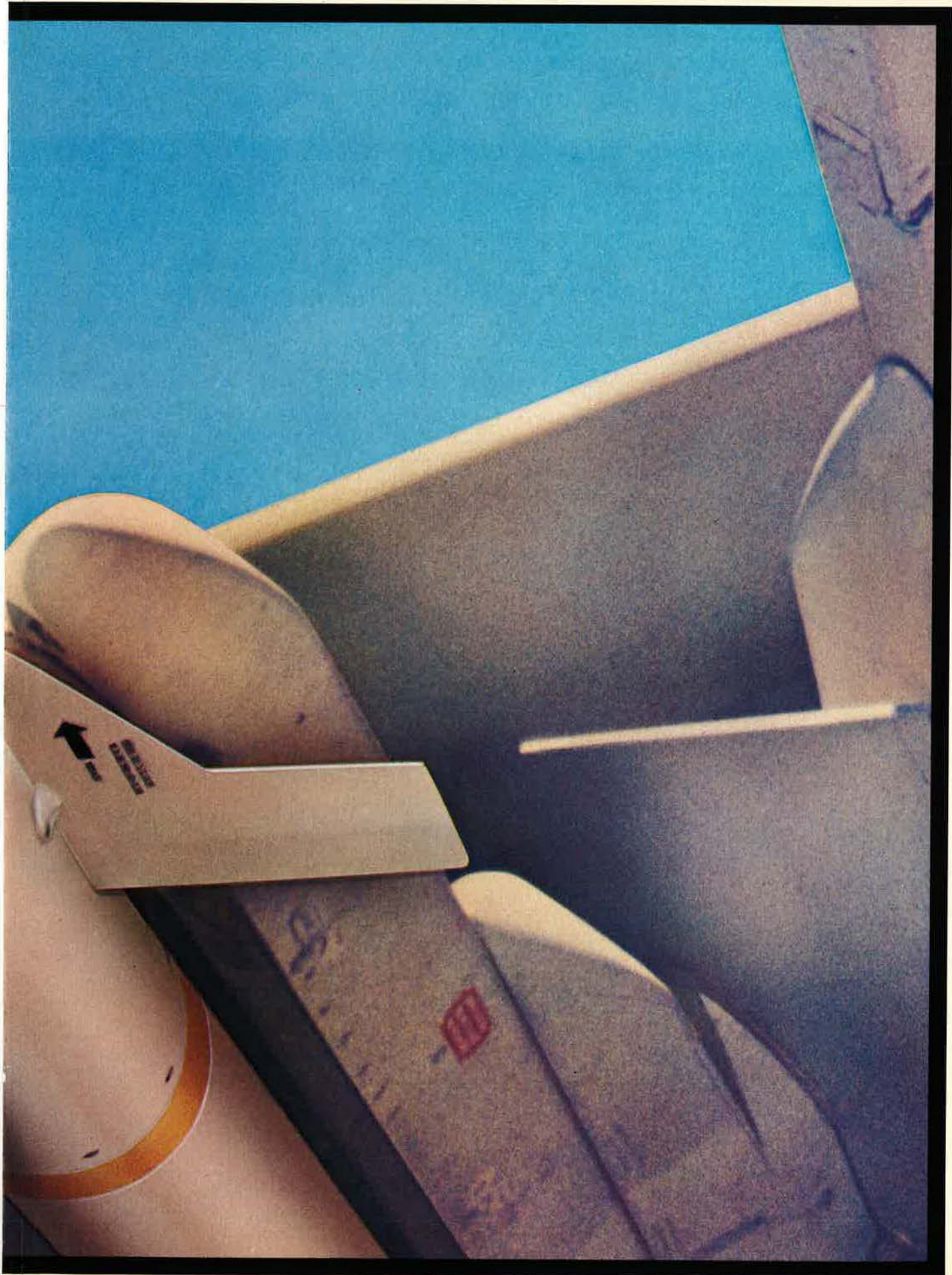
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—Lenin

ANOTHER LOOK AT THE SOVIET PILOT

BY CAPT. RANA J. PENNINGTON, USAF

THE West has sometimes greatly overestimated the Soviets, especially with regard to numbers of weapons and technological sophistication. However, this has not been the case in judging the proficiency of Soviet pilots. Rather than painting the Soviet pilot as ten feet tall, we have consistently depicted him as a midget—a dwarf at best. It has long been a matter of reassurance to the Air Force that no matter how many aircraft the Soviets had, the poor skills of their pilots would significantly hamper their ability to use those aircraft effectively.

Unfortunately, this view may have promoted a complacent attitude that has obscured the real meaning of seemingly insignificant developments. Soviet tactics and training generally evolve in a deliberate and incremental manner. This makes it easy to ignore the cumulative effect of change.

Myth and Reality

Recent articles in the Soviet press point to important changes in fighter tactics and training. (*For more on these ongoing Soviet developments, see "Closing the Tactics Gap" in the March '84 issue.*) For instance, in May 1984, an article detailing the implementation of a new training program appeared for the first time. Writ-

ten by the Commander of Aviation of the Air Defense Forces, General Colonel of Aviation N. Moskvitelev, the article described new training programs for maneuvering air combat, for interception of cruise missiles, and for other "complex types of combat employment" of fighter aircraft. Calling for "a radical overhaul of . . . flight training," Moskvitelev argued that "it is essential to use a new approach"—one that includes electronic warfare, diversification of training, and increased use of exercises and live firing of weapons.

Moskvitelev is an extremely authoritative author. His article, which appeared in an internal publication for the air defense forces, would not be written lightly or with any intention of "disinforming" his own pilots. It refers to events taking place in 1983 and 1984. Moskvitelev is frank in admitting problems in implementing new types of training, and he chastises commanders "who continue in the old-fashioned way when working out complex types of aircraft tactics; they lack creative initiative and wait, as the saying goes, for prompting 'from the top.'" Moskvitelev's article is prompting from the very highest level.

Myths abound regarding the mentality, training, and proficiency of Soviet pilots. Some of the myths are based on evaluations that have become dated. Others are completely erroneous. Most of the myths are affected by hidden assumptions that color our evaluations of the Soviet pilot.

One such assumption is the belief that the Soviets would perform poorly in one-on-one engagements. The assumed inadequacy of a Soviet pilot in a dogfight against a US fighter pilot is sometimes carried over to support a general evaluation that Soviet pilots would not be able to fulfill their missions in a wartime situation. Another assumption is that vulnerabilities are unique to the Soviets. Soviet weaknesses in some areas, such as poor capability to operate at night or in bad weather, are sometimes discussed as if these problems applied only to the Soviets.

There are five myths affecting USAF attitudes toward the Soviet fighter pilot. This article will discuss those myths and expose the hidden assumptions that have caused these myths to be widely accepted.

Myth One: Soviet wingmen are helpless without their leaders.

This myth is especially dangerous, because it promotes the belief that if we destroy the leader of a formation, the rest of the pilots will be unable to complete their mission. It is true that flight leads are by definition more experienced pilots, but it does not follow that the wingmen are incompetent and incapable of acting without a leader.

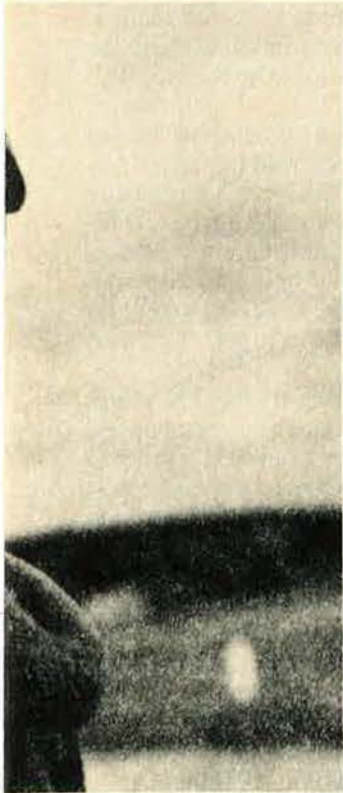
The hidden assumption here is that this vulnerability is unique to the Soviets. Instead, it is a classic military tactic to attempt to remove leaders first. This tactic can always be expected to degrade the enemy's effectiveness to some degree. The tactic is valid; the myth is that Soviet wingmen can be expected to turn and run for home if they lose their flight leads. History shows that Soviet fighter-bombers in World War II continued to their targets despite horrendous attrition—and despite the loss of their leaders.



While it is true that Soviet wingmen were not thoroughly trained for independent work in the past, recent indications are that the Soviets are putting a great deal more stress on bringing wingmen to a par with leaders in flying skills. The function of the flight lead is not to be responsible for all navigation or to conduct all target attacks, but to command the formation and to make decisions for the pair or flight as a whole. Wingmen, the Soviets note, may often be forced to operate independently. They now stress that "scarcely any flight lead would agree to have as a wingman a pilot capable only of passively carrying out the will of someone else. The wingman is an air fighter, and he must be ready for independent actions."

The Soviets recently conducted a year-long debate on the question of the basic fighter formation. Should it be a pair of aircraft or only a single fighter? The advocates of the single fighter voiced the opinion that the wingmen were of little or no assistance in modern air combat. But the great majority felt that the role of the wingman has changed to the point where he is trained to be equal to the flight lead in flying skill. The old idea of the "leader as a sword and wingman as shield" has died, they contend. Now, both leader and wingman must be ready to serve as sword *and* shield, as the situation demands.

Whether the Soviets have fully achieved their goal of wingmen who are as competent as their leaders is doubtful. There are always young pilots in a squadron who must be trained, and they cannot be expected to equal the proficiency of more experienced pilots. It is evident, however, that the Soviet philosophy regarding the roles of wingmen and leaders has changed. Soviet pilots can no longer be expected to turn and run if they lose their flight leads. Such behavior would not be consistent with previous Soviet actions in wartime or with Soviet determination and persistence.



The new Soviet fighter pilot is aggressive, receives better training in dissimilar air combat training (DACT) than ever before, and is fully aware of the performance expected from him in an all-out war, when jamming may have cut him off from centralized ground control.

Myth Two: Soviet pilots are totally dependent on ground control.

Many Westerners believe that every stage of a Soviet mission is completely controlled by the ground command post. This myth has some historical basis. At one time, Soviet ground controllers seemed to give every command, down to when to make the simplest turns, when to use afterburner, and when to launch weapons.

One reason for tight control was the extremely limited capability of Soviet aircraft of that time. The range of on-board radar was deemed insufficient to allow the individual pilot to search vast volumes of airspace. The ground command post had much more powerful radars that could see the air picture better. Even after ground control had designated a target, the Soviet fighter continued to be very precisely vectored. The poor detection capabilities of Soviet aircraft limited the pilot in closing with the target without assistance.

In addition to this, the Soviets put great emphasis on denying the enemy warning that he is being attacked by preferring not to activate aircraft radars until within close proximity to the target. They believe this contributes to the possibility of a surprise attack. This approach is tactically sound as long as good ground control is available. It is a weakness only when ground control is poor or when the pilot is excessively reliant on ground support and cannot function independently if necessary.

An Evolving Relationship

The relationship between pilots and ground controllers has changed in many ways in recent years. One important change is the vast improvement in on-board aircraft radar capabilities, making possible independent search without ground assistance. Another change resulted from Soviet analysis of the Vietnam War. That

conflict illustrated, the Soviets believe, that ground controllers are not able to maintain full knowledge of the air situation during maneuvering air combat.

The Soviets are quite clear on the current distribution of responsibilities between ground controllers and pilots. "The command post should play the leading role in a target search. . . . It is a totally different thing when the aircraft come in direct contact with the enemy. Then the initiative in combat control is transferred mainly to the flight leaders. The ground control posts, meanwhile, can only inform them of the situation in general terms." In addition, in order for a ground controller to function effectively, he "must have as good a knowledge of modern air tactics, the capabilities of his equipment and that of the enemy, and of many other issues . . . as do the flight crews. He must also possess personal qualities and capabilities equal to the pilot he is controlling."

One author has described a program in which the controllers were required to attend all pilot ground training over a long period of time. Many benefits accrue from this training: "The flight crews became more confident that the control officer would efficiently provide the assistance they needed, even in an emergency situation. The number of times radioed commands had to be clarified was halved." Another author refers to "combined four-hour lessons on the tactics of modern air combat and on the interaction between the command post and the crews, especially in the presence of intensive jamming, various limitations on radio exchange, and the use of automated control systems." Many of these lessons "have already been introduced into the training system" and "proved [their] worth in a recent tactical flying exercise in the presence of intensive jamming."

A common hidden assumption is that the Soviets, in their dependence on ground control, somehow do not take into account the possibility that they may be jammed in wartime. The last quotation shows that the Soviets have not ignored this possibility and are actively training with this consideration in mind. Their training may not be sophisticated, but it does exist.

In addition to coping with electronic warfare, Soviet pilots are expected to fly offensive missions beyond the range of ground control. Obviously, if Soviet pilots were totally dependent on ground control, they would not be able to fly such missions. The Soviets could not hope for success in offensive operations if their pilots were incompetent in that scenario.

With or Without Ground Control

The Soviets criticize those pilots who are seen to be overly dependent on ground control. Pilots who fail to complete a mission because they awaited ground control commands are rebuked. Soviet pilots today are expected to complete their mission and destroy their target with or without help from the ground. Specific instances in which pilots failed to complete a mission because communications with the ground were interrupted are cited, and pilots are warned to be prepared for this possibility in actual combat:

"Hopes on receiving helpful instructions from the command post must be unexpectedly dashed, for example, if the enemy proceeds with intensive electronic jamming of the communications channel." Further-

more, they point out that the ground controller "cannot anticipate all variations, possibilities, and conditions in advance. Only the pilot in the air, personally observing and evaluating everything that happens in the space being observed . . . is able to find the most advisable variation for performing the combat assignment at any particular moment."

The Soviets have recently reinstated training for a mission that does not make use of ground control: independent search. During independent search, pilots are assigned a limited geographic area in which to work. They are expected to find and destroy their target without assistance from the ground. General Moskvitev devoted special attention to this topic in his May 1984 article, in which he pointed out that "independent search of the air enemy is not a disorderly observation . . . but rather one that is governed by strict mathematical laws for the purpose of attaining maximum probability of spotting and destroying an enemy. Half of the success consists in learning to think like the enemy and to anticipate the optimal version of his flight. Regrettably, some air commanders do not give enough attention to this kind of fighter tactic."

This myth shares the same dangerous fallacy as the first myth. It leads to the belief that Soviet pilots may not be able to function if we deny them ground control. As long as ground control is available to the Soviets, it is a strength. But it is dangerous to assume that we could drastically impair their pilots merely by degrading—to whatever extent—their effective exercise of ground control.

The Soviets are now implementing training programs that will make them much better able to operate without continuous ground control. Their pilots are a long way from being simple guided missiles that would "go dumb" if they lost their command guidance, as this myth would have us believe. The fact that Soviet pilots in an offensive scenario would be expected to fly against pre-planned targets according to a preset time schedule, reducing the need for continuous ground control, suggests that we should come to a more realistic appraisal of Soviet dependence on ground control.

Myth Three: The Soviets are interceptor pilots only and do not train for maneuvering engagements.

This myth rests on a valid historical foundation. It was certainly true in the 1950s and 1960s. It also applied, however, to US training during that time period. With the introduction of radar-guided air-to-air missiles, it was generally believed that air combat would be conducted at long ranges, eliminating the need for maneuvering engagements at visual ranges.

This theory was disproved during the Middle East wars and by US experience in Vietnam. It was found that the missiles were not as accurate as expected and that situations frequently arose in which an enemy was first detected within visual range, necessitating the use of traditional fighter maneuvers.

The Soviets began in the early 1970s to write about the reemergence of maneuvering air combat, following their analysis of the Vietnam and Middle East air engagements. In 1978, a prominent Soviet tactician wrote a seven-part series of articles entitled "How Has Air

Combat Changed?" These articles resurrected maneuvering air combat, which had been missing from the Soviet inventory of fighter tactics since the Korean War, as a major type of air combat.

Subsequent articles have stressed the importance of maneuvering air combat. Its central role in fighter tactics is attested to by the statement that "experience indicates more and more persuasively that a pilot's ability to conduct dynamic air combat now determines success in performing the most difficult missions, to a decisive extent. . . . Maneuvering air combat is the primary test of a pilot's readiness for competent, skilled actions."

The importance of maneuvering air combat and many descriptions of maneuvering engagements in training are commonly discussed in Soviet sources. General Moskvitev's May 1984 article outlines a specific maneuvering air combat training program. This program is described as a new, strongly emphasized requirement in Soviet pilot training. The pilot first receives theoretical training. This is followed by single-ship aerobatic work, then by single-ship air combat maneuvers. Then the pilot is trained to work in a pair, then a four-ship flight of aircraft. Finally, he is tested during tactical flight exercises.

General Moskvitev reveals several important aspects of the new Soviet maneuvering air combat program. First, he emphasizes the importance of this training as vital to success in air combat. Second, it shows a syllabus approach in the classic Soviet style, "from the simple to the complex." Third, General Moskvitev claims that this training has been accomplished in a number of PVO squadrons. Further, he discloses the existence of specialized "adversary" pilots.

Clearly, training of Soviet pilots extends far beyond simple interception tactics.

Myth Four: Since Soviet training is rigid and tightly controlled from the top, Soviet pilots are not likely to display initiative in combat.

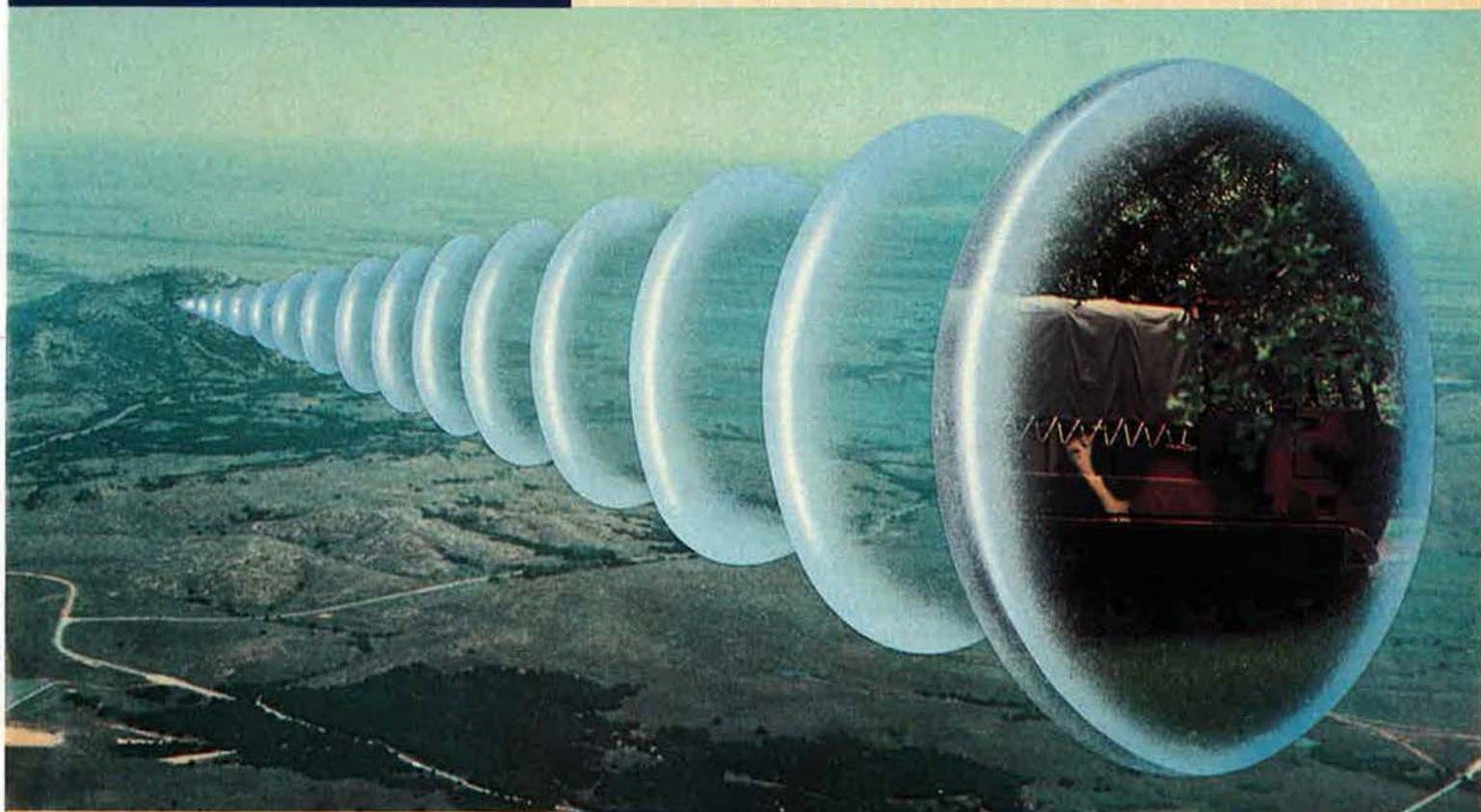
"Rigid" is practically a mandatory adjective in Western descriptions of Soviet training. It is a catchall term used to distinguish them from us. The hidden assumption is that Western training is never rigid or unrealistic, that Red Flag-style exercises are characteristic of daily USAF training. When Western analysts examine Soviet training, they often subconsciously measure routine Soviet squadron training against the Red Flag standard.

There is no doubt that most Soviet training is indeed more rigid and less realistic than most USAF training. The problem is one of degree. We have been using the same adjectives over a period of many years, as if there had been no progress or development in Soviet training at all. Twenty years ago, we described Soviet training as rigid and unrealistic, and we use the same terms today. This leads to the fallacious conclusion that the Soviets train essentially as they did twenty years ago.

A New Stress on Initiative

Western analysts, however, are discovering an increasing Soviet stress on the need for pilot initiative. The Soviets are being driven to this new orientation by their evaluation of the nature of a future air war. They say

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that such a war will be dynamic and fluid. Communications may be jammed, and the situation will be changing constantly. The increased ranges of aircraft will allow them to operate deep in enemy territory, far beyond the range of command and control. To be able to carry out missions successfully in this dynamic environment, the Soviet pilot will have to display what the Soviets call "intelligent initiative."

The Soviets define intelligent initiative as a "creative, informal solution . . . during an operation, which is part of a mission assigned, and the readiness to take a calculated risk in connection with such a solution. The initiative of a commander consists in striving to find the best method of fulfilling the assigned mission, in utilizing favorable opportunities, and in taking the most expedient measures promptly, without awaiting orders from one's immediate superior."

As another Soviet commentator has written, "An important factor in victory during modern warfare is the pilot's ability to independently find the most expedient method for hitting the target and to take all steps to successfully accomplish the combat mission in the concrete situation which has taken shape." Still another claims that "the overall plan, within the confines of a certain subject, provides the squadron commander with a right to independently carry out the task and to show initiative in organizing the attack and in determining the composition of the forces to be assigned and the method of implementing it."

Commanders who do not incorporate initiative in training exercises are being criticized. One Soviet general chastises "those commanders who, in the race for high indicators in fulfilling the flight training plan, try to simplify the air situation when working on tactical problems. They often fly the same patterns over and over again, and their tactics are never distinguished by novelty, either. Such a stereotyped approach to organizing combat training does harm to the aerial skills of the pilots and has a negative influence on the habits gained by command post personnel."

Another general similarly criticizes a squadron commander who devoted "insufficient attention" to innovative tactical training. He says that the pilots from this squadron performed much worse in exercises than other pilots. "They could not maintain their combat formations, they made significant mistakes in their target approach, and they did not fully utilize the potentials of the aircraft. Stereotype dominated their work: All groups used the same maneuver against anti-aircraft weapons while en route. We could hardly blame the pilots of the squadron for their failure. They did exactly what the commander told them to do, and they acted just as they were taught. But they were taught incorrectly."

Such criticism signifies Soviet concern over the "stereotype"—the rigidity—that has characterized their training. Open criticism of the commanders who sponsor such training (rather than of individual pilots) demonstrates Soviet determination to change this situation by attacking it at the command level.

Training to Take Risks

Fostering a degree of initiative in a force that has been taught to be exceptionally cautious is not an easy task. It is obvious from Soviet writings that many pilots and

commanders are having difficulty in adjusting. As one author says, there is "a need to be bolder, to take an intelligent risk in combat and to make more active use of the capabilities of aviation equipment and new tactics of combating the air 'adversary.'" It is no secret that some pilots prefer not to go beyond the bounds of "tried and true" methods of air combat, referring to the fact that everything is spelled out by appropriate documents, and the pilot's task allegedly is only to perform them strictly. It stands to reason that the demands of documents represent the law of flying, but they can't provide detailed recommendations for all instances that will be encountered in actual air combat."

One Soviet general wrote a lead article in the Soviet Air Forces journal *Aviation and Cosmonautics* in 1981. He warned that "if we do not . . . improve training methods, the lag in matters of flight and tactical training can have the most fatal results in the future. There are in effect, unfortunately, forces of inertia here and there, tenacious old habits and a tendency toward simplification and indulgence. . . . [However,] combat training of pilots in *leading* units is taking place against a complex tactical background. Under such conditions, each airman is granted the right to independently seek for and implement the best solution for the assigned mission."

Evidence of change in the Soviet approach to training is unmistakable. A number of recent articles point out that changing missions and targets after an aircraft is airborne is one way to interject realism into training. Pilots learn to be prepared to react to a dynamic situation—the original target has changed position, the pilot is directed to a new target after takeoff, a target of opportunity unexpectedly appears, and so on.

It is misleading to describe Soviet training as "rigid" and "unrealistic" in the face of such changes. Such adjectives, without reference to US training or other objective standards to justify them, foster continued US complacency. Initiative has always been seen as the hallmark of US tactics. It is very difficult to recognize the development of any sort of initiative in a system we have always believed to be hopelessly rigid. But to deny the development of such initiative in the face of incontrovertible evidence or to fail to acknowledge incremental improvements that eventually add up to increased Soviet capability is courting danger in any possible future air combat arena.

Myth Five: The USAF Aggressor program provides an adequate simulation of Soviet tactics.

The formation of the Aggressor squadrons was an innovation in the tactical world. The program was born at a time when the lessons of the war in Vietnam were fresh in our minds. We were willing to implement the program, despite the expense and the increased risk that accompany increased realism in training, in order to improve the combat readiness of our pilots and to prevent needless losses in any future conflict.

Support for the Aggressor program seems to have declined in relation to the time elapsed since that war and with the general belief that any future war is still distant. Thirteen years have passed since the inception of the program, yet no aircraft have been upgraded, and the training is more conservative than in the beginning—



Development of a new generation of Soviet tactical fighters, with substantially enhanced performance compared to these MIG-25s, raises the serious question of whether or not USAF Aggressor squadrons, flying older equipment, can provide adequate realistic training in Soviet air-to-air tactics.

despite changes in Soviet tactics and training. As one former Aggressor commander pointed out in speaking of the Aggressors, Red Flag, and dissimilar air combat training (DACT) programs: "These 'new' training programs are over ten years old now, and they have reached a plateau in progress, with stagnation setting in."

There are two ways to provide advanced air combat training. One is to train for combat against a particular enemy, simulating the enemy's aircraft and tactics. The pilots simulating the enemy try to be as good as the enemy—but not necessarily better. The second approach is to train for the most demanding air combat situation possible. The theory here is that if a pilot can defeat the most capable adversary, he can also defeat any lesser enemy.

One example of the second approach is the Israeli training program, which has shown excellent results in combat tests of pilot skills. Israeli air combat training is often described as the most aggressive in the world. They train against pilots who are much more skilled than the enemies they face: They train against other Israeli pilots who exploit the full range of their capabilities. Perhaps Israeli kill ratios in recent conflicts might not be so high if they trained against adversaries who were limited to simulating only what the Syrians or Egyptians could be expected to do.

An Outdated Approach?

The US took the first approach with the Aggressor program. The program provided good air combat train-

ing against a dissimilar aircraft that closely resembled enemy aircraft in appearance and performance characteristics. The Aggressors also simulated enemy intercept tactics, including the use of ground control (GCI). Good GCI was essential to the Aggressors (as it was to the North Vietnamese and the Soviets) because of the extremely limited range of their aircraft radar.

In addition to these simulations, however, the Aggressors also provided good maneuvering air combat training once ground control had brought the Aggressor within visual range of his target. This went beyond expected enemy tactics, but was recognized as one of the most valuable parts of the training. Dogfighting against a dissimilar aircraft is difficult, but it is a situation that arises in actual combat whether or not the participants have trained for it.

Dogfighting requires proportionately more training to maintain proficiency than many other types of air combat. Instead of stressing greater use of maneuvering air combat—in accordance with developments in Soviet tactics—the Aggressors have become increasingly restricted in this area. This reflects the outdated view that the Aggressors should be much less aggressive in maneuvering engagements in order to simulate the Soviets more precisely.

A fighter weapons school instructor, speaking of both USAF and Navy programs, has phrased it best: "Unfortunately, much of our tactical development and practice is focused on refining tactics that were successful in countering a simpler—and now obsolescent—threat.

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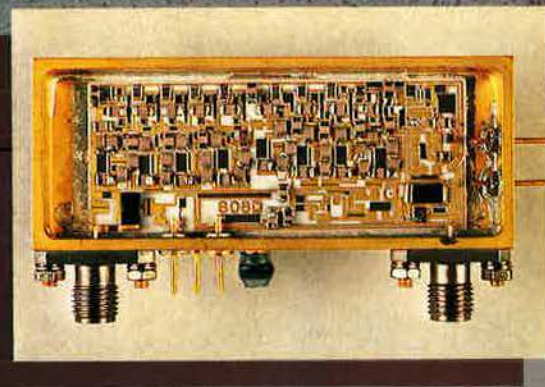
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The Eaton Corporation/AIL Division, has selected Varian's new HCL-4 Series log amplifier for use in the AN/ALQ-161. The ALQ-161 is the complete defensive avionic system for the U.S. Air Force B-1B long-range combat bomber.

The new HCL-4 Series log amplifiers are small, lightweight modules meeting the highest reliability standards. The amplifiers are fully compliant with MIL-M-38510 and are screened to MIL-STD-883D.

Utilizing Varian's unique wide band amplifier design, the units provide exceptional log accuracy and stability over a wide temperature range. Unit-to-unit reproducibility is excellent and the amplifiers can be supplied with connectors as drop-in modules.

More information is available from Varian Beverly Microwave Division, or any Electron Device Group worldwide sales organization.

Varian Beverly Microwave Division
8 Salem Road
Beverly, Massachusetts 01915
Telephone: 617-922-6000



Although there are valid lessons to be learned by reviewing these tactics, the threat is changing faster than we are responding with effective countering tactics. . . . Our tactics will languish in an era that has passed us by unless we fill the gap in adversary simulation quality immediately."

The Aggressors should be oriented toward simulating today's and tomorrow's threat—not the threat of five or ten years ago. The Aggressors should be on the forward edge of developments in Soviet tactics and equipment. Any war we fight will be tomorrow's war—not yesterday's.

What makes this situation especially ironic is the apparent development of a Soviet adversary program.

A Soviet Aggressor Program?

The Soviets have long written of the USAF Aggressor program with great admiration and frank acknowledgment of the training benefits it provides. One prominent author has written: "The process of training pilots for real combat must include simulated combat with an 'adversary' performing his distinctive maneuvers without any sort of simplification." He specifically mentions that pilots could be expected to achieve increased survivability in a war after training against a dedicated "adversary" and contrasts this to training in which pilots merely "[take] part in 'deterrence' spectacles with mandatory 'adversary' capitulation"—a clear reference to Soviet training of the time.

Through the 1970s, the Soviets commented on the US Aggressor program, but did not mention similar training in connection with their own forces. However, in the 1980s, they began to focus increased attention on the value of opposed-force training. The commander of combat training for the Soviet Air Forces stated in 1983 that "it is very important to make an exercise two-sided, with the designation of a real enemy, and to game episodes of fighting fighters against fighters." Yet another article in 1983 stresses the need for dissimilar training: "As a rule, air combat is conducted in aircraft of the same type, which causes inevitable oversimplifications inasmuch as a pilot has had a look at the traditional target and knows its capabilities from personal experience, which makes conditions easier for him. The pilot knows in advance what techniques the 'adversary' might use. There would appear to be greater benefit if a certain percentage of group maneuvering combat activity is waged with an 'adversary' flying a dissimilar type of aircraft."

Late in 1983, references began to appear regarding "experienced adversaries." It was not clear if the Soviets were referring to specially trained adversary pilots or simply to an experienced line pilot flying as a target. One reference describes "an experienced 'adversary' who would be fighting at optimal speeds and at high G-loads. Employing elaborate maneuvers and unexpected tactics, he would be squeezing every bit of performance out of his fighter. It would be no easy matter to defeat such an adversary."

The first official discussion of dedicated 'adversary' pilots appeared in the 1984 Moskвитеlev article. In describing the new maneuvering air combat training program, General Moskвитеlev claimed that fighter squadrons completing the program received training in

exercises against "specially trained aircrews flying in the role of adversary" who "performed combat maneuvers in flights of up to four aircraft." There is apparently a full squadron of these adversary pilots. It is not clear whether or not they attempt to simulate US tactics, but they are credited with having some sort of specialized training.

In order to continue to provide an accurate simulation of Soviet tactics, the Aggressors must be brought up to date. The aircraft they fly—the F-5—simulates the Soviet MiG-21, which even today is no longer the primary threat. By the time new aircraft could be bought for the Aggressors, the F-5 will be two generations out of date. Any new aircraft must be bought with an eye toward simulating the new Soviet fighters that are now becoming operational—the Fulcrum and Flanker. Furthermore, Aggressor tactics, to the degree that they simulate Soviet tactics, must take into account current and likely developments in Soviet doctrine. We should anticipate developments and be prepared to simulate and counter those tactics rather than lagging far behind.

Exploding the Myths

Continued belief in the "myths" outlined above could be detrimental to US combat readiness. It is difficult to change views that have persisted over many years; it is much more comfortable to remain complacent about the advantage in pilot training that has been ours for so long.

It is easy to ignore the slow and deliberate nature of developments in Soviet training, dismissing each individual change as incremental. But increments add up, and the cumulative effect of these changes should not suddenly take us by surprise. US tactics and training, while dynamic immediately after Vietnam, now appear to be languishing. At the same time, improvements in Soviet tactics and training have exploded many of the myths that once were truisms. Further developments are indicated in Soviet theoretical discussions. These developments will be tied to the introduction of new fighter aircraft. USAF could find its qualitative advantage diminished if we stand still while the Soviets move forward.

Improving pilot skill is a continual race. The Soviets have moved slowly, and we have ridiculed their abilities, confident of our advantage. Let us hope that we do not, like Aesop's hare, fall asleep and wake up only after the steady tortoise has crossed the finish line and won the race. Drastic action is not required—we need only continue to innovate and to exercise the initiative that has always been ours, without complacency and without underestimating the enemy. ■

Capt. Rana Pennington, USAF, is currently a Soviet air analyst with the Defense Intelligence Agency. She holds a bachelor's degree in Soviet Studies and is completing a master's degree in Soviet Military Affairs at Georgetown University. She has previously served as a fighter wing intelligence officer, an intelligence officer for the Aggressors, and an Aggressors academic instructor. Captain Pennington is the author of two DoD manuals on Soviet fighter tactics, has written several articles for the Fighter Weapons Review, and is a contributor to a recent book on the Soviet Air Forces. Her earlier article for this magazine, "Closing the Tactics Gap," appeared in the March '84 issue.

A Spectrum of Products to Meet Current and Future Tactical Threats.

THE OBJECTIVE: CREDIBLE CONVENTIONAL DETERRENCE

Our potential adversary has been engaged in an unprecedented buildup; they now have a numerically superior, almost totally mechanized force. The NATO Allies must be capable of responding to an enemy conducting high speed operations, supported by massive firepower, and backed by a substantial nuclear inventory.

To ensure a credible conventional deterrent, we must amplify and multiply our effectiveness with smart munitions. Many smart munition concepts exist. Those that will answer the need must meet three criteria:

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- Dependability — effective in all combat environments and weather conditions.
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THE AVCO SOLUTION: THE *Skeet
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The Air Force carries the brunt of the strategic job. Its proposed budget for FY '86 is the largest of any service.

Budgeting for a Bedrock Strategy

BY EDGAR ULSAMER
SENIOR EDITOR (POLICY & TECHNOLOGY)

THE Administration plans to meet the upsurge in Soviet military capabilities with a three-pronged strategy and an increase in US defense spending, which will absorb about \$2 trillion over the next five years. Premised on the traditional US preference for deterring rather than preempting potential aggressors, America's defense strategy—as set forth by the FY '86 Defense Report, the Military Posture Statement by the Joint Chiefs of Staff, and the associated reports by the services—seeks to strengthen three pillars of deterrence.

As spelled out by Secretary of Defense Caspar W. Weinberger in his report to Congress, the three bedrock components of this country's military strength are (1) defensive capabilities perceived to be sufficiently effective by a potential foe to dissuade him from attacking, (2) the ability to escalate the level of conflict forced upon the US in order to warn an adversary that his aggression could trigger responses he hadn't bargained for, and (3) the unmistakable will and means to retaliate against the aggressor's vital interests, with the consequence that his potential losses would outweigh any possible gains from his war efforts.

An effective defense is central to this triad of mandatory capabilities, according to Secretary Weinberger: "A potential aggressor would have little cause to doubt that this nation would use its military capabilities to try to repel an attack. Effective defense is also less likely to cause escalation than are the other two sources of deterrence, and it provides the means for protecting ourselves should deterrence fail." The broad strategy underlying the new Five-Year Defense Plan—and also the FY '86 Defense Budget request pegged at \$313.7 billion in budget authority and \$277.5 billion in outlays—is the "flexible and sufficient application of force to ensure that no area of vital interest is lost by default" in cases where deterrence fails.

Comparison of Key Military Technologies As of January 1, 1985

Basic Technologies	
Aerodynamics/Fluid Dynamics	Red
Chemical Warfare	Red with dots
Computers & Software	▲ Blue
Conventional Warhead (including Chemical Explosives)	Red
Directed Energy (Lasers)	Red
Electronic Warfare	▼ Blue
Electro-Optical Sensor (including IR)	▼ Blue
Guidance & Navigation	▼ Blue
Microelectronic Materials & Integrated Circuit Manufacture	Blue
Nuclear Warhead	Red
Optics	▼ Blue
Power Sources (Mobile)	Red
Production Manufacturing (includes Automated Control)	Blue
Propulsion (Aerospace and Ground Vehicles)	▼ Blue
Radar Sensor	▼ Blue
Signal Processing	Blue
Stealth (Signature Reduction Technology)	Blue
Structural Materials (Light-weight, High-strength)	▼ Blue
Submarine Detection	▼ Blue
Telecommunications	Blue
US Superior	Blue
US-USSR Equal	Red
USSR Superior	Red with dots
Indicates US Lead is Diminishing	▼
Indicates US Lead is Increasing	▲

This strategy seeks the earliest termination of conflict on terms favorable to the US, with "favorable" meaning "that if war is forced upon us, we must win—we cannot allow aggression to benefit the aggressor." The objective of "winning" is excised, however, from nuclear scenarios, because US policy recognizes that such wars "cannot be won and must never be fought." Here, the Administration emphasizes that even a cursory glance at

"our nuclear force structure and modernization plans makes clear that [deterrence] in fact is our policy: We do not have, nor do we seek, a first-strike capability; we do not have a 'nuclear warfighting' posture; all of our exercises and doctrine are defensive in nature."

The Air Force, whose proposed FY '86 budget is the largest of the services, carries the brunt of the strategic job—ensuring that aerospace deterrence remains strong in the face of the continuing buildup of Soviet nuclear forces. Modernization of the strategic forces, in the offensive as well as defensive sense, remains the Air Force's "first priority." Attaining this goal won't be easy in light of the strong and growing Soviet lead in deployed strategic offensive and defensive weapons and the markedly faster pace of Moscow's modernization program.

As of the start of 1985, the Soviet lead in strategic nuclear delivery systems (ICBMs, SLBMs, and bombers) was 2,762 vs. 1,970 for the US, according to the Joint Chiefs' Military Posture Statement. While the number of warheads and nuclear bombs carried by these weapons is about the same for both powers—due to the large number of small MIRVs carried by the US Navy's SLBMs—the combined nuclear yield of all Soviet warheads and bombs as well as their "time-urgent hard-target kill potential" favor the USSR in a lopsided way.

Ominous Strategic Reality

Nowhere is the strategic imbalance more pronounced and consequential than in the ICBM arena. Soviet ICBMs carry about three times the number of warheads and four times the payload of US missiles. As Secretary Weinberger told Congress, over the past few years the Soviets have deployed "more than 300 SS-18s—each twice as large as the Peacekeeper/MX and capable of carrying ten warheads—and 360 SS-19s, each larger than the MX and capable of carrying six warheads." These statistics, he stressed, translate into an ominous strategic reality: "It would take only a fraction of this force of approximately 5,000 highly accurate warheads—itsself representing only a portion of the Soviet ICBM force—to destroy most of our land-based missile silos."

This Soviet "first-strike capability" is exacerbated by broad buildups of their active and passive defenses "in a clear and determined attempt to blunt the effects of a possible US retaliation." Included here, he explained, are modernization of the massive and sophisticated Soviet air defense capabilities, development of a new ABM network, and the hardening to an "unprecedented degree—far above the strength of our Minuteman silos—[of] their ICBM silos and launch facilities and other key command and control and leadership bunkers." As a result, Soviet nuclear planners might be tempted to "envision a potential nuclear confrontation in which they would threaten to destroy a very large part of our force in a first strike, while retaining overwhelming nuclear forces to deter any retaliation we could carry out."

Moreover, this ability to conduct a first strike undermines the "deterrent linkage between our strategic nuclear force and our forward deployed conventional and nuclear forces." Unless countervailing US capabilities can be fielded, the Soviet leaders "could come to believe that their hardening programs would permit them to

emerge from a major conflict with their forces, command and control, and other support systems damaged but still functioning." The FY '86 Air Force Posture Statement adds on this score that Soviet trends toward "hardening and mobility [of new ICBMs] will add further to the imbalance in relative capability of US and Soviet strategic forces." The Air Force document asserts that Soviet ICBM silos and launch-control facilities have reached hardness levels that the current generation of US ICBMs can't cope with. Hence the admonition that "without a credible US capability to threaten large Soviet ICBMs in silos, the Soviets will have little real incentive to abandon them in favor of more stable forces."

The new Five-Year Defense Plan (FYDP) carries forward or initiates a number of programs that in the aggregate will countervail the growth in the Soviet strategic threat. Pivotal here is the completion of the MX program, which—assuming congressional approval this spring—is to achieve initial operational capability (IOC, meaning ten missiles deployed in operational silos) by December 1986 and full operational status (100 deployed missiles) in FY '89, at a total cost of \$16.5 billion. There is concern in the Pentagon that some members of Congress favor linking the deployment of a portion of the MX force—possibly the last fifty missiles to be deployed—to the construction of superhard silos. Such a move would delay the full operational capability of the system by several years and increase program costs significantly.

In phase with the MX program and forecast growth in the Soviet threat, the FYDP calls for development and deployment of a new, small, single-warhead ICBM suitable for but not necessarily confined to mobile basing modes. Depending on how relevant small missile technologies and basing modes evolve, the small missile might enter full-scale development in 1987. Its first flight should occur in 1988, and IOC could be reached by December 1992.

Supporting both MX and the small single-warhead missile are efforts in follow-on basing technology and the ASMS (Advanced Strategic Missile Systems) program. The primary purpose of ASMS is to develop penetration aids for MX and Minuteman III to counter "both upgraded Soviet ABM capabilities and any possible Soviet nationwide violation of the ABM Treaty." Also, the ASMS program is to generate advanced technologies that ensure that RVs can penetrate upgraded Soviet ABM defenses. Lastly, the FYDP provides for continued modernization of the Minuteman force to maintain these missiles "as an important element of the triad through the year 2000." The FY '86 budget request allots almost \$5 billion to ICBM modernization.

Bomber and SLBM Modernization

The FYDP's strategic bomber modernization plan contains three main elements and is premised on a mix of penetrating bombers, employing gravity bombs and a new short-range attack missile, and cruise-missile carriers. Included here are the installation of air-launched cruise missiles on B-52 aircraft, modification of the B-52G and H models, production of 100 B-1Bs, and development of the Advanced Technology Bomber (ATB, or "Stealth"). Almost \$6 billion is sought in FY

Strategic Offensive Forces

US		USSR	
ICBMs			
30	TITAN	SS-11	520
450	MINUTEMAN II	SS-13	60
550	MINUTEMAN III	SS-17	150
1,030		SS-18	308
		SS-19	360
			1,398
SLBMs			
304	POSEIDON (C-3)	SS-N-5	45
312	TRIDENT I* (C-4)	SS-N-6	336
616		SS-N-8	292
		SS-N-17	12
		SS-N-18	224
		SS-N-20*	60
			969
Bombers			
167	B-52G	Bear	120
96	B-52H	Bison	45
61	FB-111	Backfire**	230
324			395
Approximate Totals			
Delivery Vehicles		US	USSR
• Missiles		1,646	2,367
• Bombers		324	395

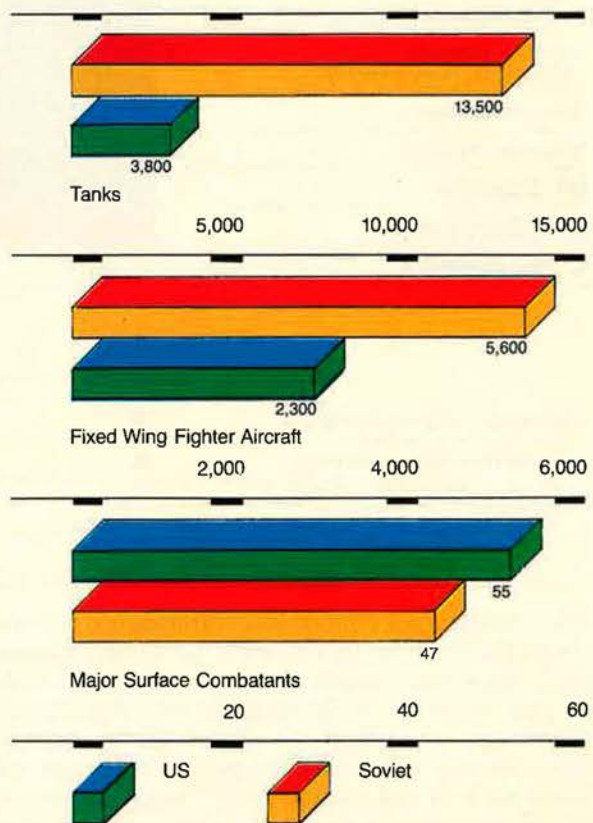
* Includes SLBMs potentially carried on Trident and Typhoon on sea trials
 ** Includes Soviet strategic and naval aviation Backfire aircraft.

As of January 1, 1985

US-Soviet Production of Major Weapon Systems

1980-84

As of January 1, 1985



**FY 1986 Department of Defense
Long-Range Budget Forecasts**
(\$ in Billions)

Budget Authority	FY 1986	FY 1987	FY 1988	FY 1989	FY 1990
Total, Current Dollars	313.7	354.0	401.6	438.8	477.7
Total, Constant (FY 1986) Dollars	313.7	339.4	369.5	388.0	406.7
Percent Change	5.9	8.2	8.8	5.0	4.8

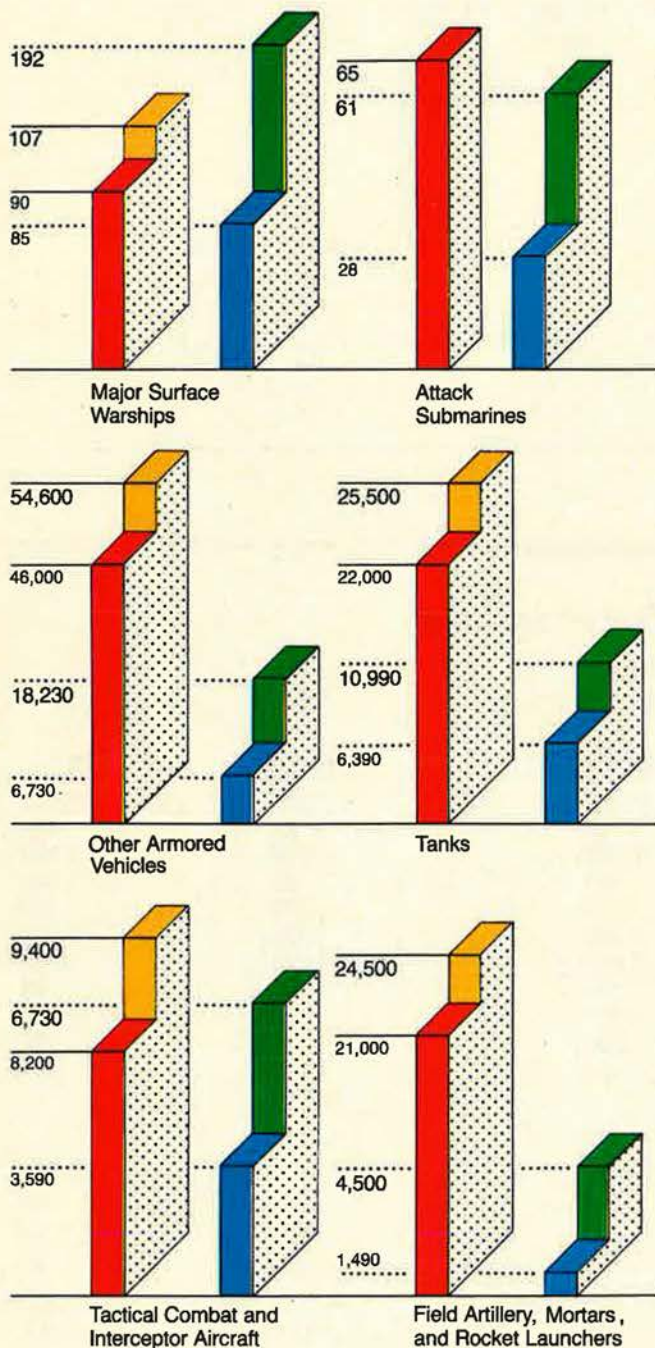
Outlays					
Total, Current Dollars	277.5	312.3	348.6	382.3	418.3
Total, Constant (FY 1986) Dollars	277.5	299.0	319.3	336.1	353.8
Percent Change	8.4	7.7	6.8	5.3	5.3
Composite Pay/Price Assumptions for Outlays	100.0	104.5	109.2	113.7	118.2

USAF Selected Key Programs
(Millions of \$)

AIRCRAFT	RDT&E	*PROCUREMENT	(QUANTITY)	TOTAL
B-1B	\$367	\$5,462	(48)	\$5,829
C-17	454	0	(0)	454
C-5B	0	2,268	(16)	2,268
C-20A	0	169	(8)	169
MC-130H	14	80	(1)	129
F-15	252	2,139	(48)	2,391
F-16	95	3,390	(180)	3,485
HH-60A	14	122	(3)	136
KC-10A	0	447	(12)	447
T-46A	54	206	(33)	260
TR-1/U-2	0	344	(8)	344
MISSILES				
Peacekeeper	\$804	\$3,037	(48)	\$3,841
GLCM	0	554	(95)	554
Sparrow (AIM-7M)	0	82	(425)	82
Sidewinder (AIM-9L/M)	0	43	(800)	43
Maverick	0	489	(3,500)	489
HARM	4	478	(1,715)	482
SPACE SYSTEMS				
DSCS	\$ 7	\$ 149	(2)	\$ 156
Navstar/GPS	77	197	(9)	274
Milstar	478	34	(1)	512

* Does not include weapon system initial spares

Production of Selected Weapons for NATO and Warsaw Pact Forces (1975-84)



Non-Soviet Warsaw Pact
 Soviet Union

Non-US NATO
 United States

'86 for the acquisition of the final lot of forty-eight B-1Bs and associated spares. Funding and other details about ATB remain largely in the "black," classified area. Deployment of ATB is to occur in the 1990s, at which time the FB-111s—fifty-six aircraft at present—will be shifted to tactical missions and the B-1Bs "will begin a mixed cruise-missile carrier and penetration role as well as other missions involving the use of conventional munitions."

There is the assertion that, "in the 1990s, a combined force of B-1Bs, ATBs, and B-52s [armed] with cruise missiles will place maximum stress on Soviet air defenses and provide the US with a flexible and more capable nuclear and conventional deterrent." The tone of the Air Force Posture Statement suggests that the service is warming up markedly to ATB, crediting the Stealth bomber with the ability to "negate present and projected Soviet air defenses" and stressing that the "technologies involved represent a major technological advance of extraordinary military significance, even though they are still in the early developmental stages."

Another major program that remains shrouded because of security considerations is the Advanced Cruise Missile (ACM), a follow-on to the ALCM (Air-Launched Cruise Missile, whose production was halted in FY '84). The Defense Department's report to Congress gives no clue as to when the ACM will reach IOC and discloses only that the weapon now in development "will have a longer range than the ALCM and will incorporate low-observable technology." Also, compared to the ALCM, which is now deployed on ninety B-52s, ACM will have an increased range capability, resulting in two advantages: "B-52s will be able to stand off farther from Soviet defenses and still put distant targets at risk, and the missile will be able to circumnavigate some air defenses." The stealth features of ACM "will enhance the missile's ability to penetrate highly defended areas," according to Secretary Weinberger.

Stealth features are also to be incorporated in the Short-Range Attack Missile II (SRAM II), a follow-on to the SRAM I, which entered the inventory more than a decade ago. Designed for carriage by both the B-1B and ATB, SRAM II will capitalize on advances in low-observable technology, navigation systems, propulsion efficiency, and system accuracy, according to the Air Force Posture Statement. SRAM II "will make the penetrating bomber more flexible by giving it one weapon that can strike many targets." Driving the requirement for SRAM II, a supersonic air-to-ground nuclear weapon that can severely degrade Soviet defenses, is the USSR's "trend toward harder and [increasing numbers of] mobile targets, [which] demands that we make additional performance improvements." Over the next two fiscal years, the Air Force expects to spend about \$9.5 billion on modernization of the strategic bomber force and related support systems.

Sea-Based Strategic Nuclear Forces

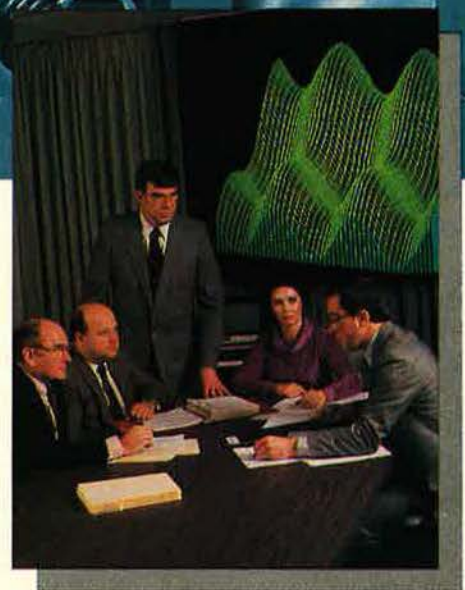
Over the next two years, the new budget seeks about \$10 billion for modernization of the sea-based strategic force. Included here is production of an additional Trident SSBN, bringing to thirteen the number of these submarines authorized so far, as well as acquisition of the first twenty-seven D-5 (also called the Trident II)



THE RIGHT INGREDIENTS FOR THE RIGHT CONCEPT

In the 1990's, a new generation of pilots will take to the skies in advanced computerized aircraft traveling at supersonic speeds. They will encounter a complex threat environment where mission success will depend on winning an electronic battle spanning the entire electromagnetic spectrum.

In answer: The Sanders/General Electric Team has marshalled the people, resources and experience to design the countermeasures system to meet that challenge; INEWS, the Integrated Electronic Warfare System.



Single-seat military aircraft will be able to fly low-altitude attack missions at night with a system now undergoing evaluation by the U.S. Air Force. The Low Altitude Navigation and Targeting Infrared System for Night (LANTIRN) permits attacks at night and in low-visibility weather while relieving a pilot of many manual targeting functions. Elements include infrared sensors, an automatic multimode tracker, a laser designator/ranger, and a terrain-following navigation system. These components are mounted in two pods installed under the aircraft. Hughes Aircraft Company, as subcontractor to Martin Marietta, has supplied five modified Imaging Infrared Maverick air-to-surface missiles along with launchers and a missile boresight correlator (the device which automatically hands off targets from the pod sensor to the missile). LANTIRN is designed for the F-16, F-15, and A-10 aircraft.

Two types of miniaturized infrared systems designed for airborne reconnaissance can be used in aircraft as diverse as high-speed, low-flying strike fighters and remotely piloted vehicles. The systems provide real-time infrared imagery which can be viewed in a cockpit, relayed to a ground station through a secure data link, or videotaped for later analysis. One system, the Linescan 4000, is in development for the Tornado aircraft and is designed for high-speed aircraft. The other, the Linescan 2000, is designed for remotely piloted vehicles and slow aircraft. Hughes markets the systems under agreement from British Aerospace Dynamics Group.

A short-range air defense system has substantially exceeded reliability requirements set for it by the U.S. Army during intensive tests aimed at determining its fitness for battlefield and surveillance duty. U.S. ROLAND, one of the most advanced systems of its kind in the world, tracked and fired missiles at airborne test targets and withstood attempts to jam its electronics. With one test fire unit operating around the clock, the systems were required to average a specific number of operating hours between failures. They achieved over three and a half times the requirement. The mobile U.S. ROLAND provides a day-night, all-weather surveillance and defense capability against low-level, high-speed air attack. Hughes and Boeing Aerospace built the system under license by Euromissile, a joint venture of SNI Aerospatiale of France and Messerschmitt-Boelkow-Blohm of West Germany.

An antenna system made entirely of composite materials is operating on LEASAT, a communications satellite launched last year from the space shuttle. The antenna's structural elements and fittings are made of carbon powder, fiber, and epoxy. This approach eliminates metal pieces that cause spurious signals when impinged by many different high-energy radio signals. The carbon powder also improves the conductivity of the outer surface of the antenna and prevents arcing, the harmful build-up and discharge of static electricity. Hughes built the 7.5-ton LEASAT for operation by a subsidiary, Hughes Communications Services, Inc. The Navy leases capacity for all U.S. military services.

U.S. troops will be able to communicate reliably at extended ranges with a new family of high-frequency tactical radios. Three versions of the improved high frequency radios (IHFR) will operate beyond normal line-of-sight and over rough terrain, including desert, mountain, and jungle environments. The radio family is an advanced design that combines totally automatic tuning with high performance in a rugged lightweight package. One radio is a 20-watt Manpack unit (AN/PRC-104) that is carried on a soldier's back. The second is a 20-watt radio (AN/GRC-213) deployed on vehicles. The third is a 400-watt high-power mobile command radio that provides communications over longer ranges. Hughes produces the radios for the U.S. Army.

US Chemical Warfare Protection Capabilities

CATEGORY	CURRENTLY USED	PLANNED IMPROVEMENTS
<ul style="list-style-type: none"> • Individual protection 	<ul style="list-style-type: none"> • Protective mask • Protective overgarment 	<ul style="list-style-type: none"> • Improved mask • Lightweight overgarments
<ul style="list-style-type: none"> • Collective protection 	<ul style="list-style-type: none"> • Limited shelters 	<ul style="list-style-type: none"> • Disposable shelters • Fixed site shelters • Shipboard upgrades • Portable modular systems
<ul style="list-style-type: none"> • Detection and warning 	<ul style="list-style-type: none"> • Detection paper • Chemical agent alarm • Chemical agent detector kit 	<ul style="list-style-type: none"> • Hand-held monitor • Unattended remote sensor • Point scanner
<ul style="list-style-type: none"> • Decontamination 	<ul style="list-style-type: none"> • Individual decontamination • Decontamination apparatus 	<ul style="list-style-type: none"> • Non-water-based decontamination • Chemical-agent-resistant coatings

As of January 1, 1985

SLBMs. Four of the new Trident submarines are now operational, and their performance, according to Secretary Weinberger, "has met or exceeded design specifications." Initial deployment of the D-5, described as being capable of "putting hard targets at risk," is scheduled for 1989.

The significance of an SLBM capable of hard-target kill is pervasive, since it would largely overcome a major "timing problem" associated with the triad of strategic forces—ICBMs, SLBMs, and strategic bombers—that makes up the offensive nuclear arsenals of both the US and the USSR. As long as only ICBMs are capable of successfully attacking ICBMs sheltered in hardened silos, a variety of factors mitigate against the possibility of a truly successful first strike. Because of the protracted flight time of ICBMs—about thirty minutes—the defender receives ample warning of an impending attack so that he can "flush" his strategic bombers on alert and decide whether or not to launch some or all of his ICBMs in "use or lose" fashion.

On the other hand, if the aggressor were to decide to use his SLBMs to attack the defender's bombers in the hope of catching most of them before they could be flushed, the SLBMs' short flight time—somewhere between five to eight minutes—can't be synchronized easily with the much longer flight time of the ICBMs. In short, by attacking the bombers with his SLBMs, the aggressor provides unambiguous warning for the other

side's ICBM force. Availability of SLBMs with a hard-target kill capability obviously would greatly ease the aggressor's timing problems if the defender does not resort to such countermeasures as mobile deployment or superhardened silo basing of ICBMs, ballistic missile defenses, or a combination thereof.

The degree of concern expressed by Soviet arms-control officials about D-5 leaves no doubt that Moscow understands the military significance of such a system. There also can't be any serious doubt that the Soviets themselves are working feverishly on SLBMs with hard-target kill capability.

As a further means for shoring up the effectiveness of the sea-based element of the triad, the FYDP provides for continued deployment of Tomahawk nuclear-armed sea-launched cruise missiles (SLCMs) on a variety of submarines and surface ships. These weapons—which are effective against a wide range of land targets—"give us a cost-effective means of increasing hard-target capability at sea in the near term," according to Secretary Weinberger. "Because they are distributed among a large number of ships, SLCMs complicate a potential attacker's planning and improve the overall survivability of the force," he added.

Conventional Force Requirements

Expansion of conventional warfare capabilities—in terms of readiness, sustainability, modernization, and

force structure—receives increased emphasis under the new Five-Year Defense Plan. The tactical air forces (TAF) are to be bolstered with the acquisition of 2,238 fighter and attack aircraft over the next five years. Of this total, the Air Force is to receive 1,284 aircraft, while 954 are slated to go to the Navy and the Marine Corps. These numbers are sufficient to “reach our goal of fourteen carrier air wings by FY '87 and of forty Air Force tactical fighter wings by FY '91.” At the end of FY '86, the total US inventory of fighter and attack aircraft (all services, active and reserve) is expected to reach 4,284, about 1,000 fewer aircraft than are in the Soviet inventory. The Soviet buy rate continues to exceed that of the US, according to the Defense Department's report to Congress.

The rationale underlying USAF's force planning in the tactical arena is to meet “theater-unique requirements” with basically flexible designs that can serve across a broad range of potential conflicts. As Air Force Secretary Verne Orr and USAF Chief of Staff Gen. Charles A. Gabriel put it in their joint congressional testimony, “In any conflict, our tactical air forces must do two things: [They must] quickly achieve air superiority so that our ground and air forces can fight and be reinforced free from enemy air attacks, and [they must also] provide critical offensive air support to our ground forces.”

In the air-to-air role, this means the ability to detect and destroy numerically superior, sophisticated Soviet aircraft. In the ground-support role, the requirement is for all-weather systems that can evade, suppress, and penetrate dense defenses to cope with a wide range of targets. Fighter aircraft need to be acquired by the Air Force at a rate of between 260 and 280 units each year in order to move concurrently toward the programmed but elusive forty-wing force structure while maintaining an average aircraft age of ten years.

The proposed FY '86 buy is 228 fighters—compared to 192 in FY '85. That rate is to be increased to the required level of between 260 and 280 units by FY '88 and will be sustained thereafter, according to present Air Force plans. Specifically, the new budget seeks the acquisition of forty-eight F-15s and 180 F-16s. Eight of the F-15s will be “E” models (the so-called dual-role fighter), scheduled to achieve initial operational capability in FY '89.

The FYDP stresses the importance of a “vigorous modernization program” with regard to both the F-15 and F-16. This program is being driven by pending deployment of a new generation of Soviet fighters “with greatly improved air-to-air combat capabilities.” Included here are plans to increase the thrust levels of engines for both aircraft by FY '90 and to develop an F-16 variant, the F-16F, with “improved air-to-air capability,” according to Secretary Weinberger. Procurement of the first F-16Fs is expected in FY '89. A range of promising technologies is being considered for incorporation in the F-16F. In this context, Secretary Weinberger cited the F-16XL, “with its fuselage extension and cranked-arrow wing for longer range and increased payload,” as well as the Advanced Flight Technology Integration (AFTI) program as possible contributors to the F version.

In the area of combat readiness, the new budget re-

quest seeks to boost flying hours for both the Air Force and the Navy. USAF's tactical aircraft pilots will average about 233 flying hours in FY '86. This amounts to an increase of about fifty percent over the nadir in FY '78, when the average was 156 hours. The new total is about twice the time logged by Soviet pilots. The Navy's tactical aircraft pilots will average about 300 flying hours next year, up from 276 hours in FY '84.

Aircraft self-protection gets special attention in the new budget in order to counter the fielding of new defensive systems and the upgrading of existing systems by the Soviets. In addition to strengthening the array of radar warning receivers, self-protection jamming systems, and expendable chaff and flares, development of a self-protection weapon (SPW) is being initiated. This “comparatively lightweight, low-cost missile is being designed to counter low-altitude, radar-directed threats and for employment by all tactical aircraft without sacrificing air-to-surface munitions load capability,” according to the Air Force's Posture Statement. The new weapon is to complement the capability of the high-speed antiradiation missile (HARM) and to augment the F-4G Wild Weasel, EF-111, and Compass Call aircraft. The new budget allows for the modification of sixteen C-130 aircraft to the EC-130H Compass Call configuration to boost US ability to disrupt enemy communications systems from a standoff position.

Both Chemical Warfare Defense (CWD) and chemical retaliatory capabilities are to be expanded to help counter the vast and growing lead in Soviet CWD capability. Specifically, funds are requested to make possible production of “Bigeye” binary spray bombs that “will let us place [persistent chemical agents] over a wide area in a retaliatory attack.”

The Global Challenge

Secretary Weinberger's Annual Defense Report to Congress sums up why the budget is sized the way it is in a succinct description of Soviet military doctrine and goals. Stressing that Soviet warfighting doctrine has consistently exhibited an offensive orientation, the Report underscores that the Soviet General Staff's current concept of operations “represents a continuation of this long-standing . . . preference.” Specifically, the new Defense Report cites Moscow's growing emphasis on operational maneuver groups—“highly mobile formations of up to corps size designed for the rapid seizure of targets in the enemy rear areas”—as a manifestation of this doctrine.

Further, the development of large special operations forces and strategic air armies tailored for attacks on high-priority targets deep in Western Europe and the Far East is anchored in the USSR's offensive warfighting doctrine, according to Secretary Weinberger's report. The Secretary concludes that “new and more capable Soviet ships and weapons, and the manner in which they are being deployed, indicate clearly that the Soviet fleet is intended ultimately to extend its area of sea control and sea-denial operations farther from the Soviet landmass, severing the sea lanes linking the United States with its allies.” In short, Secretary Weinberger warns, “The Soviet challenge and threat to our interests are global, and thus, deterrence requires that we have global capabilities to respond.” ■



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F 16



USAF's new primary trainer aircraft has all of the right features.

The T-46A Is Here

BY JAMES P. COYNE, SENIOR EDITOR

THERE'S no business like show business, and the rollout ceremonies for the Next-Generation Trainer, the Fairchild Republic T-46, certainly recognized this American tradition in a hangar at the company's plant in Farmingdale, L. I., N. Y., in February.

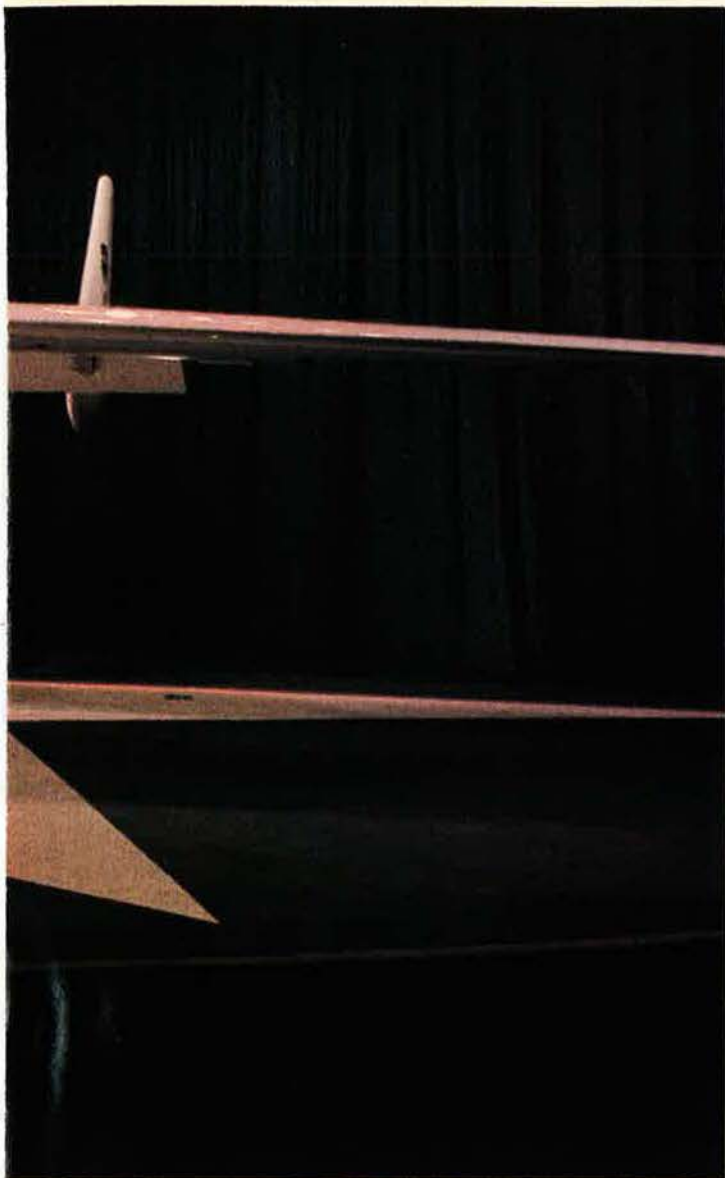
After a choir sang "The Star-Spangled Banner" and then hummed "America the Beautiful" as background for the invocation, a taped rendition of Aaron Copland's "Fanfare for the Common Man" rolled over the crowd while red, white, and blue strobe lights flashed overhead and white vapor swirled along the floor of the raised platform on which the T-46 perched. Then Secretary of the Air Force Verne Orr and Sen. Alfonse M. D'Amato (R-N. Y.) actuated the switch to lift the silver curtain enshrouding the

form of the little trainer. The T-46 stood trim and alone, its Air Training Command white paint gleaming in the glare of the spotlights.

More than 600 invited dignitaries witnessed the event, including a host of company executives led by Edward G. Uhl, Chairman, President, and Chief Executive Officer, Fairchild Industries, and members of both houses of Congress from New York state.

The aircraft deserved the hoopla. It is the first Air Force primary trainer to be introduced in thirty years, and it will train at least 50,000 USAF student pilots over the next twenty-five years. Through savings from increased efficiency, greater capability, and economy of fuel consumption, the company forecasts a complete payback on investment for USAF in twelve years.

With new engines, new technology, new design, and capabilities exceeding all the specifications, the Next-Generation Trainer, the Fairchild Republic T-46A, will train more than 50,000 USAF student pilots over the next twenty-five years.



Superior reliability is one of the aircraft's strong points, according to Fairchild Republic spokesmen, who project a fully mission-capable rate of ninety percent. Once a sortie has begun, the projected mission completion success probability is ninety-nine percent. This can be accomplished with only 4.25 maintenance man-hours per flight hour. The aircraft will be able to fly more than four sorties per day, with a turnaround time of only fourteen minutes.

Viewed with an experienced eye, the T-46 appears to combine those qualities most desired in a primary trainer: honesty, reliability, safety, and performance. The straight wing, slightly tapered on the leading edge, promises consistent control response throughout the performance envelope. The twin rudders

mean better directional control at all combinations of bank, angle of attack, and airspeed than would be likely with a single rudder. The maximum crosswind speed that the T-46 can tolerate during landing is thirty knots, high for a small airplane.

Redundancy means safety. Twin engines provide better reliability, and the intake size promises adequate single engine power in most expected flight regimes. The aircraft is equipped with engine inlet anti-icing and windscreen deicing for greater bad weather flying capability.

Like the T-37, it's a small airplane, with a thirty-seven-foot wingspan and a length of twenty-nine and a half feet. Viewed on the ground from the front, it even resembles the T-37—at least as far

back as the rear of the cockpit—because its two-seat, side-by-side configuration gives it a fat appearance, with the big single canopy open and hinged from the rear and looming over both pilots.

But from the cockpit on back, there are significant differences. Most obvious are the wings, which are shoulder-mounted, almost on top of the fuselage, rather than at the mid- or low-wing position as on most trainers and fighters. And, of course, the marked anhedral is most obvious.

Avoiding Snap Roll

The wing is constructed this way, with the wingtips considerably lower than the wing root, because this arrangement provides better stability at lower speeds and high angles of attack. In aircraft with di-

hedral, yaw inputs under these conditions could more easily result in undesired rolling moments. Stability in this regime is vital to many high-performance training maneuvers. In training, this becomes important when an inexperienced student overshoots his turn to final approach, steepens his bank until it is almost vertical, and then feeds in some rudder "to help things along a little bit."

This is a classic setup for a snap roll. At traffic pattern altitude, there is insufficient airspace to recover from a snap roll before the aircraft crashes. If the student pilot delays too long before deciding to eject, he may go in with his plane. While snap rolls on final are relatively rare in USAF flying training nowadays, they are nevertheless an ever-present danger. The T-46, with anhedral designed into its wings, significantly reduces the risk, as well as the possibility of undesired rolls occurring during other high-performance maneuvers.

In order to achieve the benefits of anhedral (wingtips lower than wing roots) with the wings attached to the lower or underside of the fuselage, the aircraft would have to be equipped with long landing gear so that the wingtips would not be too close to the operating surface for student flying. This would add weight and could make the aircraft unstable during ground operations. This could also place the aircraft and its internal components so far off the ground that special stands and ladders would be required for access for maintenance. All of this would add to cost and complexity. So, the wings are attached near the top of the fuselage.

A big advantage of having the wing at shoulder height and a prime consideration in its placement is the significant improvement in downward and rearward visibility afforded the aircrew when compared with a low wing placement. Other advantages of the higher wing are easy access to the engines, since they are mounted under the wings, and sufficient clearance to mount external stores on the wings in the proposed attack version of the T-46.

A look in the cockpit reinforces the impression of safety and simplicity. The instrument panel is equipped primarily with "round



dial" instruments, rather than "tapes" (as in the F-105 and F-106 and some transport aircraft) or the newer digital readout instruments and cathode-ray tubes (CRTs) in the newer fighters. There is no provision for a head-up display (HUD) in this Next-Generation Trainer.

Cost is a big factor. Gadgets are expensive. Further, they are designed to aid the pilot as he flies and fights, performing such tasks as all-weather navigation, low-level attack, and offset weapons deliveries. But in primary training, the *only job* of the student pilot is to *learn the basics of military flying*. Simple dials and gauges are what he needs at this stage of his flying career.

When he moves on to advanced training in fighters, bombers, or transports, he will use the HUD and other modern cockpit aids as part of

the airborne weapon system he will be learning to employ. Then again, he may well be assigned to one of a number of USAF aircraft that aren't equipped with a HUD, digital readout instruments, or CRTs.

For the same reason—simplicity and economy—the T-46 pilot controls aircraft pitch and bank with a between-the-knees stick rather than a sidestick controller like the one in the F-16. If the student can handle the T-46 with a stick in it, he will easily adapt later to the more precise sidestick controller; the reverse may not be true, and he may not fly an operational aircraft with a sidestick controller.

The seats are mounted side by side with the instructor pilot on the right, as in the T-37. This gives the instructor pilot an unobstructed view of what the student is doing

The T-46A cockpit, with its side-by-side seating, "round-dial" instrument panel, ACES II ejection seats, and full controls for instructor and student pilot, is optimized for the training mission.

Pronounced anhedral of the T-46A's shoulder-mounted wing provides stability at high angles of attack and low airspeeds and helps to counteract rudder inputs that can induce undesired rolling moments—an ever-present danger in student flying.

and allows him to demonstrate procedures and techniques easily. The pilots sit in ACES II ejection seats, now standard equipment in the F-15 and other fighters.

In the T-46, the seats have been modified so that they will move on diverging vectors as they travel upward during a sequenced dual ejection. This provides sufficient separation for interference-free parachute deployment. The instructor can initiate a dual ejection; the student can eject only himself. The ACES II seat has a zero-zero capability, which means that the seat will carry the pilot high enough above the ground when ejecting at zero altitude and zero airspeed for safe parachute deployment.

Each pilot has his own set of throttles. In the usual side-by-side seat configuration, there is a single

set of throttles between the two pilots. But each pilot in the T-46 flies with the stick in his right hand and the throttles in his left, just as he would in an advanced trainer or fighter, regardless of whether he is in the left or right seat. This arrangement gives the instructor better command of the aircraft.

In addition to the usual flight instruments, avionics, and controls, the T-46 has a full complement of radios, including TACAN, VOR, and ILS for navigation, both VHF and UHF command radios for communications, and IFF.

The aircraft is equipped with a dual hydraulic system for actuation of the landing gear, flaps, wheel brakes, nosewheel steering, and speed brakes (speed brakes are located on the lower outer intake cowlings). The rudders are actuated hydraulically as well, with a servo device that also provides "feel," trim, and stability augmentation. The stick is connected by cable to the ailerons and elevators; trim is electrical.

Intakes for the two Garrett F109-GA-100 turbofan engines are just aft of the cockpit. Ample ground clearance minimizes the danger of foreign-object damage (FOD), but the engines are still low enough to be worked on from ground level. The engines are interchangeable and, according to Fairchild, can be removed and replaced in only thirty minutes. Each develops 1,330 pounds of thrust.

With both engines running, the aircraft burns only 52.4 gallons per hour, less than a third of the T-37's consumption (184 gph). This will not necessarily result in longer training sorties (an average training sortie lasts 1.3 hours), but it will provide a safe margin of fuel reserve that makes it possible to launch sorties when there is unsettled weather at the training base or in the local area. With other trainers, it may not be possible to launch under these conditions because the aircraft does not have enough fuel to reach an alternate field with safe reserve, as required by Federal Aviation Administration and USAF regulations.

Fairchild predicts the low fuel consumption of the Garrett turbofans will result in savings to the Air Force of \$50 million per year in fuel costs, or total savings over twenty-

five years of \$1.25 billion for the entire fleet of 650 aircraft. The single bladder, 200-gallon fuel tank is in the fuselage between the engines.

Ahead of Specs

Fairchild has logged more than 1,300 hours of wind-tunnel time, hundreds of hours in flight simulators, additional hours in radio-controlled scale models, and twenty-three actual flight hours in a sixty-two-percent-scale manned demonstrator aircraft. The engines have been extensively tested, both by the manufacturers and by the Air Force at the Engine Test Facility at Arnold AFS near Tullahoma, Tenn. As a result, the manufacturers are confident the T-46 will exceed all of the Air Force's design specifications.

These specifications include a required cruise speed of 300 knots at 25,000 feet; the T-46 will do 382 knots. The specified maximum cruise altitude was 35,000 feet; the T-46 will cruise at 44,000 feet, with a service ceiling of 47,000 feet. These altitudes are possible not only because of the efficiency of the Garrett turbofans but also because the T-46 has a fully pressurized cockpit; its predecessor primary trainer does not. Specified single-engine climb rate at 5,000 feet on a 100 degree Fahrenheit day was 470 feet per minute; the T-46 will climb at 590 fpm. The new trainer has a maximum range of more than 1,190 miles.

The Aeronautical Systems Division at Wright-Patterson AFB, Ohio, awarded the \$104 million development contract for the new trainer to Fairchild Republic in July 1982. At the same time, Garrett was awarded a \$121 million contract for the new engine. With a total planned purchase of 650 trainers through 1992, total program cost is estimated at \$3.5 billion.

Flight-testing of the T-46A will begin this month at Edwards AFB, Calif. Delivery of the first aircraft is scheduled for April of next year. The first two aircraft delivered will be used for USAF operational testing. The first operational aircraft to be used for student primary training will be delivered to the 47th Flying Training Wing (ATC) at Laughlin AFB, Tex., in June 1986. ■

A photograph of a traditional Chinese boat on a lake at dusk. The boat is silhouetted against the dark blue water and sky. Several people are visible on the boat, some holding oars. In the background, a large mountain is silhouetted against the twilight sky. The overall mood is serene and contemplative.

Led by Deng Xiaoping, the Chinese walk a few steps along the capitalist road.

CHINA

And Its Four
Modernizations

BY ANDREW B. ANDERSON AND
BARBARA ANDERSON



Much of China's commerce flows along its rivers. A key to China's industrial development will be modernization of its ancient transportation network.

THIRTY-SIX years after the revolution that brought Mao Zedong and the People's Republic to power, China—one of the oldest nations on earth—is still searching for its modern identity. Concurrently, the United States is searching for the best strategy in dealing with the China that is emerging.

The face of the new China, if it is truly new, cannot be clearly seen yet. But there are indications that it may be far different than anyone would have predicted during the social upheaval and internal purges of the 1950s and the Cultural Revolution in the 1960s and 1970s.

China occupies a geographic position of obvious strategic importance. It has a quarter of the world's population. It maintains a regular military establishment of 4,000,000 troops, with many more in its militia. And although its prospects for modernization now seem more promising than they did in the recent past, the People's Republic of China cannot realistically aspire to superpower status, in either a military or an economic sense, any time soon.

Where China goes from here depends on the success of a bold program of reform initiatives—some of them unabashedly capitalistic—being pushed by hard-charging senior Chinese leader Deng Xiaoping. During our recent three-week visit to China, we were especially alert for any signs of economic progress and watchful in both rural and urban areas for expressions of attitude toward modernization.

The United States has a huge stake in the future of China. America is looking increasingly westward in its foreign trade, and a stable China is central to stability in Asia. China lightens the US strategic burden somewhat, as the Chinese keep considerable military assets of their former allies, the Russians, tied up

on border security. For the United States, China is no longer the perceived enemy it once was. Our approach to dealing with the Soviet Union—seeking to contain Soviet military adventurism and denying the Soviets an external solution to internal problems—can no longer be applied by extension or with slight modifications to the Chinese.

On the other hand, China cannot be regarded as an ally, either. Despite a few capitalist inroads, it remains one of the world's two major Communist countries, and the Chinese have no great love for Westerners—or any outsiders.

Our best approach to relations with the PRC will be cautious encouragement of the economic, social, and military reforms now under way and under consideration.

The Chinese Communist Party's basic domestic program of the "Four Modernizations" (referring to the modernization of agriculture, industry, science and technology, and defense) began under Mao Zedong. As set forth by Mao in the 1950s and Zhou Enlai in the 1970s, though, the slogan, objectives, and timetable appeared infeasible.

The real key to modernization lay basically in the accumulation of capital: investments in agriculture and industry to create a sustaining and growing economy. Increased technology was an important element, as was an improved defense capability to provide a more secure environment in which development could proceed. But the flaw in the formula was that all this was to be accomplished totally from within. Outside help—particularly investment capital, with its attendant strings—was considered politically abhorrent and ideologically impure.

New Emphasis

As a result, China's economy remained underdeveloped. But new

emphasis was placed on the Four Modernizations in 1978. In 1979, under Chairman Hua Guofeng, the Third Plenary session of the Eleventh Central Committee devised an "eight-character" program of economic reform. The title of the program refers to four pairs of Chinese characters that become, in English, readjusting, restructuring, consolidating, and improving. This is the operations plan for achieving the Four Modernizations.

Impressive recovery and growth took place in 1979, but problems arose from high unemployment and a large, unplanned budget deficit. Nevertheless, the party continued to fine-tune the "eight-character" program during 1980-81. In fact, a major change of attitude eventually took place—a change in economic and political philosophy that may prove a major breakthrough for the country.

Departure from Marxist communism is evident in the significant aspects of the eight-character program.

● **Readjustment:** This is the highest priority. Institutional reform is to provide peasants an incentive, missing before, by giving them a greater role in farm production decisions and management and by allotting them a greater share in the results of their efforts. Consumer goods industries will be nourished. High priority will go to energy and transport industries. More funds are to be raised for construction of factories and living facilities.

While investment expenditures are to be controlled by the central government, relatively little of the funding will come from the central government. Most projects will be financed by local authorities or by enterprises using internal, external, or jointly generated funds. To this end, China looks to expanding its foreign trade, securing foreign loans and credits, and acquiring external technology. This is a major shift, although not yet a real open-door policy.

Gradually, the standard of living of China's people is to increase. Population growth will be controlled by a variety of programs, including special benefits for couples who limit themselves to one child. The largest population that China can support is estimated to be be-

tween 1,200,000,000 and 1,500,000,000.

● **Restructuring:** The economic system is to be reformed to take advantage of individual initiative. This will entail a significant amount of experimentation. While the state intends to maintain complete control over strategic commodities, various less-important enterprises will be allowed varying degrees of autonomy and responsibility.

● **Consolidation:** Various enterprise groups will be reorganized to weed out the many unprofitable factories now subsidized by the state.

● **Improvement:** New technology must be acquired—but slowly, as the economy is able to absorb it, and as China is able to afford it. The sparse Chinese machine-building industry will be built up. Emphasis is to be given to improving the quality and quantity of higher education. Secondary vocational schools, rather than general secondary education, will be stressed.

Obviously, these principles of modernization signify, ever so slightly, a trend toward decentralized management of certain profit centers and greater reliance than at any time since 1949 on external investment capital and foreign technology. These policies seem to be sound enough, but their successful implementation has yet to be achieved.

Eight-Character Program

It was Chairman Hua Guofeng who introduced the "eight-character" program of economic reform, but the pace of all of the Four Modernizations increased after Deng Xiaoping became China's *de facto* leader in June 1981. Deng moved much faster to deemphasize collectivized agriculture. He restored free-market incentives to family work units, farms, and villages. In October 1984, with approval of the party's central committee, Deng began motivating the 200,000,000 city dwellers. The plan involves considerable loosening of centralized controls and placing the responsibility for production (and profits) in the hands of local management and the workers. Both management and workers are to share in the successes. Inefficient businesses are to be abolished, and the workers will lose their jobs.

What progress is being made under Deng's authoritarian leadership? Here is what we saw—or think we saw—during our tour of China.

About 800,000,000 of China's one billion people live in rural areas. With only thirteen percent of China's land arable, the majority of the population is in the eastern part of the nation, where the major cities are also located.



In general, the people appear to be well fed, energetic, adequately clothed, and happy. Yet housing, both urban and rural, is atrocious. Homes have little or no heat. With few exceptions, there are no bathrooms, showers, or hot running water. In Beijing, a city of 9,000,000, there are fifty-one bath houses—thirty-seven of them currently operable, according to an article in the newspaper *China Daily*. The people don't seem to mind.

The peasants—now called farmers—are far better off than they were in recent years. Farm production, still handicapped by lack of Western-style agricultural technol-

ogy, is reaching bumper-crop proportions—at least in relation to recent Chinese experience. There are free markets in the large cities and in small villages for products produced in excess of government quotas. The farm unit, more and more a family unit, gets to keep the profits. We often heard talk, especially in the cities, of the extraordinary wealth (again relative) of the farmers. City workers envy them.

supervision and without interference from the local Communist Party.

- The Chongqing branch of the People's Bank of China offers floating interest rates (rare in China) to deserving local enterprises.

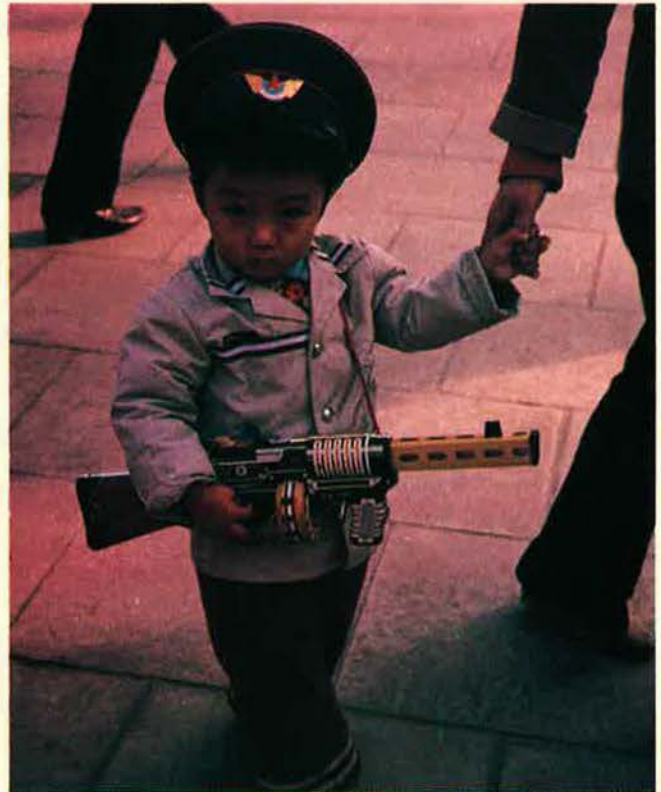
- The total production of the Home Appliances Industry Co. of Zhanjiang rose by forty percent (with profits up thirty-seven percent) in one year, according to Li

cessities of life—and many luxuries—were available.

In the town of Shashi, we visited a department store that had a large selection of yarns and bolts of cloth, sofas, lounge chairs, a nice shoe department, a small collection of ladies' formal evening wear, bicycles, some crude washing machines, window air-conditioning units, small refrigerators and plumbing supplies, radios, black-



Energy production is the weak link in China's plan for economic development. Completion of the massive Gezhouba Dam project, in 1989, will help increase China's generating capacity.



China's search for its modern identity will probably continue through the lifetime of this youngster. The results of that search may depend on China's ability to limit population growth.

Freer Enterprises

In the cities, numerous mom-and-pop shops sell goods produced at home. Employee incentive schemes are increasing rapidly in the factories. All of this is happening faster than the experts expected. Examples abound:

- In Chongqing, workers' wages have been linked to their factories' performance. Under a trial system in twenty factories, individual wages will increase 0.8 percent for every one percent rise in the enterprise's profit tax.

- Managers of twenty-eight factories have been given the authority to run their plants without central

supervision, the company's general manager. Li was elected to his position by the 6,000 employees. The company did away with guaranteed lifetime wages for workers and staff and, instead, allowed them to become shareholders, eligible to draw dividends from profits.

Surprisingly, consumer goods, while expensive, are available. We found department stores in every large and medium-size town we visited. In Beijing and Shanghai, mobs of people crowded around counters, some buying, many gawking. In smaller cities and towns, the stores were crowded, but not impossibly so. Generally speaking, all the ne-

cessities of life—and many luxuries—were available. In the town of Shashi, we visited a department store that had a large selection of yarns and bolts of cloth, sofas, lounge chairs, a nice shoe department, a small collection of ladies' formal evening wear, bicycles, some crude washing machines, window air-conditioning units, small refrigerators and plumbing supplies, radios, black-

The Problem of Energy

On the other hand, it is clear that production of electrical energy lags. The Chinese themselves consider this the weak link in the plan for economic development. One Chinese official told us that one machine in five is idle because of the energy shortage. China has vast quantities of coal, which can be used to produce energy in thermal power plants, but plants have not been built in required numbers.

Much activity is under way to interest American oil companies in multibillion-dollar offshore oil and natural gas development programs. Robert Hefner IV, exploration and production coordinator of the GHK Companies (and an expert at finding natural gas), says that China's Sichuan basin compares with the Anadarko Basin in Oklahoma and that the Sichuan fields have barely been touched. Hefner hopes to enter into some joint ventures with the Chinese.

Hydroelectric power stations are infrequently seen, although eighty have been built on the Yangtze, Yellow, and Hongshui Rivers. The largest is the Gezhouba Dam power project, of which the Chinese are very proud. Visitors are often shown this huge project, which was designed by the Russians and which has been under construction since 1970. Seven of twenty-one turbo-generators are currently on line; completion is scheduled for 1989. An even larger hydroelectric power station is planned for a location about four kilometers further up the Yangtze River, in the Three Gorges area.

China generated 351.4 billion kilowatt hours (kwh) of electricity in 1983, ranking it sixth among the world's producers. That equates to 351 kilowatt hours per person. Average annual US distribution is 10,000 kwh per person. China's generating capacity in 1983 reached 76.44 million kilowatts, eighth in the world.

Transportation and Communications

Along with energy, transportation and communications have been the most backward sectors of Chinese industrial development. High priority is being placed on all three during the 1985-89 Five-Year Plan. Particular emphasis is being given to the ancient railroad system. China's Ministry of Railroads has ordered 220 diesel locomotives from the General Electric Co. Sixty-one have been delivered so far, with the remainder to be delivered in early 1985. (A part of the deal was reported to be that the ministry would receive "seven examples of technical know-how from the US firm" that will allow China to make the frames for similar locomotives for export to the US.)

Much commerce, especially in coal, currently flows along China's rivers. While traveling up the Yangtze from Wuhan to Chongqing, we saw dozens of barges. Villages along the way had human "fire-bucket brigades" hauling coal in wicker baskets on workers' backs up banks several hundred feet high and from nearby mines down to the barges, basket by basket.

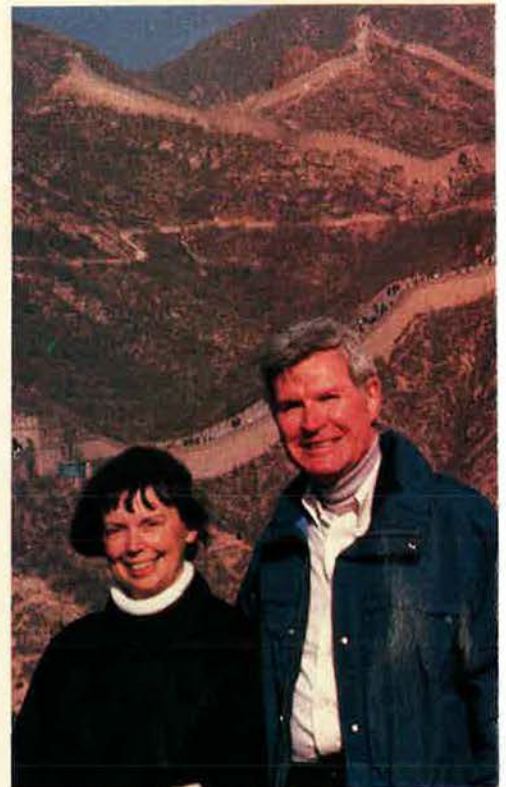
Only twenty percent of the highways are paved. The telephone system dates from the 1930s. There are 0.49 phones for every 100 people in China (the world average is twelve per 100 people; the US average is eighty-five per 100 people). An American friend told us it took two hours to fly from Beijing to Sichuan province, but two days to complete a telephone call.

Plants, apartment buildings, and office buildings are going up everywhere. Tall construction cranes and bamboo scaffolding can be seen all over Beijing. In the country, almost every village has a brick factory and a lime cement hole. Human-drawn two-wheeled carts distribute building materials to construct small one-story factories, to rebuild communes, or to patch peasants' thatched abodes. Labor-intensive industry is typical of developing nations with high unemployment, but the extent to which human resources are tied up in heavy labor seems totally out of proportion to other evidence of economic developments.

Foreign trade and foreign investment are growing by leaps and bounds. While US and European policy has been to discourage significant assistance to a country that is, after all, anti-Western, Western countries seem to be relaxing their guard. The Chinese were eager to tell us about the joint ventures now under way, how local capital is augmented by Western money and technology, and about products they are now producing primarily for export to Japan, the US, or Western Europe. The newspapers carry daily stories of new joint ventures. Spain, according to one article, leads the way among Western nations in willingness to cooperate with the Chinese.

There are two keys to economic growth in China and to the success of Deng's private enterprise initia-

tive. One is the continued and unabated development of a more flexible entrepreneurial system. The other is a reduction in government and party bureaucratic control in economic decision-making. The experiment with the agricultural sector—which comprises eighty percent of the population—appears to be making considerable headway. Chinese dependence on imports from the US is dropping sharply.



A portion of the Great Wall snakes through the mountains behind authors Andrew B. Anderson and Barbara Anderson. He is the Deputy Executive Director of the Air Force Association.

The great experiment with a muted form of capitalism in urban factories has been stressed only recently, although it has been tested selectively since 1978 in certain factories.

It is too early to declare success. Deng and Premier Zhou Ziyang recently told a group of American, European, and Japanese businessmen that the PRC will remain open to foreign investment for the next seventy years at least and that China will encourage the growth of private enterprise.

Time will tell. Deng encourages use of the term "socialism" rather than "communism." He is deem-

phasizing government control, emphasizing government ownership and joint ownership. Apparently, Deng has the solid support of the Central Committee.

Foot-Draggers

Three powerful elements are likely to drag their feet and may disrupt Deng's smooth pursuit of his objectives. First, there are the party traditionalists who continue to believe

ment and knows that defense modernization is the last priority of the Four Modernizations. Fear that even more resources will be diverted from military use creates apprehension. Further, an aging officer corps resists change. Since 1979, Deng has worked to reform the military establishment. At least tacit support by the military for his bold initiatives is essential. Deng has sought a more efficient, more

have to be dealt with. How are interest rates to be determined, and how will inflation be controlled? All these issues must be addressed successfully if Deng's programs are to endure.

Sustaining Base Required

Deng is eighty. How his initiatives would fare without his driving personality to guide and defend them is an open question. He needs to create a sustaining base for his programs throughout the political and military structure.

China is rich in natural resources. Its ability to absorb technology is increasing, and it is creating an atmosphere that is attracting foreign investments. It has an abundance of people to produce whatever is needed. Setbacks, false starts, failures, and disruptions will surely happen. Doing business with China will not be easy for those who undertake the adventure. Things will not move in the rapid and efficient manner to which Westerners are accustomed.

But free-market entrepreneurship, once tasted, becomes an addiction as well as a strong tonic. Capitalism—but not as we know it—is apt to survive. Solutions to problems will be found. We can expect competition in world trade to intensify, with China likely to exert itself as a potent economic force after the turn of the century.

What should be the position of the US as China tries to emerge as a third major world power? To begin with, we should work from the assumption that an economically healthy, stable, and secure China will contribute to peace and stability in Asia. We should seek further cooperation with the Chinese in trade, education, and certain dual-use technology transfers. Militarily, we should await their lead, but provide reasonable conventional warfare assistance as they are willing and able to absorb it and as we are willing to give it. Obviously, we should not ally militarily with the PRC. In foreign policy, we should practice what George Quester calls "constructive ambiguity," an art known well by the Chinese themselves. And, very important, all relations with the PRC must be undertaken with consideration of the views of our allies and friends, both in the Far East and in the West. ■



Free markets, unheard of during the Cultural Revolution in the 1960s and 1970s, are now a common sight—in both the cities in the east and the villages in other parts of the country.

that basic, orthodox, Communist-Marxist principles point the way to solution of China's problems. Deng is challenging this group head-on and is moving fast to remove them from positions of influence, but they linger still.

Second, decentralization and decontrol of all but the most important industries (for example, power generation and steel) threaten a well-entrenched bureaucracy. As long as unsympathetic bureaucrats hold critical jobs, their ability to impede progress is unquestionable.

Third, the military sees the great emphasis on economic develop-

combat-capable force, with younger leadership more responsive to modernization. The reforms seem to be paying off, and, for the moment, internal military resistance has declined as a problem.

Another series of problems—beyond the scope of this article—has to do with broader economic and monetary implications of the programs Deng is seeking to implement. The whole subject of pricing—how government subsidies of rent, food, and industrial products will play in the new free market—remains unresolved. Unemployment and underemployment will

Greater care on small procurements is reducing the spare-parts pricing problem.

Better Ways To Buy

It's the small stuff that causes nearly all of the problems. With its work load going up and its manning levels going down in the 1970s, the Air Force put most of its procurement talent on the big dollar items and gave minimal attention to the nuts and bolts and claw hammers. There wasn't enough money to cover all requirements, so priority went to building force structure rather than to keeping supply bins filled. Small items were bought in dribs and drabs, without much regard for economic order quantities or thought of shopping around for a better deal.

But that was before spare-parts overpricing became a matter of national outrage two years ago. Most instances of overpricing—such as the now-infamous \$916 stool cap—were discovered by the armed forces themselves, but that has hardly stilled a decibel of the uproar. Today, small procurements get plenty of attention at high levels and low, according to panelists at an Aerospace Education Center Roundtable on spare parts held last January 14.

Last year, Air Force Logistics Command screened 60,677 parts (some of them involving technical data packages three or four feet high) for price reasonableness, said Brig. Gen. Richard D. Smith, AFLC's DCS/Contracting and Manufacturing. The Command now seeks competitive bids for 12,564 items previously bought in sole-source procurements. AFLC has added 1,000 new people to work on spare-parts pricing and will have another 1,500 similarly engaged by FY '86.

Maj. Gen. Alfred G. Hansen, USAF Director of Logistics, Plans and Programs, said that the Air Force has about 500 spare-parts initiatives in progress and that substantial cost savings have already been validated as a result. Brig. Gen. (Maj. Gen. selectee) Bernard L. Weiss, USAF Director of Contracting and Manufacturing Policy, said six fundamental policy changes have been put into effect. These include:

(1) The Air Force will seek unit price integrity on each item rather than settling for statistical pricing techniques, (2) spare-parts purchases will be broken out from prime contracts whenever possible in order to increase vendor competition, (3) items will be bought in economic order quantities, (4) contracts will be written to encourage cost reduction, (5) USAF will seek data rights on what it buys so that different manufacturers can make the item, and (6) refunds will be sought when overpricing is found.

One difficulty is that there are so many spare parts—860,000 of them used by the Air Force today as compared to 830,000 a year ago—and most of them are low-value items. General Smith said that seventy-four percent of AFLC's contracts account for only 1.7 percent of the procurement dollars spent.

Dr. Jacques S. Gansler of the Analytic Sciences Corp. noted that about a third of the Air Force's plant representatives are focusing on spares, which amount to something like only four percent of the procurement dollars they're responsible for managing. He cautioned against an imbalanced use of resources to solve a controversial but relatively small problem. He also said that more solutions would be found in the early phases of the acquisition cycle, when system support considerations are first addressed, rather than in policing the tail end of the cycle.

Some solutions may lead to a new generation of problems. Data rights are expensive, and time of purchase is critical, said Maj. Gen. Dewey K. K. Lowe, Commander of the Sacramento Air Logistics Center. "If you buy data too early," he said, "you get the wrong data. If you buy data too late, you don't have the opportunity to compete." Another hitch, General Weiss said, is that small subcontractors, especially in avionics, have built their entire companies around a few products. They are not about to sell their proprietary data rights for less than huge sums. Nor does it make sense for the government to drive out such small businesses from the shrinking industrial base by insisting on that data.

General Smith said that because of the extra care being taken on spare-parts pricing, the average lead time on a procurement request shot up to 106 days last year, compared to fifty-four days in 1983. He said, however, that he thought it possible to cut that lead time.

William Missimer, executive vice president of Pratt & Whitney, said that in the past the defense industry checked incoming orders to see that the pricing approach was done properly—"that it was legal." Now, he added, "we're checking them for reasonableness." He said that while there are many instances of underpricing to balance those of overpricing and that although charges of profiteering will not stand up, it's a tough position to defend because "the charges were short and punchy and the answers were long and boring and complicated." Besides, he said, after all the explanations are given, "no hammer should cost \$400, no bolt should cost \$17.59, and nobody in his right mind would pay more than a couple of bucks for an Allen wrench."

Over the years, General Weiss said, busy people have become "order takers and order givers" instead of buyers, concerned with getting things on time and insufficiently attentive to consumer-like care. The Air Force writes some 5,100,000 contract actions a year; total elimination of every instance of overpricing is probably impossible. Thanks to the high priority assigned to the problem, though, substantial gains are noticeable now, and further improvements are surely on the way.

—J.T.C.

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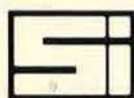


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The Pentagon says it's critical to recruiting and retaining a volunteer force. Others say it's too lavish and too costly.

Tearing Apart the Retirement Package

CONGRESSIONAL staffers, speaking at an Aerospace Education Center Roundtable on February 7, said the defense community may be making a big mistake if it digs in and refuses to cooperate in changes to the military retirement system.

Patrick A. Tucker, counsel for the Senate Armed Services Committee, said that the retirement system is a prime target for congressional budget-cutters. The audience, composed largely of military members and representatives of veterans' organizations, needed no convincing that the system is under attack. Less than forty-eight hours earlier, Budget Director David Stockman had lashed out at it with stunning insensitivity (see also "*The Bulletin Board*," p. 142).

Karen S. Heath, professional staff member for the House Armed Services Committee, said that although members of her committee understand the military and the retirement system, most congressmen do not. The committee, she said, would prefer to work with the Pentagon in achieving changes that make sense. Ms. Heath said that reduced Cost of Living Allowances ("diet COLAs") will probably be insufficient to satisfy Congress, which will want to see some structural changes to the retirement program as well.

Mr. Tucker said that if the defense community is obstinate, opposes any change at all, and declines to participate in shaping the changes, "It could be that the best friends of the military on the Hill—the two armed services committees—may not get to participate either." Ms. Heath said she can envision changes being forced through floor amendments by congressmen who look at the dollars involved and nothing else.

Tidal W. McCoy, Assistant Secretary of the Air Force for Manpower, Reserve Affairs and Installations, saw it as less certain that "a big wave is sweeping in to the coast, and everybody should get up in a banana tree." He said that the retirement system is critical to attracting and retaining military manpower, and that's why he and other defense leaders are so strong in their support of it.

Lt. Gen. Edgar A. Chavarrie, Deputy Assistant Secretary of Defense for Military Personnel and Force Management, said the retirement system was not designed to be an old-age pension. He said that it "exists for one purpose only—to help us meet the national defense requirement with a ready force." It is, he said, the price for a volunteer military force.

"Career decisions are influenced in large part by the long-term security provided by the retirement system," said Lt. Gen. Duane H. Cassidy, USAF DCS/Manpower and Personnel. He asked the question of the evening: "Why are we accepting that there *must* be change?"

The panelists identified two perceptions—that military retirement benefits are lavish, and that the nation cannot afford them—as basic to the demand for change.

Mr. McCoy said that the total income—working salary plus retirement—for a civilian airline mechanic is twenty-two percent greater than the lifetime earnings of an Air Force aircraft maintenance specialist who retires and who has a second career and a second retirement.

"The real cost [after inflation] per military retiree has declined two percent since 1980, while Social Security real cost per recipient has grown by eleven percent," Mr. McCoy said.

The overall cost of the military retirement program is still growing because the retiree population reflects the mid-1950s decision to maintain a large standing force. "We have 1,400,000 people receiving payments from the fund, and we expect it to level out at 1,600,000 and stabilize," General Chavarrie said. "This means that, unlike many other federal programs, the military retirement system is maturing. The number of new eligibles for retired pay is not expanding."

In October 1984, he said, the military retirement system moved to an accrual accounting basis. A trust fund was established at the Treasury Department, and retirees are now paid from that. Fund assets will come from DoD, the Treasury, and investments. Since retirement was funded year by year in the past, with no money set aside to provide for future obligations, it will take seventy-five years to amortize the unfunded liability.

General Chavarrie said that the only aspect of retirement cost that could affect the federal deficit is actual outlays to today's retired members. Structural changes to the retirement system for future retirees will not reduce current or near-term outlays and thus could not help immediately in deficit reduction.

Changes implemented in the past few years have already reduced the lifetime value of the retired pay package, General Cassidy pointed out. Mr. Tucker said it will take a tremendous job of explaining and convincing to head off further changes.

"But if the case for the retirement system had been made half as well as the case for how changing it is terrible," he said, "we wouldn't be here tonight talking about it."

—J.T.C.

A photograph of an aircraft wreckage in a dense jungle. The wreckage is heavily rusted and partially obscured by lush green foliage. The scene is set in a thick forest with various tropical plants and trees. The lighting is dappled, suggesting sunlight filtering through the canopy.

Aircraft wreckage in the
Bougainville jungle settles a
forty-year-old controversy.

IN SEARCH OF YAMAMOTO



Bougainville Island jungle claims the remains of the Japanese Betty bomber in which Admiral Isoroku Yamamoto died on April 18, 1943. USAAF P-38 fighters from Guadalcanal ambushed Yamamoto's flight.

BY TERRY GWYNN-JONES

HE introduced himself as Raphael Bukiri—the son of Nu Nu. He was to be our guide to “*ples bilong balus pundaun bikpela bilong Japan*,” he explained in pidgin (the place where the airplane of the big man from Japan came down).

We met Raphael on a mud track deep in the jungle of Bougainville Island. The most westerly of the Solomon Islands, Bougainville was the scene of bitter fighting during World War II. Our interest lay not with the rusting landing barges, guns, and tanks that still litter the Torokina beachhead, but rather in locating the hulk of a Mitsubishi Type 1 Betty bomber.

Over this dense jungle, arguably the most significant combat victory of the war against Japan was won. If one isolated mission could be singled out as a turning point in the Pacific war, it was the aerial ambush of Japan's greatest strategist—Admiral Isoroku Yamamoto. On April 18, 1943, while on a flight to inspect the Bougainville-Truk area, Yamamoto's Betty bomber was shot down by fighters of the United States Army Air Forces.

The wreckage of the Admiral's aircraft was said to be somewhere in deep jungle near the village of Aku. Our expedition would not only reach the remains of the aircraft, but would also solve a long-standing controversy over who actually shot down Yamamoto.

The chain of events that brought us to the fetid, equatorial jungle began in April 1943. According to official reports, an American Navy radio operator monitoring Japanese radio messages at his lonely listening post intercepted a coded signal. It advised Japanese units that the Commander in Chief of the Combined Fleet, Admiral Yamamoto, was to make an inspection of the Bougainville-Truk area. The message included the exact itinerary and concluded with a reminder that the Admiral was most punctual.

Since December 7, 1941, when he masterminded the Japanese attack on Pearl Harbor, Yamamoto had commanded the Japanese fleet as it ranged across the Pacific. As Japan's leading military strategist and architect of the world's most powerful naval air arm, the Admiral commanded the total respect and admiration of the Japanese military. To the men who served under him, Yamamoto was a god, and they gave him a personal loyalty that bordered on the fanatic.

The Japanese were not aware that their naval code had been broken, allowing the Allies to eavesdrop on their plans. The tactical edge this gave the Allies had already proven decisive at the Battle of Midway in June 1942. The ability to decode Japanese fleet messages had enabled the carrier-borne bombers of Adm. Chester Nimitz's Pacific Fleet to decimate Yamamoto's force of aircraft carriers.

“Had we lacked early information of the Japanese movements, the Battle of Midway would have ended differently,” Nimitz wrote of the naval engagement that turned the tide of the Pacific war.

Ten months after that crushing defeat, it was again to be the work of a radio operator that would lay bare Yamamoto's plans. But this time it would cost him his life.

The details were rushed to Washington, where Secretary of the Navy Frank Knox reportedly held a midnight meeting with President Roosevelt. They realized that the death of Yamamoto could have devastating consequences on Japanese naval-aerial strategy, as there was no other officer with his brilliance or stature to take over. Accordingly, a decision was reached to use the information to plan an aerial ambush during Yamamoto's flight to Bougainville.

Much to the Navy's disappointment, USAAF Lockheed P-38 Lightning fighters based at Henderson Field on Guadalcanal were



USAAF Capt. Thomas G. Lanphier, Jr., right, receives the Distinguished Flying Cross and Silver Star at wartime ceremony in the South Pacific. Lanphier led a flight of four P-38s in attacking the Japanese Bettys. Both he and his wingman, Lt. Rex Barber, shot up the bomber carrying Yamamoto, but it was Lanphier who administered the coup de grâce. In 1947-48, Lanphier served as President of the newly formed Air Force Association.

chosen for the mission. They were the only fighter aircraft available with sufficient range to make the 870-mile return flight to Bougainville. To do so, they had to be equipped with special long-range tanks, which were rushed to the island.

The Yamamoto Mission

At 0725 on April 18, sixteen P-38s headed out from Henderson Field, led by Maj. John W. Mitchell, commander of the 339th Fighter Squadron. The force was made up of pilots from the 339th, 70th, and 12th Fighter Squadrons. To ensure complete surprise, they followed a circuitous route, staying clear of Japanese-held islands. Knowing Yamamoto's planned time of arrival at Ballale (near the southern tip of Bougainville), Mitchell planned to intercept the Japanese formation about thirty miles out. If he matched Yamamoto's punctuality, the attack would take place at 0930.

"Our flight to the target was uneventful," Mitchell recalled. "We maintained an altitude of fifty feet throughout the trip, and I navigated with a clock and compass. We arrived near the interception point

only one minute off ETA, and just as we made landfall, my wingman, Lieutenant Canning, called out, 'Target at eleven o'clock high!'"

The Japanese formation comprised two Mitsubishi Type 1 Betty bombers and a protective cover of six Mitsubishi Zero fighters. Yamamoto and eight senior officers of his personal staff were divided between the two bombers. The senior officer in the second Betty was Vice Adm. Matome Ugaki, Chief of Staff of the Combined Fleet. He later recorded in his diary the events that followed:

"Without warning, the motors roared and the bomber plunged toward the jungle, close behind the lead airplane, leveling off at less than 200 feet. Even as we pulled out of our dive, our escorts turned into the attacking enemy planes, now identifiable as the big Lockheed P-38s. The numerically superior enemy force broke through the Zeros and plunged after our two bombers."

While the main force of P-38s climbed to intercept the enemy fighters, a flight of four, led by Capt. Thomas G. Lanphier, Jr., of the 70th Squadron, attacked the bombers.

Lanphier radioed his pilots to drop their long-range tanks. The flight dove to intercept the two Bettys, which by then were desperately racing south, just above the jungle canopy. One bomber turned inland; the other fanned out toward the sea.

Lanphier and his wingman, Lt. Rex Barber of the 339th, headed inland after the Betty, which, they would later find out, carried Admiral Yamamoto. Lanphier was positioning to open fire when he was attacked by a Zero and forced to defend himself. Barber took over the attack:

"I started to shoot at the bomber immediately, pressing my attack to less than a plane's length from him," Barber reported. "His rudder and a good portion of his vertical fin came off. He must have slowed down very quickly, for he seemed to do a quarter snap. As I went over him, I nearly hit his upturned wing. As I caught my last glimpse, the plane was almost on its back and smoking."

Having shot down the Zero, Lanphier turned back to attack the bomber. He wrote in a newspaper article in 1946: "I applied myself to my gunnery and, taking no chances

of missing, began firing a long steady burst across the bomber's line of flight, from approximately right angles. Long before I considered myself in range, the bomber's right engine, and then the right wing, began to burn. I had accomplished my part of the mission. Once afire, no Japanese aircraft ever ceased burning short of blowing up.

"Out of the bomber's tail was puffing a steady series of shots from the cannon lodged there. My belly already scraping the trees, I could not duck under its line of fire. I hesitated to pull above it, as I was already going slow. I would be left hanging, a sitting duck for a bothersome pair of Zeros scurrying around into position to make a pass at me.

"Apparently, the only numbers up for liquidation that day were all Japanese, however, for just as I moved into range of its cannon, the bomber's right wing came off, and it plunged into the jungle and exploded."

Aboard the second Betty, trying to escape out to sea, Admiral Ugaki watched his commander's aircraft. He wrote: "For a few moments, I lost sight of Yamamoto's plane and finally located the Betty far to the right. I was horrified to see the plane flying slowly just above the jungle, headed to the south, with bright orange flames rapidly enveloping its wings and fuselage. About four miles away from us, the bomber trailed thick black smoke, dropping lower and lower. Sudden fear for the Admiral's life gripped me."

At that moment, Ugaki's aircraft was attacked, and the pilot took evasive action. When he was in a position to look for Yamamoto a few seconds later, the end had come: "Yamamoto's aircraft was no longer in sight. Black smoke boiled from dense jungle into the air. Alas! It was hopeless now!"

Ugaki's aircraft was shot down moments later. It crashed in shallow water. Miraculously, Ugaki, his pilot, and one other passenger escaped from the submerged wreck.

The Controversy Begins

The P-38s formed up and headed back to Guadalcanal. With both Bettys and three Zeros shot down for only the loss of one P-38, the

mission was an unqualified success. Yamamoto and seven of his staff officers were dead.

Following the debriefing, Lanphier was credited with having brought down Yamamoto's aircraft despite Barber's belief that the Betty could not have survived his attack. In the years that followed, a controversy grew as to which pilot had gotten Yamamoto. Even the Thirteenth Air Force documentation somewhat vaguely stated: "It was difficult to determine which pilot had been the cause of Yamamoto's immediate death, though available evidence indicates that credit should probably go to Captain Lanphier."

The mission commander, Colonel Mitchell, believing that Lanphier received premature and unjustified credit over Barber, stated: "Whereas it is possible that Lanphier did shoot down Yamamoto, it is also just as possible that Barber shot him down—fifty percent for one and fifty percent for the other. I allowed that each had got a bomber, but that no one on God's earth knew which had shot down the aircraft carrying the Admiral." Over the years, it became widely accepted that both pilots had attacked the aircraft and inflicted severe damage and that a question mark hung over Lanphier's credit.

Even the prestigious *American Aviation Historical Society Journal*, in a detailed investigative article published in 1967, stated: "Whereas there is evidence supporting Lanphier's well-established credit, there is evidence of equal stature amply supporting the possibility that Barber shot the plane down. Perhaps firm, irrevocable proof that one or the other was the victorious pilot will come to light. Until such proof is presented, it seems only fair that Lanphier and Barber share the credit."

The first person to reach the crash site was a young Bougainvillian named Nu Nu. He had been walking near his village of Aku when he heard aircraft in the distance. Moments later, as he came to a small clearing, Nu Nu saw Yamamoto's aircraft faltering overhead, trailing smoke from an engine. Hearing the rattle of gunfire, he next saw a smaller aircraft attacking the bomber. Flying very low

over the jungle, both passed out of sight quickly. Seconds later, he heard an explosion and guessed that one aircraft had crashed.

Nu Nu climbed a tall tree and was able to see smoke rising above the jungle canopy a mile or two away. He set off to search for survivors. It took him some time to reach the wreckage. The cockpit area had exploded on impact, and the occupants had been burned beyond recognition. One unburned body, still strapped in the seat and clutching a ceremonial sword, had been hurled clear on impact.

There was nothing he could do, so Nu Nu returned to the village. Later that day, a Japanese road-building company passed through the village, and he told them of the crash. The following morning, a detachment of Japanese soldiers came to the village, and Nu Nu led them to the crash site.

The unburned body strapped in the copilot's seat was that of Admiral Yamamoto. The fact that his lifeless hands still clutched his ceremonial sword led to fanciful reports, after the war, that Yamamoto had committed aerial *hara-kiri* during the attack. This was clearly not the case, for the official Japanese postmortem disclosed that Yamamoto was killed by a burst of machine-gun fire through his head. The Admiral had died before the Betty's final plunge. His body was cremated at the nearby Japanese headquarters at Buin, and his remains were returned to Japan.

The action received no publicity at the time despite the great morale boost the news would have given the American and Australian public. If it had been announced that Yamamoto's aircraft had been shot down, the Japanese would have realized that their code had been broken. There was no other way the Americans could have known that Yamamoto was on board.

The US government had another reason for keeping the news quiet. Lanphier's brother was a prisoner of the Japanese, and officials feared for his life.

The Crash Site Today

Our journey from Kieta (the capital of Bougainville) to Aku took six torturous hours by four-wheel drive. The mud track switchbacked

over the Crown Prince Ranges, which are the island's mountainous backbone. We had hoped that Nu Nu himself would lead us to the crash site, but, too old to make the trek through the swamps easily, he sent his son Raphael. We mud-slogged in single file as Raphael and several young villagers blazed a trail with their machetes. Frequently we waded waist-deep in oily black swamp water. After two hours in the enervating steam-bath heat, we heard a triumphant shout from the head of the line.

About ten paces away lay a skeleton of mold-covered metal. We had found the tail turret of Yamamoto's Betty. Ahead in the undergrowth was a small clearing. In it lay the remains of the aircraft. Despite the catastrophic damage from the crash and the ravages of jungle decay, the remains were still clearly identifiable. The tall triangular fin and round tubular fuselage bore the unmistakable lines of Japan's most successful World War II bomber.

Only a couple of yards away, on the left side of the fuselage, lay the mangled remains of the inner section of the port wing. Close by was the port engine. The metal fins of its bank of air-cooled cylinders had almost disappeared beneath a maze of moss and fern sprouting atop the aluminum. Twisted propeller blades testified to engines roaring under power at that final instant when the aircraft flipped over and dove into the jungle.

The starboard engine was nearby, as was the outer section of the port wing. On it could be seen a portion of a Rising Sun insignia. The fuselage lay in knee-deep water, and we discovered two generators, a fuel tank, and other wreckage in the undergrowth. A towering tree stood adjacent to the tailplane. From the distribution of the wreckage, it was clear that, as the aircraft plunged down, the massive trunk had sheared the port wing and tailplane from the fuselage. The twisting body had struck nose down, and the



cockpit area had been demolished.

We had finished photographing the site and I had made a sketch of the disposition of the wreckage when Raphael asked if we wished to see the rest of the wreckage. To our surprise, he took us several hundred yards back into the jungle in the direction we had established as the final flight path of the aircraft. There he proudly showed us the relatively undamaged outboard section of the starboard wing. It lay in a dry, shaded area and was consequently unmarred by mold. Only a little rubbing was needed to bring back the gloss on the Japanese roundel.

Bullet holes had punctured the skin in several places, and there were still signs of burning where its jagged stump had separated from the starboard engine. Now, also having the benefit of Nu Nu's recollections, I was able to picture the last moments of battle.

The Controversy Settled

Yamamoto's Betty, already mortally wounded, its starboard engine on fire, was skimming the treetops, desperately trying to reach the airstrip at Buin, less than fifteen miles away. As it passed over Aku, a P-38 got in a final burst. The combination of bullets stitching the wing and burning fuel caused the main spar to fail, and the outer wing ripped off. The aircraft carried on a short distance as it rolled over into the jungle. When the gyrating aircraft hit the tree, the fuselage had rolled upright. Only the cushioning effect of the swamp prevented it from disintegrating totally on impact.

I was able to imagine that final horrific moment when the helpless pilot, if he were still alive, realized he no longer controlled his aircraft. Mercifully, it would have been no more than a second or two before death put an end to it all.

It was not until I visited the Smithsonian National Air and Space Museum in Washington, D. C., following the Bougainville expedition, that I realized the significance of the disposition of the wreckage of Yamamoto's Betty. There was little doubt that the loca-

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Starboard wing with Rising Sun emblem lies several hundred meters from Bougainville crash site of Yamamoto's aircraft. The wing broke off over the jungle while Captain Lanphier was pressing his treetop-level attack. Inspection of the wreckage confirmed that rounds from Lieutenant Barber's P-38 had struck the tail section and had set up the Betty for Lanphier's kill.

tion of the starboard wing was the final evidence needed to settle the controversy.

Lanphier's report had clearly stated the Betty's wing came off in flight while he was attacking the aircraft. Barber specifically mentioned damage to the fin and tail only. Furthermore, Nu Nu's recollections of seeing the stricken Betty pass over with smoke and fire trailing from an engine seconds before it crashed added further weight to Lanphier's claim.

There is no doubt that Barber hit the Betty's tail area. Machine-gun damage was still evident on the tail fin of the wreckage. His attack seriously damaged and slowed the fleeing aircraft. With the plane's rudder and part of its fin shot away, the pilot would have been battling to maintain control, particularly when Lanphier subsequently shot up the right engine.

Indeed, Barber undoubtedly set up the Betty for his flight leader. But it was still flying and probably would have reached Buin or Ballale airfields a few minutes away. There now appears no doubt that it was Tom Lanphier who administered the *coup de grâce*. ■

A spontaneous trick by an Australian radio operator may have revealed Yamamoto's flight plan.

Intercept Down Under

Following an interview on Australian radio, I was approached by a listener who said she had important information regarding the Yamamoto matter. While conducting an oral history project at Melbourne's Deakin University, Nan Yates had stumbled on a claim made by an "unknown" Australian soldier. Shortly before he died, Ivo Riley, a former army radio operator, told Nan of his connection with the death of Admiral Yamamoto. What follows is based on her recorded interview.

It all might have never happened if Leading Aircraftsman Ivo Riley had not flunked out of training with the Royal Australian Air Force in 1942. Having managed to pass basic flight training in a docile little Tiger Moth biplane, he just couldn't handle the faster and trickier Wirraways.

Released by the Air Force, Riley enlisted in the Army. He eventually became a member of the Australian Special Wireless Group. The highly skilled band of operators was trained by American Intelligence to listen for and to record Japanese radio messages.

"We had to learn basic Japanese to be able to intercept their coded signals," he told Nan from a hospital bed shortly before his death. Riley recounted how, during months of duty at his listening post in Darwin in northern Australia, he monitored messages from a Japanese agent, codenamed *Yak*, in Afghanistan. *Yak* sent daily signals to an operator in Japan who signed off with the name *Togo*.

All the coded transmissions were logged and sent to an American Intelligence unit. He recounted that the United States had already broken the Japanese naval code.

Riley's Audacious Trick

One night the code changed, and Riley picked it up. "I shouldn't even have been on duty," he explained to Nan. "I was taking someone else's watch when *Yak* came on the air, sending a strange group of code letters."

Riley copied down the message and waited for *Togo* to acknowledge. *Yak's* signals had been unusually weak and obviously did not reach Japan, for no acknowledgment came. So for a "bit of a lark," Riley decided to answer. Using his knowledge of the old code, Riley sent a message to *Yak*.

"I sent a string of procedural signals and transmitted: 'We are not in possession of new code books; send message in old code.' " He signed off with *Togo's* identifier, crossed his fingers, and waited.

He had gone off duty when *Yak* came back on the air several hours later. "It was unbelievable, but *Yak* fell for it. He must have been mad," Riley recounted. The relief operator took down the old-coded message, and within minutes the information was on its way to the central unit. By comparing the two messages, American cryptanalysts quickly broke the new code.

Riley said he believed that the message they intercepted had given the itinerary of Yamamoto's inspection tour of the Bougainville-Truk area. If this is true, history may need to be rewritten. It seems more likely, however, that Riley's actions broke the new code, enabling the American operator at Dutch Harbor to intercept the fateful message some time later.

American Decorations Refused

Whatever the case, it appears that the United States military wanted to decorate Riley and the relief operator for their quick-witted coup. However, the Australian Army advised it was not policy to make individual awards under such circumstances.

Nan Yates asked why he had told no one of this episode over the years. Riley replied that he was still bound by an official secrets document he had signed when demobilized at the war's end. He had only decided to tell her because it had all happened so long ago and probably no longer mattered.

After Riley died, Nan Yates attempted to get official verification of his story, but ran up against military red tape. Several of his former comrades remembered the event, though. They, like Riley, were unable to pinpoint the exact date, but recalled that it occurred before the Yamamoto affair.

There are questions surrounding this account that may never be answered. It contradicts published history and lacks detail and dates. Nevertheless, Riley was dying and had little to gain personally from his story.

We may never know for sure, but maybe it was Ivo Riley's off-the-cuff ruse that forged the first link in this chain of events that ended with Tom Lanphier's five-gun burst.

—TERRY GWYNN-JONES

AIRMAN'S BOOKSHELF

A Durable Diplomat

The Right Hand of Power, by U. Alexis Johnson with Jef Olivarius McAllister. Prentice-Hall, Inc., Englewood Cliffs, N. J., 1984. 634 pages with photos and index. \$24.95.

For more than ten years in the 1960s and 1970s, the curious name of U. Alexis Johnson appeared with notable frequency on the front pages of the nation's newspapers. Whenever high-level decisions were being made by the US in international negotiations—the Cuban missile crisis, the Vietnam War, and the SALT talks were such times—that name was likely to turn up.

The Right Hand of Power is U. Alexis Johnson's account of his role at the center of many actions involving the White House and the Pentagon as well as the Department of State. It is also a personal narrative by a foreign service officer of his years in Japan, Korea, China, Brazil, Czechoslovakia, Thailand, and Vietnam. His career spanned seven Presidents and ten secretaries of state.

In collaboration with Jef Olivarius McAllister, this remarkably durable diplomat tells his story. He begins with his origins in 1908 in Falun, a town in a farm area of Kansas. He tells of his small-town banker father and doting mother, who taught piano and who had visions of their future. She named him Ural because she liked the "vigorous sound of the name" of those mountains in the USSR. (Twenty-three years later, when Ural was a student with his eye on the foreign service, a professor at Georgetown University suggested to him that "U. Alexis" would "ring more impressively in the halls of the State Department.")

During the Cuban missile crisis in 1962, Alex Johnson served on the Executive Committee of the National Security Council. The Committee met daily for thirteen days, from October 16–28, to consider and carry out the government's response to the USSR's introduction of medium- and intermediate-range nuclear missiles into

Cuba. Alex Johnson was, according to Theodore Sorensen in his book *Kennedy*, one of "fourteen or fifteen men who had little in common except the President's desire for their judgment."

This committee was one of several attempts by the executive branch over the years to manage crises by organizing senior interdepartmental groups "to establish a mechanism for settling major matters of policy quickly and decisively." Johnson tells of these and how they worked in contingencies.

There were many times in his forty-two years in the foreign service—from Presidents Roosevelt to Ford—when Alex Johnson saw the next decade's headlines in the making: in pre-Pearl Harbor Japan, in Korea, and in Manchuria in the late 1930s. He knew the Japanese and spoke their language. His observations help explain what motivated the Japanese in the Pacific war a few years later.

The former diplomat is blunt and sometimes harsh in his characterizations of presidents, secretaries of state, defense secretaries, military officers, senators, and foreign leaders. He is especially critical of Henry Kissinger, whom newly elected President Nixon chose as his National Security Advisor in January 1969. "From the start, it was obvious that Kissinger was extremely insecure and had an obsession, which persisted throughout his White House years, that the State Department and foreign service were determined to undermine him. . . . The President and Kissinger never lost an opportunity to humiliate and degrade [Secretary of State] Bill Rogers, both publicly and privately." Johnson speaks of being "mised blatantly by Henry" and of Kissinger's "addiction to Machiavellian intrigue."

Because of the author's personal involvement at the highest levels of government, *The Right Hand of Power* is an extraordinary contribution to our understanding of foreign relations and military affairs since the 1940s. His memoir includes behind-the-scenes insights into negotiations on overseas military bases, uses of

outer space, and control of nuclear weapons.

From February 1973 until the beginning of the Carter Administration four years later, when he retired, Alex Johnson was Ambassador at Large and chief of the United States delegation to the Strategic Arms Limitations Talks with the Soviet Union. He served as Ambassador at various times to Czechoslovakia, Thailand, and Japan. He was the US coordinator during the Geneva Conference in 1954, Deputy Ambassador in Saigon for fourteen months in 1964 and 1965, and Under Secretary of State for Political Affairs during the major part of the Vietnam War.

Alex Johnson shares his unique vantage point with readers in a style that makes interesting and even exciting reading. He reminds us of policies and positions that many Americans have forgotten: US and Soviet positions on space reconnaissance (the Soviets wanted to ban it); the US goal in Vietnam, from Truman through Nixon (to persuade the North to stop what it was doing to the South); and the historic need for military forces in order "to accomplish our national aims while deterring a fight" (the Cuban missile crisis was resolved chiefly because of our military strength, plus deft diplomacy). He makes a strong case for State and Defense Department politico-military planning and long-term budget collaboration.

Johnson's memoir tells us very little about his family or his private life. His assignments forced him to spend extended periods away from his wife, Pat, and their four children. He often worked long hours—"ten hours a day, six days a week." He took pride in being the person everyone expected always "to get things done." In February 1972, he suffered "a fairly severe heart attack that put him out of circulation until April."

It is significant—though ironic—that Henry Kissinger writes in his book *White House Years*: "One of the most distinguished foreign service officers, skilled, disciplined, prudent, and loyal, Alex Johnson represented

with great ability an institution that I grew to admire—the corps of professional diplomats who serve our country with anonymity and dedication, regardless of Administration, and who thereby assure continuity of our foreign policy.”

I'd recommend this book to young professionals, military or civilian, who want to broaden their world view while acquiring pointers on how to succeed in a large organization; to those who participated in the events that U. Alexis Johnson relates; and to anyone who wants to read an interesting, well-researched, amply indexed review of international affairs over the last forty years.

—Reviewed by Frank W. Jennings. Mr. Jennings served for more than twenty-five years as editor of the Air Force Policy Letter for Commanders.

A True Hero

Into the Mouth of the Cat: The Story of Lance Sijan, Hero of Vietnam, by Malcolm McConnell. W. W. Norton & Co., New York, N. Y., 1985. 253 pages. \$13.95.

This is a hero story that transcends other hero stories. It is the saga of a young Air Force pilot who, consciously and deliberately over a period of two and a half months, risked and finally lost his life in the service of his country—not only to save endangered comrades, not to attack a target of supreme importance, not to carry out a suicide mission, but simply and directly to live up to some basic principles embodied in the Code of Conduct for Members of the Armed Forces of the United States.

More than 3,000,000 Americans served in the war in Southeast Asia; more than 58,000 died. Only 238, living and dead, were awarded the Medal of Honor; of them, only twelve were in the US Air Force. Lance P. Sijan, Hero of Vietnam, was one of these. When the reader has finished this book, he will understand why Sijan deserved to be included in this small group of heroes.

Malcolm McConnell has done a superb job of reconstructing the story of Captain Sijan's incredible personal heroism—from the moment he ejected from his flaming Phantom over the mountainous jungles of Laos, through the crushing disappointment of an unsuccessful rescue attempt, the agony of dragging his crippled body through wet, leech-ridden undergrowth for more than six

weeks, his brief period of freedom after escaping his first captors, and his final capture, torture, and death.

Lance Sijan was shot down on November 9, 1967, while on a mission over Laos. He sustained a compound fracture of his left leg, a smashed arm, a head injury, and many cuts and bruises. Almost delirious, he made contact by radio with rescue forces, which began a monumental rescue attempt involving more than 100 aircraft.

At twilight, the rescue forces succeeded in locating him precisely, and a hovering helicopter lowered a jungle penetrator about twenty feet from where he lay concealed. Because he could hear North Vietnamese troops moving through the jungle on the slopes below his hiding place, Sijan radioed that a pararescueman should not risk coming down to help him climb into the rescue device: "I'll crawl to you."

But more than a half hour later, when the rescue effort was called off because of approaching darkness, he had not reached the penetrator. The next day, when rescue forces returned, there was no response to their radio calls. Lance Sijan had begun his incredible, pain-ridden journey that would end in his heroic death.

For six weeks, at first living off leeches, ferns, and beetles, and later only on water, he crawled through the jungle. Using his one good arm and leg, he relentlessly advanced on his back along trails made by small jungle animals. Forty-six days after being shot down, on Christmas Day 1967, he was finally captured.

Even his captors were shocked at his emaciated physical condition, with bones and gristle breaking through his skin. Nevertheless, he was able to administer a karate chop to his North Vietnamese guard and escape back into the jungle. Torrential monsoon rains helped to cover his tracks while adding to his misery, but he soon collapsed on the edge of a road and was again picked up, unconscious, by the North Vietnamese.

This time, he was too weak to escape. Placed in the care of two other American prisoners, he talked during his lucid moments of little else but escape. Until he died, Lance Sijan made it clear that he was following the Code of Conduct, which requires American fighting men never to surrender of their own free will, to resist capture and to attempt to escape if captured, and, if questioned, to evade giving any answers. This he did, even when he was kicked, beaten, and tortured by his captors in the North Vietnamese prisons. Each time, he ex-

plained that the Code required that he not answer his tormentors' questions. In between questioning sessions, when lucid, he discussed plans and possibilities for escape.

Lance Sijan died in captivity of his wounds on January 21, 1968. He was awarded the Medal of Honor posthumously, based on the testimony of the two American pilots who cared for him in prison.

At times while reading this story of horror, pain, and suffering, the reader may wonder if Sijan was not a hero but a fanatic, acting not out of patriotism and devotion to duty but instead reacting mindlessly and rebelliously to the tortures he endured. Author McConnell skillfully establishes Sijan's true heroic character by exploring his life, his background, his relationship with his family and his girlfriend, as well as his expressed philosophy of life. He shows a normal American young man who did well in school and athletics, worked part-time in the family business, and became an exemplary cadet at the Air Force Academy. In this book, he is established as a true hero for all Americans, especially the military.

A portrait of Lance Sijan in combat flying gear hangs today in Sijan Hall, an Air Force Academy dormitory, as an inspiration to the cadets and to all American military people to live up to the highest goals of the profession.

This should be required reading for all Americans in uniform. Lance Sijan's example stands for us all.

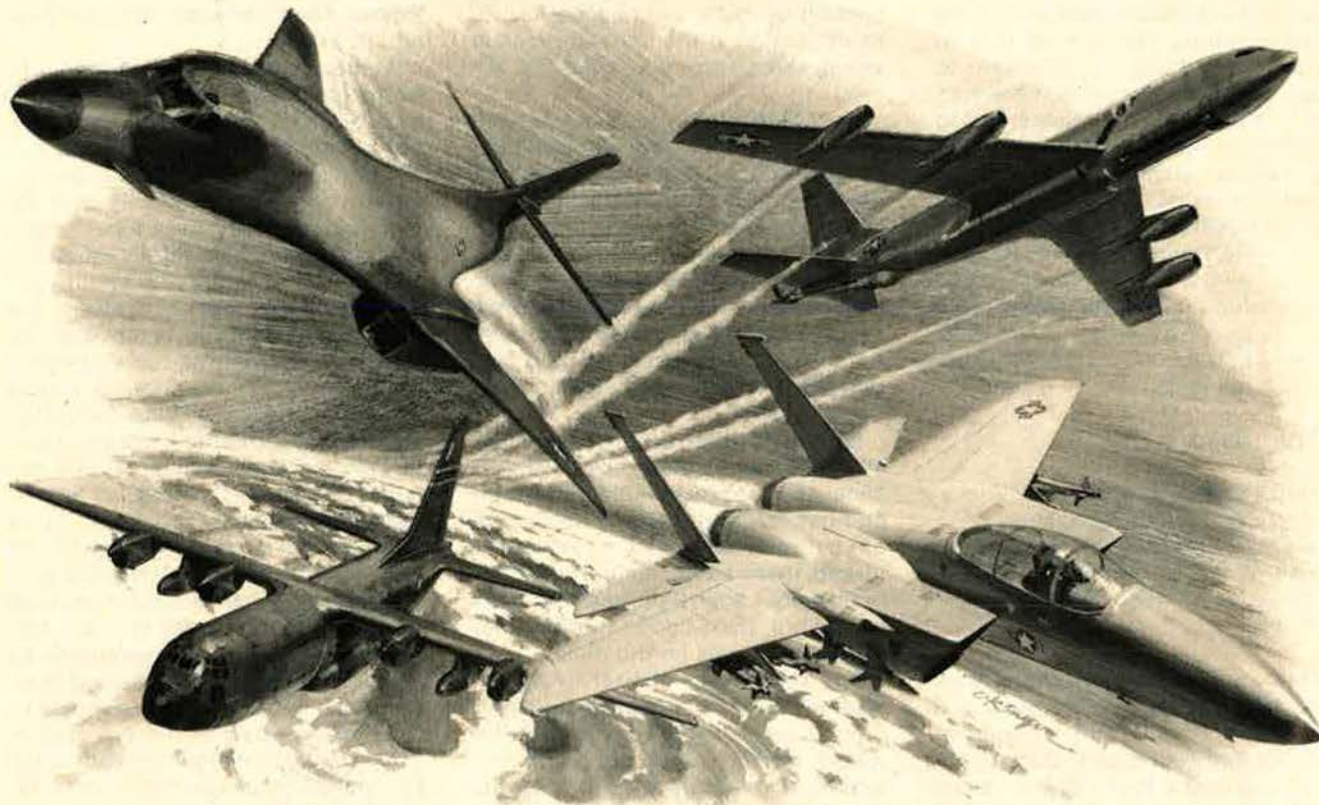
—Reviewed by James P. Coyne, Senior Editor.

New Book in Brief

California Wings: A History of Aviation in the Golden State, by William A. Schoneberger with Paul Sonnenburg. This is not the definitive, in-depth history on the subject. But who cares when the book is so attractive and written with such brio? Remarkably, given the breadth of the subject, the author does quite a creditable job of providing an overview of the rich aviation history of the Golden State in all its aspects: commercial airlines, manufacturing, research and development activities, military aviation, and so on. A special bonus of the book is a section on "Partners in Industry" that features an assortment of photos of California aviation pioneers and leaders. With a foreword by Robert J. Serling, and bibliography and index. Windsor Publications, Inc., Woodland Hills, Calif., 1984. 192 pages. \$24.95.

—Reviewed by Hugh Winkler, Assistant Managing Editor.

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APRIL 1985



Hughes Model 530MG Defender combat helicopter flies near the Grand Canyon during testing in Arizona

HUGHES

HUGHES HELICOPTERS INC (Subsidiary of McDonnell Douglas Corporation): Centinela and Teale Streets, Culver City, California 90230, USA

HUGHES MODEL 530MG DEFENDER

In late 1982 Hughes Helicopters began development of the Hughes 530MG Defender, based on the airframe and power plant of the commercial Model 530F Lifter. In consultation with experienced helicopter combat pilots, Hughes developed what is claimed to be the most advanced military helicopter

crew station in the world, with the basic philosophy of reducing the two-man crew workload by relieving them of critical decisions and time-consuming aircraft management tasks. The integrated crew station developed for the 530MG makes use of recent developments in control and display systems technology to provide a compact multi-function display which enhances cockpit field of view and enables hands-on control of the helicopter at all times, with all weapons delivery, communications management, and flight control conducted via the collective and cyclic sticks. It reflects many of the

technologies expected to be standard for the US Army's LHX advanced helicopter series.

Design of the Hughes 530MG was finalised between September and November 1983, with metal cutting for the first demonstration aircraft (N530MG) beginning in the latter month. This aircraft made its first flight on 4 May 1984, completed the first TOW missile firing on 17 July, and had finished all weapons qualification trials by 23 July. In August 1984 the aircraft had completed some 100 hours of flying before being dismantled for shipment to England, where it made its first public



Mast mounted sight and undernose night vision system enable the Hughes Model 530MG Defender to be used for nap-of-the-earth and low-level night missions over rough terrain

appearance at the Farnborough Air Show in September before embarking on a four-month sales and demonstration tour of Europe, the Middle East, and Far East. Designed primarily for point attack and anti-armour missions, but equally suitable for scout, day and night surveillance, utility, cargo lift, and light attack duties, the Hughes 530MG Defender was expected to be ready for delivery in scout configuration by the last quarter of 1984, with the first TOW-firing version following about a year later. A programme is under way to develop an over-the-horizon capability for naval applications.

TYPE: Light multi-role turbine powered military helicopter.

ROTOR SYSTEM: Five-blade fully articulated main rotor, with blades attached to laminated strap retention system by means of quick-disconnect pins for folding. Each blade consists of an extruded aluminium spar hot-bonded to one-piece wraparound aluminium skin. Trim tab outboard on each blade. Main rotor blades can be folded. Two-blade tail rotor, each blade comprising a swaged steel tube spar with metal skin covering. Four-blade 'quiet' tail rotor, offering a claimed 47 per cent noise reduction, and a main rotor brake are optional.

ROTOR DRIVE: Three sets of bevel gears, three driveshafts, and one overrunning clutch. Main rotor/engine rpm ratio 1:12.594. Tail rotor/engine rpm ratio 1:1.956.

FUSELAGE: Aluminium semi-monocoque structure of pod and boom type. Clamshell doors at rear of pod give access to engine and accessories.

TAIL UNIT: T tail with horizontal stabiliser at tip of narrow chord sweptback fin; small auxiliary fin at tip of tailplane on each side; narrow chord sweptback ventral fin, with integral tailskid to protect tail rotor in tail-down attitude near to ground.

LANDING GEAR: Tubular skids carried on Hughes oleo-pneumatic shock absorbers.

POWER PLANT: One 485 kW (650 shp) Allison 250-C30 turboshaft engine, initially derated to 280 kW (375 shp) for take-off, but being cleared to 317 kW (425 shp) for take-off. Fuel contained in two interconnected self-sealing cells with combined usable capacity of 240 litres (63.4 US gallons). Refuelling point on starboard side of fuselage. Oil capacity 5.7 litres (1.5 US gallons). Internal auxiliary tank, capacity 79.5 litres (21 US gallons), available optionally.

ACCOMMODATION: Two crew (pilot and co-pilot/gunner).

AVIONICS AND EQUIPMENT: Advanced crew station features Racal Avionics RAMS 3000 integrated control and display system for all-weather and NOE flight, designed to operate with a MIL-STD-1553B interface and comprising a processor interface unit (PIU), a control display unit (CDU), and a data transfer device (DTD) linked by a dual 1553B data bus. A multi-function display incorporates a high resolution monochrome CRT with alpha-numeric and symbolic data overlay capability. The CDU incorporates a monochrome CRT with line keys and keyboard and can

be used to conduct all normal flight planning, navigational, frequency selection, and sub-system management functions by use of dedicated keys on the CDU keyboard. Data are transferred to the DTD from a ground loader unit via an RS-232C serial data link which is placed in a cockpit receptacle for update transfer to the data base of the PIU. Other equipment includes Astronautics Corpn. autopilot; Decca Doppler navigation system integrated with Racal Doppler velocity sensor; Ferranti FIN 1110 AHRs; twin Collins VHF/UHF AM/FM radios; King HF radio, ADF/VOR, radar altimeter and transponder; Telephonics intercom; and SFENA attitude indicator. Optional avionics include Hughes Aircraft TOW mast mounted sight system, FLIR, radar warning receiver, IFF, GPWS, and laser range-finder.

ARMAMENT: Standard 14 in NATO racks for external stores. Weapons qualified or tested by September 1984 included TOW anti-armour missiles, FN pods containing two 7.62 mm or one 0.50 in machine-gun, and 2.75 in rockets in 7-tube or 12-tube launchers. Additional weapons are planned to include four General Dynamics Stinger air-to-air missiles and a 7.62 mm Hughes Helicopters Chain Gun. Chaff and infra-red decoy flares can be carried, with automatic chaff ejection on threat detection facility. Both cyclic sticks have triggers for gun or rocket firing; the co-pilot/gunner's visual image display has two handgrips for TOW/FLIR operation.

DIMENSIONS, EXTERNAL:

Main rotor diameter	8.36 m (27 ft 5 in)
Main rotor blade chord	0.171 m (6 1/4 in)
Tail rotor diameter	1.45 m (4 ft 9 in)
Length overall, rotors turning	9.80 m (32 ft 1 1/2 in)
Length of fuselage	7.49 m (24 ft 7 in)
Height to top of rotor head:	
no MMS	2.80 m (9 ft 2 1/2 in)
with MMS	3.41 m (11 ft 2 1/2 in)
Height over tail (endplate fins)	2.71 m (8 ft 10 3/4 in)
Width over skids	1.86 m (6 ft 1 1/4 in)
Tailplane span	1.68 m (5 ft 6 in)
Tailskid ground clearance	0.55 m (1 ft 9 1/2 in)

WEIGHTS:

Max normal T-O weight	1,406 kg (3,100 lb)
Max overload T-O weight	1,610 kg (3,550 lb)

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

Never-exceed speed	130 knots (241 km/h; 150 mph)
Max cruising speed:	
at S/L	119 knots (221 km/h; 137 mph)
at 1,525 m (5,000 ft)	122 knots (226 km/h; 140 mph)
Max rate of climb at S/L and up to ISA + 20°C	631 m (2,070 ft)/min
Vertical rate of climb at S/L:	
ISA	606 m (1,990 ft)/min
ISA + 20°C	558 m (1,830 ft)/min
Service ceiling	above 4,880 m (16,000 ft)

Hovering ceiling IGE:	
ISA	5,060 m (16,600 ft)
ISA + 20°C	4,265 m (14,000 ft)
ISA + 35°C	2,680 m (8,800 ft)
Hovering ceiling OGE:	
ISA	4,300 m (14,100 ft)
ISA + 20°C	3,475 m (11,400 ft)
ISA + 35°C	2,135 m (7,000 ft)
Range with standard fuel, 2 min warmup, no reserves:	
at S/L	180 nm (333 km; 207 miles)
at 1,525 m (5,000 ft)	203 nm (376 km; 233 miles)
Endurance with standard fuel, 2 min warmup, no reserves:	
at S/L	2 h 6 min
at 1,525 m (5,000 ft)	2 h 18 min

SHENYANG

State Aircraft Factory, Shenyang, Liaoning Province, People's Republic of China

SHENYANG J-8

Chinese name: Jianjiji-8 (Fighter aircraft 8) or Jian-8

Export designation: F-8

NATO reporting name: Finback

During an official visit to China in September 1980 a delegation from the US Defense Department, headed by the Under-Secretary for Research and Engineering, was allowed at Shenyang to see what was then described as 'a prototype' of China's J-8 air superiority fighter. It was reported at that time to be powered by a (sic) Tumansky R-11 turbojet engine, although there were suggestions that this power plant might be replaced in due course by the Rolls-Royce Spey turbofan, for which China had acquired a preliminary manufacturing licence in 1975. A week after this visit, US aerospace industry officials were refused similar permission to inspect the J-8, the stated reason being that the factory had been closed for the installation of production tooling.

Further reports since that time, however, have described the J-8 as 'still undergoing development', and the Spey engine programme is now known to have been abandoned. Some surprise, and not a little confusion, was created when the Chinese authorities decided, in the late Summer of 1984, to release photographs of the J-8 for the first time.

Far from being a new fighter, as alleged in some quarters, the J-8 is quite an old design. Its existence has been known, and reported openly, at least since the mid-1970s, and its configuration recalls Soviet attempts in the late 1950s to produce a twin-engined, scaled-up derivative of the MiG-21 day fighter with enhanced payload/range performance and a degree of all-weather capability.

Development of the J-8 has to be seen in the political and industrial context of China in the 'sixties, brought about first by the ideological rift with the USSR in 1960 and then by the anti-technology 'Cultural Revolution' instigated by Mao Zedong in 1966. In 1960, China had barely begun licence assembly of the MiG-19, and had received only a relatively small number of MiG-21Fs supplied directly by the Soviet Union. 'Reverse engineering' of the MiG-21 and the Tu-16 bomber enabled China to produce its own versions of these aircraft, the former (known as the J-7) as early as December 1964 and the latter about four years later. Two other programmes were also initiated which aimed to develop derivatives of the J-6 (MiG-19) and J-7, tailored to meet specific Chinese requirements. The first of these resulted in the Q-5 ground attack aircraft (described in detail in the December 1983 *Jane's Supplement*), which is now known to have made its first flight on 5 June 1965; the other resulted in the J-8, the first example of which was completed in about 1969.

The late-1950s Soviet specification for an enlarged MiG-21, which was filled eventually by the Sukhoi Su-15 'Flagon', yielded also a family of rival contenders from the Mikoyan design bureau with E-150 and E-152 designations, one of which led to the record-breaking E-166 of the early 1960s. An-

other member of that family was the E-152A (NATO 'Flipper'), which took part in the Aviation Day flypast at Tushino in June 1961. This aircraft had a wing span and area of 8.97 m (29 ft 5 1/4 in) and 28.2 m² (303.5 sq ft), overall length of 19.80 m (64 ft 11 1/2 in), and a normal take-off weight of 14,200 kg (31,305 lb); power plant was a side by side pair of Tumansky R-11F engines, each developing 56.4 kN (5,750 kg; 12,676 lb st) with afterburning.

Whether the Chinese had knowledge of the E-150/152 programme before the Sino-Soviet rift in 1960 is uncertain, but certainly the J-8 'Finback' follows closely the same design philosophy as 'Flipper', and is probably not very different dimensionally, although its operating weights may be higher. The Wopen-7 (Chinese Tumansky R-11) engines in the J-8 are Wopen-7Bs, of the same type as now offered in the F-7 export version of the J-7. These have an afterburning thrust of 59.8 kN (6,100 kg; 13,450 lb) compared with the 50.0 kN (5,100 kg; 11,245 lb) of the Wopen-7As fitted to standard J-7s in service in China, and have necessitated, in the J-8, an increase in diameter of the circular nose inlet. Another F-7 improvement, an automatically translating centrebody shock cone, is also likely to be fitted to the J-8, and photographs reveal a small 'lip' fairing in the upper arc of the intake similar to that created by the Izumrud ranging radar in the limited all-weather J-6A.

Except for the appearance of external aileron hinges on their undersides, the wings of the J-8 appear to be little changed from those of the J-7, although they may have been scaled up slightly. There are two attachment points under each wing, the inner pair probably each capable of carrying a PL-2 air-to-air missile (Chinese version of the K-13A 'Atoll') or a rocket pod. The outer pair are 'wet', and the J-8's external fuel-carrying capacity is likely to be the same as that of the F-7, comprising a 480 litre (105.5 Imp gallon; 127 US gallon) drop tank under each wing and an 800 litre (176 Imp gallon; 211 US gallon) centreline tank under the fuselage. Internal fuel capacity in the lengthened fuselage has been estimated in one report as about 5,000 litres (1,100 Imp gallons; 1,321 US gallons). There are underfuselage fairings forward of the wings for a pair of 30 mm cannon. The vertical fin is taller, broader, and slightly less sweptback than that of the J-7, with a small ram air intake at its base, and a dielectric panel at the tip suggesting the presence of a Sirena (or similar) radar warning receiver. The all-moving tailplane is low-set; above and behind it is a 'pen nib' fairing between the twin exhaust nozzles, and there is a curved, outward canted ventral fin (another point of similarity with 'Flipper') beneath each jetpipe. In the accompanying photograph of aircraft number 72067 the cockpit canopy appears to be of the standard MiG-21F/J-7 front-hinged type, but other J-8 photographs have illustrated a rear-hinged, upward opening canopy similar to that on the F-7.

According to Chinese official sources, only limited production of the J-8 (about 50 aircraft) was



The Shenyang J-8 has many features in common with the earlier, single-engined J-7/MiG-21

undertaken, and it is not known to have entered squadron service. It is perhaps more likely that in recent years it has been used for various kinds of development work, rather than being still under development itself. There is some support for this belief. China is known to have wanted to develop the J-8 to a standard comparable with the Northrop F-5E Tiger IIs operated by Taiwan, and *Jane's* has heard from an official source that a version with wing-root intakes "similar to those of the F-20" has been developed. (Existence of a lateral-intake version was reported in the magazine *Flight International* as long ago as September 1979.) Other reports, also dating back to the late 1970s/early 1980s, have referred to J-8s flight testing Spey engines (this has never been confirmed), a 30 mm gun system, a radar guided air-to-air missile, and sweptback wings (another link with early MiG-21 history). Some writers have identified the fighter with the factories at Xian (which builds the J-7) and Chengdu (where the Wopen-7 engines are produced), rather than Shenyang, again suggesting widespread use in various test programmes.

It is generally conceded that, with Wopen-7 engines, the aircraft is seriously underpowered, and that it lacks modern-standard avionics, and these were believed to be a high priority point of discussion during the visit of Chinese Defence Minister Zhang Aiping to the USA in June 1984, especially now that the licence manufacturing programme for the Rolls-Royce Spey has been abandoned. The US State Department has, however, opposed the export of such advanced technology to China, and this may be one explanation for the decision to release photographs of the aircraft only a few weeks later, possibly to encourage other western manufacturers to offer suitable alternatives. Another explanation may lie in the report in early 1985 that the New York firm Custom Associates has been given permission by China to investigate the US and possible foreign markets for a whole range of MiG fighters and their Chinese derivatives, among which the J-8 is included.

The following estimated data have been pub-

lished by the Hong Kong defence magazine *Com-milit*:

DIMENSIONS, EXTERNAL:	
Wing span	10.0 m (32 ft 9 3/4 in)
Length overall	19.0 m (62 ft 4 in)
Height overall	5.2 m (17 ft 0 3/4 in)
AREA:	
Wings, gross	40.0 m ² (430.5 sq ft)
WEIGHTS:	
Weight empty	12,000 kg (26,455 lb)
Normal T-O weight	17,000 kg (37,480 lb)
Max T-O weight	19,000 kg (41,890 lb)
PERFORMANCE:	
Max level speed at 12,000 m (39,370 ft)	Mach 2.3
	(1,320 knots; 2,450 km/h; 1,520 mph)
Max rate of climb at S/L	12,000 m (39,370 ft)/min
Service ceiling	18,000 m (59,050 ft)
Range	500-1,000 nm
	(925-1,850 km; 575-1,150 miles)

SKYTRADER

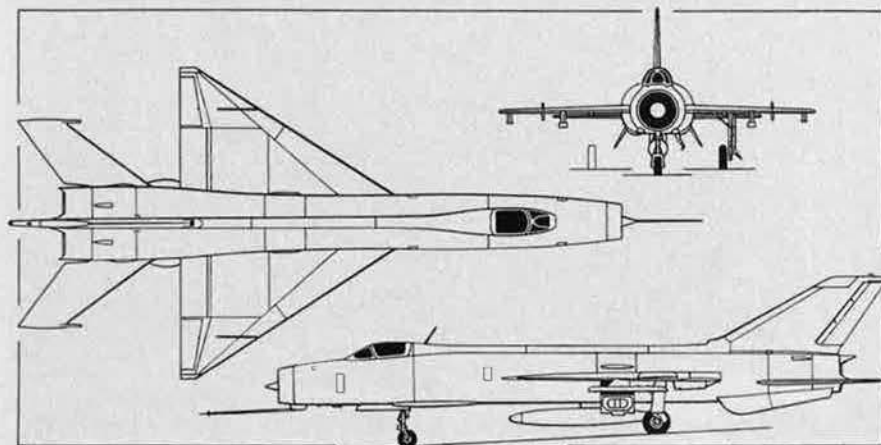
SKYTRADER CORPORATION: One Skytrader Drive, Harrisonville, Missouri 64701, USA

SKYTRADER ST1700

Design of a prototype Skytrader 800 was begun in 1972 by Dominion Aircraft Corporation Ltd, a Canadian company with facilities at Renton, Washington. Much of the design work was undertaken by former Boeing Company employees, and the first aircraft (N800ST) made its first flight on 21 April 1975.

The Skytrader 800 was powered by two 298 kW (400 hp) Avco Lycoming IO-720-B1A piston engines, but no production was undertaken before Dominion Aircraft ceased trading in 1979, and the project lay dormant until 1983 when Mr John J. Dupont acquired it and formed Skytrader Aircraft. This in turn became a wholly owned subsidiary of Superior Energy Corporation (SECO), with which it was merged and renamed Skytrader Corporation in September 1984. In October 1984 first details were announced of the Skytrader ST1700 which, though based on the earlier Skytrader 800 design, differs markedly in having two Pratt & Whitney Canada PT6A-42 turboprop engines, a T tail, extended and drooped nose ahead of the flight deck for improved lift and field of view, cambered wing and tail tips incorporating aerodynamic twist, strengthened main landing gear legs with twin wheels, and overhead cockpit 'eyebrow' windows. The ST1700's cabin is 46 cm (18 in) longer and 10 cm (4 in) wider than that of the Skytrader 800, permitting a variety of quick-change internal configurations to suit commuter operators, cargo carriers, and military services.

On 6 October 1984 Skytrader Corporation started work on a new 8,361 m² (90,000 sq ft) facility at Lawrence Smith Memorial Airport, Harrisonville, Missouri, which will include 7,618 m² (82,000 sq ft) of production space for the ST1700. Certification of the aircraft by the FAA is expected in mid-1986, by which time Skytrader plans to have ten aircraft ready for customer delivery. When full production is under way the company expects to employ 300



Provisional three-view drawing of the Shenyang J-8 air superiority fighter (Pilot Press)

people and to deliver 90 aircraft per year. An amphibious version is also planned.

The following description applies to the land-plane prototype:

TYPE: Twin-turboprop all-metal STOL commuter airliner and cargo aircraft.

WINGS: High-wing monoplane, with single bracing strut on each side. Constant chord wings, with electrically operated leading-edge slats. Full span ailerons and flaps on trailing-edge. Trim tab in each aileron.

FUSELAGE: Conventional structure with rectangular cabin section and upswept rear end. Flight deck has large single window on each side forward of crew door and extending from floor height to below instrument panel mounting. Square cabin windows, eight on port side, seven on starboard.

TAIL UNIT: Cantilever T tail, with horizontal surfaces of constant chord. Dorsal fin. Trim tab in rudder.

LANDING GEAR: Non-retractable tricycle type. Twin wheels on nose and main legs, with over-size, low pressure tyres.

DIMENSIONS, INTERNAL:

Cabin:	
Length, excl flight deck and space above ramp/door	7.11 m (23 ft 4 in)
Max width	1.37 m (4 ft 6 in)
Max height	1.65 m (5 ft 5 in)
Cargo volume, incl nose baggage compartment	17.98 m ³ (635 cu ft)
Nose baggage compartment	0.69 m ³ (24.5 cu ft)

WEIGHTS AND LOADING:

Weight empty:	
commuter	3,356 kg (7,400 lb)
cargo	3,198 kg (7,050 lb)
Max T-O weight	5,897 kg (13,000 lb)
Max power loading	4.65 kg/kW (7.65 lb/shp)

PERFORMANCE (estimated, at max T-O weight except where indicated):

Max cruising speed at S/L	215 knots (398 km/h; 247 mph)
Max cruising speed at 3,050 m (10,000 ft)	195 knots (361 km/h; 224 mph)
Cruising speed, 75% power, at 3,050 m (10,000 ft)	179 knots (332 km/h; 206 mph)

Landing run	114 m (375 ft)
Range, 45 min reserves:	
with 1,814 kg (4,000 lb) payload	563 nm (1,043 km; 648 miles)
with crew of two, 18 passengers and baggage	805 nm (1,492 km; 927 miles)
with 1,134 kg (2,500 lb) payload	1,070 nm (1,983 km; 1,232 miles)
with max fuel	1,100 nm (2,038 km; 1,266 miles)

ENAER CHILE

EMPRESA NACIONAL DE AERONÁUTICA, Gran Avenida José Miguel Carrera 11087, El Bosque, Santiago, Chile

ENAER (formerly IndAer) is an industrial organisation set up under the auspices of the Chilean Air Force (Fuerza Aérea de Chile, or FAC), and had a 1984 mixed workforce of 300 FAC personnel and civilians. Its activities began in January 1980 with the assembly of 27 Piper PA-28 Dakota light aircraft, 17 for the FAC and ten for civilian flying clubs.

To replace the FAC's Beechcraft T-34s, and to fulfil the eventual need by the air forces of other countries for a basic and intermediate trainer, ENAER and Piper Aircraft Corporation initiated the design and development of the T-35 Pillán in October 1980.

Meanwhile, in June 1980 ENAER had embarked upon an industrial transfer programme with CASA of Spain for the assembly and manufacture under licence of the latter company's C-101 Aviojet advanced jet trainer, which has the FAC designation T-36 Halcón. These aircraft are to replace the FAC's Cessna T-37s. The link with CASA became a 'two-way street' in 1984 when the Pillán was selected by the Spanish Air Force.

ENAER T-35 PILLÁN (DEVIL)

Spanish Air Force designation: Tamiz (sieve)

The Pillán is a tandem two-seat, fully aerobatic aircraft, intended for basic, intermediate, and instrument flying training. It has been certificated to FAR Pt 23 and military standards. To minimise costs, design was based on the Piper Cherokee series, utilising in particular many components of the Piper PA-28 Dakota and PA-32 Saratoga.

Two prototypes were developed by Piper, the first of these (CC-EFP, designated PA-28R-300 XBT) making its initial flight in early 1981 and the second (PA-28R-300 YBT) at the end of that year. Three further aircraft were delivered by Piper as kits for assembly by ENAER: the first of these (FAC serial number 103) flew on 30 January 1982, and the third in September of that year.

After more than 500 flying hours had been accumulated by the prototypes, a number of modifications were incorporated. These were mostly of a minor nature, the principal ones involving replacement of the original all-moving tailplane and anti-



Artist's impression of the Skytrader ST1700 twin-turboprop STOL commuter/cargo transport

POWER PLANT: Two 634 kW (850 shp) Pratt & Whitney Canada PT6A-42 turboprop engines, each driving a four-blade metal propeller. Internal fuel capacity 1,817 litres (480 US gallons).

ACCOMMODATION: Crew of two at front of cabin. Quick-change cabin interior provides various internal arrangements including 18-passenger layout with 76 cm (30 in) pitch seating and 41 cm (16 in) aisle width, or all-freight. Access to flight deck via forward hinged door on each side, and to main cabin by airstair door on port side aft of wing. Hydraulically operated rear loading ramp/door, openable in flight for airdropping; double doors on starboard side at rear for oversized items or direct fork-lift loading. Cargo compartment can accept up to six D-type containers (each 1.02 x 1.02 x 1.02 m; 40 x 40 x 40 in), or palletised or other cargo. Nose baggage compartment, capacity 136 kg (300 lb), accessible via upward opening door on port side.

DIMENSIONS, EXTERNAL:

Wing span	17.98 m (59 ft 0 in)
Wing chord, constant	2.03 m (6 ft 8 in)
Length overall	15.85 m (52 ft 0 in)
Height overall	6.10 m (20 ft 0 in)
Fuselage: Max width	1.68 m (5 ft 6 in)
Ground clearance	0.71 m (2 ft 4 in)
Tailplane span	7.11 m (23 ft 4 in)
Wheel track (c/l of shock struts)	4.27 m (14 ft 0 in)
Rear cargo loading door:	
Length	2.44 m (8 ft 0 in)
Height from ground to top of cargo compartment	2.44 m (8 ft 0 in)
Double doors (stbd):	
Height	1.37 m (4 ft 6 in)
Width	1.39 m (4 ft 7 in)
Height to sill	0.91 m (3 ft 0 in)

Stalling speed at 5,670 kg (12,500 lb) weight, slats and flaps extended

	50 knots (93 km/h; 58 mph)
Min control speed, one engine out	48 knots (89 km/h; 56 mph)
Max rate of climb at S/L	640 m (2,100 ft)/min
Rate of climb at S/L, one engine out	166 m (545 ft)/min
Service ceiling	7,620 m (25,000 ft)
Service ceiling, one engine out	4,875 m (16,000 ft)
T-O run	131 m (430 ft)
T-O to 15 m (50 ft)	257 m (845 ft)
Landing from 15 m (50 ft)	267 m (875 ft)



Newly received photo of the single-seat FMA IA 58C Pucará. For details of this aircraft, see pages 106-108, February '85 "Jane's Supplement"



ENAER T-35 Pillán two-seat fully-aerobatic trainer

tab by an electrically trimmable tailplane with a conventional elevator, and an increase in rudder mass balance.

Series production of 80 Pilláns for the Chilean Air Force began in November 1983, and the first production aircraft was rolled out on 8 March 1984. Production was at the rate of four per month in September 1984, scheduled to rise to six per month in March 1985. Deliveries to the FAC were due to start in March 1985, for service with the Air Academy. Sixty of these will be of the basic T-35A version; the other 20 will be T-35Bs, with more comprehensive avionics for instrument training.

In July 1984 the Spanish Air Force (Fuerza Aérea Española) confirmed a contract for 40 of the T-35C version, which will be known in Spanish service as the Tamiz (sieve). Deliveries to the FAE are due to begin in April 1985.

TYPE: Two-seat fully aerobatic basic and intermediate military trainer.

WINGS: Cantilever low-wing monoplane. Wing section NACA 65₂-415 on constant chord inboard panels, NACA 65₂-415 (modified) at tips. Dihedral 7°. Incidence 2° at root, -0° 30' at tip. Single-spar structure of light alloy, with components mainly from PA-28-236 Dakota (leading-edges) and PA-32R-301 Saratoga (trailing-edges), modified to shorter span. Slotted ailerons and electrically operated single-slotted trailing-edge flaps of light alloy riveted construction, identical to those of Saratoga. Electrically operated trim tab in port aileron.

FUSELAGE: Semi-monocoque structure of aluminium alloy frames and longerons, with riveted skin. Tailcone assembled from Cherokee components, modified to fit narrower fuselage. Two-piece engine cowling of GRP.

TAIL UNIT: Cantilever structure of light alloy with sweptback (38° 43') vertical surfaces, identical to those of Dakota except for heavier gauge skins, minor reinforcement of fin, and increased rudder mass balance. One-piece non-swept variable incidence tailplane, with electric trim and plastics tips. Full span mass balanced elevator. Tailplane incorporates some standard PA-28 and PA-31 (Navajo/Cheyenne) components; elevator is of all-new design. No elevator or rudder tabs; rudder is trimmed electrically.

LANDING GEAR: Hydraulically retractable tricycle type, with single wheel on each unit. Main gear legs and doors identical to those on PA-32R-301; nose gear assembled from PA-32R-301 and PA-28R-200 components. Main units retract inward, steerable nosewheel rearward, Piper oleopneumatic shock absorber in each unit. Emergency free-fall extension. Mainwheels and tyres size 6.00-6 (8 ply), nosewheel and tyre size 5.00-5 (6 ply). Single-disc hydraulic brake on each mainwheel. Parking brake.



Left to right: second prototype Pillán (YBT), second pre-production Pillán (104), and T-36 equivalent of CASA C-101CC, known in Chile as the Halcón

POWER PLANT: One 224 kW (300 hp) Avco Lycoming IO-540-K1K5 flat-six engine, driving a Hartzell HC-C3YR-4BF/F7663R-0 three-blade constant-speed metal propeller with spinner. Fuel contained in two integral aluminium tanks in wing leading-edges, total capacity 291.5 litres (77 US gallons), of which 272.5 litres (72 US gallons) are usable. Overwing gravity refuelling point on each wing. Fuel and oil systems permit unlimited inverted flight (up to 40 min flight tested).

ACCOMMODATION: Vertically adjustable seats for two persons, with seat belts and shoulder harnesses, in tandem beneath one-piece transparent jettisonable canopy which opens sideways to starboard. One-piece acrylic windscreen, and one-piece window in glassfibre fairing aft of canopy. Rear (instructor's) seat 22 cm (8 7/8 in) higher than front seat. Dual controls standard. Baggage compartment aft of rear cockpit, with external access on port side. Accommodation heated, and canopy demisted, by engine bleed air. Ventilation system as for Piper Dakota.

SYSTEMS: Electrically operated hydraulic system, at 124 bars (1,800 lb/sq in) pressure, for landing gear extension and retraction. Electrical system is 24V DC, powered by a 28V 70A engine driven Prestolite alternator and 24V 17Ah battery, with an inverter for AC power at 400Hz to operate RMIs and attitude indicators. External power socket.

AVIONICS AND EQUIPMENT: (T-35A) Optional avionics include dual VHF com, intercom, VOR, marker panel, and ADF. (T-35B) Standard package of King avionics includes dual KX 165 VHF-AM com transceivers, dual KMA 24H intercoms, KX 165 VOR/ILS nav, KR 21 marker beacon receiver, KR 87 ADF, KN 63 DME, KT 76A ATC transponder, KCS 55A compass system (dual KI 525 HSIs, dual KNI 582 RMIs, and KA 51A slaving meter); dual AI-904 AA/B attitude

director indicators; dual turn and slip indicators; stall warning system; landing gear not down warning system; pitot static system; and vacuum system for gyro instrument operation. Standard instrumentation (T-35A) includes airspeed indicator, sensitive altimeter, rate of climb indicator, turn and bank indicator, artificial gyro horizon, directional gyro, vacuum pressure gauge, g meter, and magnetic compass (all dual); engine tachometer, manifold pressure gauge, fuel flow indicator, oil temperature and pressure indicators, cylinder head temperature gauge, and exhaust gas temperature gauge (all dual); voltmeter/ammeters (two), fuel quantity indicators (four), fuel pressure indicators (two), digital clocks (two), and outside air temperature gauge (one). Other equipment includes cockpit heating outlets and ventilators (four of each); map compartment (optional); fuel and oil quick-drains; interior instrument panel/map/annunciator/fuel and oil warning lights; exterior navigation/anti-collision strobe lights, landing gear position lights, and a single landing/taxying light in centre of lower engine cowl; external power socket; wing jack pads; tiedown rings; and provision for two underwing hardpoints for external stores.

DIMENSIONS, EXTERNAL:

Wing span	8.81 m (28 ft 11 in)
Wing chord:	
at root	1.88 m (6 ft 2 in)
inboard (constant)	1.60 m (5 ft 3 in)
mean aerodynamic	1.55 m (5 ft 1 in)
at tip	1.26 m (4 ft 1 1/2 in)
Wing aspect ratio	5.69
Length overall	7.97 m (26 ft 1 1/4 in)
Height overall	2.34 m (7 ft 8 1/4 in)
Fuselage:	
Length	7.66 m (25 ft 1.7 in)
Max width	0.94 m (3 ft 1 in)
Max depth	1.56 m (5 ft 1.3 in)
Tailplane span	3.05 m (10 ft 0 in)
Wheel track	3.02 m (9 ft 11 in)
Wheelbase	2.09 m (6 ft 10 1/4 in)
Propeller diameter	1.93 m (6 ft 4 in)

DIMENSIONS, INTERNAL:

Cockpit:	
Length	3.24 m (10 ft 7 1/2 in)
Max width	1.04 m (3 ft 5 in)
Max height	1.48 m (4 ft 10 1/4 in)

AREAS:

Wings, gross	13.64 m ² (146.8 sq ft)
Ailerons (total)	1.10 m ² (11.84 sq ft)
Trailing-edge flaps (total)	1.36 m ² (14.64 sq ft)
Fin	0.69 m ² (7.43 sq ft)
Rudder	0.38 m ² (4.09 sq ft)
Tailplane	1.57 m ² (16.90 sq ft)
Elevator	0.77 m ² (8.29 sq ft)

WEIGHTS AND LOADINGS:

Basic weight empty	833 kg (1,836 lb)
Weight empty, equipped	929 kg (2,048 lb)
Fuel (usable)	196 kg (432 lb)
Max T-O and landing weight	1,315 kg (2,900 lb)
Max wing loading	96.1 kg/m ² (19.7 lb/sq ft)
Max power loading	5.88 kg/kW (9.7 lb/hp)

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

Never-exceed speed	223 knots (413 km/h; 256 mph)
Max level speed at S/L	168 knots (311 km/h; 193 mph)
Cruising speed:	
75% power at	2,680 m (8,800 ft)
	161 knots (298 km/h; 185 mph)
65% power at	3,900 m (12,800 ft)
	150 knots (278 km/h; 173 mph)
55% power at	5,120 m (16,800 ft)
	138 knots (255 km/h; 159 mph)
Stalling speed:	
flaps up	68 knots (125 km/h; 78 mph)
flaps down	62 knots (115 km/h; 72 mph)
Unstick speed	60 knots (111 km/h; 69 mph)
Max speed for flap extension	112 knots (207 km/h; 130 mph)
Max speed for landing gear extension	132 knots (245 km/h; 152 mph)
Approach and landing speed	80 knots (148 km/h; 92 mph)
Max rate of climb at S/L	465 m (1,525 ft)/min
Time to:	
1,830 m (6,000 ft)	4 min 42 s
3,050 m (10,000 ft)	9 min 12 s
Service ceiling	5,820 m (19,100 ft)
Absolute ceiling	6,250 m (20,500 ft)
T-O run	293 m (961 ft)
T-O to 15 m (50 ft)	506 m (1,660 ft)
Landing from 15 m (50 ft)	521 m (1,709 ft)
Landing run	243 m (797 ft)
Range with 45 min reserves:	
75% power at	2,440 m (8,000 ft)
	590 nm (1,093 km; 679 miles)
65% power at	3,660 m (12,000 ft)
	625 nm (1,158 km; 720 miles)
Range, no reserves:	
75% power at	2,440 m (8,000 ft)
	685 nm (1,269 km; 789 miles)
65% power at	3,660 m (12,000 ft)
	720 nm (1,334 km; 829 miles)
Endurance at S/L:	
75% power	4 h 24 min
65% power	4 h 55 min
55% power	5 h 39 min
g limits	+6.0/-3.0

ENAER T-36 HALCÓN (HAWK)

As a replacement for its Cessna T-37s the Chilean Air Force purchased an initial batch of 16 CASA C-101BB-02 Aviojets from Spain. Designated T-36 Halcón by the FAC, they differ from the C-101EB for the Spanish Air Force in having a more powerful (16.46 kN; 3,700 lb st) Garrett TFE731-3-IJ turbofan engine instead of the 15.57 kN (3,500 lb st) TFE731-2-2J, and can be identified by the addition of a ventral fin beneath the jetpipe on each side. Five more BB-02s and 16 examples of the C-101CC, with a more powerful TFE731-5-IJ engine, were ordered in a follow-on contract placed in July 1984.

The first four Halcóns were built in Spain by CASA, assembly by ENAER from Spanish kits beginning with the fifth aircraft under Phase 1 of a

multi-stage progression towards partial local manufacture, Phase 1A began with the 12th aircraft, from which ENAER is manufacturing all control surfaces and the horizontal tail. From Phase 3 (there is no Phase 2) ENAER will progress to small wing and fuselage subassemblies. Phase 3A will be a four-aircraft lead-in to Phase 4 (manufacture of front fuselage), which will involve the remaining 17 aircraft. All hydraulic and electrical systems for the Halcón are of Chilean manufacture.

Deliveries, to the tactical school of the 1st Air Group of the FAC in northern Chile, began in late 1983. Five ENAER-assembled aircraft had been completed by September 1984, when output was at the rate of six per year. The present 37-aircraft programme is due for completion in 1989.

LTV

LTV AEROSPACE AND DEFENSE COMPANY (a subsidiary of THE LTV CORPORATION): Vought Aero Products Division, Post Office Box 225907, Dallas, Texas 75265, USA

VOUGHT CORSAIR II AND III

US military designation: A-7

An initial US Navy contract to develop and build three Vought Corsair IIs, under the designation A-7A, was awarded on 19 March 1964; first flight took place on 27 September 1965. Several versions of the A-7 were developed subsequently for the US Navy, US Air Force, the Hellenic Air Force, and the Portuguese Air Force, under designations A-7A, A-7B, A-7C, A-7D, A-7E, A-7H, A-7P, and in two-seat variants as A-7K, TA-7C, and TA-7H.

Fifty TA-7Cs, powered originally by non-afterburning 59.6 kN (13,400 lb st) Pratt & Whitney TF30-P408 engines, are being re-engined with 66.8 kN (15,000 lb st) non-afterburning Allison TF41 turbofans to provide increased thrust for combat manoeuvres. Re-delivery of these aircraft began in November 1984. The programme is scheduled for completion in September 1986.

After delivery of 20 refurbished A-7As with TF30-P408 engines and A-7E-standard avionics, completed in September 1982 under the designation A-7P, a new contract was received from the Portuguese government in 1983 for a further 30 Corsair IIs, including six two-seat variants. The first of these was rolled out on 9 April 1984, at which time orders for the A-7 totalled 1,545 new-build aircraft.

Current activity is centred on a series of update programmes for the Corsair II, which include the **International Corsair II**. This is based on an A-7B airframe that is stripped, fitted with new avionics and communications equipment, overhauled engine, new wiring, and provision for night attack and the latest ordnance, providing, LTV claims, a low-cost multi-mission tactical fighter at one-third of the acquisition costs of new aircraft.

Other A-7 update programmes under way include the testing of an augmented wing flap that enables an A-7D or A-7K pilot to reduce landing speed,

improve handling characteristics on the approach, and substantially reduce landing roll. The flap, which is 127 mm (5 in) wide, is mounted on the existing wing flap trailing-edge. It is being tested by Vought Aero Products Division and is intended for retrofit to Air National Guard A-7s, where it is expected to be helpful to ANG pilots operating from the short runways and in the varying climatic conditions that they might encounter in Rapid Deployment Force roles. The augmented flap has also been offered to the US Navy.

Two Air National Guard squadrons of Corsair IIs are also being equipped with night attack capability under an \$86.8 million contract awarded by the Air Force's Oklahoma City Air Logistics Center. LTV will retrofit 48 A-7D and four two-seat A-7Ks with forward looking infra-red (FLIR) and associated equipment to provide round-the-clock capability. The US Marine Corps is testing a new night vision system in a TA-7C, which combines the use of the pilot's night goggles with a high resolution, fixed field of view FLIR sensor to project daylight visual capability in darkness. The system is expected to cost \$1 million for retrofit to each aircraft already equipped with an inertial navigation system.

US Navy A-7E and TA-7C aircraft are being retrofitted with new seat escape systems developed by Stencel Aero Engineering Corporation. The retrofit, conducted at the Naval Air Rework Facility at Jacksonville, Florida, for A-7Es and at Vought Aero Products' Dallas factory for TA-7Cs, provides an advanced ejection system with better maintainability than the original McDonnell Douglas Escape system installed in the A-7, and permits 450 days between maintenance inspections.

Also under consideration by LTV is the **Corsair III**, a re-engined aircraft with a new afterburning engine that the manufacturer says would offer the same thrust-to-weight performance as that of current tactical fighters. No details of this programme had been revealed by the beginning of 1985.

ARMAMENT (International Corsair II): Two internally mounted MK 12 20 mm cannon, with 680 rounds of ammunition. Six underwing and two fuselage weapon stations, as on A-7E, capable of carrying all USN, USAF, and NATO munitions (max external load more than 6,805 kg; 15,000 lb). Weapon carriers include BRU-10A, MER-7, and TER-7 bomb racks; LAU-3 and LAU-32 wing-mounted rocket launchers; LAU-7 fuselage-mounted missile launchers; and pods containing 20 or 30 mm guns, ECM, chaff, or auxiliary fuel. Provision also to carry 'buddy' air-to-air refuelling pods.

WEIGHTS (International Corsair II):

Weight empty	7,711 kg (17,000 lb)
Max T-O weight	19,050 kg (42,000 lb)

TYPICAL MISSION PERFORMANCE (International Corsair II at T-O weight of 14,836 kg; 32,708 lb with six MK 82 bombs and 500 rds of 20 mm ammunition):

Max level speed at S/L	555 knots (1,028 km/h; 639 mph)
Time to 9,145 m (30,000 ft)	7.9 min
T-O run	1,052 m (3,450 ft)

FOKKER

Fokker BV: PO Box 12222, 1100 AE, Amsterdam-Zuidoost, Netherlands

FOKKER 50

At the end of November 1983, coinciding with the 25th anniversary in airline service of the twin-turboprop F27 Friendship, Fokker announced follow-on developments of both the F27 and the twin-turboprop F28 Fellowship, to be known respectively as the Fokker 50 and Fokker 100. Both aircraft build on successfully proven airframes, but with significant design and structural changes, allied to more efficient (and more fuel-efficient) power plants, increased use of composite materials, greater passenger comfort and convenience, advanced digital avionics, and improved airport handling characteristics.

The Fokker 50 will be the first to appear, making its first flight during the last quarter of 1985 and



Model of the Vought Corsair III, an advanced development of the A-7 Corsair II (Brian M. Service)

becoming available for customer operation in mid-1986. Differences from the current F27 include new-technology engines, in redesigned nacelles, with six-blade propellers; use of carbon, aramid, and glassfibre composites in such areas as the wings, tailplane, fin, radome, engine nacelles, and propellers; passenger door relocated at the front of the aircraft, and the large cargo door deleted; more windows in the passenger cabin; pneumatic system replaced by a hydraulic system; and a cruising speed some 12 per cent higher than that of the F27. Seating range so far announced is 46-60, with 50 as standard, but the cabin offers considerable flexibility for other layouts, including ample accommodation for baggage and freight.

TYPE: Twin-turboprop short-haul transport.

WINGS, FUSELAGE, TAIL UNIT: Generally similar in size and basic configuration to that of the F27, but with extensive structural redesign. Metal primary structure, comprising mainly adhesive bonded skin, doubler, and stringer assemblies, mechanically fastened to frames, ribs, floor beams, spars, and bulkheads. Composites (glass, aramid, and graphite fibre-reinforced plastics) are used widely in such secondary structures as nosecone, fairings, engine intakes and nacelle cowlings, access doors, wing and tail leading- and trailing-edges, part of dorsal fin, nosewheel doors, and cabin floor. There is effective anti-corrosion treatment throughout the airframe. Passenger door is relocated at front, and there are more passenger cabin windows. Wing flaps are actuated hydraulically, and are mechanically interconnected; ailerons are actuated mechanically via cables. Each aileron has a spring tab inboard and balance tab outboard, the starboard balance tab serving also as an electrically operated trim tab. Elevators and rudder (to be manufactured by Fuji Heavy Industries) are cable actuated; trim tab in starboard elevator, trim tab and balance tab in rudder.

LANDING GEAR: Dowty Rotol hydraulically retractable tricycle type, with twin wheels on each unit. Main units have long-stroke double-acting shock absorbers and low-pressure tyres; nose unit has single-stage long-stroke shock absorber and hydraulically powered steering (73° to left and right).

POWER PLANT: Two 1,603 kW (2,150 shp) Pratt & Whitney Canada PW124 turboprop engines, each driving a Dowty Rotol six-blade propeller with spinner. Propellers have all-composite blades and Beta control. Total standard fuel capacity 5,136 litres (1,130 imp gallons; 1,357 US gallons). Single-point pressure refuelling. Engine air intakes, propeller blades, and spinners de-iced electrically.

ACCOMMODATION: Crew of two on flight deck, plus two cabin attendants. Standard commuter layout seats 50 passengers, four-abreast with central aisle, at 81 cm (32 in) pitch. Alternative layouts include 46 business class passengers at 86 or 81 cm (34 or 32 in) pitch, 54 tourist class at 76 cm (30 in), or 58 or 60 in high-density arrangement, also at 76 cm (30 in). All layouts mentioned have overhead stowage bins, forward stowage area and toilet, and galley at rear, as standard. Downward opening airstair door at front on port side; service door at rear on same side; baggage/cargo door opposite each of these on starboard side. All four doors serve also as Type 1 emergency exits. Entire accommodation pressurised and air-conditioned. Windscreens anti-iced electrically, flight deck side windows demisted by hot air.

SYSTEMS: Hamilton Standard air-conditioning system. Max pressure differential 0.38 bars (5.47 lb/sq in). Dowty Rotol hydraulic system, operating at 207 bars (3,000 lb/sq in) pressure via two engine driven Abex pumps, for landing gear actuation, brakes, nosewheel steering, and flap drive. Pneumatic de-icing of wing, fin, and tailplane leading-edges, using engine bleed air. Primary electrical system powered by two Sundstrand 40kVA engine driven starter/generators for 115/200V three-phase AC at 400Hz, with two 300A transformer-rectifiers and two 40Ah nickel-cadmium batteries for 28V DC power. Optional third (20kVA) generator, driven by APU. Exter-



Models of the Fokker 50 (foreground) and Fokker 100 transport aircraft

nal power socket. Solar Titan APU optional (in rear cone of starboard engine nacelle), for additional electrical power and bleed air for air-conditioning. Graviner fire detection and extinguishing system.

AVIONICS: Flight deck has CRT displays (EFIS) for ADI and HSI, and space provisions for a central multi-function display. Standard avionics include AFCS with integral altitude alert, dual VHF com (to ARINC 566A), dual VHF nav (ARINC 547), HF com (ARINC 559A), dual ADF (ARINC 570), DME (ARINC 568), ATC transponder (ARINC 572), weather radar, Cat.I landing, integrated alerting system, PA system (ARINC 560), interphone, marker beacon receiver (ARINC 406), radio altimeter, GPWS, cockpit voice recorder, and flight data recorder. Space provisions for second flight director computer, DME, ATC, and HF com, and for ELT and Cat.II landing.

DIMENSIONS, EXTERNAL:

Wing span	29.00 m (95 ft 1 3/4 in)
Wing aspect ratio	12.0
Length overall	25.19 m (82 ft 7 3/4 in)
Height overall	8.60 m (28 ft 2 1/2 in)
Wheel track	7.20 m (23 ft 7 1/2 in)
Wheelbase	9.74 m (31 ft 11 1/2 in)
Propeller diameter	3.66 m (12 ft 0 in)
Propeller ground clearance	1.18 m (3 ft 10 1/2 in)
Propeller/fuselage clearance	0.67 m (2 ft 2 1/2 in)
Passenger door (fwd, port):	
Height	1.78 m (5 ft 10 in)
Width	0.76 m (2 ft 6 in)
Service door (rear, port) and cargo door (fwd, stbd), each:	
Height	1.27 m (4 ft 2 in)
Width	0.61 m (2 ft 0 in)

Cargo door (rear, stbd):

Height	1.27 m (4 ft 2 in)
Width	0.86 m (2 ft 9 3/4 in)

DIMENSIONS, INTERNAL:

Cabin (excl flight deck):	
Length	15.96 m (52 ft 4 in)
Width at floor	2.06 m (6 ft 9 in)
Max width	2.49 m (8 ft 2 in)
Max height	1.96 m (6 ft 5 1/4 in)
Floor area (excl toilet)	30.2 m ² (325.0 sq ft)
Main baggage/cargo compartment volume (excl overhead bins):	
max	10.34 m ³ (365 cu ft)
commuter (50 passengers)	9.74 m ³ (344 cu ft)
Overhead bins	2.12 m ³ (75 cu ft)

AREA:

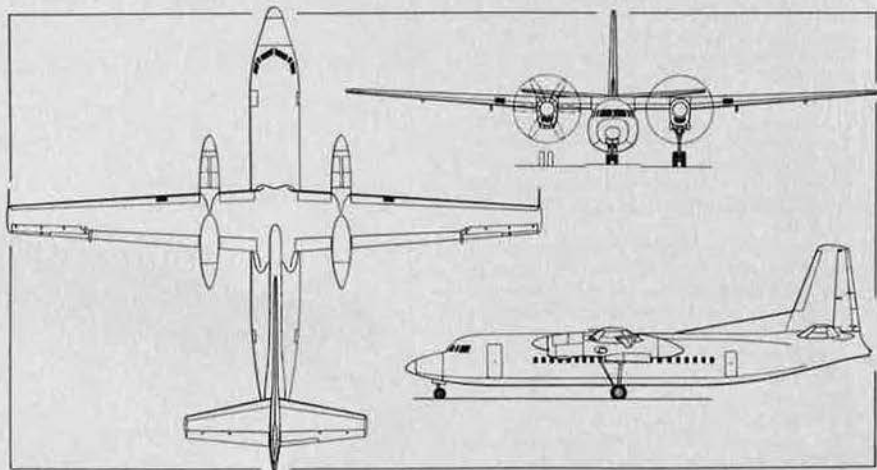
Wings, gross	70.0 m ² (753.5 sq ft)
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WEIGHTS:

Typical operating weight empty	12,333 kg (27,300 lb)
Max fuel load	4,123 kg (9,090 lb)
Max payload	5,760 kg (12,700 lb)
Max T-O weight:	
standard	19,000 kg (41,888 lb)
optional	20,820 kg (45,900 lb)
Max landing weight:	
standard	19,000 kg (41,888 lb)
optional	19,731 kg (43,500 lb)
Max zero-fuel weight	18,144 kg (40,000 lb)

PERFORMANCE (estimated):

Max operating Mach number	0.507
Typical cruising speed	287 knots (532 km/h; 330 mph)
Typical climb speed	200 knots (370 km/h; 230 mph) IAS
Typical descent speed	227 knots (420 km/h; 261 mph) IAS



Fokker 50 short-haul transport (two P&WC PW124 turboprop engines) (Pilot Press)



Mockup of the flight deck of the Fokker 50

Max operational altitude 7,620 m (25,000 ft)
 Range with 50 passengers and baggage:
 at standard max T-O weight
 720 nm (1,334 km; 829 miles)
 at optional max T-O weight
 1,510 nm (2,798 km; 1,739 miles)

FOKKER 100

Announced simultaneously with the Fokker 50, the Fokker 100 is intended to fly for the first time in mid-1986, and to be available for airline service in the Spring of 1987. It will be powered by Rolls-Royce Tay turbofan engines, and will comply with the Stage 3 requirements of FAR Pt 36, which are due to come into operation in 1986.

The Fokker 100 is based generally on the airframe of the F28 Mk 4000, but will have a fuselage 5.74 m (18 ft 10 in) longer, enabling it to accommodate 109 passengers in a standard all-economy class layout, compared with 85 in the F28 Mk 4000. The extended and much-redesigned wings are claimed to be 30 per cent more efficient aerodynamically than those of the F28.

The first order for the Fokker 100, announced on 5 July 1984, is from Swissair, for eight aircraft with a further six on option.

TYPE: Twin-turbofan short/medium-haul transport.

WINGS, FUSELAGE, TAIL UNIT, AND LANDING GEAR: Generally based on F28 Mk 4000, but with extensive design and structural changes. Wings (to be built by Shorts) have 1.5 m (4 ft 11 in) extension of each tip; new leading-edges, with reduced kink; new trailing-edges, including new flaps; and a different outer-wing aerofoil section. These changes have the effect also of altering the overall wing profile, providing an increase of approx 18 per cent in area and some 30 per cent in aerodynamic efficiency. The basic wing central box structure remains virtually unchanged. Fuselage is 5.74 m (18 ft 10 in) longer than that of the F28 Mk 4000. Composite materials will be used for the nosecone, wing/body fairings, and floor panels, and may also be used for wing flaps and flap tracks, nosewheel doors, rudder, and speedbrakes. Other changes include a strengthened Dowty Rotol main landing gear, and new wheels and brakes.

POWER PLANT: Two 60.3 kN (13,550 lb st) Rolls-Royce RB183-03 Tay Mk 620-15 turbofan engines, with Grumman nacelles and thrust reversers, pylon mounted on sides of rear fuselage. Nacelles and pylons manufactured from composite materials. Standard internal fuel capacity 13,040 litres (2,868 Imp gallons; 3,445 US gallons).

ACCOMMODATION: Crew of two on flight deck; two cabin attendants. Standard accommodation for 107 passengers, in five-abreast seating (3 + 2) at 81 cm (32 in) pitch. Optional layouts include 12 first class seats (four-abreast) at 91 cm (36 in)

pitch plus 80 or 85 economy class (five-abreast) at 32 in; 60 business class at 86 cm (34 in) plus 45 economy class, all five-abreast; or an all-economy class layout at 32 in pitch for 109 passengers. Aircraft for Swissair configured for 84 passengers (8 first class, 53 business class, and 23 economy). All layouts mentioned have a galley and toilet forward, galley and one or two toilets aft; 92-passenger mixed class provides for two more galleys between first and economy class areas. Wardrobe (forward) and up to three storage areas, depending upon layout, plus overhead baggage bins. Passenger door at front of cabin on port side, with service door opposite on starboard side. Auxiliary service door on starboard side near rear galley. Two overwing emergency exits each side. Three underfloor baggage/cargo holds (two forward of wing, one aft), each with downward opening door on starboard side.

AVIONICS: Standard avionics include dual VHF com (to ARINC 716), PA system (ARINC 715), VOR/DME based R/Nav system, ATC transponder (ARINC 718), dual AHRS (ARINC 705), dual radio altimeters (ARINC 707), dual VOR with marker beacon receiver (ARINC 711), dual ILS (ARINC 710), dual ADF (ARINC 712), dual DME (ARINC 709), primary flight display (PFD) and navigation display (ND) for each pilot (PFD has Collins EFIS to ARINC 725), dual air data systems (ARINC 706) with computer driven instruments, weather radar (ARINC 708 on EFIS), and digital automatic flight control and augmentation system (AFCAS) for Cat. II approach and

landing. Optional avionics include single or dual HF com (ARINC 719), third VHF com, Selcal (ARINC 714), audio control system (ARINC 724), second ATC, third AHRS (ARINC 704) and ILS, Sperry full flight management control system (FMCS), third symbol generator for PFD, dedicated display for weather radar, and Cat. III capability with autothrottle on AFCAS for auto-land only or full flight regime.

DIMENSIONS, EXTERNAL:

Wing span	28.08 m (92 ft 1½ in)
Wing aspect ratio	8.43
Length overall	35.31 m (115 ft 10¼ in)
Fuselage: Length	32.50 m (106 ft 7½ in)
Max diameter	3.30 m (10 ft 10 in)
Height overall	8.60 m (28 ft 2½ in)
Passenger door (fwd, port):	
Height	1.93 m (6 ft 4 in)
Width	0.86 m (2 ft 9¼ in)
Service door (fwd, stbd):	
Height	1.27 m (4 ft 2 in)
Width	0.61 m (2 ft 0 in)

DIMENSIONS, INTERNAL:

Cabin (excl flight deck):	
Length	21.06 m (69 ft 1¼ in)
Max length of seating area	
Max width	18.65 m (61 ft 2¼ in)
Max width at floor	3.10 m (10 ft 2 in)
Max height	2.86 m (9 ft 4½ in)
Max floor area	2.02 m (6 ft 7½ in)
Max volume	61.44 m ² (661.3 sq ft)
Max volume	113.02 m ³ (3,991.3 cu ft)
Overhead stowage bins (total)	
Additional baggage space (total)	5.49 m ³ (193.9 cu ft)
Underfloor compartment volume (total)	3.84 m ³ (135.6 cu ft)
Underfloor compartment volume (total)	17.72 m ³ (625.8 cu ft)

AREA:

Wings, gross 93.5 m² (1,006.4 sq ft)

WEIGHTS:

Typical operating weight empty (107 passengers)

23,200 kg (51,147 lb)

Max payload (weight-limited)

11,500 kg (25,353 lb)

* Max T-O weight 41,500 kg (91,490 lb)

Max landing weight 38,330 kg (84,500 lb)

Max zero-fuel weight 34,700 kg (76,500 lb)

PERFORMANCE (estimated):

Max cruising speed Mach 0.75

Design approach speed at max landing weight

128 knots (237 km/h; 147 mph)

Max cruising altitude 10,670 m (35,000 ft)

FAR T-O field length (S/L, ISA + 15°C):

at T-O weight for 500 nm sector

1,616 m (5,300 ft)

at max T-O weight 1,942 m (6,370 ft)

Range with 107 passengers and baggage, Mach

0.73 cruise

1,200 nm (2,224 km; 1,382 miles)

* 43,090 kg (95,000 lb) under study



Launch customer for the Fokker 100 is Swissair

INDUSTRIAL ASSOCIATES OF THE AIR FORCE ASSOCIATION

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

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Lockheed Aircraft Service Co.
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Lockheed Electronics Co.
Lockheed Engineering &
Management Services Co., Inc.
Lockheed-Georgia Co.
Lockheed Missiles & Space Co.
Lockheed Space Operations Co.
Logicon, Inc.
Loral Corp.
LTV Aerospace & Defense Co.
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Sierra Research Div.
Lucas Industries Inc.
Magnavox Advanced Products &
Systems Co.
M.A.N. Truck & Bus Corp.
Marconi Avionics, Inc.
Marotta Scientific Controls, Inc.
Marquardt Co., The
Martin Marietta Aerospace
Martin Marietta Denver Aerospace
Martin Marietta Orlando
Aerospace
MBB
McDonnell Aircraft Co.
McDonnell Douglas Astronautics
Co.
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MITRE Corp., The
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Pan Am World Services, Inc.,
Aerospace Services Div.
Planning Research Corp.
Products Research & Chemical
Corp.
Rand Corp.
Raytheon Co.
RBI, Inc.
RCA, Government Systems Div.
RECON/OPTICAL, Inc., CAI Div.
Rediffusion Simulation, Inc.
Republic Electronics, Inc.
Rockwell Int'l Corp.
Rockwell Int'l Collins Government
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SENTEC
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Defence Systems Co.
SoftTech
Sonicraft, Inc.
Space Applications Corp.
Space Communications Co.
Space Ordnance Systems
Sperry Corp.
Standard Manufacturing Co., Inc.
Stencel Aero Engineering Corp.
Sundstrand Corp.
Sverdrup Corp.
Syscon Co.
System Development Corp., A
Burroughs Co.
Systems Control Technology, Inc.
Systems Research Laboratories,
Inc.
Systron Donner, Safety Systems
Div.
Talley Defense Systems
Tandem Computers Inc.
Teledyne, Inc.
Teledyne CAE
Teledyne Ryan Aeronautical
Texas Instruments Equipment
Group
Thomson-CSF, Inc.
Time & Space Processing, Inc.
Top Brass Enterprises, Inc.
Tracor, Inc.
Trident Data Systems
TRW Electronics & Defense
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TRW Space & Technology Group
Turbomach Div. of Solar Turbines,
Inc.
United Technologies Corp.
UTC, Chemical Systems
UTC, Hamilton Standard
UTC, Norden Systems, Inc.
UTC, Pratt & Whitney
UTC, Research Center
UTC, Sikorsky Aircraft
Varo, Inc.
Vega Precision Laboratories
V. Garber Int'l Associates, Inc.
Vitro Corp.
Western Gear Corp.
Western Union Telegraph Co.,
Government Systems Div.
Westinghouse Electric Corp.
Westinghouse Electric Corp.,
Baltimore Div.
Westland Technologies, Ltd.
Wild Heerbrugg Instruments, Inc.
Williams International
Wyman-Gordon Co.
Xerox Corp.

Wild, Wild Weasel

Leo Thorsness fought "most of North Vietnam" in one of the epic solo battles of the SEA war.

BY JOHN L. FRISBEE

THE Wild Weasel crews, flying two-seat F-105Gs, took on the most dangerous and demanding mission of the air war in Southeast Asia. Their job was to precede a strike force into the target area, entice enemy surface-to-air missile and anti-aircraft radars to come on the air, and knock them out with bombs or with missiles that homed on the radar's emissions. Often they were in a high-threat area for half an hour while the strike force attacked its targets and withdrew. The business of offering themselves as targets for enemy gunners was made even more hazardous by the presence of MiG fighters. Only the top pilots were selected to fly F-105Gs.

Head Weasel of the 357th Tac Fighter Squadron at Takhli Air Base in Thailand was Maj. Leo Thorsness. On April 19, 1967, he and his backseater, Capt. Harold Johnson, fought one of the epic solo battles of the war in a wild fifty-minute duel with SAMs, AAA, and MiGs.

The target that day was an army compound near Hanoi, the most heavily defended area in the history of aerial warfare. Thorsness, leading a flight of four Weasels, heard the rattling in his headset that signaled enemy radars coming on long before they reached the target. Directing two of his F-105s to the north, Thorsness and his wingman stayed south, forcing enemy gunners to divide their attention. Johnson's scope in the back seat showed many SAMs in the area. Thorsness fired a Shrike missile at one of the sites, and moments later its radar went off the air. He then silenced another with a direct bomb hit.

Things quickly began to go sour. First, Thorsness's wingman, Tom

Madison, was hit by flak. Both he and his backseater, Tom Sterling, ejected. Thorsness flew toward their chutes, somehow finding time to fire at another SAM site along the way. Then the two Weasels he had sent north were attacked by MiGs. The afterburner of one F-105 wouldn't light; the element was forced to return to Takhli, leaving Thorsness alone in a hornet's nest of SAMs, AAA, and MiGs.

As Major Thorsness circled the two chutes, Johnson spotted a MiG off their left wing. The big F-105, designed for delivering nuclear weapons at low altitude, was never intended for air-to-air combat. But never mind that. Thorsness attacked the MiG, destroying it with 20-mm cannon fire as another MiG closed on his tail. Low on fuel, he broke off and rendezvoused with a tanker.

In the meantime, two prop-driven A-1E Sandys and a rescue helicopter had arrived to look for Madison and Sterling. Thorsness, with only 500 rounds of ammunition left, turned back from the tanker to fly cover for the rescue force, knowing there were at least five MiGs in the area. Using the last of his ammunition, he hit and probably destroyed one of them. Then, in a wild supersonic dash at fifty feet, he shook off four more MiGs that had come up fast behind him.

Once more, Thorsness started for the rescue scene, where MiGs had downed one Sandy. Out of ammunition, he hoped at least to draw the MiGs away from the remaining Sandy in what might well have been a suicidal maneuver. In the nick of time, an element of the strike force, which had been delayed, arrived and hit the enemy fighters.

It wasn't over yet. Again low on fuel, Thorsness headed for a tanker just as one of the strike force pilots, lost and almost out of fuel, called him for help. Thorsness knew he couldn't make Takhli without refueling. Rapidly calculating that he could stretch it to Udorn, some 200

miles closer, without taking on fuel, he directed the tanker toward the lost pilot. Once across the Mekong, he throttled back to idle and "glided" toward Udorn, touching down as his tanks went dry. That four-hour mission had been, as Captain Johnson said, "a full day's work."

Eleven days later, while Thorsness was on his ninety-third mission, a MiG popped up from behind a mountain and put a missile up the tailpipe of his F-105. He and Harry Johnson ejected at 600 knots, Thorsness suffering severe injuries. Both men spent almost the next six years in North Vietnam's prisons. Because of his "uncooperative attitude," Thorsness was denied medical attention, spent a year in solitary, and suffered severe back injuries under torture. On March 4, 1973, both men walked away from prison, Thorsness on crutches. No one could ever say that Leo Thorsness hadn't paid his dues in full.

On October 15, 1973, President Nixon presented the Medal of Honor to Lt. Col. Leo K. Thorsness for extraordinary heroism on that April day in 1967. Maj. Harold Johnson was later awarded the Air Force Cross. No longer able to fly fighters because of his back injuries, Leo Thorsness retired as a colonel. He is now Director of Civic Affairs for Litton Industries. ■



Lt. Col. Leo K. Thorsness of Sioux Falls, S. D., received the Medal of Honor on October 15, 1973, for valor in Vietnam.

The Electronic Air Force

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In June, AIR FORCE Magazine presents . . .





Tennessee Ernie Ford, who headed up the entertainment at the Air Force Ball, pauses to reminisce with actor Lorne Greene.

The theme for the 1984 Air Force Ball was . . .

Round-the-World

BY JAMES A. McDONNELL, JR., MILITARY RELATIONS EDITOR

THE shrinking globe, exemplified by around-the-world flights in both fantasy and reality, was the symbol of the 1984 Los Angeles Air Force Ball held last November at the Century Plaza Hotel.

The annual black-tie fund-raiser, which each year brings together Los Angeles society with Air Force leadership, is a potent charitable engine for raising funds for AFA's Aerospace Education Foundation and the Scholarships for Children of American Military Personnel (SCAMP). This year was no exception, with a record 1,200-plus people attending the festivities.

The decorations and the program were geared to the fantasy circumnavigation described by Jules Verne in his delightful *Around The World in Eighty Days*. As television personality Lorne Greene put it, "Jules Verne was a man of vision, and I have no doubt that he fully expected man to someday make a reality of his eighty-day fantasy. It was a half-century later that daring aviators of

the United States Army Air Service took a giant step toward achievement of that goal when they flew their Douglas World Cruisers completely around the world—the first time that had ever been done."

Mr. Greene went on to bring the story of around-the-world flight right up to today's ninety-minute circumnavigation of the earth by satellites and Shuttle craft and to expound on the role of the Air Force in these endeavors.

On hand from the Air Force were Under Secretary and Mrs. Edward C. "Pete" Aldridge; Gen. and Mrs. Bennie L. Davis; CMSAF and Mrs. Sam Parish; the military co-hosts, Lt. Gen. and Mrs. James E. Light and Lt. Gen. and Mrs. Forrest McCarty; and a multitude of others.

AFA leaders present included AFA National President and Mrs. Martin H. Harris, Chairman of the Board and Mrs. David L. Blankenship, AFA National Director and SCAMP President and Mrs. Edward A. Stearn, and many other

Association state and local leaders. The Ball General Chairman was William P. Kieschnick.

Stage and screen personality Ricardo Montalban, who served as master of ceremonies, and television performer John Schuck were on hand as four young men and women received 1984 scholarships from SCAMP. (A fifth scholarship recipient was unable to attend the ceremonies.) The scholarships, each worth \$3,000 a year, are continued each year that the students maintain satisfactory academic progress.

The evening's entertainment featured an outstanding nostalgic performance by Tennessee Ernie Ford, attired in a replica of his World War II Army Air Forces uniform. Ernie was the navigator-bombardier on AFA Executive Director Russ Dougherty's B-29 crew, and he had several humorous anecdotes to relate about his wartime experiences. Also appearing with Ernie was Ms. Dolores Bedard, who has graced

rd

several AFA programs, including AFA's 1983 Convention.

This year's Air Force Ball will take place in Los Angeles on Friday, October 25. ■

1984 SCAMP Scholarship Winners

The five SCAMP scholarship recipients for 1984, each the son or daughter of an American serviceman missing or killed in action, are:

Jennifer M. Andrews, Montgomery, Ala., daughter of Col. Stuart M. Andrews, USAF; **Marjorie A. Brown**, Las Vegas, Nev., daughter of Lt. Col. Robert Mack Brown, USAF; **Michael D. Cooper**, Portland, Ore., son of Lt. Daniel Dean Cooper, USN (KIA, February 1972); **Kelly Lorraine Miller**, San Diego, Calif., daughter of Lt. Robert Lester Miller, USN; and **Laura K. Vinson**, Washington, D. C., daughter of Col. Bobby Gene Vinson, USAF. Miss Miller was unable to attend the Ball.



The charity fund-raising event attracted a number of Air Force leaders and entertainment personalities. Above, Under Secretary of the Air Force and Mrs. Edward C. "Pete" Aldridge, Jr., left, visit with Mr. and Mrs. Ricardo Montalban.



AFA National President and Mrs. Martin Harris stop to chat with CMSAF Sam E. Parish about the funds raised for Air Force charities from the proceeds of the Ball. A record \$145,000 was netted from the November event.



Master of Ceremonies Ricardo Montalban poses with the SCAMP scholars. They are, from left, Michael D. Cooper, Portland, Ore.; Jennifer M. Andrews, Montgomery, Ala.; (Mr. Montalban); Laura K. Vinson, Washington, D. C.; and Marjorie A. Brown, Las Vegas, Nev.

THE BULLETIN BOARD

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

Defense Dollars for People

President Reagan's defense budget for FY '86 has been presented to Congress. It's expected to generate considerable light and heat in the coming months.

In the people area, \$103.3 billion has been allocated to pay DoD's military and civilian forces. This amounts to a 1.5 percent real-dollar increase overall and makes possible these increases in personnel: 1.2 percent (25,630 people) in the active-duty force; 1.7 percent (about 19,000) in civilian employees; and 4.4 percent (about 47,000) in the reserve forces.

The increase in active-duty strength is aimed at supplying people for new or increased programs, many of which are in the Air Force, such as the B-1B, the MX, GLCM, and the KC-10. Manpower-related costs total about forty-two percent of the defense budget.

In the Air Force, military people will account for about \$20.8 billion of the total \$110.3 billion requested. Projected are increases of 9,430 in the active-duty force and 5,740 in the reserves. An increase of 10,300 is asked for the Air Force civilian federal employee group.

The budget calls for the military to receive a three percent pay hike on July 1, but DoD civilians—along with their peers throughout the government—are due for a five percent pay cut. This pay cut is projected to save \$1.1 billion.

Other people-related items in the Air Force budget include: increasing

weight allowances for PCS moves, providing a travel entitlement for junior enlisted members, providing dependent dental care, and protecting the value of retirement. (See related item on p. 143.) All of these plus some others have been characterized by Air Force Secretary Verne Orr and Chief of Staff Gen. Charles Gabriel as "quality-of-life" issues.

In a joint statement to Congress on the topic, the two Air Force leaders noted that "systems and capabilities alone can't get the job done. The best weapons in the world would be of little value without trained and motivated people to operate and support them. Consequently, our overall commitment must always be to our people."

As the budget moves through the congressional process, there is no doubt that the commitment to maintain people programs in the face of a looming deficit will be strongly tested.

Revised Cadet Honor System Implemented

In the wake of a cheating incident last June, the USAF Academy—following an interim period during which the administration of the honor code was handled by commissioned officers—has instituted a revised cadet honor system.

As classes resumed at the beginning of 1985, the revised system was back under the supervision of the Cadet Wing. Lt. Gen. Winfield W. Scott, Jr., Academy Superintendent, empha-

sized that "we've reached the point where we can institute these new administrative procedures, which we believe will help us continue meeting our goal of graduating officers with the highest sense of honor and integrity, who will set the standard in the Air Force."

The new system, which was accepted by a majority vote of the Wing, contains five key points:

- The honor code is a goal for the first two school years and becomes a minimum standard of behavior for the remaining two school years.

- A new approach is taken toward "toleration" of honor code violations. While tolerating an offense by another cadet is still a violation, the sanction for this may be less than that given for lying, stealing, or cheating, depending on the circumstances.

- Another "evaluation board" has been added to administer the system. In the new system, the first board will determine if there has been a violation, while the second one will determine any punishment.

- Increased involvement of both commissioned officers and the cadet chain of command has been built into the new system. This makes it much more like the operational Air Force.

- A broader spectrum of cadets is now involved in the administration process than in the past.

Also changed is the pledge that cadets take in their freshman year, when they formally accept the code. It now reads: "We will not lie, steal, or cheat, nor tolerate among us those who do. Furthermore, I resolve to do my duty and live honorably, so help me God." According to General Scott, the addition of the second sentence emphasizes the relationship between duty and honor.

First Woman Security Specialist

An Air Force security specialty has opened its doors to women for the first time. On New Year's Day, Carmen Y. Collins of Glen Burnie, Md., enlisted in the 512th Weapons System Security Flight, Air Force Reserve, Dover AFB, Del., becoming the first woman recruit in the field. She's due

During the St. Louis Veterans Day Parade, the famed Budweiser Clydesdales won first place in the Parade's civilian category. Parade General Chairman Bill Lill (left) presented the award to Tom Moore, Anheuser-Busch's Director of Military Sales.



to end basic training and technical school this month and begin work in the field (see photo).

The tradition-breaking airman comes from an Air Force-oriented family. Her brother, Roscoe, serves in the medical administrative career field at Langley AFB, Va., and her father is an Air Force retiree who completed twenty-three years of service, mostly in the security police field.

CAP Saving Lives

For just over a year now, the Civil Air Patrol, the Air Force's official auxiliary, has been flying a new type of mission. CAP-Live Organ Transport (CAP-LOT) has flown fifty-four missions, carrying X rays, blood, and human tissues and organs to make transplants possible (see photo). The concept has been tested and is being carried out mainly by the CAP California Wing, headquartered in Oakland. Some sporadic East Coast missions have also been flown.

These missions are of two kinds: "life-improving" and "lifesaving." To date, five lives have been saved and more than 500 people have benefited from these missions. Prior to CAP-LOT, X rays and blood from distant donors were carried by bus, sometimes arriving too late to save would-be recipients.

CAP-LOT appears to be unequaled for transport of kidneys, livers, and pancreases. Last November, for example, a flight carried a pair of kidneys from a Modesto, Calif., donor. One saved the life of a twenty-five-year-old mother. The other freed a fifty-seven-year-old lawyer from seven years of dialysis. However, heart and heart-and-lung transplants must still travel by road or in the larger air-ambulances because the small CAP-LOT aircraft can't carry the necessary support apparatus for the organs.

While the program appears to have unlimited potential, one major obstacle remains—lack of money. By law, the Air Force may fund only search and rescue missions. Some fuel and maintenance costs have been authorized for "lifesaving" CAP-LOT missions, but such costs for the "life-improving" flights have been funded either privately or by the CAP pilots themselves. A large initial donation was made by the Lockheed Missiles and Space Co.'s Bucks-of-the-Month Club. It's estimated that average costs run about \$90 per flight.

Summing up the effects of the program, a spokeswoman for one of the transplant banks involved declared that CAP-LOT is "altering people's lives in such a positive way that it really is 'life-giving.'"



Amn. Carmen Y. Collins is the first woman to enlist in the Air Force security specialist career field since the field was opened to women. Her first assignment will be at Dover AFB, Del. (USAF photo)

Women To Join Minuteman Crews

In a dramatic change of heart, SAC has reversed a long-standing policy against assigning women to operational Minuteman crew duty. (Women have served on Titan II missile crews since 1978.)

The decision followed a special study on the role of women in the Air Force. As a participant in that study, SAC evaluated the ICBM crew member issue and decided to allow women to join the Minuteman force. Also,



CAPer Mike Dazey carefully removes a package containing human eye corneas from a CAP-LOT flight piloted by CAP Capt. Alice Becka of Squadron 80. CAP-LOT is a program to fly medical emergency missions. See item.

women will be eligible for duty on crews of the Peacekeeper MX when it becomes operational at F. E. Warren AFB, Wyo., next year.

A SAC spokesman said that women will be able to apply for Minuteman training classes slated to begin later this year at Vandenberg AFB, Calif. Both Minuteman and Peacekeeper require two-officer crews. Both officers of an individual crew will be of the same sex, due to the lack of adequate facilities for a mixed crew in the small launch center.

Military Retirement

Among the many items of controversy stirred up by the release of the proposed defense budget was one caused by the President's Budget Director, David Stockman.

Testifying on the Hill, Mr. Stockman stated that "institutional forces in the military are more concerned about protecting their retirement benefits than they are about protecting the security of the American people."

In Congress, Sen. David L. Boren (D-Okla.) rose to deplore this "insensitive attack upon the patriotism of those who have served and continue to serve in uniform—many of them serving outside the boundaries of this country, many of them serving at the sacrifice of the time they can spend with their wives and children and a normal family life to provide services to this country. . . . I hope that the men and women in the armed services of this country know that those statements do not reflect the feelings of the American people or the American Congress."

Mr. Stockman's outburst—later disavowed by the President—while in-temperate, did point up the strong feelings that are running in Washington on the topic of military retirement. It's an easy target, and Mr. Stockman—who had a student deferment during his draft-eligible years—is not alone in taking shots at it. Along with the Civil Service retirement program, it will unquestionably be scrutinized further this year.

However, the comment also stirred up support for the current military retirement system. Secretary of Defense Caspar W. Weinberger, Secretary of the Air Force Verne Orr, and Air Force Chief of Staff Gen. Charles A. Gabriel defended the system as "not lavish" and "a management tool we need."

Secretary Orr, who visits about one base per week, said the major concern of the troops is retirement, "and that doesn't come, as Mr. Stockman seemed to indicate, from generals in the Pentagon, protecting their own

retirement. That comes from our airmen and NCOs out there at the bases who are concerned about all this talk." The Secretary was encouraged when Rep. William L. Dickinson (R-Ala.), ranking minority member of the House Armed Services Committee, told him that he knows of no intention to change the retirement system for people now on active duty. Research Institute, a respected private forecast group, also noted that, in the "long term, Stockman's seeds may bear legislative fruit. But for now . . . military pensions . . . are unlikely to be cut deeply."

Speaking directly to the Stockman attack, Secretary Weinberger averred that "military personnel are far too dedicated to the service of their country to be more concerned with their benefits than the national security. . . . The military compensation system, including retirement, is fair, but by no means lavish."

AFA will continue to report developments in this area and, moreover, to speak out against injudicious tampering with this vital program.

Reservists Fly "Mercy Mission"

An Air Force Reserve C-130 of the 934th Tactical Airlift Group, Minneapolis, Minn., recently flew a "mercy mission" to Crookston, Minn., to bring a seriously injured six-year-old boy to medical attention (see photo).

The youngster, Dustin Merseth of Fisher, Minn., had been involved in an auto accident and was hospitalized with a crushed leg. His condition worsened, and the doctors asked

THE BULLETIN BOARD

USAF for an emergency air evacuation flight to Minneapolis.

Within an hour of the time the call was received at MAC headquarters, the 934th Group went into action. An aircrew was formed, two nurses and a medical technician prepped, and a flight-line crew warmed up the engines of the Reserve C-130 under weather conditions that blew in with a wind-chill factor of forty-five degrees below zero.

All went well with the flight and with Dustin, who, at press time, was in stable condition. All indications are that his leg will be saved. Kudos to the Air Force Reserve!

Short Bursts

Beginning next month, **military bases in states where the drinking age has been raised to twenty-one will abide by that rule on base.** After that, as other states enact similar laws—and most, if not all, are expected to do so to ensure continuation of federal highway funds—the remaining bases will fall in line. Historically, uniformed members could drink on base regardless of the local law.

The Thunderbirds, USAF's air demonstration squadron, are looking for pilots for the 1986-87 season. Appli-

cation deadline is May 1, 1985. For those ten-year pilots who meet minimum qualifications of unconditional flying status and at least 1,000 hours of first-pilot or instructor jet time, details can be found in AFR 36-20 or by calling Capt. John Robinson, AUTOVON 682-2227.

Three stamps that commemorate veterans are due out in 1985. The trio will honor **Korean War Veterans; Adm. Chester Nimitz, Pacific Fleet Commander in World War II; and World War I Veterans.**

Two VA design engineers were honored by President Reagan recently for designing "the Seattle Foot"—a **revolutionary prosthetic device** that enables foot amputees to participate in such sports as running, basketball, and soccer. **Dr. Ernest M. Burgess and Donald L. Poggi** were recognized for incorporating mechanical simplicity, high efficiency, and modest cost in their device, which is now being field-tested in forty-two VA prosthetic centers.

Eight states—Arizona, California, Idaho, Louisiana, Nevada, New Mexico, Texas, and Washington—currently consider military retired pay as community property. Thirty-nine other states allow judges to divide the retired pay in divorce settlements. In essence, based on 1985 legislation, **all states may now decide whether or not they will include retired pay in divorce proceedings.**

The 2614th Reserve Recruiting Squadron, assigned to Fourteenth Air Force at Dobbins AFB, Ga., won the top Air Force Reserve Recruiting Award for 1984. This is the tenth consecutive year it has done so, an unprecedented accomplishment.

The Air Force Management Engineering Agency at Randolph AFB, Tex., is **now a separate operating agency** reporting directly to the Air Force Director of Manpower and Personnel at the Pentagon. Previously a subordinate unit of the Air Force Manpower and Personnel Center (AFMPC), the AFMEA develops or approves manpower standards for Air Force functions.

The Air Force Academy's **Wings of Blue Parachute Team** has **captured its eighteenth title** in the last twenty years in the national collegiate parachuting championships.

Beginning this month, **Korea-bound blue-suiters can skip combat-arms qualification.** Certain specialists, such as security police and others with a possible combat role, will still have the requirement. But cutting out the weapons-training requirement for most will bring "a significant savings."



1st Lt. Cleo L. Nelson and MSgt. James B. Gustafson of the 47th Aeromedical Evacuation Flight comfort Dustin Merseth while flying the injured boy to medical attention in Minneapolis. See item. (AFRES photo)

VA reminds veterans that **burial space in a particular cemetery cannot be reserved prior to death.** Veterans having a preference should leave behind an easy-to-find "statement of wishes" so that the person making arrangements—usually the funeral director—may contact the director of the desired cemetery.

The National League of Families is planning to hold "Run for Freedom" ten-kilometer runs during MIA/POW Day on July 20, 1985. Those who want to sponsor, participate, or just find out more about these events are invited to contact the League at 1608 K St., N. W., Washington, D. C. 20006, or call (202) 223-6846.

Senior Staff Changes


RETIREMENT: M/G William E. Masterson.

CHANGES: B/G Philip M. Drew, from Ass't Dep. Dir., Political Mil. Affairs, J-5, OJCS, Washington, D. C., to Dep. Dir., Political Mil. Affairs, J-5, OJCS, Washington, D. C. . . . B/G Fred R. Nelson, from Dep. Dir., Nat'l Mil. Command Ctr., J-3, OJCS, Washington, D. C., to Dep. Dir., Operational Plans & Capabilities, J-3, OJCS, Washington, D. C. ■

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Our past three National Electronics Symposia in the Boston area have established a proud tradition. Both government and industry leaders have told us of their utility. Thus, we have scheduled another meeting on this important subject—"Electronics and the Air Force"—for April 1985.

WHO: National AFA, in conjunction with Air Force Systems Command and its Electronic Systems Division.

WHAT: An in-depth look at the major electronic requirements and developments and capabilities in electronics, C³, and electronics warfare.

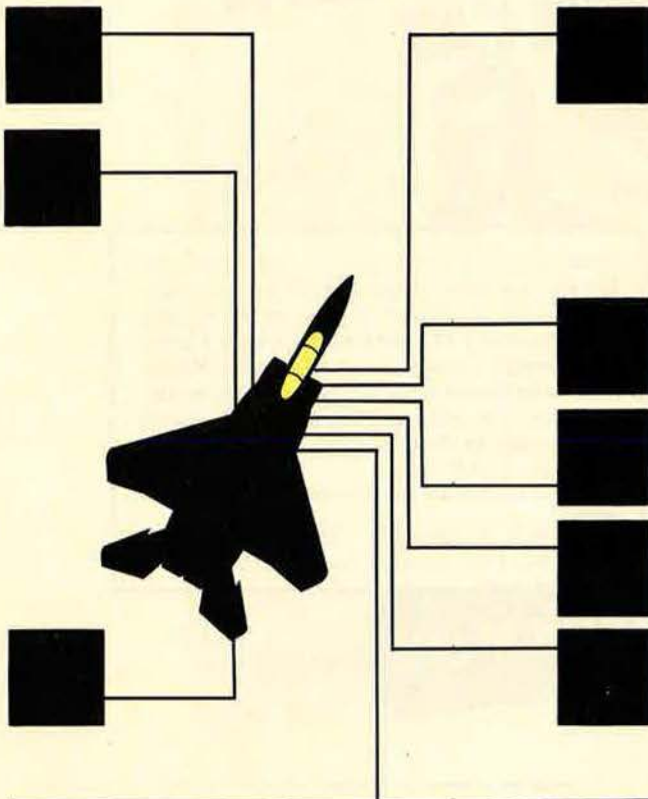
WHEN: April 25-26, 1985.

WHERE: In America's electronic heartland—the Conference Center at "The Hilton at Colonial," Wakefield, Mass. (on Interstate 95 and Route 128, near Hanscom AFB, Mass.).

Gen. Lawrence A. Skantze, Commander, Air Force Systems Command, will keynote this symposium. Leadoff speaker on the second day will be Dr. George Keyworth II, President Reagan's Science Advisor.

Featured dinner speaker will be the Hon. Donald C. Latham, Assistant Secretary of Defense for C³. Other symposium speakers include Gen. Robert C. Kingston, USA, Commander in Chief, US Central Command; Gen. Earl T. O'Loughlin, Commander, Air Force Logistics Command; Lt. Gen. Melvin F. Chubb, Jr., Commander, Electronic Systems Div., AFSC; and Maj. Gen. Thomas S. Swalm, Commander, USAF Tactical Air Warfare Center. Additional high-level speakers have been invited.

Make your plans now to attend! For further information, call Jim McDonnell or Dottie Flanagan at (703) 247-5800.



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AFA INTERCOM

By Robin L. Whittle, AFA DIRECTOR OF COMMUNICATIONS

Warbirds Descend on Fresno Chapter's Annual Air Show

Air Force, Army, Marine Corps, and Navy fighters, bombers, transports, trainers, and miscellaneous aircraft built in Great Britain, Canada, America, and Germany converged at the Madera Municipal Airport for the Fresno Chapter's thirteenth annual international air show last August. The distinguished warbirds included Canadian-built Harvards, a British Spitfire, and a German Me-108 and Fieseler-Storch Fi-156D, which made its debut after an extensive period of rebuilding.

American-built planes included twenty-seven P-51 Mustangs, five B-25 Mitchells, an A-26 Invader, an L-17, a P-40 Warhawk, a P-38 Lightning, a P-63 Kingcobra, an F-4U Corsair, a TBM Avenger, a C-46 Comman-

do, an AT-11 Kansan, and T-6/SNJ's, T-28s, T-34s, BT-13s, PT-17s, PT-22s, PT-23s, and other miscellaneous aircraft types.

Fresno Chapter Communications Director Sam Boghosian said the Korean War was represented by five British-built Sea Furies and five L-19 Bird Dogs, while from the Vietnam era came a Canadian-built C-7A Caribou, an A-4 Skyhawk, an S-1 Tracker, a Huey gunship, an O-2 Skymaster, and an immaculately restored A-1 (AD-4N) Skyraider complete with USAF Southeast Asian camouflage and markings. The Skyraider, which made its West Coast debut at the AFA event, crashed into a mountain in Virginia during inclement weather on November 4, killing owner Jack Spanich and his wife.

Program highlights included military aerobatics by Marvin "Lefty" Gardner in a P-38, Eric Mingleorff in

a P-40, Robb Satterfield in a P-51, Howard Pardue in an F-4U, and airline pilot Julie Clark in her T-34 Mentor *Air Force One-Half*. She had also performed previously at the General Robert F. Travis Chapter's air show (see December '84 "Intercom," p. 191). A "Thirty Seconds Over Madera" aerial demonstration was enacted by five twin-engine B-25 bombers making simulated bomb runs over the airfield. The pilots opened their bomb-bay doors as they started their attacks, firing .50-caliber propane-operated machine guns, dropping flour bombs, and then trailing engine smoke as they sustained "battle damage."

Participants came from Canada, Louisiana, Wyoming, Michigan, Texas, Arizona, and Nevada, and the event received extensive coverage from aviation writers and photojournalists from the West Coast, Great



This British-built Spitfire two-seater, owned and operated by William Greenwood, of Colorado, made its West Coast debut last August at the Fresno Chapter's thirteenth annual international air show. (Photo by Richard E. Satchell)

Britain, and Japan, Mr. Boghosian reports.

"What makes the Fresno Chapter air show unique are the ex-military aircraft that are forty to forty-five years old," he said. Each year, the show also features a variety of vintage armored vehicles, armor, and military vehicles. At the 1984 show, a rare ex-Army Air Forces Dodge bomb-loader was featured.

Fresno Chapter member Chris DeGuitaut, who has been involved with the program since the first Gathering of Warbirds in 1972, Chapter President Ronald H. Markarian, and air show Chairman Arnie Schweer are working on this year's event, which "will commemorate the end of World War II. We will try to get as many aircraft representing that era as we can, including a B-29 Superfortress," Mr. Markarian said. The event will be held on August 16-18, 1985, at the Madera Municipal Airport.

Rep. Tom Loeffler Addresses Alamo Chapter Meeting

Rep. Tom Loeffler (R-Tex.) addressed a joint luncheon meeting of AFA's Alamo Chapter and the San Antonio Chamber of Commerce's Military Affairs Council on December 10.

The four-term Republican, who represents the Twenty-first District in Texas, which includes San Antonio and San Angelo, told the more than 300 guests in the Coronado Room of the El Tropicano Hotel that before a "zero" increase in the budget is authorized for Fiscal Year 1986, certain spending items that were delayed during the last session of Congress need to be appropriated before Easter. These include the Peacekeeper MX missile system, providing aid to "freedom fighters" in Nicaragua, and spending more on defense technology and research.

He noted that with the Republican edge in the Senate shaved from a fifty-six to forty-four majority in the Ninety-eighth Congress to a fifty-three to forty-seven majority in the Ninety-ninth, Senate Majority Leader Robert Dole (R-Kan.) will have to extend his hand "across the aisle" and build a bipartisan coalition in the Senate, just as the Republican minority in the House forged a coalition with conservative Democrats in the Ninety-eighth Congress.

Regarding President Reagan's budget request (which had not yet been submitted when the speech was made), Representative Loeffler said it was important that the Administration present a budget to Congress that is "credible." He said the budget should

INTERCOM

favor an aggregate spending freeze to meet the deficit problem. If the President submits any other type of budget, he warned, it could result in a stalemate in the House.

Regarding the MX, he said, "It is vital that the Congress move forward with additional MX missiles because this will give us the strength [we need] at the time we begin a freeze and a verifiable reduction."



Utah State AFA President Jack Certain, left, AFA National Director Nate Mazer, right, and Ogden ALC Commander Maj. Gen. Charles McCausland admire a lithograph of a stained-glass window that is a memorial to the 384th Bomb Group. The lithograph will eventually be hung in Utah's proposed Heritage Museum and Aerospace Park.

Utah AFA Presents Framed Lithograph to Ogden ALC Commander

Utah State AFA President Jack Certain and Nate Mazer, AFA Permanent National Director, recently presented a framed lithograph of a stained-glass window that adorns the Parish Church of St. James the Apostle in Grafton Underwood, Northamptonshire, England, to Maj. Gen. Charles McCausland, Commander of the Ogden Air Logistics Center, for display in his office until the lithograph can be hung permanently in Utah's proposed new Heritage Museum and Aerospace Park.

The window, which depicts a B-17 returning from a World War II bombing mission, serves as a permanent reminder of the activities of the 384th Bombardment Group (Heavy) at the

airfield at Grafton Underwood. In particular, the window is a memorial to the 1,579 members of the 384th lost in combat.

Mr. Certain says the blue sky represents the arena in which the 384th saw combat and in which many members fought their last battle. The white cliffs of Dover were the first sight of England that the aircrews glimpsed upon returning from combat over Europe. Crossed flags in the window signify the combined efforts of England and the US in the defeat of a common enemy, and the four badges at the top of the window are those of the 544th, 545th, 546th, and 547th Squadrons. The shield below the badges is that of the 384th Bombardment Group

(Heavy), whose motto, "Keep the Show on the Road," was coined by Deputy Group Commander Maj. Selden McMillan while he was in a POW camp after being shot down on one of the group's early missions. The aircraft is the Boeing B-17 Flying Fortress, which the group operated during its stay at Grafton Underwood. Finally, the Celtic cross and Star of David represent the various religions of the members of the 384th.

"It is a precious piece of art," Glenn M. Lusk, Utah State AFA Vice President for Communications, noted.

Romanian Princess Delivers Timeless Message to Ex-POWs

Princess Catherine Caradja, a ninety-two-year-old Romanian princess who emigrated to this country in 1952

when she realized her personal safety was at stake, addressed a meeting of the American Ex-POWs in Rogers, Ark., reports Arkansas State AFA Communications Director Chuck Hoffman, who attended. At the meeting, the Princess met Bob Clay, a World War II pilot she had befriended when his plane was shot down over Romania in 1944. During the war, she aided some 3,000 American and allied aircrew members by sheltering them before the Germans discovered them. She helped many to cross back to American/Allied lines once they were able. She also aided those who escaped from POW camps.

Mr. Hoffman says her message that evening was timeless. "In effect, she told us that we have the most precious thing in life—freedom—and we ought to protect it. She emphasized that it is only after it is gone that one begins to realize exactly what was lost, but by then it is too late." Mr. Hoffman says she was emphatic about the need to keep the Strategic Defense Initiative from the Soviet Union. "It's the one thing that brought them back to the negotiating table. With it, your country has the Soviet Union in check. Without it, they have the superiority they need to push their totalitarian regime," Mr. Hoffman quoted her as saying.

Princess Caradja promised herself when she left Romania that she would devote the next twenty years to spreading the message of the need for Americans to protect their freedom, their democracy, and their way of life. Mr. Hoffman says Princess Caradja, who lives in Kansas City, Mo., spends three months each year traveling around the country in search of the former American and allied servicemen she befriended some forty years ago.

On the Scene In AFA's Busy and Active Grassroots

Actress **Martha Raye** (a retired Air Force lieutenant colonel), **Lt. Gen. James Abrahamson**, USAF, Director of the Strategic Defense Initiative Organization (SDIO), local luminaries, and the families of area servicemen killed in Lebanon joined together for the Spirit of St. Louis Chapter's "Salute to the Veterans." During the Salute, **Dung Chau Tran**, a South Vietnamese refugee and tenth grader at Richmond Heights High School, was honored for his haunting essay on the theme of veterans, reports **Mary Ann Seibel**, Under-40 National Director and Spirit of St. Louis Chapter President. . . Active Texas State AFA leader **C. Carey Deckard** has been nomi-



Actress **Martha Raye**, right, a retired Air Force lieutenant colonel, congratulates South Vietnamese refugee **Dung Chau Tran**, left, whose haunting essay on the theme of veterans captivated the audience at the Spirit of St. Louis Chapter's "Salute to the Veterans."



Gen. John W. Pauly, USAF (Ret.), right, accepted the 1984 Tennessee Ernie Ford Aerospace Award from the Ol' Peapicker himself at the Tennessee Ernie Ford/Silicon Valley Chapter's recent awards ceremony. General Pauly, a pilot since 1945 and a member of the Tennessee Ernie Ford/Silicon Valley Chapter, was honored for a long and distinguished military career that included assignments with the Joint Chiefs of Staff, a stint as Deputy Chief of Staff for Plans and Operations, Hq. USAF, and service as Vice Commander in Chief, and later Commander in Chief, US Air Forces in Europe. (Photo by Patrick Frederickson)

nated for promotion to brigadier general in the Air Force Reserve. He serves as Mobilization Assistant to the Air Force Director of Public Affairs and is vice president for advertising and public relations at InterFirst Bank in San Antonio.

"Tribute to the Air National Guard" was the theme for the Reno Chapter's membership dinner in February, says Chapter President **Vic Hollandsworth** . . . This active AFA leader started the Black & Gold Squadron (Chapter) after World War II while teaching speech arts at the University of Maryland, then, after a second tour in Korea, moved to Denver and founded the Metropolitan Squadron, and, later, the Front Range Chapter, and, finally, AFA's Silver & Gold Chapter. He's **Ted Stell**, Vice President/Communications for the Silver & Gold Chapter in Denver . . . National Director **Tom Bigger** was written up recently in *World Services News*, the employee news magazine of Pan Am World Services, Inc.

Panelists at the Chicagoland-O'Hare Chapter Symposium on "The Coming Revolution in Military Technology" included **T. K. Jones**, Deputy Under Secretary of Defense (Strategic and Theater Nuclear Forces); **Lt. Gen. Herman O. Thomson**, USAF, Director, J-5, Joint Chiefs of Staff; **Gen. Robert C. Kingston**, USA, Commander in Chief, US Central Command; **Dr. Fred C. Iklé**, Under Secretary of Defense for Policy; **Vice Adm. Bernard M. Kauderer**, USN, Commander, Submarine Force, US Atlantic Fleet; **Maj. Gen. Andrew L. Cooley**, USA, Director, Strategic Plans and Policy, DCS/Operations and Plans, Hq. USA; **Brig. Gen. Jimmie V. Adams**, USAF, Special Assistant for Tactical Modernization, DCS/RD&A, Hq. USAF; **Lt. Gen. Alfred M. Gray**, USMC, Commanding General, Fleet Marine Force, Atlantic, and Commanding General, II Marine Amphibious Force; and **Lt. Gen. James Abrahamson**, USAF, Director, Strategic Defense Initiative Organization (SDIO). This was the eighth defense symposium conducted by Chicagoland-O'Hare, says Chapter President and Symposium Director **Tom Hilquist**.

Arnold Air Society's Jake Schaefer Squadron at the University of Illinois, Champaign, was honored by AFA's Illini Chapter in January for sponsoring a "baby-buggy race" around the University Armory Building track for twenty-four consecutive hours to raise funds for two charities. Illini Chapter Awards Chairman **Glen Wensch** says that many community groups were involved and that the project netted more than \$5,000,

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ribbon in the presence of North Dakota Governor **Allen Olson**, Minot State College President **Dr. Gordon Olson**, and Minot Mayor **Chester M. Reiten**. The room contains a considerable amount of memorabilia donated by General Jones to AFA's Minot Chapter. Chapter officials had no place to



Gen. Lawrence A. Skantze, left, AFSC Commander, accepts an *Ira Eaker Fellowship medallion* from **H. H. Arnold Chapter Executive Council Chairman Frank Battersby**, following the General's address to a recent Chapter meeting.

thanks to the efforts of the two coordinators, **Cadet Maj. Craig Rutland** and **Cadet Capt. Dale Hietala**; Squadron Advisor **Capt. Terry McDonnell**; **Col. Lloyd K. Houchin**, Professor of Aerospace Studies; and the Squadron cadets. All were honored by the Illini Chapter, says Chapter President **Donald Kruse** . . . AFA's H. H. Arnold Chapter in New York sponsored **Gen. Lawrence A. Skantze**, Commander, Air Force Systems Command, as an *Ira Eaker Fellow* of AFA's Aerospace Education Foundation after his address to more than 300 members and guests at a recent luncheon, says **Frank Battersby**, Chairman of the Chapter's Executive Council.

On the second floor of the Student Union on the Minot State College campus sits "The David C. Jones Room," which was officially dedicated last spring when native son **Gen. David C. Jones**, USAF (Ret.), former Chairman of the Joint Chiefs of Staff and graduate of Minot State, cut the

treasures until **Ruth Ziegler**, Minot Chapter President, and other Minot Chapter officials worked out the details with the College President and **D. Archie Peterson**, Director of College Relations. An excellent brochure now explains the story behind "The David C. Jones Room" . . . Eugene Chapter members and guests met at the Emerald Valley Forrest Inn in Creswell, Ore., on January 31 to hear **Chief Warrant Officer 4th Class Dan Harris** relate his extensive knowledge and experience in Army aviation as Chief Instructor Pilot, I Corps Army Aviation, Pacific Northwest, as a member of the evaluation team for the new LHX rotary-wing aircraft, and as an instructor pilot for the Cobra and OH-58 helicopters.

The Air Force Space Museum at Cape Canaveral AFS, Fla., reopened in November thanks to the efforts of National Director **Dan Callahan** and thirty members of AFA's Cape Canaveral Chapter who offered to serve as volunteer guides. Air Force offi-



Meeting at AFA's recent Tac Air Symposium were, from left, AFA National Director Carl J. Long, former AFA President and Board Chairman and current National Director John G. Brosky, and National Vice President Charles H. Church, Jr.

cial closed the historic facility to the public last spring because of staff shortages and security problems. The Museum features the original blockhouse, firing rooms, and launchpads that were used for some historic missions, including Mercury-Redstone 3, the nation's first manned spaceflight vehicle, in which astronaut Alan Shepard flew downrange on May 5, 1961 . . . "Hangar Talk" is the name of the Cleveland Chapter's new newsletter, which is typeset, includes photos, and is well done. Good work by **Tony Mazzolini**, Chapter Public Relations and Communications Director, Chapter President **Leo Johnson**, and all who developed "Hangar Talk."

Community Partners of AFA's **Union Morris Chapter** in New Jersey are well publicized in the Chapter's newsletter "Plane Talk." In fact, they are discussed in an article, "They Help Us—Now It's Our Turn!" The article encourages members to avail themselves of the services offered by the local business establishments that are affiliated with the Chapter as Community Partners . . . So that there's no doubt about meetings, places, and dates, **Bob Hazeleaf**, President of AFA's General Robert F. Travis Chapter in California, outlines the entire year's activities in the January issue of the Chapter newsletter—a superb planning guide and a good idea.

Gerry Chapman reports on veterans affairs for the California State AFA newsletter and notes in the February issue that "thousands of veterans in VA hospitals around the country are all but forgotten by the public, but there are some people who care." Two who do are **CAP Maj. Beatrice Sparks** and **Chaplain Francis Jeffery**, of AFA's Tennessee Ernie Ford Chapter in Sunnyvale, who regularly visit patients at the VA Hospital in Palo Alto. Bea reports that in one of the wards the veterans were reading copies of **AIR FORCE Magazine** that date from the early 1970s. "Action is under way to improve the situation," Gerry reported . . . **Eugene Goldenberg**, President of AFA's Metropolitan Philadelphia Chapter; **Roy Whitton**, President of the Florida Highlands Chapter; National Director **Vic Kregel**; Executive Director **Russ Dougherty**; **Darwin Van Keuren**, Genesee Valley Chapter President; and AFA member and columnist **Eugene Mitchell Beard** are among the latest AFAers to protest the cancellation of the television series "Call to Glory" in letters to the president of ABC Entertainment in Los Angeles. Mr. Whitton also wrote letters to the Florida congressional delegation and to President Reagan in protest of OMB Director **David Stockman's** comments on military retirement.

Recent additions to AFA's chapter network include the **Green Valley Chapter** in Green Valley, Ariz., led by **Francis Nugent**; the **Manila Chapter** in the Philippines, led by **Paul Graf**; the **Rheinfalz Chapter** in West Germany, led by **David Stripling**; the **Hahn Air Base Chapter** in West Germany, led by **Thomas E. Baril**; and the **Gateway to Freedom Chapter** in



Rep. Steve Bartlett (R-Tex.) displays the AFA mug presented him by former Dallas Chapter President Bill Solemene. Speaking at a recent Chapter meeting, Representative Bartlett discussed key legislative concerns and saluted AFA's efforts.



AFA State Contacts

Following each state name, in parentheses, are the names of the communities 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 appropriate contact.

ALABAMA (Auburn, Birmingham, Huntsville, Mobile, Montgomery, Selma): **Jim Patterson**, 802 Brickell Rd., N.W., Huntsville, Ala. 35805 (phone 205-837-5087).

ALASKA (Anchorage, Fairbanks): **Michael T. Cook**, 1001 Noble St., Fairbanks, Alaska 99701 (phone 907-456-7762).

ARIZONA (Green Valley, Phoenix, Sedona, Sun City, Tucson): **Meryll Frost**, 7426 E. Random Ridge Drive, Tucson, Ariz. 85710 (phone 602-298-1580).

ARKANSAS (Blytheville, Fayetteville, Fort Smith, Little Rock): **Aaron E. Dickerson**, 710 S. 12th, Rogers, Ark. 72756 (phone 501-636-7460).

CALIFORNIA (Apple Valley, Edwards, Fairfield, Fresno, Hermosa Beach, Los Angeles, Merced, Monterey, Novato, Orange County, Pasadena, Riverside, Sacramento, San Bernardino, San Diego, San Francisco, San Jose, Santa Barbara, Santa Monica, Sunnyvale, Vandenberg AFB, Yuba City): **David Graham**, 29611 Vista Plaza Drive, Laguna Niguel, Calif. 92677 (phone 714-495-4622).

COLORADO (Boulder, Colorado Springs, Denver, Fort Collins, Grand Junction, Greeley, Littleton, Pueblo, Waterföhr): **Thomas W. Ratterree**, P. O. Box 26029, Colorado Springs, Colo. 80938 (phone 303-599-0143).

CONNECTICUT (East Hartford, Middletown, North Haven, Storrs, Stratford, Westport, Windsor Locks): **Raymond E. Choquette**, 16 Tonica Springs Trail, Manchester, Conn. 06040 (phone 203-646-4818).

DELAWARE (Dover, Wilmington): **Joseph H. Allen, Jr.**, 31 Muirfield Court, Dover, Del. 19901 (phone 302-674-3400).

DISTRICT OF COLUMBIA (Washington, D. C.): **David J. Smith**, 1501 Lee Highway, Arlington, Va. 22209-1198 (phone 703-247-5820).

FLORIDA (Avon Park, Brandon, Cape Coral, Daytona Beach, Fort Walton Beach, Gainesville, Homestead, Jacksonville, Leesburg, Naples, New Port Richey, Orlando, Panama City, Patrick AFB, Redington Beach, Sarasota, Tallahassee, Tampa, West Palm Beach, Winter Haven): **H. Lake Hamrick**, 206 Sotir Ave., N. W., Fort Walton Beach, Fla. 32548 (phone 904-862-5067).

GEORGIA (Athens, Atlanta, Columbus, Rome, Savannah, St. Simons Island, Valdosta, Warner Robins): **Wilbur H. Keck**, 116 Stillwood Drive, Warner Robins, Ga. 31093 (phone 912-922-0655).

GUAM (Agana): **Joe Gyulavics**, P. O. Box 21543, Guam 96921 (phone 671-734-2369).

HAWAII (Honolulu): **Don J. Daley**, P. O. Box 3200, Honolulu, Hawaii 96847 (phone 808-525-6296).

IDAHO (Boise, Mountain Home, Twin Falls): **Stanley I. Anderson**, Box 45, Gowen Field, Boise, Idaho 83707 (phone 208-362-9360).

ILLINOIS (Belleville, Champaign, Chicago, Elmhurst, Peoria, Springfield-Decatur): **Kyle Robeson**, P. O. Box 697, Champaign, Ill. 61820 (phone 217-352-3936).

INDIANA (Bloomfield, Fort Wayne, Indianapolis, Lafayette, Logansport, Marion, Mentone, South Bend): **John Kagel**, 1029 Riverside Drive, South Bend, Ind. 46616 (phone 219-234-8855).

IOWA (Des Moines): **Carl B. Zimmerman**, 608 Waterloo Bldg., Waterloo, Iowa 50701 (phone 319-232-2650).

KANSAS (Topeka, Wichita): **Cletus J. Pottebaum**, 6503 E. Murdock, Wichita, Kan. 67206 (phone 316-683-3963).

KENTUCKY (Lexington, Louisville): **Jo Brendel**, 726 Fairhill Drive, Louisville, Ky. 40207 (phone 502-897-7647).

LOUISIANA (Alexandria, Baton Rouge, Bossier City, Monroe, New Orleans, Shreveport): **James P. LeBlanc**, 3645 Monroe St., Mandeville, La. 70448 (phone 504-626-4516).

MAINE (Bangor, Limestone, N. Berwick): **Alban E. Cyr, Sr.**, P. O. Box 160, Caribou, Me. 04736 (phone 207-496-3331).

MARYLAND (Andrews AFB area, Baltimore, Rockville): **James M. Kennedy**, 304 Tantalum Drive, Fort Washington, Md. 20744 (phone 301-292-6066).

MASSACHUSETTS (Bedford, Boston, Falmouth, Florence, Hanscom AFB, Lexington, Taunton, Worcester): **John F. White**, 49 West Eagle St., East Boston, Mass. 02128 (phone 617-567-1592).

MICHIGAN (Battle Creek, Detroit, Kalamazoo, Marquette, Mount Clemens, Oscoda, Petoskey, Southfield): **Robert J. Schaeztl**, 42247 Trotwood Court, Canton, Mich. 48187 (phone 313-552-3280).

MINNESOTA (Duluth, Minneapolis-St. Paul): **Paul G. Markgraf**, 2101 E. 3d St., St. Paul, Minn. 55119 (phone 612-735-4411).

MISSISSIPPI (Biloxi, Columbus, Jackson): **R. E. Smith**, Route 3, Box 282, Columbus, Miss. 39701 (phone 601-327-4422).

MISSOURI (Kansas City, Knob Noster, Springfield, St. Louis): **Orville R.**

Blair, 1504 Golden Drive, St. Louis, Mo. 63137 (phone 314-867-0285).

MONTANA (Great Falls): **Ed White**, 2333 6th Ave., South, Great Falls, Mont. 59405 (phone 406-453-2054).

NEBRASKA (Lincoln, Omaha): **Donald D. Adams**, First Tier Inc., 17th & Farnam, Omaha, Neb. 68102 (phone: 402-348-7905).

NEVADA (Las Vegas, Reno): **Vern Frey**, 4665 Rio Encantado Lane, Reno, Nev. 89502 (phone 702-825-1125).

NEW HAMPSHIRE (Manchester, Pease AFB): **Robert N. McChesney**, Scruton Pond Rd., Barrington, N. H. 03825 (phone 603-664-5090).

NEW JERSEY (Andover, Atlantic City, Belleville, Camden, Chatham, Cherry Hill, E. Rutherford, Forked River, Fort Monmouth, Jersey City, McGuire AFB, Middlesex County, Newark, Old Bridge, Trenton, Wallington, West Orange, Whitehouse Station): **Gilbert Freeman**, 42 Weirimus Lane, Hillsdale, N. J. 07642 (phone 201-666-5379).

NEW MEXICO (Alamogordo, Albuquerque, Clovis): **Louie T. Evers**, P. O. Box 1946, Clovis, N. M. 88101 (phone 505-762-1798).

NEW YORK (Albany, Brooklyn, Buffalo, Chautauqua, Garden City, Hempstead, Hudson Valley, New York City, Niagara Falls, Plattsburgh, Queens, Rochester, Rome/Utica, Southern Tier, Staten Island, Suffolk County, Syosset, Syracuse, Westchester): **Robert H. Root**, 57 Wynnwood Ave., Tonawanda, N. Y. 14150 (phone 716-692-2100).

NORTH CAROLINA (Asheville, Charlotte, Fayetteville, Goldsboro, Greensboro, Kitty Hawk, Raleigh): **Bobby G. Suggs**, 501 Bloomfield Drive, Fayetteville, N. C. 28301 (phone 919-323-5281).

NORTH DAKOTA (Concrete, Fargo, Grand Forks, Minot): **James M. Crawford**, 1720 9th St., S. W., Minot, N. D. 58701 (phone 701-838-0010).

OHIO (Akron, Cincinnati, Cleveland, Columbus, Dayton, Newark, Youngstown): **Chester Richardson**, 1271 Woodledge Ave., Mineral, Ohio 44440 (phone 216-652-5116).

OKLAHOMA (Altus, Enid, Oklahoma City, Tulsa): **G. G. Atkinson**, P. O. Box 25858, Oklahoma City, Okla. 73125 (phone 405-231-6213).

OREGON (Eugene, Portland): **Zane R. Harper**, 5360 SW Dover Lane, Portland, Ore. 97225 (phone 503-244-4561).

PENNSYLVANIA (Allentown, Altoona, Beaver Falls, Coraopolis, Drexel Hill, Erie, Harrisburg, Homestead, Johns-

town, Lewistown, Philadelphia, Pittsburgh, Scranton, State College, Washington, Willow Grove, York): **Jack B. Flaig**, P. O. Box 375, Lemont, Pa. 16851 (phone 814-238-4212).

PUERTO RICO (San Juan): **Fred Brown**, 1991 Jose F. Diaz, Rio Piedras, P. R. 00928 (phone 809-790-5288).

RHODE ISLAND (Warwick): **King Odell**, 413 Atlantic Ave., Warwick, R. I. 02888 (phone 401-941-5472).

SOUTH CAROLINA (Charleston, Clemson, Columbia, Myrtle Beach, Sumter): **James Catington**, 2122 Gin Branch Rd., Sumter, S. C. 29154 (phone 803-481-2634).

SOUTH DAKOTA (Rapid City, Sioux Falls): **John E. Kittelson**, 141 N. Main, Suite 308, Sioux Falls, S. D. 57102 (phone 605-336-2498).

TENNESSEE (Chattanooga, Knoxville, Memphis, Nashville, Tri-Cities Area, Tullahoma): **Jack K. Westbrook**, P. O. Box 1801, Knoxville, Tenn. 37901 (phone 615-523-6000).

TEXAS (Abilene, Amarillo, Austin, Big Spring, College Station, Commerce, Corpus Christi, Dallas, Del Rio, Denton, El Paso, Fort Worth, Harlingen, Houston, Kerrville, Laredo, Lubbock, San Angelo, San Antonio, Waco, Wichita Falls): **Bryan L. Murphy, Jr.**, General Dynamics, P. O. Box 748 MZ 1221, Fort Worth, Tex. 76101 (phone 817-429-0693).

UTAH (Brigham City, Clearfield, Ogden, Provo, Salt Lake City): **Jack Certain**, 2369 N. 2600 East, Layton, Utah 84041 (phone 801-777-7235).

VERMONT (Burlington): **John D. Navin**, 6 Belwood Ave., Chocoma, Vt. 05446 (phone 802-863-1510).

VIRGINIA (Arlington, Danville, Harrisonburg, Langley AFB, Lynchburg, Norfolk, Petersburg, Richmond, Roanoke): **C. W. Scott**, 6368 Brampton Court, Alexandria, Va. 22304 (phone 703-370-2702).

WASHINGTON (Bellingham, Seattle, Spokane, Tacoma, Yakima): **David Anderson**, 915 E. Lake Sammamish Shore Lane, SE, Issaquah, Wash. 98027 (phone 206-392-5052).

WEST VIRGINIA (Huntington): **David Bush**, 2317 S. Walnut Drive, St. Albans, W. Va. 25177 (phone 304-722-3583).

WISCONSIN (Madison, Milwaukee): **Charles Marotske**, 7945 S. Verdev Drive, Oak Creek, Wis. 53154 (phone 414-762-4383).

WYOMING (Cheyenne): **William Helms**, 808 Shoshoni, Cheyenne, Wyo. 82009 (phone 307-638-3114).

Berlin, West Germany, led by **W. Charles Austin** . . . "Americans in general, and Virginians in particular, have believed in the need for a strong defense since 1755, when the Virginia General Assembly authorized the creation of a militia to defend the colony," **Brig. Gen. (Maj. Gen. selectee) John Michael Loh**, Deputy Chief of Staff for Requirements at Tactical Air Command, told some eighty Richmond Chapter members and guests at a meeting in January. He told the gathering that "today we are 250 percent better prepared to fight and win than four or five years ago." (*For more on TAC readiness, see "At the Edge on Air Superiority" on p. 52 of this issue.*)

Frank Luke Chapter President **Norman O. Gallion** has ordered 100 copies of the 1985 AFA policy book for distribution locally and to key public officials . . . **Harry Williams**, President of AFA's Roanoke Chapter, received a letter from **Rep. James R. Olin** (D-Va.) thanking Harry for sending the AFA policy book. "There will be a great deal of debate on the floor of the House on several of the issues mentioned in the AFA policy book, and I am sure this year's budget process will be a lengthy one, particularly on the defense budget," he wrote.

"I have added your letter and the Air Force Association policy book to my legislative files so I can refer to it

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throughout the Ninety-ninth Congress," **Rep. Frank Horton** (R-N. Y.) told Genesee Valley Chapter President **Darwin Van Keuren** in a letter of thanks . . . Ohio State AFA President **Chester A. Richardson** was thanked by **Sen. Howard M. Metzenbaum** (D-Ohio) for the AFA policy book. The Senator noted, "I am sure that these policies will be of great value to me as I study the issues in the coming months." ■

UNIT REUNIONS

Glider Pilots Ass'n

World War II glider pilots will hold their reunion on September 19-22, 1985, at the Clarion Hotel in Colorado Springs, Colo. **Contact:** Virginia B. Randolph, 136 W. Main St., Freehold, N. J. 07728.

Jolly Green Rescue Forces

The Jolly Green Rescue Forces will hold their sixteenth reunion on May 17-18, 1985, at the Regency Beach Resort Hotel in Fort Walton Beach, Fla. **Contact:** Jack Allison, 2007 Bayshore Dr., Niceville, Fla. 32578. Phone: (904) 678-8135.

North East Air Command

A reunion will be held on September 19-22, 1985, in Colorado Springs, Colo., for officers who were stationed at Fort Peperel, Newfoundland, Canada, during the period 1948-53. **Contact:** Robert F. Herrick, 3902 Constitution Ave., Colorado Springs, Colo. 80909. Claire LaRue, 2411 Airport Rd., Colorado Springs, Colo. 80910.

Stalag Lufts IV and VI

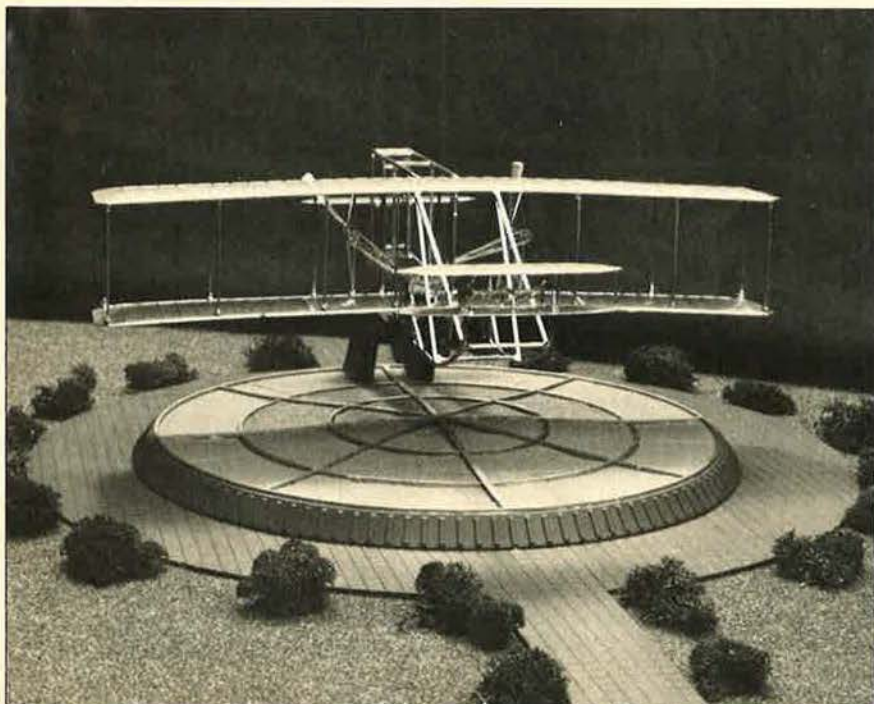
Former prisoners of war of Stalag Lufts IV and VI will hold a reunion on July 25, 1985, at the Marc Plaza Hotel in Milwaukee, Wis. **Contact:** Leonard E. Rose, 8103 E. 50th St., Indianapolis, Ind. 46226.

8th Fighter Group Ass'n

Members of the 8th Fighter Group and attached units (World War II) will hold their reunion on July 25-28, 1985, at the Paper Valley Hotel in Appleton, Wis. **Contact:** Vincent W. Steffanic, 21 Curson St., West Warwick, R. I. 02893.

Coming Events

April 12-13, **Alabama State Convention**, Mobile . . . April 12-13, **South Carolina State Convention**, Shaw AFB, Sumter . . . April 26-27, **Massachusetts State Convention**, Boston . . . May 4, **Louisiana State Convention**, Barksdale . . . May 17-18, **Mississippi State Convention**, Biloxi . . . May 17-18, **Oregon State Convention**, Portland . . . May 17-18, **Tennessee State Convention**, Chattanooga . . . June 7-8, **Oklahoma State Convention**, Altus . . . June 14-16, **Georgia State Convention**, Savannah . . . June 15, **Illinois State Convention**, Chanute AFB, Rantoul . . . June 21-22, **Ohio State Convention**, Cleveland . . . June 28-29, **New Jersey State Convention**, Cape May . . . July 12-13, **Colorado State Convention**, Air Force Academy . . . July 12-14, **Pennsylvania State Convention**, Pittsburgh . . . July 19-21, **Texas State Convention**, Austin . . . August 2-4, **New York State Convention**, Niagara Falls . . . August 2-4, **Washington State Convention**, Bellevue . . . August 17, **Arkansas State Convention**, Blytheville AFB . . . August 22-24, **California State Convention**, San Diego . . . August 23-24, **North Dakota State Convention**, Minot . . . September 15-19, **AFA National Convention and Aerospace Development Briefings & Displays**, Washington, D. C.



AFA's Montgomery Chapter has pledged its support for the "Monument to Powered Flight," shown here in miniature, that will be erected later this year at Maxwell AFB, Ala. The monument—a full-scale, stainless-steel replica of the Wright Flyer—will be a symbol of the Wright brothers' activity in Montgomery. In 1910, with the support of local citizens, the Wright brothers established the first aviation training school in the US at a field now occupied by the Air University.

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11th Bomb Group Ass'n

Members of the 11th Bomb Group (H) will hold their reunion on July 13-27, 1985, in Honolulu, Hawaii. **Contact:** Robert E. May, P. O. Box 637, Seffner, Fla. 33584. Phone: (813) 681-3544.

15th Constabulary Squadron Ass'n

The 15th Constabulary Squadron Association will hold its reunion on July 18-20, 1985, at the Milwaukee Marriott in Brookfield, Wis. **Contact:** Jimmy D. McLees, 12301 W. Oklahoma Ave., Apt. 13, West Allis, Wis. 53277. Phone: (1-414) 545-4741.

19th Bombardment Ass'n

The 19th Bombardment Association has scheduled four regional gatherings in the following locations: San Antonio, Tex. (May 16-18, 1985); Dayton, Ohio (June 20-22, 1985); Seattle, Wash. (July 25-27, 1985); and Orlando, Fla. (September 19-21, 1985). **Contact:** Conrad A. Marvel, 5357 E. Zion Pl., Tulsa, Okla. 74115. Phone: (918) 835-9909.

20th Fighter Group Ass'n

The 20th Fighter Group Association will hold their reunion on June 13-16, 1985, at the Antlers Hotel in Colorado Springs, Colo. **Contact:** John Hudgens, 409 University Ave., Apt. 108 S., Lubbock, Tex. 79401. Phone: (806) 763-5576 or (619) 276-5297.

23d Bomb Squadron

Veterans of the 23d Bomb Squadron will hold their reunion on May 28-31, 1985, in Reno, Nev. **Contact:** Lee Benbrooks, 1409 W. Cerritos Ave., #58, Anaheim, Calif. 92802. Phone: (714) 772-1233.

25th Bomb Group

The 25th Bomb Group "Watton Warriors" and attached units stationed in Watton, England, will hold a forty-first anniversary reunion on July 18-20, 1985, in Salt Lake City, Utah. **Contact:** Col. Warren Borges, USAF (Ret.), 162 Topsfield Rd., Ipswich, Mass. 01938. Phone: (617) 356-2881.

29th Air Service Group Ass'n

The thirty-ninth reunion of the 29th Air Service Group will be held on July 7-13, 1985, in Willow Grove, Pa. **Contact:** Frank Pace, 315 W. 15th St., Dover, Ohio 44622.

30th Bomb Group

Veterans of the 30th Bomb Group will hold their third reunion on October 4-5, 1985, in Dallas, Tex. **Contact:** John Allison, 19 Lowndes St., Charleston, S. C. 29401.

Class 42-A

Pilots of Class 42-A (Kelly, Foster, and Ellington Fields) will hold a reunion on September 27-29, 1985, in Colorado Springs, Colo. **Contact:** Mike (Kovacevich) Kovar, 3 Puddingstone Ct., Morristown, N. J. 07960. Phone: (201) 267-0657 evenings.

Class 43-E

Pilots of Class 43-E (Gulf Coast Training Command) will hold their forty-second anniversary reunion on May 17-19, 1985, in Denver, Colo. **Contact:** K. C. Grove, 508 S. Ogden Dr., Los Angeles, Calif. 90036. Phone: (213) 931-8835.

43d Bomb Group Ass'n

A reunion of the 43d Bomb Group will be held on September 25-28, 1985, in Omaha, Neb. **Contact:** Lloyd Boren, 102 Beechwood, Universal City, Tex. 78148.

44th Fighter Squadron

The 44th Fighter Squadron ("Vampire Squadron") will hold a reunion on May 23-26, 1985, at the Camelback Inn in Scottsdale, Ariz. **Contact:** Jack Laurie, 3885 Oak Trail Rd., Santa Ynez, Calif. 93460.

49th Fighter Group Ass'n

The 49th Fighter Group will hold its reunion on July 18-22, 1985, at the Radisson Inn in Superior, Wis. **Contact:** John Roth, 1017 Adams S. E., Albuquerque, N. M. 87108. Phone: (505) 268-2903.

55th Troop Carrier Squadron

The 55th Troop Carrier Squadron "Tokyo Trolley" (later the "Imperial Couriers") will hold its first reunion on April 12-14, 1985, at the Granada Royale in San Antonio, Tex. **Contact:** Don Gourley, 370 We Go Ct., Deerfield, Ill. 60015.

56th Troop Carrier Squadron

Members of the 56th Troop Carrier Squadron, 375th Troop Carrier Group, will hold their reunion on October 4-6, 1985, at the Holiday Inn Central in Colorado Springs, Colo. **Contact:** Erwin J. Walter, 977 Cardiff Dr., Crystal Lake, Ill. 60014. Phone: (815) 459-3097.

58th Bomb Wing Ass'n

The 58th Bomb Wing, including the 40th, 444th, 462d, and 468th Bomb Groups and the 25th, 78th, 86th, and 87th Air Service Groups, will hold a three-day cruise starting on July 12, 1985, followed by a reunion starting on July 15 at the Marriott Harbor Beach Hotel in Fort Lauderdale, Fla. **Contact:** Joseph E. Pokraka, 1730 Laporte Ave., Whiting, Ind. 46394. Phone: (219) 659-2092.

64th Troop Carrier Squadron

A reunion will be held for veterans of the 64th Troop Carrier Squadron, 403d Troop Carrier Group, on October 1-4, 1985, in Orlando, Fla. **Contact:** George Knight, P. O. Box 1256, Wildwood, Fla. 32785.

68th Air Service Group

The 68th Air Service Group will hold its reunion on August 29, 1985, in Tucson, Ariz. **Contact:** Bob Pierce, P. O. Box 15061, Lakewood, Colo. 80215. Phone: (303) 985-1933.

F-82 Aircrews

Former F-82 Twin Mustang aircrew members will hold their first reunion on August 2-4, 1985, in Hot Springs, Ark. **Contact:** Talmage Allred, P. O. Box 647, Collins, Miss. 39428. Phone: (601) 765-4740.

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COTTON CLASSICS!

Style #1910, \$16.50

Features: 4 button placket; 2 pieced fused collar; Pearl buttons; Right side pocket with flap; Double needle tailoring; collar stays; Full golfer cut.

Sizes: S-M-L-XL-XXL

Colors: White, Navy, Camel, Red, Kelly Green

Style #2400, \$15.50

Features: Ladies version-2 Button placket; Fashion knit collar; Banded sleeves; Long rear tail.

Sizes: S-M-L-XL

Colors: White, Bone, Navy, Kelly Green, Lavender

CASHMERLON™ I

Style # 1001, \$22.50

Features: Full turnback cuff; fully fashioned saddle shoulder; full golfer cut.

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Colors: White, Navy, Chocolate, Burgundy

Style #2001, \$22.00

Features: Ladies Version-Full turnback cuff; fully fashioned; raglan sleeve.

Sizes: S-M-L-XL

Colors: White, Lt. Blue, Navy and Plum



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Style # JK 1700, \$31.00

Features: 100% nylon water repellent rain jacket; noise resistant fabric; heavy zippers; hidden hood; action knit under arms allows for free and easy movement; Two front zip pockets.

Sizes: S-M-L-XL-XXL

Colors: Lt. Blue, Navy, Camel

Style # JK 2700, \$30.00

Features: Ladies version of JK 1700

Sizes: S-M-L-XL

Colors: Yellow, Navy, Plum

Style #	Color	Size	Quantity	Price
Shipping and handling				3.00
TOTAL AMOUNT ENCLOSED				\$

Enclose check or money order made payable to the Air Force Association and send to AFA, 1501 Lee Highway, Arlington, VA 22209-1198. (Virginia residents please add 4 percent sales tax.) (Please allow six to eight weeks for delivery.)

4-85

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The many features of the Air Force Association Grandfather Clock are those found only in the highest quality timepieces. The features include:

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Please note that all orders are subject to credit approval. There is no finance charge and no down payment on the monthly installment plan. Appropriate sales tax will be added to the monthly payments of Tennessee residents only. Please allow approximately 8 weeks for delivery.

99th Bomb Group

The 99th Bomb Group reunion will be held in July 1985 in Seattle, Wash. **Contact:** Joseph H. Chance, Jr., 6250 Pepper Hill Dr., West Bloomfield, Mich. 48033. Phone: (313) 851-2038.

351st Bomb Group Ass'n

Veterans of the 351st Bomb Group, which included the 508th, 509th, 510th, and 511th Bomb Squadrons stationed in Polebrook, England, will hold their reunion on July 25-28, 1985, at the Crown Plaza Hotel in Seattle, Wash. **Contact:** Ben Schohan, 398 Catawba Ave., Westerville, Ohio 43081. Phone: (614) 882-8410.

442d Air Force Reserve Ass'n

The 442d Air Force Reserve Association will hold a reunion on June 14-15, 1985, at Richards-Gebaur AFB, Mo. **Contact:** Alice Morriss, 924 Crestline, Wichita, Kan. 67212. Phone: (316) 722-7337.

500th Bomb Squadron

The 500th Bomb Squadron, 345th Bomb Group (M), will hold its reunion in October 1985 in San Francisco, Calif. **Contact:** CMSgt. Fred Moore, USAF (Ret.), 4952 Vivaldi Dr., Las Vegas, Nev. 89102. Phone: (702) 871-4405. Grant Ross, 3642 Louis Rd., Palo Alto, Calif. 94303. Phone: (415) 494-1652.

622d Air Refueling Squadron

Members of the 622d Air Refueling Squadron will hold a reunion on May 23-25, 1985, in Alexandria, La. **Contact:** Jim Riser, 5519 Hall St., Alexandria, La. 71303. Phone: (318) 443-4127.

Stalag Luft I

I am trying to locate former Barth Luft I prisoners of war for the purpose of holding a reunion in conjunction with the American Ex-Prisoners of War convention on July 24-26, 1985, in Milwaukee, Wis.

Please contact the address below.

Darwin G. Nelson
615 Monroe Ave.
Los Banos, Calif. 93635

Swedish Internees

During World War II, I was interned in Sweden along with approximately 1,000 other Eighth Air Force personnel. I am trying to organize a mini-reunion of Swedish internees to be held during the Eighth Air Force Historical Society reunion on October 17-20, 1985, in Wichita, Kan.

Interested Eighth AFHS members are asked to contact the address below.

Ernest J. Richardson
10491 Marcia Lane
South Lyon, Mich. 48178

Phone: (313) 437-0140

White Sands Pioneer Group

We are looking for former employees—civil servant, military, or contractor—of the White Sands Missile Range/Holloman AFB, N. M., who are interested in attending our first-ever reunion and fortieth-anniversary observance to be held in July 1985.

White Sands Pioneer Group
P. O. Box 1945-85
White Sands Missile Range,
N. M. 88002

13th Bomb Squadron

We would like to hear from anyone who served in Korea with the 13th Bomb Squadron "Grim Reapers" during 1950-53. Our second reunion is scheduled for October 1985 in Satellite Beach, Fla., and we would like to hear from members who are interested in attending.

Please contact the address below.

Grim Reapers Association (Korea)
250 E. Hazelwood Lane #20
Lemoore, Calif. 93245
Phone: (209) 924-2803

Class 49-C

I am attempting to establish a current roster of graduates of Pilot Class 49-C for a possible future reunion.

Please send your name, rank, address, and pilot training base to the address listed below.

Lt. Col. E. W. Skaggs,
USAF (Ret.)
1600 W. 38th St.
Suite 422
Austin, Tex. 78731

Class 63-B

I would like to hear from members of Class 63-B (Vance AFB, Okla.) who would be interested in holding a reunion.

Please contact the address below.

Lt. Col. Nicholas S. Plodinec III,
USAF (Ret.)
800 River Rd.
Beaver, Pa. 15009



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ORDER FORM: Please indicate below the quantity desired for each item to be shipped. Prices are subject to change without notice.

- A. Tie Bar \$20 each _____
- B. Member Lapel Pin \$15 each _____
- C. Member Tie Tac \$10 each _____
- D. Lapel Pin \$15 each (Please specify: President, Past President or Life Member) _____
- E. Stickpin \$16 each (Please specify: Member or Life Member) _____

TOTAL AMOUNT ENCLOSED _____

Enclose your check or money order made payable to Air Force Association, 1501 Lee Highway, Arlington, VA 22209-1198. (Virginia residents please add 4% sales tax.)

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Please send me an AFA gift brochure.

RECORD BENEFITS

CURRENT BENEFIT TABLES

Including Substantial Benefit Increases for Policyholders Under Age 65
(effective June 30, 1984)

Member's Attained Age	STANDARD Premium: \$10 per month Basic Benefit*	HIGH OPTION Premium: \$15 per month Basic Benefit*	HIGH OPTION PLUS PLAN Premium: \$20 per month Basic Benefit*
20-24	\$125,000	\$187,500	\$250,000
25-29	110,000	165,000	220,000
30-34	80,000	120,000	160,000
35-39	65,000	97,500	130,000
40-44	40,000	60,000	80,000
45-49	25,000	37,500	50,000
50-54	18,000	27,000	36,000
55-59	12,000	18,000	24,000
60-64	9,000	13,500	18,000
65-69	4,000	6,000	8,000
70-74	2,500	3,750	5,000

AVIATION DEATH BENEFIT* (for pilots and crew members)

Non-war related: Ages 20-34—Payment of ½ the scheduled benefit. (Applies to Standard, High Option and High Option Plus Plans)
Ages 35-74—Payment of the full scheduled benefit. (Applies to Standard, High Option and High Option Plus Plans)

War related:	\$15,000	\$22,500	\$30,000
EXTRA ACCIDENTAL DEATH BENEFIT**	\$12,500	\$15,000	\$17,500

*AVIATION DEATH BENEFIT: The coverage provided under the Aviation Death Benefit is paid for death which is caused by an aviation accident in which the insured is serving as pilot or crew member of the aircraft involved. Under this condition, the Aviation Death Benefit is paid in lieu of all other benefits of this coverage. Furthermore, the non-war related benefit will be paid in all cases where the death does

not result from war or act of war, whether declared or undeclared.

**EXTRA ACCIDENTAL DEATH BENEFIT: In the event of an accidental death occurring within 13 weeks of the accident, these AFA plans pay an additional lump sum benefit as shown in the tables, except as noted under AVIATION DEATH BENEFIT above.

OTHER IMPORTANT BENEFITS

COVERAGE YOU CAN KEEP. Provided you apply for coverage under age 65 (See "ELIGIBILITY") your insurance may be retained at the same low group rates to age 75.

FULL TIME, WORLD WIDE PROTECTION. The policy contains no war clause, hazardous duty restriction, combat zone waiting period or geographical limitation.

DISABILITY WAIVER OF PREMIUM. If you become totally disabled at any time prior to age 60 for at least a 9-month period, your coverage will be continued in force without further payment of premiums as long as you remain disabled.

FULL CHOICE OF SETTLEMENT OPTIONS. All standard forms of settlement options, as well as special options agreed to by the insured and United of Omaha, are available to insured members.

CONVENIENT PAYMENT PLANS. Premium payments may be made by monthly government allotment (payable to Air Force Association), or direct to AFA in quarterly, annual or semi-annual installments.

DIVIDEND POLICY. AFA's primary policy is to provide maximum coverage at the lowest possible cost. Consistent with this policy, AFA has provided year-end dividends in all but three years (during the Vietnam War) since the program was initiated in 1961, and basic coverage has been increased on seven separate occasions.

ADDITIONAL INFORMATION

Effective Date of Your Coverage. All certificates are dated and take effect on the last day of the month in which your application for coverage is approved, and coverage runs concurrently with AFA membership. AFA Group Life Insurance is written in conformity with the insurance regulations of the State of Minnesota. The insurance will be provided under the group insurance policy issued by United of Omaha to the First National Bank of Minnesota as trustees of the Air Force Association Group Insurance Trust.

EXCEPTIONS: There are a few logical exceptions to this coverage. They are:

Group Life Insurance: Benefits for suicide or death from injuries intentionally self-inflicted while sane or insane will not be effective until your coverage has been in force for 12 months.

The Accidental Death Benefit and Aviation Death Benefit shall not be effective if death results: (1) From injuries intentionally self-inflicted while sane or insane, or (2) From injuries sustained while committing a felony, or (3) Either directly or indirectly from bodily or mental infirmity, poisoning or asphyxiation from carbon monoxide, or (4) During any period a member's coverage is being continued under the waiver of premium provision, or (5) From an aviation accident, either military or civilian, in which the insured was acting as pilot or crew member of the aircraft involved, except as provided under AVIATION DEATH BENEFIT.

ELIGIBILITY

All members of the Air Force Association are eligible to apply for this coverage provided they are under age 65 at the time application for coverage is made.

*Because of certain restrictions on the issuance of group insurance coverage, applications for coverage under the group program cannot be accepted from non-active duty personnel residing in New York.

OPTIONAL FAMILY COVERAGE

PREMIUM: \$2.50 per month

Member's Attained Age	Life Insurance Coverage for Spouse	Life Insurance Coverage for each child*
20-39	\$20,000.00	\$4,000.00
40-44	15,000.00	4,000.00
45-49	10,000.00	4,000.00
50-54	7,000.00	4,000.00
55-59	5,000.00	4,000.00
60-64	3,000.00	4,000.00
65-69	2,000.00	4,000.00
70-75	1,000.00	4,000.00

*Children under six months are provided with \$250 coverage once they are 15 days old and discharged from the hospital.

Upon attaining age 21, and upon submission of satisfactory evidence of insurability, insured dependent children may replace this \$4,000 group coverage (in most states) with a \$10,000 permanent individual life insurance policy with guaranteed purchase options.

Please Retain This Medical Bureau Prenotification For Your Records

Information regarding your insurability will be treated as confidential. United of Omaha Life Insurance Company may, however, make a brief report thereon to the Medical Information Bureau, a nonprofit membership organization of life insurance companies, which operates an information exchange on behalf of its members. If you apply to another bureau member company for life or health insurance coverage, or a claim for benefits is submitted to such a company, the Bureau, upon request, will supply such company with the information in its file.

Upon receipt of a request from you, the Bureau will arrange disclosure of any information it may have in your file. (Medical information will be disclosed only to your attending physician.) If you question the accuracy of information in the Bureau's file, you may contact the Bureau and seek a correction in accordance with the procedures set forth in the federal Fair Credit Reporting Act. The address of the Bureau's information office is P.O. Box 105, Essex Station, Boston, Mass. 02112. Phone (617) 426-3660.

United of Omaha Life Insurance Company may also release information in its file to other life insurance companies to whom you may apply for life or health insurance, or to whom a claim for benefits may be submitted.

All members under age 65 now eligible to apply

NOW AVAILABLE



APPLICATION FOR AFA GROUP LIFE INSURANCE



Group Policy GLG-2625
United of Omaha 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 _____ Height _____ Weight _____ Social Security Number _____
Mo. Day Yr.

This insurance is available only to AFA members

- I enclose \$18 for annual AFA membership dues (includes subscription (\$14) to AIR FORCE Magazine).
- I am an AFA member.

Name and relationship of primary beneficiary

Name and relationship of contingent beneficiary

Please indicate below the Mode of Payment and the Plan you elect:

Mode of Payment	Standard Plan		Plan of Insurance High Option Plan		High Option PLUS Plan	
	Member Only	Member And Dependents	Member Only	Member And Dependents	Member Only	Member And Dependents
Monthly government allotment (only for military personnel). I enclose 2 month's premium to cover the necessary period for my allotment (payable to Air Force Association) to be established.	<input type="checkbox"/> \$ 10.00	<input type="checkbox"/> \$ 12.50	<input type="checkbox"/> \$ 15.00	<input type="checkbox"/> \$ 17.50	<input type="checkbox"/> \$ 20.00	<input type="checkbox"/> \$ 22.50
Quarterly. I enclose amount checked.	<input type="checkbox"/> \$ 30.00	<input type="checkbox"/> \$ 37.50	<input type="checkbox"/> \$ 45.00	<input type="checkbox"/> \$ 52.50	<input type="checkbox"/> \$ 60.00	<input type="checkbox"/> \$ 67.50
Semi-Annually. I enclose amount checked.	<input type="checkbox"/> \$ 60.00	<input type="checkbox"/> \$ 75.00	<input type="checkbox"/> \$ 90.00	<input type="checkbox"/> \$105.00	<input type="checkbox"/> \$120.00	<input type="checkbox"/> \$135.00
Annually. I enclose amount checked.	<input type="checkbox"/> \$120.00	<input type="checkbox"/> \$150.00	<input type="checkbox"/> \$180.00	<input type="checkbox"/> \$210.00	<input type="checkbox"/> \$240.00	<input type="checkbox"/> \$270.00

Names of Dependents To Be Insured	Relationship to Member	Dates of Birth			Height	Weight
		Mo.	Day	Yr.		

Have you or any dependents for whom you are requesting insurance ever had or received advice or treatment for: kidney disease, cancer, diabetes, respiratory disease, epilepsy, arteriosclerosis, high blood pressure, heart disease or disorder, stroke, venereal disease or tuberculosis? Yes No

Have you or any dependents for whom you are requesting insurance been confined to any hospital, sanatorium, asylum or similar institution in the past 5 years? Yes No

Have you or any dependents for whom you are requesting insurance received medical attention or surgical advice or treatment in the past 5 years or are now under treatment or using medications for any disease or disorder? Yes No

If YOU ANSWERED "YES" TO ANY OF THE ABOVE QUESTIONS, EXPLAIN FULLY including date, name, degree of recovery and name and address of doctor. (Use additional sheet of paper if necessary.)

I apply to United of Omaha Life Insurance Company for insurance under the group plan issued to the First National Bank of Minneapolis as Trustee of the Air Force Association Group Insurance Trust. Information in this application, a copy of which shall be attached to and made a part of my certificate when issued, is given to obtain the plan requested and is true and complete to the best of my knowledge and belief. I agree that no insurance will be effective until a certificate has been issued and the initial premium paid.

I hereby authorize any licensed physician, medical practitioner, hospital, clinic or other medical or medically related facility, insurance company, the Medical Information Bureau or other organization, institution or person, that has any records or knowledge of me or my health, to give to the United of Omaha Life Insurance Company any such information. A photographic copy of this authorization shall be as valid as the original. I hereby acknowledge that I have a copy of the Medical Information Bureau's prenotification information.

Date _____, 19____ Member's Signature _____

Bob Stevens'

"There I Was..."

AT A PRIMARY SCHOOL, WINTER 1942.



I'M GONNA WASH YOU OUT! YOU DON'T KNOW YOUR LEFT HAND FROM YOUR **RIGHT!**



THIS IS A TRUE STORY ABOUT "FLYING SERGEANTS" (THERE WERE A LOT OF 'EM IN WWII - THEY NOW HAVE AN ORGANIZATION and REUNIONS). ENLISTED TRAINEES WENT THROUGH THE SAME PROGRAM and WORE THE SAME UNIFORM AS AVIATION CADETS - SAVE FOR SERVICE CAPS. THE ONE EXCEPTION WAS THE HORSE CAVALRY - THEY WERE, WELL, *DIFFERENT*.

EVERYONE DID WELL EXCEPT THE EX-CAVALRYMAN.



YESSIR, I DO. IN THE CAV. WE HOLD THE REINS IN THE **LEFT** HAND TO CONTROL THE HORSE and THE **RIGHT**...



THANKS TO ALFRED NAIGLE (MC USAF RET.)

P.S. HE MADE IT! (AFTER THEY STRAIGHTENED HIM OUT)

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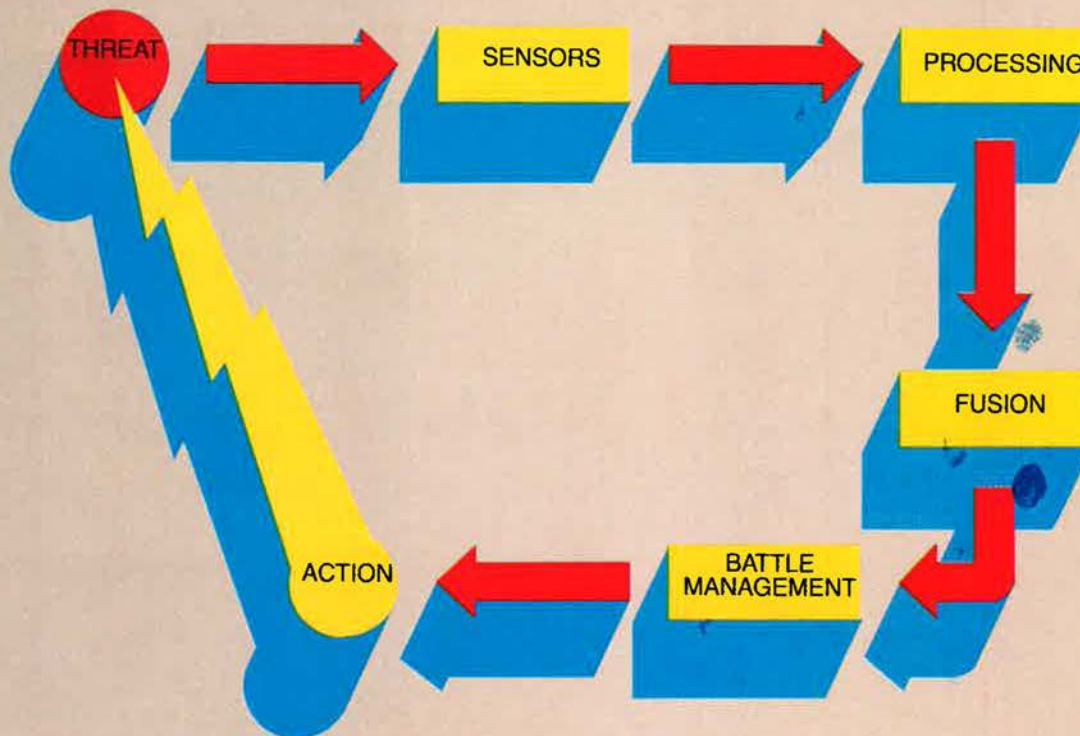
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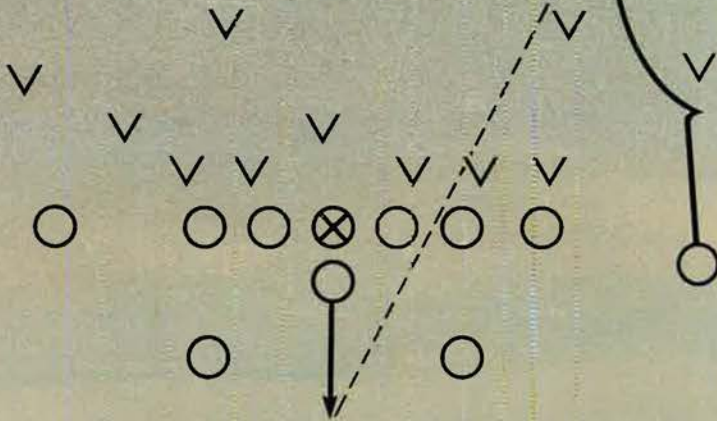
A strong defense for America means that the Air Force must be able to go deep when necessary. The mission requires a plane that can fight its way to and from the target through hostile skies, in any weather, day or night, then deliver its payload with precision on high-value, rear-echelon targets.

The Air Force chose the F-15E for this deep interdiction

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GOING DEEP.



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