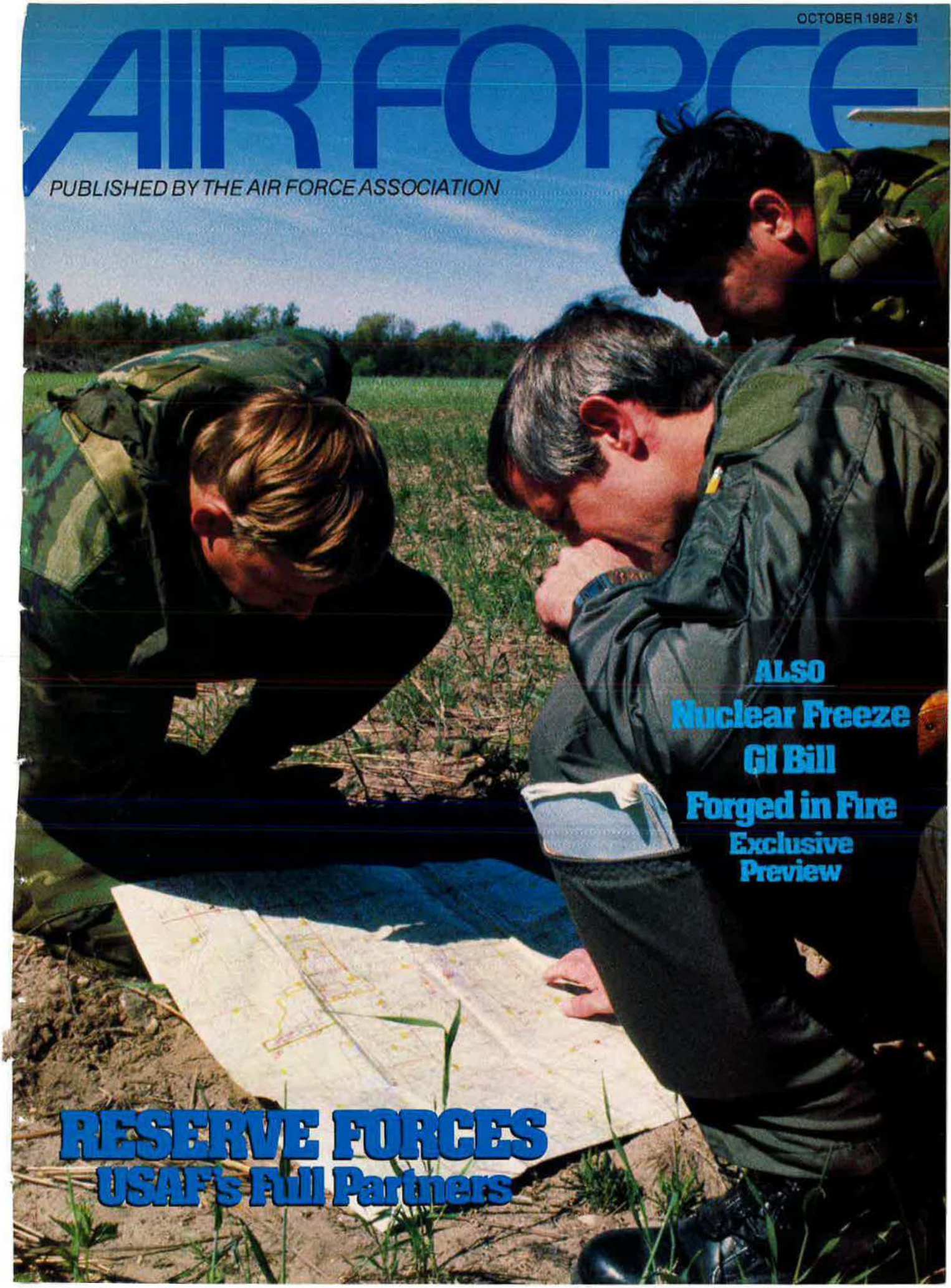
OCTOBER 1982 / $1

AIR FORCE

PUBLISHED BY THE AIR FORCE ASSOCIATION



ALSO

Nuclear Freeze

GI Bill

Forged in Fire

Exclusive Preview

RESERVE FORCES

USAF's Full Partners

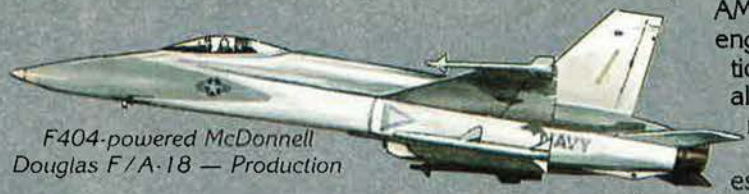
The GE technology edge: durable fighter turbofans with turbojet characteristics.

General Electric's new supersonic fighter turbofans benefit from technology that is *five years more advanced than any competitive engine.* And these advances are proven by endurance testing far more severe than previous standards. Accelerated Mission Testing (AMT), for example, subjects an engine to over 30 times the number of full throttle cycles and 12 times as many afterburner lights as traditional 150-hour qualification tests.

The F404 is a 16,000 lb. thrust engine in production for the U.S. Navy F/A-18 multi-mission aircraft. It has also been selected for the Canadian CF-18, the Australian F/A-18, the Swedish JAS aircraft, and is being offered in several other fighter competitions. The F404 has also been selected for the new Tigershark intermediate fighter and DARPA's Grumman X-29 demonstrator aircraft.

The F101 DFE, a derivative of the F101 developed for the U.S. Air Force B-1, is in the 26-29,000 lb. thrust class. It has been funded by the USAF and USN in a development and flight test program to provide competitive production alternatives in the large fighter engine thrust class. The engine has met all its fixed price contract requirements, completed its flight clearance tests, and conducted outstandingly successful flight test programs in both the USAF F-16 and USN F-14.

F101 DFE-powered General Dynamics F-16 — Flight Test



F404-powered McDonnell Douglas F/A-18 — Production

General Electric is truly setting *new standards* for fighter turbofans:

• **OPERABILITY:** Exceptionally stall-free engine operation and stable afterburner operation through the entire fighter envelope, with no throttle restrictions. Pilots report that F404 and F101 DFE turbofans behave like General Electric's famed J79 fighter turbojet. As one pilot said, "I can really fly the aircraft up to its capabilities." Said another, "Amazing response for a turbofan — as good as a turbojet."

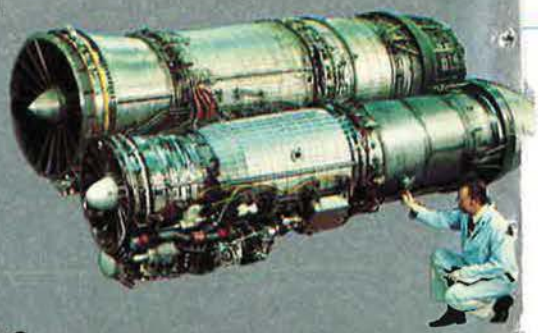
• **DURABILITY AND RELIABILITY:** Proven by record-breaking AMT tests on both engines. Hot section lives equivalent to 2,000 mission hours of the toughest fighter operation were demonstrated on the F101 DFE without significant distress — and the parts will be put back in engines for more testing. With their preeminent hot section technology, GE engines offer *twice* the hot section life of any other engine in service.

• **OPERATING COSTS:** From simpler design through advanced technology. For example, GE engines feature single-stage turbines, machined ring combustors, mixed flow afterburners, and thousands of fewer parts than other engines. Simplicity *plus* durability provide low maintenance costs. This is a direct result of low engine removal rates, where General Electric's engines have a preeminent record: The J79 removal rate in the F-4 is three per 1,000 flight hours. The TF34 in the A-10 is under two per 1,000. And the F404 and F101 DFE are on track for two per 1,000. Truly new industry standards!

F101 DFE-powered Grumman F-14 — Flight Test

When you need advanced fighter capability, GE gives you the technology edge . . . durable turbofans with turbojet characteristics.

Great Engines From General Electric's Advanced Technology



GENERAL ELECTRIC

Who makes the real UHF DAMA?

☐ *a. MOTOROLA Government Electronics Group*

☐ *b. Loft Shop Operators Incorporated*

☐ *c. Magic Box Company*

The real UHF DAMA is in production at Motorola under U.S. Navy contract and will control the 25 kHz channels on Navy UHF satellites.

Motorola's TD-1271 UHF Demand Assigned Multiple Access system permits maximum access and faster transmissions for more users without satellite availability loss to anyone.

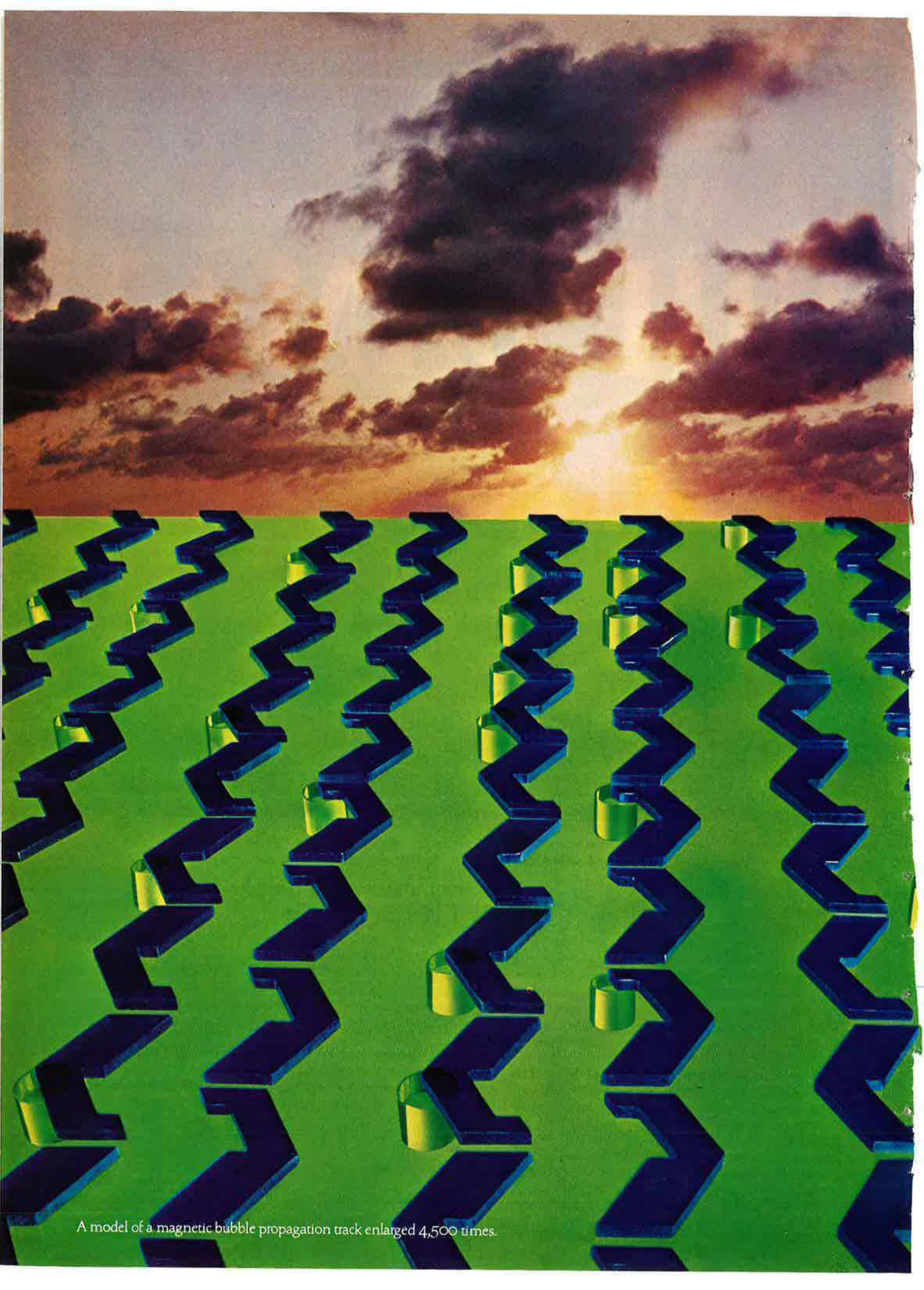
Because Motorola's UHF DAMA system efficiently matches varying user demands to available system capacity... several independent communication sources can share the same channel without mutual interference.

Secure voice, TACINTEL or CUDIXS/NAVMACS all can be carried on the same channel.

If you'd like to know more about maximum access to satellite channels via the real UHF DAMA system, call Jack Esry at 602/949-3142 or write to Motorola Government Electronics Group, P.O. Box 2606, Scottsdale, AZ 85252.

MOTOROLA

Making electronics history.



A model of a magnetic bubble propagation track enlarged 4,500 times.

Who will help the military put bubble technology into the field?

WE will. We're Western Electric. And we're ready to put bubble memory technology to work for you.

Western Electric bubble memories are tailor-made for scores of military applications. They're non-volatile and modular with a capacity that's expandable from 2 to 120 megabits. And they'll stand up under harsh field conditions with easy maintenance and repair.

When you want to get the most out of bubble technology, Western Electric is your best partner. After all, Bell Labs invented magnetic bubbles and today Western Electric is a leader in the field.

We're ready to take your order for bubble memory systems right now. So for more information, contact our Magnetic Bubble Consultant, P.O. Box 20046, Greensboro, North Carolina 27420. Telephone: (919) 697-6587.

Western Electric

Government and Commercial Sales Division

over 4000 missiles in service with more than 10 armies on 4 continents

CROTALE

for faultless coordinated defence

12 anti-aircraft missiles
ready for launch
in a few seconds

THOMSON-CSF

DIVISION
SYSTÈMES ÉLECTRONIQUES

1, RUE DES MATHURINS
B.P. 10 - 92223 BAGNEUX CEDEX/FRANCE
TEL. : (1) 657.13.65

N° 4463

AIR FORCE MAGAZINE
PUBLISHED BY THE AIR FORCE ASSOCIATION

AIR FORCE Magazine (ISSN 0730-6784) is published monthly by the Air Force Association, Suite 400, 1750 Pennsylvania Ave., N.W., Washington, D.C. 20006. **Phone:** (202) 637-3300. Second-class postage paid at Washington, D.C., and additional mailing offices. **Membership Rate:** $15 per year (includes $9 for one-year subscription); $36 for three-year membership (includes $24 for subscription). **Life Membership:** $200. **Subscription rate:** $15 per year; $25 per year additional for postage to foreign addresses (except Canada and Mexico, which are $8 per year additional). Regular issues $1 each. Special issues (Soviet Aerospace Almanac, USAF Almanac issue, Anniversary issue, and "Military Balance" issue) $3 each. **Change of address** requires four weeks' notice. Please include mailing label. Publisher assumes no responsibility for unsolicited material. Trademark registered by Air Force Association.

BPA Circulation audited by Business Publication Audit

This Month

OCTOBER 1982 • VOLUME 65, NUMBER 10

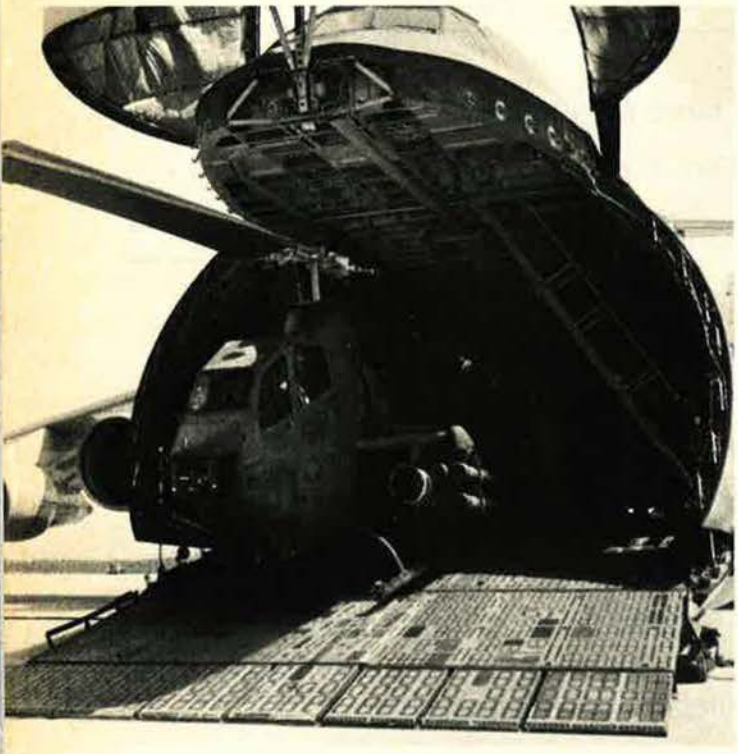
The Total Force

ABOUT THE COVER

Realistic training—such as the combat rescue training that took place during the Condor CRTE '82 exercise—is an integral part of ensuring that the Reserve Forces are prepared to fulfill their Total Force role. "The Total Force" section begins on p. 38 of this issue. (Photo by Art Director William A. Ford)

Departments

Defense leaders agree: more airlifters able to



The C-5B will meet that need faster,

Outsized equipment is big equipment—fully assembled helicopters, infantry fighting vehicles, self-propelled artillery, tank recovery vehicles. Even tanks. It's the kind of equipment American troops will need in the first crucial hours or days of a crisis. It's the kind of equipment that can mean the difference between victory and defeat.

Today only the C-5A can handle outsized equipment. The proposed C-5B will keep those features—such as a cargo compartment and openings able to handle big equipment—that have been proved in crisis after crisis, to quote the words of a senior defense leader.

New, modern electronic systems.

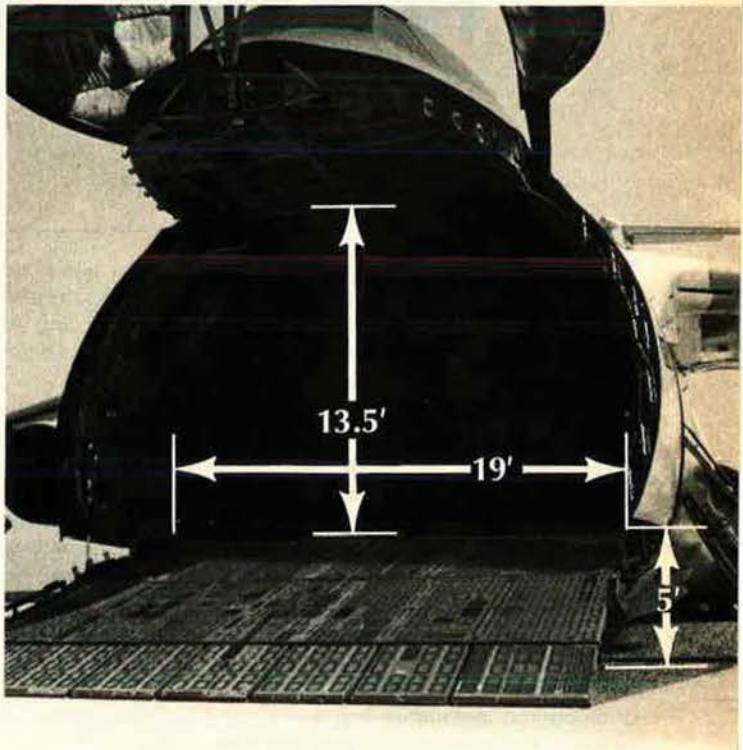
To cut maintenance costs drastically and increase effectiveness, the C-5B will have a number of new, proved electronic systems. Wherever possible, they will meet U.S. Air Force standardization guidelines.

Those systems include: A simplified automatic flight control system; a lighter, more reliable color weather radar; a communications/navigation system; digital air data computer and others.

To further reduce maintenance hours, the C-5A's crosswind landing system will be eliminated. Operational experience has shown that it is not needed.

The C-5's extraordinary speed in loading and unloading is demonstrated in this photograph

America most urgently needs handle outsized equipment.



at less cost, than any other option.

A new engine, which also is being retrofitted on the C-5A, will give the C-5B more thrust and other economies. In addition, tough, new aluminum alloys, which were not in existence when the C-5A was built, will add strength and cut corrosion on the C-5B.

that shows armored vehicles using its unique straight-through, drive-on/drive-off features.

A tried and true approach.

By keeping the crisis-proved features of the C-5A and adding modern systems wherever possible, the Air Force will gain virtually a new airlifter. It has followed this approach many times with great success. The Lockheed C-141 StarLifter has just been improved significantly, ahead of schedule and under budget. The Lockheed SR-71, world's fastest and highest flying aircraft, has been improved in many ways since it first entered service in 1966. The Boeing B-52 bomber's systems and structures have been updated throughout its long career. The McDonnell Douglas F-15 fighter has undergone many improvements since it first flew in 1971.

Keep the best features, add modern ones—that's the proved way to get a greatly improved airlifter faster and at less cost than any other option. The Air Force wins, the taxpayers win.

Lockheed C-5B

AN EDITORIAL

Reserves Pull Their Share

THE theme for this issue is the "Total Force." It was selected to emphasize the reality of today's situation regarding the air reserve forces—the Air National Guard and Air Force Reserve—and to highlight how they are fully functioning daily contributors to national airpower.

For an appreciation of the reserves' value, consider these budget figures: The Air Force Reserve (AFRES) budget is 1.9 percent of the Air Force total, and the Air National Guard's is about three percent of the total. But look at what they contribute. For example, AFRES provides 100 percent of USAF's aerial spraying capability, sixty-four percent of the Military Airlift Command's aeromedical evacuation aircrews, and fifty percent of MAC's strategic airlift crews. The Air National Guard (ANG) constitutes seventy-five percent of the people and seventy percent of the equipment in combat communications and air traffic control and service functions, fifty percent of electronic installation capability, and twenty-four-hour air defense and air refueling alert service.

Any time disaster strikes, the Guard and Reserve can be counted on to come to the relief of the afflicted people and communities. Each year, they rack up an impressive record of saves and of humanitarian achievements across the nation. In that way, the entire civilian community gains an awareness of the value of having forces in being. Of course, the very fact that reservists are full-time community citizens ensures this awareness. But their contributions are not limited to home turf.

Reserve people and equipment constantly take part in worldwide deployments completely synonymous to and to the same standards as those of the active force. In fact, to the Army, Navy, and foreign units supported, there is absolutely no difference between the support. That, of course, is the criterion that counts: The user of airpower gets the best support possible, independent of originating organization.

This splendid state of affairs did not always exist. Even people with short memories can recall with horror and without nostalgia anecdotes of just a few years ago, when reservists were considered by the active force to be second-class citizens, "weekend warriors." For their part, the reservists, aware of the opprobrious labels, all too often lived down to them.

Yet when their country called, reservists laid down their civilian pursuits and performed competently, as in Korea, the Berlin Wall in 1961, or the Cuban missile crisis. Surely one of President Lyndon Johnson's major miscalculations during the Vietnam era was choosing not to exercise a full mobilization and call-up of the people and equipment of the Air Guard and Air Force Reserve. Of course, it is arguable whether after mobilization President Johnson would have altered the restrictive rules of engagement that handcuffed full employment of airpower. But having the Guard and Reserve fully committed to combat would have made such action more palatable domestically.

At any rate, even through years of second-classdom, the people of the reserve forces persevered. Then, when the "Total Force" concept became reality in 1969, they were ready to perform. The reservoir of skill and experience represented by those men and women could be put to use for national purposes, with rather modest training and equipment upgrading. It was a national bargain, especially considering the costs in people and money to create entirely new units.

Now, with the splendid day-to-day top-line performance of the reservists, one doesn't hear "weekend warrior" any more. That's great, but the current situation should not be taken for granted. It could deteriorate. That would be a national disaster. "Never happen," you might say, but you could be wrong. The reservists now are expected to perform fully to regular forces' standards. However, they operate under different funding and different political rules and milieus. The consequence is a sort of "balanced tension" among the active force and the reserve components, especially in competing for funds and new aircraft. Balanced tension isn't bad when it results in more stringent scrutiny of requirements and plans. Then the outcome can be better. But when the competition becomes acrimonious, or the cohesion among components disintegrates, chaos and disorder can ensue.

The possibility of strays was enhanced when the Guard's "Vista 1999" study came to light. In it, a board of senior Guard officers strayed from the team, advocating equipment and organization that would have crippled the Treasury, as well as created a chasm between the Guard and regulars.

On their side, people in both the ANG and AFRES are beginning to think the active force is delaying the introduction of new aircraft into their units. That is certainly another potential source of tension, especially if it's a misperception. The data can be interpreted either way, depending on your point of view. As of September 30, 1979, 77.5 percent of ANG's aircraft were more than nine years old. At the same date in 1980, the figure was 80.1 percent, and it was eighty percent in 1981. For AFRES, eighty percent of their aircraft were more than nine years old in 1979, but the percentage climbed to 87.8 a year later, then dropped back to 82.7 percent as of September 30, 1981. In those years, brand-new A-10 and C-130 aircraft were indeed being introduced into ANG and AFRES units, but remaining aircraft of other types continued to age and, thus, kept the percentage up.

However, the active leadership of the Air Force, uniformed and civilian, is determined to prevent misperceptions and to ensure the continued modernization and improvement of the reserve components. With a like spirit in the reserve components, and the support of Congress, the Total Force can continue ready to react when needed.

That's a true asset in the national power computation.

—F. CLIFTON BERRY, JR., EDITOR IN CHIEF

"INFORMANIA"

It's having weekly reports for an inventory that changes minute to minute.

You're in charge.

You keep track of aircraft weapons inventories and support supplies. You make the decisions, place the orders, spend the money and reap the rewards.

Or suffer the consequences.

Yours is not an easy mission, either. Inventories change almost as fast as minds can think.

So when you're told "we have 40,000," but nobody can tell you if that's pairs or units, it isn't surprising that there's a sudden ringing in your ears.

That's "Informania."

The solution is information. The right information. In the right form. For the right people in the right place and time.

Burroughs can help. Because we know how to manage information. Strategically. We've put 95 years of thought and experience into it and we offer a comprehensive solution to the problem of "Informania."

Our sophisticated computers and office automation systems can help you collect, compose, analyze, store, recall, reformulate and distribute information.

So that you will know. Minute to minute.

When "Informania" strikes, the answer is Burroughs. Write for our free brochure: Burroughs Corporation, Standard Products Group, Dept. AF-79, 7925 Jonesbranch Drive, McLean, VA 22101.

Burroughs

Building on strength

AIRMAIL

The Airlift Tragedy

I read your August '82 editorial *("The Airlift Tragedy," p. 4)* with a great deal of interest and enjoyment. I find myself in agreement with its thrust, although there are two points I question.

First, whether the C-5 or 747 is purchased is really not that important. The C-5's advantages are well-known. The 747 is faster, lifts more, flies farther without refueling, and can be loaded and unloaded with the same equipment that is being procured for the KC-10 anyway. Both 747 options are far cheaper than the C-5B. The benefits of either aircraft are fairly equal. . . .

The two most telling arguments in favor of the C-5 are that picking any other plane would require a new, lengthy competition, which the country doesn't need, and the fact that Lockheed probably needs the business more. In either case, 747 or C-5, that isn't the tragedy.

The first tragedy is the damage this debacle has done to USAF credibility. After all these years of explaining how badly we need the CX and how (quite truly) the C-5 won't do, to say suddenly the C-5 is the plane we need after all really makes USAF look bad. Granted, this was an Administration decision, but USAF is taking the heat.

The second tragedy is that the Army gets the shaft. As of the end of this year, USAF will be unable to provide airlift where there is not at least a 3,000-foot runway in place. It was this fact that made the C-17, and AMST before it, so needed. The shortage of airlift in the field is critical, and there doesn't appear to be any move to rectify the situation. The C-17, although unglamorous, is what's needed.

Despite statements to the contrary, it is highly unlikely that, if the C-5 or 747 is purchased, Congress will later fund the C-17. . . . Boeing pointed out months ago that if the C-5B goes into production, the most likely outcome will be the death of the C-17 and continued C-5B production. This was loudly pooh-poohed at the time, but it is significant that USAF is now saying that after the fifty C-5Bs are built, it wants an *additional* sixty-five! Goodbye, C-17.

The last two paragraphs of the editorial also cause me some problems. The purpose of airlift is to move the Army, and should be geared to Army needs. If making certain equipment airliftable requires too much of a loss in combat capability, maybe that item shouldn't be airliftable.

The M-1 is often criticized for not being designed for airlifting easily, but think for a moment. Can you think of any scenario where the environment will be secure enough to allow C-5s to be used, yet so critical that it will be necessary to airmail M-1s one at a time? Remember, without the C-17, those M-1s have to be driven to the front.

The Air Force also has to learn to "squeal." The tail mustn't wag the dog.

Art Hanley
Carmichael, Calif.

The real tragedy is that the taxpayers are going to pay billions of dollars more for the C-5B, which is an unknown quantity that could again be plagued with both technical and cost problems, whereas the 747 is an available, proven, off-the-shelf airplane that carries a heavier payload farther and faster than the C-5.

The small percentage of outsize cargo that cannot be carried in the 747 can be accommodated with the existing C-5 fleet. As you stated, it's time the Army directed its attention toward smaller, highly mobile equipment for the Rapid Deployment Force. Buying the 747 instead of the C-5B would cause the Army to consider this parameter in new equipment development.

Another argument used against the 747 is the lack of loading and unloading equipment. If that's the case, it should also disqualify the KC-10. Commercial carriers routinely handle thousands of tons of 747 cargo around the world every day, and, believe me, they are not known for extravagant ground-handling equipment expenditures.

Another argument that you used against the 747 is that they could be had through the Civil Reserve Air Fleet, or by outright takeover. This is true; however, most of the 747 freighters are owned by foreign carriers. Additionally, not all 747 freighters owned by domestic carriers have swing-up nose doors. The 747s in the Civil Reserve Air Fleet are mostly passenger airplanes and would require extensive modification for military use.

Acquisition of 747s instead of C-5Bs would be one of the sweetest, most cost-effective deals ever executed by DoD. Boeing Chief Executive Officer T. A. Wilson, his proposal team, and his supplier team should be given a national award for providing the Reagan Administration a significant means of reducing current government expenditures. . . .

David Flaming, Jr.
Kirkland, Wash.

I compliment Mr. Berry on his fine editorial, "The Airlift Tragedy." To be sure, the present political/industrial squabble (C-5 or 747) has reached unprecedented proportions. However, I find a positive note to all of this: More policy- and decision-makers and members of Congress are beginning to understand that airlift *is* an integral part of our combat capability. Now, let's get on with an airlift program to redress the deficiency.

I would like to correct one misnomer—your reference to the C-17 as a "tactical airlifter." Former Secretary of Defense Harold Brown, in October 1979, tasked the Air Force to develop a strategic outsize airlifter with a secondary priority to have tactical capability. The CX mission requirements and competition answered the task. The result was the selected C-17, which has better strategic capability than the existing military airlifters and better tactical capability than the Advanced Medium STOL Transport (AMST) prototypes.

Most importantly, the C-17 will fill the void in the present MAC system—direct delivery. MAC is the product of two commands' resources and missions thrown together: MAC's long-range C-141s/C-5s and TAC's short-

range C-130s, C-123s, and C-7s. The C-17 will provide this nation, well into the twenty-first century, an airlift system designed to do the wartime airlift mission—move combat forces directly from garrison to the objective area, thereby eliminating the long and time-consuming transshipments required today.

The direct-delivery C-17 uses proven technology to combine effectively and efficiently the long-range mission of the C-5/C-141 with the short-range characteristics of the C-130. In the future, please refer to the C-17 as an *airlifter,* and if you must get more specific, it's a "direct-delivery" airlifter.

Maj. George V. Frushour, Jr., USAF
Washington, D. C.

Your editorial, "The Airlift Tragedy," provided some beneficial perspectives on the airlift issue. There are two areas, however, that detract from an otherwise fine editorial.

First, you characterize the C-17 as a tactical airlifter. In point of fact, the C-17 is not now and never has been a tactical airlifter. When the CX Request for Proposal was submitted to industry in October 1980, the Air Force outlined the following operational requirements for the CX: It must have intercontinental range, it must carry outsize equipment, and it must be able to operate into small, austere airfields.

The C-17 is the first aircraft designed around a full range of airlift operational requirements. In fact, the technology built into the C-17 make the terms "strategic" and "tactical" outdated.

Secondly, you characterize the C-17 program as a panic effort. Again, the facts show otherwise. When compared to other recent aircraft programs, and airlift programs that are not so recent, the C-17 program is designed with less concurrence than any of the past programs.

These facts were readily available. It is crucial to the debate over the airlift program that they be reported accurately.

Maj. Clark B. Russell, USAF
Springfield, Va.

Logistics Problems

I read with interest your interview with Gen. James P. Mullins in the August issue of AIR FORCE Magazine *("AFLC Keeps USAF Ready to Fight," p. 28).*

In line with the cover blurb on that issue—"Air Force Logistics: Essential for Readiness"—I expected more from your segment on Air Force logistics. In that same issue, your editorial, "The Airlift Tragedy," was outstanding. It pointed out the problem, it indicated its importance, and it told of its impact on the valid requirements of the military forces.

Unfortunately, the sum of those articles on Air Force logistics did not do the same. The problem with Air Force logistics, or military logistics in general, is that there is no consensus or valid guidance on what it is, what it is composed of, what it seeks to achieve for the forces, and how you determine how much you have achieved. It would be well worth an in-depth article in your publication in an attempt to solve that problem. . . .

Fred Gluck
Fairborn, Ohio

Son of Hustler

Jennifer Harper's B-58 article in the August '82 issue is a jewel *("Supersonic Hustler," p. 62).* Although most readers are unlikely to make a connection between the premature demise of the B-58 and the editorial in the same issue—"The Airlift Tragedy"—our future effectiveness depends on understanding that connection.

The B-58 died early because the A model, as is the case with most aircraft, left some things to be desired, and the proposed B model, with its five-foot fuselage extension for more fuel and turbofan engines for better fuel efficiency, would have been sufficiently good to threaten the B-70, the dream of big-aircraft advocates. Even after most people realized that the large, expensive, high-altitude, stainless-steel B-70 was the wrong aircraft, there was still time to grow the B-58, except USAF was without plans for this.

The crossfire started from all sides, both within and outside DoD: ballistic missiles and air defenses made bombers obsolete, a bomber version of the F-111 was more cost effective, B-52s could be modified indefinitely, a new bomber optimized for low altitude was the only solution, etc. If one ignores the unsubstantiated rumor that bias for and against certain contractors was involved, it can only be concluded that USAF decision-makers could not see through all the smoke.

Had they been able to sift out fact from fiction, they would have seen that B-58 growth versions based on F-111 state-of-the-art technology would have exceeded FB-111 capability, and that a later growth version using B-1 engine and avionics technology could have given the B-1 itself a run for the money. While no one can argue that the range/payload tradeoff of a 200,000-pound B-58X would match that of a 400,000-pound B-1, both could reach the deepest targets at similar speeds and altitudes. And even the staunchest advocates of "bigger is better" will concede . . . the advantages of having a larger force size at comparable costs. . . .

The underlying cause of USAF's failure to follow the logical and long-accepted practice of model improvement must be found outside the B-58 itself. One need only look as far as the extremely nasty environment that surrounds major system decisions, then and today. During seventeen years devoted to the acquisition of aircraft and missiles for strategic use, some idea of how the game is played has rubbed off on me, and it's a wonder that any decisions are made, much less good ones. . . .

Hopefully, in the case of the B-1, sensible heads have at last prevailed—they didn't in the case of the B-58, and they won't in the future unless our decision-makers understand that the name of the game is hardball.

On a more pleasant note, old timers used to say that you could tell a lot about an airplane just by looking at it—if it looks good, it will fly good. When I see the good-looking lines of the B-1, I cannot help but remember how its mother looked—a real beautiful Hustler!

Col. Robert F. Hegenberger, USAF (Ret.)
Harrison, Ariz.

The Vanishing Substructure?

John T. Correll's article in your July 1982 issue *("The Industrial Substructure: Trouble at the Bottom," p. 48)* was excellent in its discussion of forces affecting the subcontractor/supplier relationship to the DoD infrastructure. It is about time somebody realized that the defense contractor base is shrinking. My concern is that the article did not "begin at the beginning."

People seem to feel that the United States can become a service economy, abrogating manufacturing functions to lesser-developed countries. In fact, a member of an American Academy of Sciences task force on industrial policy has told me that the finding of her task force has been that defense is the *only* area in which we need manufacturing capability. That is another indication that we are not "beginning at the beginning."

I do not feel that defense manufacturing is any different from other forms of manufacturing, and I do not believe that it can stand alone. When the general manufacturing base goes

away (as it is now in the process of doing) to Korea, the Philippines, Mexico, and other less-developed countries, there will be no defense manufacturing capability.

While there are some firms that are devoted strictly to defense-related work, most subcontractors (as well as most prime contractors) are only able to undertake defense work because they already have a base in consumer or industrial manufacturing. If it were not for that base, manufacturing firms would generally not be in a position even to make bids for defense contracts. . . .

Jay Lewis
Montgomery, Ala.

Fill 'Er Up?

Gen. H. M. Chapman's experience with P-80A 001, which he so interestingly reports in the August '82 issue *("Overfilling Double-Oh-One," p. 100),* brings to mind the following.

A couple of months after graduating with Class 53-B, I was a member of the last USAF F-80 gunnery school class at Tyndall AFB, Fla. The F-80 was being phased out of service at that time. Among the F-80s on the flightline were 001 and 004 (pictured in the article), the latter of which I flew.

One morning, a flight of F-80s was airborne, including 001, when fog moved in and closed the base. They diverted to nearby Eglin AFB and refueled. Later in the day, when the fog had cleared, all the F-80s returned except Double-Oh-One.

You guessed it—the Eglin refueling crew had proceeded to refuel the nonexistent leading-edge tanks despite the fact that the filler caps were covered with circular plates secured with screws!

Anyone else out there know of other refueling incidents with Double-Oh-One?

Maj. Erroll L. Williams,
USAFR (Ret.)
Glendale, Calif.

A-10 Controversy

I read with great interest your recent interview with Rep. Joseph Addabbo, Chairman of the Defense Subcommittee of the House Appropriations Committee *(July '82, "Stretching Those Defense Dollars," p. 84).* It was most unfortunate that your interviewers did not address Mr. Addabbo's consistent support for A-10 procurement, conflicting as it does with the repeated desires of both TAC and USAFE.

Could it be that Mr. Addabbo is more interested in promoting defense contracts for his own district (where all those excess A-10s are being built

AIRMAIL

at a nonefficient rate) than in "getting the most defense out of defense dollars" that he trumpets for the rest of the defense establishment?

Mr. Addabbo's stated concern for fiscal responsibility would be more convincing if his own track record were not so self-serving. Although he surely does not warrant any more criticism than his peers (Sen. Henry Jackson's recent effort to promote 747s for strategic airlift comes to mind), AIR FORCE Magazine should not neglect to probe what has become a controversial *cause célèbre.*

Maj. Douglas W. Schott, USAF
Gettysburg, Pa.

Back on the Team

I am a recently recalled aeronautical engineer presently assigned to the San Antonio Air Logistics Center at Kelly AFB, Tex. I'm writing to thank the Air Force Association, and particularly AFA Special Assistant for Defense Personnel Matters Ben Catlin, for giving me the personal support that helped me to return to the US Air Force. I'm extremely happy to be back as part of the "team."

To explain my particular circumstance, I will summarize some of the important decision factors that led to my separation. I left the Air Force in December 1976 because of (1) the inequity and dissension caused by the controlled OER; (2) the erosion in pay and benefits and the feeling that no one cared; and (3) the rumor of DOPMA with a lot of indecision. In addition, I was a 30XX communications officer who could not get in 2855 aero engineering (in which I hold a degree).

After leaving the Air Force I received an excellent job offer from Corning Glass Works and was hired as a staff planner at the corporate headquarters. I excelled and was recognized for the fast-track executive program. I met Col. (now brigadier general) Leo W. Smith II, USAF, who started my interest growing again about the service.

In my corporate development process, Corning transferred me to Danville, Ky., for operations training. It was at this point that I read in AIR FORCE Magazine about the USAF recall program for engineers. I called AFA, and was put in contact with Mr. Ben Catlin. He personally helped me over the next six months in making my decision to apply for the recall program. Working with Mr. Catlin, and experiencing his positive attitude regarding my personal situation, really motivated me to pursue the recall steps.

In making my final decision, the following were strong factors in returning to USAF: (1) the passage of DOPMA and the new "people" image displayed in the Air Force way of life; (2) the personnel steps to recognize and support comparability (*i.e.,* the needed raises and the considerations for the scientific bonus that were unthinkable a few years ago); and (3) the chance to utilize my aero degree with my industrial experience. In addition, I'm happy to say that my decision to return has been extremely positive for me and my wife. I have been reestablishing myself to make the Air Force my permanent way of life.

I'm a believer in God and country and the way of life and freedoms that we must not take for granted. I feel strongly committed to these ideals and the Air Force mission.

Please accept my personal "thank you" to AFA, and to my special friend, Mr. Ben Catlin, for all that you do to support our Air Force.

Capt. James F. Guzzi, USAF
Kelly AFB, Tex.

Overemphasis on Pilots?

I find that AIR FORCE Magazine is usually concerned with pilots and does not give any credit to other professions in the Air Force.

There are engineers, scientists, and other members who have been given a back seat to flyers. I realize that flyers are a prime concern of USAF, but you can't run everything with flyers.

As a journalistic medium, you should give the plight of the support people some time. However, all you read about is the poor flyer and how poorly he is treated. Why are they getting out?

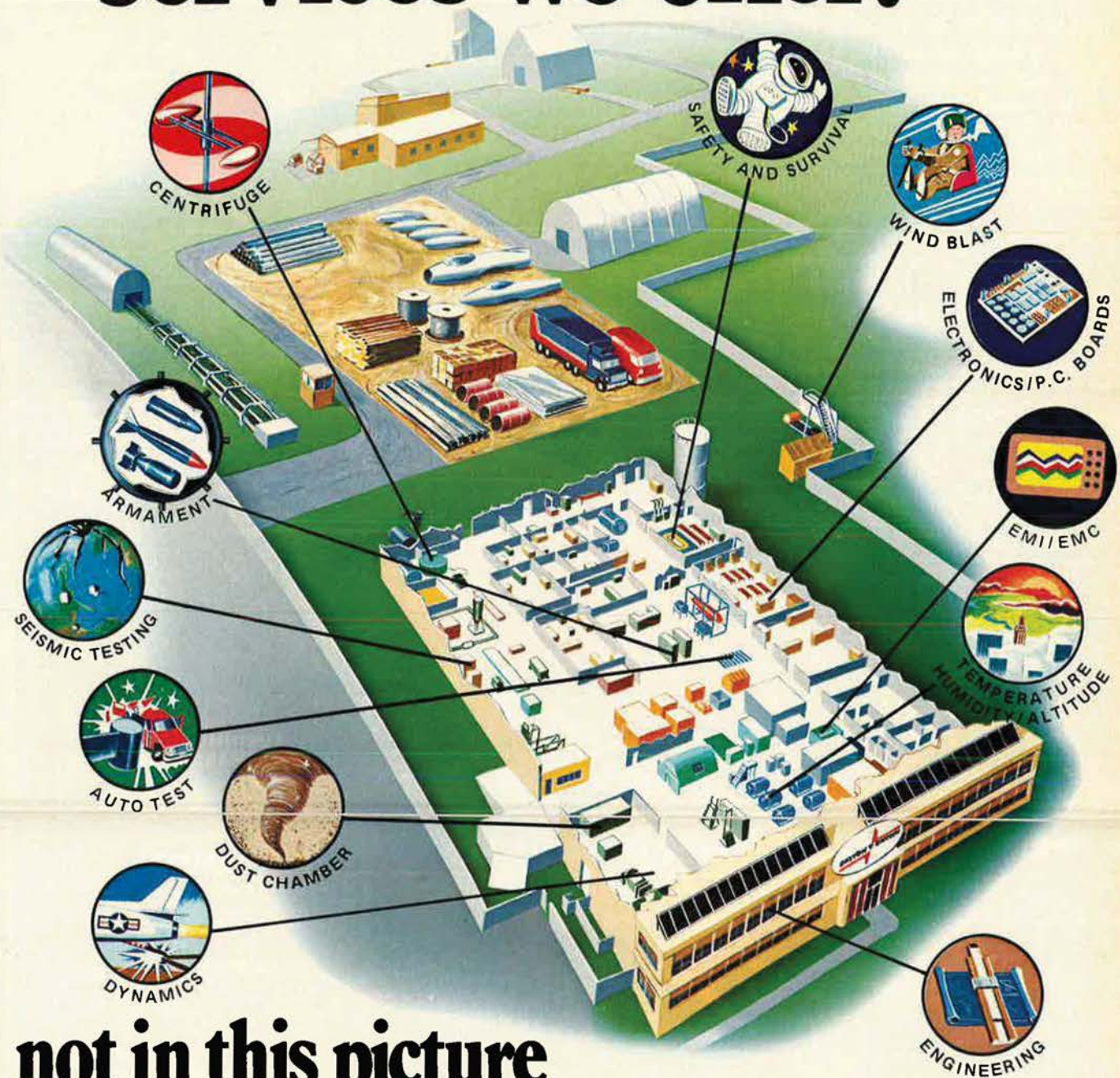
I ask: Why are professional engineers and scientists getting out? It's because of the overplaying of pilots, and the lack of justice, equity, and attention to support people.

James D. Bradley
San Antonio, Tex.

Joint Service Duty

In response to Col. George Gibson's rebuttal *(August '82 "Airmail," p. 6)* to my letter in the June '82 "Airmail," I would like to point out that I was responding to the views expressed by Gen. David Jones on his departure as Chairman of the JCS, where he cited particularly the prob-

can you name all the services we offer?



not in this picture

...because at Dayton T. Brown, Inc. one picture only tells part of the story. We are one of the largest testing, engineering, and documentation services companies in the country. Government and industry alike have been asking Dayton T. Brown, Inc. to test their products, solve their problems, and document the results for well over 30 years. It would be difficult, if not impossible for you to find our vast knowledge and experience anywhere else.

Whether your needs call for an EMI and Environmental Test or a complete ILS program, you should be discussing it with us. The people at Dayton T. Brown, Inc. want you to know more about our extensive capabilities. By sending us your business card, or letterhead we will send you a full size, color poster reproduction of this ad along with a copy of our new, "Look Us Over" brochure.

Call or Write: Dayton T. Brown, Inc., Engineering and Test Division, Dept. 82-4, Church St., Bohemia, L.I., N.Y. 11716 Phone (516) 589-6300, Telex 96-1325, TWX (510) 228-7323

DAYTON T. BROWN INC.

TIGERSHARK. NOW FLYING.

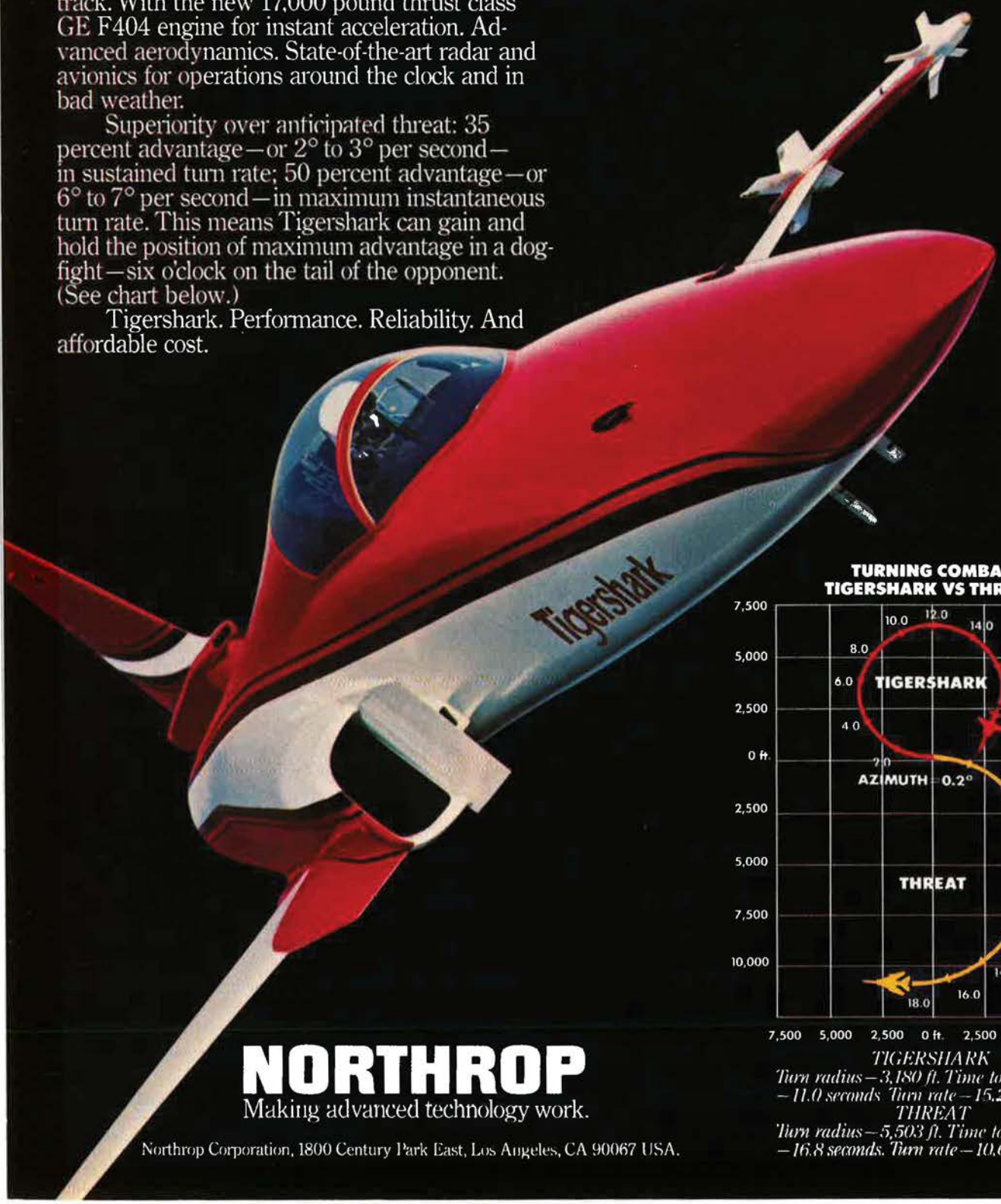
TIGERSHARK DESIGN PERFORMANCE (CLEAN)	
Maximum speed—level flight	Mach 2 Class
Combat thrust-to-weight ratio	1.13
Acceleration: 0.9 to 1.2 Mach at 30,000 feet	29 seconds
Sea level rate-of-climb	54,100 feet/minute
Takeoff weight	17,260 pounds
Takeoff distance	1,500 feet
Time to climb to 40,000 feet	2.2 minutes from brake release

Tigershark. Northrop's new Mach 2 class tactical air defense fighter. More than a match for any likely opponent.

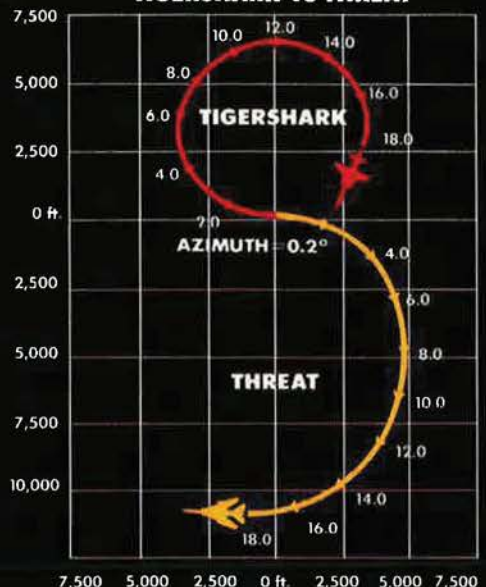
Agile. Maneuverable. Difficult to see and track. With the new 17,000 pound thrust class GE F404 engine for instant acceleration. Advanced aerodynamics. State-of-the-art radar and avionics for operations around the clock and in bad weather.

Superiority over anticipated threat: 35 percent advantage—or 2° to 3° per second—in sustained turn rate; 50 percent advantage—or 6° to 7° per second—in maximum instantaneous turn rate. This means Tigershark can gain and hold the position of maximum advantage in a dogfight—six o'clock on the tail of the opponent. (See chart below.)

Tigershark. Performance. Reliability. And affordable cost.



TURNING COMBAT
TIGERSHARK VS THREAT



TIGERSHARK
Turn radius—3,180 ft. Time to turn 180°—11.0 seconds. Turn rate—15.25°/second.
THREAT
Turn radius—5,503 ft. Time to turn 180°—16.8 seconds. Turn rate—10.6°/second.

NORTHROP

Making advanced technology work.

Northrop Corporation, 1800 Century Park East, Los Angeles, CA 90067 USA.

lem of an officer often being penalized for his joint service duty.

I agree wholeheartedly with Colonel Gibson that my assignment in Defense Logistics Agency was the best assignment I ever had in the Air Force—no argument on that point.

The Colonel also cites some recent promotion statistics that please me. However, in the period of 1976 to 1980, the figures were not so rosy—particularly in reference to 1980. . . .

The senior officer at Hq. DLA for endorsement of Air Force officer reports simply checked the concur block, signed the report, and made no comment on any Air Force officer's OER. Counseling by AFMPC indicated that my four years in a joint command—during my entire lieutenant colonel report history—jeopardized me since I was, to quote, "outside the Air Force."

Colonel, I'm happy to hear things have changed, but it simply doesn't change history.

Lt. Col. R. T. Cwikowski,
USAF (Ret.)
Dayton, Ohio

Unimpressed

The following factual put-down was called to mind by Bob Stevens's "There I Was . . . " in the August '82 issue.

Some years back, when I was a first lieutenant, I was quite naturally proud of being certified as a MATS C-124 aircraft commander, but my eight-year-old son was not favorably impressed. To wit:

"Dad, is there anyone else in the airplane with you?"

"Oh yes, first there's the copilot."

"And what does he do?"

This type of questioning continued as I then explained the duties of the navigator, two flight engineers, and the loadmaster, with me describing the duties of each crew member in terms that were supposed to be both understandable and impressive to a boy his age. He liked the engineer's job, because playing with big engines seemed fun to him.

When I had finished my description of duties for all the other crew members, my son really showed how impressed he was about whatever duties could possibly remain for the aircraft commander by asking, "Well, Daddy, what do you do, just guide it?"

Lt. Col. R. W. Hudson, USAF
Scott AFB, Ill.

A Unique Insignia

In the August '82 issue article on the Military Aircraft Storage and Disposition Center *("Holding Pattern," p. 36),* the picture of the B-52 with tail number 0-30402 shows it to have a "unique" national insignia. I know the -52 is old, but that old? I'm wondering if anyone knows the background to this insignia.

I enjoy the magazine, month after month—keep up the good work.

Maj. Richard J. Arbes, USAFR
Tallahassee, Fla.

AIRMAIL

The C-6 Is There

I don't know which copies of *Jane's All the World's Aircraft* Sergeant Strobeck has been looking at *(August '82 "Airmail," p. 7),* but we have listed the Beechcraft C-6 (originally a VC-6A, now a VC-6B) every year since it was first delivered in 1966.

On its first appearance in *Jane's* (1966–67 edition), it was listed on page 191, accompanied by a large photograph; it is still listed on page 287 of the 1981–82 edition, and we've even picked out the designation in bold type so that he can spot it easily!

Kenneth Munson
Assistant Editor
Jane's All the World's Aircraft
Seaford, Sussex
England

First Stealth Pilot

Reference your Stealth-47 picture on p. 219 in the "Intercom" section of the May '82 issue:

The pilot on the left is Capt. Richard P. Sulzbach, at Pisa, Italy, in April 1945. He had just returned from a mission in the Po Valley carried out by the 346th Fighter Squadron of the 350th Fighter Group. He had mushed into a forest on a strafing pass.

This mission took place in the last month of the war. He had another mission a couple of days later in which he shot down two Me 109s, followed later by a mission in which *he* was shot down by antiaircraft fire. He survived and returned to his outfit at the end of the war. (April was an exciting month—the 350th Group had twenty-six pilots shot down.)

Dick Sulzbach attended the 350th Group's fortieth anniversary reunion in San Diego in June, along with 175 other members of the old World War II group.

Col. Hugh D. Dow, USAF (Ret.)
Santa Barbara, Calif.

People Lost and Found

I would like to attest to the effectiveness of AIR FORCE Magazine's "Airmail" section as a vehicle for finding lost friends.

In the mid-1970s, while I was on active Air Force duty, I corresponded with Mr. C. M. Habermehl of Brenham, Tex., concerning the history of the B-47. We then lost contact with each other until recently, when he sought me through the "Airmail" section in the July 1982 issue of AIR FORCE Magazine.

Even before I had received my own copy of the magazine, I received many calls from friends informing me of the query. That's what I call results, and shows how many people read the "Airmail" section.

Thanks for making this "people lost and found" service available to the aviation community.

Lt. Col. Augustine R. Letto,
USAF (Ret.)
Albuquerque, N. M.

The Elite 88

I just received my August issue of AIR FORCE Magazine. As usual, it is a fine issue, though I have not completed reading it yet.

I did notice my letter in the "Airmail" section *(p. 11).* I do not have a copy of the letter I sent, so I do not know if it was a typo on my part, but the year of my service at Lackland AFB, Tex., is in error.

Could you possibly print that it was the year 1948 that the "Elite 88" was at Lackland in the 3741st Squadron?

Keep those great issues coming. I enjoy every word.

Patricia B. Narike
425 S. Kenmore Ave., # 312
Los Angeles, Calif. 90020

Hueys in Vietnam

I am a former US Army UH-1 Huey aviator, with service in Vietnam, and am presently researching the UH-1 aircraft in preparation for a publication featuring the Huey in Vietnam (and prior to the war).

I'm aware of Air Force employment of UH-1s in Vietnam, and would like to hear from any Air Force personnel who may have worked with Hueys. I've found that information concerning Vietnam-based USAF Hueys is difficult to obtain, and I would certainly welcome any assistance in shedding some light on this subject.

Such materials as photographs, technical data, unit histories, and mission data would be most helpful. I will gladly pay any postage and any copying costs, and ensure proper credit.

Wayne D. Mutza
3728 S. 19th St.
Milwaukee, Wis. 53221

AIRMAIL

Mobile/Field Training

I am currently doing research on the development of mobile/field training in the US Army Air Forces and the Air Force as part of the official USAF history program. I would like to contact anyone who was directly involved in mobile/field training in the 1940s, 1950s, and 1960s.

In particular, I would like to correspond with people formerly assigned with the 3499th Field Training Wing in the 1950s, FTD 917S/917H, FTD 921R. or the 355th Tactical Fighter Wing, Takhli AB, Thailand.

Boyd L. Dastrup
Center Historian
STTC-HO
Sheppard AFB, Tex. 76311

Aerobatic Teams

I am preparing a book entitled "Aerobatic Teams of the World," and I would like to appeal to readers for information and photographs on any aerobatic team, but especially such lesser-known USAF teams as the "Sabre Knights," "Minute Men," and "Skyblazers."

Especially valued would be photographs of foreign aerobatic teams taken by servicemen on overseas duty. Any photographs, color slides, or other material will be handled with great care and returned promptly after copying.

Adrian M. Balch
32, Akrotiri Square
Watton
Thetford
Norfolk IP25 6HZ
England

B-26s in Korea

Does anyone have any photos or information about the AN/AVQ-2A searchlight that was mounted under the right wing of Douglas B-26 Invaders as used by the 3d Bomb Wing in Korea, circa 1950–51?

This information is needed for a research project concerning B-26B-50DL (44-34314), as flown on the night of September 14, 1951, north of Hwang Ju by Medal of Honor recipient Capt. John S. Walmsley. His bombardier/navigator was Lt. William D. Mulkins, and his gunner was MSgt. George Morrar—all members of the 8th Bomb Squadron, 3d Bomb Wing.

William J. Bennett
17017 S. Orchard Ave.
Gardena, Calif. 90247

305th Air Service Group

I am seeking contact with anyone who served with the 305th Air Service Group from 1942–45. I am trying to document the history of the Group, and need information, documents, pictures, etc., particularly of its years of service in the CBI.

I am also interested in getting any old group or squadron patches, and copies of the Group newspaper—*Yankee Doodler.* All material received will be copied and promptly returned.

Capt. Richard A. Rodrigues, USA
532 B Winans Rd.
West Point, N. Y. 10996

Looking for . . .

The 38th Air Depot Group was activated about March 1942 at Herbert Smart Airport, Macon, Ga., pending the completion of Robins Field, Ga.

I was one of the first fifteen men—all privates—in the 38th. We later moved to Robins Field. I was transferred out of the Group before they left for North Africa in February 1943.

In January 1944, I was sent to Italy, where I served with the 19th Air Service Group, Twelfth Air Force. We serviced the 79th Fighter Group in Italy, and were stationed in Austria after the war.

I would like to hear from anyone who served with me or knew me over the years, especially Myer Racoff and Leo Mitchell of Massachusetts, George Dyer of Mississippi, and George Sunday of Pennsylvania.

F. A. Clifton
Rte. 1, Box 220
Beech Grove, Ark. 72412
Phone: (1-501) 249-3455

I am trying to get some information on some people in my outfit in World War II. I need to find the doctor who took care of me in the hospital in France, or the two men who had beds on either side of me. The medical officer who took care of me was Capt. John S. Chaffee.

We were in either the 422d or 423d Bomb Squadron, 305th Bomb Group. We were in the dispensary at Istres AB, France, Detachment A of the 62d Field Hospital, during May 1946. I was a corporal at the time.

Please contact the address below.

Irvin W. Peterson
c/o E. Kohen
P. O. Box 2349
White City, Ore. 97503

As Secretary of the 7 Squadron Association, I am trying to locate two of our former pilots. They were both Americans, and, with myself, formed the first part of the first Pathfinder Force.

They are W. "Buck" Senger and John Stickell. Both reached the rank of flight lieutenant, were awarded the Distinguished Flying Cross, and finished their tours of forty-five missions. They both eventually transferred to American forces—Buck Senger to the Army Air Forces as a captain, and John Stickell to the Navy.

We have just held our first squadron reunion, and Buck's navigator and bomb aimer attended. We should very much like to get in touch with these two characters, for characters they were.

Please contact the address below.

Arthur Frewin
40, Nettlecombe Close
Shanklin Village
Belmont, Sutton
Surrey
England

I am trying to locate James A. Watts and Stephen M. Perrone, who were members of my aircrew during World War II.

We departed in February 1944 for Townsville, Australia, and the crew was disbanded at Tacloban, Philippines, in January 1945, after completion of our combat tour with the 63d Squadron, 43d Bomb Group.

Watts's original home was Bluefield, W. Va., and Perrone came from Philadelphia, Pa.

Please contact the address below.

Kent L. A. Zimmerman
P. O. Box 158
North Pownal, Vt. 05260
Phone: (802) 823-5273

I am interested in contacting anyone who may have served with my father, Capt. William Simmons, at Cam Ranh Bay, Vietnam, in 1966, or at MacDill AFB, Fla., prior to his Vietnam tour.

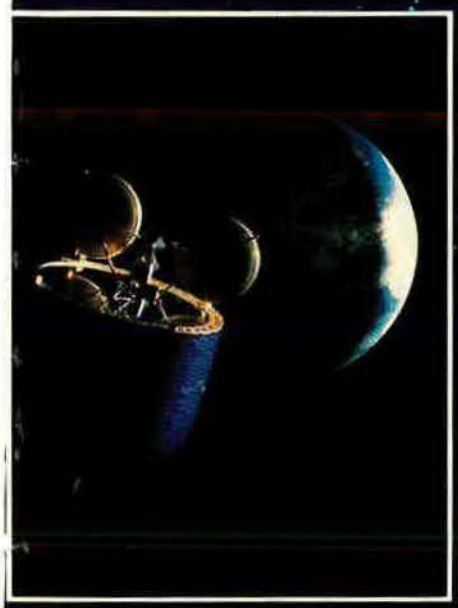
I am interested in the activities of the unit at the time he was killed on September 3, 1966. He was a flight surgeon for the 12th Tactical Fighter Wing, and sometimes flew combat missions with the 557th Tactical Fighter Squadron.

Any stories relating to him, especially any that might give insight to his personality, would be very appreciated. I was only seven years old at the time of his death, and never got to know him well.

I may be contacted at the address below.

SSgt. Robert N. Simmons, USAF
PSC Box 6773
Goodfellow AFB, Tex. 76908

MILSTAR



Survivability

The survivability of future military spacecraft is now so vital to our defense that it has become a matter of national policy.

TRW has been involved in overall space and weapons systems survivability for more than 15 years.

In the 1960s, we pioneered the application of survivability technologies to military communications satellite systems. We built the Defense Satellite Communications System (DSCS II) for the Air Force using design techniques, parts selection and test methods for satellite survivability in a nuclear environment.

Later, our operational Fleet Satellite Communications System (FLTSATCOM) incorporated even more advanced survivability techniques.

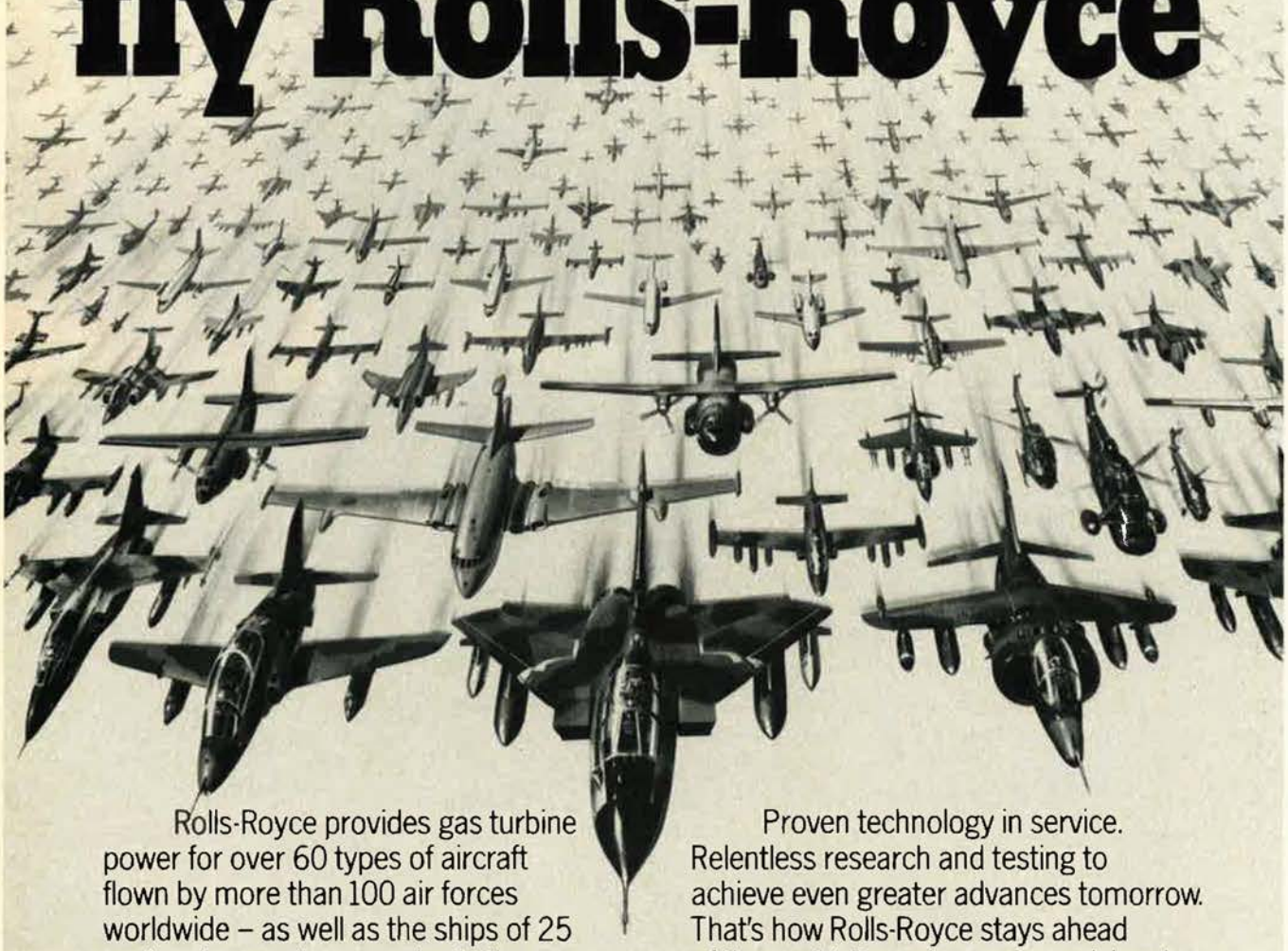
TRW plays a leading role in helping the Air Force develop the Minuteman weapon system. We have unique capabilities for the assessment, design, and testing of spacecraft systems and their operation in the radiation and electromagnetic pulse environment of a nuclear explosion.

The design of the MILSTAR system for survivability will present new challenges that will be met with the use of advances in the state of the art of this key technology. Our survivability design and assessment team is ready to meet this challenge

TRW

TRW Space & Technology Group

Why 100 air forces fly Rolls-Royce



Rolls-Royce provides gas turbine power for over 60 types of aircraft flown by more than 100 air forces worldwide – as well as the ships of 25 navies. A record no one else in the world can equal.

These engines were chosen for their high performance, based on Rolls-Royce advanced technology. Plus their combination of reliability, fuel economy and versatility.

Proven technology in service. Relentless research and testing to achieve even greater advances tomorrow. That's how Rolls-Royce stays ahead of the world. Powering commercial and military aircraft and warships. Pumping oil and gas. Generating electricity.

ROLLS-ROYCE INC., 375 PARK AVENUE, NEW YORK, NEW YORK 10152.

STAYING AHEAD IN THE RACE TO TOMORROW.

ROLLS RR ROYCE

IN FOCUS...

Tac Air Feels the Squeeze

By Edgar Ulsamer, SENIOR EDITOR (POLICY & TECHNOLOGY)

Forty-Wing Goal Fades ★ Soviets Fielding Four New Fighters

Washington, D. C., Sept. 1

Matching US global strategy as defined by the Administration would require a force strength of fifty-four wings, each consisting of seventy-two fighters, on the part of USAF's tactical airpower, according to the most recent assessment of the Joint Chiefs of Staff. But the current total is only 34½ wings, with strong prospects that Congress will reduce that total by one wing next year, according to Gen. W. L. Creech, Commander of Tactical Air Command.

Soviet tactical airpower, by contrast, consists of the equivalent of 108 tactical fighter wings and is being modernized at a far more rapid rate than is US airpower.

In a recent breakfast meeting with several Pentagon correspondents, General Creech pointed out that the Air Force determined in 1973—when it mustered a force of thirty-three tactical fighter wings—that there was a clear-cut need to build up to a level of forty wings by FY '81. That buildup, for a variety of reasons, was halted, with the result that over the intervening nine years the Air Force was able to gain only an additional wing and a half, of which, in the near future, TAC is likely to lose one wing by congressional fiat.

The principal reason for this stagnation, according to General Creech, is that "we are trying to modernize the three legs of the strategic triad all at the same time." This involves building Trident SSBNs and D-5 SLBMs, the B-1B, and MX, while at the same time "building toward a 600-ship Navy, and in the [resultant] budget squeeze there isn't enough money for [expansion and modernization of tactical air]," TAC's Commander explained.

The current Air Force growth goal is to build toward forty wings—scaled back from the forty-four wings proposed when moves toward a defense buildup were gathering steam about two years ago—by the end of this decade, according to General Creech. But the rate at which the Air Force is acquiring new aircraft would seem to relegate that goal to never-never land. The Air Force's rule of thumb is that to offset attrition and force aging it takes "6.5 times the number of tactical fighter wings [in the inventory] in order to determine how many fighters must be bought each year to maintain that force," General Creech said.

In the case of a forty-wing force, for instance, it would take an annual fighter buy of about 260 aircraft just to sustain that force level. If the objective is to increase the force by one wing a year, an additional 100 aircraft (seventy-two inventory aircraft plus training units) are required, the TAC Commander pointed out.

The Air Force's buy rate lags grossly behind these requirements. In FY '82, the Air Force's buy of tactical fighters is held to a total of 176 aircraft, of which thirty-six are earmarked for strategic air defense, leaving 140 units for the tactical air forces. This figure is significantly less than half the number required for attainment of the forty-wing force goal by FY '89. With totals in FY '83 and FY '84 fixed at 180 acquisitions each, General Creech remarked wryly, "It doesn't look terribly promising for our goal." The Soviets, on the other hand, are building more than 1,300 tactical fighters each year, of which between 850 and 900 units go to Soviet forces. The remainder are for export, according to General Creech.

Asked about the Administration's plan to boost strategic air defense forces substantially as part of the five-pronged strategic force modernization program, the TAC Commander, who has oversight over these forces, said that "there is no proposal at present to increase significantly the number of [air defense] fighters. There is some talk of decreasing [them]. We have the equivalent of 3.75 fighter wings for strategic air defense, or fifteen eighteen-ship squadrons."

Explaining that this total is down from 105 squadrons in the 1950s, he said that in his judgment the Air Force is "at rock bottom" in terms of its ability to carry out "peacetime air sovereignty and the limited warfighting we are responsible for. We have to maintain twenty-six alert sites around the United States with two aircraft on five-minute alert just to maintain air sovereignty."

Stressing that the Air Defense Master Plan adopted by the Administration was being implemented, he said the Air Force is beginning to replace the F-106s—which average an age of twenty-three years—with F-15s: "We have equipped the first squadron at Langley with F-15s already and will soon begin [modernizing the squadron at] McChord AFB." These two squadrons, he added, will have to "double in brass" by being assigned also to the ASAT (antisatellite attack) mission.

In order to bolster strategic air defense, the Air Force is deploying OTH-B (Over-The-Horizon Backscatter) radars on both the East and West Coasts. These radars detect approaching Soviet bombers over long distances. At the same time, coordination with Canadian Air Defense forces is increasing, and there is the prospect of the Air Force's buying additional numbers of E-3A AWACS to strengthen strategic defense. There are also plans to upgrade the Reserve Forces—which perform about two-thirds of the strategic air defense mission—with F-16s equipped with the high-performance AMRAAM (Advanced Medium-Range Air-to-Air Missile) after the latter enters the inventory in either 1987 or 1988.

Pointing out that the present deficiencies in tactical airpower are a matter of "numbers and sustainability," he explained that these conditions ensued from the prolonged underfunding of the 1970s. Nevertheless, he said, "we have a substantial warfighting capability in place [and] would do very well" against Soviet airpower, "provided we get the missiles and parts to do the fighting." He warned, however, that Congress is try-

ing to cut back in the funding of spares and other elements essential for readiness and sustainability.

While the US has no advanced fighters in development—and USAF's Advanced Tactical Fighter program is in limbo—the Soviet Union is bringing four new designs into its inventory, according to the TAC Commander. Limited numbers of a fighter version of the MiG-25 reconnaissance aircraft, codenamed Foxhound, have been deployed. (Other sources indicate that this aircraft is also known as the MiG-31.) This aircraft, termed the world's fastest, highest-flying, fastest-accelerating fighter by General Creech, is equipped with a "very sophisticated radar [and] a new, sophisticated air-to-air capability." As a result, the Mach 3-plus Foxhound has a first-look, first-shoot advantage over the F-15. Foxhound, he said, is "faster, flies farther, and outaccelerates the F-15" while carrying similar armament "so far as radar and infrared guided missiles are concerned."

The F-15, on the other hand, "has it all its way" in the case of turning engagements. This advantage, he acknowledged, may not always be decisive since Soviet doctrine and training stress "shoot-and-run" operations. Soviet look-down, shoot-down capabilities probably are not yet on a par with those of the F-15, but "they are moving closer and closer" to US technology levels.

The Soviets, he added, "now have matched us in radar plus some." The Soviet radars have greater range than the US systems. Also, the new Soviet radar missiles have greater reach than the AIM-7, General Creech said. In addition, there is evidence that the Soviets have developed, although not yet operationally deployed, "an all-aspect IR missile." Soviet technology in the tactical arena is not moving "much more rapidly than ours, but [they are] putting their technology in the field so much more rapidly than we do."

The Soviets, in addition to the Foxhound, have three other new fighters in or close to production, according to General Creech. The Su-25, codenamed "Frogfoot" by NATO, is a "super A-10" and has two and a half times the latter's thrust. The Su-27, which as yet has not been given a NATO code name, is entering production. This aircraft, he said, resembles the F-15, but is "slightly larger and, we believe, will have a longer-range radar with look-down, shoot-down" features. This aircraft, too, is thought to have a first-look, first-shoot advantage over the F-15. The MiG-29 Fulcrum, another entirely new aircraft, is expected to go into production soon. This aircraft, General Creech said, is slightly larger than the F-18 and also includes look-down, shoot-down capabilities.

Lastly, the Soviets are expected to deploy a SU-AWACS (a Soviet version of the US E-3A AWACS) derived from the Il-67 Candid transport. While stressing that the US lacks details about the state of Soviet look-down pulse Doppler technology, he said there is "ample reason to believe that it will be similar to the E-3A which, after all, represents fifteen-year-old technology."

The US response to the burgeoning Soviet tactical air threat, General Creech emphasized, should center on full funding of all relevant programmed improvements. Equally important: "We should start development of the Advanced Tactical Fighter right away," especially since for the moment only "seed money" is required. The current antitechnology atmosphere, he charged, has been a factor in delaying this program to develop a new fighter for the 1990s and beyond. He underscored the urgency of initiating the Advanced Tactical Fighter program by pointing out that "the F-15 . . . is [already] a ten-year-old aircraft." He added that the Air Force frequently is being accused of "having an insatiable appetite for high technology." In fact, he said, an objective review of the F-15 design approach makes clear that it used state-of-the-art technology across the board, including a "hand-me-down gun and . . . armament of the F-4."

The short-term response to the Soviet first-look, first-shoot advantage, according to General Creech, is the expeditious development and deployment of AMRAAM. Even the older models of the Soviet MiG-23 Flogger can fire "four to six missiles against the F-16 and stay out of its range" so long as the latter is confined to heat-seeking missiles. This disadvantage is exacerbated by the fact that the Soviet airplanes can "outrun" the US fighters.

AMRAAM, he said, is "coming along well." The new missile, scheduled for initial operational capability (IOC) late in the 1980s, is a launch-and-leave missile that "does the end game all by itself." It eliminates the disadvantages of the AIM-7, which requires illumination of the target until impact and prevents the pilot from moving on to other bogeys during that time, according to the TAC Commander. AMRAAM also will provide higher reliability and greater P_k (probability of kill) than the AIM-7 Sparrow missile, he said.

Rising to the defense of the AGM-65 Maverick that has been under attack by some national media and in Congress for allegedly typifying the Air Force's infatuation with high technology systems, General Creech pointed out that of all firings since Maverick was first introduced, "about eighty-five percent turned out to be direct hits. That is probably the most effective weapon we have ever developed." The Israeli Air Force, he disclosed, found the electro-optically (TV) guided Maverick so unerringly accurate that it considered deploying the weapon without a warhead, relying instead on kinetic energy to disable tanks and other mobile targets. (The Israelis are wont to minimize damage to expensive enemy weapons with an eye on capturing, refurbishing, and reusing them.)

The Air Force needs and is developing a version of Maverick using imaging infrared (I^2R) guidance that "has some advantage in daytime and will be very important to us at night as we develop a night [attack] capability with LANTIRN," the low-altitude navigation and targeting infrared at night system. The test program of the I^2R Maverick, General Creech said, "has been very successful." While there have been some "component failures and development bugs, we have a high degree of confidence in this system." The reason is that I^2R represents a mature technology and because "we know that Maverick works" as a weapon system.

Turning to the lessons the Air Force gleaned from the recent war between England and Argentina as well as from the confrontation between the Soviet-equipped Syrian Air Force and the largely US-equipped Israelis in Lebanon, General Creech suggested

IN FOCUS...

Falklands, Mideast Combat Refutes Critics of 'Complex' Systems

Canadair announces yet another breakthrough in the fight against the high cost of jet fuel.

April 10, 1982: First flight of the new GE-powered Challenger 601.

With the introduction of the Lycoming-powered Challenger 600 in 1976, we began an unabashed campaign to wean executive travelers from the cramped, fuel-guzzling aircraft which, until then, had passed for corporate jets.

We were met with an enthusiasm that stunned even us.

Executives whose responsibilities demanded multi-hour jet travel thirty or forty times a year or more were apparently possessed of a desperate inner longing for an alternative to claustrophobia. And here we were, offering an aircraft both wider and more economical than any other intercontinental corporate jet in the world.

With the result that back orders for the Challenger 600 sprouted like the proverbial beanstalk.

At this writing, more than ten 600s are already in service, and over 25 more are in completion centers. More than 6,000 fleet hours have already been accumulated by these aircraft. And more than 30 Atlantic crossings were made during those hours.

And all this, as of the first flight of a new Challenger on April 10, 1982, is only half the story.

Introducing a second Challenger to choose from.

Like the Lycoming-powered Challenger 600, there were those who said the new Challenger 601 would never fly.

It was said, no corporate jet in history had ever combined so much performance with so much fuel economy. It was said, no corporate jet in history had ever combined such performance and economy with such a wide cabin configuration.

All we said was, it will fly in April, 1982, which it has.

All we're saying now is, the General Electric engine will be certified on schedule in mid-1982. The aircraft will begin serving our customers and causing discomfort to our competitors by late 1983, and, like the Challenger 600, fly you more economically and in greater comfort than any other intercontinental corporate jet in the world.

(The fact is, even far smaller jets like the Falcon 50 and the Falcon 20F fail to achieve any meaningful advantage over either Challenger in fuel efficiency. While a Gulfstream III can consume as much as 40% to 60% more than a 600 or 601,* depending on trip length.)

Actually, there is one other thing we'd like to say. If you want to find out more about the Challenger family of business jets, the man to speak to is Mr. James B. Taylor, President of Canadair Inc. You can call him at (203) 226-1581, or write him at Canadair Inc., 274 Riverside Avenue, Westport, CT 06880.

And you might as well know now. The back orders have already started.

canadair challenger

*Challenger 601 data are based on wind tunnel tests and continuing flight tests. For performance guarantees, see technical specifications.

Before your next missile design goes too far, make sure its actuation systems go far enough.

At Garrett's AiResearch Manufacturing Company, we've earned our reputation as a leader in electromechanical actuation systems, as well as hydraulic and electric power systems. We're known for building tough, high-performance actuation systems which give you greater flexibility in designing the complete missile system.

Our leadership is also the result of unsurpassed capabilities in making trade-off studies between possible design approaches— capabilities involving an extensive use of computer programs which permits rapid response to your needs.

This expertise in complete actuation and control systems is based on advanced technology in individual components, such as electromechanical actuators which provide stiff, high-frequency response capabilities; high-speed, lightweight, turbine-driven pumps and alternators; and samarium cobalt, permanent magnet DC motors.

Furthermore, the actuation systems we pioneered on such missiles as Nike Hercules, Nike Zeus, SUBROC, and Spartan helped establish state-of-the-art technology for today. Among our current applications are MX, Pershing II, Trident, ALCM, ASW/SOW, HARM, and ALWT.

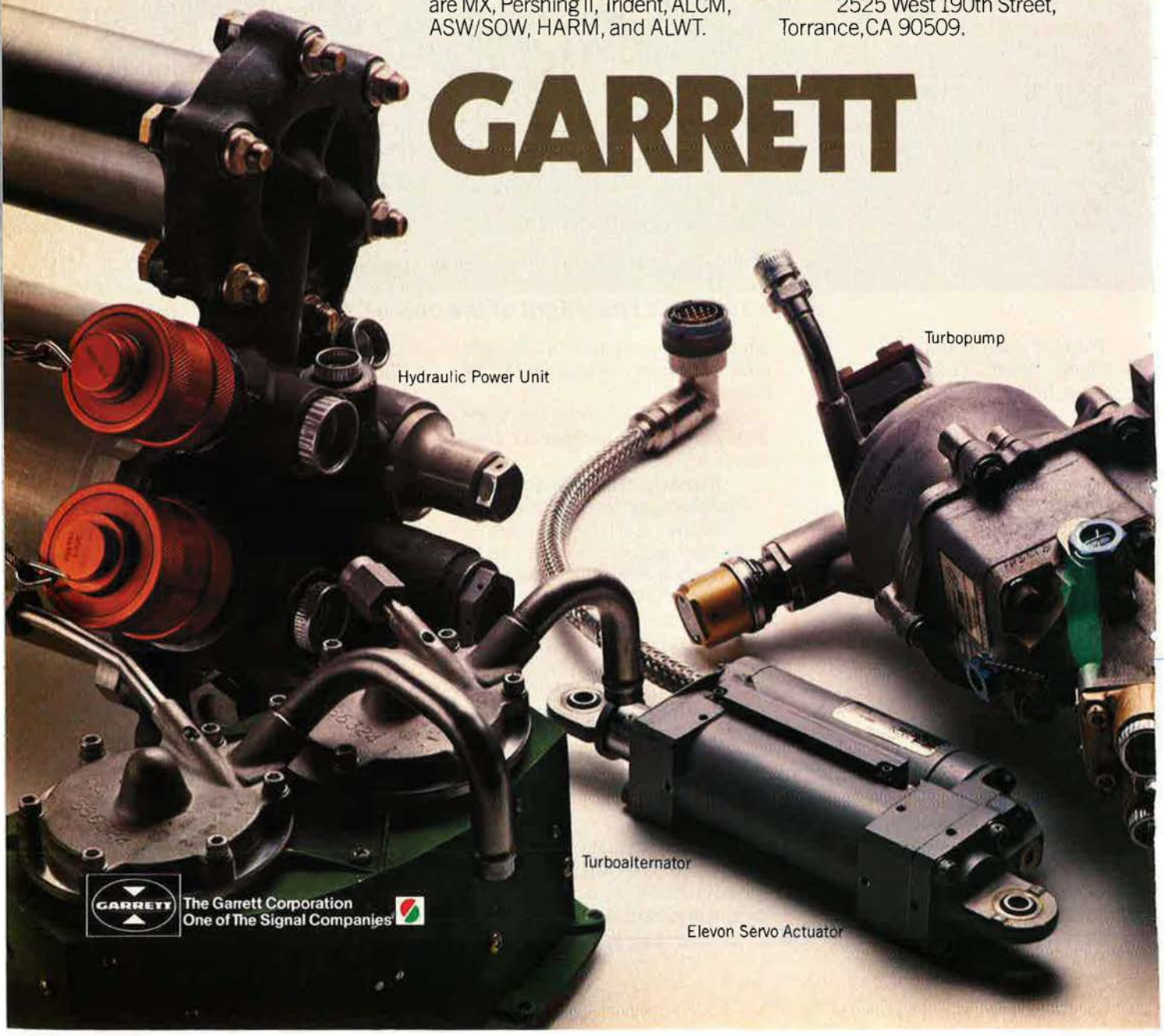
In addition, we have capabilities in electronic systems, including weapons launch controls, air data sensors and computers, solid state power conditioning systems, plus electronic cooling systems. Our experience also includes ground support, environmental, and power drive systems.

So if you're looking for qualified leaders with a solid reputation, contact Garrett's AiResearch Manufacturing Company.

Before you've gone too far.

Write: Missile Systems Sales, AiResearch Manufacturing Company, 2525 West 190th Street, Torrance, CA 90509.

GARRETT



GARRETT The Garrett Corporation
One of The Signal Companies

IN FOCUS...

that fundamental was the refutation of USAF's critics who claim that sophisticated equipment won't work in combat. US supplied AIM-9L all-aspect missiles turned the British Harrier "into a credible air-to-air performer . . . something that is not easy to do since [that aircraft] simply is not designed for that," General Creech said.

The conflict in Lebanon, he pointed out, "proved again the reliability and effectiveness of American equipment, especially the newer equipment." According to the latest information available to TAC, the Israelis shot down ninety-two Syrian aircraft, eighty-five in air-to-air combat and the remainder by ground fire. About forty of the Syrian MiG-23s and MiG-21s—about twenty each—were shot down by F-15s, giving that aircraft an overall combat score, counting Israelis kills in previous skirmishes, of fifty-eight to zero, according to General Creech. (Among the kills were two Soviet MiG-25 Foxbats.) The remaining Israeli kills were scored by F-16s, except for one F-4 victory, according to General Creech.

The Israelis have three F-16 squadrons numbering seventy-two aircraft and 1½ F-15 squadrons, with thirty-seven aircraft. According to information available to General Creech, the Israelis deliberately exposed all their units to combat in order to "give everybody a chance to participate." It follows, he suggested, that the F-15 shot down a proportionately larger number of Syrian aircraft than did the F-16. He reported that less than seven percent of the Israelis' kills were scored with guns. The bulk of the missile kills—involving AIM-9Ls in the case of the F-15s—were by radar.

The Israeli Air Force's success against Syria's Soviet surface-to-air (SAM) missiles proved that "Soviet SAMs are not invincible," General Creech suggested. The Israelis, he said, took out nineteen SAM sites, ten of them in the first ten minutes, using with some marginal differences the same tactics as the US Air Force: "You go in low, use terrain masking . . . antiradiation missiles . . . chaff and flares . . . standoff jamming . . . and drones." While the Israeli drones garnered considerable press attention, "what really carried the day were jamming and antiradiation missiles," such as the Standard ARM and Shrike, he said.

The Israelis lost only two aircraft and one helicopter to ground fire and SAMs. They encountered both older SA-6s and the more modern SA-8s. Although acknowledging that "we don't have precise figures," he suggested that the Syrians "probably fired more than 100 SAMs" for each of the three kills.

While the Soviets have developed yet newer and more capable SAMs—such as the SA-10 and SA-13—that USAF would have to contend with in case of a US-Soviet conflict, the Air Force has a number of systems for coping with advanced air defenses that were not available to the Israelis. These include the EF-111A Tactical Jamming System, the F-4G Wild Weasel, HARM (High-speed Anti-Radiation Missile), and Compass Call, a system to jam the enemy's command and control network, according to General Creech. The Israeli success in overcoming Soviet SAMs, in concert with the synergism of USAF's advanced weapons and tactics, caused the TAC Commander to predict that US tactical airpower would do very well against sophisticated Soviet air defenses, which he stressed "are formidable but not invincible."

The Israeli experience in Lebanon, according to information made available to General Creech, underscored the high reliability of modern US weapons. Citing the case of the F-16, he stressed that all seventy-two aircraft in the Israeli Air Force's inventory were in commission 100 percent "every morning." The US Air Force, he said, can maintain equally high readiness rates "because the equipment is very reliable," provided sufficient spares are available. The Israelis, he added, "were smart enough" to maintain an adequate supply of spares.

In his overall assessment of the airpower lessons of the Israeli-Syrian conflict, he cautioned that "I am not saying that we could get an eighty-five to zero score against the Soviets, but we could do very well if we don't turn our backs on modern American equipment as some would have us do."

Washington Observations

★ Rockwell International, the B-1B's prime contractor, has developed a concept for a "Long-Range Counter-Air" derivative of the Air Force's new strategic bomber that could carry as many as thirty 985-pound AIM-54C Phoenix air-to-air missiles. Potential missions for the proposed Long-Range Counter-Air B-1 derivative that Rockwell officials are discussing with congressional staffers include support of the Rapid Deployment Force, maritime defense augmentation, interception of Soviet airlift channels on a global scale, strategic air defense intercept up into the polar region without need of refueling, and combat escort in nuclear war, conventional war, and during crises.

★ Pentagon analysts believe that the Soviets are working toward battlefield laser weapons designed to blind ground troops and air crews. These weapons presumably would sweep in searchlight fashion across the FEBA (forward edge of the battle area) and the airspace above. The psychological effect of risking blindness just by looking toward the enemy, these analysts fear, would be horrendous.

★ At this writing the Air Force has just completed its in-depth review of a permanent basing mode for MX and concluded that closely spaced basing (CSB) works. This basing arrangement maximizes the so-called fratricide effects of nuclear weapons on one another by placing superhard silos closely together. The objective is for a large percentage of the incoming Soviet warheads to kill each other rather than their targets. The principal hurdle yet to be cleared: various assumptions about how soon and to what degree the Soviets might find ways to counter CSB and what US options are available to negate Soviet countermeasures.

The Administration is obligated to present its plan for a permanent basing mode to Congress no later than December 1 of this year. The White House is understood to oppose release of the basing mode decision before the November elections to avoid unnecessary political entanglements. Opponents of the MX in Congress will presumably exploit the fact that the Administration is asking for the appropriation of funds for a weapon system whose most critical aspect—how it is to be based to assure resilience against a first strike—has not yet been announced. While the positive conclusions reached by a host of experts concerning the effectiveness of CSB justify a degree of guarded optimism, it will take a concerted, vigorous campaign by the White House on Capitol Hill to obtain full funding of the MX program.

★ US intelligence sources report that the Soviets have deployed between forty and 100 mobile SS-16 ICBMs at their Plesetsk launch complex. These deployments violate the SALT accords. ■

CAPITOL HILL

By Kathleen G. McAuliffe, AFA DIRECTOR OF LEGISLATIVE RESEARCH

Washington, D. C., Aug. 27

Controversial Authorization

The House and Senate compromised to authorize $178 billion for DoD procurement, R&D, and operations and maintenance amid controversy that the bill was busting budget resolution levels. The compromise version is higher than either original House or Senate bill and reduces the President's request by $5.6 billion. The budget resolution requires a reduction of $9.8 billion. This leaves $4.2 billion yet to be cut.

In addition, there is a danger that the Appropriations Committees now have a better reason to make even greater defense program cuts. But Armed Services Committee sources say the necessary savings will be achieved through cuts in other defense legislation.

More Defense Cuts

The Chairman of the House Appropriations Defense subcommittee, Rep. Joseph Addabbo (D-N. Y.), wants FY '83 defense cuts to carry over to budgets in FY '84–85. His reasons: the nation's economy and projected high deficits. Mr. Addabbo also wants to make the Administration abide by the defense levels projected for the outyears in the budget resolution, despite the President's statement that he may not feel bound by those figures.

Representative Addabbo wants his panel to slice $10 billion from DoD programs, but thinks that the past practice of "shaving" funds from many systems only results in future cost growth and schedule delay. Hence, the Chairman told the Pentagon that there are only two viable options for achieving real savings in FY '83 and beyond—outright cancellation of some major programs and/or not funding force structure enhancements.

Congressional sources aver that the Congressman plans to try to get his subcommittee to zero some major USAF programs. Most notable is MX, which the panel killed last year only to see it revived by the full Appropriations Committee. Chairman Addabbo is hoping for a different conclusion this year. In light of the uncomfortably close 212 to 209 MX procurement vote in the House in July and the lack of a permanent basing mode, Mr. Addabbo's chances are much better now.

Airlift Still in Question

The House and Senate approved Administration plans to buy fifty C-5Bs and authorized procurement of the first aircraft in FY '83. But funds were also authorized for a one-year buy of commercial wide-bodies, which a top USAF official says will be converted to military cargo configurations and which the Air Force will then attempt to lease back to the airlines.

However, the C-5B now appears to be in competition with the C-17. Sen. Ted Stevens (R-Alaska), Chairman of the Senate's panel on defense appropriations, would like to move ahead with vigorous R&D on the C-17 and drop the C-5B. This would mean reprogramming funds and busting the $1 million authorization level for C-17-type aircraft development.

The defense subcommittee voted ten to six against the C-5B during Senate debate on the Authorization and, therefore, may be amenable to the C-17, especially if they perceive a convergence of the two aircraft's Initial Operating Capability (IOC) dates. Subcommittee sources believe the White House will have to lobby hard to save the C-5B.

Soviet Force Expansion

In an effort to prevent further program reductions, Secretary of Defense Caspar Weinberger told Congress that the Administration has confirmed significant additions to the Soviet force. Evidence shows sixty-five new mobile SS-20 intermediate-range ballistic missiles; sixty more Backfire bombers deployed; flight testing of a larger B-1-type aircraft, the Blackjack, expected to be operational in mid-decade; advances in antiship weapons; and new improvements on the SS-N-20 Typhoon missile. Secretary Weinberger asserted that it would be incongruous to cut defense spending below the budget resolution when the Soviet threat is increasing "dramatically."

Advanced Tactical Fighter

Funds are authorized for the Air Force's Advanced Tactical Fighter (ATF) R&D program, but some Appropriations Committee staffers expect only the engine to survive the appropriations process.

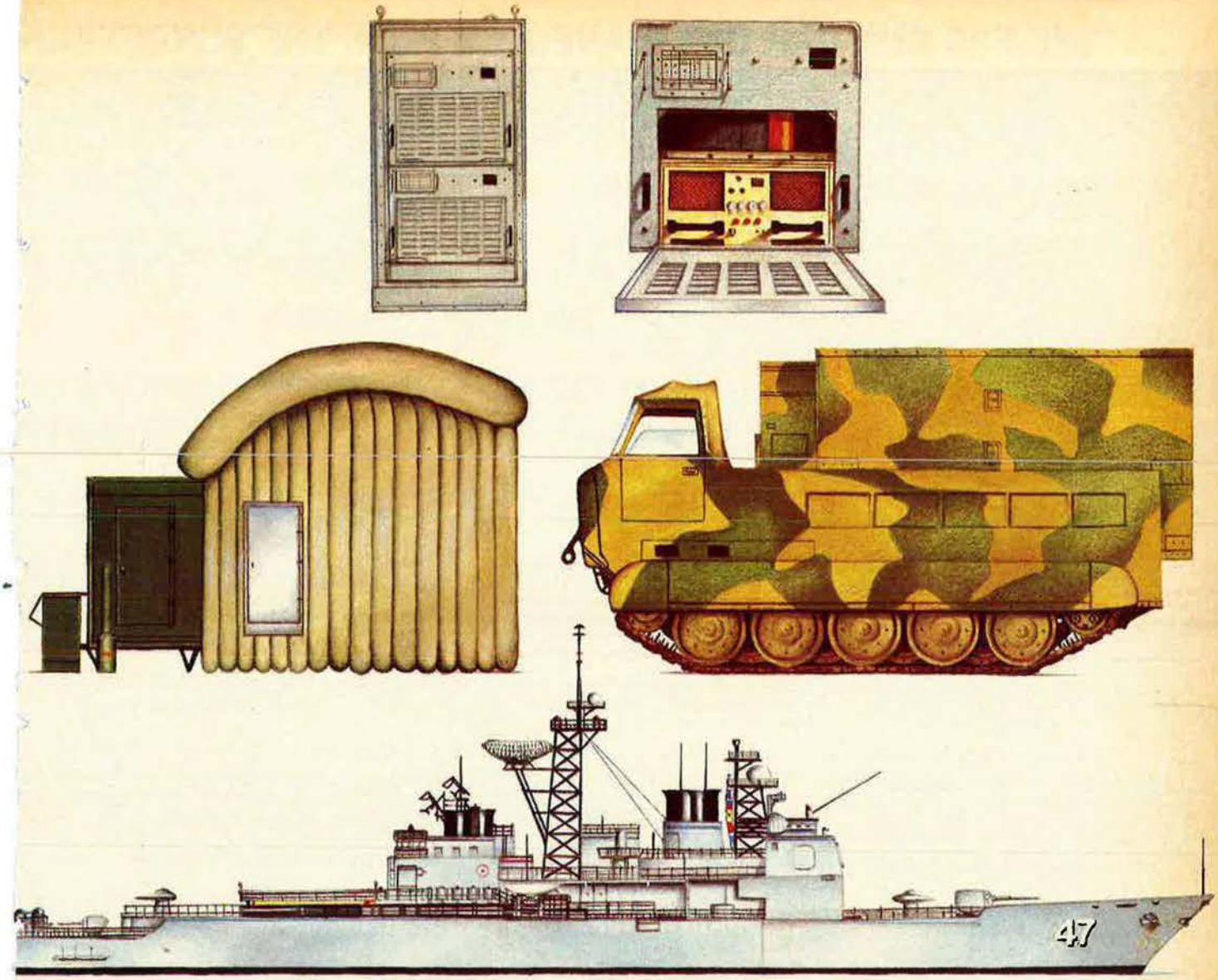
The Senate Appropriations Defense subcommittee probably will go along with the Authorization and appropriate funds for R&D on the engine and airframe. However, its House counterpart is planning to vote down the program. This leaves a good compromising position for funding engine R&D, which is more important for fielding a new-generation fighter in the nineties.

Interim Funding

There is little doubt on Capitol Hill that the Pentagon will be forced to operate under a stopgap funding measure—one or more Continuing Resolutions—since the regular FY '83 Defense Appropriations bill will probably not be adopted before the start of the new fiscal year on October 1. Both the House and Senate Appropriations Defense panels want to complete work on their FY '83 bills so that they may be used as bases for the interim measure. The Continuing Resolution could adversely affect some programs that have big procurement outlays planned for FY '83, like B-1B.

Stockpile Shortages

Sen. Carl Levin (D-Mich.) wants the Administration to follow a more prudent policy on the National Defense Stockpile. He accused the President of "putting short-term budgetary considerations ahead of our long-term national security interests" by holding funds, generated from sale of surplus strategic materials, in the Treasury instead of using them to stockpile other critical materials. Results of a General Accounting Office study, requested by the Senator, show a stockpile shortage of sixty percent of its $17.5 billion requirement for critical materials. ■



FORCE MULTIPLIER

The faster you process information, the better your edge: you multiply your capability, without boosting the cost. That's why every service has Control Data's RD-448(V) militarized data storage disk system in service.

The RD-448(V) stores 640 megabits of critical data. Combined with expansion drive units, each with disk drive and power supply, the total data storage is boosted to 2.56 billion bits.

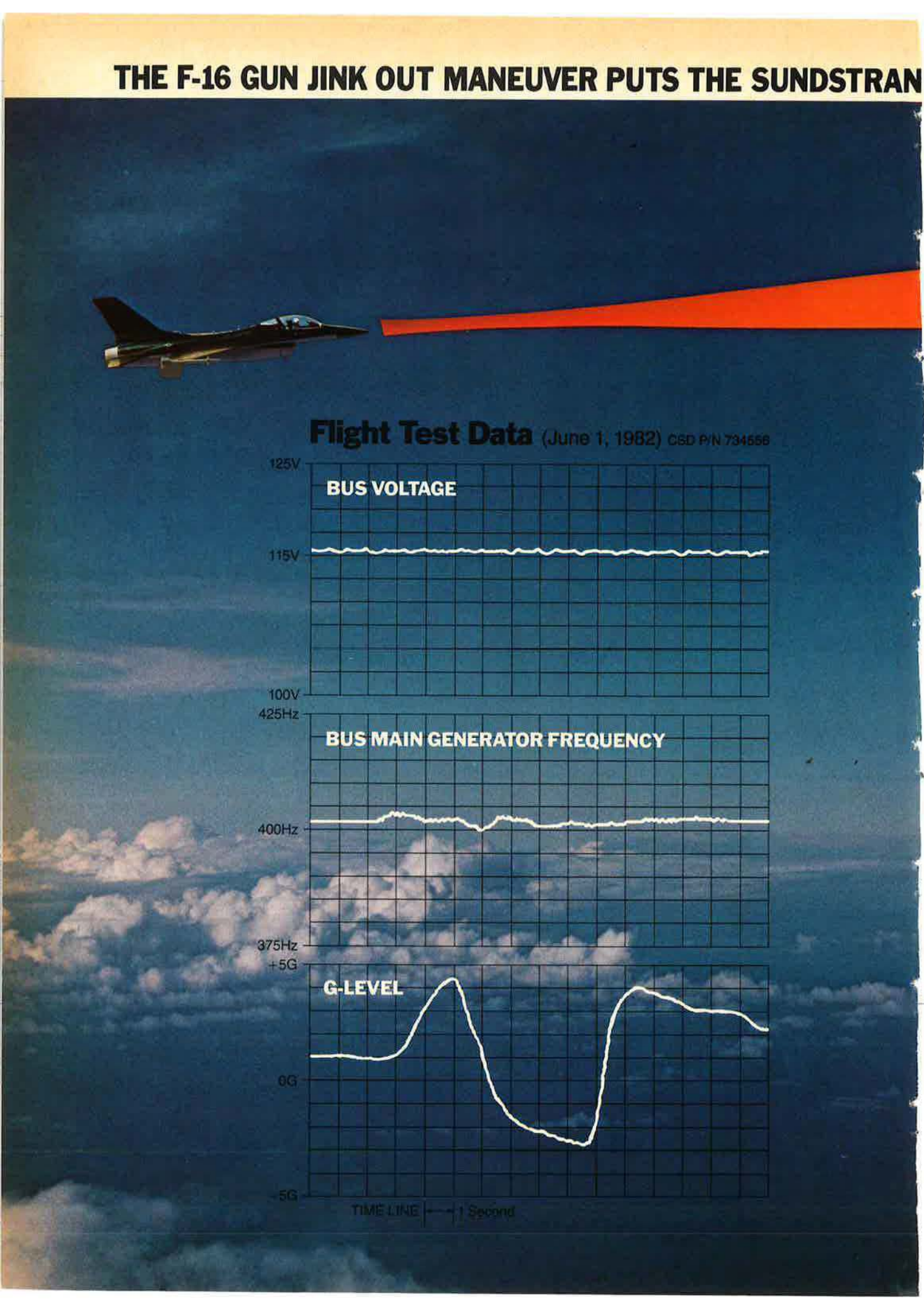
The system is MILSPEC-qualified. It takes the shocks the operating environment can dish out, whether it's analyzing naval ASW and AAW target data, tracking incoming artillery fire from a van, or storing intelligence imagery data.

The RD-448(V) gives users more of an edge, because it multiplies capabilities.

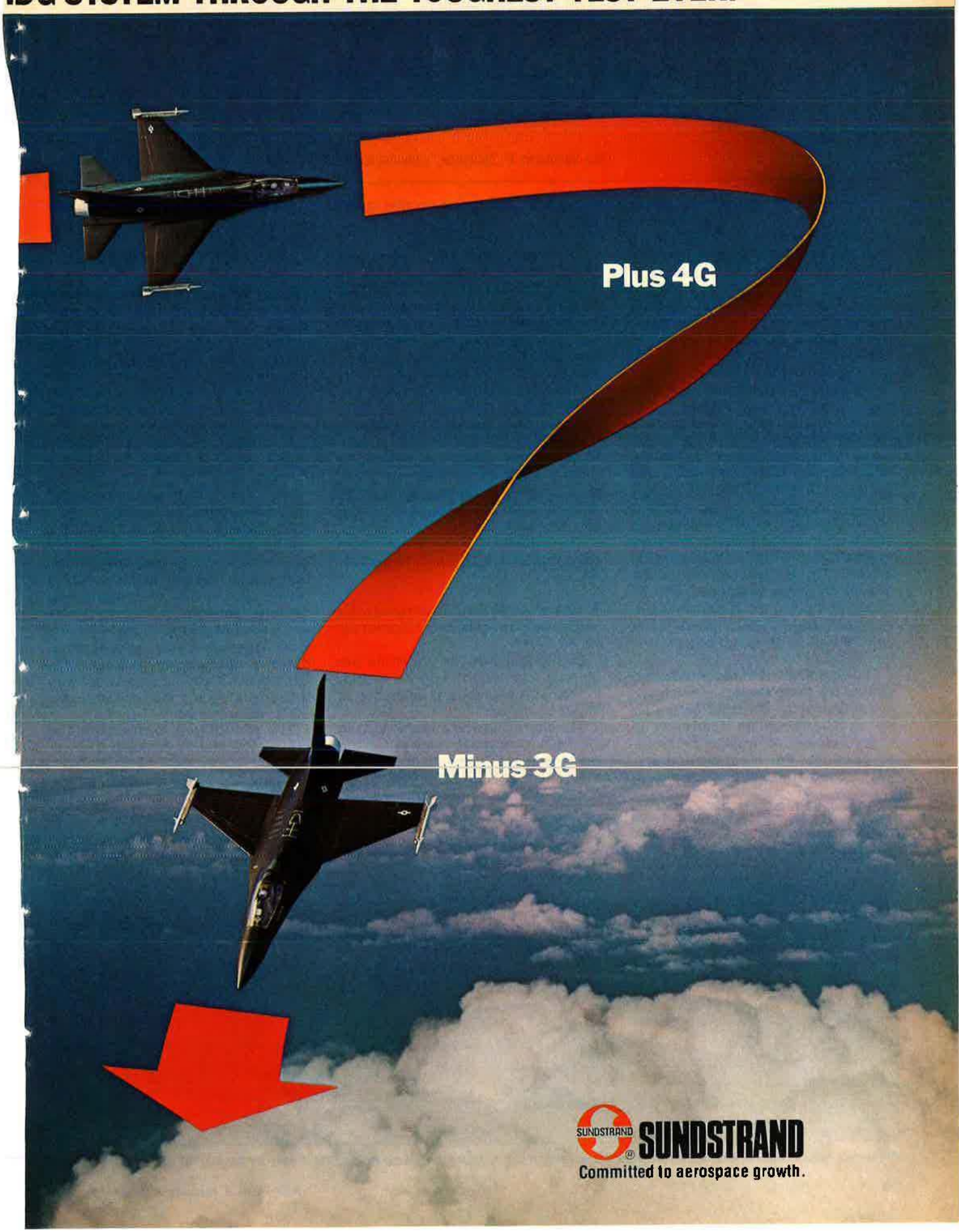
Find out how Control Data can help satisfy your project requirements. We'll send you more information, along with a print of these "force multipliers". Call us at 612/853-5000. Or write Government Systems Resource Center, Control Data Corporation, P.O. Box 609, Minneapolis, MN 55440.

CONTROL DATA

THE F-16 GUN JINK OUT MANEUVER PUTS THE SUNDSTRAN



IDG SYSTEM THROUGH THE TOUGHEST TEST EVER.



SUNDSTRAND®

Committed to aerospace growth.

AEROSPACE WORLD
News, Views & Comments

By William P. Schlitz, SENIOR EDITOR

Washington, D. C., Sept. 6

★ The Northrop Corp. rolled out its first preproduction F-5G Tigershark tactical air defense fighter at the company's Hawthorne, Calif., facility in August.

The Tigershark is a Mach 2-class fighter equipped with the latest avionics systems that give it round-the-clock tactical fighter capabilities, according to Northrop. The Tigershark is the first tactical defense fighter to be built entirely with private sector funds, a multimillion dollar gamble with no firm buyers lined up as yet.

But said Gen. Robert T. Marsh, AFSC Commander, "Our friends face growing threats from the Soviet Union and others. The government has recognized, in the President's decision on the export fighter program in which the F-5G is a competitor, that modern fighter aircraft would be needed by these countries." The Tigershark is designed to counter Soviet MiG-21 and MiG-23 fighters being deployed in large quantities around the world.

The Tigershark is the successor aircraft to Northrop's series of F-5 fighters in service or on order by the air forces of thirty nations. It can carry up to six Sidewinder missiles on air-to-air missions. For air-to-ground sorties, more than 6,500 pounds of ordnance can be carried on five stores stations. Two internally mounted 20-mm guns are standard equipment.

The Tigershark's GE F404 engine gives it seventy percent more thrust—17,000 pounds—than the current F-5E International Fighter, according to officials. It will be able to accelerate from Mach 0.9 to Mach 1.2 in twenty-nine seconds at 30,000 feet. Sea level rate of climb is 54,100 feet per minute and takeoff distance is just 1,500 feet.

Within three minutes after the pilot straps in, Northrop said, the F-5G can be flying at 17,000 feet with all systems combat ready. Its multimode radar will allow a pilot to detect and track targets at ranges up to thirty nautical miles "look up" and twenty-two nm "look down."

The Tigershark made its first flight from Edwards AFB, Calif., on August 30.

★ Spain has decided to purchase the McDonnell Douglas F/A-18 fighter for its Air Force.

Eighty-four F/A-18s are to be acquired under a contract that, including support elements, is estimated at about $3 billion.

The aircraft is to be powered by twin GE F404 low-bypass, augmented turbofan engines in the 16,000-pound-thrust class that power the US Navy's newest production fighter, the Hornet, as well as Australia's F/A-18 and Canada's CF-18.

McDonnell Douglas Corp. is the prime contractor, with GE, Northrop Corp., and Hughes Aircraft Co. major subcontractors in the F/A-18 program.

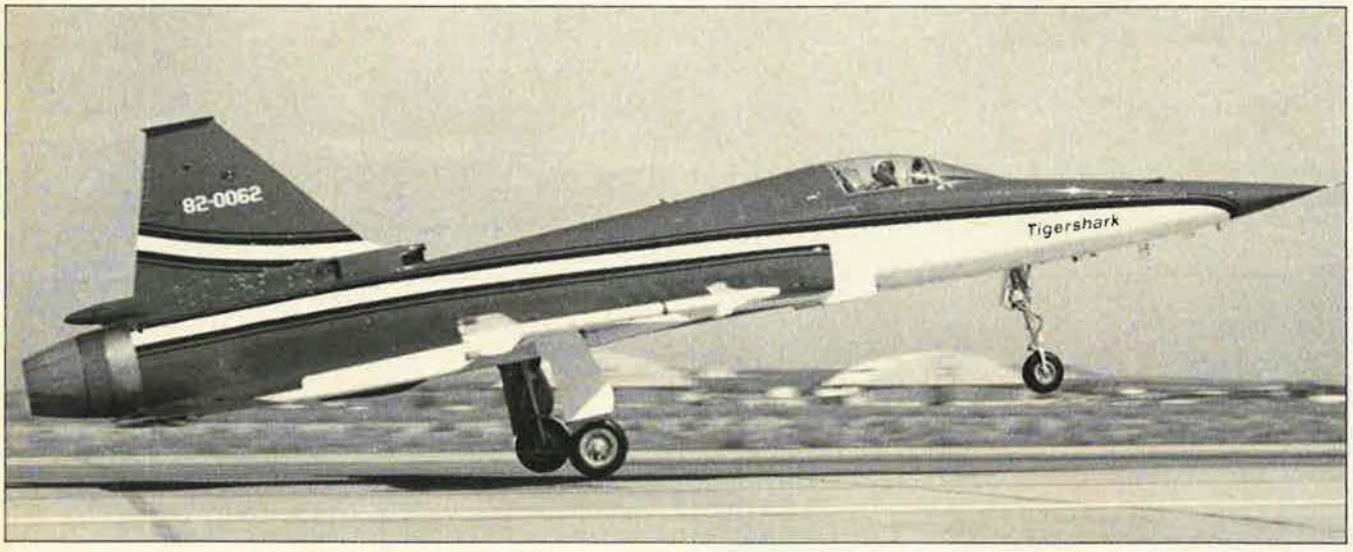
The first Spanish F/A-18 is to be delivered in January 1986 with production running into the 1990s. The Canadian government has ordered 138 Hornets. The first of these made its maiden flight in early August.

Australia, in its largest defense purchase ever, is to procure seventy-five F/A-18s, while the US Navy and Marine Corps plan to purchase 1,377 Hornets through the 1990s.

According to B. A. Riemer, GE's F404 project general manager, the engine is designed to meet the military fighter/attack aircraft requirements of many nations into the twenty-first century. "Versions of the engine also will power Northrop's single-engine F-5G Tigershark [*see above*], Sweden's single-engine JAS aircraft, Grumman's X-29A forward sweptwing demonstrator, and the Grumman A-6 STOL demonstrator."

The production forecast for the F/A-18 now stands at 1,674.

★ Some 100 Air Force Communica-



America's newest fighter, the Northrop Tigershark, lifts off on its first flight at Edwards AFB, Calif., on August 30. (See item.)

tions Command air traffic control facilities around the world will receive new, improved equipment, AFCC officials said.

Under a $17 million program, the new system—known as the Standard Communications Control System—is being completed during the next five to six years. The standardization will be a vast improvement over the current system, which uses fourteen or so different kinds of equipment, according to MSgt. John F. Tigue, program manager.

Members of the 1827th Electronics Installation Squadron at Kelly AFB, Tex., are assembling the new units, with major air traffic control facilities first on the list for installation over the next three years. Smaller facilities will then follow in a total program lasting some five years.

Sergeant Tigue pointed out that the present system is a maintenance and paperwork nightmare because of its many keying, landline, radio, and supply systems; maintenance procedures; contracts with telephone companies; and monthly charges.

Our new system will be good once it's installed," Sergeant Tigue said, "because our maintenance people won't have to learn everything from scratch when they're assigned to another base. AFCC will own the equipment, and our maintenance procedures and supply line will be the same from base to base."

In another equipment matter, AFSC's Electronic Systems Division, Hanscom AFB, Mass., plans to save $40 million and two years of development time by adapting Marine Corps tactical air control equipment (TAOC-85) for Air Force use.

The equipment, known as the Modular Control Element or MCE, includes a shelter containing radios, data processors, connecting cables, communication switches, and information display consoles that can be transported by land, sea, or air to a battle area. The MCE equipment is used to display enemy aircraft detected by radar and to direct friendly fighters during the air battle.

The new system will eliminate the heavy inflatable shelters currently in use and combine all of the "boxed" equipment into a single 10,000-pound unit called an operations module, similar to a trailer truck van. The climate-controlled unit contains four consoles and all other needed equipment except radar and power generator.

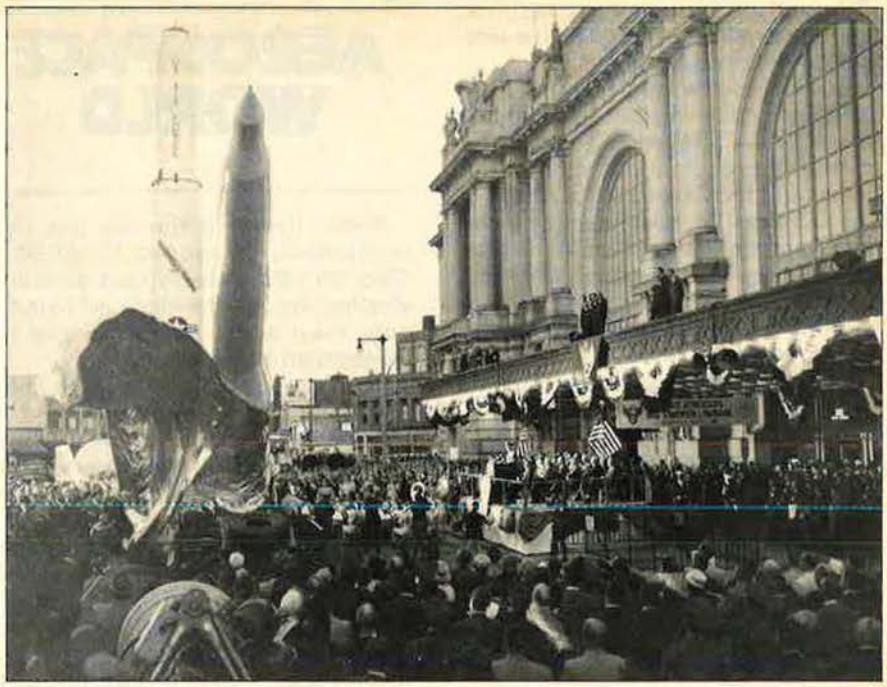
For larger control centers, operations modules and radars can be added.

"Size and weight reductions are made possible by using microelectronic components and replacing heavy copper connecting cables with thin, lightweight, fiber optic cables," said Edward M. Kalapinski, ESD project manager. "The new cables allow a radar to be located up to 1.2 miles from the operations module instead of the previous 400-foot limit. This is an advantage in hilly terrain where the radar should be positioned as high as possible so its scanning area is not blocked."

An Air Force AN/TPS-43 radar is being modified to work with the new operations module. The radar's manual aircraft tracking equipment will be replaced with an automatic tracker, which separates target aircraft from clutter—the radar return signals caused by clouds, rain, or ground reflections. Fiber optic cable connector panels will also be installed.

An automatic fault location system in the operations module continuously monitors electronic component performance. If a malfunction occurs, the location of the faulty part is immediately displayed at an operator console. Most field repairs, so-called "click-click" procedures, should take less than fifteen minutes.

The Air Force operations module will have a larger data base than the Marine Corps version, simultaneously allowing it to display and control more aircraft.



At the Air Force Association National Convention in San Francisco in 1960, USAF Chief of Staff Gen. Thomas D. White unveiled the newest SAC ICBM weapon system—the Minuteman missile. The other missile, behind Minuteman, is a full-size Titan. The highly reliable and lighter-weight Minuteman went on alert in 1962 and celebrates its twentieth anniversary of operational service this month. USAF currently operates 550 Minuteman III and 450 Minuteman II missiles. The Minuteman I was phased out in September 1974.

Litton Data Systems of Van Nuys, Calif., has received $10 million of a $27.6 million, three-year contract to design and build one full-scale development operations module for Air Force testing in late 1984.

★ A new digital color weather radar system has been installed on a C-5A transport by Lockheed-Georgia Co., and been successfully flight-tested.

The newly equipped aircraft is bound for Travis AFB, Calif., for further evaluation.

Considered a state-of-the-art replacement for conventional C-5 radar, the new commercially available unit provides weather pattern data in easily discernable color, plus limited navigation capabilities. Built-in beacon mode for rendezvous with other aircraft and ground-mapping capability are also features of the system.

The advanced unit consists of a thirty-inch dish antenna, electronic components, and two flight-station displays. The aircraft's current nose radome is to be replaced with a smaller one.

The Air Force's fleet of C-141s, also built by Lockheed-Georgia, is also to be converted to the Bendix-developed color radar system, which will result in commonality of parts and expertise and thus reduce maintenance time and costs, officials said.

Other advantages are that the new

radar is more than 300 pounds lighter than its predecessor and much simpler to maintain.

Lockheed-Georgia is producing thirty-one color weather radar kits for installation aboard C-5s, and the company expects a contract for the remaining forty-six (the remainder of the C-5 fleet) by November. Only the prototype kit was installed at the Marietta facility, with the remaining production kits to be delivered and installed simultaneously at Travis, Dover, and Kelly AFBs.

The program should be completed by 1985.

★ The first Air Force KC-135 tanker equipped with the new, fuel-saving CFM56 turbofan engine made its maiden flight early in August at Boeing Military Airplane Co.'s facility in Wichita, Kan.

The aircraft is scheduled for a nine-month flight-test program at Edwards AFB, Calif.

The KC-135R is to provide one-and-a-half times the fuel offload capacity of present KC-135As as well as fully meeting federal noise and emission standards, officials said.

Current plans call for integrating re-engining of the French Air Force's C-135F aircraft into USAF's program, with the first of these aircraft delivered in mid-1985. SAC is to take possession of the first KC-135R production aircraft in mid-1984.

★ The Air Force has begun operating a new tactical long-range navigation (LORAN) and target-locater system in Germany that almost doubles the area covered by the twenty-year-old equipment it replaced.

AEROSPACE WORLD

Pilots flying in Europe use the equipment, developed by AFSC's Electronic Systems Division, as an all-weather, around-the-clock aid to indicate their exact locations and to guide them to targets.

The European LORAN system consists of three transmitters and a monitoring station. Signals emitted are picked up by an aircraft's receiver and navigation computer to guide it to a preselected set of targets or navigational waypoints with a high degree of accuracy, generally better than 500 feet (152 m).

Program manager Coast Guard Cmdr. David H. Amos said the powerful new equipment increases the navigational coverage of Europe by 150 miles (241 km) in all directions over the old equipment.

Detachment 4, 1964th Communications Group at Rhein Ordnance Barracks operates and maintains the system.

The system's monitoring and control station, in three van-type shelters, is located at Schweinfurt. The transmitters are at Baumholder, Eching, and Hohes.

Commander Amos is serving as program manager under a mutual service agreement under which the Coast Guard contributes its expertise on radio navigation programs. Sperry Gyroscope of Great Neck, N. Y., built the system, as well as a similar one in Korea, under a $30 million production contract.

★ The top international aviation award for the longest nonstop piston-engine airplane flight ever made without landing or refueling has been presented to Dallas pilot Jerry D. Mullins.

Last December's record flight lasted seventy-three hours, twenty-one minutes, and thirty-six seconds on a 10,007.1-statute-mile closed-circuit course requiring five 2,014-mile roundtrips at an average speed of 134.2 miles per hour between Oklahoma City and Jacksonville, Fla.

The record, officially recognized by the Fédération Aéronautique Internationale, is actually an all-class record for any size and weight of piston-powered aircraft.

Next for Mr. Mullins, a pilot with Eastern Air Lines, is a year-long program to ready himself and his "Phoenix" (a highly modified Schweizer SGS 2-32 high-performance powered sailplane) for an attempt at the first nonstop, nonrefueled global circumnavigation.

To aid in the minimum 22,000-mile northern hemisphere flight, the "Phoenix" is being modified and high-technology and navigation and communications systems are being installed.

★ The American Fighter Aces Association has selected the Champlin Fighter Museum, Mesa, Ariz., as its official home.

The AFAA was formed in September 1960 and has grown from the original sixty-three members to more than 400. The group includes aces from World War I through the conflict in Southeast Asia.

The Champlin Fighter Museum was opened in January 1981 and currently has on display twenty-five fighter aircraft from World Wars I and II. Also on exhibit are fifty paintings of aircraft in combat and more than 500 autographed photographs of fighter aces dating from World War I. The fighter museum is located at Falcon Field in Mesa.

★ Within the span of a few days, Gennaro Scarfoglierro stopped a crime, won $1,000, flew from New York to San Antonio, Tex., and began basic training at Lackland AFB.

The youngster received the financial award from the New York *Daily News* and was named the city's "Crimefighter of the Month" for preventing a mugging and providing information to police that resulted in arrests of the suspects.

One morning while jogging, two days before leaving for basic training,

The first Air Force KC-135 tanker to be equipped with the new, fuel-saving CFM56 turbofan engine shown on its maiden flight. The reengined aircraft will provide one-and-a-half times the fuel offload capacity of the present KC-135As. (See item.)

aerospatiale

military pilot training

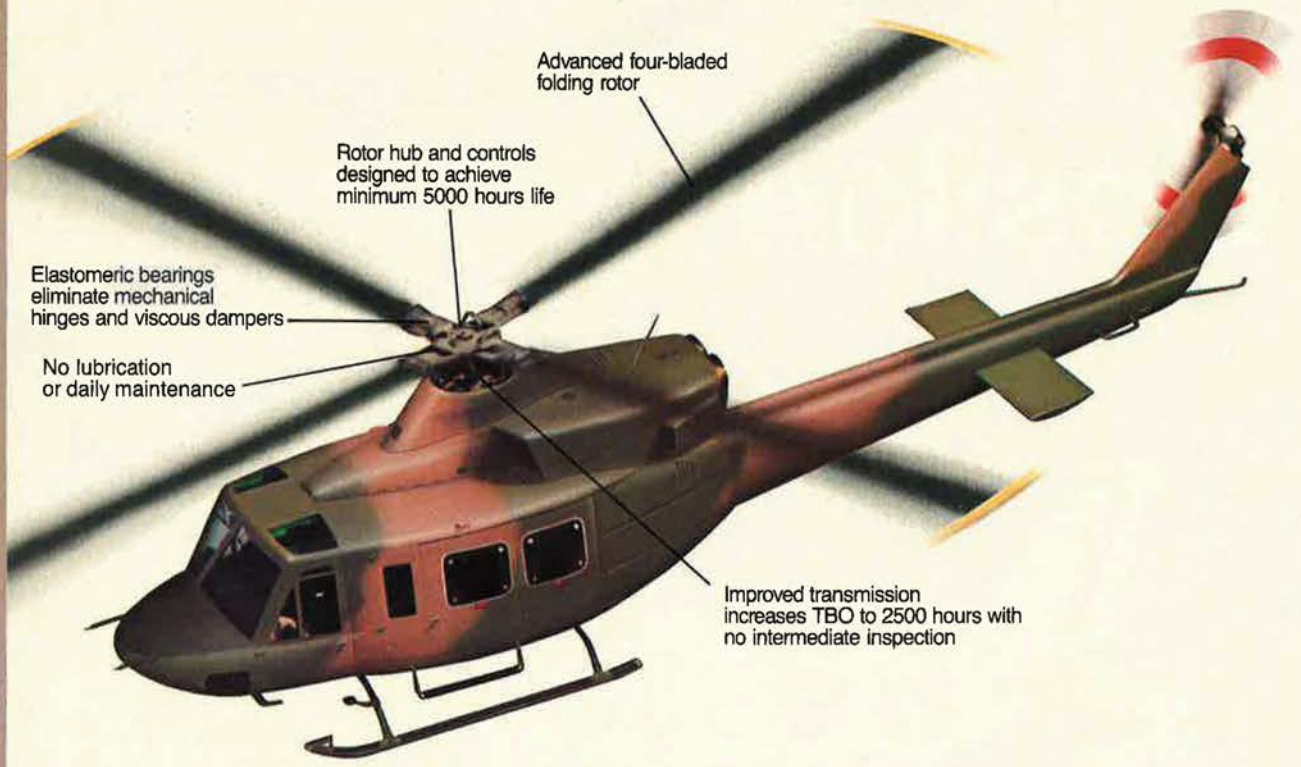
Epsilon

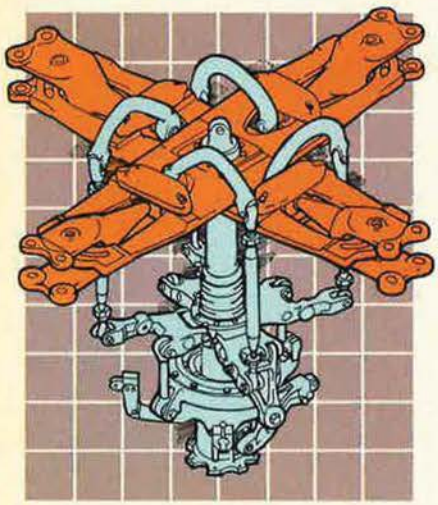
basic military trainer ordered by the French Air Force

A/1108/Epsilon

aerospatiale
Division avions : 37, bd de Montmorency – 75781 Paris Cedex 16 – France
U.S. Office : **aerospatiale**, inc., 1101 fifteenth St.N.W., Washington D.C. 20005. Tel (202) 223.44.40

Promote an over-achiever.





In any service, over-achievers are recognized because they are the toughest. They're there when you need them — volunteers for the jobs that require endurance, performance and versatility. And Bell's UH-1N has been just that for those it has served.

Now, four-bladed, proven technology is available and ready for upgrading the UH-1N. A simple conversion makes this over-achiever even more capable: Faster. Smooth and agile. Highly efficient.

Design simplicity reduces maintenance, weight and drag. An initial transmission TBO of 2,500 hours without any intermediate inspection increases it's availability and reduces maintenance costs. Elastomeric bearings eliminate mechanical hinges, viscous dampers, and provide built-in safety. A gross weight of 11,500 lbs. means greater payload. And advanced technology composite rotorblades improve fatigue life, free blades from corrosion and provide interchangeability that will make the UH-1N even more versatile.

When you consider the cost of new aircraft today, it's wiser to promote from within. Especially when the bottom line is reduced cost of operation and an increase in performance and payload.

For more information on how to get the best from hard workers, write Ray Swindell, Director, U.S. Government Marketing, Bell Helicopter Textron Inc., Dept. 683, Box 482, Ft. Worth, Texas 76101.

Bell Helicopter TEXTRON
A Subsidiary of Textron Inc.

he paused to break up the assault on an older man and then helped police apprehend the three suspects.

"I knew the license plate number, the car's description, and could identify the three individuals," the future airman said. "They weren't too smart. All three were caught hiding behind the same bush about fifteen yards from where they had parked the car."

Police discovered the assailants were wanted on a number of other charges. The morning before the flight to Texas, the young New Yorker appeared before a grand jury hearing to testify in the case.

★ The Air Force Security Police Academy, Lackland AFB, Tex., will train some 1,000 Marine Corps members each year.

The six-week course for Leatherneck security policemen was previously taught by the Army at Fort McClellan, Ala., ATC officials said.

The Marines are moving to Lackland because the Security Police Academy program more fully meets the needs of USMC, officials explained.

Trainees will arrive at Lackland following boot camp at Marine recruit depots at Parris Island, S. C., and San Diego, Calif., officials said.

AEROSPACE WORLD

★ Kiffin Rockwell, Norman Prince, William Thaw, Victor Chapman. Names probably not now familiar to Americans but still remembered by the French.

They were among the young American fighter pilots who flew with the Lafayette Escadrille during World War I and died in the skies over France.

The French Air Force's "Fighter Squadron Lafayette" has announced that it is planning ceremonies at its base at Luxeuil in October to honor them and to commemorate the unit's history and traditions. It was there that the Escadrille was formed in 1916 and became internationally famous for its role in the war.

In keeping with the international heritage of the unit, a variety of vintage airplanes will be on hand. Among them: a Nieuport 17 from the French Air Museum; a Curtiss P-40; a P-47 Thunderbolt; a Spitfire Mk IX; and an F-84F. Also to be featured will be a demonstration flight by the French Air Force's aerobatic team, the *Patrouille de France.*

During the event the squadron plans to unveil a tablet dedicated to Col. Charles "Carl" Dolan, USAF (Ret.), the last survivor of the Escadrille, who died earlier this year *(see March '82 issue, p. 32).* There will also be presented an issue of commemorative envelopes and a printed history of the unit dating from its initial flying orders.

All former members of the squadron have been invited as well as personnel from the US Embassy in Paris.

The squadron has requested that contributions to help underwrite the project be sent directly to the unit at Air Base 116, 70301 Luxeuil, France, or to the Lafayette Foundation, Fund-

New Technology May Change Air Combat Tactics

Aerial combat maneuvers used by pilots since World War I may be revolutionized, according to officials at the Aeronautical Systems Division (ASD) at Wright-Patterson AFB, Ohio.

For years aerial combat tactics called for pilots to fire weapons from a tail position behind the target and dive near the ground to release air-to-surface weapons. A current test program, which is demonstrating both accuracy and survivability, may change all that. Named the Integrated Flight Fire Control-I/ Firefly III, a McDonnell Douglas F-15 Eagle aircraft has been modified with new flight and fire control systems that have been designed to work together *(also see p. 89).*

Two of USAF's ASD laboratories at Wright-Patterson have been conducting the tests: the Flight Dynamics Laboratory and the Avionics Laboratory.

According to Virgil Marti, chief program engineer for advanced fighter technology at McDonnell Douglas, St. Louis, Mo., the tests have been in progress for some time. "We have been testing the aircraft with the Air Force for fifteen months at the Air Force Flight Test Center at Edwards AFB, Calif., and the Air Force Tactical Fighter Weapons Center at Nellis AFB, Nev." More than sixty test flights have been conducted, he said.

In the tests, pilots fired live 20-mm ammunition at scorable targets and simulated 20- and 30-mm electronic bullets at real targets. Range towers and the onboard computer scorer recorded bomb drop results.

The F-15 test aircraft looks like a production F-15 except for an Automatic Tracking Laser Illumination System (ATLIS II) pod mounted on the left forward Sparrow missile station. Internal modifications included adding a digital computer that stores flight and fire-control algorithms; modifying control augmentation computers and the central computer; and including an instrumentation system to measure and record flight-test information.

The IFFC-equipped F-15 has demonstrated, according to ASD officials, two revolutionary advantages in aerial combat. First, the accuracy of the fire-control system lets a pilot shoot down targets from any attack angle. A pilot can pursue and attack alongside or above his target while turning and rolling. The IFFC allows the pilot to shoot at the target and then leave about three times faster than a conventional fighter.

Second, in the air-to-ground attack using the integrated fire, flight, weapons-control, and pilot-tasks system, the pilot fires while turning and never flies over the target. Since he is turning and staying farther away from ground fire, there is less chance he will be hit, say test officials. The pilot still controls course flight maneuvers through the stick and throttle. Only fine tuning, which demands a great deal of attention, is done automatically in the IFFC system's computers.

As far as compatibility with other aircraft, Mr. Marti says the system could easily be designed to work in the F-16.

—M.B.P.

An F-15 Eagle modified with a new integrated flight and fire-control system may revolutionize the tactics used during future aerial combat. More than sixty test flights have been conducted to date.

Raising Account A 39912-2, Morgan Guaranty Trust Co., New York, N. Y. 10005.

★ A memorial dedicated to those who died in the effort to rescue the Americans held captive in Iran was unveiled recently at Hurlburt Field, Fla.

The memorial is a 12.5 by 9.5-foot stained-glass window mounted in the west wall of the base's chapel. The window, a replica of a painting by Florida artist Jack Lorusso, was built by Jerry and Dorothea Milton with nearly 1,200 pieces of glass. It depicts an American eagle perched on the shield of Hurlburt's 1st Special Operations Wing.

Financed by the Hurlburt Field community and the people of Okaloosa County, the memorial specifically honors the five men of 8th Special Operations Squadron who died in the desert tragedy: Capts. Lyn McIntosh, Richard Bakke, Harold Lewis, Jr., Charles McMillan, and TSgt. Joel Mayo.

Said memorial fund committee chairman June Lawrie: "The loss of those brave men was felt by those locally as well as by those at Hurlburt Field. They were airmen and citizens, and we don't want them to be forgotten."

★ DoD announced that a worldwide drug and alcohol abuse survey will be administered to about 26,000 military personnel at some sixty locations *(see also p. 99).*

The objective of the survey, according to Dr. John H. Johns, Deputy Assistant Secretary of Defense for Drug and Alcohol Abuse, is to determine the extent of drug and alcohol use within the military services and to depict any physical, social, and work consequences, including the effects of dependence.

The survey is voluntary and individual responses will be anonymous.

A private firm will administer the survey to randomly selected enlisted and officer personnel, and it will be stratified by each military service across four regions—the US, Pacific, Europe, and other.

The survey will be similar to the one administered in 1980, which found that overall drug use had declined since an earlier survey in 1974.

★ **NEWS NOTES—Recently retired Air Force Chief of Staff Gen. Lew Allen, Jr.,** has been named **director of the Jet Propulsion Laboratory,** Pasadena, Calif. JPL, which employs some 2,700 scientists and engineers, is operated for NASA under contract by the California Institute of Technology. JPL is internationally known for its development of sophisticated hardware for the exploration of planets and outer space. It also engages in developing military satellites for Air Force use, among other things.

AEROSPACE WORLD

The Air Force has awarded a $31.6 million contract to **Douglas Aircraft Co.,** Long Beach, Calif., for a **modestly paced R&D program on the C-17 transport design.** Funds are included for those C-17 technologies that would benefit other airlift programs as well. Technologies to be investigated include a swept supercritical (unique airfoil-shaped) wing, winglets tailored to supercritical wing design, and an engine core thrust reverser. While no decision has been made to proceed beyond this to full-scale engineering development of the C-17, the contract does contain that option if it is later deemed appropriate as part of USAF's long-term airlift acquisition plan, officials said.

Svetlana Savitskaya, a champion test pilot and parachutist, in August became the **second woman to be launched into space** with the orbit of Soviet capsule Soyuz-T7. The three-person crew included **Leonid Popov,** who holds the space endurance record of 185 days in orbit. Soyuz-T7 was headed for a rendezvous with Salyut-7 research laboratory. Soviet Cosmonaut **Valentina Tereshkova** spent three days in orbit in June 1963.

This summer, four more aviation greats were inducted into San Diego's **International Aerospace Hall of Fame: Walter H. Beech,** deceased, a pioneer aircraft designer and manufacturer who built civil and military aircraft for nearly sixty years; **Dr. Edward H. Heinemann,** a designer, engineer, and executive known for his many naval aircraft; **Juan Trippe,** deceased, Pan Am founder and over-ocean flying pioneer; and **Dr. Hans-Joachim Pabst von Ohain,** jet engine designer/engineer and co-inventor of the jet engine.

Died: Brig. Gen. Robert F. C. Winger, a 1952 graduate of the US Military Academy and veteran of 260 fighter missions in Vietnam, of cancer in Virginia in August. The long-time AFA member was fifty-two. ■

INDEX TO ADVERTISERS

SCIENCE/SCOPE

Delivery of the first production Joint Tactical Information Distribution System (JTIDS) terminal has been called a milestone achievement by the commander of the U.S. Air Force's Electronic Systems Division. Lt. Gen. James W. Stansberry congratulated Hughes for its efforts in delivering the first production JTIDS Class 1 terminal 31 days ahead of schedule. He said the delivery and acceptance "demonstrably establishes jam-resistant, secure digital data links as a viable medium for tactical command, control, and communications (C^3) systems."

The United Kingdom's Royal Navy uses a satellite for its ultra high frequency communications in the Atlantic Ocean. The Royal Navy leases capacity on a Marisat communications satellite, placed in service in 1976. Two other Marisats serve ships in the Pacific and Indian Oceans. Since its inception, a primary Marisat customer has been the U.S. Navy, which uses dedicated, specialized ship-to-satellite and satellite-to-ship UHF capacity for communications for its worldwide fleets. Hughes built the Marisats for a joint venture headed by Comsat General and involving three U.S. international record carriers.

A new era in sonar for U.S. Navy antisubmarine ships has begun with the first installation of the SQS-52B aboard the USS Moosbrugger. This surface-ship sonar is far more powerful and capable than existing systems. It detects, tracks, and classifies many submarine targets simultaneously. The SQS-52B's sonar bulb is built into the bow of the ship below the waterline. It creates sound waves and detects their echoes off targets. The system also is used to listen for unusual sounds. Hughes is manufacturing systems for more than 40 ships.

The first of four new air defense radars for West Germany is now keeping a close watch over surrounding skies. The Hughes Air Defense Radar (HADR) is a long-range, three-dimensional radar that provides civilian air traffic control and military air defense. It pinpoints aircraft locations and heights, eliminating the need for a separate height-finding system, and detects targets in heavy clutter and under intense electronic countermeasures. HADR won't grow obsolete because it is computer-controlled and can be reprogrammed to meet future threats. Built-in fault detection and isolation features reduce the number and overall skill level of maintenance personnel needed to keep HADR operational.

A new mast-mounted sight for helicopters, which lets a gunner fire TOW antitank missiles while the helicopter hides behind hills or trees, is designed to accommodate various improvements. The sight was developed by Hughes for use with the airborne TOW (Tube-launched, Optically tracked, Wire-guided) missile system. Its design allows for future installation of a laser rangefinder, an automatic target tracker, and a forward-looking infrared (FLIR) night vision system. The sight has been mounted on a Hughes Helicopters 500MD Defender to improve the helicopter's ability to avoid radar and visual detection while scouting for targets and shooting at them. (Hughes Aircraft Company and Hughes Helicopters, though both founded by the late Howard Hughes, are two separate companies.)

Creating a new world with electronics

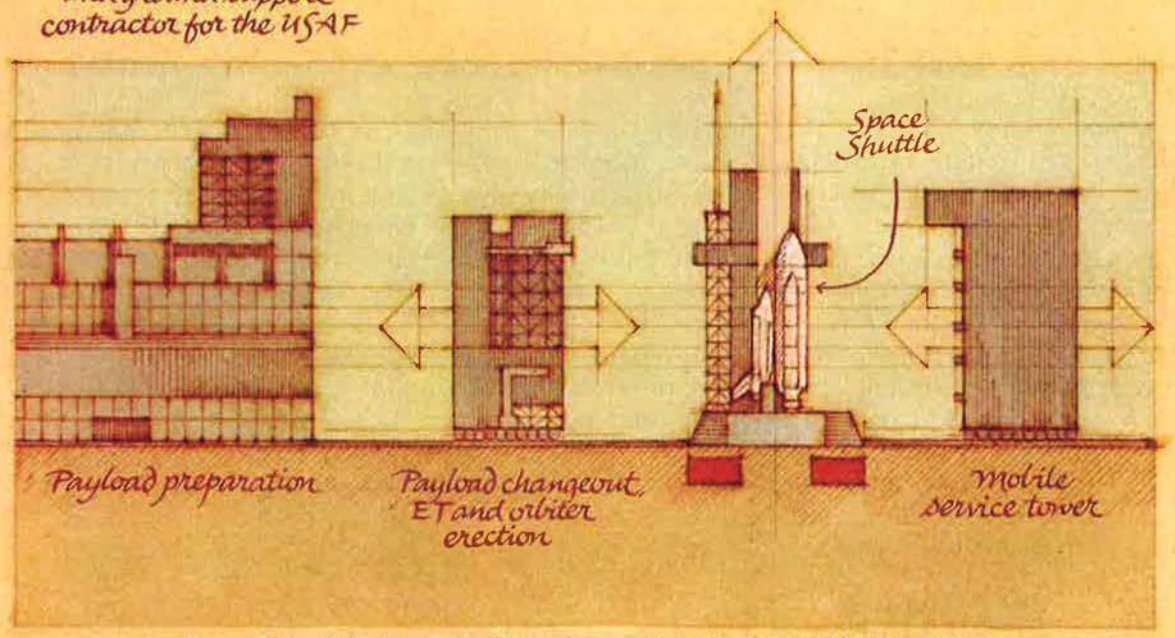
HUGHES

HUGHES AIRCRAFT COMPANY
CULVER CITY, CALIFORNIA 90230
(213) 670-1515 EXTENSION 5964

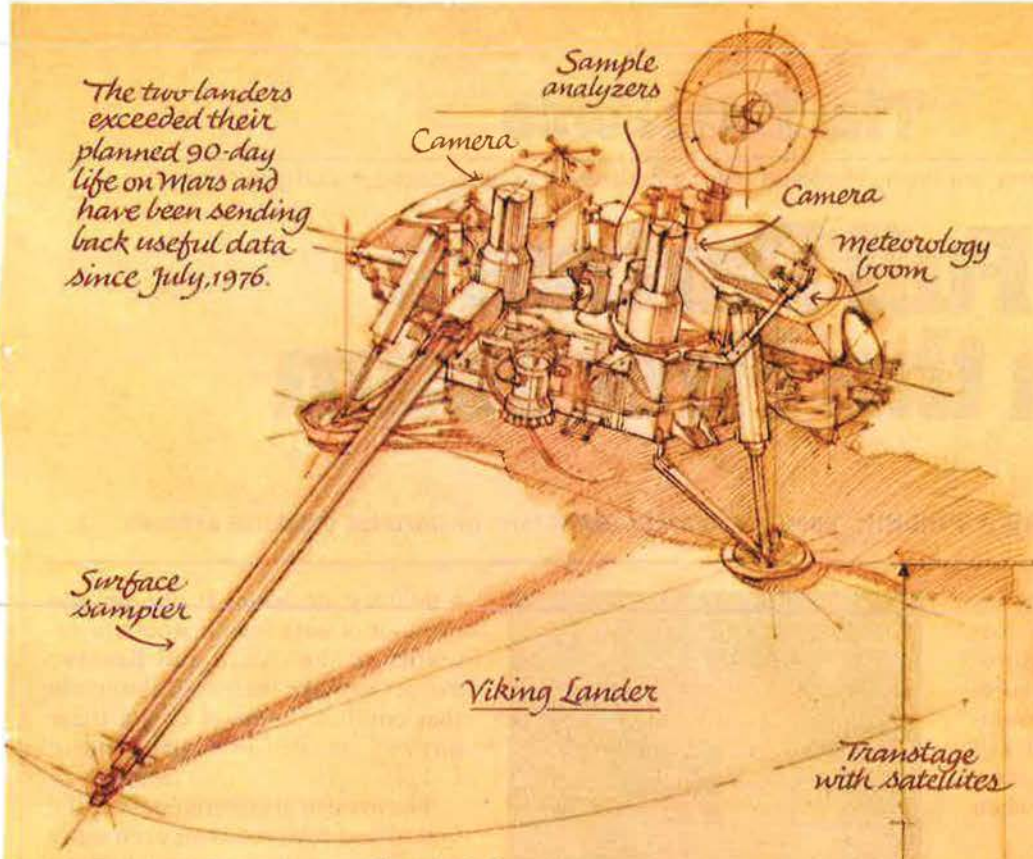
What does it take to be a successful systems integrator?

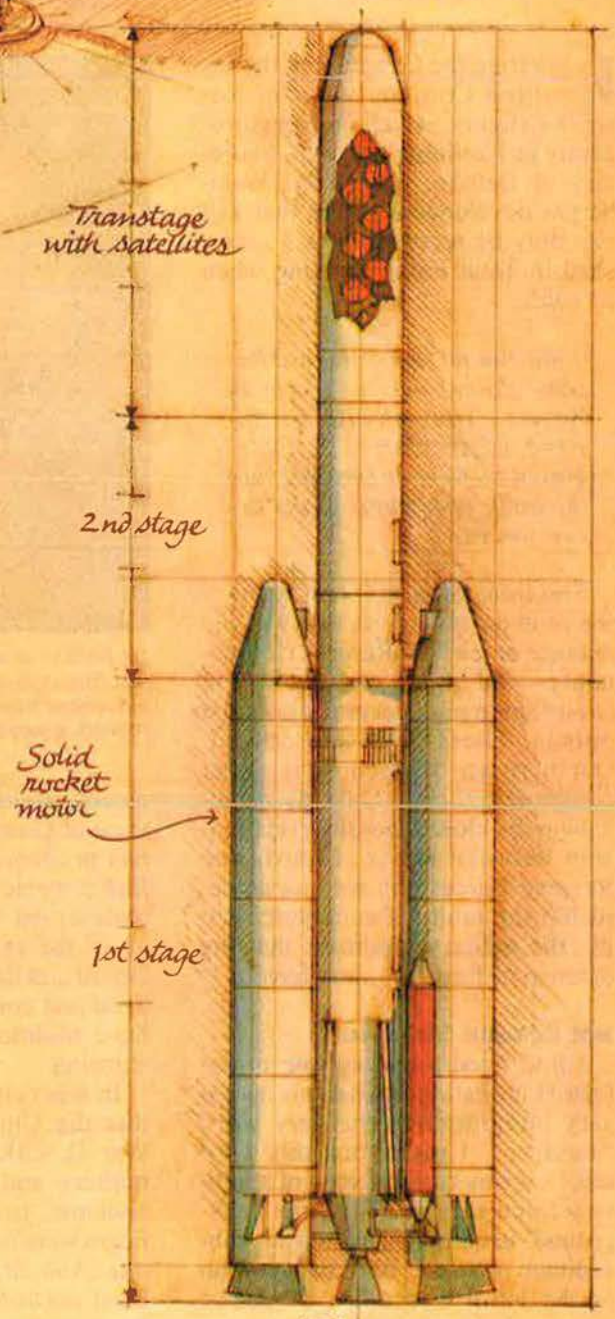
Know-how.

Martin Marietta is the Shuttle payload integrator and ground support contractor for the USAF



Space Shuttle Launch Complex at Vandenberg Air Force Base





Titan IIIC

Basic vehicle for launching spacecraft and satellites.

For over thirty years, Martin Marietta has developed and engineered systems for many of our nation's most successful launch vehicles, spacecraft and defense systems.

They range from the family of Titan launch vehicles and the historic Viking landings on Mars to the Pershing tactical missile and the revolutionary Copperhead, a laser-guided artillery projectile.

As integrating contractor we perform a tightly structured set of interlocking activities for the development and deployment of these complex systems. Our role encompasses defining all system requirements, interfacing procedures and operations, facilities, software, airborne and ground equipment. It also involves working with numerous government agencies and coordinating associate contractors. In addition, we also design, engineer and build much of the major hardware.

Today we're involved in hundreds of significant programs for DOD and NASA. And we are ready to continue in the development and management of other systems required for space exploration and defense in the years ahead.

MARTIN MARIETTA

Martin Marietta Aerospace
6801 Rockledge Drive, Bethesda, Maryland 20817 U.S.A.

The Guard and Reserve are finally shedding their undeserved image as backups and gap-fillers.

Full Partners On the First Team

BY THE HON. EDWARD J. PHILBIN, DEPUTY ASSISTANT SECRETARY OF DEFENSE (RESERVE AFFAIRS)

In greeting the Congress of the Interallied Confederation of Reserve Officers, which convened recently in Washington, D. C., Secretary of Defense Caspar W. Weinberger developed a theme that will certainly be recognized as a watershed in Total Force thinking when he said:

> *We can no longer regard Reserve Forces only as forces in reserve. They should be, instead, adjunct forces . . . integrated as fully as possible into the daily operations of the active forces.*

This integration of forces is one of the primary objectives that we who manage or lead the Reserve Components—and those of us who are Guardsmen and Reservists—must pursue. These times are critical. Our heritage of freedom is under continuous threat. Only by establishing the closest possible relationship between active, Guard, and Reserve Forces can we guarantee, within the limits of economic reality, the military readiness that the defense of freedom must have.

Dr. Philbin says Reserve Forces aren't just forces in reserve. Such thinking influences how they must be organized, trained, equipped, and employed.

Not Second Stringers

I find it curious that one of the factors militating against this necessary integration is the very word "Reserve." I regret that this word often carries connotations of a military force that is held in the background, usually in a somewhat subordinate position, until called upon in the latter and more desperate stages of a national emergency—second stringers, as it were. An examination of modern military history tends to confirm that this rather narrow, stultified, and short-sighted view of Guard and Reserve Forces has predominated and endured. I find it ironic that it has enjoyed an undeserved vitality in the face of all of the evidence that, when the Guard and Reserve have been mobilized and committed to battle, they have traditionally made a brilliant showing.

In this context, we should reflect that the United States won World War II with 300,000 active-force military and 13,500,000 converted civilians. In the Army, regular officers were outnumbered by forty to one. And, in the Korean War, significant portions of all our Guard and Reserve Components were called upon to fight—and fought well! In the Vietnam era, the minimal use of Reserve Forces was a political, not a military, decision. It was not the product of any unwillingness or inability of the Guard and Reserve Forces to make their contribution in that conflict. Some of us got there anyway, mostly in F-100s and in C-124s.

The historical effectiveness of the Guard and Reserve is an even more impressive achievement when we recall that during peacetime, our forces generally received insufficient financial support to maintain full wartime readiness. Systematic annual training was neglected; many Reserve Component personnel were regarded as mere fillers for active force units and, therefore, were not organized and trained as Guard and Reserve units. The units that did exist were equipped with obsolete hardware. Joint training and mobilization exercises were seldom conducted. Most damaging of all to wartime readiness, Guardsmen and Reservists were rarely integrated with active forces into daily military operations.

The Air Force leadership worked hard to break out of this mold and develop a far-reaching concept to transform the Air National Guard and Air Force Reserve into a usable and productive force. The result was a bold (for that time) initiative proposed in 1969 by Air Force Secretary Robert C. Seamans, Jr., who stated that the Total Force concept should be applied to all aspects of planning, programming, and equipping.

He also stated that ". . . in many instances the Air Reserve Forces can perform peacetime missions as an adjunct of training, resulting in further manpower savings." As a result of these initiatives, the Air

Reserve Forces have evolved from "peacetime only" organizations into fully integrated components of the Total Air Force. The transfer of modern, front-line equipment, combined with the development of the Reserve Associate program, has significantly increased the Reserve potential for participation in the Air Force mission.

Neglect of the citizen-soldier has been commonplace despite the recognition of the professionalism and dedication of Guard and Reserve personnel by perceptive military leaders of international stature. Gen. George C. Marshall was one of those astute leaders. In a radio broadcast to Americans made more than forty-two years ago, he emphasized to the nation the professionalism, dedication, and contributions made by Reserve Component personnel. General Marshall's observations are as applicable today as they were in 1940.

Even a cursory examination of the vital roles played today by our Guard and Reserve Forces amply supports the Secretary of Defense's judgment that Reserve Forces indeed are not merely forces in reserve. That conclusion should constitute the foundation for a concerted effort to reassess the manner in which we organize, train, equip, and employ all of our Guard and Reserve assets during peacetime as well as wartime.

At Andrews AFB, Md., District of Columbia Air Guardsmen Lt. Dave Smith and Capt. Dave Riley, just back from a mission in their F-4D Phantom II, go over their logbook, with crew chief TSgt. Michael Cavey looking on. Well-equipped and well-trained Reserve Forces are vital to an effective and affordable national defense. (Photo by William A. Ford)

Three Current Realities

Such a reassessment must be based upon strong conceptual underpinnings. An unassailable intellectual foundation has proven essential to every major breakthrough in military thinking. Creative thinking about our Guard and Reserve Forces will be no exception. However, the philosophical foundation must support three current realities:

First, we must recognize that finite constraints on military budgets demand that we continue to maximize the contributions derived from all components of military power. Therefore, we can no longer be satisfied with military structures and funding procedures that force the active, Guard, and Reserve Forces to compete for increasingly scarce resources.

Instead, we must objectively determine the optimum combination of active, Guard, and Reserve Forces that will provide maximum defense and combat capability at minimum cost. It is worthwhile to note at this point that while standing ready to fill their primary missions, the Air Guard and Reserve Forces have effectively augmented the Air Force without being mobilized through: (1) the assumption of additional peacetime missions, thereby releasing active-duty personnel for other commitments; (2) a voluntary manpower surge to avert overcommitment of active units; and (3) incremental tour scheduling to permit continuous augmentation.

Over the years the contributions of Air National Guard and Air Force Reserve personnel in these three methods of augmentation have been most impressive.

Second, the rapidity with which modern military crises unfold necessitates that we develop a peacetime force structure that integrates the Guard and Reserve Forces with the active forces they must augment in wartime. By delaying effective integration of our active, Guard, and Reserve Forces until the day they must join to face hostile fire, we court an unacceptable risk of military failure.

Third, the high-technology component of contemporary warfare requires us, in peacetime as well as wartime, to rely heavily on seasoned military technological and analytical personnel. We must not forget that such experts are found not only in the active force, but in the Guard and Reserve as well. Citizen-soldiers who are college professors, engineers, technical consultants, scientists, researchers, and budget analysts—and I could mention many other professions as well—have an expertise essential to the development and employment of our increasingly sophisticated weapon systems.

Also, as General Marshall observed, Guard and Reserve members possess a patriotic dedication that can sustain a far higher level of participation in daily military operations than our defense establishment has heretofore utilized. To be quite candid, I have talked with both Guard and Reserve members throughout the country, and I am convinced that the full potential for making greater—and more effective—use of the Guard and Reserve in peacetime has yet to be reached. In fact, to the detriment of both peacetime operations and wartime readiness, that potential has not been adequately explored.

It is essential for us to examine

The Massachusetts Air Guard was one of the first ANG organizations to receive the A-10. Assigning first-line equipment to Reserve Forces increases their potential to contribute to the Air Force mission. (Photo by William A. Ford)

that potential at once so we may achieve the integration of components that military realities require. Guardsmen and Reservists working through such organizations as the Air Force Association can help bring about that integration in cooperation with the leadership of the active establishment. Active members need to reaffirm their comprehensive understanding of the need of the active forces for Guard and Reserve support, both in peacetime and wartime. Members of the Guard and Reserve must possess an equally comprehensive understanding of their capacity for meeting those needs as well as of the limitations inherent in part-time service.

Return on Investment

Defense leaders must acknowledge that in addition to the obvious peacetime and mobilization contributions, the active force benefits in many other ways from its day-to-day relationships with the Guard and Reserve. Many Guardsmen and Reservists are willing to participate part-time, but, for various reasons, do not choose to remain on active duty. These members possess a wealth of talent that would otherwise be lost, and by retaining their Guard or Reserve affiliation, they greatly increase the return on their initial training investment.

The essential contribution of our Reserve Components can be seen in a variety of ways. One very useful point of view is in terms of improved return on human investment. In addressing the crucial question of adequacy of US defense expenditures, a highly valued tool is US/USSR investment balance analysis. In this type of analysis US and USSR military investments are compared in real terms. These investments fall into two categories: things (such as weapon systems); and people (primarily citizens with military training).

The Soviet military system hangs tenaciously onto its equipment and personnel. In this country our experience of abundance has, in the past, led us to treat both things and people as somewhat disposable. However, economic realities and demographic trends mean that now and in the future we must value and marshal our human resources to the utmost.

A capable, trained person leaving our active military service is a vitally valuable asset and, in the aggregate, represents a major investment. That person's subsequent participation in one of our Reserve Components substantially extends asset life and utility of the investment. Similarly a person who chooses to enter the Guard or Reserve directly requires investment and becomes an asset with the prospect of a long life.

In the Soviet Union, human military assets are retained largely by coercion and are often wastefully managed. For this country it is my active objective that, through a variety of initiatives within the All-Volunteer Force framework, our Reserve Components will achieve their full potential to employ efficiently the priceless asset of our military people—in effect to enhance our return on human investment. This is a key economical means to shift the true US/USSR investment balance in our favor.

In addition, many Guardsmen

and Reservists occupy responsible positions within their communities and effectively educate the civilian population about today's military forces. Through membership in the Reserve Components, the citizen-soldier has a sense of participation and responsibility in our national defense, which, by association, he or she imparts to the public.

Integration With Active Forces

Although integrated into the Total Force, the Guard and Reserve must not—and cannot—be "mirror images" of their active-duty counterparts. Peculiarities in the system require organizational differences. As a visible example, the grade structure within the Guard and Reserve is different from that found in the active force—and must be so—to ensure a properly seasoned and motivated force. We cannot attract and retain a twelve-year veteran with the offer of an apprentice grade.

The reaffirmation to which I have referred would lead, I believe, to the reawakening of a more accurate and broad-based perception of the military competence of Guardsmen and Reservists. As has been demonstrated in each of this nation's wars through history, properly trained, adequately equipped, and effectively integrated Guardsmen and Reservists can be, and certainly thousands upon thousands have been, genuine military professionals.

Therefore, they should not be regarded in peacetime as "semi-professionals," but must instead be considered as military professionals in the fullest sense of that term at all times. As such, they should be distinguishable from their active force comrades-in-arms solely by the fact that in peacetime they serve on a part-time basis.

By continuing to structure our Guard and Reserve skill maintenance and training activities to promote this integration with the active force, we can gain additional advantage beyond that of maximizing wartime readiness. We have found that realistic training, conducted in conjunction with active-force units and staffs, is one of the principal incentives for joining and remaining a member of the Guard or Reserve. Providing Reserve Component members with fair pay for the military duty they perform is, without doubt, a basic incentive. But in the absence of challenging, interesting, and meaningful training activities, a career as a citizen-soldier will lose its attraction for the most talented of our Reserve personnel. An intelligent, successful person cannot be paid enough to acquiesce in boredom. Moreover, it is precisely these highly talented and ambitious Guardsmen and Reservists whom we wish to retain in the military force.

Field and mobilization exercises are an additional form of training that merit our continued attention. During visits I have made to active, Guard, and Reserve units in the United States and overseas, I have been impressed by the realism provided by field training conditions. Peacetime training in the very environment in which wartime operations may occur is a dimension of realism essential to readiness. Mobilization exercises contribute to that realism, and provide an opportunity to refine plans and procedures for calling Guardsmen and Reservists to active duty when military emergencies occur.

The recognition that Reserve Forces are not merely forces in reserve would have a favorable impact on another important objective of our long-term defense program, namely, adequately equipping the Guard and Reserve. In too many instances our Guard and Reserve Forces lack the equipment to carry out their assigned missions with full effectiveness. I have been grappling with this exceptionally serious problem because it is a truism that military forces that cannot be sustained in battle are forces that cannot be relied on to execute their wartime missions. Moreover, such forces have only a marginal deterrent value. Obviously, since this is equally true of active, Guard, and Reserve Forces, it is essential to continue development of an integrated approach to equipping the Total Force.

Equipment Modernization

While I am aware that personnel shortfalls exist in many of our Guard and Reserve Components, I consider equipment shortages far more detrimental to readiness than personnel problems. In the most extreme of circumstances, some individual, although initially untrained, can be designated to fill a manpower vacancy. However, in the same emergency situation, an aircraft, a fuel truck, a critical item of aerospace ground equipment or a vital spare part that does not then exist cannot be pressed into service. It must be manufactured and will take a finite period of time to produce. Unfortunately, long lead times are not an affordable luxury in a world in which the borders of tyranny are pressed up against the borders of freedom.

Although the Air Guard and Reserve are much further along than the other Reserve Components regarding adequate equipment, those of us who manage Guard and Reserve Forces, and the men and women who constitute those forces, still face two other common major equipment problems. The Guard and Reserve Forces have historically operated with equipment that has been replaced as outmoded or declared excess by the active forces. This process has produced a persistent, dangerous, long-term problem within the equipment arena. I refer to that problem as block-obsolescence, which is the impending obsolescence of entire communities or models of military hardware.

The other problem is incompatibility of equipment between active, Guard, and Reserve Forces which, after mobilization, would be jointly committed to combat. Much of the equipment that has been passed on to the Guard and Reserve is neither deployable nor sustainable due to age and spare part shortages. Such shortcomings denigrate

---

Dr. Philbin's appointment to his current position culminates a thirty-one-year Reserve career. He began with five years as an enlisted Naval Reservist, was commissioned from Air Force ROTC, and served two years as an active-duty Air Force navigator and bombardier. He saw duty in Vietnam, and was the first Reserve officer on the Air War College faculty. He was promoted to colonel in the Air Force Reserve in 1980. He has written extensively on engineering, physics, law, and military affairs, and, before going to the Pentagon in 1981, was a tenured professor at the University of San Diego School of Law.

training and readiness, penalize the combat capability of the units affected, increase the cost and complexity of maintenance, and, in the worst of circumstances, can present safety hazards as well. Equipment deficiencies even have a negative effect on personnel recruitment and retention.

I believe that a reassessment of policies for equipping Guard and Reserve Forces, if based on the concept that these forces are not merely forces in reserve, would lead to a more effective equipment strategy. The strategy we must pursue would ensure that equipment procurement, modernization, and distribution priorities result not from competition between active, Guard, and Reserve Forces, but reflect the nature of the combat missions and deployment schedules assigned to active, Guard, and Reserve Forces.

A Genuine Career

The logical implications of management policies that ensure that Guard and Reserve are more than forces in reserve mandate a very significant conclusion: Opportunities must be provided for our citizen-soldiers to perform military service within a genuine career context. Such service is of necessity part-time, but it should nonetheless have all of the genuine hallmarks of career service. Included are long-term participation for which equitable pay and entitlements are provided; the opportunity to compete for promotions in both enlisted and officer ranks; eligibility for advanced training at military schools conducted by the active force; and career management strategies which provide Guardsmen and Reservists a progression of increasingly responsible assignments.

I believe that the career approach to service in the Reserve Components is advantageous for two important reasons: First, it enables the active force to program peacetime as well as wartime missions for the Guard and Reserve systematically, knowing that these part-time professionals will be available on a long-term basis. Second, Guardsmen and Reservists can maximize their contributions to the active force because, knowing that their military service will extend throughout their working years, they can harmonize military duties with the demands of a civilian career.

To a large extent, achieving and maintaining the closer integration I have referred to is the direct responsibility of the civilian and military leaders of our defense establishment. Nonetheless, I believe that the Guard and Reserve community must continue to strenuously support these endeavors. In many instances, Guardsmen and Reservists must take the initiative in informing the public, the legislature, and key Defense Department officials of the capabilities that reside in, and the contributions that are made by, the Guard and Reserve.

Lack of information about those capabilities, and about the support which the Guard and Reserve lend to the daily operations of the active force, has sometimes tended to militate against adequate funding of Guard and Reserve training and equipment acquisition. Our military associations must press on with more powerful information programs to broadcast the Guard and Reserve story to appropriate audiences. Working together, we can ensure that degree of integration of active and Reserve Component forces that we all recognize to be an absolute necessity.

The Guard and Reserve Forces are a repository of military skills our country desperately needs, and will continue to need. It would exact an incalculable price in time and resources to replace those skills. Therefore, we all must ensure that the Guard and Reserve are maintained as full partners in the Total Force. As partners, they constitute a strong deterrent capability. And, if deterrence fails, they will assuredly fulfill their assigned missions with their usual distinction and effectiveness. As was Napoleon, I am certain that "a nation that is defended by its citizens will never be defeated."

One Total Force

I am not a prophet. I cannot predict with any degree of certainty what the future holds. But I am certain that well-equipped, well-trained, and combat-ready Guard and Reserve Forces such as the Air National Guard and Air Force Reserve are the key to the creation and maintenance of an effective defense that will not bankrupt our nation.

I am also sure that there must be some outer boundary—some upper limit on size, numbers, and cost—beyond which the concept of Reserve Component forces becomes unmanageable and inefficient. While I have no idea where this boundary lies, I am convinced that we have not yet reached, nor are we even approaching, the upper limits of utility of that concept. At present, we are limited only by our lack of vision.

We must all develop a broader vision of military requirements and attempt to meet those requirements objectively with a force optimally balanced between Regular, Guard, and Reserve Components that counteracts the entirety of the perceived threat. Whatever the future holds, we must seize the present opportunity to better weld the active, Guard, and Reserve Forces into one Total Force, materially and mentally.

Guard and Reserve contributions to the active force mission and the nation's defense are both extensive and diverse. While ready to perform the primary mission of providing immediate augmentation through mobilization, they also contribute significantly each day to the peacetime mission as an adjunct to their training. They have a purpose, a role, and a mission to perform. They do not have all that they need, but they perform magnificently with what they have. They have demonstrated time and again, at the risk and sometimes the cost of their lives, that they can and will perform it brilliantly.

Air Guardsmen and Air Force Reservists point with pride to their important role and perhaps more importantly that the Air Force welcomes the additional assistance. This close working relationship and mutual reliance did not just happen. It is the result of years of planning and nurturing.

The mutual cooperation and command support now evident will be the key to ensure that the Air National Guard and Air Force Reserve remain responsive to the same dynamic requirements that challenge the active force. Given the proper resources, they can and will perform as well as any other military force in existence. ■

This is the Gulfstream III.

The world's leading corporations, as well as many governments, use it to transport their highest level executives and staff into every corner of the globe.

They chose the Gulfstream III because these missions demand the ultimate in airframe integrity, engine reliability, systems dependability and performance. And the Gulfstream III has proven it has them all.

As a result, there is an unequalled level of confidence in this airplane — that it will go anywhere you have to go, anytime you want to go, and perform a variety of missions with maximum effectiveness.

As we see it, that is the fundamental basis for selecting an executive transport, whether it is flown by a world business leader or the government that leads the world.

Gulfstream American

For information about the Gulfstream III, contact: Gulfstream American Corporation, P.O. Box 2206, Savannah, Georgia 31402, U.S.A. Telephone: (912) 964-3274 or 1000 Wilson Blvd., Suite 2701, Arlington, Virginia U.S.A. Telephone: (703) 276-9500.

At an all-time peak strength, the Air National Guard is retaining its talented people, modernizing its forces, and training alongside the active forces for any contingency. It's all part of ensuring the goal of being . . .

'The Best Back-Up Air Force in the World'

BY MAJ. GEN. JOHN B. CONAWAY, USAF, DIRECTOR, AIR NATIONAL GUARD

TODAY your Air National Guard is a fighting force of more than 100,000 people, men and women who have volunteered their time and talents in support of the Guard's state and federal missions.

This is the greatest strength we have ever achieved in the history of the Air Guard. It is a tribute to the hard work of the Adjutants General and the local commanders. It is also a testimony to the fact that people will voluntarily join together in pursuit of a worthwhile cause—in this case, the defense of our nation.

I wish I could introduce each reader of this magazine to an Air Guardsman so you would know the dedicated and professional people they are. While that may be impossible, I can share some of the statistics we have compiled on these 100,000 citizen-airmen.

First of all, the ANG is diverse. We have more than 1,000 units in fifty-four states and territories. Various minority members comprise nearly fifteen percent of our force, and approximately ten percent of the total force is female.

Second, the Air Guard is experienced. Our officers average more than fifteen years of service; our enlisted people, nearly eleven years. This is reinforced by the fact that our officers averaged five years on active duty before they joined the Guard. Among the enlisted personnel, they have an average of thirty-eight months of active duty.

The average age for our officers, both flying and nonflying, is thirty-seven. Our enlisted crew members are just slightly less, averaging thirty-six years of age. Overall, ANG enlisted people average thirty-three years.

General Conaway: ANG is "capable of fighting in support of the active Air Force anywhere in the world . . ."

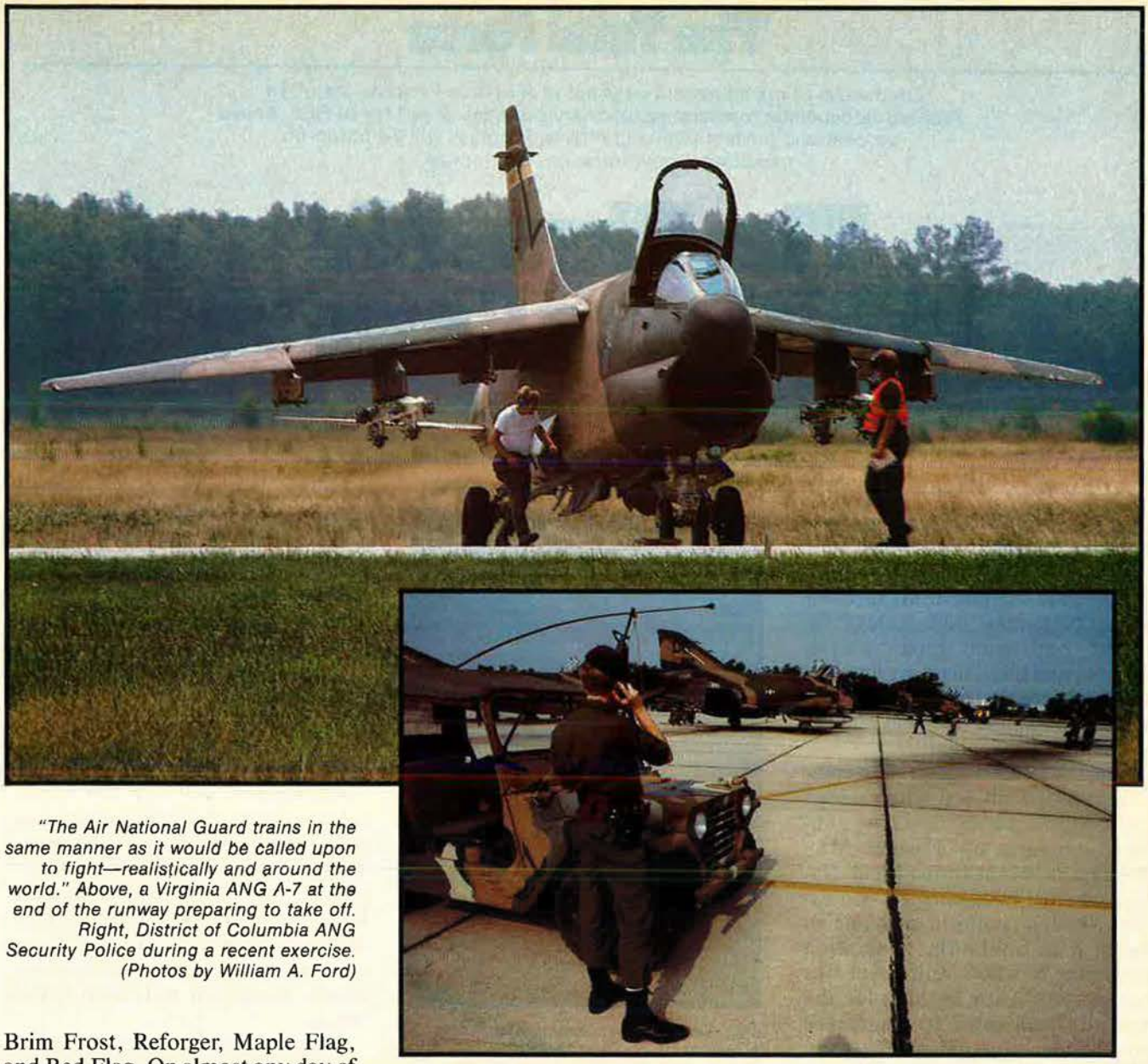
Lastly, our people are staying with us. In the fiscal year that just ended, two out of every three people who were eligible to separate chose to remain with their Guard unit. Their quality is reflected in the fact that eighty-eight percent of our officers have some college or better, and ninety-seven percent of enlisted people have completed high school.

Statistics are often freeze-dried facts, but I think you can see that the ANG has a lot of talented, experienced people. These people are trained and ready to support their states and local communities in time of natural disaster or civil unrest. They are also capable of fighting in support of the active Air Force anywhere in the world within seventy-two hours. I believe we are more ready than ever to meet both commitments.

In the past year, we have announced modernization programs for the Air National Guard that are truly revolutionary. Our last F-105 unit has begun the conversion process to F-4Ds, and the Alaska Guard tactical airlift unit will soon receive brand-new C-130Hs. By early 1983, three of our ANG air refueling units will have their KC-135s reengined with the improved and better performing JT3D fanjet engine. Next spring, the 169th Tactical Fighter Group, South Carolina ANG, will receive the first of its F-16 Fighting Falcons.

These are just the latest examples of continuing US Air Force efforts to include the Air Guard as a partner in the Total Force. Force modernization increases the ANG's ability to perform its assigned missions on a worldwide basis.

The Air National Guard trains in the same manner as it would be called upon to fight—realistically and around the world. This past year, ANG units have deployed to Germany, Panama, Denmark, Korea, the United Kingdom, Portugal, Norway, Italy, and Turkey on various training assignments. Similarly, Guard people and equipment have been participants in several JCS and major command exercises—Bold Eagle, Bright Star, Ocean Venture, Gallant Eagle,



"The Air National Guard trains in the same manner as it would be called upon to fight—realistically and around the world." Above, a Virginia ANG A-7 at the end of the runway preparing to take off. Right, District of Columbia ANG Security Police during a recent exercise. (Photos by William A. Ford)

Brim Frost, Reforger, Maple Flag, and Red Flag. On almost any day of the past year, Air Guardsmen were on duty in different parts of the world supporting US defense commitments and improving their unit and personal readiness.

At their home stations and in deployment to field training sites, Guard units have also displayed their professionalism. For the past five years ANG units have proven their operational capability.

By another measure, the ANG's flying accident rate for calendar year 1981 was the lowest ever recorded. Without the committed concern of each Guardsman and woman, that could not have been achieved. This personal dedication to safety was recognized by the Daedalian Society when they awarded the Air National Guard the Benjamin Foulois Flying Safety Award.

I have always believed that to make any organization grow and become dynamic you need professional people performing an important mission with as much modern equipment as possible. At a time when we are experiencing the greatest strength in our history, those very forces are coming together in the Air National Guard.

Our duty is to exemplify the trust the Congress, the Department of Defense, and the Air Force have placed in us. I feel we are close to our goal of being the "best back-up air force in the world." ■

Maj. Gen. John B. Conaway has been Director of the Air National Guard since April 1981. He attended the University of Evansville in Indiana, where he received a BS in business administration. Commissioned a second lieutenant in 1956, he attended undergraduate pilot training and then flew F-102 fighter-interceptors in Air Defense Command. He has also flown SA-16s and RB-57s in various Guard assignments. He was called to active duty in 1968, serving in Alaska, Panama, Japan, and Korea. Upon deactivation in 1969, he returned to the Kentucky Air Guard as operations officer. In 1972, he was named KyANG Air Commander. General Conaway was recalled to active duty as Deputy Director of the ANG in 1977. His decorations include the Legion of Merit, the Meritorious Service Medal, and the Air Force Commendation Medal.

On the eve of his retirement as Chief of Air Force Reserve, Maj. Gen. Richard Bodycombe foresees evolutionary progress ahead for AFRES, based on past and present planning efforts. Progress will be based on manpower, modernization, and money . . .

The Three M's of Air Force Reserve

BY MAJ. GEN. RICHARD BODYCOMBE, USAF

ALTHOUGH I don't plan to fade away like the "old soldier" immortalized by General of the Army Douglas MacArthur in his farewell before Congress, nonetheless my military retirement looms on the horizon, and this will be my farewell to you, the loyal members of the Air Force Association and avid readers of this fine publication.

It has been more than thirty-eight years since I pinned silver wings and gold bars on my new pink-and-green uniform on a warm May morning in 1944 at Turner Field, Ga. Since then, I have pursued two careers, one in uniform and one in mufti, and, unlike the generation before me to whom retirement was synonymous with heading for the pasture, I am eager to commence round three in aviation. However, while I'm still at the helm of the Air Force Reserve, I would like to share with you my thoughts and concerns about what the future holds for our component.

Tomorrow should be directly related to what is going on today. I foresee no revolutionary change for the Air Force Reserve, no massive realignments, no basic changes in mission, and no major challenge to our structural integrity. Nor do I envision our recruiters suddenly awash with applicants, our flight lines replenished with new aircraft, or a blank check issued in our name. Instead, our progress in the future will be evolutionary, based on the planning that went on five years ago and the planning that is going on even as I write this. Our success in the out years will be based on what I refer to as the three M's—manpower, modernization, and money. The three are totally interrelated.

Maj. Gen. Richard Bodycombe retires November 1 as Chief of Air Force Reserve and Commander of AFRES.

Faces, Not Spaces

Let's take the first one—manpower—which Webster defines as "the total supply of persons available and fitted for service." In other words, faces, not spaces. We continue to maintain a very favorable manning posture and, as FY '82 draws to a close, we anticipate exceeding our objective for the fifth consecutive year. We project an end strength of 63,950 by September 30, 1982, compared with 61,565 for the previous year.

Looking down the road, our FY '88 projection is 82,572 selected Reservists, with most of the increases coming in the medical, aerial port, and civil-engineering areas. By way of comparison, this figure represents an increase of sixty-seven percent over the end strength AFRES had when I returned to active duty as Vice Commander in 1976.

Finding and retaining these people is the most critical issue the Air Force Reserve will face, not just in the near term, but for the foreseeable future. We must continue to attract high-quality, skilled, disciplined, motivated, and dedicated Reservists—and do so in sufficient numbers to meet our seemingly ever-increasing manpower requirements, consistent with Total Force needs.

No small part of this requirement will need to be met through the Individual Mobilization Augmentee program. These specialized personnel fill wartime-only positions in active force organizations. The IMA program will continue to provide the Air Force with yet another means to retain highly skilled personnel who have previously served on active duty, to train these personnel in specific wartime positions, and to mobilize them rapidly in time of war. It is a cost-effective answer to selected wartime needs. Today, IMAs number 9,785. By FY '83, IMA strength is expected to total 10,832. As integrated members of active-force staffs, our augmentees in the future will find their tasks increasingly challenging.

My next "M"—modernization—falls logically in place as our second

concern, present and future. During my watch, I have seen great strides made in modernizing our Reserve force. Most visible, of course, is the overall improvement in our flying units. The A-37s are gone, replaced by A-10s. The much-heralded F-105 is going, replaced by F-4s and, in the near future, our first F-16s.

On the airlift side, our C-7 and C-123 force is being replaced with C-130s, a long-overdue move I actively sought. Overall, I am very pleased with this modernization effort. The changes allow our Air Force Reserve to fulfill its mandate. When and if mobilized, we will fight with modern equipment that will be effective in an increasingly sophisticated battlefield environment.

Modernization Candidates

This is not to say that our force is where I would wish it to be. We are continuing to work hard to identify modernization candidates for our C-130A and B fleets, for instance. While not an immediate problem, it will become an issue of escalating concern toward the end of this decade. It will require careful planning and programming to avoid "block obsolescence" of our C-130 fleet.

This issue, as with all issues, must be viewed from an overall Air Force perspective. The solution to this early model C-130A issue will, in all probability, be part of an overall solution to the proven Air Force need for new advanced airlift aircraft. It will not be resolved during my tenure; it will be left to my successor, working with the Air Force leadership and the Congress, to find an answer.

One cannot serve long as Chief and not be cognizant of, and extremely impressed by, the significant contributions made by our combat support units. They are already a significant portion of the Total Force capability. In the years ahead, they will be growing at an unprecedented rate; ensuring that US forces can be projected to any part of the world in minimum time and sustained there if necessary.

The modernization efforts during the past few years are in large part a direct reflection of both the understanding and support offered by the Air Force leadership. In their desire to make a better, more capable Air Force, they have not neglected the Air Force Reserve. In my judgment, within the confines of the budget, USAF has consistently supported a strong and ready Reserve program.

Above, an HC-130 refuels an HH-3 Jolly Green Giant helicopter during the recent Air Force Reserve combat rescue training exercise, Condor CRTE '82. See also article on p. 62. (Photo by William A. Ford)

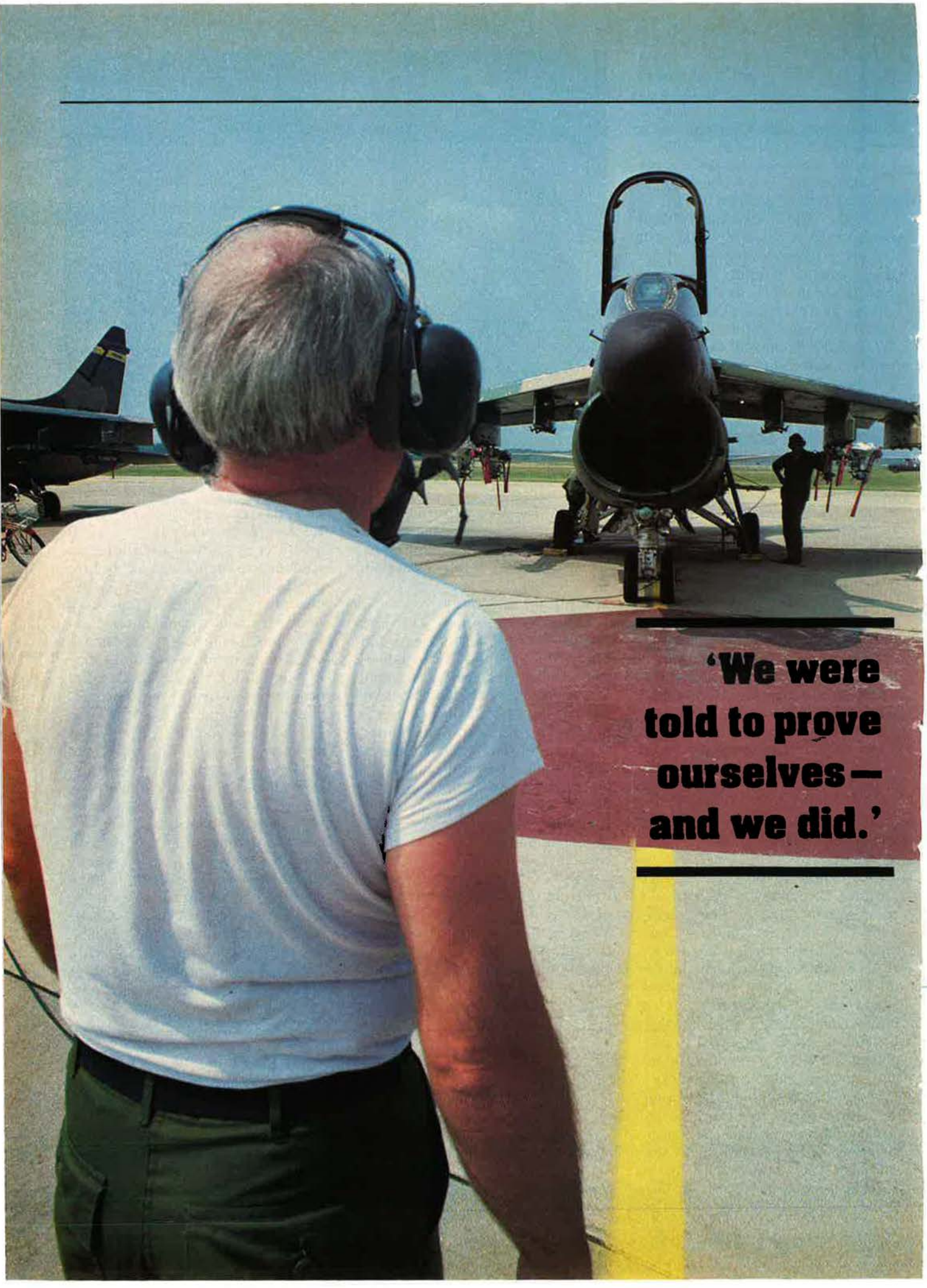
The Matter of Money

The introduction of the term "budget" is not a coincidence. It represents the third "M"—money. The growth, successes, and challenges I have been describing will require significant increases in money if we are to maintain our momentum. As you have been hearing and reading, the overall condition of our economy in future years will have a large impact on the availability of financial resources necessary to sustain and improve our defense capability.

The current Administration is unwavering in its support of a strong national defense; however, we, along with all components, must constantly strive to ensure that all expenditures are made at the right time and in the right places to provide the maximum benefit. Congress has restated its belief in strong Reserve Forces on many occasions and has provided adequate resources and support throughout the appropriation process. We, as recipients of this support, must continue to provide the maximum capability possible through efficient and effective expenditure of funds.

With all due respect to the Minnesota-based firm doing business under that name, I have just described Bodycombe's three M's—manpower, modernization, and money. Together, they constitute the triumvirate in whose hands rests the future of the Air Force Reserve. My successor and his successors will become as intimately familiar with this triad as I have during my tenure as Chief. I bequeath to them the support I have received from the active force and successive Chiefs of Staff. I leave a manned, trained, equipped, proud, and ready force of American citizen-airmen, the best there is, to my immediate successor. I envy him! ■

Maj. Gen. Richard Bodycombe is Chief of Air Force Reserve, Hq USAF, and Commander, Hq. AFRES, Robins AFB, Ga. He holds bachelor and master of science degrees from the University of Michigan. General Bodycombe served as a B-24 pilot in Italy during World War II and was recalled to active duty after the war to participate in the Berlin Airlift. He subsequently served in various Reserve assignments until 1976, when he was recalled to active duty as Vice Commander of AFRES. He is a command pilot with more than 16,500 flying hours, and holds the Distinguished Service Medal, Legion of Merit, and Distinguished Flying Cross, among other decorations. He assumed his present position in April 1979.


'We were told to prove ourselves— and we did.'

Turn 'em around and go again.

Guard's Up in Virginia

BY JON R. DONNELLY
Photos by William A. Ford, ART DIRECTOR

Above: Two A-7s coming in on a formation landing at Richmond's Byrd Field. Facing page: TSgt. Tom Wallis (foreground) and TSgt. John Fore (under wing) prepare to launch a flight.

As he relaxed in a chair, recalling events as though they had happened the day before, Hartwell F. Coke IV didn't look the part of a successful commander who had led his forces into battle and, as it were, come out on top.

Coke was dressed as he frequently is: black flying boots that look as comfortable as bedroom slippers; a green flight suit that fits his trim six-foot frame with deceptive casualness; and a chest patch adorned with the command pilot wings he earned and the nickname, "Tee," that he was given.

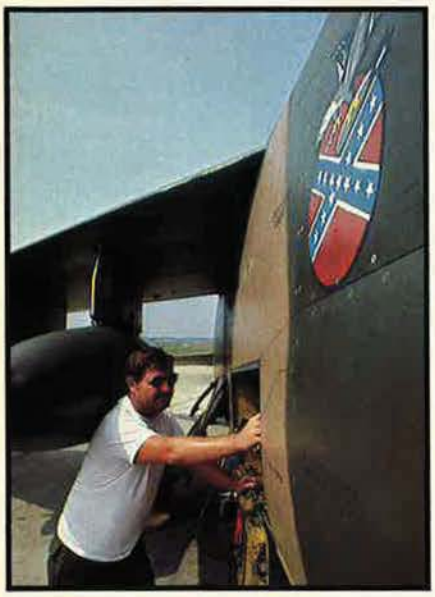
Muted eagle insignia denoted his rank of colonel in the Virginia Air National Guard while colorful patches on either shoulder identified him as a member of Virginia's "Air Militia" and the Virginia Air Guard's 149th Tactical Fighter Squadron.

Everything about Coke, forty-five, Commander of the 192d Tactical Fighter Group, the 950-member flying unit of the Virginia Air Guard, was the same—low-keyed and professional.

But as Coke discussed a recent full-scale evaluation which the 192d Group—and its component units like the 149th Squadron—underwent last month, he was hard pressed to keep a look of pride and a contented smile from occasionally drifting across his face and its deeply chiseled features.

In short, the 192d Group was put to the test and after six grueling days was judged by the Air Force to be capable of carrying out its combat mission in a wartime situation.

From the Richmond, Va., News Leader, *July 22, 1982. Reprinted by permission.*



Operational Readiness

Coke's pride stems in part from the fact that the full-time and part-time Guardsmen passed this test, known as an operational readiness inspection, only eight months after the unit started a conversion from F-105 Thunderchief fighter-bombers to newer A-7 Corsair II attack fighters, and only two months after the conversion was completed.

Neither Coke nor the Air Force would say what "grade" the 192d Group received to pass the inspection, held at Travis Field in Savannah, Ga. But an Air Force spokesman said the reserve unit's fighting capabilities were judged on the same basis and criteria as full-time, active-duty forces.

One veteran military pilot said that passing the operational readiness inspection with a new and sophisticated weapon system like the A-7 "should be a source of pride to each member of that unit. It's difficult under even ideal conditions."

The inspection began on May 29, the Saturday of the Memorial Day weekend, continued as the 192d Group deployed some 550 of its members and twenty warplanes from its base at Byrd International Airport, Richmond, Va., to Savannah, and lasted through June 3.

Virginia Air Guardsmen remained at Travis Field through June 12 to complete their regular summer field training, said Coke, who took command of the group in December. He is a soft-spoken, full-time Guardsman.

Ground support personnel, the people who keep the Air Guard's A-7s flying, went to Georgia in transport planes. The unit's fighters

Left, from top to bottom: Returning from a sortie in the 192d's factory-fresh A-7K, pilot Maj. Bob Seifert (on ground) and flight surgeon Maj. Dave Hudson are greeted by TSgt. James F. Lanham (in white shirt) and TSgt. Mitch Carter. With the distinctive 192d insignia above him, TSgt. Robert Fone prepares an aircraft for a flight. In the maintenance hangar TSgt. L. W. Clough works on an A-7 vertical stabilizer. The 192d Commander, Col. H. F. "Tee" Coke, discusses aircraft status with crew chief MSgt. Walter Davis. Facing page: Working on an A-7, from top, TSgts. James Lanham, Robert Fone, and Tom Barlow.


Teamwork
on the ground
and in the air.

Top photo: TSgt. L. W. Clough works on the wing of an A-7. Above: Preflighting before a sortie, Col. Alvah S. Mattox, Jr., Chief of Staff of Virginia Air National Guard, foreground, and Lt. Col. Jerry Hallman, Senior Air Force Advisor to the 192d, look over a bomb rack.

were flown down under real and simulated conditions they might experience during a rapid move to an overseas combat zone, Coke said.

He added that Georgia and neighboring states then became simulated European countries in a wartime situation. Gunnery and bombing ranges, many of which the Virginia pilots had not seen before, became enemy targets to be located and attacked.

Sixteen-hour Days

Conditions in Savannah, both real and simulated, were mostly less than ideal, said Coke. Among other things, the Virginians had to contend with unusually hot and humid weather, demands for sixteen-hour work days to support "friendly" troops, simulated attacks from "enemy" ground and air forces, and the presence of a team of hand-picked Air Force specialists whose jobs were to spot the 192d Group's mistakes and weaknesses.

"It was very realistic and, in fact, you could see people get caught up in some of the simulated situations and problems they threw at us," said Coke.

Other tests included the Virginians' abilities to cope with simulated bombing attacks and resulting "injuries" to people and "damage" to runways and equipment, and simulated infantry attacks on aircraft flight lines during which ground crews and pilots were forced to take cover, the commander said.

In the air, Virginia Air Guard pilots fought against Air Force fighters playing the role of enemy MiG aircraft, and worked to penetrate simulated and actual defenses surrounding their ground targets, he added.

The test situations were what 192d Group members "would face in the real world," said Coke. "There were lots of decisions being made, and I can say that most of those decisions were judged by the inspectors to be correct under the circumstances."

Of the tests, perhaps the most decisive in terms of evaluating the Virginia Air Guard's state of readiness was the number of sorties the unit proved it could fly during a given time period, or surge.

A sortie is a single flight of an aircraft on a combat mission. In wartime, Virginia Air Guard personnel would have to arm and fuel their planes, fly them to targets, and return to base. The planes would then have to be "turned around"—have any battle damage repaired, be refueled and rearmed, and have pilots briefed on the next combat mission.

During a ten-hour surge period that began at 6:15 a.m., said Coke, ground crews worked in sweltering conditions to launch eighteen A-7s on a total of seventy-eight sorties. It was "one of the best displays of teamwork I've seen," said Coke, a Norfolk native who has been a Virginia Air Guard pilot since 1960.

"What was more impressive to me was that the ground crews and pilots were prepared to keep going beyond the time we stopped flying," he added.

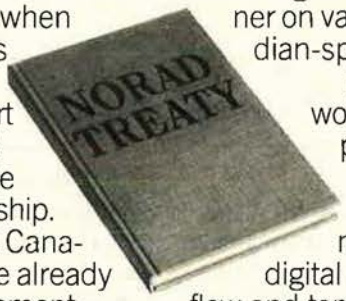
Coke's pride in the outcome of the inspection was summed up in one sentence he spoke as he stood up from the chair after an hour to stretch. The smile, absent during most of his rundown of the week's events, returned.

The members of Virginia's Air Militia "were told to prove ourselves," he said quietly, "and we did." ■

Jon R. Donnelly is State Editor and aviation columnist for the Richmond News Leader, *Richmond, Va., and an AFA National Director. A journalist for eighteen years, Mr. Donnelly has won numerous national, state, and local writing awards.*

Defense development sharing: It brings close allies even closer together.

Combining the defense resources of American and Canadian industry is an effective way of stretching the resources of each country. And when you consider Canada's sophisticated facilities and state-of-the-art technology, you have the makings of a close and profitable relationship.



Since the U.S. and Canadian Governments are already committed to development sharing under the provisions of the NORAD Agreement, now is a good time for American military labs to discover Garrett Manufacturing Limited as a new technological ally.

Already a world leader in advanced technology, GML has all the necessary credentials to be a strong co-development partner on various U.S. and Canadian-sponsored programs.

For example, we're working on advanced process and packaging technology for custom hybrid microcircuits, as well as digital control, and electronic flow and temperature sensing for airborne environmental control systems. We're also developing RF communication systems up to 500 MHz, and cockpit peripheral vision systems utilizing laser light display.

As a military supplier for nearly 20 years, we've achieved an impressive service record. For example, GML is the dominant supplier of aircraft temperature control systems. Our custom thick/thin film hybrid microcircuits are on leading U.S. military aircraft, missiles, and communications systems. Our emergency locator beacons are used on military and commercial aircraft alike. And our VHF radios are being installed throughout Canada and in the third world.

For more information on all the resources we have to share, contact: Sales Manager, Garrett Manufacturing Limited, 255 Attwell Drive, Rexdale, Ontario, Canada M9W 5B8. Or call: (416) 675-1411.

GARRETT

GARRETT MANUFACTURING LIMITED

GARRETT The Garrett Corporation
One of The Signal Companies

RESERVE FORCES: Bottom Line on Top Performers

BY CAPT. MICHAEL B. PERINI, USAF, CONTRIBUTING EDITOR

THE Air Reserve Forces make a significant contribution to the nation's defense effort with manning totaling more than 240,000. Included are approximately 100,000 people in Air National Guard units, 64,000 in Air Force Reserve units and mobilization augmentee programs, and about 82,000 in the Individual Ready Reserve. Combined, these support a major part of the day-to-day mission for the strategic, general-purpose, and mobility forces, as well as being ready to respond to crisis situations.

The chart on the bottom of p. 55 indicates the value of the Air Reserve Forces.

Air Reserve Forces Modernization

The Air National Guard and Air Force Reserve continue to upgrade and modernize equipment, facilities, and materiel. The FY '83 program includes additional A-10s and C-130Hs for AFRES, and F-4s and F-16s for the ANG.

AFRES is modernizing with more first-line aircraft. The A-37s are gone, replaced by A-10s. The F-105s are being replaced by F-4s and, in the near future, by the F-16. The C-123s and C-7s are being retired as more C-130s enter the inventory.

Though aircraft modernization is under way, the average age of aircraft remains significant:

Average Age of Aircraft
(End of FY '81)

USAF	13 years, 1 month
ANG	15 years, 0 months
AFRES	16 years, 6 months

Air Force Reserve

The Air Reserve component originated in June 1916, when the Aviation Section Signal Organized Reserve Corps was established. Today, the Air Force Reserve is fully integrated in the daily operations of the Total Force and the nation's deterrent posture.

The overall AFRES budget of $1.036 billion constitutes 1.9 percent of the total Air Force budget of $54.52 billion. With this, AFRES provides:

- 100 percent of the aerial spraying capability.
- Sixty-four percent of the MAC aeromedical evacuation aircrews.
- Fifty percent of MAC's strategic airlift crews.
- Fifty-eight percent of AFLC's logistics support units.
- Fifty percent of USAF's AC-130 gunship capability.
- Forty-seven percent of MAC's aerial port wartime unit capability.
- Thirty-six percent of MAC's tactical airlift capability, comprising C-7, C-123, and C-130 transports.
- Thirty-five percent of the USAF strategic airlift maintenance force.
- Thirty-five percent of USAF's weather reconnaissance force (aircraft and aircrews).
- Twenty-one percent of USAF's aerospace and recovery capability.
- Fifteen percent of USAF's civil engineering support.
- Ten percent of TAC's fighter and attack aircraft strength.
- Four percent of SAC's air-refueling capability.

The typical AFRES airlift pilot is thirty-seven years old, with more than 3,800 flying hours. The typical AFRES fighter pilot is thirty-eight and a half years old with more than 2,700 flying hours.

Supporting the AFRES blue-suiters are more than 4,275 USAF civilian employees.

South Carolina's 169th Tactical Fighter Group will be the first Air National Guard unit to convert to the new F-16 Fighting Falcon aircraft during FY '83.

Air National Guard

During the past year, the Air National Guard undertook such missions as tactical fighter and attack operations, air defense, rescue, re-

connaissance, refueling, airlift, and tactical air support.

ANG A-7, RF-4, EC-130, and communications units have been earmarked as members of the Rapid Deployment Joint Task Force.

For twenty-eight years ANG units have performed a mission of air defense alert in safeguarding CONUS and Hawaii.

ANG KC-135 tankers perform twenty-four-hour-per-day alert duty and also support the European Tanker Task Force on an annual basis.

In numbers, the ANG has in its inventory more than 1,600 aircraft of sixteen different types. These make up a total of ninety-one flying squadrons. Also included in the ANG structure are 243 major non-flying units. ANG has on its rolls more than 100,000 military personnel and 2,000 civilians. In 1981, the Air Guard logged 410,000 flying hours.

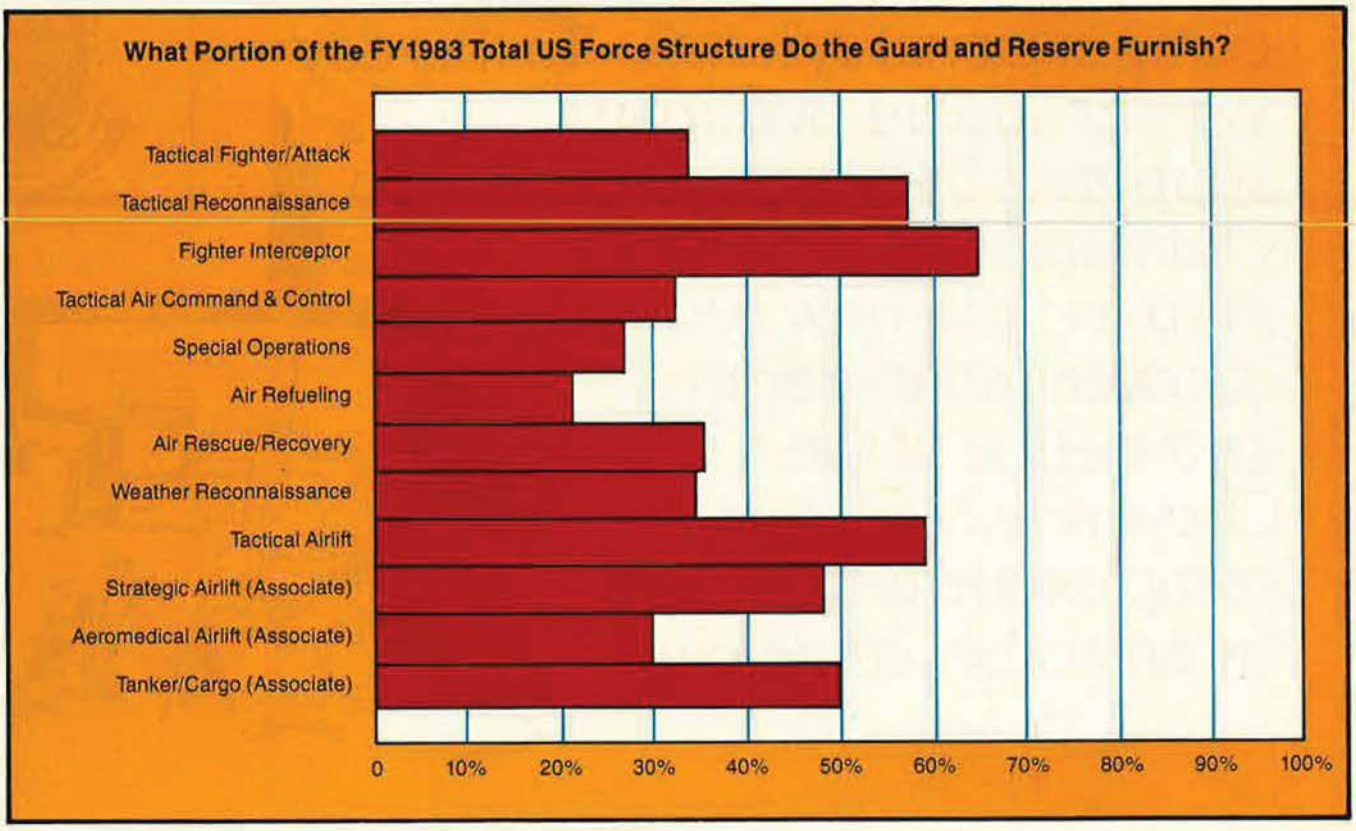
The ANG provides thirty percent of USAF's Total Force structure, but costs only about three percent of the annual USAF budget.

The ANG provides USAF with:

- Fifty percent of electronic installation capability.
- Seventy-five percent of the people and seventy percent of the equipment in combat communication and air traffic control and service roles.
- Fifty percent of weapon system control capability (tactical control units).

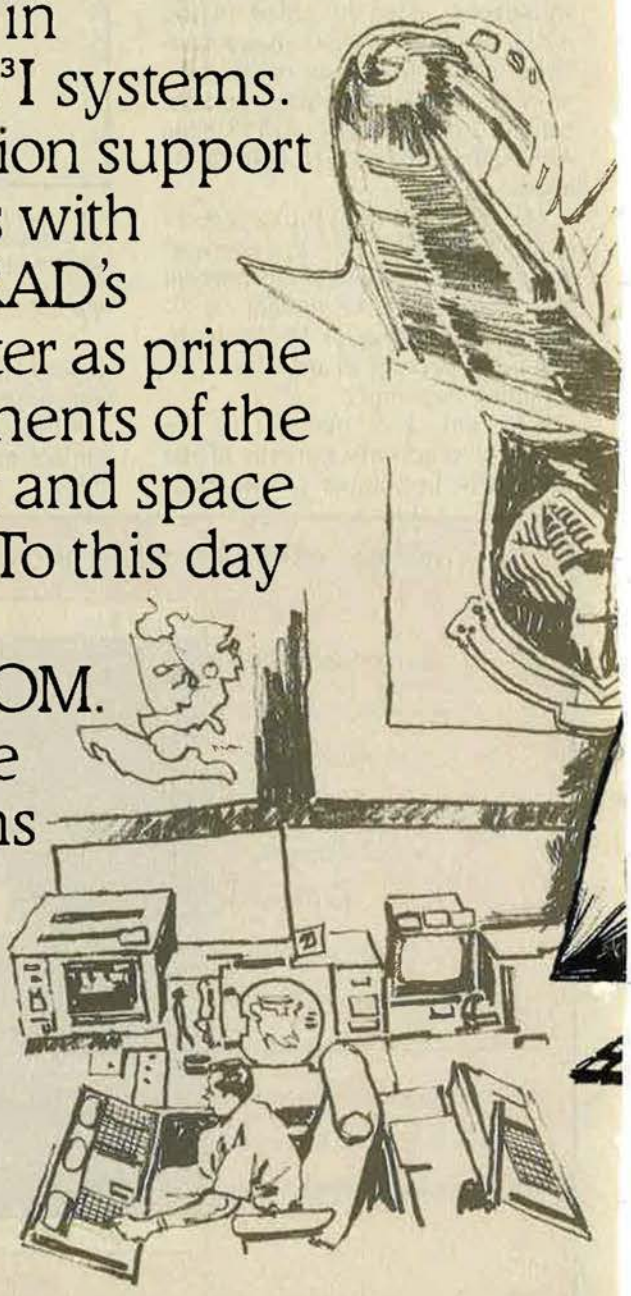
A ski-equipped C-130 of the 109th Tactical Airlift Group, New York ANG, provides vital airlift support to radar sites along the Distant Early Warning Line in Greenland. These resupply missions are just one example of the ANG's role in support of the active-duty Air Force. The ANG provides thirty percent of USAF's Total Force structure, but costs only about three percent of the annual USAF budget.

The ANG won the Daedalians' annual Maj. Gen. Benjamin Foulois Award for 1981 for having the most effective aircraft accident prevention program during the year. ■

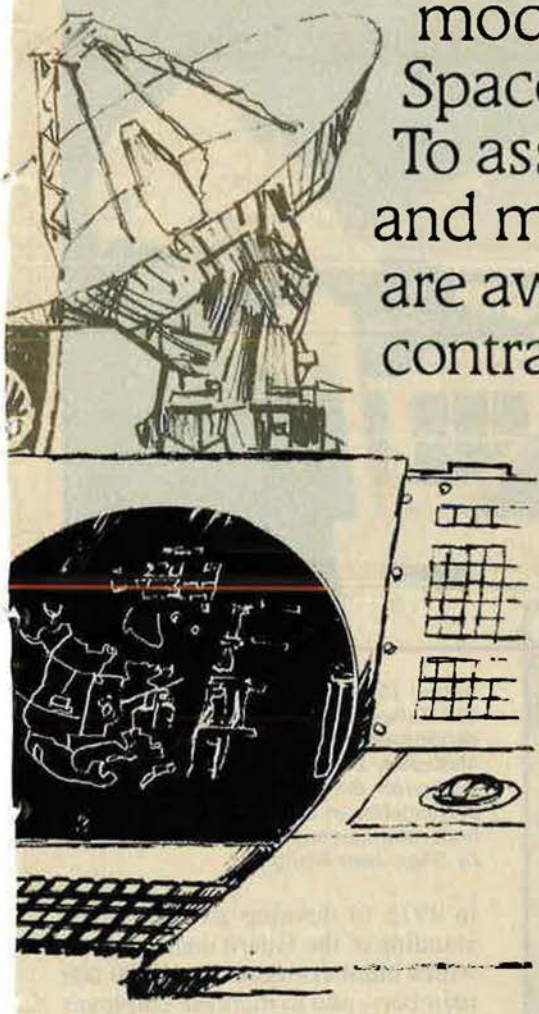


We've only just begun

For almost a quarter-century, Ford Aerospace has played a leading role in developing our nation's C^3I systems. Our legacy in space mission support began in the early 1960's with our contributions to NORAD's Combat Operations Center as prime contractor for major segments of the communications, display, and space computational systems. To this day we provide 24 hour/day support to NORAD/ADCOM. Our hands-on experience in successful new systems cut over and in-depth knowledge of the Cheyenne Mountain complex are unmatched by any other contractor.



Ford Aerospace is ready to apply our C³I systems expertise to the challenges of the future, including the modernization of the Space Defense Operations Center. To assure on-time performance and minimize risk in the event we are awarded the production contract, SPADOC systems and software are presently being developed by us and verified at our test facility. This Head Start program, together with our C³I systems expertise, have prepared us for another new beginning in Space Defense Operations.



Ford

Ford Aerospace & Communications Corporation

Since 1776, "citizen-soldiers" have been the backbone of our nation's defense program. Today, their employers play a critical role in the Guard and Reserve.

Is Anyone Working to Gain Employer Support?

BY CAPT. MICHAEL B. PERINI, USAF, CONTRIBUTING EDITOR

THE fireman is upset. So is his supervisor at the small city fire department where he has worked for three years.

The fireman is the ideal employee: dependable, honest, and knowledgeable. He takes his job of firefighting and saving lives seriously. But he takes his other job seriously, too.

One weekend a month, and two weeks during the year, he goes to his part-time job as a firefighting training officer with the National Guard. But his commitment to the nation's defense is creating problems. His swing-shift work schedule at the city fire station often requires someone else to work in his absence while he attends military training. In addition, he must use vacation time to complete his duties as a sergeant in the Guard.

His civilian supervisor has told him to pick one job or the other. Facing a showdown with his boss, the sergeant is in limbo—to reenlist or not.

The sergeant's case is typical of the kind of problems faced by numerous Guardsmen and Reservists today. He would like to resolve the problem as informally as possible. But where can Guardsmen turn when they have problems juggling demands of a civilian job and service in the Guard or Reserve?

The job of seeking employer backing for their workers' part-time military careers is the responsibility of a Washington, D. C.-based Department of Defense organization known as the National Committee for Employer Support of the Guard and Reserve (NCESGR).

The organization was established in 1972 to develop public understanding of the Guard and Reserve, which numbers more than 1,300,000 members, and to increase employer support through the development of personnel policies that permit and even encourage employee participation in Guard and Reserve programs.

Above: TSgt. Mike Syrko, a Pennsylvania Bell Telephone Co. employee, with assignment supervisor Dorothy McKeown. Left: Ms. McKeown and supervisor Bill Zinkham, right, call his participation in the Air Force Reserve an important community service. (Photos by SSgt. Jean Albright)

US Reserve components include

the Army National Guard, Army Reserve, Naval Reserve, Marine Corps Reserve, Air Force Reserve, the Air National Guard, and Coast Guard Reserve. In fact, US Reserve Forces total approximately forty-six percent of the Total Force.

Since 1970, the Air Force has pursued a Total Force policy, incorporating the Air National Guard and the Air Force Reserve in wartime planning and peacetime operations. "The Air National Guard alone provides about thirty percent of our Total Force structure but costs only about three percent of the annual budget," said Under Secretary of the Air Force Edward C. Aldridge.

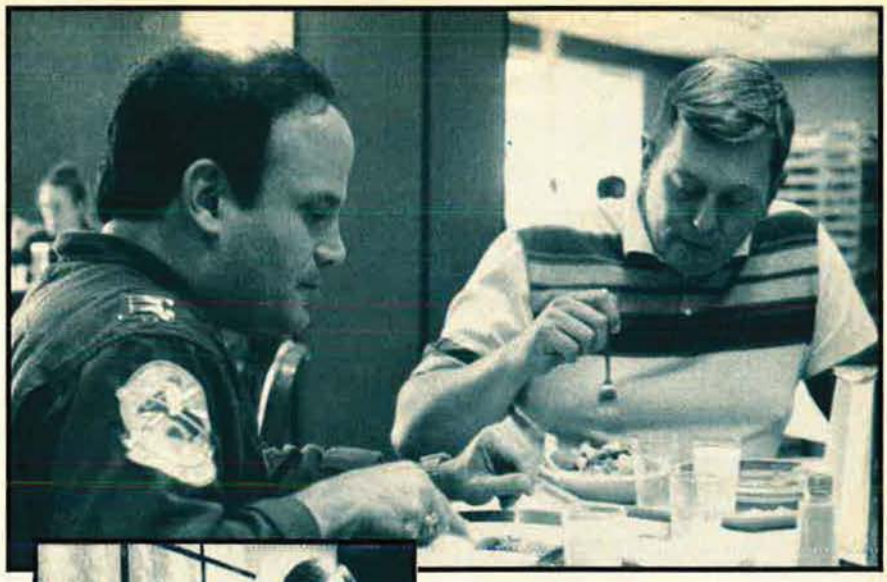
Today, the country's Ready Reserve shortfall numbers approximately 157,000. The NCESGR is working to keep members of the Guard and Reserve in uniform. Organized as part of the Office of the Secretary of Defense, the committee's national chairman is Gilbert M. Turner, a Texas business executive. Mr. Turner said, "Employer support is vital to the readiness of the Guard and Reserve forces—so much so that our national team of civilian business and civic leaders exists to promote the support of employers."

Studies Fuel Efforts

The committee's efforts have been fueled recently by research into cases like the sergeant fireman, which has indicated that employer ignorance, disinterest, and hostility affect Guard and Reserve reenlistments. For example, during the last year the Guard and Reserve lost 61,000 people. Studies suggest that almost one-third who hung up their uniforms did so because of job-related conflicts.

These conflicts are not limited to the private sector. Federal and state government agencies can also cause problems, according to NCESGR members. Agencies such as the Postal Service and fire and police departments, because of the high proportion of employees who work the seven-day shift schedule, often experience conflicts with Guard and Reserve training.

According to a Rand Corp. study, "Conflict with civilian jobs was cited by almost thirty-one percent of the ex-servicemen and women as the most important factor in their decision to opt out of the military."



Above: Air Force Reserve Capt. Mike Silverman relies on the support of his civilian supervisor, Peter Arnhath, to complete military training. Left: Captain Silverman is an electronic data processing auditor with Alcoa and works with William Warrick, Chief Internal Auditor. (Photos by SSgt. Jean Albright)

Another thirty-two percent cited "conflict with family or leisure time" as their reason for leaving.

Rand, which published its study earlier this year, informed DoD officials that some of these family pressures undoubtedly reflect hidden job-related matters as well. For example, a Reservist forced to use earned vacation time from his civilian job in order to complete training requirements would probably face objections from his family.

A subsequent study conducted by La Brie Associates for Congress and DoD found similar trends. Many members of the Guard and Reserve refuse reenlistment, said the La Brie researchers, due to "problems with civilian work," and because part-time military duty "prevents getting job promotions."

The findings of both the Rand and La Brie studies have helped the NCESGR answer those who question the committee's usefulness and more than $1.1 million annual budget. "The simple fact is that Guard and Reserve members whose military duties don't cause them problems on the job are more likely to reenlist," said Dick Ellis, Executive Director of the NCESGR.

Employer Conflict

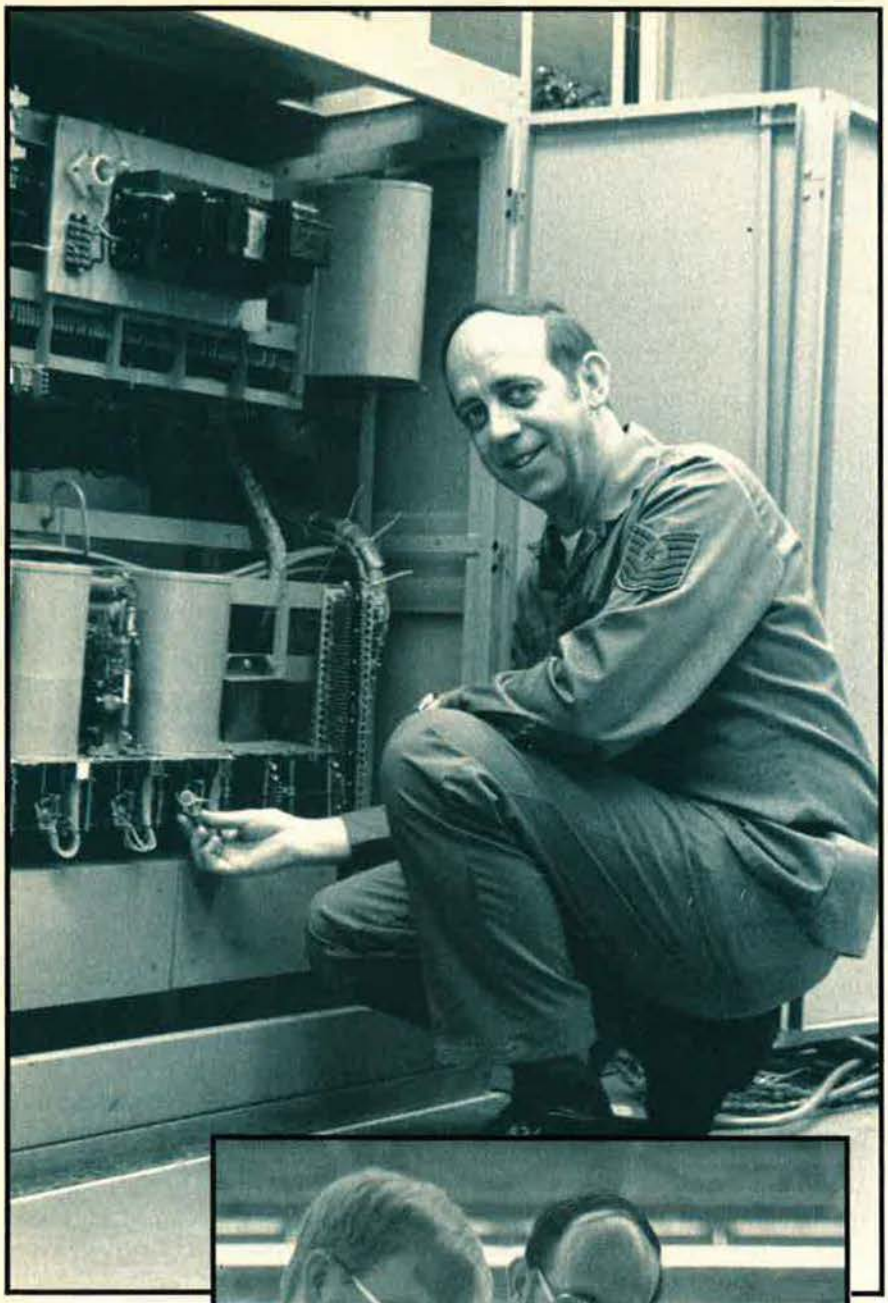
The NCESGR is working, according to Mr. Ellis, to eliminate many of the problems outlined in those studies.

Employer conflict, however, can take many forms:

- *Problem of the first-line supervisor.* The president of the company may support the Guard and Reserve, but lower-level supervisors don't get the word.
- *Some conflicts are blatant.* "Go off to play war this weekend and you won't have a job come Monday" is a statement heard by many.
- *Conflicts may be subtle.* For no apparent reason, members of the Guard and Reserve have found that they are overlooked for promotion. Others, like the fireman, find they must use paid vacation time to attend annual training.

To resolve these problems/conflicts, the committee has focused its efforts in several areas.

"We have tried acquiring a statement of support from employers and sought volunteers in each state to reach the grass-roots level," Ellis explained.



Right: MSgts. Mike Howze and Roger Ryan work at General Electric, Seattle, Wash. Both are Air National Guardsmen. Above: Sergeant Ryan's Guard duties include teaching repair work on teletype equipment. Sergeant Howze is a cargo processor and his unit's career advisor. (Photos by SSgt. Jean Albright)

The statement of support is a signed declaration by the employer of his intent to: not limit or reduce an employee's job and career opportunities because of service in the Guard or Reserve; grant leaves of absence for military training in the Guard or Reserve without sacrifice of vacation; and make this agreement and its resultant policies known throughout the organization.

More than 300,000 employers, who employ more than half the nation's work force, have signed statements of support. "The job of acquiring employer support will never be completed," Ellis said. "New companies are established daily, Guard and Reserve members change jobs, and bosses rotate."

Until late 1978, the committee had worked only from the national level, gaining support of major employers. Since then, working with the Guard Adjutants General and active and Reserve commanders in each state, the committee has built a network of volunteer organizations that can help acquire employer support in their areas and to help resolve conflicts.

"Today there are more than 2,600 prominent civic, business, education, religious, and government leaders promoting support of the Guard and Reserve," Ellis said. The committees are located in every state and in Guam, Puerto Rico, the Virgin Islands, and the District of Columbia. Another committee will soon be established in American Samoa.

These volunteers, many of whom are employers and supervisors themselves, explain the employer support story through speaking engagements, media exposure, publicly recognizing supportive employers, and serving as ombudsmen in resolving employer-employee conflicts.

Employees at Fault, Too

Employers themselves are not the sole source of conflict in the matter of employee Guard and Reserve training. According to Mr. Ellis, "Half of the problems are caused by the employer and the other half by the Guard or Reserve member. Nine out of ten complaints, however, result from misunderstanding or lack of education," he said.

In the 1940 congressional hear-

EMPLOYER SUPPORT OF THE GUARD & RESERVE

This logo appears on a variety of informational products designed to enhance the relationship between Guardsmen/Reservists and employers.

Gilbert M. Turner is the Chairman of the National Committee for Employer Support of the Guard and Reserve.

In September 1981, Dick E. Ellis was named executive director of the NCESGR.

ings on a peacetime draft, Sen. Elbert Duncan Thomas of Utah stated:

"If it is constitutional to require a man to serve in the armed forces, it is not unreasonable to require the employers of such men to rehire them upon the completion of their service, since the lives and property of the employers as well as everyone else in the United States are defended by such service."

As a result, reemployment rights were enacted into law as part of the Selective Training and Service Act of September 16, 1940.

Today, the rights and responsibilities concerning employment and Reserve duty are set in law, specifically in Chapter 43 of Part III of Title 38, US Code. It has been amended several times and, through the years, the courts have interpreted the law.

Basically, the law states:

- An employee can't be fired for being a Reservist.
- An employee can't be denied promotion or any other advantage because of his Guard or Reserve status.
- Military training cannot be charged against vacation time.
- Individual rights remain the same regardless of military service.
- Members have the same right to time off regardless of whether they were ordered for training or put in for it voluntarily. In addition, the law places no limit on the number of times a Reservist can go for military training.
- As long as a member is gone on extended active duty no longer than four years (five at the convenience of the government), he is entitled to his old job or its equivalent when he returns.
- Individuals get the same seniority status, vacations, pay, and other benefits upon returning from training, as if they had never been away. One exception: An employer may—but isn't required to—pay civilian salary while his employee is on active duty.

Two-Way Street

Though the national committee cannot mediate problems through the court system, it does have the local, state, and national ombudsmen to assist and act as intermediaries between Reservist and employer. If necessary, the Reservist can always take his case to the Department of Labor's Management Service Administration. The sergeant's case, for example, was solved by a local ombudsman. He remains in the Guard today.

"Employer support is a two-way street," Mr. Ellis remarks. Some Reservists have been known to give very little advance warning of training requirements, while others sign up for repeated tours of active duty in training assignments not essential to their unit's mission.

The committee offers several suggestions to promote positive employer support:

- Keep employers and supervisors posted on drill dates.
- Inform the employer about the productive things being learned and accomplished in uniform.
- Thank the employer and supervisor for cooperating.
- Use military training on the job.
- Iron out problems personally.

Employers appreciate Reservists who go the extra mile in keeping them informed of their military duties. As one California businessman said, "It is significant that what distinguishes employees who belong to Reserve component units from other employees as a whole is their dependability, honesty, and loyalty. They are not the ones who call in sick on Monday or must take time off from work for some reason or other."

In the past decade, the Guard and Reserve have assumed greater roles in the All-Volunteer Total Force. Defense planners see the trend continuing well into the future. For this reason, the NCESGR is currently expanding its programs to enhance the relationship between Guardsmen/Reservists and employers. An aggressive information and promotion campaign is under way, which includes a national public service advertising campaign and awards for supportive employers.

"Much of our success, however, will—as it always has—depend on the interest and support of the American business community, as well as every segment of our society," Mr. Ellis emphasized.

For more information, call the committee's toll-free phone number: (800) 336-4590. ■

Part-time blue-suiters checked in from all around the nation for a search-and-rescue exercise held in the woods and skies of northern Michigan. The name of the game for the 403d Wing's Reservists was realism during . . .

CONDOR CRTE '82: Training for Combat Saves

BY WILLIAM P. SCHLITZ, SENIOR EDITOR
Photos by William A. Ford, ART DIRECTOR

LET's join a group of Air Force Reservists about to undertake a realistic rescue training mission in "enemy"-controlled territory:

The big Jolly Green Giant rescue helicopter stood in a clearing in the Michigan woods, its rotors turning slowly. Its crew and a team of four pararescuemen waited for daylight to fade before the next stage in their mission: the ten-minute flight from a "safe" area of the war zone to a point the PJs had designated as "Alpha"—in territory where "aggressor" forces were known to be operating.

In planning the rescue mission, the PJs had selected Alpha as the primary "insertion" point. If Alpha proved to be "hot" with enemy activity, the team had the option of two other preselected alternates. The mission called for the PJs to be inserted into enemy-held territory, after which they were to maneuver to a downed aircrew of two "survivors" and shepherd them to a pickup point for "extraction" by rescue helicopter.

"Okay," said the PJ team leader, "let's crank it up." In the growing darkness, the Jolly lifted in a swirl of dust from the clearing's scrub surface and headed north.

Being described here is one of a long list of training objectives devised by planners of the Air Force Reserve's 403d Rescue and Weather Reconnaissance Wing, headquartered at Selfridge ANGB in Michigan. Eleven months had gone into planning the Combat Rescue Training Exercise, dubbed Condor CRTE '82. The wing-size exercise took place this past spring during a two-week encampment at Phelps Collins ANGB in northern Michigan *(see also p. 67)*.

The first such exercise conducted by the 403d took place in 1977 and involved fewer than 150 Reservists. It was planned by two of them and executed within thirty days with only aircraft from the wing's Selfridge-based 305th Aerospace Rescue and Recovery Squadron participating. This year's Condor CRTE was the seventh in the series

and involved more than 1,000 Reservists, Air Guardsmen, and active-duty Air Force participants, among others. To indicate growth, this was double the number of those who took part in the wing's previous CRTE two years ago. For CRTE '82, more than forty Reserve and ANG aircraft were on hand at various phases of the exercise.

The night had arrived—moonless and overcast—perfect conditions for an insertion.

At the Alpha clearing all was quiet, and on landing the PJs—in camouflaged combat fatigues and heavily laden with equipment and weapons—quickly scrambled out of the aircraft to form a security perimeter for the few moments before the Jolly Green rose into the night sky for return to base.

During ground missions in daylight, pararescuemen observe strict silence and communicate by hand signals only. At night, though, whispered consultations are necessary at times and thus the PJs put their heads together to nail down several details before moving off into the bush.

This night, the four Reservist PJs slipped into the woods in Indian file as they had been trained: point man, compass man, team leader, and rear guard.

Besides representatives of the 403d Wing's four squadrons—one each located at Selfridge, Homestead AFB, Fla., Portland IAP, Ore., and March AFB, Calif.—blue-suiters arrived at Phelps Collins from all over the country to attend CRTE '82. For example, a C-130 from March had swung by McChord AFB, Wash., to pick up twenty-nine Reservist firefighters. Their first trip to a CRTE, they manned the fire equipment at Phelps Collins.

Among the airlifted equipment were five HH-1 Huey rescue helicopters from the wing's Portland squadron, brought in by C-5. (One Huey made the trip in cross-country legs, a grueling effort for the crew.)

Massachusetts's 104th Tactical Fighter Group, one of the first ANG units to be equipped with the A-10, provided aircraft for the close-support role.

Army personnel acting as aggressors came from the 1st Infantry Division, Fort Riley, Kan., and Special Forces from Portland IAP, Ore., Fort Bragg, N. C., and elsewhere.

Participating observers joined the exercise from Hq. AFRES, Robins AFB, Ga., and from MAC's Aerospace Rescue and Recovery Service headquartered at Scott AFB, Ill.

Clockwise from above, A-10 "Sandy" provides escort and close air support for the search-and-rescue task force; HH-3Es conduct refueling operations; pararescuemen study map during field exercise. Far left, an HC-130 acting as "Kingbird" for mission command control and communications—a vital element in combat rescues.

Under the canopy of trees, the PJs' vision was almost nonexistent. But even in darkness, the pararescuemen knew how far and fast they could move over a specific type of terrain. In mission planning, Intel (Intelligence) had provided the map coordinates locating the downed survivors (actually a pair of aircrewmen chosen arbitrarily for the role and inserted previously).

During planning, the PJs had charted a zigzag course to the survivors' position using prominent terrain features as guideposts and making use of heavy undergrowth for cover. The team traveled 1,700 meters that night and hit all its map reference points. The PJs then holed up to get some rest and await the dawn, spelling each other on lookout.

"The primary purpose of Condor CRTE '82 was to provide our aircrews with realistic rescue training under simulated combat conditions and to develop close cooperation among all support personnel and all elements of a search-and-rescue task force," commented Col. Richard L. Hall, 403d Wing Commander who has been instrumental in developing the exercise's broad scope and depth.

The foundation of the exercise was an elaborate intelligence scenario—typical of a large-scale military training deployment. The 403d Wing's involved two fictional countries, Trozia and Brendland, at war. Detailed were the history, geography, economics, military power, climate, etc., of the two, with Brendland receiving the support of US forces against the aggressor Trozia.

While daily briefings by Wing Intel kept abreast of the progress of the "war," the rescue helicopter and fixed-wing aircrews were kept uninformed as to what missions they would fly until alerted.

The tactics stressed during CRTE '82 were those that have evolved since the Southeast Asia experience, when combat search and rescue came into its own and, in the latter stages of the war, received crucial setbacks because of more effective enemy countermeasures based on such technologically advanced weapons as shoulder-fired surface-to-air missiles.

In those days, and in retrospect,

Clockwise from top, a C-130 landing on a logistics mission—typical AFRES training conducted parallel with Condor CRTE '82; conducting maintenance in chemical warfare ensemble; in gas masks repairing a "downed" aircraft; Jolly Green Giant flight engineers fired machine guns on every rescue sortie.

USAF photo by SSgt. Ernest H. Sealing

USAF photo by SSgt. Ernest H. Sealing

there were instances when rescue aircraft and crews were lost in the sheer determination to accomplish the mission in the face of impossible odds. The tactics utilized for search-and-rescue training during CRTE '82 were based on lessons learned in SEA and refined since.

Many of the rescue procedures developed in SEA, however, are still valid in certain circumstances. For example, ideally, a search-and-rescue task force would consist of a mix of aircraft with varying roles. Over all would be a rescue C-130 acting as "Kingbird" or airborne mission commander in direct contact with the Joint Rescue Coordination Center. The JRCC, under a wartime setup, would be linked to a Tactical Air Control Center so that such resources as A-10s or other close-support aircraft could be allocated for rescue missions to safeguard the slower-flying helicopters, supplement their firepower, and provide fire suppression against enemy ground activity. (Whatever the aircraft type, they're known as "Sandys" in rescue jargon.)

Other support aircraft in the task force might include a SAC KC-135 tanker and Forward Air Control aircraft (an OA-37 FAC operated during CRTE '82). Almost certainly a C-130 tanker would be airborne to refuel the helicopters.

But at the heart of any rescue mission would be the helicopters—the longer-range and aerial refuelable HH-3 Jolly Greens and the smaller HH-1 Hueys.

A major endeavor in assessing a rescue mission would be to determine the seriousness of the "threat"—singly or in combination—of enemy surface-to-air missiles and other antiaircraft weaponry, small-arms fire, and perhaps hostile attack helicopters. (The last are potentially a formidable adversary because of their mobility and ability to give chase. They are also capable of using terrain-masking or clearings for concealment to lie in wait—with rotors turning—in ambush.)

Under ideal conditions, a number of Sandys would escort a pair of rescue helicopters.

"And while we might go in with 'guns blazing' as in earlier days," said Col. Gerard J. Braun, Commander of the wing's 305th Aerospace Rescue and Recovery Squadron and Director of Operations for CRTE '82, "we wouldn't commit forces if it simply wasn't practical. More and more emphasis is being placed on clandestine operations."

Thus, the four PJ Reservists found themselves in the Michigan woods on a chilly spring night. They had struggled through the underbrush loaded down with equipment and were fighting a losing battle against swarms of mosquitoes immune to insect repellent. "In moments like that," said PJ TSgt. Paul Columna, in civilian life a firefighter/rescue paramedic in the Miami area, "a Reservist might be excused for asking himself: 'What the heck am I doing here?' "

Sergeant Columna is quick to point out that it is also moments like that that forge the bonds of camaraderie with teammates.

In moving across country on rescue training missions—as they would in combat—the pararescue teams seek out hardship. "We make use of the worst possible terrain," said Sergeant Columna. "We know that psychologically the enemy doesn't like to be in there any more than we do. Among other things, we steer clear of roads that are likely to be patrolled," added the ten-year PJ veteran.

"During our mission in CRTE '82, the aggressor forces used searchlights and small-arms fire in a 'creeping line' hoping to draw our fire. But our weapons are strictly for defense; we avoid contact with the enemy if at all possible."

The central core of CRTE '82 operations was the JRCC, located in the Phelps Collins ops building on the flight line. In it were assembled Intel, weather, the Command Post, and a Crisis Action Team, a sort of brain trust in rescue mission planning expertise. The JRCC kept aircraft and personnel resources sorted out and generated missions to satisfy inputs by the exercise director's staff, located at an "off-limits" site further down the Phelps Collins flight line. The staff fed the JRCC information piecemeal until enough had been received on which to plan a mission. The JRCC staff—with special emphasis on the Intel function—was drawn from the squadrons, wing headquarters, Hq. ARRS, and also included several mobilization augmentees. "Because of all this diverse expertise working shoulder to shoulder, the JRCC operation was much more than the sum of its parts," commented Colonel Braun.

At CRTE '82, the weather station was manned by Individual Ready Reservists Majs. Ronald G. Wong and David Koehler. They forecast local weather conditions important to the exercise, such as winds that posed a threat to paradrops and the timing of sunset and sunrise for PJ insertions and extractions.

An important task of the JRCC as a lesson of the SEA experience was the creation of "authenticator" files, coded data whereby rescue forces can be absolutely certain of the identity of a downed aircrew member.

"During CRTE '82 we kept a Kingbird airborne in the battle vicinity," said Colonel Braun. "In that aircraft was the airborne mission commander and essential communications equipment. Through Kingbird, information is transmitted to the JRCC about downed aircrew. A wingman may have seen him go in and plotted the map coordinates. Or transmissions may be picked up from the emergency radio. Or perhaps a fix may be made on the downed pilot's beeper," Colonel Braun added. "In any event, it is the JRCC's job to assess—based on Intel input concerning enemy threats and other factors—whether a rescue should be attempted and, if so, task the mission with the appropriate resources. We might not be able to assemble an ideal search-and-rescue task force because mission density has stretched us thin. Possibly we might have to scrape together what we have and go with that."

During CRTE '82 there was considerable suspense at the JRCC. The exercise director was calling the shots from the Master Event Scenario List developed by exercise planners, and the JRCC staff had no prior knowledge of what the missions would entail.

Thus, realism was emphasized and "the exercise provided the best combat training the wing aircrews have ever had, with pilots being issued sidearms and survival vests on

Left, PJ-qualified Capt. (Dr.) Craig Silverton chutes up for a training jump to retain AFRES qualification in that mission specialty. Above, SrA. Susan Powers, left, makes a point about sharpshooting on the small-arms range at Phelps Collins ANGB.

every mission and with loadmasters drawing both sidearms and M-16 rifles," commented Colonel Braun. "M-60 machine guns were mounted in the Jollys and fired on every mission.

"In one instance, a C-130 crew on the ground came under simulated aggressor attack and was declared wiped out by the trusted agent on the scene," said Colonel Braun, "and for the first time during a CRTE, wing maintenance people were issued field equipment and weapons to provide their own security and were airlifted into the countryside to recover a 'downed' aircraft."

Their mission was to assess the repairs required on a "downed" helicopter (blade damage and malfunctioning hydraulic pump and starter) and then fix it. As one later related, the tent shelter provided saw little use as most were manning the perimeter against nighttime attacks by the aggressor force. On occasion, maintenance folk in the field *did* get "aggressed" and fought back.

In one field scenario of several involving chemical warfare, the maintenance crew was notified by trusted agent that a mortar round containing chemical agents had exploded nearby. They were then air-evacuated for decontamination, and another group replaced them in the field to complete the repair task.

Flight-line maintenance in general was undertaken with the professionalism, based on long years of experience, for which AFRES and ANG units are justly noted. The A-10 unit from Barnes Field, Mass., brought its own people along to Phelps Collins, while the 403d Wing's fixed-wing aircraft and helicopters were placed in the care of those drawn from the four squadrons, depending on specialty.

"Our job was to keep those aircraft sortie-ready, as in a combat situation," said Capt. Andrew Sentgeorge of Homestead's 301st ARRS. "We didn't wait on conventional logistics parts replacement. In one instance we needed a helicopter strut and cannibalized it from an aircraft at Homestead. There were, of course, the routine logistics flights from Selfridge," he added.

"Despite not knowing each other, our maintenance people pitched right in and, if need be, worked two twelve-hour shifts around the clock to keep everything flyable," Captain Sentgeorge stressed. "In the matter of maintenance officers, it was planned deliberately to assign pure Reservists and leave the technicians at home," explained the young officer, who in civil life is an engineer with Pratt & Whitney.

In a support innovation at CRTE '82, a PERSCO van (for Personnel Support of Contingency Operations) was airlifted via C-141 to Phelps Collins from Hq. MAC at Scott AFB, Ill. The van, with its power trailer, has been designed to be driven to remote sites.

"This was the first time a Reserve or Guard unit has had this kind of computer support during an exercise," said Maj. Roger H. Bosse, 403d Wing Director of Personnel.

With the van came 1st Lt. John DeBack, chief of automated personnel contingency systems, Hq. MAC; MSgt. Russell Davidson, also Hq. MAC; and SSgt. James Hendershott, a computer operator for MAC's 1500th Computer Services Squadron at Scott.

"The van was used to keep track of personnel at the exercise and gave the regular Air Force an opportunity to work with the Reserve and Guard to identify problems," commented Lieutenant DeBack. Added Sergeant Davidson: "It provided usable information in a timely manner. For example, the computer storage contained the identity, unit, and duty title of all those who participated in the exercise" and this data was readily available for access by exercise staffers.

In the early hours of the next day, the team of Reservist PJs established radio contact with the two survivors. After interrogation by the pararescuemen it was decided that the area was too hot with aggressor activity to attempt a linkup and the survivors were told to lie low to await a quieter time. At the designated hour, the PJs came up on their radio and, with Kingbird relaying messages, were instructed by the JRCC to terminate the mission and head for the extraction point.

Once the decision was made not to attempt a linkup, a similar, preplanned zigzag course was followed to the primary helicopter extraction location, pickup point Delta. When it became apparent that the team would not make Delta on time, it came up on the radio to inform Kingbird that the extraction would "flip"—slip—twelve hours. Kingbird thus informed the JRCC, which

was keeping tabs on the mission and coordinating the extraction.

At the appointed time, a Jolly Green arrived at Delta on cue to return the team to base.

"During Condor CRTE '82," said 403d Wing Commander Colonel Hall, "there were two equally important groups of objectives. One group concerned the 'war game' and its realistic combat rescue sequences that also stressed heavily the support activities. In terms of AFRES requirements, the exercise provided an arena, say, for A-10 pilots to requalify in the close air support function.

"The other provided typical Reserve training to keep people current in their specialties. For example, wing people qualifying on the small-arms range at Phelps Collins.

In another example, AFRES training requirements meshed beautifully with the exercise: C-130 pilots undertaking logistics flights as a means of logging required training brought in spare parts needed to keep our aircraft ready for the exercise's simulated combat sorties."

Along with the search-and-rescue training missions conducted from Phelps Collins were two adjuncts that added additional realism to CRTE '82.

One concerned the use of the Army's airfield at Grayling, Mich., as a forward operating location (FOL) into which were rotated as many as possible of the wing's helicopters. One objective, among others, in using the FOL was to test JRCC communications command and control in organizing a search-and-rescue task force composed of elements from Phelps Collins and Grayling Army Airfield.

"The coordination in launching and controlling extraction missions worked very smoothly and we'll be able to apply our experience to broaden future exercises," said Lt. Col. Charles F. Srull, the wing's Assistant Director of Operations. "We were able to pick up all the survivors we went after. Everything meshed nicely."

In all, the Grayling training area is composed of about 250 square miles of ranges, with the tactical ranges offering such simulated targets as radar vans and other vehicles. Strafing scoring is accomplished electronically. Grayling's year-round ranges are favorites of fighter units from the tri-state area of Ohio, Indiana, and Michigan.

The second realism-adding ac-

Phelps Collins ANGB and Its Ranges

In an area of northern Michigan where farming, light industry, and tourism provide a slender economic base, the township of Alpena has a major advantage: nearby Phelps Collins Air National Guard Base.

Throughout the year, ANG and AFRES units occupy the base while conducting field training exercises on huge ranges that Phelps Collins controls in upper Michigan. The 3,217-acre installation is leased from the county, and the base's runways, the longest of which is 9,000 feet, are shared with the local municipal airport. While the base was able to accommodate in its barracks and other quarters the more than 1,000 Reservists who participated in CRTE '82, the money spent outside the gates was of considerable benefit to the surrounding community.

The Phelps Collins ANG complex is located west of the flight line, which has lining it a fire station, control tower, operations building, and five general-purpose structures. The ops building, which houses extensive communications equipment and a weather station, served as the 403d Wing's Rescue Coordination Center during CRTE '82. The other buildings along the flight line provided headquarters and maintenance areas for the helicopter squadrons, the C-130 squadrons, and the close-support fighter units. In the midst of an adjacent barracks area are two dining halls.

"The base has been stocked with all types of equipment so that a visiting unit's airlift is kept to a minimum to hold down expenses," commented Capt. Armando Rosado, the base's director of resources. "For example, in our motor pool are 150 vehicles, including pickup and refueling trucks, buses, vans, and the like. We also have available such heavy equipment as snow plows, bulldozers, and cranes.

"The base also has a fuel dump for JP-4 storage and a number of aircraft ground starting units. Visitors can avail themselves of our sheet metal and machine shops, tire shop, and photo lab," Captain Rosado noted.

Phelps Collins also has a fully equipped hospital, including a dental clinic and laboratory. There is a small-arms range with twenty-five firing points and issue .38 pistols, M-16 automatic rifles, and shotguns are available.

"When visiting units arrive," said Lt. Col. David B. Roebuck, the base's executive officer, "they take over the running of the base and we become the tenants. For example, Lt. Col. William Dudley, Commander of the wing's 403d Combat Support Squadron, became base commander. In financial terms, we 'rent' our base to deploying units," added Colonel Roebuck.

While the base's extensive facilities are being added to and improved, according to the two active-duty Title 32 officers, the base's appeal to visiting units lies in the nearby training airspace it controls. This consists of the Grayling air-to-ground range, overwater Great Lakes ranges, and a number of areas suited for ground operations. Airspace ranges up to 45,000 feet. Additionally, the ranges are located in sparsely populated areas, away from high-density air traffic. Every type of military flying training can be accommodated, including high-speed low-level and low-altitude navigation.

The terrain is also reminiscent of that found in many parts of Europe.

"Large units undertaking major deployments like the 403d have the opportunity at Phelps Collins to exercise their support elements, which they rarely can do at their home stations," said Captain Rosado.

The permanent base staff consists of fifty-two military and twenty-six civilians, including security personnel. The civilians are federally funded Michigan civil servants. The two officers cite the professionalism of their enlisted force, founded as are many ANG and AFRES units on longevity of service. "This comes into play in solving the problems of visiting units," Captain Rosado commented.

The base's tower is manned by active-duty Title 32 air traffic controllers weekdays during daylight hours. They are augmented during deployments by active-duty military ATCs from such units as the 3d Combat Control Group, Tinker AFB, Okla.

Phelps Collins is one of four such bases operated by the ANG. The others are at Savannah, Ga., Gulfport, Miss., and Volk Field ANGB in Wisconsin.

Among other base facilities are a chapel, BX, theater, lighted tennis courts, softball diamonds, basketball and volleyball courts, and a jogging track. There are a number of lounges and recreation centers.

The base is named for Capt. W. H. Phelps Collins, killed in France in March 1918 while serving with the US Air Service.

tivity at CRTE '82 was the performance of aggressor forces staged from the Army National Guard's Camp Grayling. About fifty people acted as the enemy force and were commanded by Maj. Bill Peden of the wing's 304th Aerospace Rescue and Recovery Squadron, Portland IAP, Ore. These included about a dozen Army Special Forces, who as a sideline conducted classes in unconventional warfare. Their students were pararescuemen rotated to the aggressor force for field training during the exercise. Among them were a dozen or so "pups" (as newcomers are known in PJ lingo) who were then able to apply in a counterforce role their knowledge of PJ procedures during ground missions plus the added Special Forces lore.

"The aggressors just didn't wander around the woods at random," remarked Bill Peden. "They operated in conjunction with the exercise director's staff and only 'aggressed' where and when ordered. As trusted agents, they knew where and when missions were coming in and thus were able to 'tailor' aggression to the situation."

Besides the ground troops at his disposal, Major Peden had several HH-1 Hueys used to conduct Soviet attack helicopter tactics against the rescue force aircraft.

"This type of training—meeting the enemy face to face—is very important, especially to us as a Reserve unit," commented Bill Peden. "We have only the two-week summer session to try to give everyone some realistic experience. Fortunately, we had the flexibility to keep things running smoothly by rescheduling if, say, bad weather caused a glitch in operations," he added. "Also during CRTE '82, for the first time a series of events depended on what had preceded it. For example, in previous exercises if we missed a pickup, we simply brought the survivor in from the field by helicopter at day's end. In CRTE '82, he remained in hiding overnight and we rescheduled the extraction mission for the next day." ("Wild Bill" Peden doubled as governor of Trozia, the aggressor country, and was duly "assassinated" by raiding "guerrillas" during the exercise.)

To ensure a smooth operation, Major Peden and his group were connected by telephone "hotline" with the exercise director's staff. The Army Reserve Special Forces personnel and other trusted agents were able to coordinate efforts on a daily basis through terminals linked via orbiting satellite.

Another first during CRTE '82 was the combined use by aggressors of the Air Force active-duty Red Eye surface-to-air radar simulator and its missile simulator counterpart, Smokey Sam. During the exercise, on "valid" tracking of rescue aircraft by Red Eye, some 108 Sam rockets were launched to indicate the rescue forces had come under enemy attack. CRTE '82 was the first exercise other than Red Flag in which Sam, on loan from a US Navy depot and operated by one of its ordnance civilians, was on hand to simulate a Soviet SA-7 ground-to-air missile.

Once back at base, the PJ team was interrogated by Intel. "Debriefings in our view are almost as important as the mission itself," commented Sergeant Columna. "Because the team has actually been over the terrain, it can inform Intel about enemy activity it has observed. It also knows what the ground cover is like and any threats that might be hidden by it. The team can note problems encountered with equipment and what needed equipment was lacking. All of this is important if a second rescue mission is to be attempted," added Sergeant Columna.

"Thus, while the primary objective of the mission—the extraction of the two survivors—was not accomplished, valuable information was attained and the rescue team got away without casualties," noted Sergeant Columna.

The success of any endeavor depends on the motivation of the people entrusted with it. No exception to this rule was CRTE '82 and the Reservists who participated in it. Following are minibiographies on several of the 403d Wing's extraordinary people encountered during the course of CRTE '82.

Consider SrA. Susan Powers, who stands five feet four inches tall and weighs about 110 pounds. Despite her diminutive size, and apparently with considerable grit, she overcame all obstacles to become a uniformed member of the Detroit Police Department. The six-year police veteran has made her share of arrests and has earned a citation for foiling an armed robbery.

But that's not all. Two years ago, Airman Powers realized a life-long ambition of a separate career with the military when she joined the Air Force Reserve. "I wanted work related to but not in law enforcement," she recalls. "So when the recruiter suggested a small-arms specialty, I accepted," Airman Powers said. She now teaches small arms—including the intricacies of the M-16 automatic rifle—at the 403d Wing. During CRTE '82 she taught classes and helped supervise use of the Phelps Collins firing range. Airman Powers's next objective is to earn a commission.

Then there is MSgt. Mike French, an Air Reserve Technician who is NCOIC of the PJ Section with the 301st Aerospace Rescue and Recovery Squadron, Homestead AFB, Fla. Despite the loss of toes from frostbite following an accident that killed a companion while mountain climbing in Argentina several years ago, Mike French continues to climb mountains for recreation and as a PJ teaches snow and ice rescue techniques.

SSgt. Andrea J. Shafron in civil life hopes to transition from what she considers the unsatisfying—although lucrative—world of data processing to a more people-oriented occupation in public affairs. At CRTE '82, she was among the some 100 people supporting the three C-130s provided by her home unit, the 913th Tactical Airlift Group of Willow Grove ARF, Pa.

Sergeant Shafron filled in at the wing public affairs office set up at Phelps Collins as both writer and photographer representing her unit. She considers her AFRES training as helping to further her transition plans. Sergeant Shafron has applied for a commission in her AFRES specialty.

Capt. (Dr.) Craig D. Silverton can be considered extraordinary by any standard. One of the few officers to complete pararescue training and don the PJ's distinctive maroon beret, in civilian life he practices emergency medicine in Flint, Mich. Like

C-130 pilot Maj. Philip A. Smith, Jr., scans terrain while flying rescue tracks in a precise pattern searching for "survivors"—403d Wing aircrew selected at random and "inserted" in the Michigan woods during Condor CRTE '82.

many others, he had a hankering for an association with the military—preferably with an elite unit. He got wind of the Air Force's PJ program and made up his mind.

Commissioned because of his medical background, Captain Silverton overcame many obstacles to become PJ-qualified. Especially in the PJ enlisted career field, with its extended period of strenuous physical and other training. This has been followed in the course of duty by periodic stressful workouts—water jumps, for example—to keep current in the slew of PJ specialties.

Early on, Captain Silverton had some support from the blue-suit community, and eventually his PJ application was given the nod by AFRES Commander Maj. Gen. Richard Bodycombe. "In training, exceptions had to be made for me all along the way. For example, gaining permission to eat in enlisted dining halls," Captain Silverton recalls.

At Selfridge, Captain Silverton is assigned as a wing flight surgeon and mentor to the 403d's PJ Sections in honing their medical skills. There might be an element of pique in some quarters regarding this highly visible officer, but at least several PJs interviewed during the course of researching this story indicated they are firmly in "Doc" Silverton's camp. "He thinks like a PJ," commented one with unabashed approval.

But that's not half of it. As a Reservist, Doc Silverton has carved out his own military medical specialty: the treatment of chemical warfare casualties, which is a very sensitive subject these days following confirmation by some authoritative voices of the use of chemical warfare agents in various third-world countries.

Since the best medicine is preventive medicine, it follows logically that Captain Silverton would be interested in procedures and equipment that would *forestall* chemical warfare casualties. He is, and is developing a full program of instruction—including video presentations—on the subject.

"The idea is to get chemical warfare instruction out of the classroom and into the field," said Captain Silverton, "with everyone at least familiar with the subject and with the equipment and procedures we've already developed."

To this end, he instigated a half-dozen chemical-warfare-related scenarios during CRTE '82, involving decontamination procedures and wearing protective garments and ensembles. One easily recognizable—and major—headache to such training is the extreme discomfort of wearing such clothing even for short periods, especially in warm weather.

Another highly visible Reservist is MSgt. William E. Kratch, whose "Kratchmobile" communications jeep-mounted equipment provided novel communications via orbiting satellite during CRTE '82. The value—and future potential—of this creative and visionary Reservist's contribution has already been noted in higher Air Force circles. For a separate story about Sergeant Kratch, see p. 70.

During CRTE '82, the Kratchmobile was in use for short periods to relay intelligence to forward operating locations. Frequencies were also available immediately had a genuine emergency occurred, such as injuries or the actual loss of an aircraft.

Besides the conventional military radios, also on hand at CRTE '82 were two stationary ground terminals that, like the Kratchmobile, were operated in conjunction with an ATS-3 orbiting satellite. On loan from NASA, they were also used to relay information as well as range safety. They, too, could have immediately come into play in a real-world emergency. One was operated by the exercise director's staff and one was sited with the FOL at Grayling Army Airfield.

The terminals were operated under the supervision of Ben Bemis, under contract to NASA and senior field engineer with Westinghouse Electric Corp. At CRTE '82, Mr. Bemis participated in a combat search-and-rescue exercise for the first time, although he's had previous experience in rescue work. He provided communications through four such terminals in the wake of the Mount St. Helens eruption when members of the 403d Wing played such a crucial role, including employment of the Kratchmobile, during rescue operations.

Mr. Bemis is on call twenty-four hours a day in the event of a national emergency. "When collapsed, the terminals can be packed in three suitcases and shipped as baggage on commercial airliners," he noted.

One communications objective during CRTE '82 was the exercise of such security procedures as encrypting and decoding radio traffic.

In explaining procedures in preparation for a linkup mission, Sergeant Columna commented: "Once a PJ team is picked for a mission, it

will suddenly disappear from the PJ base area. That's so any snooper can't keep track of our comings and goings. The team will be in isolation planning the mission. The only outside contact will be with the PJ Mission Commanders who oversee all missions as tasked by the Rescue Coordination Center Mission Commander. This is to prevent the mission from somehow being compromised.

"Enormous detail, much of which has to be committed to memory, goes into planning a mission," continued Sergeant Columna. "For example, we'll memorize the terrain we'll be crossing. A great help in this are the aerial reconnaissance photos we are provided. We'll memorize the radio frequencies we'll be using and the times we have slated to come up on the radio. Most important, we'll memorize the information used to authenticate the survivors. In aerial pickups, the PJs' final authentication must take place while the survivor is in sight," added Sergeant Columna.

As part of the emphasis on escape and evasion during CRTE '82, aircrews and Intel personnel were addressed by Claude Watkins, a POW in Germany during World War II, and Lt. Col. Donald "Digger" O'Dell, USAF (Ret.), a prisoner in Southeast Asia. The two rendered accounts of their experiences in captivity.

Mr. Watkins, a former B-17 gunner, is currently head of the Air Force Intelligence Service program on survival, evasion, resistance, capture, and escape at Fort Belvoir, Va.

Colonel O'Dell, a six-year veteran of the "Hanoi Hilton," is now the civilian public affairs officer for the Michigan ANG's Detachment 1 at Selfridge.

Providing guidance for survivors—selected at random from among aircrews—were instructors from the Air Force's Survival School, Fairchild AFB, Wash. But they weren't always around to help (although all survivors were "shadowed" in the field to ensure that the less-experienced in outdoors matters were kept out of harm's way). Lt. Col. Robert Klein, Commander of the 327th Tactical Airlift Squadron, Willow Grove ARF, was inserted as a survivor equipped with a survival vest and the problem of making his way back through enemy-controlled terrain—a three-day trek.

A feature of CRTE '82's ground activities was the establishment and use of an escape-and-evasion net maintained by Special Forces. The E&E net—which used various structures in the Grayling area—was supported by a guerrilla force made up of Special Forces and survival instructors. These positioned survivors for insertion in the net; people who made it through the net were guided by guerrillas to an extraction point.

According to Sergeant Columna, the pararescue people are looking ahead to more advanced equipment to help in their mission. For example, pocket calculator-type devices that would ready messages for burst transmissions from ground radios to evade interception; camouflaged and bulletproof vests and ammunition pouches; removable backpacks for hauling equipment; and voice-keyed radios that leave both hands free while transmitting. The obvious advantages for this last include being able to support or care for the wounded while retaining transmit capability.

In its logistics shopping for CRTE '82-related necessities, the 403d Wing had ordered 700,000 gallons of JP-4 aviation fuel. It was needed. The search-and-rescue force alone flew 556 sorties during 880 flying hours. Overall—including support flights—CRTE '82 generated 731 sorties in 1,331 flying hours, a strong showing in anyone's exercise book.

Last month, at the Air Force Association's annual National Convention in Washington, D. C., AFA's Air Force Reserve Outstanding Unit Award was presented to the 403d Wing. The citation accompanying the award read in part: The 403d Wing "distinguished itself by outstanding achievement from 1 April 1981 to 31 March 1982. During this period, the wing and its assigned units participated in numerous humanitarian missions, flying 234 sorties totaling 524 flying hours, which resulted in the saving of fifty-eight lives. . . ." ■

IT WAS 1972, and Bill Kratch was returning from a search mission bone-weary and depressed.

The mission had been typical for Sergeant Kratch's Reserve unit, the 303d Aerospace Rescue and Recovery Squadron at March AFB in California. Bill Kratch had flown as a systems operator aboard an HC-130 launched in response to a request for assistance by civil authorities searching for a downed private aircraft.

The plane had been found, but its occupants, a young boy and his parents, were all dead. There was evidence, though, that had the ground search party reached the scene sooner, the boy's life might have been saved.

Or so Bill Kratch believed. The culprit, in his estimation, was the lack of radio communication between the ground party and search aircraft. A communications gulf also existed between civilian rescue organizations and their military counterparts, a situation that had long troubled Bill Kratch.

The four-year-old boy's seemingly needless death triggered in Bill Kratch the intent to do something about closing the communications gap. Bill knew, for example, that the radios then operated by military ground rescue elements predated 1950 and were, in his word, "junk." He also knew that the technology to remedy the situation was in hand. It simply needed to be assembled in a workable fashion from mostly off-the-shelf components. For the next two years, Kratch conducted his crusade alone.

In 1974, he teamed up with another Reservist, flight engineer MSgt. John Irsik, and the project began to roll. From depots the two scrounged high-frequency radio and other telecommunications equipment that the Property Disposal System had declared unrepairable. They repaired it. They did the same with a junked jeep that had been scratched from the inventory. Their idea was to combine the two elements to provide mobile ground rescue communications capabilities far more advanced than anything then in use. It would also be a system that could be airlifted aboard Air Force HC-130 rescue aircraft.

The two first demonstrated what has become known as, among other

A visionary Reservist whose ingenuity and perseverance have contributed immeasurably to search-and-rescue communications capabilities and thus to untold future lives saved, MSgt. William E. Kratch has already been effective in dealing with disaster. Witness the Mount St. Helens volcanic eruption, when it was the . . .

'Kratchmobile' to the Rescue

BY WILLIAM P. SCHLITZ, SENIOR EDITOR

things, the "Kratchmobile" in 1975 at Hq. MAC, Scott AFB, Ill. There, MAC's Aerospace Rescue and Recovery Service quickly accepted the idea of developing advanced mobile ground rescue communications equipment and gave Kratch and Irsik the green light.

Thereafter, the two involved themselves and the Kratchmobile in every civilian and military emergency that came their way. They had access to all radio frequencies used throughout the military services and by such organizations as the Civil Air Patrol and local law-enforcement agencies. They could talk to a county sheriff in his cruise vehicle, for example. Yet, a substantial chunk of communications capability remained out of reach.

Early in 1978, Kratch & Co. upgraded their vehicle when Hq. USAF and Hq. AFLC authorized the acquisition of a commercial CJ5 jeep, deemed best suited for their requirements and the airmobility role of rapid deployment in emergencies. The problem then was to adapt their electrical and communications elements to the AMC-built vehicle's system. With this accomplished, the new Kratchmobile went operational in mid-1978.

In 1979 came another major breakthrough. The largest single civilian agency of its kind, the National Association for Search and Rescue, and NASA extended the Kratchmobile's horizons by allowing access to the first and very-advanced L-band frequencies aboard orbiting satellite ATS-6. This provided hemispheric communications capabilities.

Meshing with the satcom proved fortunate, for they were prepared to respond to the Wichita Falls, Tex., tornado disaster that June. "This was the first time as far as we know that satellite communications came into play in disaster relief," noted Sergeant Kratch. During the same emergency, a similar communications vehicle that had been added to the inventory of the 305th Aerospace Rescue and Recovery Squadron, Selfridge ANGB, Mich., was deployed to Austin, Tex. The Kratchmobile concept had taken hold.

Since then, Kratchmobiles have been around, with a list of participation in civil emergencies and military exercises far too long to catalog here. Let several examples at home and abroad suffice.

A Kratchmobile was airlifted to Panama during the evacuation of American citizens following the seizure of the US Embassy in Nicaragua in 1979.

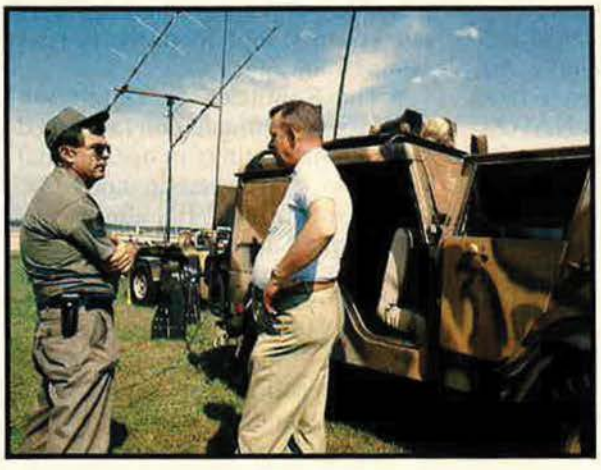
Now beaming off the ATS-1/ATS-3 Applied Technology Satellite, the 303d's vehicle most notably served during the Mount St. Helens emergency when it was able "to bring all rescue resources—civilian and military—under one hat," commented Sergeant Kratch. In this effort, conventional ARRS combat rescue techniques were applied, with a C-130 "Kingbird" providing wings for the airborne mission commander who was responsible for controlling some 100 aircraft operating in the area each day. (It was in the aftermath of the May 18, 1980, Mount St. Helens eruption that members of AFRES 403d Wing [*see also p. 69*] earned a host of decorations for their rescue achievements.)

By this time, Kratch & Co. could "remote" from their vehicle via a console linked by a 210-foot cable that allowed them to operate from a field shelter or command post. "During the span of the Mount St. Helens emergency, we operated nineteen to twenty hours a day with no equipment failures," added Sergeant Kratch.

Currently, the AFRES 403d Wing has been authorized four Kratchmobile vehicles, one for each of its squadrons. It is anticipated that Wing headquarters itself eventually will be similarly equipped. This will make the wing not only the only unit in AFRES but throughout the entire Air Force having such communications capabilities. (This situation may prevail only temporarily, since Hq. USAF has the system under consideration for implementation service-wide. The Army's High Technology Division also has a study under way.)

More parochially, at this writing plans were being finalized for the appearance of Sergeant Kratch and his vehicle for demonstrations at AFA's National Convention in Washington, D. C., in September.

Air Reserve Technician MSgt. William E. Kratch is currently serving as a Communications Management Specialist with 403d Wing headquarters, while John Irsik continues in a Reserve role at March AFB, Calif., where it all began. ■

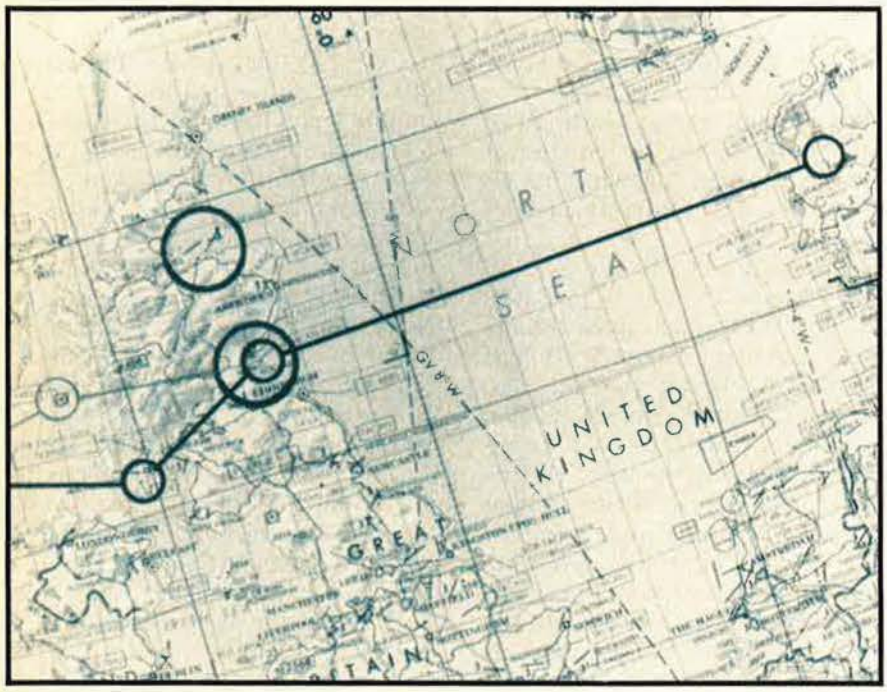


MSgt. William E. Kratch and his "Kratchmobile," ground mobile communications tailored expressly for search-and-rescue missions, but finding extensive employment in civil emergencies. Sergeant Kratch, a nineteen-year veteran of rescue work, is shown here at Condor CRTE '82 with Ben Bemis, senior field engineer with Westinghouse Electric.

The bragging rights belong to those ANG Kentuckians charging off . . .

Into the Wild Bluegrass Yonder

BY ERIC CLYDESDALE



Turn right at Edinburgh and press on to further achievements. In-flight route map for the 123d Tactical Reconnaissance Wing en route to Best Focus 82, the international photo recce competition. (Photo by Richard Shock)

You can count on these Kentuckians to go all out in whatever they do, whether it's flying a photo-recce mission or keeping their shot records up to date.

That's why the 123d Tactical Reconnaissance Wing, Kentucky Air National Guard, was chosen to represent the United States in NATO's "Best Focus 82" photo-reconnaissance competition. It's also why the Spaatz Trophy, which honors the top Air Guard flying unit in the nation, is again on display at the 123d's headquarters at Standiford Field in Louisville. (Kentucky had won it previously in 1950 and in 1965.)

Among the other achievements clicked off by the 123d en route to the Spaatz Trophy:

- Capts. Don Goley and Paul Rhodes were best aircrew in the annual "Photo Finish" tac reconnaissance tournament, scoring 602 of a possible 640 points to beat out both active-duty and Reserve Forces competition.
- The Kentucky Air Guard and all of its subordinate units received "excellent" ratings in operational readiness, management, and stan/eval inspections. "It's almost unprecedented for an entire wing to have such consistently excellent results," says Brig. Gen. Carl D. Black, 123d Wing Commander.
- TSgt. Todd H. Beasley of the wing's recruiting staff was named ANG outstanding recruiter of the year. Little wonder. He and his colleagues recruited 227 new people last year, enough to put the manning roster above 100 percent, the highest level in unit history. The retention rate is an impressive seventy-six percent. And Beasley still found time for NCO Academy Leadership School, graduating—of course—tops in his class.
- The wing also led all ANG units in the nation in professional military school attendance, won its third Air Force Outstanding Unit Award, and raised $2,500 for youth programs in just one of its numerous community service projects, the annual Bean Soup Feast. The list of accomplishments goes on and on. And the Ken-

TSgt. Nancy Marchand (right) leads a group of Kentucky Air Guardsmen in preparing cole slaw during the unit's annual Bean Soup Feast. The event raises money for disadvantaged children. In 1982, the unit raised more than $2,500 in its effort. (Louisville Courier Journal photo reprinted by permission)

TSgt. Mike Yahne of Kentucky looks on as a Danish pilot looks for his target. In Best Focus 82, the flying and photo interpretation teams had an international composition. (Photo by RDAF Karup Photo Lab)

tuckians really did get an "attaboy" for keeping their shot records current.

Above all, this is a wing that can fly and photograph with the best of them. Said Norwegian Lt. Gen. I. T. Narvhus to the Kentuckians at the end of "Best Focus 82" at Karup Air Station, Denmark: "It's quite a feat for part-time personnel to drop into the European environment and impress all the other competitors as you have done." Goley and Rhodes, the winners from "Photo Finish," were on the winning international team at Karup, too.

The Kentucky wing does a great deal of flying—logging more than 4,000 hours and more than 2,700 sorties in the RF-4C aircraft for the year ending June 30. That wasn't flying around the flagpole, either. The itinerary included Red Flag, Quick Thrust, Bold Eagle, and Gallant Knight exercises. Deployments far exceeded what is normally expected of an Air Guard unit.

Before losing an aircraft because of material failure in flight last May, the 123d Wing had flown 34,419 accident-free hours, its last previous loss being back in November 1974.

In addition to the wing troops and the 165th Tac Recce Squadron in Louisville, the wing has four subordinate units out of state: three tactical reconnaissance groups—the 152d in Reno, Nev., the 155th in Lincoln, Neb., and the 124th in Boise, Idaho—and a reconnaissance technical squadron, the 123d in Little Rock, Ark.

Maj. Gen. John B. Conaway, Director of the Air National Guard—and a former vice commander of the 123d Wing—didn't hear any arguments recently when he proclaimed: "Kentucky is one of the most outstanding reconnaissance units in the world. Period."

And a spokesman for the wing says the 123d is looking to still bigger and better things. Those Kentuckians don't believe in letting the bluegrass grow under their feet. ■

After the eight-hour flight from Karup, Denmark, Capt. Paul Rhodes enjoys an opportunity to stretch. Part of the smile, though, is because Rhodes was navigator on the winning international team at Best Focus 82, held in Karup. (Louisville Times *photo by Todd Buchanan)*

World War II was coming. Hal George was determined that strategic airpower requirements not be lost in ground-based thinking. Racing the clock, he and his team produced AWPD-1 . . .

The Pioneer Plan for Air War

BY DE WITT S. COPP

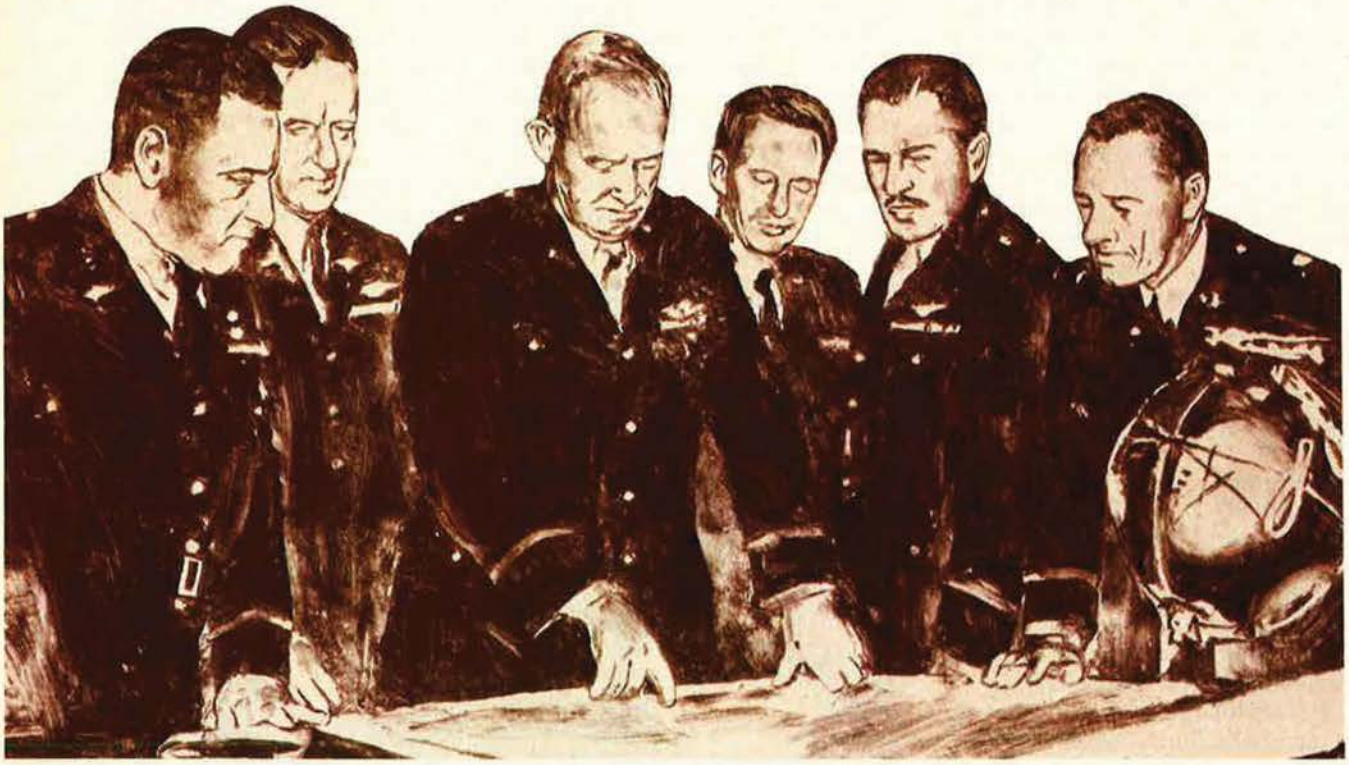
Editor's Note: This article is an excerpt from the book Forged in Fire *published by Doubleday this month. It is the second of a two-volume work on the development of US airpower, written under the auspices of the Air Force Historical Foundation.*

THE genesis of what became known as AWPD-1 lay in the long-expressed complaint by successive Secretaries of War and their key military advisors that the White House did not have a consistent and clear policy with regard to the war. As Secretary of War Henry L. Stimson viewed the situation, there was a dangerous state of drift, a failure by President Roosevelt to provide a plan and a stirring call for united action. As he sourly put it: "The President takes his advice from the last person he speaks to."

Army Chief of Staff Gen. George C. Marshall expressed his frustration in similar terms: "First the President wants 500 bombers a month and that dislocates the [production] program. Then he says he wants so many tanks and that dislocates the program. The President will never sit down and talk about a complete program and have the whole thing move forward at the same time."

The result, as Secretary of State Cordell Hull continued to repeat wearily, was that "Everything is going Hellward."

The problem at its simplest was that the country had a President who was willing to go to war and a citizenry that was not. The public clung to the belief that the involvement of American forces could be avoided, the attitude best reflected by the August confrontation in



Hal George, left, and his colleagues present AWPD-1 to Generals Spaatz and Arnold (center). The next step would be to sell the proposal to General Marshall—who could flatten the whole effort with a shake of his head. At right are "Possum" Hansell, Larry Kuter, and Ken Walker. (Illustration by Ken Krawczyk)

the House of Representatives, where by a single vote the draft law was retained.

Although the German invasion of the USSR took some of the pressure off the British, as the summer ran on it appeared that both countries were on the brink of disaster, and President Roosevelt was anxious to act vigorously on their behalf.

Overall Production Requirements

Some months earlier, as a result of General Marshall's worry that he could not legally request funds for an Army larger than 2,800,000, President Roosevelt had asked both services to make studies of the production

There had never been such a plan. There was no formula to follow.

and force requirements needed to defeat the Axis. In May, Marshall and Chief of Naval Operations Adm. Harold Stark asked their staffs to begin work on strategic estimates for an orderly production expansion, but it was not until the Soviet Union was invaded that any real momentum developed in the endeavor. It began on July 9 with a secret request by Roosevelt to Stimson and Secretary of the Navy Frank Knox asking them to have drawn up "overall production requirements required to defeat our potential enemies."

The following day, in a fateful but seemingly unrelated event, Lt. Col. Harold L. George arrived in Chief of the Air Staff Brig. Gen. Carl "Tooey" Spaatz's office, atop the Munitions Building. He had relinquished command of the 2d Bomb Group, at Langley Field, Va., to take over as chief of the newly established Air War Plans Division (AWPD).

During the 1930s, Hal George had spent five years at the Air Corps Tactical School, first as Chief of the Bombardment Section and then as Director of Air Tactics and Strategy. He headed a small cadre of exceptional officers who were refining the air warfare theories of Douhet, Mitchell, and Trenchard.

The philosophy had long been infused in the minds of Army air leaders, most of whom either had attended the Tactical School before its doors were closed, in 1940, or had served in Gen. Frank Andrews's GHQ Air Force. Gradually, the attitude in the War Department, which for years had steadfastly rejected the doctrine of strategic bombing, *had* shifted to a greater awareness of the role strategic airpower would play should the United States become involved in the war. Marshall, as noted, was in the forefront of this changing view.

Still, the two schools of thought were far apart. Ground officers could argue with pointed accuracy that in France, and now in Russia, German airpower was tied to the unparalleled sweep of the Wehrmacht and not to bombing far-distant industrial targets. In this latter regard they saw that England had withstood a siege of sixty-seven consecutive nights of bombing while its industry continued to operate and its public remained undaunted.

Prior to the formation of the Army Air Forces and the new Air Staff, the Army's General Staff and its War Plans Division dictated and controlled overall Air Corps policy. Now the principal areas of AAF personnel, intelligence, operations, training, and supply were under the direction of the Air Staff. But what of Air War Plans?

Maj. Gen. Henry H. "Hap" Arnold, as Deputy Chief of Staff for Air, was officially appointed a member of the Joint Army-Navy Board on the same day Roosevelt asked for an assessment of what it would take to win a war. Arnold expected that plans for an air war would be drawn up in the War Plans Division of the War Department, and that is the way it would have been in the momentous weeks that followed had it not been for Hal George. Few realized that the opportunity George was about to grasp would be as important in its ramifications as the reorganization of the air arm itself.

In Name Only

When he reported to Spaatz, Hal George found the largest part of his division was its name. Besides himself, the Air War Plans Division consisted of three officers: Lt. Col. Howard Craig, Chief of the "Projects Group;" his assistant, Lt. Col. Orvil Anderson; and Lt. Col. Kenneth N. Walker, who was the sole member of the War Plans Group. Walker, a very close friend, had been a senior instructor at the Air Corps Tactical School when George was a student there. Like George, he was imbued with an abiding—even overwhelming—faith in the doctrine of strategic airpower.

They were soon joined by a fourth member cut out of the same strategic mold. He was Maj. Haywood S. "Possum" Hansell, Jr., former instructor at the Air Corps Tactical School at the same time George and Walker were teaching forbidden theories. Hansell, younger, a crack pursuit pilot in spite of his bombardment convictions, had been serving in the equally small Air Intelligence Division, heading up a section on strategy and analysis. He had just returned from England loaded with RAF Intelligence digests on German industrial targets. George wanted him on his team.

In fact, because Craig and Anderson were fully occupied on projects in being, it was a three-man team until it became a foursome through a request that another old friend and colleague from the Tactical School, Maj. Larry Kuter, be assigned. Kuter had remained with G-3 after Andrews's departure. He and "Possum" Hansell had been classmates at the Tactical School, and Kuter, having graduated at the head of his class in 1935, was asked to remain as a bombardment instructor.

The President had specified that he wanted the production estimates in a matter of weeks. Under whatever time limits, the order was viewed in the War and the Navy Departments as staggering. To begin with, the members of the Joint Army-Navy Board knew that there had to be a military strategy on which to base production

and manpower figures. The only guidelines were Rainbow 5, at best a broad contingency plan, supported by the general agreements reached with the British in the American-British Conference No. 1 (ABC-1) talks back in January, when US and British planners had secretly met to discuss joint strategy. The overall concept was that offensive war would be waged against Germany and Italy while defending against Japan.

Army War Plans Chief Brig. Gen. Leonard T. Gerow saw the President's directive as an unusual challenge, for this was the first time in US history that a war plan on a global scale had been asked for. To head the group undertaking the massive job, he appointed a very savvy and gifted major, Albert C. Wedemeyer. Wedemeyer, a West Point graduate and career officer, had spent two years (1936–38) at the German War College in Berlin, and, as a result, his insight into German military thinking, particularly with regard to the USSR, was broader than that of most of his colleagues. Unlike his well-known father-in-law, Lt. Gen. Stanley D. Embick, he had a broad appreciation of airpower and an understanding of its strategic use.

The ranking air officer in the War Plans Division was Lt. Col. Clayton Bissell, combat veteran, Billy Mitchell aide, and bomber proponent. Wedemeyer expected that Bissell and other air personnel assigned to the Division would prepare an "Air Annex" that would be appended to the Army estimates. But their numbers were few and they needed help.

Gerow called Arnold to ask if the air corps could supply assistance. At about the same time, Bissell stopped by to see George and said: "Hey, Hal, how about your team coming over and working under us? It's a helluva big job."

What Is the Air Objective?

George didn't like the idea at all. He went to "Tooey" Spaatz and told him why. It was obvious the Army would base its estimates on the size of the ground forces it had to defeat. It would do the same when figuring air strength, and it simply couldn't be done that way. There was no record to show how many fighters you needed to shoot down one bomber, or how many bombers you needed to destroy a target when the bombers were flying under varying circumstances, in varying numbers, and with differing range and firepower.

The War Plans Division had never undertaken a study of the industrial and economic vulnerability of Germany and Japan from the point of view of aerial attack in order to establish priorities. The Air Corps Tactical School had, and Hansell's intelligence work of the past two years was a continuation of it. Certainly there were those in the War Plans Division who understood all those factors and would attempt to take them into account, but overriding all else was the question: What is the Air Objective?

Spaatz and George were combat veterans of the First World War, and veterans of all the lean, hard years in which they had labored and fought to establish an air objective. Hal didn't have to spell it out for Spaatz. If the War Department prepared the Air Annex, the emphasis was bound to be on tactical air strength as an auxiliary support of the troops. Strategic airpower would be secondary.

If, on the other hand, the Air War Plans Division prepared the estimates, the balance would be there, and for the first time in history the strategic component would become the principal air objective. It was a thunderous opportunity, and Spaatz, not blinking an eye, said they'd better talk it over with Arnold.

It might seem that Arnold would automatically accept the idea, but George was worried. Arnold was one of the few early airmen who had not attended the Air Corps Tactical School. That didn't mean he wasn't in favor of what was taught there, but George believed that the impatient Arnold was not excited by long-range plans. That "Possum" Hansell had been innovative enough to get target information on German power-generating plants by going to New York banks once involved in their financing and asking for blueprints was the sort of action that made Arnold grin. But contingency plans for far in the future when he was tied up with God-awful production problems right here and now! What the hell, let WPD handle it! Or so thought Hal George and his confederates. Happily, they were wrong.

Exactly a Week

As it turned out, Arnold cagily suggested to General Gerow that since the War Plans Division was swamped with its task of preparing the requirements for an Army that would number millions, the Air Staff could take over responsibility for drawing up air requirements. Gerow accepted. He asked only that Rainbow 5 and the ABC-1 agreements be used as guidelines. Later, Hal George was to praise "Hap" Arnold for having brought off a momentous coup, but it was George who recognized the opportunity and alerted Spaatz and Arnold.

On August 4, George's quartet of airmen went to work on the air war plan. They had exactly a week to do the job.

Rainbow 5 and ABC-1 called for providing air forces in the Western Hemisphere; an air offensive against Germany while preparing to invade the Continent; close support for the invasion and subsequent ground operations; and air defense and support for strategic defensive operations in the Pacific.

The imponderables were vast, for as Hansell put it, "There were no commonly accepted formulae for such things as: (1) the method to be employed in the air offensive; (2) the specific objects to be sought; (3) the targets to be attacked; (4) the size and composition of the air forces; and (5) the timing of the various major strategic operations, including the mobilization date, the

---

DeWitt S. Copp was an Army Air Forces pilot during World War II. He has written numerous books and screenplays on military and civil aviation. Mr. Copp has served in Europe and the Far East as a newspaper and magazine correspondent. In researching A Few Great Captains *and* Forged in Fire, *he used many previously untapped sources, including personal diaries, newly declassified documents, and interviews with many of the characters in the books. He and his wife Susan live in Manchester, Vt.*

outbreak of war, the buildup of all forces, and the final surface offensive against the Continent. The best we could do was develop our own formulae based on our critical experience at the Air Corps Tactical School, our belief in the potential of strategic bombardment, and our own experience.

"Perhaps no other military operation in all of history presented such an awesome task without providing a usable past experience and at least a few lessons of history. . . . But if the task was staggering, so too was the opportunity. In a very real way, we sensed that the future of American airpower depended, in large part, on what we accomplished. . . . "

At the beginning, they gave their study the somewhat deceptive title "Munitions Requirements of the Army Air Forces to Defeat Our Potential Enemies." A big question was the time left before the United States entered the war, and, here again, from some crystal ball in the War Department came the date of April 1942.

But, to the air planners, it was as much a matter of *what* as it was *when*. What types of aircraft would be coming off the production line around which they could build the air offensive against Germany? For the immediate future there were the B-17 and the B-24, and beyond them longer-range, more-powerful bombers were in development—the Boeing B-29 and the Consolidated B-32. At the very time George and his team were weighing the problem, Assistant Secretary of War for Air Robert Lovett was meeting with Chief of the Army Air Corps Maj. Gen. George Brett and Wright Field engineers to review design studies of a bomber (eventually the Consolidated B-36) with a 10,000-mile range carrying a 10,000-pound bomb load. Like the B-29, it would have a pressurized cabin.

The impetus to get going on the plane was stimulated by the realization that if Germany defeated the Soviet Union and then forced England to surrender, the United States would stand alone and in need of a truly intercontinental bomber. But such equipment could not be ready for several years under any circumstance, and the planners knew that in the interim they must base the offensive against Germany and Italy—and the defense of the hemisphere and the Philippines—on the B-17 and the B-24. Even as they labored, the contradictory reports were coming back from England that the B-17 was being clobbered over Europe and the B-24 wasn't capable of even night operations.

Contradictory reports filtering through on the performance of the Fortress and the Liberator could not for one moment dissuade and/or deflect the planners from their determined course. They had no doubts as to the capability of the equipment involved or the tactics that should be employed. Their lives were meshed into the development of one end interwoven into the concepts of the other.

They were racing the clock, and their considerations were focused on the future, not on the piecemeal, misapplied expenditure of aircraft on which they were staking the cause of strategic airpower. If the negative reports on B-17 operations put furrows in "Hap" Arnold's brow, they simply bounced off the walls of the improvised Munitions Building war room, where they labored.

Aside from the shortness of time to finish the job, they were faced by another time factor. How soon after US entry into the war would the available forces be ready for operations? They saw as their main objective the destruction of German industrial might. To accomplish this goal, they broke down targeting into four major headings: the enemy's electrical power system; transportation system (railroads, highways, canals); oil and petroleum industry; and, contiguous with all three, the destruction of German interceptor defenses both on the ground and in the air. In all, 154 targets were selected, but central to the plan was the belief that not until the strategic force reached full strength could its effect be felt, and then only by no less than six months of sustained attack.

Marshall's reaction to the proposal would be critical—and his support vital.

The tentative date to begin large-scale operations was forecast as July 1943, with the six months of sustained bombing running from April through September 1944. This, predicted the planners, "would in all probability cause the collapse of the German military and civilian establishment." They also believed that its effect might well make it unnecessary for an army to invade the continent of Europe.

Huge by Any Standard

The numbers of men and planes arrived at to accomplish the global purpose were huge by any standard. More than 135,000 pilots and crews; nearly 900,000 technicians and ground crews; more than 60,000 nonflying officers. Aircraft in all categories were estimated at close to 70,000, with more than half the number designated for training. Replacement aircraft were figured at more than 2,000 a month. With these production figures and their breakdown as to location and type were included munitions estimates based on how often each target would have to be hit to keep it out of commission.

In this incredible compilation of production needs, attention was also given not only to the defense of the Western Hemisphere and the Pacific but also to tactical air support for the Army ground forces. The planners felt this last was the weak point, the Achilles' heel of their plan. They knew they were playing a numbers game. Give the Army what it wanted—tactical air forces in England and the Mediterranean—and perhaps they could get it through the War Department. Further, the Air Annex was supposed to be limited to production estimates. Instead, in making only the estimates, they

had seized fortune at the flood and, with Hal George leading, were attempting to ride the tide to a previously unacceptable air objective.

A Select Audience

They knew when they presented the plan the whole thing could be rejected—nullified—called back—canceled out, with the attendant effect on their careers. They did not have to remind themselves that they were proposing that the War Department abandon its prevailing doctrine that the principal use of army aviation was in support of the troops. What they believed was going for them was the nature of the war, the fact that airpower could be used against Germany long before an army would be ready to invade.

War Plans Division was operating flat out, and when AWPD planners officially submitted their massive document to Wedemeyer, his officers took the package, stamped it "Annex 2, Requirements of the Army Air Forces," and added it to their own bundle of papers.

Still, the program had to be presented to the high brass, and George decided they would put together a formal explanation of the plan with each of them describing a part of it. They would use maps and charts but no script or notes.

On Tuesday, August 12, the curtain went up for a select audience led by Brig. Gen. Henry L. Twaddle, Army Assistant Chief of Staff for G-3, and members of his staff. There was a nice Machiavellian touch in making the Army Chief of Operations and Training the first of the General Staff to judge the plan. Twaddle had formerly served under Andrews, and Larry Kuter had served under both. To Kuter, Twaddle was a friendly sort, an infantry officer more interested in self than in selflessness, but worth cultivating, a good man for an ambitious and enterprising major to be on friendly terms with. He obviously thought highly of Kuter's intellect and talents, and through their association knew something about airpower. It was he, after all, who had permitted Kuter to join AWPD. Therefore, with the thought that flattery might make Twaddle twinkle, they invited him to hear the war plan first. The presentation took two hours, Hal George acting as the keynoter.

There was little doubt that the assembled were impressed with what they heard, perhaps even a bit overwhelmed. In using the provisions of Rainbow 5 and ABC-1, George knew he was on firm ground when he described the primary air objective "to conduct a sustained, unremitting air offensive against Germany and Italy to destroy the will and capability of Germany and Italy to continue the war; and to make an invasion either unnecessary or feasible without excessive cost."

The first of several more demanding tests came ten days later when the plan was presented to a gathering that included General Gerow and Robert Lovett. The four knew they could expect strong support from the Assistant Secretary of War for Air, but Gerow was a big question mark. He, too, was an infantryman and, they figured, had an infantryman's way of looking at aviation.

Others thought differently. Known as "Gee" to his friends, Gerow, like Dwight Eisenhower, was considered by Marshall to be an intelligent and broad-minded officer. To the enormous relief of the air quartet he proved he was just that. Gerow had questions, as did others, but he seemed satisfied by Hal George's answers. When it was over, the planners felt they were past another mighty hurdle, but the biggest jump of all lay ahead.

On a Saturday, August 30, they went before Marshall and Arnold and a mixed General Staff, Air Staff, and civilian audience, including, among others, W. Averell Harriman, Roosevelt's Lend-Lease expediter. This was the critical point. Marshall could flatten them with the shake of his head. He listened intently as they explained. Then the questions from General Staff officers and war-production representatives began. The queries were hard and sharp and contentious. There was no hiding the fact, as Hansell phrased it in retrospect, that "our request was out of all proportion to the requirements brought forth by the Army and the Navy," which meant they were making excessive production demands at the expense of the other services.

"The Plan Has Merit"

When the questions and answers and objections died away, Marshall, who had remained noncommittal, rose and gave the verdict. "Gentlemen," he said, "I think the plan has merit. I would like the Secretary and the Assistant Secretaries to hear it."

Thanks to the perception of George Marshall, a roadblock was to be avoided. By directing that the plan be brought directly to Stimson, Marshall circumnavigated the Joint Army-Navy Board. He knew that if the admirals got their hands on the plan they would automatically reject it. The Navy was thinking in terms of ships and all that it took to build them; it saw no reason for Army Air to be any more than an auxiliary, as Navy Air was.

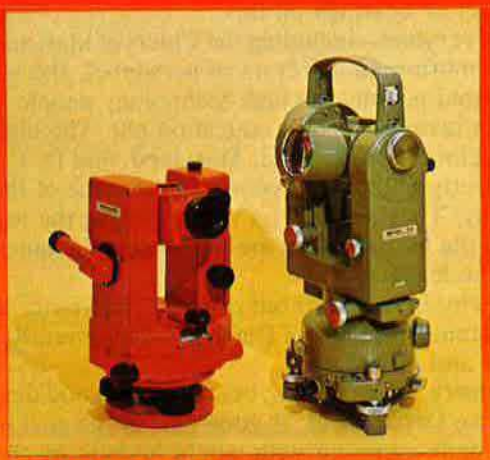
Marshall asked for a repeat performance and brought National Defense Advisory Commission overseer William S. Knudsen and his production chiefs. Gerow was there again, as was Arnold. Once more the searching questions, mostly from Knudsen and members of OPM (Office of Production Management), and once more the answers, this time well supported by Lt. Col. Edgar Sorensen's A-4 Division of the Air Staff.

Finally, on Thursday, September 11, the four weary planners accompanied General Marshall to Secretary Stimson's office and described what became known officially as AWPD-1. Said Stimson when they had concluded, "General Marshall and I like the plan. I want you gentlemen to be prepared to present it to the President. I will speak to him about the date. Thank you for coming to my office."

The four departed jubilant. At long last the use of strategic airpower had been officially accepted in principle by the Army. It was a thunderous victory! But one thing was sure: There was going to be a helluva fight with the Navy and the production people, not to mention the Lend-Lease eagles, in trying to implement the handiwork of Hal George, Ken Walker, "Possum" Hansell, and Larry Kuter.

The least they could do was take time to hoist a glass in celebration of having accomplished what many would have deemed impossible. ■

9 EDM OPTIONS



17 THEODOLITES

15 LEVELS

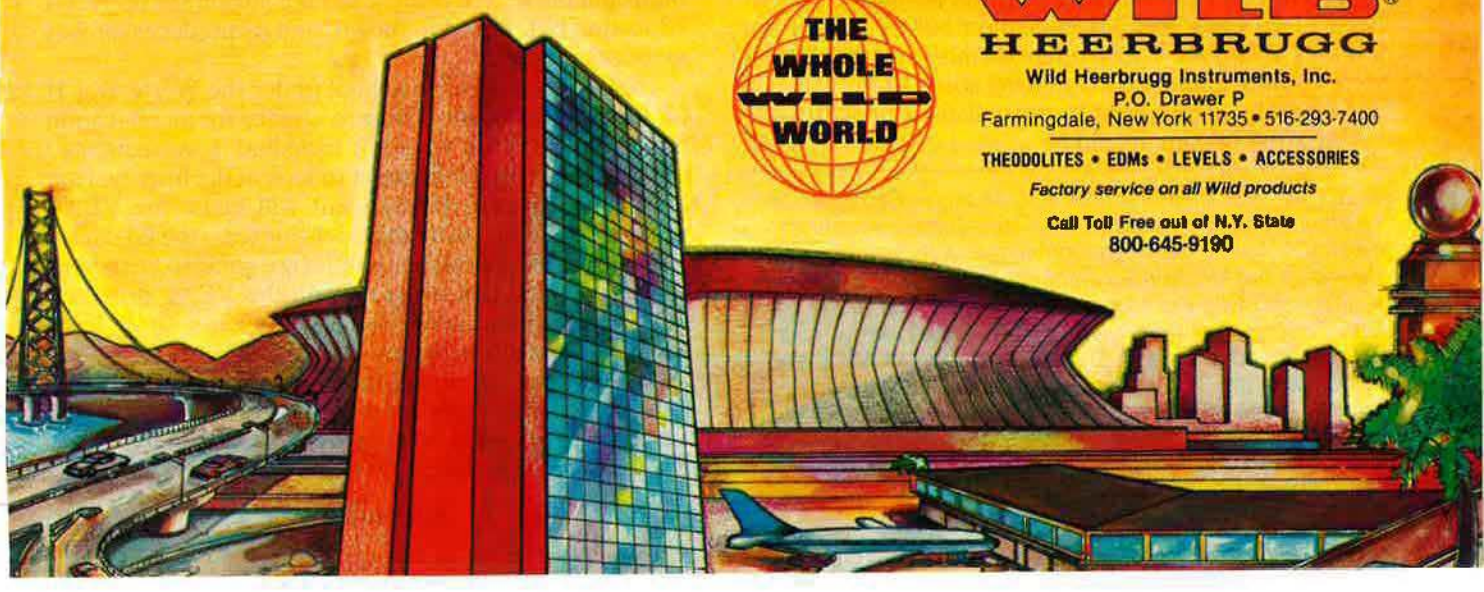
Only WILD gives you total coverage

Whatever you use — an EDM to lay out a subdivision or to prospect for natural resources; a theodolite for alignment or astronomical observation, or a level for road grading or optical tooling — Wild has you covered.

Wild instruments are recognized worldwide as the standard in the field. They're so well recognized that merely referring to a DI 4, T2 or N3 is sufficient to identify Wild anywhere in the world. This level of acceptance has been earned by Wild's long record of quality, accuracy and durability.

So, if you want an instrument that you can count on to meet your requirements now and tomorrow, investigate the whole Wild world with your authorized dealer today.

Plus the renowned WILD quality



THE WHOLE WILD WORLD

WILD® HEERBRUGG

Wild Heerbrugg Instruments, Inc.
P.O. Drawer P
Farmingdale, New York 11735 • 516-293-7400

THEODOLITES • EDMs • LEVELS • ACCESSORIES

Factory service on all Wild products

Call Toll Free out of N.Y. State
800-645-9190

Keep Pushing for the GI Bill

The veterans need it—and so do the services.

An Interview With Rep. G. V. "Sonny" Montgomery
By Esther Curtis and F. Clifton Berry, Jr.

AIR FORCE Magazine: Mr. Montgomery, how do you assess the present status of the "consensus for defense" that existed before the 1980 elections?

Mr. Montgomery: I think it's been eroded somewhat by the high interest rates and economic situation facing the country. Unless we can get the interest rates down and get the economy moving again, we might not have enough money to buy everything necessary for defense. It's awfully important to get the economy moving again, and to control federal spending.

That's why I support the Reconciliation Act and controlling the increased growth in federal spending. We're really not cutting back at all; we're cutting growth everywhere we can. I think generally the military programs will come out all right. There's a lot of money there, and it has to be spent wisely. I don't think we will hurt the effectiveness of the defense posture by the slowdown in growth of spending in the military budget.

AFM: Turning to educational benefits for service people, do you see them as expenditures or as investments in the future?

Mr. Montgomery: I think it's better to address them as investments in our young men and women who will be eligible for what we call the GI Bill of the 1980s. It's not originally my idea; it was President Reagan's idea. He said in 1980 at the American Legion convention that we need to go back to a GI education bill as part of our military strength. Then, other members of the House were coming to me in 1981, asking about a GI education bill. Therefore, we went to work and came up with a bill, because the President said he wanted it. That bill, H.R. 1400, was introduced. It makes a lot of sense, contains many new ideas, and addresses the educational needs of our military personnel.

The bill has been reported out of the House Armed Services Committee and the Committee on Veterans Affairs, but it is opposed by the top echelons of the Department of Defense.

AFM: What's been the reaction from people in the services?

Mr. Montgomery: We've had more extensive hearings on this bill, H.R. 1400, than any other piece of legislation that's been up, including the C-5B, AWACS, and anything else in the military field. We've held an unprecedented number of hearings on this.

Basically, everyone—including the Chiefs of Staff and the services' uniformed directors of personnel, the recruiters, enlisted people, the high-technology people—all testified in favor of this GI education bill. The high school counselors from Virginia, Maryland, and D. C., who deal directly with young people, gave some of the best testimony. They said, "You're not getting the top students into the military. You are not getting the quick learners or the leaders."

AFM: Then why is Dr. Korb out of step? [Lawrence J. Korb is Assistant Secretary of Defense (Manpower, Reserve Affairs and Logistics).]

Mr. Montgomery: I don't know, because it's a good deal for the Defense Department. A good part of the cost in the bill we finally came up with would be paid by the Veterans Administration. I don't understand it. They seem to look only at the numbers, and not consider the categories of the people they're getting now. Fifty percent of the people they are bringing in now are in Category III or IV.

We really need more quick learners, and we're not getting them. We are not getting any of the top students, because we don't have anything to compete with the regular nonobligation student loans and grants that the government sponsors. Perhaps we should take some of that money and put it into GI education.

The VEAP [Veterans Educational Assistance Program] that exists now is not working. DoD claims thirty percent participation, but fifty percent of those drop out. What Dr. Korb is doing over there [in the Pentagon] is not fair. He's almost saying, put in a dollar, and get a thousand back. They ought to take advantage of the GI education bill. It's well-known, and its predecessor was a success.

Their fathers went to school under the World War II GI Bill; it gave many of them a chance for an education that they otherwise wouldn't have had. I was educated under the GI Bill. OSD ought to look at the history. I am afraid the Defense Department will make the VEAP program a GI Bill, without benefiting from the GI name.

Actually, this bill [H.R. 1400] is not going to be so very expensive. You can do away with the VEAP program; that's $100 million saved. You can do away with the high-school education program; that's more money saved. And then, the retention factor is so great—and that testimony comes from enlisted people themselves—you save enormous sums by keeping those skilled people in. They say to themselves, "I've got to educate my kids,"

Rep. G. V. "Sonny" Montgomery (D-Miss.) is Chairman of the House Veterans Affairs Committee and a member of the House Armed Services Committee. A former brigadier general in the Mississippi National Guard, he retired in August 1980 with the rank of brigadier general in the US Army Reserve. His thirty years in the military, active and reserve, included duty in Europe during World War II and service with the 31st Infantry Division in the Korean conflict. In the 1970s, he was a leader in congressional concern for MIA/POWs and made twelve trips to Southeast Asia.

and you can promise them that with this bill.

AFM: You mean the transferability provision?

Mr. Montgomery: Yes. That really has a lot of merit.

AFM: What effect would H.R. 1400 have on the Guard and Reserve?

Mr. Montgomery: That's a very important point. It would make an unbelievable contribution to strengthening the reserves. The Reservists would earn educational benefits after different combinations of active and reserve service, and could begin using them while still serving in the Reserves, just as the active-duty forces could. They could start drawing at half the basic level after they had completed their basic training and six months service, and could continue as long as they stayed in their Guard or Reserve unit.

We'll have to wait and see the precise results, but I believe it will have a tremendous positive effect. The Army Reserve leaders, for example, believe that this program, modest as it is, would improve their recruiting 1,000 percent.

So it's a good deal for the long term. The argument from OSD is that they don't want to take the money out of certain accounts, so they tell the services to take it out of their hides, and to fund it on an accrual basis, that is, set aside funds now against the future. Secretary Korb is living in a dream world.

When the economy improves and young people can get civilian jobs, then recruiting will fall off. The numbers will decline because of that, and because fewer young people will be available in the population pool. Then OSD will come over here and say they want money to pay incentive bonuses to critical skills. They'll say they didn't have any trouble recruiting five years ago in 1982, but now in 1987 they have problems and want the money.

AFM: Will you cram H.R. 1400 down their throats?

Mr. Montgomery: I don't want to do that. I want to work with them if possible.

AFM: Are they showing any signs of working with you?

Mr. Montgomery: No.

AFM: What's the next step?

Mr. Montgomery: Mr. Nichols [Chairman of HASC Personnel Subcommittee] and I will decide when to bring a bill to the House for a vote.

AFM: Will you bring it out before October?

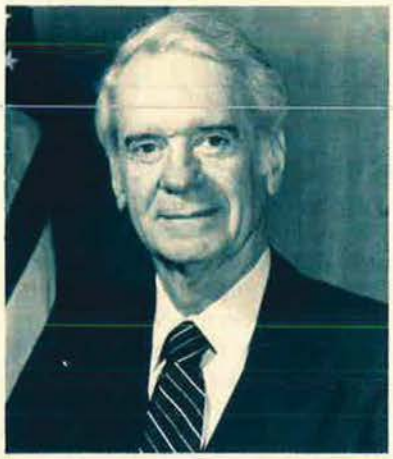
Mr. Montgomery: Yes, and probably with a suspension of rules. [*Editor's note: Under a suspension, amendments during House floor debate are prohibited.*]

AFM: What are the prospects for passage?

Mr. Montgomery: I can't predict. But I do know that the members of the House know that we need to improve the quality of our armed services. Now, so much time is spent on disciplinary matters. That hurts the strength of our armed services.

AFM: What can Air Force Association members do?

Mr. Montgomery: Keep pushing. The Air Force provided some of the strongest testimony during our hearings, especially Lt. Gen. Andrew Iosue of the Air Force, as well as the testimony of the Air Force Association. The Air Force does a terrific job in their recruiting and also they don't have some of the problems the other services do. But they still advocate and support the value of educational benefits for getting the top people and the quick learners into the service. That's vital now, given the nature of modern equipment.



Representative Montgomery: "We ought to learn from the Israeli experience—they fight well with limited numbers, because their people are intelligent and motivated."

We ought to learn from the Israeli experience—they fight well with limited numbers, because their people are intelligent and motivated. That's what we need to win.

AFM: Back to the Reserve Forces for a moment. What do you see ahead for them?

Mr. Montgomery: I've introduced a package that would provide certain health benefits for Reservists and Guardsmen. It's too early to tell the fate of those bills, but I believe they would help strengthen the Reserve Forces. [*Editor's note: The bills are H.R. 1491, 1492, and 1493.*]

AFM: In your opinion, how are the Reserve Forces carrying out their roles as part of the total force?

Mr. Montgomery: Very well. For example, the Air Force Reserve has had the best safety record of all components over the past couple of years. The Air Guard beat them this year, but not by much. I see no problems with their performance of the operational missions assigned. What Congress can do is examine their needs, and take the actions necessary to get them better equipment and necessary incentives.

AFM: What's your reaction to the reports that the Air Force plans to put the Air Reserve Personnel Center under the active personnel center?

Mr. Montgomery: I've heard that. But we'll do all we can to prevent that from happening. ■

Features of H.R. 1400, GI Education Bill for the Eighties

	General	Noncontributory
Basic (the recruiting incentive)		$300/month for 36 months, after 3 years of service.
Supplemental (the retention incentive)		$600/month for 36 months, after 6 years of service.
Transferability (career retention)		To spouse or children after 10 years of active duty.
Selected reserves		Basic for 2 years active, 4 years reserve; Supplement for 4 years active, 8 years reserve; One-half basic for 6-year non-prior-service reserve enlistees.
In-service use?		Yes, after 2 years.
Administration and funding		VA administers. VA funds basic, DoD all others.

Nuclear freeze partisans are regrouping for another attack. Meaningful arms control could be an unintended victim . . .

THE RIGHT FREEZE AND THE WRONG FREEZE

BY EDGAR ULSAMER
SENIOR EDITOR (POLICY & TECHNOLOGY)

EARLY in August, the US House of Representatives voted down, by an extremely close margin (204 to 202), an omnibus nuclear weapons freeze and arms-reduction resolution that President Reagan warned would have caused "dangerous asymmetries in the nuclear balance and a return to the flawed SALT II agreement." Additionally, he stressed, the resolution "would seriously undercut our negotiating position and reduce the chances for achievement of our objectives."

The closeness of the vote, in spite of all-out efforts by the Administration and the national security community to defeat it by a wide margin, guarantees that the nuclear freeze issue will figure prominently in American politics for some time to come, especially in the November elections.

Nuclear freeze advocates, in and out of Congress, treated the defeat of their resolution as merely a setback and threatened that the jihad they were mounting against candidates in the November elections who oppose the nuclear freeze would produce a drastic change in the makeup of the Congress next year.

As Congressman Edward J. Markey (D-Mass.), one of the standard bearers of the nuclear freeze movement, predicted bluntly, "when we come back here next year, we will have the votes not just to pass a nuclear freeze resolution, but to defeat first-strike destabilizing weapons." In that category, the nuclear freeze causists are known to include any new strategic weapon system, from MX and B-1B to Trident SSBNs and cruise missiles.

The consequences of the freeze as proposed in differing forms by various proponent groups both here and abroad were summarized tellingly by Gen. Jerome F. O'Malley, the Air Force's Vice Chief of Staff, when he said that at present such a scheme, "aside from the fact that Soviet compliance may not be verifiable, is simply not in our nation's interest." A freeze now, he added, "would leave us with a permanently weakened deterrent posture [and continue] the very vulnerabilities which we are making great efforts to overcome."

Further, General O'Malley believes that a freeze would "decrease the stability of the nuclear balance as Soviet defenses against our aging systems continue to improve." Possibly the most negative corollary of such an approach to arms control, he warns, is that it would give the Soviets, without cost, "their major objectives in the START and Intermediate-Range Nuclear Force [reduction] talks."

General O'Malley accused the advocates of an immediate nuclear freeze of "using a distorted set of arguments and playing upon a public fear of nuclear war, which they themselves arouse. They have changed the focus of the discussion from deterrence of nuclear war to the effects of nuclear war." They claim that "every weapon added to the stockpile decreases the chances for human survival." The disciples of the nuclear freeze movement reject—probably more for reasons of rhetoric than logic—the concept of deterrence, stability, and even improving the reliability and controllability of nuclear weapons.

The crux of the issue, the Air Force Vice Chief of Staff said, is that the US wants reductions in nuclear arms. But while negotiations are going on, General O'Malley stressed, "national security demands that we modernize our older and increasingly vulnerable strategic systems." The multifaceted strategic nuclear force modernization program, according to USAF's Vice Chief, does not "move us toward nuclear war, but away from it." Rather, this five-pronged program restores the "capability and credibility of our deterrent force."

In its zeal to halt the growth in nuclear weapons inventories, the nuclear freeze movement disregards the fact that the US strategic force modernization program—consisting of MX, B-1B, Trident II (D-5s), improved command and control, and revitalized strategic defenses—is as essential with current Soviet force levels as it is at the reduced levels that would ensue from the US objectives in the Strategic Arms Reduction Talks (START). The reason is that with reduced numbers of warheads on both sides, survivability and effectiveness become even more important than is the case with larger forces.

US START Objectives

As President Reagan announced prior to the beginning of START negotiations in Geneva, Switzerland, this effort is to complement such related discussions as control of intermediate-range nuclear forces, a proposed total ban on chemical weapons, and negotiations on reductions in conventional weapons. Dropped from the agenda—and presumably eliminated from further consideration—is a comprehensive test ban treaty that would preclude the underground testing of any nuclear device.

As State Department officials told the Senate Foreign

Relations Committee, the US approach to START pivots on the following eight specific criteria:

- The agreement must permit the United States to develop and possess sufficient military capability to deter the Soviet Union and to execute the US national military strategy, taking into account the military capability that would be allowed the Soviet Union under such an agreement.
- The agreement must be based on the principle of equality. Nothing less than equality is acceptable in the provisions of any future strategic arms-limitation agreement for military and political reasons.
- The agreement must promote strategic stability by reducing the vulnerability of US strategic forces.
- There must be effective verification with the necessary counting rules, collateral constraints, and cooperative measures.
- The agreement must lead to substantial reductions. The US took as a given that whatever unit of account was adopted should lend itself to substantial reductions below current levels of forces and that reductions should be to equal ceilings.
- The US must be able to explain the objectives and proposals in clear and simple terms to ensure that the START approach would enjoy broad public support.
- The US approach had to take into account those matters of particular concern to US allies, including the ability of the United States to maintain a credible deterrent, the relationship of the START approach to the intermediate-range nuclear forces negotiations, and the likelihood of success.
- A key need is to devise a sustainable position, which could provide a framework for detailed negotiations and the basis for an eventual agreement, even in the face of initial Soviet resistance. This means the position needs to be demonstrably fair, mutually beneficial, and realistic.

To achieve this objective, the US proposed to the Soviets in Geneva a practical plan for phased reductions of strategic weapons. This plan reduces the risk of war by negotiating significant reductions in the most destabilizing weapons possessed by both sides—their numbers, their warheads, their overall destructive potential.

The United States further proposed that, at the end of the first stage of START reductions, ballistic missile warheads be reduced to levels at least one-third below current numbers. The United States position also stipulates that, to enhance stability further, no more than half these warheads be deployed on land-based missiles.

Such an agreement, the Administration believes, can serve as the basis for negotiations leading to a second-phase agreement imposing equal ceilings on other elements of US and Soviet strategic nuclear forces, including equal limits on ballistic missile throw-weight at less than current US levels. In both phases, the US will insist on verification procedures to ensure compliance with the agreement.

As an ancillary to their nuclear freeze resolution in the House, some members of Congress as well as other freeze supporters urge the acceptance—either formally or informally—of the terms of SALT II on a permanent basis, which the Carter Administration withdrew from further consideration by the Senate.

The Administration, while not opposed to an informal, tentative compliance with SALT II as long as the Soviets do so also, treats that accord as seriously flawed. These flaws include the perpetuation and codification of dangerous, destabilizing asymmetries, illustrated by a unilateral Soviet advantage of 308 heavy ICBMs. It contains several ambiguities, particularly with respect to provisions for verification. It permits force expansion rather than achieving force reductions—it is possible that the Soviet ICBM forces alone could have grown to more than 8,000 warheads under SALT II.

The Flaws of SALT II

These flaws would have to be rectified: If the US were to propose changes to correct them, it is reasonable to expect that the Soviets would propose treaty changes of their own. Inevitably, this would lead to separate negotiations on this country's new START proposal. Even before the Soviet invasion of Afghanistan—ostensibly the reason for withdrawing the accord from further consideration by the Senate—there were strong indications that SALT II would not be ratified because of its flaws and ambiguities. Attempting to ratify SALT II now would only reopen that controversial debate—just at the time when the US needs to develop a broad consensus behind the START proposal.

Formalizing the SALT II Treaty now would make achievement of the goals for START more difficult by establishing unacceptable precedents for a future agreement. For example, the large number of Soviet Backfire bombers were not included in the aggregates for Soviet Strategic Forces in the SALT II agreement. These and other provisions would have to be changed later in START, vastly complicating the achievement of the Administration's goals. While adhering to these elements of SALT II would not impede progress toward START, codifying them most certainly would.

In addition, there is concern in Congress about possible violations of SALT II.

As Congressman David F. Emery (R-Me.) pointed out recently, "There is a strong case for investigating alleged violations in the following areas:

- "It has been reported that the Soviet Union has so completely encrypted the telemetry from the SSN-X-20 Typhoon SLBM that it is virtually impossible to determine whether or not the missile is a heavy SLBM, which is prohibited under SALT II. In addition, such encryption would appear to constitute illegal interference with the US National Technical Means of Verification (NTM), which is a violation common to several of the other examples I will offer.
- "It is reported that the Soviet Union has demonstrated a rapid reload and refire capability for the SS-18

ICBM, which would be a violation of SALT II prohibitions against reload capabilities for ICBMs.

- "The Soviet Union has reportedly so heavily encrypted the telemetry from the SS-18 in its latest modification that it is impossible to tell whether or not the SALT II rules on warhead types, numbers, and sizes for ICBMs have been violated.
- "It is reported that the telemetry from the SSN-19 SLCM has been so completely encrypted that we cannot tell whether or not the missile has multiple warheads or a range in excess of 600 km, both of which would be SALT II violations.
- "The telemetry encryption on the SS-20 IRBM appears to be so total that we cannot determine if its range has been extended or if the number of warheads has been illegally altered, in violation of SALT II.
- "The Soviet Union has reportedly stockpiled over 100 mobile SS-16 ICBMs, and it is further reported that 200 SS-16s have been deployed at the Plesetsk test range. The production and deployment of the SS-16 would be a SALT II violation.
- "The Soviet Union evidently made the false claim during the SALT II deliberations that they had no cruise missiles with ranges in excess of 600 km. In fact, it is reported that the AS-3 Kangaroo ALCM has a range of 650 km, and that it is deployed on Bear bombers, which are not counted as ALCM carriers under the SALT II Data Exchange of June 18, 1979. It would seem that, by a literal interpretation of SALT II, all of the Bear bombers (105 in number) capable of carrying long-range ALCMs should be counted against the 1,320 Soviet ceiling on MIRVed ICBMs and ALCM carriers.
- "It is reported that the Backfire bomber can carry the AS-6 ALCM, which reportedly has a range of 700–800 km. . . . The Backfire is not counted as a strategic bomber under SALT II, although its production rate is constrained. Thus, it would appear that the ALCM range prohibition has been violated in this instance, by a system which was not covered under the SALT II Treaty."

The "No-First-Use" Ploy

Running in tandem with the nuclear freeze movement is a campaign against the first use of nuclear weapons, especially so far as NATO is concerned. An excessive amount of deception underlies the chimera of a Soviet "no-first-use" policy.

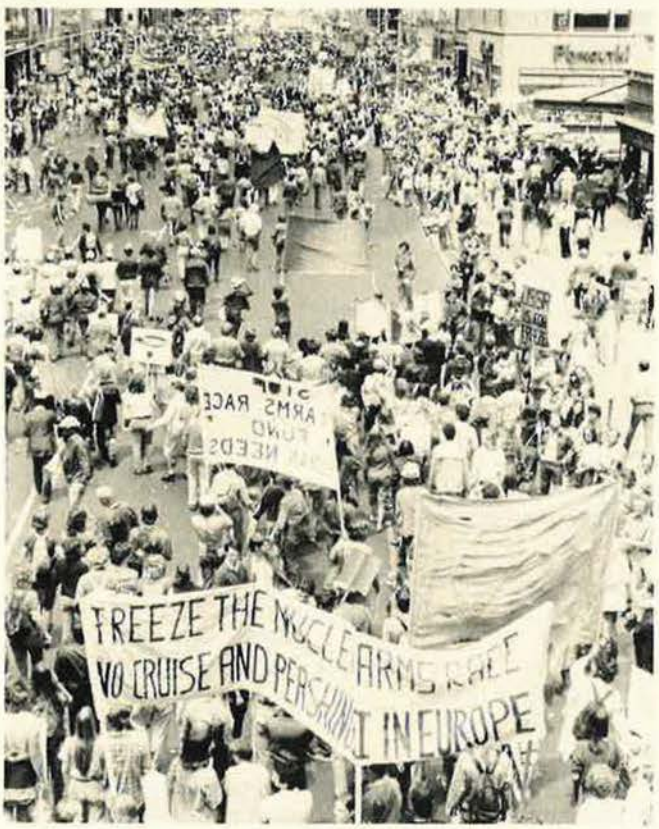
The North Atlantic Treaty Organization is a defensive alliance, with a long-standing policy that no NATO weapon of any kind will ever be used for aggressive purposes. As President Reagan stressed recently, "No NATO weapons, conventional or nuclear, will ever be used in Europe except in response to attack."

The US and NATO have maintained a doctrine of deterrence and flexible response which links or couples the US strategic forces with NATO's conventional and nuclear forces in Europe. The purpose of this doctrine is to deter any aggression.

The Soviets continue to maneuver toward a joint pledge of no first use of nuclear weapons, an idea that recently found a sympathetic echo in the US and other NATO countries. NATO has consistently rejected such Soviet proposals because a no-first-nuclear-use policy would undermine the Alliance's strategy of flexible response, necessitate large increases in expenditures for conventional forces, foster the impression that the US commitment to NATO has been reduced, and leave entirely to the Soviets the initiative and timing of conflict escalation.

In the last analysis, of course, NATO's policy of no first use of military force is more effective, credible, and workable than a promise not to use nuclear weapons after an attack has begun.

There is considerable irony in the fact that Soviet propagandists succeeded in hoodwinking vocal minorities in Europe and the United States into believing that



Smaller sign (center right) says "USSR is for Freeze." A freeze now would perpetuate the advantage of the Soviets, who have conducted a one-sided arms race for years. (Photo by Till Bartels)

it is NATO, rather than the USSR, that engages in nuclear sabre rattling and flexing its military muscle.

Former Secretary of State Henry Kissinger said it best in a lecture on public policy in Washington D. C.: "It is an amazing phenomenon, less than two years after Afghanistan, less than four years after Cuban troops under a Soviet general appeared in Ethiopia, six years after the same thing happened in Angola and while thirty-plus Soviet divisions are constantly bringing pressure on Poland, that at this moment there should be mass demonstrations all over Europe—affirming what?—the desirability of peace and implying that it is the United States which is the obstacle."

Another gambit played with considerable daring and skill by the Soviets involves suggestions to freeze long-range theater nuclear weapons at present levels. This, too, turned out to be a charade.

On March 16, 1982, the Soviet President, Leonid Brezhnev, in a speech before the Communist Youth League that Moscow billed as being of fundamental geopolitical importance, pledged to halt all further deployment of SS-20 nuclear-armed ballistic missiles in the Western region of the Soviet Union. The State Department, on the basis of crystal-clear intelligence, announced recently that the Soviet Union has violated this moratorium by deploying at least fifteen additional SS-20s during the past two months.

Behind the INF Reduction Talks

The real story behind the INF (intermediate-range nuclear force) reduction talks is this:

In response to the massive buildup of Soviet intermediate-range nuclear forces, the NATO Ministers agreed in December 1979 to modernize the Alliance's INF while pursuing US-Soviet negotiations on arms control involving these weapons. Accordingly, the US will deploy 108 Pershing IIs and 464 ground-launched cruise missiles (GLCMs) in Europe, provided there is no full arms-control agreement arising out of US-Soviet INF negotiations. This so-called "dual-track" continues to be the official policy of the Alliance.

The need for this modernization program stems from the fact that in the mid-1970s the Soviets began deployment of the three-warhead SS-20, exacerbating the threat to NATO and an already destabilizing imbalance in INF. They currently deploy some 315 SS-20s with 945 warheads in addition to 300 single-warhead SS-4 and SS-5 missiles, for a total of 1,245 warheads on longer-range INF missiles (not counting refires). NATO has no similar systems deployed. If deterrence is to be maintained, the Alliance must move to redress the imbalance, either through negotiation, or in the event that the threat is not eliminated as a result of a concrete INF arms-control agreement, through modernization.

The US is negotiating with the Soviets in Geneva on the basis of the President's November 18, 1981, proposal to cancel deployment of Pershing II and GLCM in exchange for elimination of all Soviet SS-20s, SS-4s, and SS-5s. The US is focusing on longer-range INF missiles because they are the most destabilizing systems.

This proposal, if carried out, would be a major step toward achieving stability at dramatically reduced levels of forces. During the first round of negotiations in Geneva, the US tabled a treaty that embodied this proposal. Both sides have had a chance to set forth their respective positions and to ask questions about the position of the other side.

However, Soviet proposals made thus far contain elements that cannot provide a basis for an equitable and verifiable arms-control agreement. A Soviet proposal outlined earlier this year would not require destruction of a single SS-20 missile, but would force cancellation of NATO's modernization program and virtual elimination of US nuclear-capable aircraft from Europe. The Soviet proposal is based on contrived claims that a balance exists in INF—it includes UK and French systems and calls for reductions from an unequal starting point which gives the USSR an overwhelming advantage.

A so-called "unilateral" moratorium on further deployment of Soviet intermediate-range nuclear missiles announced by Brezhnev likewise calls for a halt in NATO deployment preparations, but allows the Soviets to retain all their currently deployed INF missiles. The Soviet objective is clearly to forestall NATO deployment without sacrificing Soviet INF superiority. NATO must remain committed to modernization if it is to convince the Soviets that they have no alternative but serious negotiations toward reduced and equal limits.

In assessing the "peace pandemoniums" so calculatingly staged by the Soviets, the basic objectives that emerge are to weaken free world alliances, especially through the creation of rifts between the US and its allies, as well as to undermine popular support of Western European governments.

The Soviet Union clearly regards arms control as a competitive process which serves both political and military objectives.

Politically, the Soviet Union poses as a champion of peace and frequently advances propagandistic arms-control initiatives. Many of these are one-sided, impractical, unverifiable, and not really intended to control armaments or even to be adopted in practice.

At the same time, the Soviet Union also advances proposals that are aimed at achieving military as well as political benefits. The Soviets seek to place constraints on US technological advantages while protecting their own military advantages.

It follows that arms-control agreements with a highly secretive adversary like the Soviet Union cannot be based simply on trust. There must be effective means of verification that enable the US to know with confidence whether the terms of agreements are being honored. In practice, this means the US must be able to monitor activities in the areas covered by these treaties in order to detect any violations at a very early stage. Arms-control agreements that cannot be verified effectively are worse than no accords at all.

In the past, this nation relied primarily on national technical means (NTM) of verification, which are sophisticated data collection methods (such as photographic, electronic, radar, or seismic means) operated unilaterally by the US. As arms-control agreements become more complex, it may be necessary to supplement NTM with some form of "cooperative" measures of verification. The Reagan Administration, therefore, has made clear that the US will insist on verification procedures to ensure full compliance with the provisions of any agreement, including the possibility of measures beyond national technical means, to achieve US objectives.

To freeze the West's nuclear weapons unilaterally, or without an ironclad *quid pro quo* on the part of the Soviets, may sound attractive to those who believe in the creed "better red than dead." They may find out over time, however, that as former Secretary of Defense Dr. Harold Brown suggested sardonically, these may not be mutually exclusive conditions. ■

AIRMAN'S BOOKSHELF

A War in the Mideast

The Yom Kippur War, by Peter Allen. Charles Scribner's Sons, New York, N. Y., 1982. 310 pages with index. $17.95.

Prelude to the Yom Kippur War of October 1973 was the Six-Day War in June 1967 when Israel's preemptive attack against Egypt, Syria, and Jordan led to their resounding defeat. Subsequently, Israel refused to return territory captured from Egypt and Syria, and there began a "war of attrition" with almost daily attacks on Israel. The USSR provided its Arab clients military advisors and massive quantities of modern equipment while the US supported to a considerable degree the Israeli Defense Forces.

In 1970, Sadat succeeded Nasser as President of Egypt. His government found the war of attrition very costly, and Sadat, who had promised to regain territory lost to Israel in 1967, began planning and training for still another war with Israel in coordination with Syria and Jordan.

D-Day was set for October 6 which, perhaps by happenstance rather than design, was the date of Yom Kippur, the highest Jewish holy day. The Soviets were informed of the date on September 22, the author believes, and could have prevented the war by notifying the US, which would have alerted Israel and hence have probably deterred the attack.

Israel was well aware of the military buildup along its borders, but did not believe the attack was imminent until the morning of October 6. The Israeli government then decided to forswear the advantage of preemptive attack in the belief that world opinion would brand the Arab states aggressors, to the advantage of Israel.

Thus, they were forced initially to fight defensively against great numerical odds on two fronts while mobilizing the reserves and putting the country on a war footing. The immediate problem was to check the Syrian advance before the Golan Heights were overrun, while slowing Egypt's more distant attack across the Suez Canal and the Sinai Peninsula.

Author Allen describes in detail the day-by-day fighting on both fronts. The Israeli forces suffered heavy losses to Russian-supplied surface-to-air and antitank missiles, but, by October 9, the Syrians were in retreat and Israel could begin to reinforce its formations confronting the Egyptians along the east bank of the Canal, where the largest tank battle since World War II took place on October 14.

The outnumbered Israelis had adjusted their tactics somewhat to counter the antitank missile threat, and the outgunned and outmaneuvered Egyptians were turned back. Two days later, the Israelis broke through to the Canal, crossed to the west bank, and knocked out the Egyptian SA-2 missile sites, which had greatly restricted the Israeli Air Force's close-support operations. Within a week, the Egyptian Third Army was surrounded, Cairo threatened, and a cease-fire signed.

Allen analyzes the strengths and weaknesses of the major contestants. Again, the Israelis had superior equipment, training, adaptability, and leadership. He recounts many astounding incidents of battlefield initiative by junior and middle-ranking officers. Although the morale and technical competence of both Egyptians and Syrians had improved greatly since 1967, their overall combat capability was no match for the Israelis.

The Egyptians planned and executed their Canal crossing brilliantly, but apparently had no detailed plan for exploiting that advance. Their failure to foresee and check the Israeli drive to the west bank was a result of inadequate reconnaissance, poor command and control, and self-delusion spawned by exaggerated reports of Israeli losses.

Relations between Sadat and the Kremlin deteriorated throughout the war, in part because Sadat felt the Soviets' massive resupply by sea and air was being held back unnecessarily and because the USSR did not share its satellite intelligence with him. The US airlift of replacements to Israel came just in the nick of time, delayed by the euphoria of détente and by lack of support from our oil-hungry NATO allies.

Most of us will remember only too well the Soviets' October 23 threat to inject unilaterally a "peace-keeping" force of some seven to nine divisions, and President Nixon's immediate declaration of a worldwide Defense Condition 3, which defused the most potentially dangerous confrontation since the Cuban Missile Crisis.

Although Allen provides little information or analysis that is new, this is an excellent, concise account of the Yom Kippur War, spiced by personal remembrances of the action gleaned from participants on both sides. There also are fascinating character studies of several senior participants, especially Ariel Sharon who has figured conspicuously in the recent Israeli campaign against the PLO in Lebanon.

The author looks with foreboding at a still-turbulent Middle East, now or soon to be nuclear armed, where "wars are no longer going to be nine-day wonders of breathtaking maneuvers and counterattacks. Unless a solution to the region's problems is found very quickly," he says, "there may be just one or two awesome bangs heralding the final Armageddon."

—Reviewed by John L. Frisbee, former Editor, AIR FORCE *Magazine.*

Pitched Battle

The End of the Line: The Siege of Khe Sanh, by Robert Pisor. W. W. Norton & Co., New York, N. Y., 1982. 319 pages, with notes and plotted geographical illustrations. $14.95.

Thirteen years before the 1968 Tet offensive and the battle of Khe Sanh, French colonial order in Vietnam ended at Dienbienphu. Brilliantly reported in Bernard Fall's *Hell in a Very Small Place* and Jules Roy's *The Battle of Dienbienphu,* this classic spec-

ter of siege and loss was alive in the minds of US military planners in the winter of 1967–68.

There were many corollaries between French and US military experiences in Vietnam. The VC and the NVA were as elusive in 1968 as were the Vietminh in the 1950s. For both forces, war in Vietnam was always a war of surprises. But one "surprise" was repugnant to US leadership: the defeat at Dienbienphu.

The siege of Khe Sanh is a catalog of similarities and differences. If the battle of Khe Sanh and the containment of Viet Cong and NVA forces during the Tet offensive fail to achieve the classic status of Dienbienphu in the annals of military history, it will not be for lack of good reporting.

The End of the Line is more than an exciting, well-documented study of the major confrontation in I Corps, the northern military province of South Vietnam. It is a penetrating analysis of two major figures: Gen. Vo Nguyen Giap and Gen. William Childs Westmoreland.

Giap, the victor at Dienbienphu and a strategic visionary, learned how to deploy force in a society with one major resource—manpower. For Giap, logistics was very simply the multiple of basic units. The load a porter could carry in a day would supply a unit of support. To sustain a given force, the amount of time and number of porters were multiplied to produce the required numbers. Porters did not require surfaced roads or permanent bridges, landing fields or warehouses.

Flexibility, determination, and time were the primary commodities that flowed into the bloody history of Vietnam over a thousand years of conflict with China, Japan, France, and the US. Giap provided the will. He knew the history of his people and he recognized the limited staying power of the US interest in a Vietnam conflict. Giap was prepared for years of war. Infiltration of cities and hamlets was the preferred tactic.

Major military confrontation was acceptable as part of total harassment, but Giap did not expect victory in massive frontal assaults on US forces. For Giap, the Tet offensive was a massive deployment of force to bolster VC attacks in the south. The NVA buildup near Khe Sanh was both harassment and a magnet drawing Westmoreland's forces from other duties in the south.

The structure of force and logistic support developed by Westmoreland in Vietnam was a tribute to his professional planning and political capability. Whenever confronted, the US and ARVN forces had the resources and techniques to minimize friendly loss and maximize punishment of the attacker. The eternal problem was ambush and the ability of the VC to slither away.

Westmoreland came to realize that unless the VC would stand and fight the war would go on indefinitely. He needed opportunities to deploy the awesome force under his command. He needed to sap the ability of the VC to infiltrate the cities and to ambush in the hills. Westmoreland knew that if Giap would not come to him, he would have to go north.

Whatever the intent of the North Vietnamese in February 1968, be it harassment, diversion, or a planned attempt to repeat Dienbienphu, the long siege at Khe Sanh demonstrated the effectiveness of massive air support of outnumbered, surrounded forces. Under the worst of weather conditions, and unlocatable and massed enemy fire, the Marine defense force at Khe Sanh was continuously supported from the air. For the first time in the history of airpower, sustained strategic bombardment was employed in close support of ground troops. General Westmoreland considered the B-52 strikes to be decisive and told the pilots and crews at Guam, "The amount of firepower put on that piece of real estate exceeded anything that had ever been seen before in history by any foe."

The End of the Line reads like a Hemingway novel. It is succinct, yet it depicts the occupants of Vietnam. The French planter, the hill people, the gentle Brus, the missionaries, in perfect context. There are no vacuums. In any war people are hurt. The people of Khe Sanh come into focus between the armies. The story opens with a firefight for Hill 881 and later returns to 881 at the right time. Weapon systems are deployed and their value depicted. For those who served in Vietnam, and for those who did not, *The Siege of Khe Sanh* is history memorably reported.

—Reviewed by Lt. Col. William G. Morley, USAF (Ret.), currently Executive Administrator, Arnold Air Society.

New Books in Brief

The American Magic: Codes, Ciphers and the Defeat of Japan, by Ronald Lewin. Author Lewin, famed for his account of the breaking of World War II German ciphers by the British in his *Ultra Goes to War,* provides here the story of the analogous American codebreaking efforts against the Japanese—the so-called "Magic" operations. This new book should recast thinking about the Pacific War in a fundamental way and lay to rest, once and for all, the "conspiracy" theory that President Roosevelt knew of the impending attack against Pearl Harbor but did not act on the information so as to have an excuse to bring the United States into the war. Lewin provides the reader a trove of previously unknown facts and anecdotes, based on newly released or declassified documents and personal interviews. With illustrations, appendices, bibliography, and index. Farrar, Straus & Giroux, Inc., New York, N. Y., 1982. 332 pages. $14.95.

Search and Rescue in Southeast Asia, by Capt. Earl H. Tilford, Jr., USAF. Part of a continuing series of books dealing with the war in Southeast Asia written in the Office of Air Force History, *Search and Rescue in Southeast Asia* is a detailed account of the evolution of search and rescue in SEA into a fine art. Captain Tilford outlines the successes of the Aerospace Rescue and Recovery Service in saving 3,883 downed aircrew and others during the war, and the development of search and rescue from the initial SA-16/HC-54 era to the sophisticated task forces employed by the end of the Vietnam conflict. With illustrations, notes, glossary, bibliographic note, and index. Available from the Superintendent of Documents, US Government Printing Office, Washington, D. C. 20402, 1980. 212 pages. $7.50.

War in Peace: Conventional and Guerrilla Warfare Since 1945, consultant editor Sir Robert Thompson, introduction by John Keegan. A compendium of accounts of the many wars that have punctuated the "peace" since the end of World War II, this large-format book is a lavishly illustrated overview of the more than twenty-five armed conflicts that have occurred in the past thirty-seven years. Although there have been conventional wars, the latter half of the twentieth century has become the age of guerrilla warfare. Eight authors focus on these conflicts, explaining orders of battle, strategies, and political affiliations while underscoring the process of decolonization and the emergence of two superpower blocs, leading to political polarization in the world that has helped produce these conflicts. With illustrations, glossary, bibliography, and index. Harmony Books, a Division of Crown Publishers, Inc., New York, N. Y., 1982. 312 pages. $25.

—Reviewed by Hugh Winkler, Ass't Managing Editor.

TWO NEW GUIDES TO THE MULTI-BILLION DOLLAR AVIATION MARKET!

JANE'S AIRPORT EQUIPMENT 1982-83

In the past ten years, nearly 100 major new international airports have been brought on line with at least that many more scheduled for the coming decade.

JANE'S AIRPORT EQUIPMENT provides a much needed international reference guide to the air traffic control, passenger and cargo handling equipment that will make these airports viable.

INCLUDES:

- Aircraft maintenance and servicing equipment
- Airport structures and runway equipment
- Cargo handling and storage
- Communications, navigation and meteorology
- Passenger and baggage handling
- Security and emergency services

Approximately 400 pp., 8½ x 12½, $120.00

NEW!

JANE'S AVIONICS 1982-83

The latest addition to the internationally acclaimed series of JANE's Yearbooks, JANE'S AVIONICS categorizes and chronicles the lastest advances in electronics technology.

The most comprehensive survey published today of airborne equipment and programs currently available or in development worldwide.

Of special interest to engineers, procurement agencies, policy-makers, aircraft manufacturers, government agencies.

INCLUDES:

- On-board computers
- Engine/thrust management
- Control instruments
- Flight instruments
- Lasers
- Nav-com; radar
- Radio/communications
- Recorders and more!

Approximately 400 pp., 8½ x 12½, $110.00

ALSO . . . The indispensable guide for aviation professionals and enthusiasts alike! –

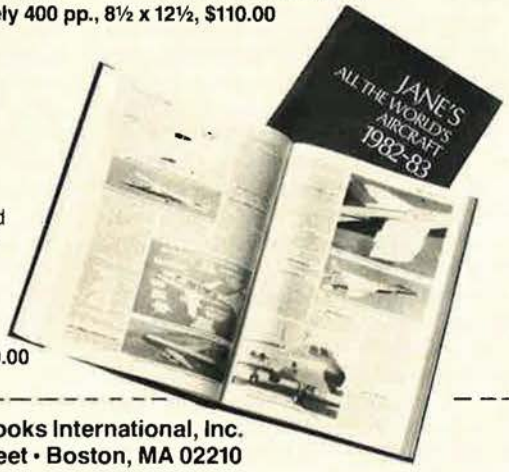
JANE'S ALL THE WORLD'S AIRCRAFT 1982-83

The internationally acknowledged standard aviation reference. Provides detailed technical information on all civil and military aircraft currently in production or under development.

More than 1400 photographs and 340 three-view drawings

- RPV's
- Air-launched missiles
- Spacecraft
- Aero-engines
- Commercial and home-built craft
- Sailplanes
- Hang gliders
- Airships
- Balloons

Approximately 840 pp., 8½ x 12½, $140.00



Come up to date on the most important events in the past year!

JANE'S 1982-83

- **AVIATION ANNUAL**
- **MILITARY ANNUAL**
- **NAVAL ANNUAL**

$15.95 EACH

JANE'S c/o Science Books International, Inc.
51 Sleeper Street • Boston, MA 02210

Please send me:

___ Jane's Airport Equipment 1982-83
___ Jane's Avionics 1982-83
___ Jane's All The World's Aircraft 1982-83

Payment — by check or credit card — or authorized company purchase order must accompany your order. (Add 10% outside U.S.A.)

Ship to:
Name _____
Organization _____
Address _____
City/State/Zip _____

___ Jane's 1982-83 Aviation Annual @ $15.95
___ Jane's 1982-83 Military Annual @ $15.95
___ Jane's 1982-83 Naval Annual @ $15.95

☐ I would like a complete catalog of Jane's titles. ☐ I am a new subscriber to Jane's.

☐ payment enclosed ☐ charge to my credit card

☐ VISA ☐ MC ☐ AMER-EX

_____ exp date _____

Signature _____
(your signature required for processing credit card orders)

☐ authorized company purchase order attached.

JANE'S

ALL THE WORLD'S AIRCRAFT SUPPLEMENT

OCTOBER 1982

McDonnell Douglas F-15C Eagle single-seat air superiority fighter of USAF's 36th TFW, based at Bitburg AB, West Germany

MCDONNELL DOUGLAS

MCDONNELL AIRCRAFT COMPANY (A Division of McDonnell Douglas Corporation); Headquarters: Box 516, St. Louis, Missouri 63166, USA

MCDONNELL DOUGLAS F-15 EAGLE

The US Air Force requested development funding for a new air superiority fighter in 1965, and in due course design proposals were sought from three airframe manufacturers: Fairchild Hiller Corporation, McDonnell Douglas Corporation, and North American Rockwell Corporation. On December 23, 1969, it was announced that McDonnell Douglas had been selected as airframe prime contractor. The resulting contract called for the design and manufacture of 20 aircraft for development testing, these to comprise 18 single-seat **F-15As** and two TF-15A two-seat trainers. First flight of the F-15A was made on July 27, 1972, and the first flight of a two-seat TF-15A trainer (redesignated subsequently **F-15B**) on July 7, 1973.

A production go-ahead for the first 30 operational aircraft (FY 1973 funds) was announced on March 1, 1973. The FY 1974 Defense Procurement Bill authorised production of 62 aircraft, and subsequent Procurement Bills have authorised production of a further 622 aircraft through FY 1982. Under the multi-year plans proposed in early 1982, eventual procurement for the US Air Force is expected to total 1,395, excluding the 20 development aircraft, by the early 1990s. An F-15B (the 21st Eagle built) was the first Eagle delivered to the US Air Force, on November 14, 1974. Structural weight of the F-15B is approx 363 kg (800 lb) more than that of the single-seater.

Production of the F-15A and B totalled 383 and 60 respectively.

Eagles produced since June 1979 are to **F-15C** and **F-15D** standard, which provides for 6,103 kg (13,455 lb) of internal fuel, and the ability to carry two low-drag fuel pallets known as FAST Packs (Fuel And Sensor Tactical Packs) developed specially for the F-15 by McDonnell Aircraft Company. Each FAST Pack contains approximately 3,228 litres (114 cu ft) of usable volume, which can accommodate 2,211 kg (4,875 lb) of JP-4 fuel. It attaches to the side of either the port or starboard engine air intake trunk (being made in handed pairs), is designed to the same load factors and airspeed limits as the basic aircraft, and can be removed in 15 minutes. FAST Packs can accommodate avionics such as reconnaissance sensors, radar detection and jamming equipment, a laser designator, low-light-level TV system, and reconnaissance cameras, in addition to fuel. All external stores stations remain available with the pallets in use. AIM-7F missiles and air-to-ground weapons can be attached to the corners of the FAST Packs.

The first F-15C (78-468) flew for the first time on February 26, 1979, and the first F-15D on June 19 of that year. Since 1980 the APG-63 radar of F-15C/D aircraft has been equipped with a Hughes Aircraft programmable signal processor, which enables changes to be incorporated in the radar earlier and

more cheaply. An updated radar data processor increases memory capability from 24K to 96K. These added features enable the radar to operate in a high-resolution rate assessment mode which can identify clustered targets individually. F-15C and F-15D aircraft delivered prior to the availability of the programmable signal processor and expanded computer will be retrofitted to bring them up to standard.

Minor changes have been made to tyres, wheels, and brakes to allow for an increased maximum take-off weight, which could be as high as 30,845 kg (68,000 lb) with full internal fuel, FAST Packs, and external tanks. Landing gear and fuel system changes have added about 227 kg (500 lb) to the aircraft's dry weight.

By early 1982 a total of 690 Eagles had been delivered, and were in operational service with the 57th FWW at Nellis AFB, Nevada, the 405th TTW at Luke AFB, Arizona, the 1st TFW at Langley AFB, Virginia (first to re-equip with 68 F-15Cs and 4 F-15Ds, beginning December 1981), the 36th TFW at Bitburg AB, West Germany, the 49th TFW at Holloman AFB, New Mexico, the 33d TFW at Eglin AFB, Florida, the 18th TFW at Kadena AB, Okinawa, and the 32d Tactical Fighter Squadron based at Soesterberg in the Netherlands. The 48th Fighter Interceptor Squadron at Langley AFB, Virginia, was the first US air defence squadron to receive the Eagle. Elmendorf AFB, Alaskan Air Command, in support of air defence, was converting to F-15s and was expected to become operational during 1982.

The F-15 has also been selected by the US Air Force for assignment to the Rapid Deployment Force. To ensure optimum effectiveness for the aircraft allocated to this mission, the US Air Force is procuring 150 sets of FAST Pack conformal fuel tanks and 325 BRU-26A/A six-station multiple bomb racks for them.

The US Air Force will have procured 779 Eagles by the end of fiscal year 1983, including the 20 R&D models. Twenty-five were delivered under an initial contract from the Israeli Air Force, with at least 15 more to follow. Saudi Arabia has ordered 62 Eagles, of which the first was delivered in August 1981. The Japan Air Self-Defence Force (JASDF) is purchasing 88 **F-15Js** and 12 **F-15DJs**, of which a total of 86 is being licence-built in Japan, with Mitsubishi as the prime contractor. The first of the 14 US-built aircraft was handed over on July 15, 1980, and the first two were flown to Japan in March 1981. The first F-15J unit was formed ahead of schedule in December 1981 at Nyutabaru AB. The last 43 Japanese-built aircraft are funded in the FY 1982 budget.

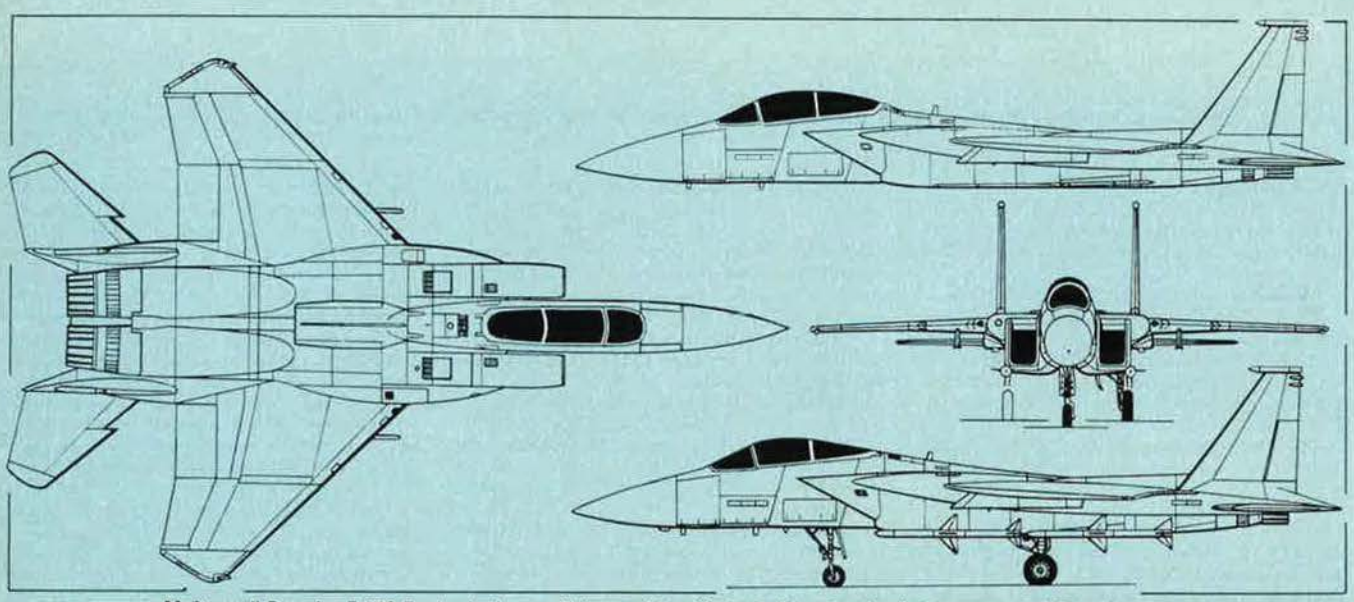
Designed specifically as an air superiority fighter, the F-15 Eagle has proved equally suitable for air-to-ground missions without degradation of its primary role. As a continuation of Advanced Wild Weasel studies which led to production of the F-4G version of the Phantom II, McDonnell Douglas has proposed to the US government a defence suppression version of the F-15D Eagle.

This F-15C of the 32d TFS demonstrates the climb rate that enabled an Eagle to set six current world time-to-height records. Armed with weapons like these AIM-7F Sparrows and AIM-9L Sidewinders while in service with overseas air forces, Eagles have scored impressive victories over opposing MiG-21s, -23s, and -25s

At the beginning of April 1981, development testing began of a US Air Force F-15 equipped with a Martin Marietta ATLIS II automatic tracking and laser illumination system pod, as part of a programme known as Integrated Flight Fire Control (IFFC)/Firefly III. The pod is mounted in the forward missile well position on the port side of the fuselage. Internal changes include installation of a modified central computer, a modified signal data processor for a pilot's head-up display, a new or modified coupler interface unit to link flight and fire control systems, and new flight/fire control software. During the 15-month, 150-flight test programme, the optical sensor/tracking pod demonstrated a capability to enable air-to-air weapons to be fired accurately at simulated targets while the F-15 manoeuvred at high offset angles, for the first time in the case of a US Air Force fighter.

The following description applies to the standard F-15C:

TYPE: Single-seat twin-turbofan air superiority fighter, with secondary attack role.



McDonnell Douglas F-15C Eagle single-seat fighter, with additional side view (top) of two-seat F-15B *(Pilot Press)*

WINGS: Cantilever shoulder-wing monoplane. Wing uses NACA 64A aerofoil section with varying thickness/chord ratios, ranging from 5.9% at the root to 3% at the tip. Leading-edges modified with conical camber. Anhedral 1°. Incidence 0°. Sweepback at quarter-chord 38° 42'. Fail-safe structure, comprising a torque box with integrally stiffened machined skins and conventionally machined ribs, of light alloy and titanium. Leading- and trailing-edges are of conventional light alloy rib/skin construction, and wingtips of aluminium honeycomb. Plain ailerons and plain trailing-edge flaps of aluminium honeycomb. No spoilers or trim tabs. Powered controls, hydraulically operated by National Water Lift actuators. No anti-icing system installed.

FUSELAGE: All-metal semi-monocoque structure. Speed-brake on upper centre-fuselage, constructed of graphite/epoxy, aluminium honeycomb, and titanium.

TAIL UNIT: Cantilever structure with twin fins and rudders. All-moving horizontal tail surfaces outboard of fins, with extended chord on outer leading-edges. Rudder servo actuators by Ronson Hydraulic Units Corporation. Actuators for horizontal surfaces by National Water Lift Company. Boost and pitch compensator for control stick by Moog Inc, Controls Division.

LANDING GEAR: Hydraulically-retractable tricycle type, with single wheel on each unit. All units retract forward. Nose and main units by Cleveland Pneumatic Tool Company, each incorporating an oleo-pneumatic shock-absorber. Nosewheel and tyre by Goodyear, size 22 × 6.6-10, pressure 17.93 bars (260 lb/sq in). Main wheels by Bendix, with Goodyear tyres size 34.5 × 9.75-18, pressure 23.44 bars (340 lb/sq in). Bendix carbon heat-sink brakes. Wheel braking skid control system by Hydro-Aire Division of Crane Company.

POWER PLANT: Two Pratt & Whitney F100-PW-100 turbofan engines, each rated at approx 106.4 kN (23,930 lb st) with afterburning for take-off. Internal fuel load 6,103 kg (13,455 lb), in five fuselage and four wing tanks by Goodyear Aviation Products Division. Fuel gauge system by Simmonds Precision Products Inc. Optional FAST Pack conformal fuel pallets attached to side of engine air intakes, beneath wing, can be removed within 15 min. Each has usable volume of 3.23 m³ (114 cu ft) and can contain 2,211 kg (4,875 lb) of JP-4 fuel. Provision for up to three external fuel tanks, total capacity 5,395 kg (11,895 lb).

ENGINE INTAKES: Straight two-dimensional external compression inlets, on each side of the fuselage. Air inlet controllers by Hamilton Standard. Air inlet actuators by National Water Lift Company.

ACCOMMODATION: Pilot only, on ACES II ejection seat developed by Douglas. Stretched acrylic canopy and windscreen. Windscreen anti-icing valve by Dynasciences Corporation.

SYSTEMS: Electrical power generating system by Lear Siegler Power Equipment Division; transformer-rectifiers by Electro Development Corporation; 40/50kVA generator constant-speed drive units by Sundstrand Corporation, Aviation Division. Three independent hydraulic systems (each 207 bars; 3,000 lb/sq in) powered by Abex engine-driven pumps; modular hydraulic packages by Hydraulic Research and Manufacturing Company. The oxygen system includes a liquid oxygen indicator by Simmonds Precision Products Inc. Air-conditioning system by Garrett. Automatic flight control system by General Electric, Aircraft Equipment Division. Auxiliary power unit for engine starting, and for the provision of electrical or hydraulic power on the ground independently of the main engines, supplied by Garrett.

AVIONICS: Lightweight APG-63 pulse-Doppler radar developed by Hughes Aircraft Company provides long-range detection and tracking of small high-speed targets operating at all altitudes down to treetop level, and feeds accurate tracking information to the airborne central computer to ensure effective launch of the aircraft's missiles or the firing of its internal gun. For close-in dogfights, the radar acquires the target automatically on a head-up display. International Business Machines, Electronic Systems Center, is subcontractor for the central computer, and McDonnell Douglas Electronics Company for the head-up display. This latter unit projects all essential flight information in the form of symbols on a combining glass positioned above the instrument panel at pilot's eye level. The display presents the pilot with all the information required to intercept and destroy an enemy aircraft without need for him to remove his eyes from the target. The display also provides navigation and other steering control information under all flight conditions. A transponder for the IFF system, developed by Teledyne Electronics Company, informs ground stations and other suitably equipped aircraft that the F-15 is a friendly aircraft. It also supplies data on the F-15's range, azimuth, altitude, and identification to air traffic controllers. The F-15 carries an AN/APX-76 interrogator receiver-transmitter, built by Hazeltine Corporation, to inform the pilot if an aircraft seen visually or on radar is friendly. A reply evaluator for the IFF system, which operates with the AN/APX-76, was developed by Litton Systems Inc, Van Nuys. A vertical situation display set, that uses a cathode-ray tube to present radar, electro-optical identification, and attitude director indicator formats to the pilot, has been developed by Sperry Rand Corporation, Sperry Flight Systems Division. This permits inputs received from the aircraft's sensors and the central computer to be visible to the pilot under any light conditions. This company has also developed an air data computer for the F-15, as well as an attitude and heading reference set to provide information on the aircraft's pitch, roll, and magnetic heading that is fed to cockpit displays. This latter unit also serves as a backup to the inertial navigation set developed by Litton Guidance and Control Systems Division. This provides the basic navigation data and is the aircraft's primary attitude reference, enabling the F-15 to navigate anywhere in the world. In addition to giving the aircraft's position at all times, the inertial navigation system provides pitch, roll, heading, acceleration, and speed information.

Other specialised equipment for flight control, navigation, and communications includes a micro-miniaturised Tacan system by Collins Radio Company; a horizontal situation indicator to present aircraft navigation information on a symbolic pictorial display, by Collins Radio Company, which is also responsible for the ADF and ILS receivers. Magnavox provides the UHF transceiver and UHF auxiliary transceiver. The communications sets have cryptographic capability. Dorne and Margolin Aviation Products is responsible for the glideslope localiser antenna, and Teledyne Avionics Company for angle of attack sensors. An internal countermeasures set, designated AN/ALQ-135, which provides automatic jamming of enemy radar signals, is supplied by Northrop's Defense Systems Division; ALR-56 radar warning systems by Loral Electronic Systems; and an electronic warfare warning set by Magnavox.

EQUIPMENT: Tachometer, fuel and oil indicators by Bendix Corporation. Flight and Engine Instrument Division. Feel trim actuators by Plessey Airborne Corporation.

ARMAMENT: Provision for carriage and launch of a variety of air-to-air weapons over short and medium ranges, including four AIM-9L Sidewinders, four AIM-7F Sparrows, and a 20 mm M61A1 six-barrel gun with 940 rounds of ammunition. A lead-computer gyro has been developed by the General Electric Company. To keep the pilot informed of the status of his weapons, and provide for their management, an armament control set has been developed by Dynamic Controls Corporation. Five weapon stations allow for the carriage of up to 7,257 kg (16,000 lb) of bombs, rockets, or additional ECM equipment.

USAF McDonnell Douglas F-15C Eagles in close formation

DIMENSIONS, EXTERNAL:

Wing span	13.05 m (42 ft 9¼ in)
Length overall	19.43 m (63 ft 9 in)
Height overall	5.63 m (18 ft 5½ in)
Tailplane span	8.61 m (28 ft 3 in)
Wheel track	2.75 m (9 ft 0¼ in)
Wheelbase	5.42 m (17 ft 9½ in)

AREA:

Wings, gross	56.5 m² (608 sq ft)

WEIGHTS (A: F-15A; B: F-15C):

T-O weight (interceptor, full internal fuel, and 4 Sparrows):	
A	18,824 kg (41,500 lb)
B	20,212 kg (44,560 lb)
T-O weight (incl three 2,271 litre; 600 US gallon drop-tanks):	
A	24,675 kg (54,400 lb)
B	26,035 kg (57,400 lb)
Max T-O weight:	
A	25,401 kg (56,000 lb)
B, with FAST Packs	30,845 kg (68,000 lb)

PERFORMANCE:

Max level speed	more than Mach 2.5 (800 knots; 1,482 km/h; 921 mph CAS)
Approach speed	125 knots (232 km/h; 144 mph) CAS
T-O run (interceptor)	274 m (900 ft)
Landing run (interceptor), without braking parachute	762 m (2,500 ft)
Absolute ceiling	30,500 m (100,000 ft)
Ferry range:	
without FAST Pack	more than 2,500 nm (4,631 km; 2,878 miles)
with FAST Pack	more than 3,000 nm (5,560 km; 3,450 miles)
Design *g* limits	+7.33/−3.0

AVALON

AVALON AVIATION (A Division of Powell Corporation); Address: 55 Great North Road, Parry Sound, Ontario P2A 2N9, Canada

Powell Corporation was formed, as Georgian Bay Airways Ltd, in 1946, and has developed subsequently into an extensive charter and scheduled flying operation specialising in the aerial detection of forest fires and in firefighting support. In 1980 it acquired Avalon Aviation Ltd and its fleet of Canso water-bombers, as part of a programme to expand its fire suppression activities.

Avalon Aviation had been founded in 1971 by Captain Robert H. Murdoch, a pioneer in the water-scooping technique using Canso aircraft. It currently employs more than 65 people, of whom 35 are pilots, and operates a fleet of eight Cansos, ten Piper Aztecs, three Cessna Model 185 amphibians, one Piper Cherokee, a Piper Super Cub, and a DHC-2 Beaver. These are maintained at Georgian Bay Airport, in a new 2,500 m² (27,000 sq ft) overhaul and maintenance facility which was opened in the first half of 1982. Here, also, Avalon is preparing a conversion programme for a heavier-duty Turbo-Canso water-bomber, powered by Rolls-Royce Dart turboprop engines. The facility is equipped to handle not only Avalon's own aircraft but those of any agency that wishes to have its Catalina/Canso aircraft modified to water-bomber configuration.

AVALON CANSO WATER-BOMBER

Canso is the Canadian name for the Consolidated/Convair PBY Catalina, which was manufactured in greater numbers than any other flying-boat/amphibian. Nearly 3,300 were built in the USA and Canada before and during the second World War, including 379 by Canadian Vickers factories and 362 by Boeing Canada; others were built in the USSR under the designation GST. Since 1945 the aircraft has remained active in civilian use, particularly in Canada as a passenger/cargo transport and, increasingly in recent times, as a water-bomber for use against large forest fires. Despite its relatively low airspeed it has, because of its amphibious capability, consistently proved able to out-perform land-based aircraft employed for this task, in terms of time taken to deliver a given quantity of water or retardant.

In 1971 Field Aviation Ltd of Toronto, Ontario, developed a water-bomber modification for the Canso, designed by Mr J. K. Hawkshaw, one of the world's leading authorities on this type of operation. This system involved building into the hull two 1,818 litre (400 Imp gallon; 480 US gallon) tanks, and providing a retractable scoop enabling the tanks to be filled at flying speed while 'skimming' on the surface of a lake. Two dump doors, built into the hull, permit either single or salvo dumping, and the system also incorporates a means of supplying the precise drop patterns required to extinguish a blaze.

The Avalon Canso can pick up a full load, from almost any body of water, in 15 seconds or less, and the drop sequence takes less than one second. Up to 12 attacks per hour can be made, and it is not uncommon for an Avalon Canso to make more than 100 drops in a day. Onboard equipment also enables correct amounts of fire-retardant chemicals to be mixed with the water load when required; each Canso is equipped with chemical tanks, and can drop from 15 to 30 mixed loads before it becomes necessary to refill the retardant tanks.

The Avalon conversion involves a substantial remanufacturing of the standard aircraft: removing the interior and installing the tanks, pickup, and dump systems; strengthening the hull; removing and replacing most of the exterior skin; overhauling the engines and propellers; and installing upgraded instruments and avionics. In 1982 the company also had in the planning stages the **Turbo-Canso**, in which the Pratt & Whitney Twin Wasp piston engines will be replaced with Rolls-Royce Dart turboprops. This version will offer a 50% increase in water-carrying capacity, increased flying speeds, decreased fuel costs, ability to use a greater variety of fuels, more time between engine overhauls, and a greater number of water-drops per hour. It is hoped to have the first Turbo-Canso ready for service in May 1983.

The standard Avalon Canso can also, if required, be used for a variety of other duties, including the transport of more than 20 passengers, or a mixed payload of passengers and cargo, up to a maximum of 3,630 kg (8,000 lb). As a liquid cargo transport it can carry 2,900 litres (638 Imp gallons; 766 US gallons) of diesel oil, aviation fuel, kerosene, or other liquid a distance of 608 nm (1,126 km; 700 miles) and return without refuelling. The water tanks can also be used to carry various spraying compounds and oil-slick suppressants.

TYPE: Amphibian water-bomber and general-purpose transport.

WINGS: Semi-cantilever high-wing monoplane. Wings built in three portions, centre-section being supported above hull on a streamline pylon and braced by a parallel pair of struts on each side. Box-spar structure, with metal stressed skin reinforced by Z-section extruded stiffeners. Trailing-edge formed by aluminium ribs cantilevered from main spar and covered with fabric. Balanced ailerons, of fabric-covered aluminium alloy. Trim tab in each aileron.

FUSELAGE: Two-step aluminium alloy hull of bulkheads, stringers, and stressed skin, upper half having a semi-circular cross-section.

TAIL UNIT: Cantilever cruciform type, lower portion of fin being integral with fuselage. Tailplane and upper portion of fin have metal skin, reinforced with extruded stiffeners. Elevators and rudder of fabric-covered aluminium alloy. Trim tab in rudder and each elevator.

LANDING GEAR: Retractable tricycle type, with single wheel and oleo-pneumatic shock-absorber on each unit. Hydraulic actuation, with manual backup. Main units retract upward into sides of hull, nosewheel rearward into planing bottom. Electrically/mechanically retractable all-metal stabilising floats, which form wingtips when retracted.

POWER PLANT (Canso): Two 895 kW (1,200 hp) Pratt & Whitney R-1830-92 Twin Wasp fourteen-cylinder radial aircooled engines, in NACA-type cowlings, each driving a Hamilton Standard three-blade constant-speed propeller. Fuel tanks, total capacity 6,624 litres (1,457 Imp gallons; 1,750 US gallons), in wing centre-section.

POWER PLANT (Turbo-Canso): Two 1,484 kW (1,990 ehp) Rolls-Royce Dart RDa.7 Mk 525 turboprop engines, each driving a 3.05 m (10 ft 0 in) diameter Dowty Rotol four-blade propeller.

ACCOMMODATION: Crew of three on flight deck (pilot, co-pilot, and flight engineer). Dual controls standard. Other crew members according to mission requirements.

AVIONICS: Avalon Cansos are constantly being modernised by installation of up-to-date avionics and instrumentation. They are operated under IFR rules, and have com/nav facilities enabling them to fly anywhere in the world at a moment's notice.

EQUIPMENT: Two water tanks in fuselage, combined capacity 3,637 litres (800 Imp gallons; 961 US gallons). Capacity to be increased to 5,455 litres (1,200 Imp gallons; 1,441 US gallons) in Turbo-Canso. Provision for additional tanks containing fire-retardant chemicals.

DIMENSIONS, EXTERNAL:

Wing span	31.70 m (104 ft 0 in)
Wing area, gross	130.06 m² (1,400 sq ft)
Length overall	19.46 m (63 ft 10 in)
Height overall	6.15 m (20 ft 2 in)

WEIGHTS:

Max T-O weight:	
Canso	13,835 kg (30,500 lb)
Turbo-Canso	approx 15,420 kg (34,000 lb)
Max landing weight:	
Canso	12,700 kg (28,000 lb)

PERFORMANCE (Canso, except where indicated):

Cruising speed:	
Canso	113 knots (209 km/h; 130 mph)
Turbo-Canso (estimated)	139 knots (257 km/h; 160 mph)
Water-drop speed	87 knots (161 km/h; 100 mph)
Fuel consumption per hour:	
cruising	350 litres (77 Imp gallons; 92.5 US gallons)
water-bombing (5 min circuit)	477 litres (105 Imp gallons; 126 US gallons)
Average drop frequency per hour (incl initial ferry time to fire)	8

Avalon Canso water-bomber, converted from a Consolidated/Convair PBY Catalina-type maritime patrol amphibian

GENERAL DYNAMICS

GENERAL DYNAMICS CORPORATION, FORT WORTH DIVISION; PO Box 748, Fort Worth, Texas 76101, USA

GENERAL DYNAMICS AFTI/F-16 PROGRAMME

On July 10, 1982, the General Dynamics AFTI/F-16 made a highly successful 1 h 14 min first flight from Carswell AFB, Texas. This marked an important stage in a development programme that began

General Dynamics AFTI/F-16 fighter technology research aircraft, photographed during its first flight, July 10, 1982

in December 1978, when the US Air Force selected the General Dynamics F-16 as a testbed with which to explore promising new fighter aircraft technologies under the Advanced Fighter Technology Integration (AFTI/F-16) programme, directed by Air Force Systems Command's Flight Dynamics Laboratory (FDL) at Wright-Patterson AFB, Ohio. General Dynamics was awarded a $34.3 million prime contract, under which it modified an F-16A (A-6) returned to the company by the US Air Force on March 6, 1980.

This very complex programme, which is expected to influence the design of future US high-performance combat aircraft, is managed by an AFTI/F-16 Advanced Development Program Office at FDL. Participants include the Naval Air Development Center, which is giving funding and technical support; the Naval Air Test Center, which is providing a test pilot for AFTI/F-16 simulations and Phase I of the test programme; the Air Force Armament Laboratory, which is funding and sponsoring the standard avionics integrated fuzing (SAIF) development programme to be flight tested during Phase II; NASA's Dryden Flight Research Center at Edwards AFB, California, providing manpower and facilities for flight test operations; and the Air Force Flight Test Center, also at Edwards, which is the USAF's responsible test organisation for Phases I and II of AFTI/F-16 testing. A Joint Flight Test Organization (JFTO), drawing upon personnel from the above participants, as well as General Dynamics, will carry out the flight test programme at Edwards AFB and Nellis AFB, Nevada.

New capabilities promised by the AFTI/F-16 originate from early control configured vehicle (CCV) programmes. These sought to develop an unstable high-performance aircraft that would be extremely manoeuvrable, relying upon fly-by-wire controls and airborne computers to ensure that the aircraft would have optimum handling qualities at all times and under all conditions. More specifically, the AFTI/F-16 programme was preceded by the CCV/YF-16, an F-16 prototype with analogue fly-by-wire control system, modified externally by the addition of two foreplanes, one on each side of the engine air intake duct, operated by hydraulic actuators. First flown with these foreplanes operative on March 24, 1976, the CCV/YF-16 demonstrated in a programme of 87 test flights that a CCV aircraft would not only fly in an entirely new way, but that fighter aircraft embodying such technology would be far more effective. Evaluation of accumulated test data suggested also that CCV aircraft could be smaller, lighter, less expensive, more combat manoeuvrable, and have better payload and range than conventional designs. Details of the CCV/YF-16 programme can be found in the 1977–78 *Jane's*.

The concept of the AFTI/F-16 has been growing from that time, with designers aware that the introduction of digital computers would provide far greater overall control capability than was possible with the analogue system in the CCV/YF-16. Flight test equipment is housed in a new dorsal fairing which extends from behind the cockpit, and into the rear end of which the vertical tail surfaces are blended. The aircraft also has two foreplanes, similar to those of the CCV/YF-16, mounted on the underside of the engine inlet duct. Its first flight represented the culmination of three years of development and testing. Wind tunnel tests had defined the aircraft's external drag characteristics due to the addition of the fairing and foreplanes, and had also documented its internal aerodynamics, stores carriage envelope, air loads, and spin characteristics. A total of 1,360 h had been accumulated when these tests ended in August 1981, in the company's low-speed wind tunnel and in the US government's 4.88 m (16 ft) transonic wind tunnel and vertical spin tunnel.

Static testing has been equally comprehensive, involving the vehicle's structure, gun system, equipment, subsystems, and digital flight control system (DFCS), plus testing for electrical hazards and electromagnetic compatibility. So-called minor testing has involved the throttle controller, flight controller, DFCS control panel, video select panel, head-up display camera, and similar hardware. These activities verified the capability of the equipment, but further testing of both hardware and software is planned prior to the beginning of Phase II flights.

Simulation has played and is playing a very important role in systems development. For example, the company's Research and Engineering Simulation Laboratory at Fort Worth (which has a fixed base cockpit simulator with a domed visual scene of computer generated graphics) has been concerned with man-in-the-loop evaluations, and has already flown virtually every task planned during AFTI/F-16 flight testing of the DFCS. It is continuing with simulations of the Automated Maneuvering Attack System (AMAS) to evaluate the engineering design and allow the pilots to practice critical flight manoeuvres. Similarly, USAF FDL's LAMARS facility is checking out the digital flight control laws of the AFTI/F-16, permitting detailed human-factors studies and investigation of AMAS.

The AFTI/F-16 will be the first operationally-equipped fighter aircraft to demonstrate the new flight techniques made possible by such an advanced configuration. It will be able to turn by sliding sideways without banking and with weapons firing. Such an ability translated to a production fighter would mean that, if a pilot saw a target in his one o'clock position, he would simply command the aircraft to turn towards it and deliver its weapons in less time than it takes a conventional aircraft to bank, turn, and fire. In fact, the AFTI/F-16 has six flight modes that cannot be duplicated by any current operational aircraft. Known as 'decoupled' or six degree-of-freedom flight modes, each motion is separated (or decoupled) from the other, usual, motions of a flight manoeuvre. The pilot of a conventional aircraft wishing to turn to starboard must roll into a bank, pull back on the control column to bring the aircraft's nose round and then roll out of the bank. In the AFTI/F-16 he merely depresses the rudder pedals for the aircraft to move to starboard in a wings-level turn without any roll.

Evaluation of the six different types of decoupled motion, first tested in the CCV/YF-16 but mechanised differently, will be an important part of AFTI/F-16 flight tests. In the longitudinal, or vertical, flight path, the motions are direct lift, pitch axis pointing, and vertical translation. The pilot commands these longitudinal motions by means of a twist grip on the port throttle; control surfaces affected are the trailing-edge flaps and the all-moving horizontal tail surfaces. Lateral, or sideways, decoupled motions are direct side force, yaw axis pointing, and lateral translation. These lateral motions are controlled by the pilot's rudder pedals, which activate three control surfaces: the flaperons (flaps/ailerons), rudder, and fuselage-mounted twin vertical foreplanes. The pilot can, of course, fly conventional manoeuvres as well as the decoupled flight paths, using the standard side stick controller

(starboard) and rudder pedals to command coupled flight modes.

However, the AFTI/F-16 coupled flight control system is itself unique. Whereas most aircraft are designed for one specific primary mission, with any diversion from it likely to compromise performance, flight characteristics, or weapon effectiveness, the AFTI/F-16 flight control laws were designed to operate well during four missions: normal (take-off, cruising flight, refuelling, formation, and landing), air-to-air gunnery, air-to-surface gunnery, and air-to-surface bombing. The pilot can select any one of these four missions on his head-up display (HUD) control panel. Such selection implements instantly the desired control laws and also causes the HUD, fire control computer, stores management system, multi-purpose displays (MPD), and radar to be configured to support that particular flight mode. Any of the standard or decoupled modes can be selected in flight at any time, with the single exception that when the landing gear is down the control laws are configured automatically to the standard, coupled mode.

The flight control hardware (DFCS) comprises three BDX 930 digital computers, each manipulating some 500,000 operations per second and storing in their large memories many task-tailored control laws that can be recalled at will by the pilot. Use of digital (rather than analogue) computers offers far greater flexibility, and new tasks can be added to the DFCS by merely writing new software programmes. The use of three computers provides reliability and flight safety, since each works in an asynchronous mode, and the three are timed to begin any electrical task milliseconds apart. When the calculations are completed the computers compare their output, so ensuring that the correct solution is transmitted to the appropriate control surface(s). Each computer has a basic analogue backup system, which means that should all three fail the pilot could still control the aircraft to effect a safe landing.

The DFCS and AMAS are linked to provide the pilot with a whole range of new attack profiles unknown in conventional fighters. He could, as explained earlier, fire weapons while slipping sideways, without banking or flying over the target. Via AMAS, the pilot can decide how much authority to pass to the system. In a fully automated mode AMAS would allow him to sit as little more than an observer, with forward-looking infra-red (FLIR) serving as his eyes, the fire control computer as his brain, and the DFCS supplying the muscles. Studies completed to date suggest that the AFTI/F-16 will have a bombing accuracy equal to that of the current F-16A but with a significant increase in pilot survivability. In an air-to-air mode AFTI/F-16 is expected to attack better from all angles and maintain a higher kill rate than conventional fighters using standard combat manoeuvres. Such capabilities can be gained only by use of advanced equipment and a brief summary of the AMAS, its subsystems, and the cockpit equipment gives a wider appreciation of the aircraft's scope.

For very precise target acquisition and tracking, AMAS will use a FLIR sensor/tracker pod which is being developed by Westinghouse Electric Corporation. It will be a conformal pod, fitted into the starboard wing to avoid degrading the aerodynamics, and will be installed after the completion of Phase I testing. Both the FLIR and the aircraft's APG-66 radar will serve as sensors for AMAS, and the pod contains also a laser system for target ranging (air-to-surface) and acquisition (air-to-air). This laser is identical to the type used in Pave Spike pods for daylight target designation. The FLIR sensor can be slewed by the pilot, slaved to another sensor, or will be capable of initiating its own target search.

The AFTI/F-16 pilot will wear a helmet-mounted sight, and will be able to 'acquire' a target by simply looking towards it and centering the cross hairs of the sight on the target. Each cross hair has a minute light at its tip, and when a light comes on it indicates target direction to the pilot. As soon as he has the target in the centre of the cross hairs all four lights will illuminate, and he has merely to depress a button on his side stick controller for the FLIR or radar sensor to slew automatically to align with the target and lock on. The use of such a sight frees the pilot's hands for more essential tasks.

AMAS is integrated with a Delco D^3 high-speed digital fire control computer. This will calculate 'aiming error', or the difference between where the target is and where the AFTI/F-16's weapon is pointed. That data is then transmitted to the DFCS, which immediately activates the aircraft's control surfaces so that it manoeuvres to correct the aiming error. A unique roll-stabilised radar altimeter is linked with AMAS for greater safety during air-to-surface operations. Six antennae, radially configured about the fuselage, provide a 360° roll altitude sensing capability during high g manoeuvres at heights down to 61 m (200 ft). The altimeter is integrated with a low-altitude autopilot, which frees the pilot from the need to devote his full attention to terrain avoidance.

A new automated device that will be tested by the AFTI/F-16 as a component of AMAS is a standardised avionics integrated fuzing (SAIF) system developed by the Air Force Armament Laboratory. SAIF is a system for setting automatically the fuzing parameters in dispenser bombs immediately before their release from the aircraft. Conventional fuzes are set before the aircraft takes off on a sortie, which means that the pilot must manoeuvre the aircraft to the preset condition for each bomb release. With SAIF, the fuze will be set immediately before release of the dispenser pod, so that the scatter pattern of the individual bomblets will be optimum regardless of the aircraft's position.

The cockpit includes two multi-purpose display (MPD) units, each with 20 electronic pushbuttons, which provide the pilot with alphanumerics (from two programmable display generators) and sensor video (from FLIR and radar) separately or in combination. The pushbuttons provide an interface between the pilot and the DFCS, allowing him to tailor the flight control laws; to change or add flight features, such as drag modulation; and select different control options. They can, additionally, provide an interface with other aircraft systems, and be used to monitor malfunctions that might develop in the DFCS.

A specially-developed Marconi Avionics HUD with a wide field of view is installed in the cockpit. It incorporates special optics to provide an instantaneous field of view of 15° by 20°, compared with only 9° by 13° for the standard F-16A HUD. It displays in alphanumerics critical flight reference information, weapon aiming and fire control data. The conventional side stick controller on the starboard side of the cockpit has been modified to provide additional switching functions: engage/disengage control of the independent backup flight control system, decoupled flight control modes, and the AMAS. Additional hands-on control is provided for the MPDs, helmet-mounted sight, and weapon delivery modes. The twist grip throttle (port) provides manual control of pitch pointing, vertical translation, and direct lift. Other capabilities, including manual slewing of the FLIR/radar in the direction of the target, are accomplished by using existing throttle switches.

Because the very different flight manoeuvres of the AFTI/F-16 can result in side forces as high as 2g, a new human factors problem has been raised: how best to restrain the pilot in his seat during such manoeuvres. Tests carried out by the Air Force Aerospace Medical Research Laboratory have shown that shoulder restraint pads attached to the aircraft bulkhead provide some measure of support for comfort while keeping the pilot's head where he can read the HUD. Flight testing will demonstrate whether this is adequate.

Another advanced technology to be tested during the flight programme is known as Voice Interaction. Involving voice warning/command, it is intended to make the pilot's task easier, by leaving his hands free to fly the aircraft and giving him more time to look outside the cockpit for enemy targets. Voice warning, relayed via the headset, will gain his immediate attention: instead of a caution light, which he could miss while watching an enemy target, a voice will give audible warning of an impending or actual emergency. Similarly, voice command will allow the pilot to initiate functions normally controlled by manual switches, without taking his hands from the flight controls. The existing UHF radio switch in the throttle will be used to activate the voice command system.

Pilots involved in the AFTI/F-16 programme will each have a personalised voice cassette of how they pronounce the command words. Once in the cockpit, a pilot will load his cassette of voice patterns into a data transfer module for transmission to the voice command computer, which will store them as individual word templates. Each template then serves as the master for the voice recognising system. Explained simply, this means that, before executing a voice command by the pilot, the voice processor must match the pilot's command with the prerecorded template word. Speaking through his normal microphone and listening through his headset, the pilot can use the established voice command vocabulary to specify tasks. Reaction to his spoken order will be printed on the MPDs, confirming that the commanded task has been completed.

Flight testing of the AFTI/F-16 is centred at NASA's Dryden Flight Research Center at Edwards AFB. Phase I tests, involving 125 flights during the first year, are concerned primarily with the DFCS which, essentially, controls the flight path of the aircraft. Other technologies of particular interest during Phase I are the new features in the cockpit, and the pilot's ability to use them efficiently for weapon delivery. Before Phase II testing begins, in the Summer of 1983, the Westinghouse sensor/tracker pod will be installed in the starboard wing and the General Electric M61A1 cannon will be slaved to the AMAS. Phase II testing calls for 150 flights during the following year and is intended to assess and validate the AMAS hardware. Particular emphasis is to be placed on coupled flight/fire control, the attack sensors, and weapon interface, including automatic setting of weapon fuzing. Weapon tests during the same period will use the M61A1 to fire 20 mm ammunition against towed targets and ground strafe panels, and simulated 30 mm rounds will also be fired at air and ground targets. Other tests will evaluate a Tactical Munition Dispenser with wide area anti-armour munitions in conjunction with SAIF, and it is planned to drop BDU-33 practice bombs to demonstrate bombing accuracy during automatic manoeuvring flight.

The information generated by this overall programme is to be made available generally to the US aircraft industry for application to the design of future fighter aircraft. Details of the standard F-16A/B Fighting Falcon and other F-16 programmes can be found in the 1981–82 and earlier editions of *Jane's*.

HAWK

HAWK INDUSTRIES INC (Aircraft Division): 57430 Aviation Drive, Yucca Valley, California 92284, USA

HAWK GAFHAWK 125

Hawk Industries, which specialises in equipment for oil and water well-drilling and fencing, experienced difficulties in transporting its products. So, in July 1977, the company's President initiated design of a freight-carrying aircraft that might overcome the slowness of road transport and the high cost and loading/unloading difficulties of conventional aircraft. He named his project GafHawk 125, signifying general aviation freighter. Features considered to be important in the design of this aircraft included STOL capabilities for operation into and from small unprepared strips; a turboprop power plant for economic operation; a square-section fuselage for maximum utilisation of internal capacity; under-tail loading of bulk cargo at truckbed height; and a single engine for economy, ease of certification, and single-pilot operation. Construction of the prototype was completed in early 1982, and the first flight was made on August 19, 1982.

The GafHawk concept was tested initially in the form of a small-scale flying testbed known as the MiniHawk, which consisted of an extensively rebuilt Piper Tri-Pacer light aircraft. This made its first flight in 1978, and was described and illustrated

GafHawk 125, designed to haul a useful load equivalent to its own empty weight on the power of a single turboprop engine

Prototype Hawk GafHawk 125 being prepared for its first flight

in the 1980–81 *Jane's*. The following details apply to the prototype GafHawk 125:

TYPE: Single-engined turboprop freighter.

WINGS: Strut-braced high-wing monoplane, with dual steel alloy struts enclosed in an aluminium fairing to provide redundancy, plus short dual auxiliary struts on each side. Wing section NASA GAW-1, modified by use of a leading-edge cuff. Thickness/chord ratio 17%. No dihedral. Constant-chord structure of light alloy, comprising a leading-edge tubular spar, a box spar, a second tubular spar aft of the box, a total of 78 one-piece ribs, and light alloy skins. Electrically-actuated full-span trailing-edge flaps of similar construction. Half-span spoiler/aileron ('rolleron') hinged to top surface within slot between wing and flap in outer half of each wing, operating differentially through a range of 60° up and 10° down. Rolleron trimming by bungee.

FUSELAGE: Basic rectangular structure of welded square-section steel tubing, covered with non-structural corrugated Alclad light alloy skins. These are attached to the hermetically-sealed square tubing by clips, to facilitate the replacement of damaged sections.

TAIL UNIT: Cantilever structure of light alloy. Construction similar to that of wings, but with only fore and aft tubular spars in fin and tailplane. Horn-balanced rudder and one-piece elevator. Dorsal fin. Rudder and elevators trimmed by bungee.

LANDING GEAR: Non-retractable tricycle type, with single nosewheel and twin wheels on main units. All units have shock-absorption by rubber in compression. Goodyear wheels of the same size on each unit, with tubed tyres size 8.50–10. Cleveland hydraulic disc brakes. Parking brake.

POWER PLANT: Prototype has one Pratt & Whitney Aircraft of Canada PT6A-45R turboprop engine with a standard maximum rating of 875 kW (1,173 shp) and an emergency rating of 893 kW (1,198 shp), driving a Hartzell five-blade reversible-pitch constant-speed low-speed metal propeller with spinner. Fuel tank, made of transparent material and with a capacity of 1,363 litres (360 US gallons), mounted above forward fuselage, directly over the wing, and providing gravity feed to engine. Refuelling point on upper surface of tank. Engine air intake incorporates an ice ramp and a foreign particle reducer.

ACCOMMODATION: Pilot and co-pilot on flight deck. Dual controls and full blind-flying instrumentation for both pilots standard. Door to flight deck on each side of fuselage; communicating door between flight deck and cargo hold in forward bulkhead. Cabin door on each side, aft of wing. Electrically-actuated main cargo loading ramp/door, in undersurface of upswept rear fuselage, can be opened in flight. Heavy-duty corrugated light alloy floor in cargo hold, with cargo tiedowns along walls at each fuselage gusset frame. Main cabin volume augmented by usable space under flight deck, accommodating pipes and timber up to 6.10 m (20 ft) in length with rear loading door closed. Accommodation heated and ventilated.

SYSTEMS: Electrical system powered by a 28V 250A Lear-Siegler starter/generator and 28V storage battery. Hydraulic system for brakes only. Vacuum system. De-icing system optional.

AVIONICS AND EQUIPMENT: Standard avionics include King Goldcrown series dual com; dual nav with dual ILS, plus an HSI on the pilot's panel; ADF; DME; radar altimeter; transponder; switching panel; and VOR/localiser-coupled Century II-B autopilot. Standard equipment includes dual blind-flying instrumentation, incl turn co-ordinator and rate of climb indicator; dual airspeed indicators; dual altimeters, one with encoding; eight-day clock; outside air temperature gauge; adjustable pilot/co-pilot seats with armrests; control locks; annunciator panel; cabin, compass, instrument post, landing, taxi, navigation, and wingtip strobe lights; two rotating beacons; and heated pitot.

DIMENSIONS, EXTERNAL:

Wing span	21.79 m (71 ft 6 in)
Wing chord (constant)	2.11 m (6 ft 11 in)
Wing area, gross	45.80 m² (493.0 sq ft)
Wing aspect ratio	10.4
Length overall	14.30 m (46 ft 11 in)
Height overall	5.49 m (18 ft 0 in)
Tailplane span	7.01 m (23 ft 0 in)
Wheel track (c/l outer tyres)	3.38 m (11 ft 1 in)
Wheelbase	4.39 m (14 ft 5 in)
Propeller diameter	2.74 m (9 ft 0 in)

DIMENSIONS, INTERNAL:

Cabin: Length at floor level, excl flight deck	4.72 m (15 ft 6 in)
Max width	2.03 m (6 ft 8 in)
Max height	2.13 m (7 ft 0 in)
Volume	20.22 m³ (714.0 cu ft)

WEIGHTS AND LOADINGS (estimated):

Weight empty	2,835 kg (6,250 lb)
Max T-O weight (initial certification)	5,670 kg (12,500 lb)
Max wing loading	124.0 kg/m² (25.4 lb/sq ft)
Max power loading:	
standard	6.48 kg/kW (10.66 lb/shp)
emergency	6.35 kg/kW (10.43 lb/shp)

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

Max cruising speed at 3,050 m (10,000 ft)	152 knots (282 km/h; 175 mph)
Econ cruising speed, 55% power at 3,050 m (10,000 ft)	126 knots (233 km/h; 145 mph)
Stalling speed, flaps down	44 knots (82 km/h; 51 mph)
Max rate of climb at S/L	290 m (950 ft)/min
Service ceiling	5,485 m (18,000 ft)
T-O run	189 m (620 ft)
T-O to 15 m (50 ft)	344 m (1,130 ft)
Landing from 15 m (50 ft)	296 m (970 ft)
Landing run	131 m (430 ft)
Range with max fuel	900 nm (1,668 km; 1,036 miles)

WING

WING AIRCRAFT COMPANY: Head Office: 2925 Columbia Street, Torrance, California 90503, USA

WING D-1 DERRINGER

The twin-engined D-1 Derringer, named after the well-known American compact pocket pistol, utilises manufacturing techniques that were new to the lightplane industry at the time of its inception. Butt-jointed, flush-riveted, chemically-milled, and stretch-formed skins are used throughout the airframe. This simplifies the achievement of a flush finish and provides integral stiffness, since the skins are left thicker at the points where additional strength is needed. Assembly is simplified as, for example, each wing has a single stretch-formed chemically-milled skin that acts also as an integral fuel tank.

Design began originally in June 1960; the prototype flew for the first time on May 1, 1962, powered by two 86 kW (115 hp) engines. Used to prove the design concept, it was retired after logging more than 300 flying hours. The second aircraft, with 112 kW (150 hp) engines, was redesigned to production standards and flew for the first time on November 19, 1964, but was lost subsequently during flight testing. A third aircraft was used for static structural testing and the fourth, with 119 kW (160 hp) engines, flew on August 25, 1965. FAA type certification under CAR Part 3 was gained on December 20, 1966, but for several reasons production aircraft did not become available until 1980.

TYPE: Two-seat twin-engined light aircraft.

WINGS: Cantilever low-wing monoplane. Wing section NACA 65$_2$-415. Dihedral 6° from roots. Incidence 1°. All-metal two-spar structure of light alloy, with chemically-milled skin. Plain ailerons of light alloy with piano-type hinges. Electrically-actuated slotted trailing-edge flaps of similar construction. Bungee-type trim control.

FUSELAGE: All-metal semi-monocoque light alloy structure, except for glassfibre nose.

TAIL UNIT: Cantilever structure of light alloy with swept vertical surfaces. Tailplane has variable incidence. Rudder and elevator trim tabs.

LANDING GEAR: Electrically-retractable tricycle type with single wheel on each unit. Nosewheel retracts forward, main units upward, wheels turning to lie flat in nacelles. Oleo-pneumatic shock-absorbers. Steerable nosewheel has tubeless tyre size 5.00-5, pressure 2.41 bars (35 lb/sq in); main wheels have low-profile tyres size 6.00-6, pressure 2.76 bars (40 lb/sq in). Cleveland single-disc hydraulic brakes. Parking brake.

POWER PLANT: Two 119 kW (160 hp) Avco Lycoming IO-320-B1C or -C1A flat-four engines, each driving a Hartzell HC-C2YL/8450-18 two-blade constant-speed fully-feathering metal propeller with spinner. Engine nacelles of glassfibre construction. Integral fuel tank in the leading-edge of each outer wing, with combined capacity of 333 litres (88 US gallons), of which 329 litres (87 US gallons) are usable. Refuelling point at each wing-

tip. Oil capacity 15 litres (4 US gallons).

ACCOMMODATION: Two adjustable seats, with seat belts and inertia-reel shoulder harness, side by side under large 'swing-up-and-away' canopy with opaque top. Tinted windscreen and windows. Dual controls standard. Baggage compartment behind seats, with capacity of 113 kg (250 lb). Accommodation is heated and ventilated.

SYSTEMS: Electrical system includes two 60A alternators and a 12V 35Ah storage battery. 15,000 BTU heater/defroster. Vacuum system for flight instruments only. Hydraulic system for brakes only. Oxygen system optional.

AVIONICS AND EQUIPMENT: Standard avionics include two 360-channel nav/coms; two VORs, one with glideslope indicator; ADF; transponder; three-light marker beacon receiver; related antennae, audio amplifier, cabin speaker, microphone, and headset. Optional avionics include autopilot with three-axis electric trim, and DME. Standard equipment includes full IFR instrumentation: exhaust gas and outside air temperature gauges; turn and slip indicator; rate of climb indicator; emergency locator transmitter; cabin soundproofing; map pockets; pilot's storm window; heated pitot; stall warning device; instrument lights; anti-corrosion, landing, and navigation lights; corrosion proofing; and towbar. Optional equipment includes propeller unfeathering accumulators, Hartzell synchrophaser, inflatable canopy seal, and external power socket.

DIMENSIONS, EXTERNAL:

Wing span	8.89 m (29 ft 2 in)
Wing chord (constant)	1.27 m (4 ft 2 in)
Wing aspect ratio	7
Length overall	7.01 m (23 ft 0 in)
Height overall	2.44 m (8 ft 0 in)
Tailplane span	3.30 m (10 ft 10 in)
Wheel track	3.30 m (10 ft 10 in)
Wheelbase	1.64 m (5 ft 4½ in)
Propeller diameter	1.68 m (5 ft 6 in)
Propeller ground clearance	0.20 m (8 in)

DIMENSIONS, INTERNAL:

Cabin: Length	2.54 m (8 ft 4 in)
Max width	1.12 m (3 ft 8 in)
Max height	1.22 m (4 ft 0 in)
Floor area	1.11 m² (12 sq ft)
Volume	1.59 m³ (56 cu ft)
Baggage hold volume	0.62 m³ (22 cu ft)

AREAS:

Wings, gross	11.24 m² (121.0 sq ft)
Ailerons (total)	0.74 m² (8.00 sq ft)
Flaps (total)	1.11 m² (12.00 sq ft)
Fin	1.08 m² (11.65 sq ft)
Rudder, incl tab	0.48 m² (5.18 sq ft)
Tailplane	1.72 m² (18.56 sq ft)
Elevators, incl tabs	1.07 m² (11.51 sq ft)

WEIGHTS AND LOADINGS:

Weight empty, standard	952 kg (2,100 lb)
Max T-O weight	1,383 kg (3,050 lb)
Max landing weight	1,315 kg (2,900 lb)
Max wing loading	123 kg/m² (25.2 lb/sq ft)
Max power loading	5.81 kg/kW (9.5 lb/hp)

In camouflage finish, the Wing Derringer looks like a workmanlike candidate for COIN/utility military service

PERFORMANCE (at max T-O weight):

Max level speed at S/L
201 knots (373 km/h; 232 mph)

Max cruising speed, 75% power at 3,050 m (10,000 ft) 190 knots (352 km/h; 219 mph)

Econ cruising speed, 65% power at 3,050 m (10,000 ft) 182 knots (338 km/h; 210 mph)

Approach speed
82.5 knots (153 km/h; 95 mph)

Stalling speed:
flaps and landing gear up
69.5 knots (129 km/h; 80 mph)
flaps and landing gear down
63 knots (116 km/h; 72 mph)

Max rate of climb at S/L 518 m (1,700 ft)/min

Rate of climb at S/L, one engine out
128 m (420 ft)/min

Service ceiling 5,975 m (19,600 ft)

Service ceiling, one engine out
2,440 m (8,000 ft)

T-O run 280 m (920 ft)

T-O to 15 m (50 ft) 457 m (1,500 ft)

Landing from 15 m (50 ft) 640 m (2,100 ft)

Landing run 378 m (1,240 ft)

Range with max fuel, 65% power at 3,050 m (10,000 ft), no reserves
1,007 nm (1,866 km; 1,160 miles)

Endurance at econ cruising speed, 65% power
5 h 30 min

WING D-2M DERRINGER

Under the designation D-2M, Wing has developed a military version of the Derringer intended for COIN and general-utility roles. It differs from the civil D-1 by having a slight increase in wing span, more powerful engines, and provisions to carry a variety of weapons. The description of the D-1 applies also to the D-2M, except as detailed below:

TYPE: Two-seat COIN/utility military aircraft.

WINGS: As for D-1 Derringer, except for a 0.25 m (10 in) increase in span. Composite tips.

FUSELAGE, TAIL UNIT AND LANDING GEAR: Generally as for D-1; weight saving composites used for construction of canopy, engine cowlings and nacelles, and nosecone.

POWER PLANT: Two 149 kW (200 hp) Avco Lycoming IO-360-A1B flat-four engines, each driving a Hartzell two-blade constant-speed fully-feathering propeller with spinner. Integral wing tanks, filled with reticulated foam, provide standard usable fuel capacity of 318 litres (84 US gallons). Auxiliary fuel tank in each wing, with combined usable capacity of 136 litres (36 US gallons), providing a maximum usable capacity of 454 litres (120 US gallons). Refuelling point on upper surface of each wing.

ACCOMMODATION AND SYSTEMS: Generally as for D-1, except crew seats of glassfibre for weight saving; optionally of Kevlar to provide a measure of protection against small arms fire.

AVIONICS: Allowance of 16.3 kg (36 lb) for installation of military nav/com and other essential avionics.

ARMAMENT (optional): Two fuselage-mounted 7.62 mm machine-guns, each with 1,000 rounds of ammunition, or two underwing store stations suitable for tube launchers with rockets, 250 lb Mk 81 GP bombs, 7.62 mm Minigun pods, public address equipment, and miscellaneous dispensers.

DIMENSIONS, EXTERNAL: As for D-1, except:

Wing span	9.14 m (30 ft 0 in)

WEIGHTS AND LOADINGS:

Weight empty	1,066 kg (2,350 lb)
Max standard T-O weight	1,633 kg (3,600 lb)
Max overload T-O weight	1,769 kg (3,900 lb)
Max wing loading	138.96 kg/m² (28.47 lb/sq ft)
Max power loading	5.94 kg/kW (9.75 lb/hp)

PERFORMANCE (in armed patrol configuration with two fuselage guns, at standard T-O weight except as indicated; figures based on D-1 test data):

Max level speed at S/L
205 knots (380 km/h; 236 mph)

Max cruising speed at 1,525 m (5,000 ft)
190 knots (352 km/h; 219 mph)

Econ cruising speed at 1,525 m (5,000 ft)
130 knots (241 km/h; 150 mph)

Stalling speed:
flaps and landing gear up
74 knots (138 km/h; 85 mph)
flaps and landing gear down
67 knots (124 km/h; 77 mph)

Max rate of climb at S/L 559 m (1,834 ft)/min

Service ceiling 5,425 m (17,800 ft)

T-O run 361 m (1,185 ft)

T-O to 15 m (50 ft) 472 m (1,550 ft)

Landing from 15 m (50 ft) at landing weight of 1,280 kg (2,823 lb) 335 m (1,100 ft)

Landing run at landing weight of 1,280 kg (2,823 lb) 155 m (510 ft)

Combat range, with 15 min loiter:
at max cruising speed
772 nm (1,431 km; 889 miles)
at econ cruising speed
1,022 nm (1,892 km; 1,176 miles)

Artist's impression of Derringer in USMC operation

Berlin was saved in 1948 because of US airlift capabilities, while the Germans sacrificed their Sixth Army at Stalingrad because of lack of it. But having numbers of aircraft is not enough . . .

AIRLIFT: The Name of the Game Is Utilization

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

THE Great Fog in December 1948 was the worst Europe had seen since December 1944. That one had grounded the Allied air forces and nearly made von Runstedt's desperate gamble in the Ardennes a success.

As for the Great Fog, it blanketed Europe from Finland to Italy, England to Warsaw, for nearly five days. Berlin lay in the midst of this shroud, its tenuous lifeline to the West—the Berlin Airlift—all but choked off. Then, as it had in the Bulge, the fog lifted, and the forces of righteousness triumphed.

The world's attention was focused that year on Berlin and its *Luftbrucke*, the Bridge in the Sky. The normally prosaic business of air transport had finally achieved a little glamour. More importantly, this Berlin rescue operation had impressed on a combat-oriented Air Force as nothing else had the need for well-managed airlift. What had begun as an *ad hoc* arrangement to buy time became a showcase for air transport, thanks in large part to the unrelenting drive of a true believer, Gen. William Tunner, who understood how to make one airplane work like three.

The airlift business has been recognized ever since as an essential element in the almost endless crises this country has faced since the Berlin blockade ended the brief respite following World War II.

Korea came along unexpectedly, as wars generally do, soon after the assets gathered for the Airlift had been dispersed. Since the Korean situation looked like a pretty close call in the early days, neither ammunition nor soldiers had time for a long sea voyage. Getting airlift back into high gear was not so much a matter of assembling airplanes as it was one of finding crews and maintenance people to keep the airplanes in the air. The air transport name for that is high utilization, something not always well understood when spare parts, money, and people are budgeted. The recent flap over what new transport airplane to buy is a case in point.

The C-5B is doubtless the best long-haul military freighter presently available. Its ease of loading alone would give it that advantage, all other things being approximately equal. But the attention directed toward the type of airplane, whether C-5B, 747, C-17, or whatever, tends to obscure the more basic factors that contribute to airlift productivity.

Airplanes at the state of the art are essential to survival in the fighter business, but military air transports are another matter. They don't even have to be competitive with those of the enemy. What they must be is reliable and undemanding in such amenities as runway length and servicing facilities.

There is, of course, a requirement for outsize loads, but that tends to get out of focus. It is not too great an extrapolation of Murphy's Law to say that the capacity of the Air Force's largest cargo airplane will inevitably be exceeded by some new piece of Army equipment. Designing a transport force for outsize loads loses sight of airlift's basic utility.

A hard-pressed combat force dependent on airlift will need a wide variety of things, and few of them, if history is any teacher, will be the heavy items. What that force will mainly need is round-the-clock reliability, a supply line responsive to the shortages of the moment.

The Germans lost their Sixth Army at Stalingrad, and with it, their war with Russia, for a number of reasons. One, of course, was Hitler's lunatic decision against a breakout to the west while it was still possible. But another was the dismal failure of the Luftwaffe's transport force to supply the Sixth Army.

The need in Stalingrad was for ammunition, food, and medical supplies, not tanks or artillery pieces. The Ju-52s, small and slow though they were, could have hauled those loads, but the Luftwaffe transport force was never up to the job. Since that should have been obvious at the outset, it remains a mystery why the Sixth Army was sacrificed in such a hopeless cause. Hitler's Luftwaffe had never put the sort of attention on airlift that it had on fighters.

Quite apart from the recent congressional imbroglio that ended in a C-5B victory, there are encouraging signs that our airlift is getting the kind of priority it deserves. Stretching the C-141 has increased its payload by thirty percent, another way of saying 270 C-141s have now become 351, the nearest thing to the loaves and fishes miracle that mortals are likely to pull off. The next trick, when the day comes, is to multiply those 351 C-141s through high utilization. This course will not be easy or cheap.

And since, unlike the United Kingdom, we don't have even one *QE2* to commandeer, the Civil Reserve Air Fleet program is getting new emphasis. Jumbo jets will be available if and when they are needed.

All in all, the airlift picture is looking up, not least because its importance is so widely recognized. But now that the fifty new C-5Bs are in the bag it might not be a bad idea for everyone to remember that new airplanes are only part of the answer. The rest is an ability to keep the airplanes moving day and night and over the long haul. That is where the money should go from now on. ■

THE BULLETIN BOARD

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

Groundbreaking Scheduled for Bob Hope Village

"We've been looking forward to this day for a long, long time. I've never doubted it was going to happen—even though it sometimes looked grim—and I want to give a special thanks to those individual AFA members and chapters that have helped all along. This is going to mean so much to enlisted widows and couples."

That is how D. N. Masone, President and Chief Executive Officer of the Air Force Enlisted Widows Home Foundation, characterized his feelings to AIR FORCE Magazine as the Home prepared for this month's groundbreaking for Bob Hope Village. The Village will add 256 apartment units to the Fort Walton Beach, Fla., facility. The current home, Teresa Village, has 121 units, and a waiting list of more than 500. Some estimates put the total number of eligibles as high as 17,000.

On October 19, the groundbreaking will herald the start of a $10 million fund-raising campaign to build the additional units. The name "Bob Hope Village" is in recognition of the entertainer's more than forty years of service to the military community. Hope first became involved with the Foundation in 1977, when he was asked by his former USO-tour Air Force pilot, Bob Gates, to perform a benefit for the widows. A second Hope benefit followed in 1980 and a third is scheduled for the October 19 groundbreaking.

The fund-raising campaign, needed to make the Village a reality, is headed by Harry J. Gray, Chairman and Chief Executive of United Technologies Corp. Gray, whose company pledged $1.5 million to start the campaign, chairs the committee of regional chairmen: Roy A. Anderson, Chairman and Chief Executive Officer, Lockheed Corp. (Western Region); David S. Lewis, Chairman and Chief Executive Officer, General Dynamics Corp. (Central Region); and Donald R. Beall, President and Chief Operating Officer, Rockwell International Corp. (Eastern Region).

VA Continues Agent Orange Research

New initiatives aimed at unearthing possible health-related effects of Agent Orange exposure have been announced by the Veterans Administration.

Ten new research projects have been approved and funded by the agency. The new projects are supported with VA research funds in excess of $2 million, and are to last for a five-year period. They were selected from proposals submitted by individual investigators working in VA medical centers across the country. The projects are aimed at exploring biochemical, physiological, or toxicological effects possibly emanating from exposure to Agent Orange.

While the projects will primarily involve animal studies, human tissue cultures will be analyzed in some instances. Specific approaches will range from behavioral observations of laboratory animals exposed to the defoliants used in Vietnam, to biochemical studies of fat metabolism.

In addition to a number of research efforts under way, the VA has given health examinations to more than 89,000 Vietnam veterans worried about possible adverse effects from the herbicides. The VA now is authorized to treat any veteran for certain disabilities that may have been caused by exposure to Agent Orange.

Senior NCO Academy to Get Enlisted Commandant

In a move attracting heartfelt approval from the enlisted force, the Air Force Senior Noncommissioned Officer Academy's commandant slot will change from a colonel to a chief master sergeant authorization this fiscal year.

Chiefs are already filling the commandant's position at major command NCO academies. The Senior school, established in 1973, plays a unique role in preparing senior NCOs to fulfill better their leadership and management responsibilities. Its commandant is the principal advisor to the Air University Commander on senior NCO professional military education. There are sixty-one permanent party positions at the Gunter AFS, Ala., location. More than 1,000 senior NCOs from throughout the Air Force are graduated from the school each year.

POW/MIA Issue Gets High-Level Support

In what many observers have characterized as the highest level of interest shown in this topic in a decade, President Reagan and several of his top officials have taken a strong stand on accounting for POW/MIAs.

In a message sent to the national gathering of the National League of Families, the President said:

During a recent ceremony at Eglin AFB, Fla., retired Col. George E. "Bud" Day—a Medal of Honor recipient and a former POW—accepts a folded American flag from the Security Police Drill Team as a symbolic gesture honoring all former prisoners of war. The local AFA chapter assisted in coordinating the event.

"More than nine years have passed since the accounting for our missing military and civilian personnel was to have occurred. We are fully aware that attempts to secure the cooperation of the Communist powers regarding this issue of fundamental humanitarian concern to all Americans have been unsatisfactory. I pledge to you that this Administration will support and vigorously pursue the fullest possible accounting for our missing countrymen. . . . I assure you that actions to investigate live sighting reports receive and will continue to receive necessary priority and resources, based on the assumption that at least some Americans are still held captive. Should any such report be proven true, this government will act decisively to ensure their return. . . ."

In other speaking engagements around the country, other high Administration officials have echoed and reinforced this theme. Secretary of Defense Caspar W. Weinberger has said, "We proceed under the assumption that at least some Americans are still held captive by the Indochinese Communists." Judge William Clark, the President's National Security Affairs advisor, also has told audiences that all applicable agencies of government have been given the responsibility to devote necessary resources and priority to resolving the problem.

Blood Processing Added to CHAMPUS Reimbursement

CHAMPUS will now share the cost, in many cases, of "plasmapheresis"—the removal, processing, and return of blood to the body in certain life-threatening situations.

The technique has been under study regarding its effectiveness in treating certain diseases and thus had not heretofore been included in CHAMPUS benefits. Results of these studies have been promising, and its usefulness in treating some diseases has been documented. However, it still has not been proven effective across the board, and so CHAMPUS can only cost-share as a last-resort treatment of certain conditions.

Preliminary ground rules governing reimbursement call for blood processing to have been used only after conventional forms of treatment have been tried and have failed, and when the patient's life is endangered by certain specific medical conditions, including myasthenia gravis—a progressive weakening and paralysis of the muscles—thickening of the blood associated with the growth of certain tumors, and certain kidney inflammations.

In other CHAMPUS news, the agency has announced that, effective January 1, 1983, claimants in Arizona, California, Nevada, and New Mexico will use Blue Cross of Washington-Alaska for claims processing rather than Blue Shield of California. This contract incorporates a new procedure that makes Blue Cross of Washington-Alaska subject to both bonuses and penalties tied to speed and quality in paying claims.

Women and Explosives

A1C Bonnie Richardson, Hill AFB, Utah, recently became the first woman explosive ordnance disposal specialist assigned at Hill. There are only fifty-four women in the EOD field in all branches of the military, twenty-six of them in the Air Force.

Airman Richardson says that she doesn't view her work as extraordinarily dangerous, "as long as you do what you're supposed to do," she added *(see photo)*. There's always the chance for a mistake, she admits, but she likens that danger to the chances of an automobile accident while driving. She chose the EOD specialty while still a high school senior in Beaulaville, N. C., and has found her subsequent training and job more enjoyable than "an ordinary job."

Meanwhile, an Air Force nurse at Langley AFB, Va., Col. Gail Liberty, has returned to her hobby as a dead-eye sharpshooter after a hiatus of fifteen years, primarily because of the awakening of international interest in the sport.

Colonel Liberty began shooting for the Air Force team as a second lieutenant in 1962 and was the women's national champion in 1962 and 1963. She took fourth place in the World Championships in 1966.

A1C Bonnie Richardson, an explosive ordnance disposal specialist, uses a crimping tool to make a cap well in mock C-4 material. The material is resting on an inert bomb in the 2701st Explosive Ordnance Disposal Squadron's proficiency range at Hill AFB, Utah. See item. (USAF photo)

Last year she returned to competition at Langley, noting "I really became interested after learning that there are now a lot more international women's shooting events than there were sixteen years ago." Indeed, 1982 marks the first time that the *Counseil Internationale du Sportes Militaire* (CISM), an international military sports organization, will have women's shooting events. Colonel Liberty was selected for the CISM team.

Asked how she managed to maintain that high level of skill after such a long layoff, she commented, "I didn't. But shooting is just like any other sport. You pick up where you left off, try to recall the fundamentals—but you really need to practice. A lot depends on how much time and effort you are willing to devote to getting back to that high level of skill."

Obviously, her effort has paid off. She has been selected for the US team that will compete in the 1982 World Championships in Venezuela next month; the US National Training Team; and the Mexican Championships next spring. She hopes that these world-class events will help her prepare for what is her ultimate goal—the 1984 Olympics. For the first time, these Games will include women's pistol events. Colonel Liberty wants to be there.

Drug/Alcohol Abuse Gets Attention

DoD is probing the extent of drug and alcohol use/abuse among both military and civilian employees.

Just nearing completion is a worldwide survey—completely voluntary and with anonymity guaranteed—of usage among civilian employees. It's designed to evaluate the extent of drug and alcohol use among the DoD civilian work force and to plan improvements in employee assistance programs and policies. It's patterned after similar programs for the military and is believed to be the first such in-depth effort for civilians.

Meanwhile, last month DoD kicked off the third such survey—following up similar efforts in 1974 and 1980—aimed at military members. Again, survey participants must volunteer and individual responses will be anonymous. DoD hopes to "define the true nature of the problem" with this evaluation. It will probe not only use, but also physical, social, and work consequences, including drug and alcohol dependence. The 1980 worldwide survey found that drug abuse had decreased since the 1974 survey *(see also p. 34)*.

DoD continues to be concerned with this aspect of administering the

force, and with good reason. It estimates that almost 500 military people, throughout DoD, were killed as the result of drinking and driving last year. In the Air Force, in 1981, 152 members were killed in auto accidents, with at least forty-five percent of the incidents involving alcohol.

AFJROTC Expands

As the new school year gets under way, the Air Force has established ten more Air Force Junior ROTC units, primarily in East Coast high schools.

Public law authorizes a total of 1,600 units, of which Air Force JROTC operates approximately 285, located at high schools nationally and in Europe and Guam. Retired Air Force officers and NCOs, recruited and nominated by the Air Force, are hired as local school employees who must meet local hiring criteria. They teach leadership and how social and physical sciences apply to the aerospace world.

Selection of schools for the program is based on several factors, including nationwide population distribution, sufficient school enrollment to ensure at least 100 AFJROTC students, and proximity to an Air Force installation.

The new units are being established at Lake Worth Community High School, Lake Worth, Fla.; Brick Township Memorial High School, Brick, N. J.; Ramstein American High School, Ramstein, Germany; Pompano Beach High School, Pompano Beach, Fla.; Buchholz High School, Gainesville, Fla.; Arlington Career Center, Arlington, Va.; Scotch Plains-Fanwood High School, Scotch Plains, N. J.; Potomac Senior High School, Oxon Hill, Md.; N. B. Forrest Senior High School, Jacksonville, Fla.; and Socastee High School, Myrtle Beach, S. C.

Fitness as an Air Force Goal

Emphasizing the Air Force's increasing push to keep the force fit, a Special Office on Fitness has been created at the Air Force Manpower and Personnel Center, Randolph AFB, Tex.

Capt. Bobbie Butler has been named to head the office. One of her first tasks will be to develop and implement a new fitness program and evaluation procedure *(see related item, June '82 "Bulletin Board").* Efforts are already under way to incorporate instruction on diet and exercise in professional military education schools. Air Training Command and Medical Service Center specialists are jointly developing course materials. An advisory council, drawing on experts from various disciplines, will be set up to assist the fitness office with ideas.

THE BULLETIN BOARD

Federal Benefits for Prisoners Sorted Out

In October 1980, responding to perceived constituent indignation, Congress passed legislation excluding prisoners from receiving certain government benefits. Surprisingly, and as Congress admitted at the time, no one knew exactly how many people this included. Perhaps even more surprising, in this day of computerization, is that the exact figures are still unknown.

At any rate, Congress directed its investigative arm, the General Accounting Office, to take a count. GAO has just reported back and its estimates shed some interesting light on this topic.

GAO reports that, of those drawing the now eliminated benefits, about 4,300, or some 1.4 percent of the approximately 314,000 incarcerated felons, were receiving Social Security disability benefits of about $17 million a year. About 3,000, or one percent, were receiving VA disability compensation benefits of about $8 million a year, and some 4,000 (1.3 percent) were receiving VA education benefits worth about $14 million annually. These payments have now been stopped as the law requires, in those cases where the agencies can identify the recipients as ineligible.

Some other federal payments were not affected by the legislation, but GAO, while it was counting, also attempted to get a handle on these. It found that about 1,400 or less than 0.04 percent were getting Social Security retirement or survivor benefits worth about $4 million a year. Some lesser numbers are receiving military and civil service retirement payments.

GAO's first and most important recommendation of the report was that state prison systems must do a better job of validating Social Security numbers of prisoners and sharing this information with the government agencies providing benefits so that the intent of the law can be carried out. All concerned agree that this is tough, but, as the report noted, "Social Security Administration and the Vet-

erans Administration will not be able to completely identify prisoner beneficiaries until accurate Social Security numbers are available for all prisoners. States vary widely in the completeness and accuracy of this information and could improve their documentations. . . . " Obviously, not much happens today without a Social Security number.

Short Bursts

For the second consecutive year, the **Air Force captured the Interservice Tennis Championships.** The Air Force netted twenty-two points compared to runner-up Army's fifteen. In the junior veterans division, SSgt. Dewey Varn, Dyess AFB, Tex., took the title against his brother, Lt. Col. Ben Varn, Randolph AFB, Tex., in two sets, 6–3, 6–2. The Varn brothers then teamed up to beat the Army team, last year's doubles winner.

MSgt. John J. Radziwon, Ellsworth AFB, S. D., is **1982's Air Force Suggester of the Year.** One of his several adopted suggestions eliminated ninety percent of depot-assisted repairs—with its concurrent TDY—and allows local technicians to perform repairs on missile launch control facility safety ventilation systems.

CAP's new National Commander is Howard L. Brookfield, former vice commander. A promotion to one-star CAP rank goes with the job. General Brookfield is a member of AFA's Pasadena Chapter. Congratulations!

Frequently confused is the **difference between VA disability compensation and disability pension.** Compensation goes to vets with a ten percent or more disability tied to active service. Pension is paid to needy war veterans who are permanently and totally disabled from non-service connected causes prior to age sixty-five.

VA's newest national cemetery at Indiantown Gap, fifteen miles northeast of Harrisburg, Pa., **has opened** for burials. This is the 107th VA cemetery and will primarily serve veterans from Pennsylvania, Delaware, New Jersey, Virginia, and West Virginia, but is of course open to all eligible veterans. About 270,000 veterans live within a fifty-mile radius of the new facility, and close to a million and a half are within several hours drive. It's planned to have 360,000 grave spaces. ■

SENIOR STAFF CHANGES

PROMOTIONS: To be **Lieutenant General:** William E. **Brown,** Jr.; John L. **Piotrowski.**

To be **Brigadier General:** Jerry D. **Holmes;** Monte D. **Montgomery;** Clifford H. **Rees,** Jr.; Robert L. **Rutherford.**

RETIREMENTS: M/G Richard **Bodycombe;** M/G John R. **Paulk.**

CHANGES: B/G Clarence R. Autery, from Ass't DCS/Ops., Hq. SAC, Offutt AFB, Neb., to Cmdr., 3d AD, SAC, Andersen AFB, Guam, replacing M/G Stanley C. Beck . . . **M/G Stanley C. Beck,** from Cmdr., 3d AD, SAC, Andersen AFB, Guam, to Vice Cmdr., 15th AF, SAC, March AFB, Calif., replacing M/G John A. Brashear . . . **B/G William P. Bowden,** from Dep. Dir., Log. Plans & Prgms., DCS/L&E, Hq. USAF, Washington, D. C., to Dir., Log. Plans & Prgms., DCS/L&E, Hq. USAF, Washington, D. C., replacing M/G Theodore D. Broadwater . . . **M/G John A. Brashear,** from Vice Cmdr., 15th AF, SAC, March AFB, Calif., to DCS/Ops., Hq. SAC, & Dep. Dir., Ops., SAC Operational Support, Offutt AFB, Neb., replacing M/G Louis C. Buckman.

M/G Theodore D. Broadwater, from Dir., Log. Plans & Prgms., DCS/L&E, Hq. USAF, Washington, D. C., to Ass't DCS/L&E, Hq. USAF, Washington, D. C., replacing retired M/G Martin C. Fulcher . . . **M/G (L/G selectee) William E. Brown, Jr.,** from Cmdr., 17th AF, USAFE, Sembach AB, Germany, to Cmdr., AAFSE, & Dep. CINC USAFE for the Southern Area, Naples, Italy . . . **M/G Louis C. Buckman,** from DCS/Ops., Hq. SAC, & Dep. Dir., Ops., SAC Operational Support, Offutt AFB, Neb., to Chief, JUSMAG, Athens, Greece, replacing M/G Cornelius Nugteren . . . **M/G Philip J. Conley, Jr.,** from Cmdr., AFFTC, AFSC, Edwards AFB, Calif., to Vice Cmdr., ESD, AFSC, Hanscom AFB, Mass., replacing M/G Casper T. Spangrud.

B/G Milford E. Davis, from Cmdr., 24th AD/NORAD Rgn., TAC, Malmstrom AFB, Mont., to Cmdr., ADWC, TAC, Tyndall AFB, Fla., replacing M/G Robert H. Reed . . . **B/G James B. Davis,** from DCS/Personnel, Hq. TAC, Langley AFB, Va., to Dir., Personnel Prgms., DCS/M&P, Hq. USAF, Washington, D. C., replacing M/G Mele Vojvodich, Jr. . . . **M/G Herbert L. Emanuel,** from Ass't DCS/M&P, Hq. USAF, Washington, D. C., to Cmdt., AFIT, ATC, Wright-Patterson AFB, Ohio, replacing M/G Stuart H. Sherman, Jr. . . . **B/G Gordon E. Fornell,** from Dep. Dir. of Development & Production, DCS/RD&A, Hq. USAF, Washington, D. C., to Dep. Dir., Log. Plans & Prgms., DCS/L&E, Hq. USAF, Washington, D. C., replacing B/G William P. Bowden.

L/G Philip C. Gast, from Dir., J-3, OJCS, Washington, D. C., to Dir., Defense Security Assistance Agency, Washington, D. C. . . . **M/G Harry A. Goodall,** from C/S, 4th ATAF, AAFCE, Heidelberg, Germany, to Cmdr., 17th AF, USAFE, Sembach AB, Germany, replacing M/G (L/G selectee) William E. Brown, Jr. . . . **B/G John E. Griffith,** from DCS/Air Transportation, Hq. MAC, Scott AFB, Ill., to Dir. of Transportation, DCS/L&E, Hq. USAF, Washington, D. C., replacing M/G George B. Powers, Jr. . . . **Col. (B/G selectee) Jerry D. Holmes,** from Cmdr., 552d AWCW, TAC, Tinker AFB, Okla., to Spec. Ass't to DCS/Log., Hq. TAC, Langley AFB, Va.

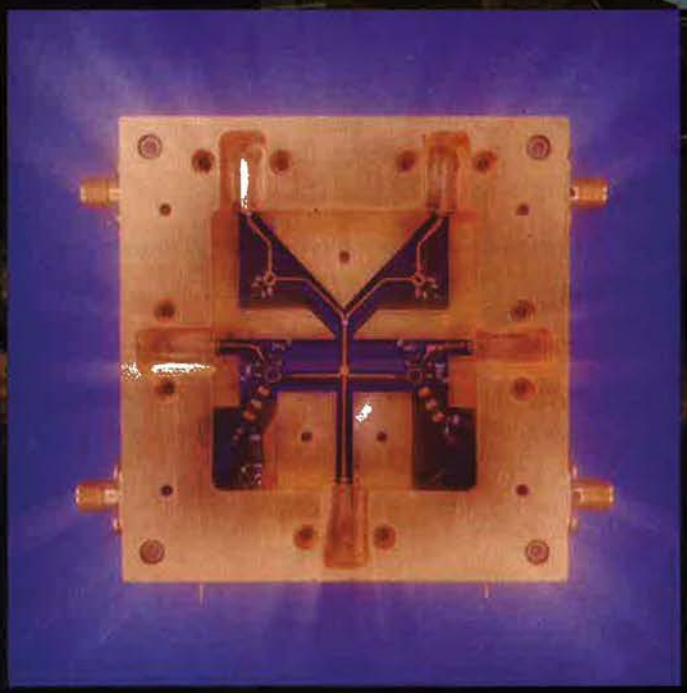
B/G Wayne W. Lambert, from Ass't DCS/Ops. Plans, Hq. SAC, Offutt AFB, Neb., to Ass't DCS/Ops., Hq. SAC, Offutt AFB, Neb., replacing B/G Clarence R. Autery . . . **Col. (B/G selectee) Monte D. Montgomery,** from Cmdr., 64th FTW, ATC, Reese AFB, Tex., to Spec. Ass't to DCS/Log., Hq. ATC, Randolph AFB, Tex. . . . **M/G Cornelius Nugteren,** from Chief, JUSMAG, Athens, Greece, to Cmdr., Warner Robins ALC, AFLC, Robins AFB, Ga., replacing retired M/G John R. Paulk . . . **M/G Peter W. Odgers,** from DCS/T&E, Hq. AFSC, Andrews AFB, Md., to Cmdr., AFFTC, AFSC, Edwards AFB, Calif., replacing M/G Philip J. Conley, Jr.

B/G Richard M. Pascoe, from Cmdr., 81st TFW, USAFE, RAF Bentwaters, UK, to Cmdr., 25th AD/NORAD Rgn., TAC, McChord AFB, Wash., replacing M/G Harold W. Todd . . . **M/G (L/G selectee) John L. Piotrowski,** from DCS/Ops., Hq. TAC, Langley AFB, Va., to Vice Cmdr., Hq. TAC, Langley AFB, Va., replacing L/G Thomas H. McMullen . . . **M/G George B. Powers, Jr.,** from Dir. of Transportation, DCS/L&E, Hq. USAF, Washington, D. C., to Cmdr., Defense Construction Supply Center, DLA, Columbus, Ohio . . . **M/G Robert H. Reed,** from Cmdr., ADWC, TAC, Tyndall AFB, Fla., to DCS/Ops., Hq. TAC, Langley AFB, Va., replacing M/G (L/G selectee) John L. Piotrowski.

Col. (B/G selectee) Clifford H. Rees, Jr., from Vice Cmdr., Hq. AFMPC, & Dep. Ass't DCS/M&P for Mil. Personnel, Randolph AFB, Tex., to Dep. Dir., Leg. Liaison, OSAF, Washington, D. C., replacing B/G Buford D. Lary . . . **Col. (B/G selectee) Robert L. Rutherford,** from Cmdr., 18th TFW, PACAF, Kadena AB, Okinawa, Japan, to Vice Cmdr., Hq. AFMPC, & Dep. Ass't DCS/M&P for Mil. Personnel, Randolph AFB, Tex., replacing Col. (B/G selectee) Clifford H. Rees, Jr. . . . **M/G Harold W. Todd,** from Cmdr., 25th AD/NORAD Rgn., TAC, McChord AFB, Wash., to C/S, 4th ATAF, AAFCE, Heidelberg, Germany, replacing M/G Harry A. Goodall . . . **M/G Mele Vojvodich, Jr.,** from Dir., Personnel Prgms., DCS/M&P, Hq. USAF, Washington, D. C., to Ass't DCS/M&P, Hq. USAF, Washington, D. C., replacing M/G Herbert L. Emanuel.

SENIOR ENLISTED ADVISOR: CMSgt. Charles E. Teston, to SEA, Hq. AFCC, Scott AFB, Ill., replacing CMSgt. Earl Dorris. ■

Advanced Technology for TRW's Electronic Systems



Millimeter Wave Transceiver

Millimeter Wave All Weather Sensors
This extremely high frequency technology, now in the prototype hardware stage at TRW, will enable the next generation of smart munitions and missiles to locate targets in fog, rain, sleet, or snow.

Sub-Miniature Transceivers
Our Electronic Systems Group has already developed transceivers in the 20 to 100 GHz range. They weigh less than one-half pound and occupy less space than a hockey puck. With a five-inch antenna, they can home-in on targets such as tanks from a range of several kilometers.

Millimeter Wave Technology
We have developed a number of wide band solid state amplifiers—at 20 GHz/20 watts, at 44 GHz/11 watts and at 94 GHz/12.5 milliwatts. A variety of companion reveivers have also been developed, including a 60 GHz receiver on a sapphire chip with a demonstrated 6 dB single side band noise figure. We are presently developing a monolithic EHF gallium arsenide receiver. Supporting these amplifier and receiver developments is an extensive materials and device development program.

This technology is typical of that used in TRW's eletronic systems for advanced communications satellites, their ground terminals and other military systems. TRW's technical teams are at work on complete EHF systems that will become operational in the mid and late eighties.

For further information, contact:
George L. Ziff (213) 535-4828

Electronic Systems from
A Company Called TRW

TRW

TRW Electronic Systems Group

INTERCOM

A passel of AFA Life Members: A1C Ferdinand Morales, center, completes his life membership application under the watchful eyes of Lt. Gen. William R. Nelson, left, Twelfth Air Force Commander, and AFAer Henry Cline. Other AFA Life Members include (standing, from left): Capt. L. F. Wilkes, Austin Chapter President John E. Stavast, Col. Jason I. Chick, Capt. Fred Stoessel, Lt. Col. Samuel R. Palumbo, Sgt. Richard A. Small, Jr., Capt. Jerry L. Smith, TSgt. Harvey J. Symm, TSgt. Darwin E. Douglas, SSgt. Warren L. Anderson, SMSgt. Eldred J. Caillouet, 2d Lt. John M. Huddleston, SSgt. John W. Hall, 2d Lt. Kenneth W. Polk, 1st Lt. David O. Best, 1st Lt. Stephen B. Davis, Maj. Robert C. Kuhlo, SSgt. James E. Miller, Col. Lester G. Frazier, and Austin Chapter Executive Vice President Ollie Crawford. (USAF photo by Sgt. Gary Kitchen)

AFA Life Membership: Here's an Idea Whose Time Has Come

The man to tell you about the advantages of life membership in the Air Force Association is Capt. Fred Stoessel of Bergstrom AFB, Tex. So far this year, he has recruited forty-three Life Members, and he says he isn't finished yet.

It all began when Captain Stoessel agreed to serve as AFA membership chairman for Bergstrom AFB and Twelfth Air Force. "I decided that if I was going to do the job right, I ought to be a Life Member," he says.

Having convinced himself that this was a good deal, he mentioned his decision to the first three people he approached for regular membership. They also saw the light, signed on for life, and one of them—Lt. John M. Huddleston—volunteered to help spread the word still further.

Ironically, one of the forty-three new Life Members is Col. Lester G. Frazier, the man who in 1981 convinced Fred Stoessel that he ought to join AFA in the first place.

This year's membership drive at Bergstrom is over, but Captain Stoessel is keeping the books open. He has recruited Life Members in every grade from airman through lieutenant general except for three grades—senior airman, brigadier general, and major general.

Captain Stoessel says he didn't use any special techniques in his recruiting efforts. His approach was to describe the advantages of life membership and, from there, "it just kept rolling."

Looking ahead, he adds, "we laid the basis this year for the *big* drive next year."

The idea of AFA life membership seems to be catching on all over. As of

At the South Carolina State AFA Convention held last May, the new Clemson Chapter was chartered. Those present at the chartering ceremony included (from left): Lee C. Lingelbach, National Vice President for the Southeast Region; Clemson Chapter President Ed Rumsey, accepting the charter; AFA National President John G. Brosky; and South Carolina State President William Gemmill.

mid-August, the Association had 5,500 Life Members—up from 3,515 at the beginning of the year and swamping the total of 765 a decade ago.

Life Members receive a never-ending subscription to AIR FORCE Magazine, plus assured access to all the other benefits of being an AFAer. A membership that's always current is particularly helpful to those enrolled in one or more of AFA's group insurance programs, since membership is a requirement for continued coverage.

The cost—$200—can be spread out over two years if the Life Member wishes.

"Mr. AFA in Texas" Retires After a Forty-One-Year Career

Sam E. Keith, Jr., a long-time AFA member and forty-one-year employee of General Dynamics Fort Worth Division, retired last July from his position as manager of plant engineering.

Mr. Keith has been active in the Air Force Association since 1964. During that time he has served as chapter president, state president, and as National Vice President for the Southwest Region. In 1968, he was named AFA's Man of the Year.

Mr. Keith's career at the Fort Worth "bomber plant" has spanned every major aircraft program from the World War II B-24 Liberators to today's modern F-16 Fighting Falcons.

In addition to his work for AFA, Mr. Keith has long been active in other civic and community endeavors. He served for thirty years on the Board of Directors for the General Dynamics Con-Trib Club, the company's United Way organization, and has also participated in the Big Brothers, the Fort Worth Boys Club, Goodwill, and the Fort Worth Chamber of Commerce.

Mr. Keith is an AFA Life Member and a permanent member of the AFA Board of Directors.

Awards Night and Flag Day Celebrated at AFA's Eglin Chapter

AFJROTC Cadet Kathleen Vaughn was selected last June as the Jimmy Doolittle Award winner for 1982 by AFA's Eglin Chapter. The Doolittle Award is presented annually to the outstanding AFJROTC cadet in Florida's Okaloosa County.

The Fort Walton Beach High School graduate received a four-year AFROTC scholarship to attend Washington University in St. Louis, Mo., where she plans to major in electrical engineering. Her goal is to become a career officer in the Air Force.

ABOVE: Maj. Gen. William B. Maxson (left) and Eglin Chapter President Lake Hamrick flank the Chapter's 1982 Doolittle Awards winners (from left): Diane Hebeler, Richard Goree, James H. Phillips, James W. Bobbett, Anthony Sawyer, and Kathy Vaughn. LEFT: Flag Day ceremonies at Eglin AFB. See item. (Photo by Bob Hill)

Cadet Vaughn received a plaque, watch, and $1,500 in savings bonds from the Eglin Chapter.

In addition, two runners-up each received a plaque and $1,000 in savings bonds. First runner-up was Diane M. Hebeler of Niceville High School, and James W. Bobbett of Choctawhatchee High School was second runner-up. The Eglin Chapter also presented $1,000 scholarship awards to five other area cadets: Richard Goree, James H. Phillips, Anthony Sawyer, Vincent W. Mayfield, and William Scot Johnson.

Money for the awards is raised through the annual AFA Golf Extravaganza held each September by the Eglin Chapter.

Eglin Chapter President Lake Hamrick presided over the ceremonies, assisted by Lt. Gen. Charles G. Cleveland, Air University Commander, and Maj. Gen. William B. Maxson, Armament Division Commander. General Cleveland served as keynote speaker and spoke about the Air University, which he described as a "leadership lab, and an invaluable broadening experience for young officers."

The Eglin Chapter also elected new officers to be installed in October. They are Dick Schoeneman, President; Ed Taconi, Vice President; Joe Loria, Secretary; and L. A. Cutcliff, Treasurer.

Florida State AFA President Lee Terrell and other area military and civic dignitaries also attended the ceremonies.

Also in June, fifty state flags were raised over Eglin AFB in a ceremony commemorating Flag Day. The state flags were donated to the men and women of the base by AFA's Eglin Chapter.

Chapter President Lake Hamrick presented the flags to Maj. Gen. William B. Maxson, Armament Division Commander, who turned them over to base commander Col. Bill Wycoff for safekeeping by the base honor guard.

The idea for the Flag Day ceremony

was conceived by General Maxson and Mr. Hamrick. The flags are displayed in an "Avenue of Flags" in front of Armament Division headquarters, and will be used for different patriotic ceremonies throughout the year.

From its earliest days, USAF has attracted well-educated people. Today, ninety-eight percent of new officers are college graduates, and eighty-three percent of enlisted recruits have high school diplomas; 42.4 percent of the total officer corps has advanced degrees, as does 39.6 percent of the line officer force.

Alamo Chapter Hosts Outstanding Recruiting Service Unit

A seven-member Air Force recruiting team from the Jamestown, N. Y., area arrived at Randolph AFB, Tex., in August to be honored as the outstanding Recruiting Service flight for Operation Blue Suit IV. This year's winner of the competition was Flight F of the 3513th Recruiting Squadron—the second consecutive year Flight F has won this recruiting incentive competition.

Operation Blue Suit IV culminated with Air Force Recruiting Service meeting its annual enlistment objectives last May.

During their six-day stay, the recruiters and their supervisor were hosted by AFA's Alamo Chapter, the San Antonio Chamber of Commerce, the Noncommissioned Officers Association, and Air Force leaders.

Members of Flight F are Flight Supervisor MSgt. Bobby Jacques, Ms. Cathy Firkel, MSgt. Mike Twaroski, SSgt. Eugene Kelley, SSgt. Mark Linderman, SSgt. Richard Denault, and MSgt. Chuck Tache.

Ak-Sar-Ben Chapter Contributes to Offutt AFB Open House

"Air Force Heritage" was the theme of the July 1982 Open House at Offutt AFB, Neb., which drew a crowd of more than 175,000.

The show was highlighted by the appearance of such World War II vintage aircraft as the B-40, B-17, B-25, P-51 and others.

The appearance of the planes was made possible by members of the Warbirds of America and the Confederate Air Force, who are dedicated to the preservation of classic planes, as well as by members of the Tired Iron racing team and the Combat Air Museum of Topeka, Kan.

Fuel to launch the vintage fleet of planes was purchased with the help of area groups, including AFA's Ak-Sar-Ben Chapter, the Nebraska Chapter of the Air Force Sergeants Association, and the Daedalians.

Winners of the Blue Suit IV competition arriving at Randolph AFB, Tex., are greeted by Air Force leaders, including ATC Commander Gen. Thomas M. Ryan, Jr., and by San Antonio Chamber of Commerce members and other local community and business leaders, including members of AFA's Alamo Chapter. See item. (Photo by MSgt. Buster Kellum)

The United States Air Force: Today and Tomorrow

An Air Force Association National Symposium
October 21–22, 1982
Hyatt at Los Angeles Airport, Calif.

A penetrating appraisal by senior Defense and Air Force leaders of how our forces can counter today—and in the future—an ever-growing, sophisticated, global threat.

FEATURING

The Hon. Verne Orr, Secretary of the Air Force

Gen. John W. Vessey, USA, Chairman of the Joint Chiefs of Staff

Gen. Charles A. Gabriel, Chief of Staff, USAF

Gen. James R. Allen, Commander in Chief, Military Airlift Command

Gen. W. L. Creech, Commander, Tactical Air Command

Gen. Bennie L. Davis, Commander in Chief, Strategic Air Command

Gen. Robert T. Marsh, Commander, Air Force Systems Command

Gen. James P. Mullins, Commander, Air Force Logistics Command

Lt. Gen. Richard C. Henry, Commander, Space Division,
Air Force Systems Command

. . . and others to be announced . . .

Whether you are in aerospace industry, in defense-oriented science and engineering fields, or are a civic leader concerned about our nation's defense posture, you should not miss this uniquely illuminating Symposium.

Registration for all Symposium events is $150. For information and registration call Jim McDonnell or Dottie Flanagan at (202) 637-3300.

Air Force Association
Suite 400, 1750 Pennsylvania Ave., N.W.
Washington, D.C. 20006

INTERCOM

AFA's Lake Region Chapter honored area youth during a banquet held last May at the Florida Cypress Gardens Quality Inn. Those present at the banquet included (from left): Lt. Col. John Dillin, USAF Academy Liaison Officer; John J. McGarrity; Maj. Gen. James I. Baginski, Director of Deployment for the Joint Deployment Agency at MacDill AFB; Linda Van Lieu; Sean Jersey; Gary Christensen; Bobby Rodriguez; and retired B/G Morgan S. Tyler, Jr. John McGarrity and Bobby Rodriguez plan to attend the Air Force Academy; Linda Van Lieu is a Little General in the Arnold Air Society; Gary Christensen is the Florida Outstanding Civil Air Patrol Cadet; and Sean Jersey was chosen the Florida Outstanding Air Force JROTC Cadet.

UNIT REUNIONS

Hondo Army Airfield
Members of Hondo Army Airfield Navigation School (1942–45) will hold their fortieth reunion on October 8–10, 1982. **Contact:** Ed Osander, 7709 Broadway, Apt. 222, San Antonio, Tex. 78209.

Mather AOBs/Navigators
Mather AFB, Calif., Air Observers and Navigators, including instructors, students, and pilots, in classes from 1941–51 will hold a reunion on November 12–14, 1982. **Contact:** Leon "Cubby" Culbertson, 4631 Las Lindas Way, Carmichael, Calif. 95608.

A-37 Rapfest
The A-37 Rapfest will hold a reunion on October 29–30, 1982, at Langley AFB, Va. **Contact:** Maj. Flash Gordon, AUTOVON 432-4161, or (804) 764-3349. Maj. Nick Nicolai, Jr., AUTOVON 227-9767, or (202) 697-9767.

Class 40-G
The Flying Cadet Class 40-G will hold its forty-second annual reunion at the El Presidente Hotel, Juarez, Mexico, on November 11–14, 1982. **Contact:** "Gus" Wittrock, 10229 Ridgewood, El Paso, Tex. 79925. Phone: (915) 598-5166.

303d Bomb Wing Ass'n
The 303d Bomb Wing (Tucson) will hold a reunion on October 15–17, 1982, at the Rio Rico Resort, Nogales, Ariz. **Contact:** 303d Bomb Wing (Tucson) Ass'n, P. O. Box 15086, Tucson, Ariz. 85708.

355th Fighter Group Ass'n
The 355th Fighter Group will hold its annual reunion on October 28–31, 1982, at the Sheraton Valley Forge Hotel, King of Prussia, Pa. **Contact:** Robert E. Kuhnert, 4230 Shroyer Rd., Dayton, Ohio 45429. Phone: (513) 255-7296.

463d Bomb Group Historical Ass'n
Members of the 463d Bomb Group will hold their reunion on October 21–23, 1982, at Dyess AFB, Tex. **Contact:** Charles R. Hewitt, 114 W. Xenia, Fairborn, Ohio 45324. Phone: (513) 879-3869.

780th Bomb Sqdn.
Members of the 780th Bomb Squadron will hold their reunion on October 14–17, 1982, at the Best Western North Park Inn, Dallas, Tex. **Contact:** Wanda Dannelly, 5851 McCommas Blvd., Dallas, Tex. 75206. Phone: (214) 826-5059.

86th Fighter Bomber Group
I am attempting to locate former members of the 525th, 526th, and 527th Fighter Bomber Squadrons of the 86th Fighter Bomber Group. On May 30, 1944, the "bomber" designation was dropped and these squadrons became fighter squadrons.

We held our third reunion in St. Louis, Mo., in June 1982, and have scheduled our

AFA STATE CONTACTS

Following each state name, in parentheses, are the names of the localities in which AFA Chapters are located. Information regarding these Chapters, or any place of AFA's activities within the state, may be obtained from the state contact.

ALABAMA (Auburn, Birmingham, Huntsville, Mobile, Montgomery, Selma): **Don Krekelberg,** 904 Delcris Dr., Birmingham, Ala. 35226 (phone 205-942-0784).

ALASKA (Anchorage, Fairbanks): **Frank X. Chapados,** 1426 Well St., Fairbanks, Alaska 99701 (phone 907-452-1286).

ARIZONA (Phoenix, Sun City, Tucson): **John P. Byrne,** 9318 Country Club Dr., Sun City, Ariz. 85373 (phone 602-974-1349).

ARKANSAS (Blytheville, Fayetteville, Fort Smith, Little Rock): **Charles E. Hoffman,** 1041 Rockwood Trail, Fayetteville, Ark. 72701 (phone 501-521-7614).

CALIFORNIA (Apple Valley, Edwards, Fairfield, Fresno, Hermosa Beach, Los Angeles, Merced, Monterey, Novato, Orange County, Palo Alto, Pasadena, Riverside, Sacramento, San Bernardino, San Diego, San Francisco, San Mateo, Santa Barbara, Santa Monica, Vandenberg AFB, Yuba City): **Richard C. Doom,** P. O. Box 2027, Canyon Country, Calif. 91351 (phone 213-715-2923).

COLORADO (Aurora, Boulder, Colorado Springs, Denver, Fort Collins, Grand Junction, Greeley, Littleton, Pueblo, Waterton): **Karen M. Kyritz,** 17105 East Bethany Circle, Aurora, Colo. 80013 (phone 303-690-2920).

CONNECTICUT (East Hartford, North Haven, Storrs, Stratford, Westport, Windsor Locks): **Frank J. Wallace,** 935 Poquonock Ave., Windsor, Conn. 06095 (phone 203-688-3090).

DELAWARE (Dover, Wilmington): **John E. Strickland,** 8 Holly Cove Lane, Dover, Del. 19901 (phone 302-678-6070).

DISTRICT OF COLUMBIA (Washington, D. C.): **W. Jack Reed,** 1750 Pa. Ave., N. W., Suite 400, Washington, D. C. 20006 (phone 202-637-3346).

FLORIDA (Broward, Cape Coral, Fort Walton Beach, Gainesville, Jacksonville, New Port Richey, Orlando, Panama City, Patrick AFB, Redington Beach, Sarasota, Tallahassee, Tampa, West Palm Beach, Winter Haven): **Lee R. Terrell,** 39 Hemlock Dr., N. W., Fort Walton Beach, Fla. 32548 (phone 904-882-4486).

GEORGIA (Athens, Atlanta, Columbus, Rome, Savannah, St. Simons Island, Valdosta, Warner Robins): **Edward I. Wexler,** 8 E. Back St., Savannah, Ga. 31406 (phone 912-964-1941, Ext. 253).

GUAM (Agana): **Joe Gyulavics,** P. O. Box 21543, Guam 96921 (phone 671-477-9711).

HAWAII (Honolulu): **Don J. Daley,** P. O. Box 3200, Honolulu, Hawaii 96847 (phone 808-525-6296).

IDAHO (Boise, Mountain Home, Twin Falls): **John W. Logan,** 3131 Malad St., Boise, Idaho 83705 (phone 208-385-5475).

ILLINOIS (Belleville, Champaign, Chicago, Decatur, Elmhurst, Peoria): **Richard H. Becker,** 7 Devonshire Dr., Oak Brook, Ill. 60521 (phone 312-654-3938).

INDIANA (Bloomfield, Fort Wayne, Indianapolis, Lafayette, Logansport, Marion, Mentone, South Bend): **Richard Ortman,** 2607 Sunrise Ave., Lafayette, Ind. 47905 (phone 317-743-3896).

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 (Louisville): **Elmo C. Burgess,** 116 S. 5th St., Louisville, Ky. 40202 (phone 502-585-5169).

LOUISIANA (Alexandria, Baton Rouge, Bossier City, Monroe, New Orleans, Shreveport): **Thomas L. Keal,** 404 Galway Dr., Shreveport, La. 71115 (phone 318-797-9688).

MAINE (Limestone, N. Berwick): **Arley McQueen, Jr.,** 153 Jelliegh Dr., Wells, Me. 04090 (phone 207-646-2718).

MARYLAND (Andrews AFB, Baltimore): **Thomas W. Anthony,** 4111 Carriage Dr., Temple Hills, Md. 20748 (phone 301-894-0067).

MASSACHUSETTS (Bedford, Boston, Falmouth, Florence, Hanscom AFB, Lexington, Taunton, Worcester): **Zaven Kaprielian,** 428 Mt. Auburn St., Watertown, Mass. 02172 (phone 617-924-5010).

MICHIGAN (Battle Creek, Detroit, Kalamazoo, Marquette, Mount Clemens, Oscoda, Petoskey, Southfield): **Jeryl L. Marlatt,** 740 S. Cranbrook Rd., Birmingham, Mich. 48009 (phone 313-494-8232).

MINNESOTA (Duluth): **Edward A. Orman,** 368 Pike Lake, Duluth, Minn. 55811 (phone 218-727-8381).

MISSISSIPPI (Biloxi, Columbus, Jackson): **Don Wylie,** P. O. Box 70, Biloxi, Miss. 39533 (phone 601-374-3611).

MISSOURI (Kansas City, Knob Noster, Springfield, St. Louis): **William A. Dietrich,** P. O. Box 258, Kansas City, Mo. 64141 (phone 816-561-2134).

MONTANA (Great Falls): **Dick Barnes,** P. O. Box 685, Great Falls, Mont. 59403 (phone 406-727-3807).

NEBRASKA (Lincoln, Omaha): **Edward A. Crouchley,** 1314 Douglas On the Mall, Omaha, Neb. 68102 (phone 402-633-2125).

NEVADA (Las Vegas, Reno): **James L. Murphy,** 2370 Skyline Blvd., Reno, Nev. 89509 (phone 702-786-1520).

NEW HAMPSHIRE (Manchester, Pease AFB): **Charles J. Sattan,** 53 Gale Ave., Laconia, N. H. 03246 (phone 603-524-5407).

NEW JERSEY (Andover, Atlantic City, Belleville, Camden, Chatham, Cherry Hill, E. Rutherford, Forked River, Fort Monmouth, Jersey City, McGuire AFB, Middlesex County, Newark, Trenton, Wallington, West Orange): **John P. Kruse,** 1022 Chelten Pkwy., Cherry Hill, N. J. 08034 (phone 609-428-3036).

NEW MEXICO (Alamogordo, Albuquerque, Clovis): **Ken Huey, Jr.,** P. O. Box 1946, Clovis, N. M. 88102 (phone 505-769-1975).

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): **Thomas J. Hanlon,** P. O. Box 400, Buffalo, N. Y. 14225 (phone 716-632-7500).

NORTH CAROLINA (Asheville, Charlotte, Fayetteville, Goldsboro, Greensboro, Kitty Hawk, Raleigh): **William M. Bowden,** 509 Greenbriar Dr., Goldsboro, N. C. 27530 (phone 919-735-5584).

NORTH DAKOTA (Concrete, Fargo, Grand Forks, Minot): **Maurice M. Rothkopf,** 3210 Cherry St., Grand Forks, N. D. 58201 (phone 701-746-5493).

OHIO (Cincinnati, Cleveland, Columbus, Dayton, Newark, Youngstown): **Francis D. Spalding,** 718 Martha Lane, Columbus, Ohio 43213 (phone 614-866-9381).

OKLAHOMA (Altus, Enid, Oklahoma City, Tulsa): **Aaron C. Burleson,** P. O. Box 757, Altus, Okla. 73522 (phone 405-482-0005).

OREGON (Eugene, Portland): **William Gleaves,** 2353 Oakway Terrace, Eugene, Ore. 97401 (phone 503-687-2269).

PENNSYLVANIA (Allentown, Beaver Falls, Chester, Dormont, Erie, Harrisburg, Homestead, Lewistown, Philadelphia, Pittsburgh, Scranton, State College, Washington, Willow Grove, York): **Tillie Metzger,** 2285 Valera Ave., Pittsburgh, Pa. 15210 (phone 412-881-1991).

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, Columbia, Myrtle Beach, Sumter): **William B. Gemmill,** 11 Victoria Ave., Myrtle Beach, S. C. 29577 (phone 803-626-9628).

SOUTH DAKOTA (Rapid City, Sioux Falls): **Duane L. Corning,** Box 901 RR 4, Rapid City, S. D. 57701.

TENNESSEE (Chattanooga, Knoxville, Memphis, Nashville, Tri-Cities Area, Tullahoma): **Arthur MacFadden,** 4501 Amnaicola Highway, Chattanooga, Tenn. 37406 (phone 615-622-6262).

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): **John Sparks,** P. O. Box 360, San Antonio, Tex. 78292 (phone 817-723-2741).

UTAH (Brigham City, Cedar City, Clearfield, Ogden, Provo, Salt Lake City): **Charles E. Walker,** 1243 E. 3075 North, Ogden, Utah 84404 (phone 801-782-7826).

VERMONT (Burlington): **John D. Navin,** 350 Spear St., Unit 64, South Burlington, Vt. 05401 (phone 802-863-1510).

VIRGINIA (Arlington, Danville, Harrisonburg, Langley AFB, Lynchburg, Norfolk, Petersburg, Richmond, Roanoke): **Ivan R. Frey,** 73 James Landing Rd., Newport News, Va. 23606 (phone 804-595-5617).

WASHINGTON (Seattle, Spokane, Tacoma): **William C. Burrows,** 6180 93d Ave. S.E., Mercer Island, Wash. 98040 (phone 206-773-5395).

WEST VIRGINIA (Huntington): **David Bush,** 2317 S. Walnut Dr., St. Albans, W. Va. 25177 (phone 304-722-3583).

WISCONSIN (Madison, Milwaukee): **Kenneth Kuenn,** 3239 N. 81st St., Milwaukee, Wis. 53222 (phone 414-871-3766).

WYOMING (Cheyenne): **R. S. Rowland,** P. O. Box 811, Cheyenne, Wyo. 82001 (phone 307-638-3335).

Idaho State AFA President John Logan recently presented a $150 check to CAP Cadet Col. David Thornton to help defray the expense of his trip to Britain as part of the CAP International Air Cadet Exchange Program.

next reunion at Wright-Patterson AFB, Ohio, on June 9–12, 1983. Please contact the address below.

Sid Howard
10011 Knoboak Dr., #65
Houston, Tex. 77080
Phone: (800) 231-2388

91st Reconnaissance Technical Sqdn.

A reunion is being planned for personnel assigned to Barksdale AFB, La., (1949–56).

Please contact the address below.

Bob J. Pfister
P. O. Box 1774
Ruston, La. 71270
Phone: (318) 255-4724

119th Observation Sqdn.

I would like to hear from all former members and attached Air Corps units of the New Jersey National Guard or NGAUS (1930–42). The purpose is for planning a reunion and seeking material for the new museum of the New Jersey National Guard.

Please send addresses to the address below.

Damien G. Nagle
71 Robbins Rd.
Bricktown, N. J. 08723
Phone: (201) 840-1540

455th Bomb Group (H)

I would like to hear from members of the 455th Bomb Group, 742d Bomb Squadron.

Please contact the address below.

Robert F. Arnold
P. O. Box 412
Elizabethtown, Ky. 42701

Coming Events

October 15–16, **State Presidents Orientation Meeting,** Sheraton Washington Hotel, Washington, D. C. . . . October 21–22, **AFA Symposium,** Hyatt House Airport Hotel, Los Angeles, Calif.

All members under age 65 now eligible to apply

NEW, RECORD BENEFIT

CURRENT BENEFIT TABLES

Including Substantial Benefit Increases for Policyholders Under Age 65

(effective May 31, 1982)

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*	
	Former Coverage	New Coverage	Former Coverage	New Coverage	Former Coverage	New Coverage
20-24	$85,000	**$100,000**	$127,500	**$150,000**	$170,000	**$200,000**
25-29	85,000	**95,000**	127,500	**142,500**	170,000	**190,000**
30-34	65,000	**70,000**	97,500	**105,000**	130,000	**140,000**
35-39	50,000	**55,000**	75,000	**82,500**	100,000	**110,000**
40-44	35,000	**37,500**	52,500	**56,250**	70,000	**75,000**
45-49	20,000	**22,500**	30,000	**33,750**	40,000	**45,000**
50-54	12,500	**15,000**	18,750	**22,500**	25,000	**30,000**
55-59	10,000	**11,000**	15,000	**16,500**	20,000	**22,000**
60-64	7,500	**8,000**	11,250	**12,000**	15,000	**16,000**
65-69	4,000	**4,000**	6,000	**6,000**	8,000	**8,000**
70-74	2,500	**2,500**	3,750	**3,750**	5,000	**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 Benefit Life Insurance Company may, however, make a brief report thereon to the Medical Information Bureau, a nonprofit membership organization of life insurance companies, which operates an information exchange on behalf of its members. If you apply to another bureau member company for life or health insurance coverage, or a claim for benefits is submitted to such a company, the Bureau, upon request, will supply such company with the information in its file.

Upon receipt of a request from you, the Bureau will arrange disclosure of any information it may have in your file. (Medical information will be disclosed only to your attending physician.) If you question the accuracy of information in the Bureau's file, you may contact the Bureau and seek a correction in accordance with the procedures set forth in the federal Fair Credit Reporting Act. The address of the Bureau's information office is P.O. Box 105, Essex Station, Boston, Mass. 02112. Phone (617) 426-3660.

United Benefit Life Insurance Company may also release information in its file to other life insurance companies to whom you may apply for life or health insurance, or to whom a claim for benefits may be submitted.

IOW AVAILABLE (30% Dividend—1981)

APPLICATION FOR
AFA GROUP LIFE INSURANCE

United of Omaha

Group Policy GLG-2625
United Benefit Life Insurance Company
Home Office Omaha Nebraska

Full name of member _____
Rank Last First Middle

Address _____
Number and Street City State ZIP Code

Date of birth (Mo. Day Yr.)	Height	Weight	Social Security Number

This insurance is available only to AFA members

☐ I enclose $15 for annual AFA membership dues (includes subscription ($9) 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	Plan of Insurance: Standard Plan		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.	☐ $ 10.00	☐ $ 12.50	☐ $ 15.00	☐ $ 17.50	☐ $ 20.00	☐ $ 22.50
Quarterly. I enclose amount checked.	☐ $ 30.00	☐ $ 37.50	☐ $ 45.00	☐ $ 52.50	☐ $ 60.00	☐ $ 67.50
Semi-Annually. I enclose amount checked.	☐ $ 60.00	☐ $ 75.00	☐ $ 90.00	☐ $105.00	☐ $120.00	☐ $135.00
Annually. I enclose amount checked.	☐ $120.00	☐ $150.00	☐ $180.00	☐ $210.00	☐ $240.00	☐ $270.00

Names of Dependents To Be Insured	Relationship to Member	Dates of Birth Mo. Day Yr.	Height	Weight

Have you or any dependents for whom you are requesting insurance ever had or received advice or treatment for: kidney disease, cancer, diabetes, respiratory disease, epilepsy, arteriosclerosis, high blood pressure, heart disease or disorder, stroke, venereal disease or tuberculosis? Yes ☐ No ☐

Have you or any dependents for whom you are requesting insurance been confined to any hospital, 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 Benefit Life Insurance Company for insurance under the group plan issued to the First National Bank of Minneapolis as Trustee of the Air Force Association Group Insurance Trust. Information in this application, a copy of which shall be attached to and made a part of my certificate when issued, is given to obtain the plan requested and is true and complete to the best of my knowledge and belief. I agree that no insurance will be effective until a certificate has been issued and the initial premium paid.

I hereby authorize any licensed physician, medical practitioner, hospital, clinic or other medical or medically related facility, insurance company, the Medical Information Bureau or other organization, institution or person, that has any records or knowledge of me or my health, to give to the United Benefit Life Insurance Company any such information. A photographic copy of this authorization shall be as valid as the original. I hereby acknowledge that I have a copy of the Medical Information Bureau's prenotification information.

Date _____, 19 ____ _____
Member's Signature

FORM 3767GL App REV. 10-79

Application must be accompanied by a check or money order. Send remittance to:
Insurance Division, AFA, 1750 Pennsylvania Avenue, NW, Washington, D.C. 20006

10/82

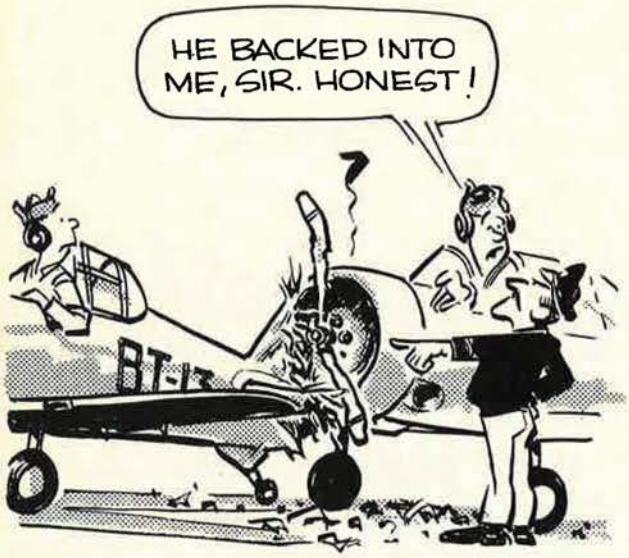
Bob Stevens'

"There I was..."

SNAPPY RETORTS IS THE SUBJECT. HOW MANY TIMES HAVE YOU EVER THOUGHT, "GEE, I WISH *I'D* SAID THAT!" USUALLY THE INSPIRED REPLY COMES TO YOU A DAY OR SO AFTER YOU'VE BEEN ZAPPED—OR AT 3 AM ON A WAKEFUL NIGHT.

HERE'S SOME SPUR-OF-THE-MOMENT DEATHLESS PROSE:

IT IS REPORTED THAT OL' LONESOME GEORGE GOBEL CAME UP WITH THIS BEAUT AFTER A TAXI ALTERCATION—



THANKS TO GEN. RUSS DOUGHERTY

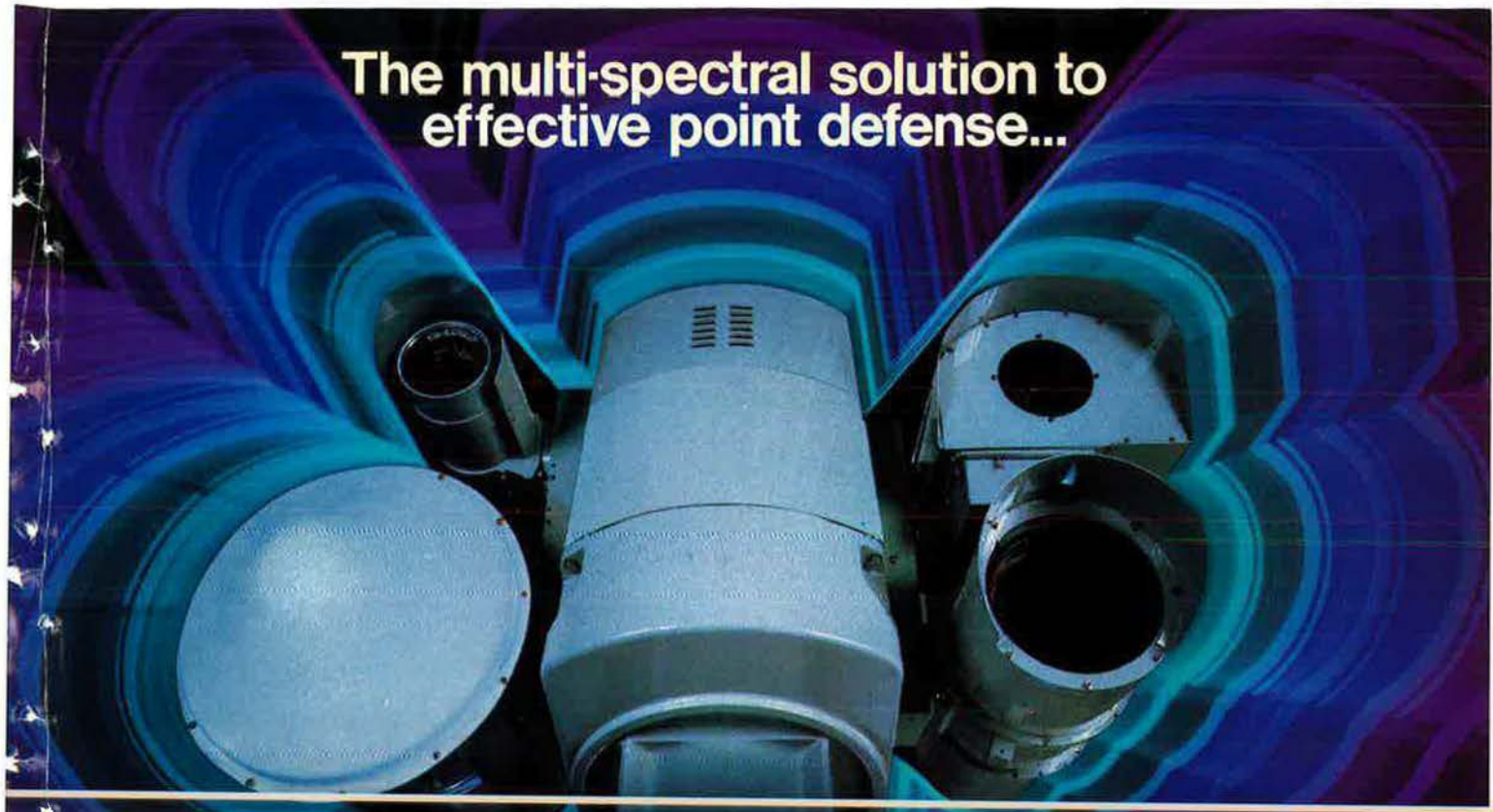
THEN THERE WAS THE 2ND LT. WHO WAS ON THE RECEIVING END OF A 20-MIN. TIRADE—

* TOTAL MONTHLY CADET PAY—1943

FINALLY, USING THE WRITTEN WORD, A LATRINE HUMORIST GOT IN THE LAST WORD IN THE MEN'S ROOM, BASE ORG, LOWRY AFB, COLO.

ORIGINALS OF 'THERE I WAS' NOW AVAILABLE! FOR BROCHURE WRITE: VILLAGE PRESS, P.O. BOX 310 FALLBROOK CA. 92028

The multi-spectral solution to effective point defense...



because Sperry knows how to listen.

A hostile air target is detected on a radial course at 20 meters altitude and near sonic velocity. In less than six seconds and two kilometers of target penetration, precise weapon orders are available for defense against this surface-hugging threat.

That's Sperry's Challenger™ SA-2 in action. It's capable of combining the tracking functions of two bands of infrared, TV, laser, and millimeter radar in any selected configuration. In its class, it is our most advanced fire control system for close-in tactical support.

An all-weather, day/night system, Challenger SA-2 acquires and tracks both air and surface targets... automatically directing multiple slaved guns up to 76mm in caliber or providing guidance information to independent missile weapons.

Whether deployed for either shipborne or land-based applications, Challenger SA-2 requires only one operator and a minimum of training and support.

Challenger SA-2 joins a tradition of Sperry fire control systems including the MK 76, principal area defense of the U.S. Fleet and the MK 92 used for rapid engagement of multi-threat air and surface targets.

To learn more about what we're doing in advanced fire control, talk to us... we listen.

Write to Sperry Division Headquarters, Gyroscope Marketing, Great Neck, N.Y. 11020.

SPERRY

SPERRY IS A DIVISION OF SPERRY CORPORATION

Two good reasons for the F-15 Eagle: Half the world is always in darkness. And 40% is covered by clouds.

Clouds or darkness engulf most nations 70% of the time. When such conditions prevail, "day fighter" aircraft are little more than ceremonial cannon, their diminutive airframes limiting their radar size, their heat-seeking missile firepower "blinded" by moisture-laden skies.

To survive and win, you must be ready to fight on terms the adversary will choose. That's why the F-15 Eagle was designed so that it doesn't have to pick its day to fight—why it's been given longer range—why it can go where it is needed when it is needed. Day or night. Good weather or bad.

The F-15's attack radar system gives the pilot long-range "eyes" to acquire, identify, track and fire on hostile targets in the air or on the ground long before the Eagle is detected and challenged. Visual displays, combined with the inertial navigation system and a digital computer, help the pilot plan his attack. All necessary target data, the status of weapons systems and firing cues for precision weapons delivery are provided on both his windscreen and cockpit displays.

The F-15 Eagle. Day or night, in all kinds of weather, it's the *complete* air force.

F-15 Eagle

MCDONNELL DOUGLAS