APRIL 1982 / $1

AIR FORCE MAGAZINE

PUBLISHED BY THE AIR FORCE ASSOCIATION

AIR FORCE RESEARCH, DEVELOPMENT, AND ACQUISITION

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 F-5G intermediate fighter.

The F101 DFE, a derivative of the F101 developed for the U.S. Air Force B-1, is in the 27-30,000 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. This 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

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.

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

• **OPERATING COSTS:** From simpler design through advanced technology. For example, GE engines feature single-stage turbines, machined ring combustors, mixed flow afterburners, and thousands 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

Gulfstream American's Next-Generation Trainer.

How it stacks up financially is impressive, too.

Exceeding the Air Force's NGT performance specifications is one thing. Impressive financial performance is another.

Gulfstream American's NGT/Peregrine is strong on both counts.

With its own R&D funds, Gulfstream American designed and built a flying test bed to assure a successful full-scale Peregrine development program.

Peregrine combines an innovative business approach with state-of-the-art technology to offer an off-the-shelf price. Savings: substantial reductions in RDT&E funding requirements.

Peregrine also boasts an innovative contractor approach to logistics and support. Savings: a 51% reduction in maintenance costs.

The Williams International FJ44 turbofan designed for the Gulfstream NGT/Peregrine.

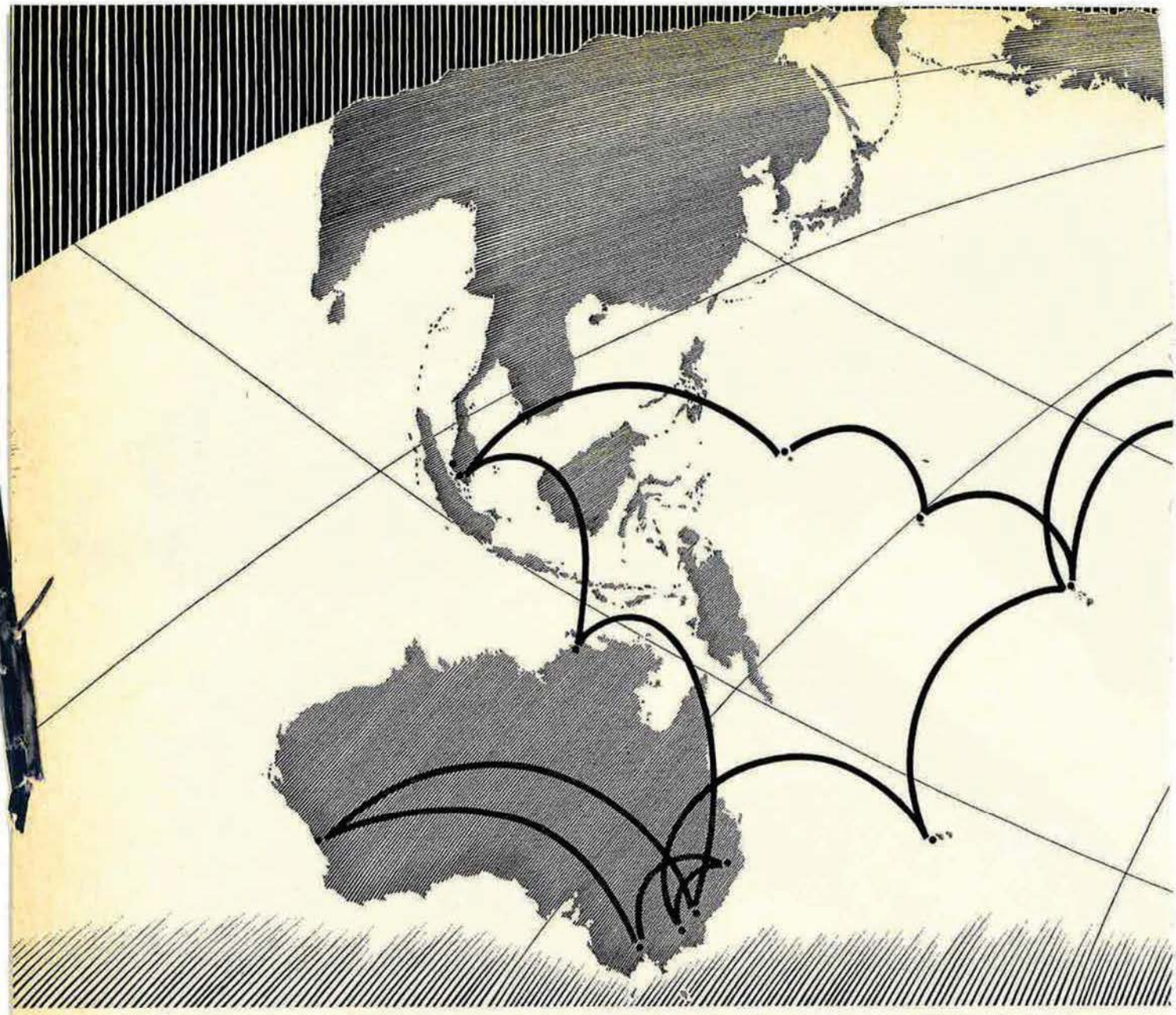
Peregrine's proven composite technology soars far above metal skin birds to provide substantial weight reduction. Savings: fuel savings of up to 65% over the present-generation T-37 primary trainers.

Peregrine's powerplant is the Williams International FJ44 turbofan. Simpler and substantially lighter than the current competitive engines. Result: still more savings.

NGT/Peregrine. Aerodynamically and financially, it's a beautiful bird.

For more detailed information, contact Gulfstream American's Washington Headquarters: (703) 276-9500. Or Peregrine marketing, Bethany, OK: (405) 789-5000, ext. 357.

Gulfstream American



When you fly a new corporate jet over 70,000 mil
In fact, virtually nothing did.

By now, you may be aware of the fact that the Canadair Challenger will fly its passengers more economically and in greater comfort than any other intercontinental corporate jet in the world.

What you may not be aware of is the success with which the first Challengers have already done so.

A crucial point illustrated best, we feel, by an actual case history.

What we did with this aircraft in less than two months, you probably wouldn't do in five months.

On September 14, 1981, Canadair Challenger #5 left its home base in Hartford, Connecticut with a crew of three, flew to New York to pick up eight passengers, flew to Long Beach, California for the National Business Aircraft Association Convention, flew 13 demonstration flights in two days, then left immediately for Honolulu and the Western Pacific.

The itinerary included Wake Island, Guam, Singapore, Kuala Lumpur, Penang, Paya Lebar (Singapore), Darwin, Sydney, Perth, Melbourne, Essendon (Melbourne), Brisbane, Canberra, Pago Pago, Honolulu again, and finally San Francisco, Bridgeport and Hartford.

Total miles flown: 36,000. Total days: 20. Total takeoffs and landings: 60. Average hours flown per day: 4.7. Total hours flown: 93.4.

Dispatch reliability: 100%.

Special maintenance and support provisions: none.

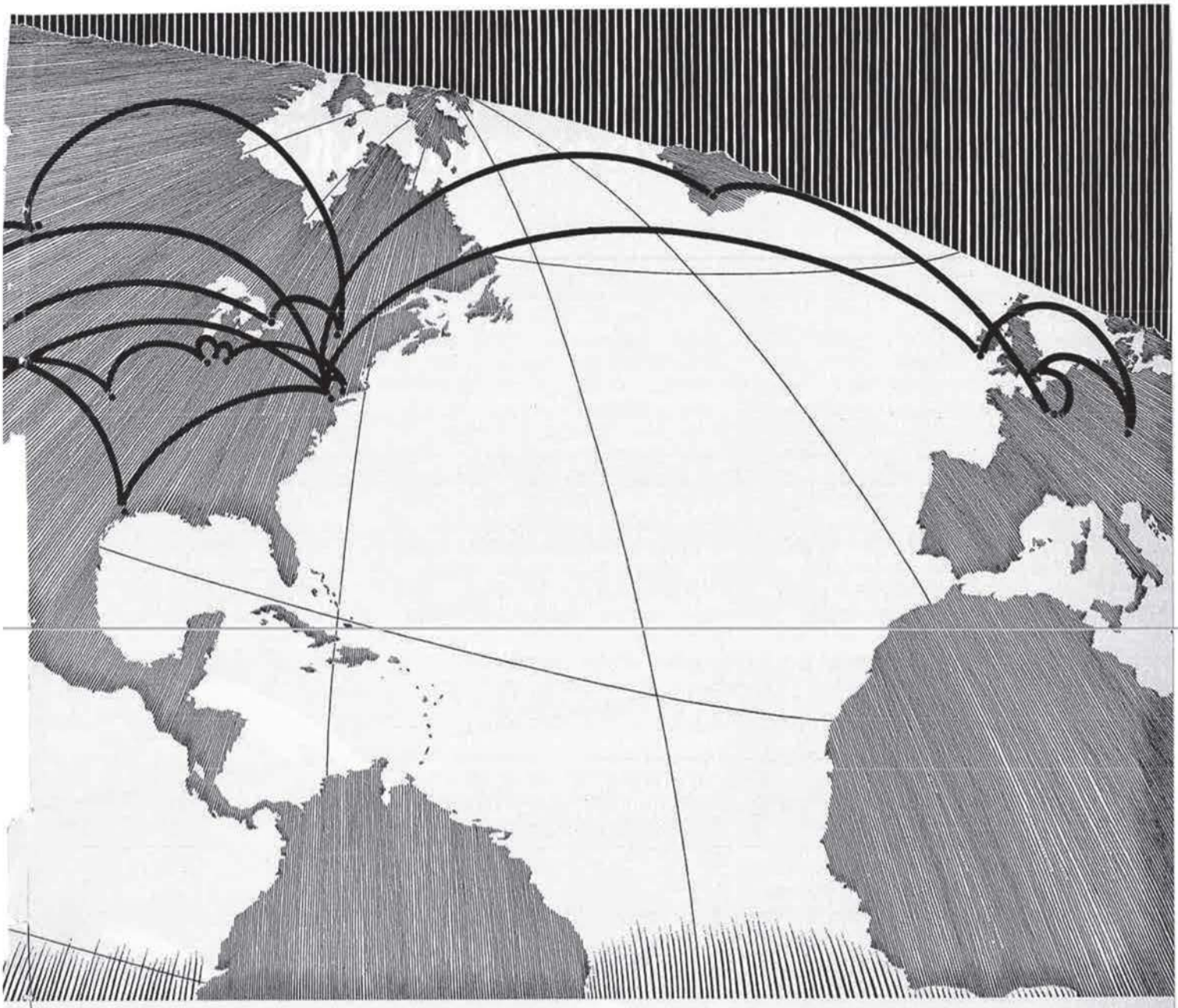
Which is not to say that, with its Pacific tour completed, the Challenger had arrived back in Hartford for a respi

The next morning it refueled and fl to Europe.

	PASSENGERS	TOTAL TIME EN ROUTE	TOTAL DISTANCE	TOTAL FUEL CONSUMPTION	TOTAL FUEL CO
CHALLENGER (OCTOBER 4)	8 + 2 CREW	8HR.+51 MIN.	3,760NM	2,782 GAL.	$4,673.7
GULFSTREAM II (OCTOBER 5)	8 + 2 CREW	8HR.+48 MIN.	3,760NM	4,191 GAL.	$7,040.8

Flight summary: New York-Shannon-Vienna-October 4 and 5, 1981.

*Based on an average cost for jet fuel of $1.68 per gallon. From a national survey of U.S. fixed base operators as reported in the No 1981 issue of *Business and Commercial Aviation*.



n 48 straight days, virtually anything can happen.

. And, by the sheerest coincidence, so did a Gulfstream II.

Duel over the Atlantic.

On October 4 and 5, respectively, the Canadair Challenger and a Gulfstream II flew New York to Vienna, with a stop in Shannon, Ireland.

As the chart will show you, the Challenger arrived exactly three minutes later, and exactly $2,367.12 cheaper. One way.

(Incidentally, based on computer projections of their manufacturers' own data, the far smaller Falcon 50 would not have made the trip with any significant fuel savings over the Challenger, while the Gulfstream III would have required 33% more than the Challenger.)

Which is still not to say that the Challenger then flew home for a respite.

Instead, it flew home for a tour of North America. By way of London, Paris, New York, Houston, Las Vegas, Pittsburgh, Montreal, Toronto, Calgary, Los Angeles, Cincinnati, Kansas City and Akron. To name just a few of the stops.

Total miles flown: 70,000. Total days: 48. Total takeoffs and landings: 111. Average hours flown per day: 4.1. Total hours flown: 195.9.

Dispatch reliability: 100%.

Special maintenance and support provisions: none.

Which is *still* not to say that the Challenger then flew home for a respite.

At this writing, it is uninterruptedly flying its missions, receiving only routine maintenance and parts support and giving no one even the slightest degree of grief.

For a detailed explanation of how a corporate jet so new can possibly be so reliable, we suggest you ask the man in the best position to know. His name is James B. Taylor and he's the President of Canadair Inc. His address is 274 Riverside Avenue, Westport, CT 06880 and his telephone number is (203) 226-1581.

There's a great deal he can tell you himself. And, if you like, he can even have you meet with the maintenance people responsible for that Challenger.

They have lots of free time on their hands.

canadair challenger

We found a way to elevate missile technology, yet keep costs down to earth. MQM-107B.

When the MQM-107A was introduced in 1976, it was the most advanced, low-cost, subsonic, recoverable missile target. Since then it's been through a lot of ups and downs—with over 400 units flying at a rate of 20 missions each. It was bound to be a success. Designed for simplicity, production efficiency and utilizing state-of-the-art technology, it's little wonder that the MQM met the target requirements of so many military organizations, so well.

But now there is a new state-of-the-art—the MQM-107B. Like its predecessor, it can be surface launched from a zero-length launcher with rocket booster assistance. It can be operated from remote ground control just like the MQM-107A, and recovered on command with a two-stage parachute system. In fact, the MQM-107B can do everything its predecessor did, but with greatly improved performance characteristics.

The MQM-107B utilizes an increased thrust propulsion system together with more precise digital flight control and improved 3-axis maneuvering autopilot to raise performance characteristics to a new level. Speeds in excess of 535 knots TAS are possible, from sea level to over 40,000 feet. Maneuvers requiring constant g loads up to 6 g's are no problem.

These improvements permit more precise target control and increased mission profile flexibility. For example, low altitude terrain following missions and simultaneous three vehicle flight missions can be flown. And the MQM-107B digital control system has additional computer capacity already built in to accommodate the even more stringent target requirements of the future.

In addition to improved performance, the MQM-107B has an improved payload capability with an internal volume capacity of 4.8 cubic feet. Easy access to augmentation and scoring payload and core electronics are also included in the design. And the new MQM-107B is mobile. Launch, tracking and control units are all self-contained. Relocation of a target operation is a matter of just picking up and moving.

The MQM-107B and all the various elements of its improved design have been thoroughly tested. It more than meets the military's demands for large payload volume and weight, target size, speed, altitude, endurance and precise controllability. All within a down to earth, cost-efficient system. That's technology.

For further details, please write to: Beech Aircraft Corporation, Aerospace Programs, Wichita, Kansas 67201.

50 YEARS
Beechcraft
1932-1982

A Raytheon Company

AIR FORCE
PUBLISHED BY THE AIR FORCE ASSOCIATION
MAGAZINE

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.

BPA Circulation audited by Business Publication Audit

This Month

APRIL 1982 • VOLUME 65, NUMBER 4

Air Force Research, Development, and Acquisition

ABOUT THE COVER

An inside look at an F-15 Eagle center fuselage buildup, showing assembly work being done on the air intake for one of the Eagle's F100 engines. A special "Air Force Research, Development, and Acquisition" section begins on p. 46 of this issue. (Cover photo by Art Director William A. Ford)

Departments

AN EDITORIAL

A Time for Service

RECENTLY, college students and their teachers and administrators have been up in arms about Reagan Administration plans to reduce certain federally funded educational loan programs. A few of them showed up in Washington to carry signs, to harangue their colleagues from the Capitol steps, and to enlist the aid of members of Congress to cut the Administration off at the pass. Being visual, it was duly carried on the evening network news programs. The event apparently attracted television notice because of the connotation of college kids protesting the budgeted higher expenditures for national defense.

This makes easy television and is a seemingly lucid argument: that the added dollars for defense are depriving hundreds of thousands of young Americans of their bachelors' and masters' degrees and imperiling the existence of the institutions that they attend. But it begins from a flawed premise. That is a conviction that somehow the US government owes these young people a college degree simply because they and the colleges exist.

The case is mentioned here because it is intertwined in larger national defense issues—the business of attracting sufficient qualified young persons to join the armed forces, and retaining enough of them for careers to ensure that the forces can fight and win when the time comes. The word "forces" includes both active and reserve components as part of the total fighting power available for use.

For the moment, the services seem to be meeting their accession goals. Also, retention is better now than it was three or four years ago. Improved pay scales have helped. So have increased correction by senior leaders of the Air Force and other services of many irritants, both petty and major, that drove people out. Finally, the sorry state of the US economy probably has contributed to many decisions to enlist, and many other decisions to stay in service.

But one powerful factor that encouraged postwar enlistments and got many people motivated to a military career is not being exploited as it once was. That is the GI Bill. In fact, the Defense Department and the military services cannot seem to come together with themselves, let alone the Congress, on what a GI Bill should do. Their deliberations have gotten so mired down in bean-counting and gobbledygook that the real benefits of a GI Bill to the nation have been lost to sight.

It is fair to say that the World War II GI Bill was a national asset whose value to an increased GNP was worth untold billions of dollars. It created opportunities for millions of young Americans who had served their country honorably to improve their position in life. For most of those millions, in the prewar United States a college education could not even be dreamed of. But in 1946, because they had served their country well, it was within reach. They could set their sights higher than their fathers and mothers had been able to do. Most strove to do better than they could have aspired to before their service. They earned an education in whatever field they chose. The result was a national leap forward in the 1940s and '50s. The GI Bill was very much a stimulant for that leap.

In that same period, through the peacetime years and the wartimes of Korea and Vietnam, the GI Bill was one of the attractive features of military service. It certainly influenced my own decision to enlist in the Air Force, and over the years was a positive factor in the decision subsequently to serve a full career in the Army.

As originally constituted and administered over those years, the GI Bill had two very attractive features that are now missing: It required no contribution from the individual other than honorable service, and it was easy to understand.

That changed, and so did the concept of service to country. In fact, during the Vietnam era staying in college became an easy and legal way to avoid serving the country. Students were quite willing to suckle up to the easy loan programs of the federal government. Then many used student status to shirk the obligation of a citizen of this republic: to be prepared to serve it in time of need.

Disregard the past rhetoric about an immoral war; thousands of young Americans were encouraged and aided in shirking. So they got a bachelor's degree. Many stayed for a master's to avoid the chill wind of the draft. They were encouraged to believe that the higher education was owed them, not that they owed anything to the country.

Meanwhile, the Defense Department mucked up the educational assistance programs. The economists or the bean-counters, or both, got into the act, and the result was awful. Now a young person already has to have a degree in economics to understand the program, and be willing to perform an unnatural act—have part of his monthly pay withheld—for some nebulous future educational "benefit."

The country ought to make educational assistance simple to understand. Furthermore, the assistance should be contingent on honorable service to country. Then the education will mean something to the young people who earn it, who can aspire to better themselves and the country in the process. As it now stands, the system does neither.

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

SCIENCE/SCOPE

The first TV-guided Maverick missile built on a reopened production line has been delivered two months ahead of schedule. The missile was the first of more than 2,700 to be built by Hughes under contract to the U.S. Air Force for delivery to foreign customers. Except for a rocket motor that emits less smoke, models of the new missiles are identical to those built between 1972 and 1978, when approximately 26,000 were produced. Of more than 1,000 Mavericks fired operationally, 85 percent have been direct hits.

Though tantamount to being tied to a rifle bullet, an extremely pure steel wire carries guidance signals in flight to the U.S. Army and Marine Corps TOW (Tube-launched Optically tracked, Wire-guided) anti-tank missile. The wire is manufactured by U.S. Steel Corp. under exacting conditions to obtain the rare combination of high tensile strength and high ductility, or ability to bend. After the gunner fires the missile, two strands of wire peel off twin bobbins in the tail of the missile at velocities approaching the speed of sound. Guidance commands reach the missile automatically as the gunner keeps the target in his cross hairs. The wire enables the Hughes TOW to have one of the highest velocities and longest ranges (2.3 miles) of any wire-guided missile in the world.

A communications system for U.S. Army troops will be one early demonstrated use of Very High Speed Integrated Circuits (VHSIC), the "super chips" that will give military electronics systems a tenfold increase in data processing capability. As one of six firms involved in the tri-service program, Hughes will put VHSIC chips into a brassboard demonstration processor for the Army's Battlefield Information Distribution System (BIDS). This portable, two-way high-data-rate system is slated for operation in the 1990s. It will allow troops to communicate among themselves and find and report their positions.

The first equipment for West Germany's new air defense system is being installed to help monitor the skies of southern Germany. The new German Air Defense Ground Environment (GEADGE), a replacement for the network that was built in the early 1960s, is comprised of radars, computers, displays, and other electronic subsystems. It uses advanced data-processing methods to track, identify, and evaluate airborne targets, and to direct intercept missions more efficiently. Besides covering German airspace, GEADGE will become part of the NATO Air Defense Ground Environment (NADGE), which provides a protective radar umbrella from Norway to Turkey. Hughes, with support from German and other NATO firms, is responsible for the system's design, manufacture, and installation.

A laser device for pinpointing targets for laser-homing weapons and conventional artillery has passed rugged testing by the U.S. Marine Corps. The Hughes-built Modular Universal Laser Equipment (MULE) was evaluated under simulated combat conditions. MULE operators designated targets for the Copperhead laser-guided artillery projectile, laser-guided bombs, and the Hellfire laser-guided missile. Aircraft equipped with laser spot trackers located and identified all designated targets. MULE's laser module, which resembles a short-barreled rifle, can be aimed from a tripod or by hand for target designation or rangefinding.

Creating a new world with electronics

HUGHES

HUGHES AIRCRAFT COMPANY
CULVER CITY, CALIFORNIA 90230

(213) 670-1515 EXTENSION 5964

AIRMAIL

Flying Training With Frisbee . . .

The February '82 issue of AIR FORCE Magazine is the best yet. It is a joy to read and reminisce with. The choice of a monthly theme—"USAF Training—The World Leader"—made it most appealing for me.

After spending nearly all of a thirty-year career in cockpit, training, operations, or safety assignments, the February issue brought back many memories—both bitter and sweet. The article "On the Way to a Miracle" *(p. 73)* by John L. Frisbee took me back through the time tunnel some thirty-nine years.

My introduction to instrument flying in the BT-13 was getting beat on the knees with the control stick while under the hood while trying to master the needle-ball-airspeed technique for level turns. A little additional verbal abuse helped make it a sporty course. Some instructors I came in contact with seemed to be mad at the world simply because they had been assigned as IPs.

Mr. Frisbee is correct when he says one of the major weaknesses of flying training of that era was a lack of instrument training—plus operable instrument equipment. Within four months after my class graduated in early 1944, many of us found ourselves in Burma or China, flying in monsoon weather. The pilots in command were not very much more experienced than we were, having only graduated from flying school two or three months ahead of us. Those who made it could be called survivors.

Years later, as a chief of standardization in a MAC line squadron, I was constantly amazed at the skill and knowledge of instrument procedures displayed by young pilots we got straight out of UPT.

The Air Training Command of today has done a masterful job in preparing its newly minted pilots to fly in any command, and in any weather.

Again, my compliments on a really superb issue. It could not have been better!

Col. William H. Ramsey,
USAF (Ret.)
North Little Rock, Ark.

I read with interest and nostalgia the excellent article "On the Way to a Miracle" by John L. Frisbee in the February '82 issue. However, while I enjoyed the article and found it accurate as well as interesting, I must mention a couple of things about the article that bothered me.

Mr. Frisbee referred to the Stearman PT-17 as "The Washing Machine," which is not as I remember. The "Washing Machine" that I recall was a system of check rides, not the specific airplane. It existed at all the primary flying schools, even those equipped with the Ryan-built "Maytag Messerschmitts" (PT-22s) or the Fairchild PT-19. . . .

Once a student was recommended for a check ride in the Washing Machine, he started packing, for all was considered lost. Most were recommended for check rides due to a lack of skill or inability to gain sufficient proficiency at the accelerated pace of training. A few rides were the result of personality conflicts between instructors and students, or violations of rules. Regardless of the reason for the ride, only a very few survived. The few who did were those who seemed to do better under the extra pressure, which was a desirable trait. That there were not many survivors is attested to by the forty to fifty percent washout rate at the primary flying schools, in spite of the pressing wartime need for pilots.

Another point—Mr. Frisbee did not mention that ten enlisted aviation students graduated as sergeant pilots alongside those 199 aviation cadets there at Columbus Army Flying School in Class 42-I. Those ten were just a small part of the 2,214 enlisted men known to have graduated as sergeant pilots in the Army Air Forces in 1942. They took the same training as the aviation cadets, who were commissioned as second lieutenants, while the enlisted men became staff sergeant pilots. . . . Many of these sergeant pilots found themselves flying fighters, photoreconnaissance aircraft, and transports in New Guinea, North Africa, and India before they were commissioned or before the flight officer program caught up with them. A number died while still serving as sergeant pilots.

The first-ever reunion of these men from the 1942 pilot training classes, plus surviving enlisted pilots from an even earlier era, is scheduled for this coming September in Colorado Springs, Colo. . . .

Lt. Col. J. H. MacWilliam,
USAF (Ret.)
Columbus, N. C.

. . . And Scrutinizing the JCS

This letter is a comment on the article "New Life for JCS at Forty" by John L. Frisbee in the February '82 issue.

John Frisbee's article on the JCS is a well-researched, scholarly dissertation on the JCS, as viewed from the outside.

A candid view as seen from the inside would probably not serve any worthwhile purpose, except to present a more accurate, albeit limited, picture of the games we play in the name of national defense.

The gist of the matter is that the JCS as presently constituted is an unworkable, cumbersome organization inherently incapable of giving worthwhile, usable military advice to the Secretary of Defense or the President.

I served on a service staff and the Joint Staff during the McNamara era. I not only worked on some of the "military counsel" given Secretary McNamara, but was present when it was given. I can assure you that any responsible person receiving such advice would be inclined to reject it out of hand.

Furthermore, it is not accurate to say that Secretary McNamara was unreceptive to military advice. It is true that he stopped using the JCS for specific actions. However, he did continue to meet with them, and they had ample opportunity to present their views. What he did do was designate the different service Secretaries as crisis managers for particular actions. On several occasions the service Secretary responsible asked for and received factual information from staff officers. The information was

given on an informal basis, without staffing, and without seeking a consensus.

None of the above is intended to reflect in any way on the professionalism or loyalty of any member of the JCS, Joint Staff, or service staff. These individuals have no choice but to work within the system and play the game. It seems rather apparent that the JCS system is unworkable as long as service input to Joint Staff papers is permitted to dominate the final result. Solutions to problems based on the lowest common denominator are generally worthless.

As long as the service Chiefs are primarily concerned with service strength ceilings and budgets, they can logically be expected to assume an adversary position in the "tank." In fact, if they did not take such a posture, the service staffs would cut off their buttons and drum them out. Such sentiments are regularly expressed by senior staff officers whenever the service Chief sees fit to agree with another Chief or, as put by the staffs, "cave in." The JCS system renders the Chiefs captives of the services and, particularly, the service staffs.

It is about time that we develop a JCS system that can provide the Secretary of Defense and the President with timely, usable military advice untainted by parochial service views.

(I emphasize that my critical remarks are addressed to the system, and are not intended to reflect on any individual.)

Col. Jack W. Tooley,
USA (Ret.)
Orange, Calif.

• *For more on the JCS, see "In Focus . . . " starting on p. 17 of this issue.*—THE EDITORS

Planning for a Changing Future

Capt. Phil Lacombe's article on AFIT *("AFIT: The Technical Challenge," p. 78, February '82 issue)* was a very good exposition, but in describing the changing programs at AFIT, he also described problems that have plagued the Air Force for a very long time.

We are back to educating to present operational demands—repeating the errors of fifteen years ago that led to our present incapacity in CBW, RFI, and intelligence, to name a few areas with which I have some acquaintance.

In 1972, it was frequently commented that "engineers are a dime a dozen, why bother with them?" Now it can be foreseen that semi-crash programs will produce another glut of very good, but unemployed people.

On p. 80, Captain Lacombe quotes Colonel Adams: "We have everyone from mathematicians to an Egyptologist in the program now." A good mathematician is a very rare gem. Surely the Air Force can find a better use for this type of mentality than engineering specialties. Analysis of Russian mathematical output from the Academy of Sciences is one such use; technological assessment and the myriad of math-based computer control systems are others.

The waxing and waning of Air Force programs have created a rather bleak image of the Air Force as an employer that can use people, and throw them away with every fresh direction. Adequate planning requires future projection, but since that is always uncertain, one would think officers prepared in basic mathematics, physics, and chemistry, with a specialization, would be more adaptable in a changing future.

James W. Frazer, Ph.D.
San Antonio, Tex.

Marine Corps Aviation

Thank you for "Advanced Aviation Weapons Training—USMC Style" *(February '82, p. 48)*. Having recently (the winter before last) participated in an analysis of Marine Corps Close Air Support under a study contract for the Commandant's office, for which MAWTS-1 (Marine Aviation Weapons and Tactics Squadron One) proved to be the principal source of tactical and technical data, I can testify that you have trod the same path as I did and have not missed anything along the way.

I take a certain proprietary pride in MAWTS-1, as I wrote the official initiative letter recommending the squadron's creation (submitted April 19, 1966). At that time (and until 1978, when MAWTS-1 was commissioned), the mission and tasks were divided between two MAWTUs—one at Cherry Point MCAS (MAWTULant), and one at El Toro MCAS (MAWTUPac). These units in turn had evolved from the two SWTUs originally set up thirty years ago to provide secure instruction in (and safe handling of) nuclear weapons. As officer-in-charge of MAWTUPac in 1965–66, it fell to me to put that unit into the business of air-to-air weapons, as well as air-to-ground, and to add to the latter *helicopter* attack weapons and tactics.

However, it is one thing to start new projects and another to develop, sustain, and extend them; by far the most significant progress along these lines was made in the years immediately preceding the commissioning of MAWTS-1 under the leadership of MAWTUPac Lt. Col. Ray Hanle, during which time the existing WTI concept was conceived and implemented.

Finally, the most difficult command responsibility is a new squadron. For the first commanding officer of MAWTS-1, the Corps drew the best of the best: Lt. Col. Howard DeCastro. Howard, who served under my command in combat fifteen years ago, needs no further testimonials from me (these having long since been written into official records, as well as personal correspondence). The Commandant of the Marine Corps appropriately acknowledged the brilliance of Howard's management and the resolution of his leadership as MAWTS-1's first commander on the completion of the assigned tour of duty (which ceremony both Hanle and I were privileged to attend).

The squadron continues in competent and dedicated hands, as your excellent report so eloquently relates.

P.S. There *was* one error—not in the article, but in the box on p. 51: On the A-6, you *can* put twenty-eight Mk 82 bombs, but *not* 28,000 lbs (twenty-eight Mk 82s weigh just under 17,000 lbs). See the flight manual and WSTM for specifics.

Col. John M. Verdi,
USMCR (Ret.)
Santa Ana, Calif.

PRANG Is Ready

In response to Gen. T. R. Milton's article in the February '82 issue of AIR FORCE Magazine titled "Are We Being Outflanked in the Caribbean?" *(p. 37)*, I would like to make a few comments.

First of all, I agree that " . . . Fidel Castro or, more likely, his Soviet masters, have concluded that the Caribbean is an air and naval theater, with air the dominant factor." I also agree that the US should get more serious in its dealings with Cuban influences in this region.

However, when you state that " . . . we should be able to put in an austere base somewhere on that island chain. Nothing fancy, you understand, with no great numbers of people permanently on station, . . . " you seem to be unaware of the fact that there is already an "austere base" on that island chain. This austere base contains a tactical fighter group, flying A-7Ds, in addition to one of the few aircraft control and warning squadrons left in USAF.

I am referring to the men and women of the 156th TFG, 198th TFS, and the 140th ACWS, components of the Puerto Rico Air National Guard, based at Muniz ANGB and Punta Salinas/Borinquen radar sites. Although

not as large as any major command, it is still a "military presence in the Caribbean." For years this force has maintained its proficiency and high caliber of combat readiness.

You don't need to have the active-duty Air Force show its power in the Caribbean—use the PRANG and you will get the same results cheaper.

2d Lt. Galin Hernandez,
PRANG
Catano, Puerto Rico

The Navigator's Viewpoint

This old navigator has never flown in an "old T-37 'Tweety Bird' " having fun over the Sierras, but I have participated in and observed navigator training at Mather since 1946 *("Navigating Can Be Fun, Too," p. 68, February '82).*

I suggest that in your next training issue you tell the Mather navigator training story from a navigator's eyes. It has been said that Mather graduates are better navigators than they think they are. For example, the classes that graduated in June 1950 had members participating in combat in less than one month after graduation.

Col. Carl L. Miller,
USAF (Ret.)
Carmichael, Calif.

The February Cover

In these days of renewed interest in items nostalgic, I thought some of your readers might be interested in some background information on the lead T-38 in your February cover photo. While I no longer have access to the official aircraft records, here is the part of the story that I know.

T-38 number 60-01554 was apparently assigned to the boneyard at Davis-Monthan AFB, Ariz., sometime in 1970, suffering from wing fatigue failures deemed too expensive to repair at the time. As the years passed and T-38s fell prey to normal attrition, it became economical to retrieve some of the previously condemned aircraft from their premature graves.

Somewhere around 1977, the San Antonio Air Logistics Center contracted to attempt such a retrieval of three T-38s. Three more years passed as the restoration of these aircraft proceeded, paced by the limited availability of replacement parts—most notably a new wing. . . .

But things all came together in April 1980, and the first of the three was readied for its long-awaited functional check flight (FCF). Maj. Glenn Little sat poised, and feigned confidence at the controls on April 4, 1980. The brakes released, the burners lit, and it flew for a while. Shortly after takeoff, what man had joined together, Bernoulli put asunder, as the front canopy separated and fluttered to its final resting place in some south Texas rancher's pasture.

Nearly four months later, after eight more FCFs, Major Little and I released the aircraft for flight, and it was assigned to the 12th Flying Training Wing at Randolph AFB, Tex., on July 23, 1980. Incidentally, the contract for restoring this airplane to fleet operation came in under cost, as I understand it.

Whatever happened to the other two T-38s? We still have them, and once we get new wings for them, we will return them to fleet operations alongside 554.

After all, ten years between IFEs isn't a bad record, eh?

Capt. Wayne Neet, USAF
San Antonio, Tex.

AIRMAIL

Being There

Regarding the two pictures on p. 74 of the February '82 issue *("On the Way to a Miracle" by John L. Frisbee):* Those two pictures were taken at Randolph Field in the summer of 1941. The flying cadets in the picture are from Class 42-A, and went on to graduate from Kelly Field across town. The airplanes are not BT-13s, but North American BT-9s or BT-12s. There were no -13s at Randolph in 1941.

The cadet in the front cockpit is Braxton Thompson, and behind him on the right wing is Hans van Ness Allen. In the rear cockpit is Craig Daub, and I am behind him on the wing. The other two cadets and the sergeant—I don't know.

Lt. Col. William F. Wilkerson,
USAF (Ret.)
Fort Mitchell, Ky.

January Issue

A short note to say how great your January '82 issue was—"Aircraft Engines—The Driving Force of Aerospace Power."

Being a jet engine mechanic with the 14th FMS at Columbus AFB, Miss., I greatly appreciated the facts and new information.

Mark T. Voorhis
Columbus, Miss.

Misstep on STEP?

I was surprised to read in your January '82 issue that STEP (Stripes for Exceptional Performance) is "generally believed to be a program that has gained overwhelming acceptance from the working level troops, and is a powerful motivator" *("The Bulletin Board," p. 99).* I assume the term "generally believed" means that the generals believe it, because I certainly don't know anyone else who does. Personnel who earned a stripe under WAPS and have to wait their turn to don the insignia are understandably not too impressed by the idea of an individual who did not make it under WAPS assuming the new rank immediately under STEP.

It was my understanding that most of the feedback from the field concerning the test phase of the program ranged from lukewarm (tell Headquarters what they want to hear) to hostile. If my base is anything to go by, the hostiles were in a considerable majority. Since the announcement that STEP is to become a permanent program, I have encountered several bitter reactions to the effect that "we told them the program was no good and yet they turn around and ram it down our throats."

The basic fallacy of STEP, as with so many other well-meaning programs, is to confuse the intent with the deed. No one would quarrel with the idea of promoting airmen with exceptional potential. The hard fact remains that the Air Force has no objective way of identifying the truly exceptional performer. WAPS, for all its imperfections, is by far the best system we have come up with yet for objectivity and fairness. Under STEP, a gifted writer could get almost anybody without a criminal record promoted.

I have no reason to doubt that the troops already promoted under STEP merited this recognition. My concern lies with the thousands of equally deserving people in the Air Force who, because of the subjective nature of the system, did not receive equitable consideration.

STEP is manifestly unfair. Those staffers who would have us believe the program is popular with the troops should try conducting a meaningful opinion survey in the field. I'll bet they'd be embarrassed by the results.

CMSgt. George Reeve, USAF
APO New York 09755

Info on UPT

I am an Air Force ROTC cadet and a senior at East Carolina University. I recently completed the Flight Instruction Program and look forward to attending Undergraduate Pilot Training after my graduation and commissioning on May 7, 1982.

I was impressed with your February issue on Air Force training, and es-

THE ONLY USAF TRAINER DESIGN FLYING TODAY.

62% scale flight demonstrator.

THE FAIRCHILD REPUBLIC NEXT GENERATION TRAINER.

- Proven Quality Design, Excellent Handling Characteristics, and Spin Resistancy Demonstrated through:
  - — 62% Scale Manned Flying Demonstrator
  - — 1200+ Wind Tunnel Hours
- Lowest Life Cycle Costs— Highly Reliable and Durable
  - — Fuel Efficient GARRETT Engines
  - — Low Maintenance Costs— Demonstrated on the Full Sized Mock-up
- Affordable, Lowest Development Risk, and Safest for the Pilot Training Mission for the Next Quarter Century
- Innovative Design and Development to Meet the Needs of the Air Force Acquisition System
- A FAIRCHILD/GARRETT TEAM

FAIRCHILD
REPUBLIC COMPANY
Farmingdale, L.I., New York 11735

The instant aircraft carrier - thanks to Rolls-Royce

With its vertical take-off and near-sonic strike speed the Rolls-Royce powered AV-8B Harrier II permits even container ships to be used as effective bases for marine assault. Rapidly coverted in times of emergency, these ships can greatly augment a nation's naval power.

The conversion system is being demonstrated by the U.S. Navy.

Just another example of the operational flexibility of AV-8B V/STOL aircraft, powered by the Pegasus vectored-thrust engine. AV-8B has been chosen for service with the U.S. Marine Corps and the Royal Air Force.

After 20 years the Pegasus is still unique. Constantly improved by Rolls-Royce advanced technology, its thrust has been more than doubled. Its performance improved to make supersonic V/STOL operation possible in the future.

Proven technology in service. Advanced engineering programmes for the future. That's how Rolls-Royce stays one jump ahead of the world. Powering commercial and military aircraft worldwide. Pumping oil and gas. Generating electricity. And powering the ships of 25 navies.

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

STAYING AHEAD IN THE RACE TO TOMORROW.

AIRMAIL

pecially with the section on the future of Air Force pilot training. I would like very much to get some information from anyone presently attending UPT. If anyone presently attending or recently graduated from UPT would drop me a note, it would be much appreciated. Also, if anyone knows where I can get a T-37 or T-38 flight manual, please let me know.

Write me at the address below.

Bill Miller
224 Green Mill Run Apts.
Greenville, N. C. 27834

McChord AFB History

The Taylor Publishing Co. of Dallas, Tex., is in the process of compiling and publishing a pictorial history of McChord AFB, Wash., and needs help. The units listed below served at McChord over the years, but as to their men, missions, and aircraft, there is little or, in many cases, no information available. If you have any information, newspaper clippings, or photographs, they are needed to make the history as comprehensive as possible. People making contributions will be given credit for information furnished.

Data and photographs are needed on: 939th Military Air Group; 131st Military Airlift Squadron; Det. 7, 42d Aerospace Rescue and Recovery Squadron; 1705th Air Transport Group; 4704th Air Defense Wing; 7th Region, US Air Defense Command; Det. 5, Aero-Reconnaissance Squadron; 28th Military Airlift Squadron; 22d Air Refueling Squadron; 6th Troop Carrier Squadron; 1727th Air Support Squadron; 567th Air Defense Group; 32d Air Transportation Squadron; 97th Military Airlift Squadron; 95th Bombardment Squadron; 43d Air Rescue Squadron (flew SA-16s); Det. 502, Air Training Command; 64th Fighter-Interceptor Squadron; 498th Fighter-Interceptor Squadron; 27th Fighter Group; and 505th Air Control and Warning Group.

Information may be sent to either address below.

Ed Uecker
Rte. 4, Box 235
Hillsboro, Ore. 97123
or
62d Military Airlift Wing
Historian
McChord AFB, Wash.
98438

B-29s and F-86s

I am starting research for a new book that will follow closely the pattern of my recent *Target Berlin*, a detailed account of the first daylight raid on the Reich capital in 1944.

This time I would like to hear from anyone who took part in or who was connected with the first B-29 raid on Tokyo, November 24, 1944. I need recollections and photos. All loaned material will be handled carefully and returned.

Also, after the joy of writing a fresh book on the P-51, I have another book project that should prove just as exciting. Jane's Publishing Co. has asked me to do a book on the F-86 Sabre for their "Jet Combat History" series.

I would like to hear from anyone who flew, crewed, or had anything to do with this great fighter. I need recollections and photos, particularly of combat. All material would be carefully handled and returned.

Jeff Ethell
Rte. 1, Box 519
Front Royal, Va. 22630

WHEN YOU CAN TEST THE TOUGHEST, YOU CAN TEST THE REST

We're Grumman, Boeing/Rockwell. And we've combined our technical resources and support experience to compete for the F/FB-111 AIS Replacement Program. Our credentials:

Grumman developed the test station for the EF-111A – the most sophisticated high-technology aircraft in the F-111 family.

Boeing has developed test equipment to support such Air Force programs as the B-52 Offensive Avionic System (OAS) and the Short Range Attack Missile (SRAM).

Rockwell International is a major avionic supplier for radar, navigation and communication systems and test equipment associated with the development and support of the F/FB-111 MK II avionics.

Over the past three years we've analyzed test requirements for over 400 types of avionics systems in the F-111 family. The result: an optimized, refined state-of-the-art AIS design that will keep pace with the F/FB-111 avionics into the next century.

It will employ reliable off-the-shelf hardware as well as proven software common to existing EF-111 automatic test equipment. This approach provides for design modularity, allowing for future F/FB-111 avionic growth as well as commonality to existing EF-111 ATE.

All of these benefits will result in lower AIS replacement program life-cycle costs.

We're committed to providing a total system with complete organic support capability, at low risk, on schedule.

Grumman. Boeing. Rockwell. The team to select for proven performance.

GRUMMAN/BOEING/ROCKWELL

AIRMAIL

Anyone Seen? . . .

I am trying to locate Maj. Donald S. Davis, USAF. He was in the Speaker's Branch, OPI/OSD, at the Pentagon in 1951–54.

I need Major Davis's help in researching bandleader Maj. Glenn Miller's death in 1944. Please contact me at the address below.

Lt. Col. Thomas F. Corrigan, USAF (Ret.)
3815 Somerset Dr.
Colorado Springs, Colo. 80907

I would like to hear from anyone who knows the whereabouts of my veteran son, Roy F. Bruce or Roy B. Flores. His last known address was at the University of California at Davis in 1969–76. He might be working as an engineer or pilot.

Please contact me with any information at the address below.

Ralph Bruce
Lista De Correos
Armeria, Colima
28300 Mexico

I am anxious to learn the whereabouts of a World War II friend, Lt. Robert W. Benson. He was a student at Washington University, and was with the 103d AACS unit at Camp Campbell, Ky. He was the best man at my wedding in September 1945; he still owes me $5!

Any help in locating this rascal will be appreciated.

J. B. Dron
2915 N. Cottonwood St., #10
Orange, Calif. 92665

Polish Air Force (WW II)

I work on a Polish-American newspaper and would greatly appreciate any information that readers would be willing to provide.

I would like to hear from past members of the Polish Air Force, or anyone who has photos, data, etc., dealing with this subject.

The Polish American
c/o Richard J. Staszewski
45 Roosevelt St.
Maynard, Mass. 01754

AAS Alumni

The Charles E. Yeager Squadron of the Arnold Air Society would like to maintain contact and good relations with our alumni. We need some information from you, such as present address, AFSC (Air Force Specialty Code), year of graduation from WVU, and if you are still in the Air Force.

This information, plus any other pertinent information, will be deeply appreciated. Please contact the address below.

Public Affairs Officer
Arnold Air Society
Charles E. Yeager Squadron
WVU, AFROTC Det. 915
Morgantown, W. Va. 26505

The Frank P. Lahm Squadron of the Arnold Air Society at the University of Maryland's ROTC Det. 330 is searching for its alumni. We are interested in letting them know what's been happening since they were Arnies.

If you are an ex-Terp Arnie, please contact the address below.

AAS/AFROTC Det. 330
Cole Field House
University of Maryland
College Park, Md. 20742

444/NGT

Model 444 Turbofan by TELEDYNE CAE for the NGT by CESSNA

Training jet pilots in the Cessna T-37 powered by the J69-T-25 by Teledyne CAE has become an Air Force tradition.

Now Teledyne CAE and Cessna Aircraft Company are teamed once again to translate that 25 years of service and reliability into a new tradition – the **N**ext **G**eneration **T**rainer.

The Teledyne CAE model 444 turbofan is engineered specifically for durability in the rugged military environment and, yet, designed for low cost, easy maintenance in the field. A prototype model 444 engine has already completed initial shakedown tests, demonstrating significant engineering achievement.

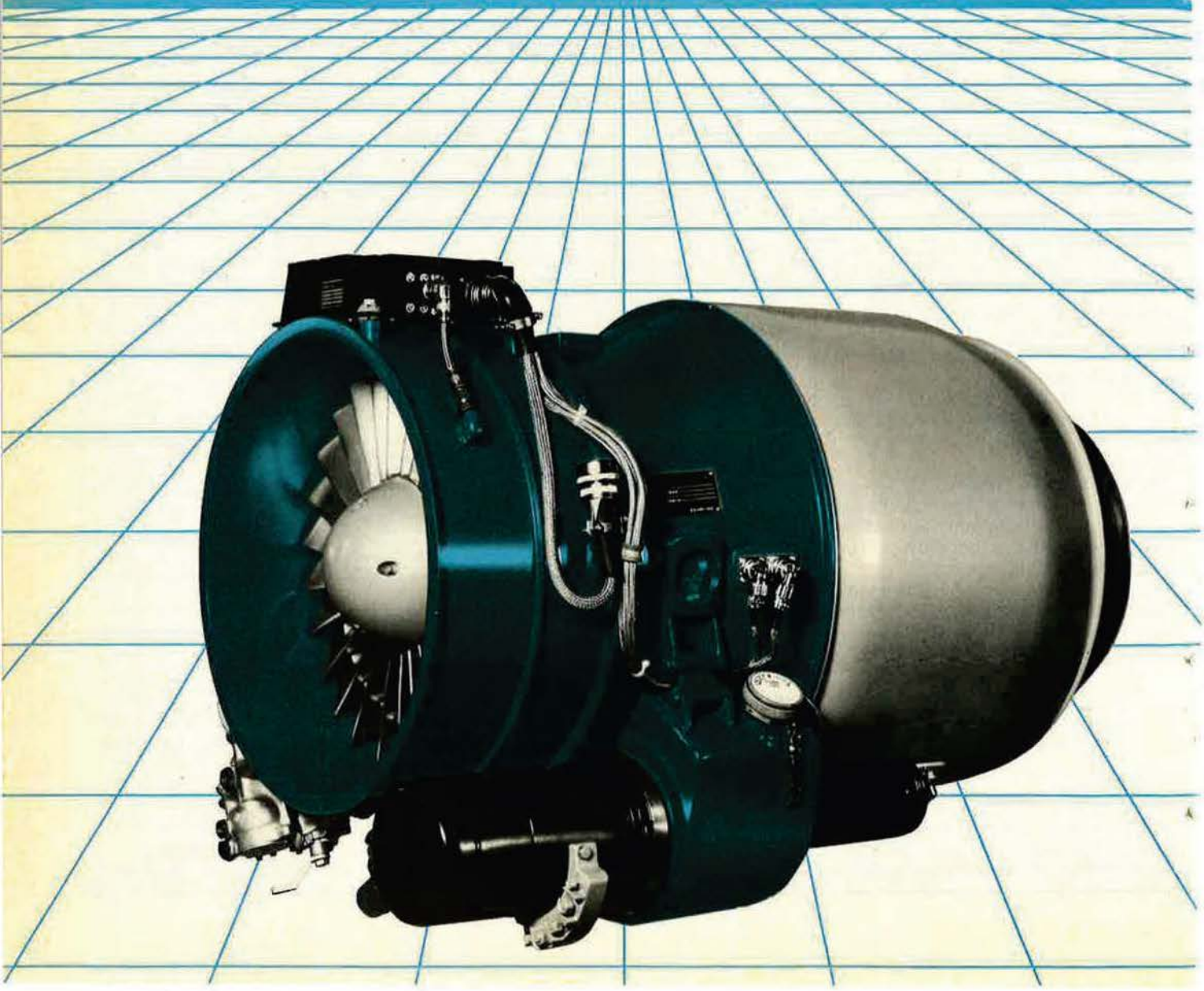
Model 444 turbofan – ready today for the challenge of tomorrow.

Ideas With Power

TELEDYNE CAE

Turbine Engines

P.O. BOX 6971
TOLEDO, OHIO 43612



IN FOCUS...

By Edgar Ulsamer, SENIOR EDITOR (POLICY & TECHNOLOGY)

Washington, D. C., Feb. 26

"Why the JCS Must Change"

Leadership by multitiered committees that in turn are reined in by a multiplicity of checks and balances can make the world safe for democracy. But such a diffusion of command authority and management by boards of directors with conflicting territorial imperatives does not necessarily make for vibrant and cohesive military leadership, and can hinder the efficient execution of national strategy. Thus it can be argued that the optimal solution is one that leaves intact the constitutional imperative of civilian checks and balances over the military while countering within the limitations imposed by a "committee system."

Gen. David C. Jones, Chairman of the Joint Chiefs of Staff for four years —and as Chief of Staff of the Air Force a member of the Joint Chiefs for the preceding four—has felt for some time that major changes at the top echelon of the military leadership structure were needed. He waited in going public with his recommendations for change until close to the end of his tenure as Chairman to avoid the suspicion of self-serving motives.

In February of this year, General Jones presented his views on structural deficiencies in the JCS makeup—and what might be done to correct them—to congressional committees and the press. In drawing up his brief on behalf of change, General Jones acted with particular circumspection and constraint with regard to the office he is about to vacate, that of the JCS Chairman.

In an analysis entitled "Why the Joint Chiefs of Staff Must Change," General Jones hints that the Chairman's standing as *primus inter pares* is shaky since he "does not exercise command over the Joint Chiefs of the Armed Forces but acts as advisor, a moderator, an implementer, and an integrating influence whenever possible." General Jones recommends, therefore, that the role of the Chairman be strengthened.

"Many issues can't be dealt with effectively by committee action," he argues, "when four out of five committee members have institutional stakes in the issues and the pressure is on to achieve unanimity in order to act. It is unreasonable to expect the Service Chiefs to take one position as Service advocates when dealing in Service channels, and a totally different position in the joint arena. Such matters should, therefore, be removed from addressal by the Joint Chiefs as a body."

Further, formation of interservice perspectives should come under the Chairman in consultation with the Combatant Commanders, meaning the European Command, Pacific Command, Atlantic Command, Southern Command, Readiness Command, Strategic Air Command, Aerospace Defense Command, Military Airlift Command, and the Rapid Deployment Joint Task Force. Some of these entities are Unified Commands (involving more than one service) and others are Specified Commands, manned by a single service.

Emphasis of interservice perspective in turn "would require strengthening the Unified Commander's role with respect to his Service Component Commanders who command the forces and report both to the Unified Commander and the Service Chief. Under the current system the Service Component Commander's attention is often drawn more to Service issues than to interservice coordination problems. In other areas—such as joint operational and long-range planning, crisis management, and a number of routine matters—neither the Service Chiefs nor the Service staffs need participate at the level of detail in which they are involved today."

General Jones argues bluntly and convincingly that the JCS Chairman "should be authorized a deputy. It is an anomaly that the military officer with the most complex job is virtually the only senior—and in many cases not so senior—officer who does not have a deputy. This causes substantial problems of continuity when individual Service Chiefs, who spend only a fraction of their time on joint activities, stand in for the Chairman in his absence.

"Secondly, the Chairman needs assistance, particularly in ensuring the readiness, improving the war planning, and managing the joint exercising of the combatant forces. I would also recommend that, at least until there is far more cross-experience and education among all four Services, the Chairman and the Deputy Chairman should come from the two different groupings [one be a Navy or Marine officer and the other an Army or Air Force officer]."

Without such a revision, General Jones suggests, "the very great demands on the time of a Service Chief will continue and perhaps even worsen." There is, he added, "great wisdom in having the Joint Chiefs of Staff act as senior military advisors to the President and Secretary of Defense on certain key issues. But without a stronger role and better support for the Chairman, the work of the Joint Chiefs is likely to remain too dis-

JCS Chairman Gen. David C. Jones recommends far-reaching changes in the makeup of his office, the Joint Chiefs of Staff, and their Joint Staff.

persed, diluted, and diffused to provide the best possible military advice or to ensure the full capability of our combatant forces."

In his analysis, the JCS Chairman acknowledges the system's seemingly immutable character, stressing that "most of the problems and some [of my recommendations] have been discovered—then reburied—many times in the past thirty-five years." Over the years, he said, "many good men have struggled very hard to make the best of the joint system, and most, if not all, have experienced a great sense of frustration in dealing with both large and small problems. Much of this frustration comes from having to cope with legislative and organizational constraints which reflect concerns of the past, inhibit attempts to meet the rapidly changing demands of today's world, and violate basic leadership and management principles.

"Yet, despite many studies that have periodically documented problems with this military committee system and made cogent recommendations for improvements, the system has been remarkably resistant to change. Committees can serve a useful purpose in providing a wide range of advice to a chief executive or even in making some key policy decisions, but they are notoriously poor agents for running anything—let alone everything."

One cardinal facet of the problem, General Jones feels, is that a "Chairman generally has more influence but less control than a Service Chief. Whereas a Service Chief can draw on significant institutional sources of formal authority, the Chairman's influence must be derived primarily from his effectiveness in personal relationships. His position provides the opportunity to meet with the leadership of the nation, but it is his professional competence, his ability to present well-thought-out and broad-based arguments, and his performance as a team player in grappling with difficult questions of national priorities that determine his degree of influence. The Chairman's only institutional advantage is his status as the one senior military official whose sole responsibility encompasses the entire spectrum of defense."

Further, the Joint Chiefs are handicapped because the Joint Staff that supports them is by law limited in size and tenure and dwarfed by the staffs of the Services and the Secretary of Defense. Except for urgent matters, General Jones explains, "a joint action is traditionally handled by assigning the issue to a Joint Staff action officer who meets with comparable-level representatives from the four Service staffs. The pressures at this point create a greater drive for agreement than for quality: The process usually results in extensive discussion and careful draftsmanship of a paper designed to accommodate the views of each Service—at least to the extent of not goring anyone's ox."

Substantive and disputed issues percolate upward through a series of committees to a group composed of the Service Operations Deputies and the Director of the Joint Chiefs, all of whom hold three-star positions. The product of such a multiple committee process predictably is "watered down or well-waffled," General Jones points out. Policy or operational issues of less than major crisis magnitude that filter up to the Joint Chiefs are dealt with in routine meetings, usually held three times a week.

Because the job of Service Chief necessitates considerable travel—and these meetings are held in Washington—the Vice Chiefs substitute frequently for them. But since the Chairman is not allowed a Deputy, the senior Service Chief present chairs those meetings that the Chairman can't attend. "My experience has been that one or more substitutes attend about three-quarters of the meetings, a situation that results in a lack of continuity," according to the JCS Chairman.

The process also is not being helped by the fact that if the Joint Chiefs fail to reach unanimous agreement on an issue, they must so inform the Secretary of Defense. General Jones points out that such splits are referred to the Secretary a few times a year, "but we are understandably reluctant to forward disagreements so we invest much time and effort to accommodate differing views of the Chiefs."

This multilayered, cumbersome system causes two basic problems, according to General Jones: "First, the Service staff involvement is a cumbersome staffing process and, second, the Service Chiefs receive their advice on joint matters from their Service staffs." He recommends, therefore, that when "a Service Chief acts on a Service matter he should receive advice from his Service staff and when he acts on a joint matter he should receive his advice from the Joint Staff; however, since the beginning of the joint process, Service Chiefs have relied almost exclusively on their Service staffs in preparing for joint meetings. It is unrealistic to expect truly interservice advice from a staff comprised of officers from only one Service. The Joint Staff can and should provide such advice."

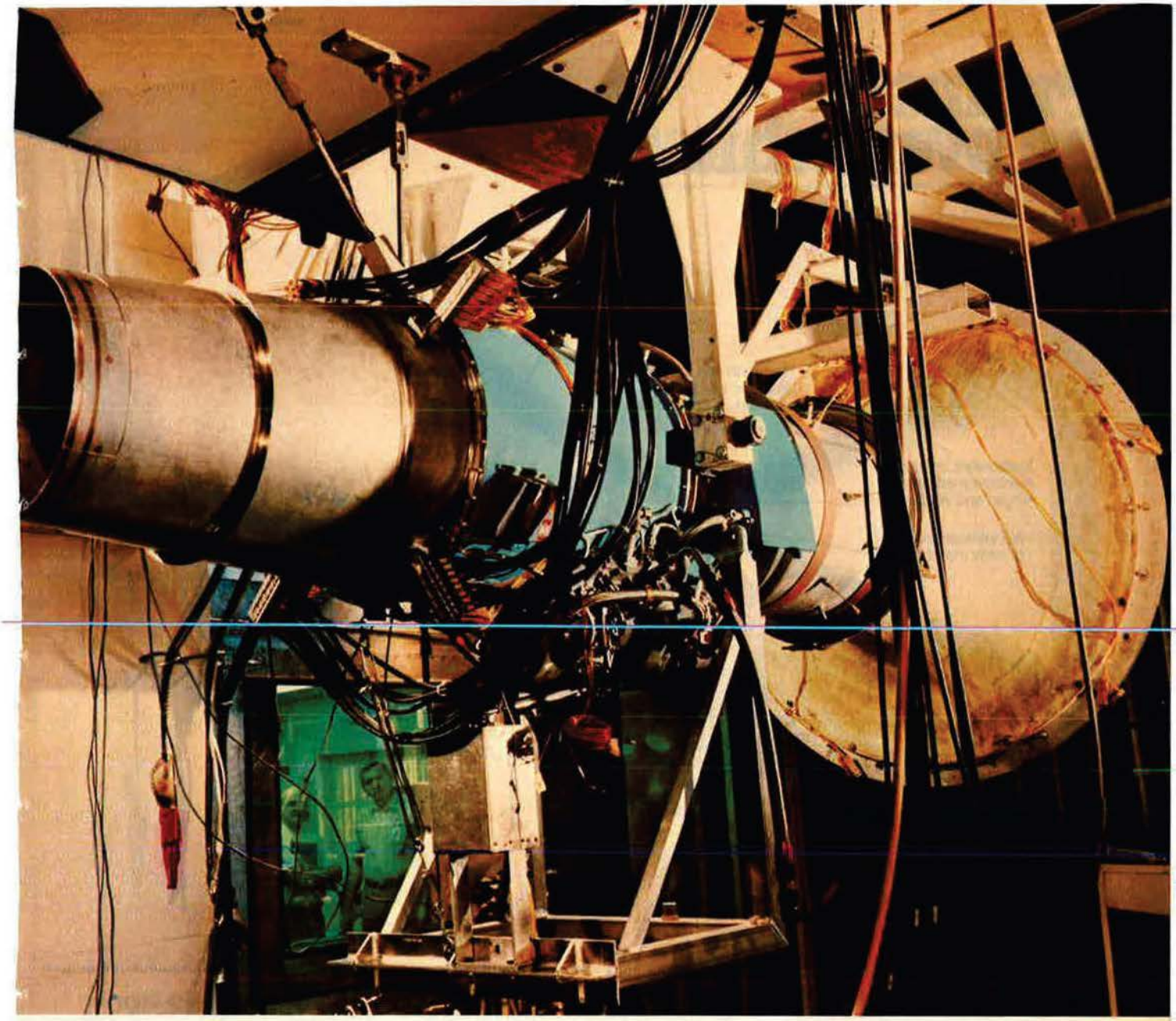
One of the fundamental problems plaguing the current Joint Staff arrangement, in General Jones's view, is "inadequate cross-Service and joint experience in our military, from the top down. The incentives and rewards for seeking such experience are virtually nonexistent." Exacerbating the problem is the high degree of turbulence in key positions and the fact that "we do not prepare officers to assume the responsibilities of membership on the Joint Chiefs as well as we should."

Not only do most newly assigned officers arrive on the Joint Staff or a Unified Command staff from a Service-oriented career with little interservice experience and inadequate preparation for joint service, but they expect to return to their Services, which control their assignments and promotions. As a result, this umbilical cord provides little incentive and becomes a deterrent for officers to seek joint duty or to differ with the positions of their Service in joint deliberations.

Further, Joint Staff duty more often than not leads to oblivion rather than to the top. With the exception of Army Gen. Earle Wheeler, not a single Director of the Joint Staff or one of its components ever became Chief of his Service or Chairman of the Joint Chiefs of Staff.

"We have," General Jones points out, "many outstanding officers on the Joint Staff who work very hard under very difficult conditions with few rewards. It is no wonder that many retire while on or soon after leaving the Joint Staff, or seek early release for a more rewarding job. The three-year limit on assignments—when coupled with our reluctance to stand in the way of good people attempting to move to Service jobs that may further their careers—results in a turnover of the Joint Staff in a little more than two years. Better continuity is required."

He specifically recommends, therefore, that "more officers should have more truly joint experiences at more points in their careers—and should be rewarded for doing so." General Jones recommends more interchange among the Services at the junior ranks and significantly broad-



THE TFE76: NOW RUNNING FOR THE NGT.

The Garrett TFE76 turbofan engine is already running, meeting or exceeding all predicted operational characteristics.

On November 4, 1981, the TFE76 began this significant phase in its development. The engine will continue to run for further substantiation of component performance.

Why such confidence in this Next Generation Trainer engine? Designed specifically for use as a trainer engine, the TFE76 is a derivative of already proven Garrett T-76 and TPE331 engines. With Garrett's TFE76, the Air Force can have the best of both worlds — advanced technology in a very low-risk, low life cycle cost engine. Furthermore, the TFE76 should easily meet the 1987 target for operational service of the NGT.

The TFE76 is the result of a six year company funded project. And with Garrett's 25 million operating hours experience on 12,000 turbofan and turboprop engines in this power category, you know the expertise is as strong as the commitment. This expertise provides every confidence the TFE76 will meet all Air Force specifications for durability, damage tolerance, performance, maintenance and low fuel consumption.

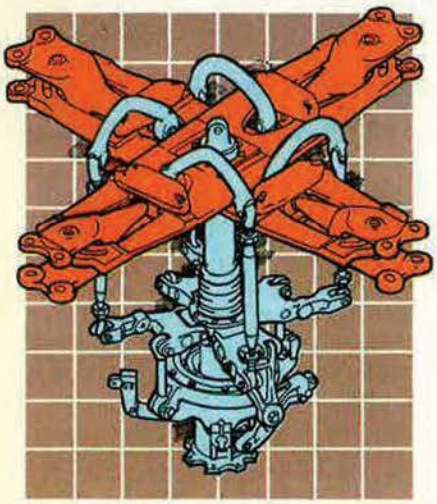
The TFE76 will give the Air Force NGT the power for high altitude operations, dependable performance, and the growth capability to even higher thrust levels, while operating with a noise level which is 20 dB lower than the existing trainer engine.

Because of our demonstrated, low-risk, proven approach, both Fairchild-Republic and Rockwell International have chosen Garrett power for their NGT aircraft. They know the logical choice is Garrett. For more information, write: Propulsion Engine Sales, Garrett Turbine Engine Company, P.O. Box 5217, Phoenix, AZ 85010. Or call (602) 267-4035.

GARRETT

The Garrett Corporation
One of The Signal Companies

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

ened preparation for joint assignments. Also, the joint educational system should be expanded and improved possibly to include attendance of common courses of joint education by all newly appointed generals and admirals. Lastly, an assignment "to the Joint Staff or to a Unified Command headquarters should be a part of an upward mobility pattern rather than a diversion or end of a career, as has been the case so often in the past. It is difficult to see how present patterns can be changed, however, without some influence by the Chairman on the selection and promotion of officers. Also, the statutory restrictions on service on the Joint Staff should be removed."

Despite formidable institutional constraints, some important improvements have been made in the joint arena over the past few years, according to the JCS Chairman, including:

- Development of a broader joint exercise program, to include mobilization practice.
- Establishment of a Joint Deployment Agency to integrate deployment plans and activities.
- Integration of our land and sea transportation systems.
- Redirection of the Industrial College of the Armed Forces to achieve better understanding of mobilization.
- Revamping of our joint education system, to include establishment, in conjunction with the Secretary of Defense, of research centers at the National Defense University to help us take fresh looks at defense problems.
- Organizational adjustments for better integration of the joint command control and communications system.
- Establishment of the Rapid Deployment Joint Task Force to improve our capability to deploy and operate forces in Southwest Asia and as a mechanism to develop and exercise integrated operations by elements of all four Services.
- Increasing the Combatant Commanders' opportunity to influence resource decisions, to include appearing before the Defense Resources Board.
- Involving the Service Chiefs in specific joint issues when visiting the field in order to report findings and recommendations at a Joint Chiefs meeting.

There is, General Jones readily concedes, an understandable desire on the part of the Services to protect "organizational interests, to preserve their sovereignty, and to conserve hard-won prerogatives. Nevertheless, we cannot escape the fact that our national security today requires the integration of Service efforts more than at any time in our history. To attempt to achieve meaningful integration only through the existing committee system is to leave it at the mercy of well-proven institutional counterpressures.

"I believe we can find a middle ground which draws on the strengths of the separate Services and of having Service Chiefs as members of the Joint Chiefs, while at the same time making the changes necessary to strengthen our joint system. If not, major surgery will be required."

IN FOCUS...

Washington Observations

★ The Commander of the Rapid Deployment Joint Task Force, Lt. Gen. Robert C. Kingston, USA, recently told this writer that the C-5B won't be able to operate from more than half of the existing airfields in the Southwest Asian/Persian Gulf region. The C-17, by contrast, would have been able to land at more than seventy percent of the facilities in that area. The Defense Department decided to acquire fifty C-5Bs and forty-four KC-10s rather than put the C-17 into production, on grounds that the shortfalls in strategic airlift needed to be corrected as soon as possible.

The contention is that the combination of C-5Bs and KC-10s would be available about three years earlier than the required number of C-17s. This assumption is predicated, however, on the availability of more than $200 million in "up-front money" for the C-5B program. At this time, there appears to be only a limited chance that Congress will provide the needed supplemental and reprogrammed funds for FY '82. If this initial funding is not available, the C-5B program would slip by about a year, according to DoD estimates.

★ The Air Force's long-range planning document, the Extended Planning Annex, envisions the eventual acquisition of at least 400 "E" versions of either the F-15 or F-16. These aircraft are to be optimized for all-weather air-to-ground operations, but also need to be capable of air-superiority missions.

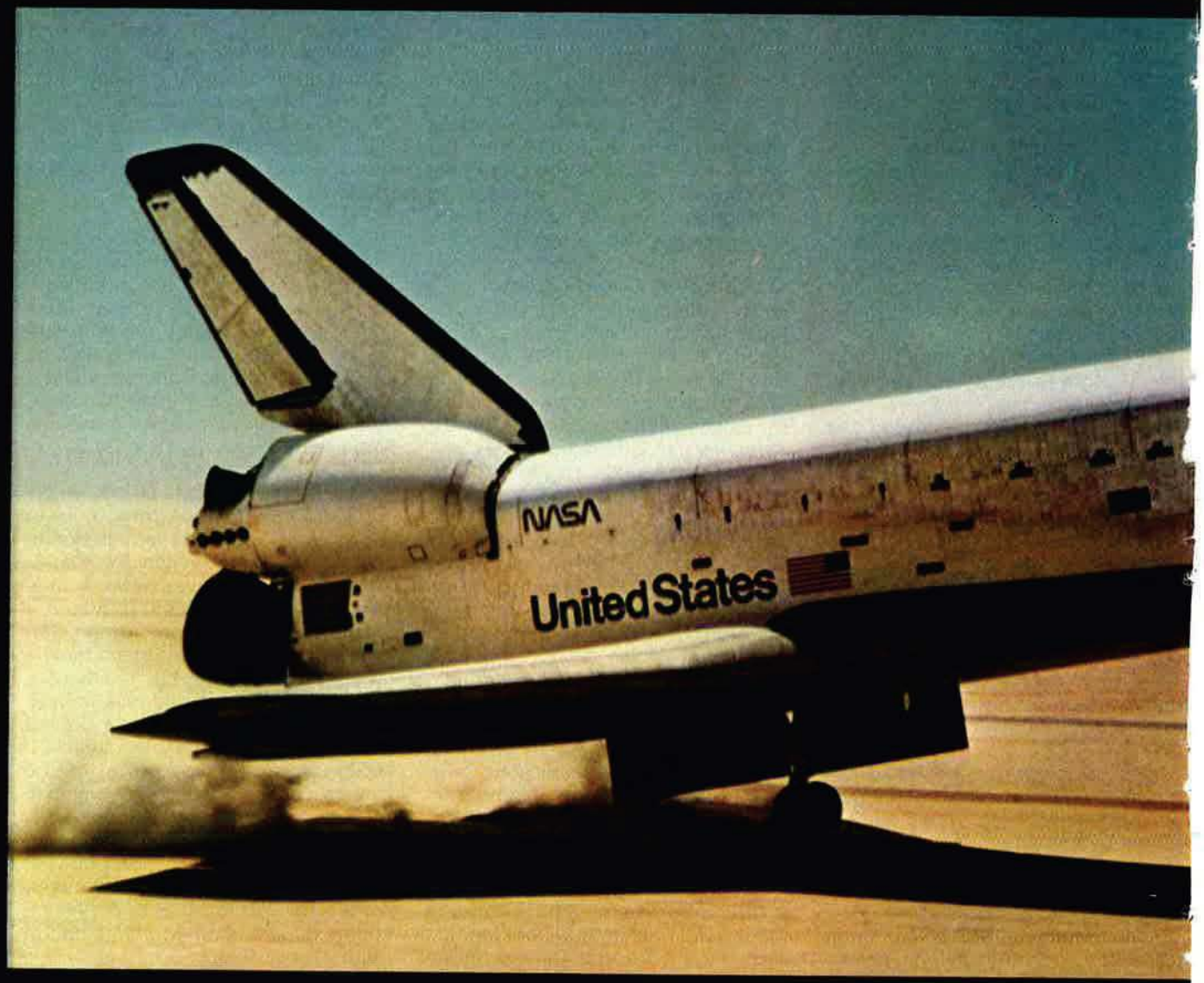
★ The attaché in charge of science and technology programs at the Soviet Embassy in Washington, D. C., Anatoliy Y. Skripko, recently disclosed that the USSR's space program includes efforts to develop nuclear, plasma, and ion power sources for long-duration missions and is developing a "third-generation" space station that will be larger, more automated, and raise operational efficiency compared to the present Salyut configuration. This new generation of space stations, he said, would be manned "by many people" and feature a modular design, meaning it would consist of a number of docking modules. He sidestepped questions about Soviet plans for a Space Shuttle, but acknowledged that "orbital factories for the assembly of very large space stations" would seem to require such a space transportation system.

★ Sen. John G. Tower (R-Tex.) is concerned over the Soviet Union's rapidly closing "the gap on us" in antisubmarine warfare (ASW) capabilities and submarine design, he told Pentagon correspondents. Unrelated, he also predicted that Congress will not authorize basing MX aboard Continuous Patrol Aircraft (CPA), a scheme reportedly favored by Defense Secretary Caspar Weinberger.

★ Sentiment is building in both houses of Congress to reduce significantly the $215.9 billion FY '83 Defense budget proposed by the Administration. Sen. Carl Levin (D-Mich.), a member of the Senate Armed Services Committee, announced that he will seek a $14 billion cut in outlays or about $40 billion in budget authority. The Chairman of the Senate Budget Committee, Sen. Pete V. Domenici (R-N. M.), has let it be known that he favors a cut in outlays by $7 billion in FY '83 and even larger cuts in the years following. There is widespread concern that Congress will not authorize the eight percent military pay raise provided for in the Administration's budget request and come in with a lower figure.

★ The Administration plans to decide next year on whether the US civil defense program is to be given a major boost or continued at the present level of about $250 million annually. Strong sentiment is building at the highest levels of the Administration to spend about $8 billion during the next Five-Year Defense Plan in the hope of assuring the survival of about eighty percent of the population and protect key defense industry in case of a nuclear attack. Senior military leaders are known to be skeptical of the feasibility of such an ambitious goal. ■

Rockwell International know-how
A transportation system that puts space to work for mankind.



The vast resources of space are now within our reach. And Rockwell International is playing the leading industrial role in the new era of space utilization.

In our Aerospace businesses, our Space Division is prime contractor to the National Aeronautics and Space Administration for the reusable Shuttle Orbiter — the most complex flying machine ever built. Our Rocketdyne Division builds the main engines — the first reusable engines to go into space. And we assist NASA in the integration of the entire Space Transportation System.

Through our Aerospace businesses, Rockwell has a major role in the development of the Department of Defense NAVSTAR Global Positioning System. We're a major supplier of aircraft assemblies for the new Boeing 757 jetliners.

Aerospace is one of the vital businesses at Rockwell International, a $7 billion worldwide, multi-industry company. We're at the leading edge

Our Collins color weather radar is another product of the technology that has made us a leader in avionics.

An advanced-technology air disc brake for the '80s: lightweight, durable, easy to maintain. More than half the heavy-duty trucks in America stop with our brakes.

Goss Metroliner® offset newspaper production systems are among the most sophisticated and technologically advanced in the world.

of technology in our other principal businesses as well: Automotive, Electronics and General Industries.

Furthermore, to manage these technologies, we've developed systems that are as advanced as the technologies themselves.

We've put the right engineering and manufacturing teams together with the right management to meet many of the world's unprecedented challenges.

To learn more about us and our products or if you are interested in an engineering career, write: Rockwell International, Department 815AF-1, 600 Grant Street, Pittsburgh, PA 15219.

Rockwell International

...where science gets down to business

Automotive / Aerospace
Electronics / General Industries

We travel in fast company.

Zero to Mach 2 in six minutes.

As fast as the F-16 flies, it can't get off the ground without Turbomach's™ Titan® JFS (Jet Fuel Starter) on board. And once airborne, the F-16 relies on the Titan for in-flight restart.

Since the first Titan F-16 installation in 1975, over 1,000 of these compact, lightweight turbine power units have been delivered. And the 500 in active aircraft now flying have developed a reliability rate in excess of 99 percent.

It's this kind of proven reliability that motivated the selection of Titan's new big brother, Titan II,™ as the main engine start system in the forthcoming KC-135 re-engine program.

Titan. Reliable, lightweight and compact. The ideal choice for both today's *and* tomorrow's airborne auxiliary power needs.

The fast company we travel in proves it.

Turbomach
A Division of Solar Turbines Incorporated

4400 Ruffin Road, Dept. AF
San Diego, California 92123 • (714) 238-5754

AEROSPACE WORLD
News, Views & Comments

By William P. Schlitz, SENIOR EDITOR

Washington, D. C., March 5

★ The 1st Tactical Fighter Wing, Langley AFB, Va., is slated to receive sixty-eight F-15C single-seat and four F-15D two-place Eagles by mid-1983.

With that acquisition, the wing will be the first US-based Rapid Deployment Force unit equipped with the advanced Eagles.

These F-15s will carry sixty-seven percent more fuel than the earlier A and B versions and will be capable of flying more than 3,000 miles (4,829 km) nonstop and unrefueled. With minimum refuelings, they should be able to reach potential trouble spots anywhere in the world.

The extended range is provided by adding two conformal fuel tanks, fitted along the fuselage, by an increase in the aircraft's internal fuel capacity, and by using larger external fuel tanks.

The conformal tanks, known as FAST Packs (for Fuel and Sensor Tactical Package), are drag-free at subsonic speeds. McDonnell Douglas Corp., St. Louis, Mo., is scheduled to begin producing them this year.

At 35,000 pounds, an F-15C's fuel capacity is almost 14,000 pounds above that of the earlier versions.

With reinforced landing gear, the F-15C's maximum gross takeoff weight has risen to 68,000 pounds from the 56,000 pounds of earlier Eagles. This should permit increased avionics and munitions loading.

Also improving the F-15C's effectiveness is its Hughes APG-63 radar, which will give a pilot facing enemy aircraft faster, more precise information during day, night, and poor weather.

In late January, two Tu-95 Bear Soviet reconnaissance aircraft were intercepted 200 miles off the Virginia coast by a pair of F-15s of the 1st TFW at Langley.

The intercept was the first by a Stateside-based F-15 unit and the first since the wing assumed the air defense role earlier in the month.

Piloting the F-15s were Capt. Mike Williams and 1st Lt. John Marshall of the 94th Tactical Fighter Squadron.

The event occurred while the Soviet aircraft were observing the sea trials of the Navy's newest aircraft carrier—the USS *Carl Vinson*.

Also involved was an E-3A Sentry AWACS aircraft from the 552d Airborne Warning and Control Squadron, Tinker AFB, Okla.

"We receive training with AWACS frequently, so we knew what kind of a job they would do," Captain Williams said.

The F-15s stayed with the Soviet aircraft about thirty minutes before handing them off to two F-4s from Oceana NAS, Va.

The Bell Helicopter Textron XV-15 tilt-rotor aircraft is being developed by the Army, Navy, and NASA. The XV-15 ascends and hovers like a helicopter, and, with rotors tilted forward, flies like a fixed-wing aircraft. See item below.

★ "It's a stable and simple helicopter that can fly like an airplane, or should we say it's a simple and stable airplane that can fly like a helicopter?" said Capt. Tom Pickering.

He's Deputy Chief of Operations, Performance Section, at USAF's Test Pilot School at Edwards AFB in California, and also liaison officer to NASA for the joint space agency/Army/Navy XV-15 test project. Captain Pickering recently became the first Air Force pilot to fly the unique tilt-rotor research aircraft.

Bell Helicopter Textron has built two XV-15s, retaining one at the company's Arlington, Tex., facility and delivering the other for flight testing at NASA's Dryden Flight Research facility at Edwards and its Ames Research Center, Mountain View, Calif.

The XV-15 combines the advantages of a helicopter with those of a fixed-wing aircraft. It can take off vertically with little or no runway and then cruise like an airplane at speeds greater than 300 knots—twice as fast and twice the distance of a helicopter.

For these reasons, widespread interest in the XV-15 is being generated. The US Navy for one because the aircraft has the potential of operating from the decks of ships. Air Force Rescue for another because of the possibility of a derivative of the XV-15 speeding to a rescue site, either hovering or descending to retrieve survivors, and then making a rapid getaway.

According to Captain Pickering, transition of the XV-15 from airplane to helicopter is "uncomplicated and immediate." The aircraft "is equipped with an automatic flight control system that increases the stability of the aircraft in all flight regimes. It makes it a joy to fly."

For its part, USAF contributed $100,000 toward XV-15 R&D in FY '80 and nothing since, but is interested in the program and is monitoring its progress. Captain Pickering has been active in the program since 1980 and trains frequently on the vertical simu-

lator at Ames Research Center. The simulator offers the opportunity to test—and then modify if necessary—the XV-15's new high-technology equipment. Also, problems encountered when flying the aircraft are duplicated on the simulator to determine and test solutions, "all without risking the safety of pilot or aircraft."

Captain Pickering logged ten years' helicopter experience before cross-training as a fixed-wing pilot. He is a graduate of the Navy Test Pilot School at Patuxent River NAS, Md., which he attended as an Air Force exchange student. He is scheduled to continue on the XV-15 project, which is being expanded to demonstrations at military bases and Navy ships.

★ With the drilling of a successful well, the Navy announced the discovery of a major geothermal field in the Coso area of China Lake, Calif., site of the Naval Weapons Center.

Such a geothermal resource is the result of the earth's molten core heating water in ground faults near the crust. The idea is to harness the steam produced to drive turbines and generate electricity.

Evaluations by DoD, the Department of Energy, and other authorities, including several universities, indicate that the potential electrical production of the Coso area could be between 675 and 4,600 megawatts, with ninety percent of the resource on Navy land. A megawatt of electricity is sufficient to meet the electrical needs of about 1,000 people.

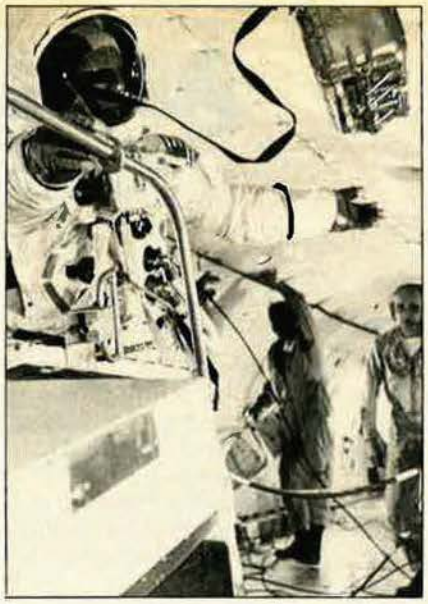
Officials estimate that over a thirty-year period, a geothermal plant at Coso could produce the equivalent of 150,000,000 gallons of fuel oil.

The Navy plans to exploit this resource through no capital cost to itself by contracts with California Energy Co., Santa Rosa, and an investment group, Caithness Corp. of New York.

The contractor is to deliver electricity to the Navy at no more than ninety-five percent of the commercial electricity rates, with the actual cost calculated on an index not tied to the price of oil.

Electricity production is expected by 1985, with significant savings to USN.

AEROSPACE WORLD



A space-suited astronaut floats during a weightlessness experiment aboard the KC-135 used to train for spaceflight. See item below.

★ AFSC's Aeronautical Systems Division, Wright-Patterson AFB, Ohio, has awarded $11.7 million to American Airlines for the acquisition of six commercial Boeing 707-320 aircraft to replace EC-135N Advanced Range Instrument Aircraft (ARIA) currently flown by ASD's 4950th Test Wing.

The six 707s are a mix of cargo-convertible and freighter aircraft powered by Pratt & Whitney JT3D-3B engines; they'll provide more space for electronic equipment and four hours' additional loiter time than the EC-135s, which were originally designed to monitor Apollo missions and used currently as airborne missile and satellite tracking stations.

This marks the first time that ASD has purchased commercial aircraft.

Modification of the 707s to mission-ready Air Force aircraft is to be undertaken by the 4950th Wing, with the initial flight of the first ARIA aircraft scheduled for mid-1984. For the follow-on 707s, Electronic Systems Division, Hanscom AFB, Mass., is managing the development of a phased-array antenna system that will equip the ARIA fleet.

★ Another specialized aircraft is also in the news. It's ol' "129," or the "Weightless Wonder," a KC-135 that's been involved in research and development at Wright-Patterson AFB, Ohio, for twenty-one years.

Acquired from a SAC wing in early 1960, the aircraft was used to familiarize astronauts in weightlessness during the manned space program, then to test satellite communications

Vought to Blueprint "Factory of the Future"

Vought Corp., aerospace subsidiary of LTV Corp., has been picked by the Air Force to combine the potential of the computer, innovative manufacturing technology, and new management concepts into a blueprint for a "factory of the future."

The two-year program was initiated under a $4.3 million contract awarded by Air Force Wright Aeronautical Laboratory's Integrated Computer Aided Manufacturing Program Office, Wright-Patterson AFB, Ohio.

Vought is to lead a coalition of highly qualified firms in addressing future planning concepts in three areas: factory of the future, integrated composite center, quality control and assurance.

The program is part of a broad Air Force movement to offset rising costs and declining productivity by combining the best of past, ongoing, and anticipated production techniques into a framework for more efficient computer-integrated manufacturing, officials said. USAF has budgeted $100 million through 1985 to increase manufacturing efficiency and productivity.

The program is to address total corporate management as well as factory structure, and rather than attacking isolated cost and production problem areas will have a single goal—increased productivity.

Catalyst for the blueprint is the computer—linking such diverse areas as sheet, composites, and assembly centers through a common language. It will integrate not only factory functions but also such elements as design, engineering, human resources, and financial and operations management.

"The computer information network will be designed to improve the decision-making process all the way from the shop floor to the boardroom," said E. F. Cvetko, Vought senior vice president for operations.

The Vought-led coalition includes General Electric/Schenectady, General Dynamics/Fort Worth, Hughes Aircraft Corp., Northrop Corp., and the Illinois Institute of Technology, among others.

Northrop will head a group including General Dynamics, GE, and Hughes in defining integrated composites center requirements and conceptual design. Their task will be to devise a plan for establishing integrated composites centers at two locations—one for fighter aircraft and one for bomber and transport types.

On completion, the "Project 1105" conceptual framework is to be used along with other improvement projects sponsored by the Air Force to provide a basis for longer-range programs of the 1985–90 period.

Answering the Challenge for Over 30 Years

(Fort Worth, Texas-1951). . . . The B-36 bomber jet-pod changeover program is well underway. Powerful gas turbine engines are being added to the aircraft by the U.S. Air Force.

Maintenance procedures for these engines will demand more sophistication, accuracy and reliability than ever required before. Measuring and monitoring the extreme heat produced by the new jet engines is to be a critical factor in their successful long term operation.

Providing a practical solution to this challenge is first priority for Howell Instruments, the newly-founded, pioneers of precision instrumentation for aircraft turbine engines.

Before the year was half over, Howell not only met this challenge, but had taken 106 orders for the revolutionary JETCAL®AnalyzerTrimmer destined for use by the Air Force.

Howell's JETCAL evolved into a multipurpose test/trim system that has determined high standards for aircraft engine maintenance throughout the world. The JETCAL also established a working philosophy that continues to spirit Howell's progress.

Over the last 30 years, Howell has designed many practical answers for military, commercial and private aviation by: investigating the customer's need; proposing the best answer; designing, developing and testing the product and supplying support in the field.

Today, Howell internationally manufactures and distributes a complete line of top-flight instrumentation. They have become a leading producer of turbine engine trimmers and testers boasting more airborne engine monitors in the sky than any other manufacturer.

Howell's PATTS™ (Programmable Automatic Test/Trim System) is currently in use by Air Force and Navy on the TF-30, T-56, F-100 and J-57. PATTS is producing savings in both trim time and fuel consumption by as much as 40%.

Growing numbers of aircraft are installing H900 solid-state indicators, that provide levels of accuracy characteristic only to Howell. Rigorous testing of the H900's has documented a mean time between failures of 6,000 hours.

Another example of Howell's capabilities is H337 Series Engine Test Set. This multipurpose set tests, trims and trouble-shoots several engines including the Pratt & Whitney PT6 or Twin Pak (T400 or PT6T-3), Lycoming LTS-101 and the Allison 250.

The Howell team welcomes challenges with the dedication and expertise necessary to meet your needs.

HOWELL®

HOWELL INSTRUMENTS INC.

3479 West Vickery Boulevard
Fort Worth, Texas 76107
817-336-7411

equipment, and, more recently, in the KC-135 winglet program. When not engaged in a test program, the aircraft flew routine flying training missions.

During the weightlessness years, 129's cargo bay was padded to prevent injury and was rigged for interior photography. Specially trained pilots used an F-106 control stick to help maintain zero gravity during the skill-taxing flights.

Besides the fledgling astronauts, NASA training specialists made the weightless flights, among others. In fact, they conferred a certain cachet. Wernher von Braun, Hugh Downs, and Jules Bergman all made flights. One highly respected television news anchorman got airsick and never referred to the flight in his many years of space age coverage.

Machines—including lunar rovers, scooters, and extravehicular activity maneuvering packs—were examined during the flights.

Basically, on the flights pilots flew by accelerometer instead of airspeed indicator, then swung into a forty-five degree, nose-up climb. Passengers felt about two Gs on the way up; at the top of the arc about thirty seconds of weightlessness could be achieved.

Missions usually lasted about two and a half hours during which forty-two parabolas (arcs) was the average.

But 129 isn't finished yet; with padding long since stripped away and winglets removed, she's leaving the 4950th Test Wing for a new assignment with SAC as an airborne command post.

AEROSPACE WORLD

★ In connection with the recent decision to add the B-1B bomber to the inventory, the Air Force has awarded a $182 million contract to GE's Aircraft Engine Business Group, Evendale, Ohio, for full-scale development of the F101-GE-102 engine.

In the 30,000-pound-thrust class, the engine is a derivative of the turbofan developed for the B-1, but with improved durability required by the B-1B's more severe mission profile, officials said.

Under the contract, a product verification program will be undertaken to demonstrate the engine's performance, operability, and durability. Three engines are to be built for this program. A key factor will be the demonstration of one full lifetime of engine "hot-section" parts prior to delivery of the first production engine. Those are components of the combustor, turbine, and afterburner exposed to a "severe temperature environment," officials said.

★ The Air Force's largest multiyear contract to date is expected to save a third of a billion dollars over the next four years, officials said.

The agreement with General Dynamics Corp., Fort Worth, Tex., is the

Fortieth Reunion of Doolittle's Tokyo Raiders

April is noted for spring showers, the yearly tax bite, and, among Air Force people, the annual reunion of a band of men who carried out one of the most sensational combat missions of World War II.

The Tokyo Raiders, originally eighty under then-Lt. Col. Jimmy Doolittle, flew sixteen B-25 medium bombers off the deck of the USS *Hornet* on April 18, 1942, to bomb the Japanese homeland barely four months after the paralyzing Japanese attack on Pearl Harbor.

The daring assault electrified America and her allies at a time when they were reeling from a succession of defeats.

The Raiders and their wives are meeting this month, April 15 to 18, in St. Petersburg, Fla., and the entire Tampa Bay area is preparing to honor them.

This year's reunion is, like the raid itself, a joint operation, cochaired by Col. Matt Carter, Jr., USAF (Ret.), and retired Navy Cmdr. J. Paul Finley. Bob Hope will be present for the early events, and a 1,000-guest banquet will be hosted by the St. Petersburg Chamber of Commerce. A luncheon at MacDill AFB is to be sponsored by Col. Henry Viccellio, Commander of the 56th Tactical Fighter Wing.

The reunion will be videotaped by NBC's "Real People," to be televised nationally on Veterans' Day, November 11.

From the proceeds of each year's banquet, a $1,500 scholarship is presented in the Raiders' name to a student of a local college. The scholarship this year will go to St. Petersburg's Bayboro campus of the University of South Florida.

After forty years, the irrepressible Jimmy Doolittle waxes as enthusiastic about his "boys" as he did in the month they practiced short-field takeoffs at Eglin AFB, Fla., in March 1942 before the embarkation from San Francisco.

"These fellows weren't hand-picked from all over the Army Air Forces," he declared. "From the first we realized the B-25 was the only plane that could do the job. At the time, the only outfit with any experience in the B-25 was the 17th Bomb Group. Even so, the pilots probably averaged less than 200 hours in the B-25, and the copilots a lot less.

"When I called for volunteers—I couldn't tell them what the mission was—the whole group volunteered. We selected the best twenty-five crews for the training at Eglin, and from them the best sixteen. They were extremely competent, very capable people—still are—and the rapport between us is very close."

A B-25 struggles into the air off the deck of the carrier Hornet *on April 18, 1942, on its way to bomb Japan. Pilots were instructed to keep the nosewheel and left wheel on the white lines at left of the deck to ensure clearing the superstructure.*

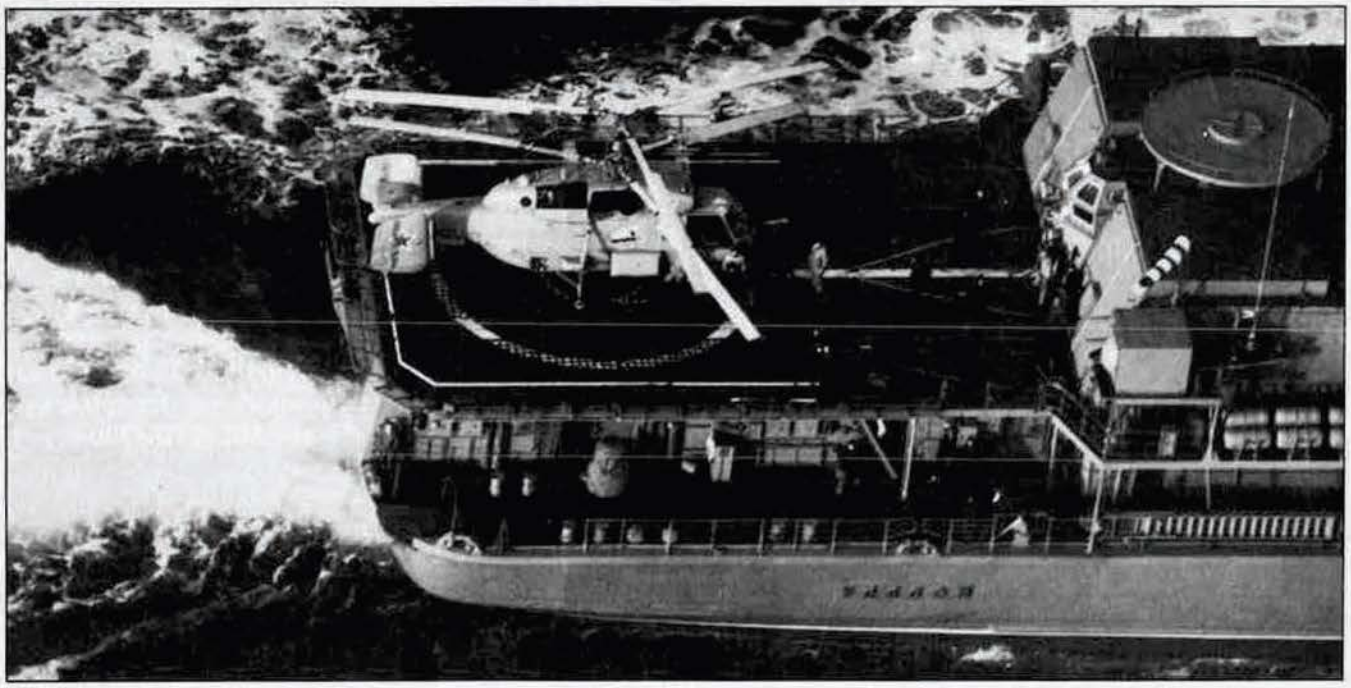
Doolittle told his crews they had a fifty-fifty chance of survival, but he was wrong. Today, forty years after the raid, forty-nine of his original eighty are living, the youngest sixty and the oldest, Doolittle himself, eighty-five.

When the Raiders hold their one solemn meeting at their reunion, the roll will be called for each of the sixteen crews, and a member of each will be able to respond.

One crew, the "Lucky 13th," will report "all present or accounted for," the only crew all living today. They are Edgar E. McElroy, pilot, of Lubbock, Tex.; Dick Knobloch, copilot, San Antonio, Tex.; Clayton Campbell, navigator, Boise, Idaho; Adam Williams, engineer-gunner, Plymouth, N. C.; and Robert Bourgeois, bombardier, Metairie, La.

There is only one from No. 6 crew. Two drowned on ditching off the Chinese coast. Three others were captured, as were the five of No. 16 crew.

On trumped-up charges, the Japanese executed both pilots,



In the Baltic Sea, this high-angle photo shows the Soviet "Helix" helicopter on the hangar deck of the Soviet guided-missile destroyer USSR Udaloy. The helicopter is an apparent variant of the Kamov Ka-25, and is cited in the "Gallery of Soviet Aerospace Weapons," March 1982 issue, p. 105. (US Navy photo)

Lts. Dean Hallmark of No. 6 and William Farrow of No. 16, as well as Farrow's engineer-gunner, Sgt. Harold A. Spatz. Lt. Robert Meder, Hallmark's copilot, died after twenty months in captivity, leaving Chase Jay Neilsen of Brigham City, Utah, as his crew's only survivor.

Rescued with Neilsen from prison after the Japanese surrender were the remaining three members of No. 16 crew: Lt. George Barr, navigator, who died in 1967; Robert Hite, copilot, of Enid, Okla.; and Cpl. Jacob DeShazer, bombardier, of Salem, Ore. DeShazer, now retired, entered the ministry after the war and served twenty-five years in Japan.

A sad note marring this year's reunion was the death in February of John A. Hilger, who rose to brigadier general before his retirement. A major in 1942, Hilger, as next senior to Doolittle, was his executive officer. He piloted No. 14.

In the raid, Doolittle's crews were far outnumbered by their Navy hosts, with close to 10,000 personnel aboard a task force of two carriers, four cruisers, two destroyer divisions, and supporting oilers.

"It was a perfectly coordinated Navy-Army operation," Doolittle recalled. "Before the raid, Admiral Halsey and I got together and considered every conceivable thing that might come up."

As things worked out, a Japanese picket ship sighted the task force early on April 18, eight hours short of the planned takeoff point but close enough to Japan so that, with luck, the B-25s just might fly on to mainland China.

After hasty preparations, Doolittle's plane was the first off, shortly after 8:00 a.m.; the others followed at about three-minute intervals.

Over Japan in bright midday sunlight, the crews encountered only light fighter opposition and inaccurate antiaircraft. But over the East China Sea the weather turned sour.

One by one, as their tanks ran dry, eleven crews bailed out into the inky night. Four experienced forced landings, while one turned northwest to the USSR. This crew was interned for more than a year.

Of those reaching China, the majority evaded capture and eventually reached Chungking. In further combat service, twelve died and four were shot down and taken prisoner in Europe.

Doolittle himself was awarded the Medal of Honor and promoted to brigadier general. Later, in North Africa and Europe, he added two more stars.

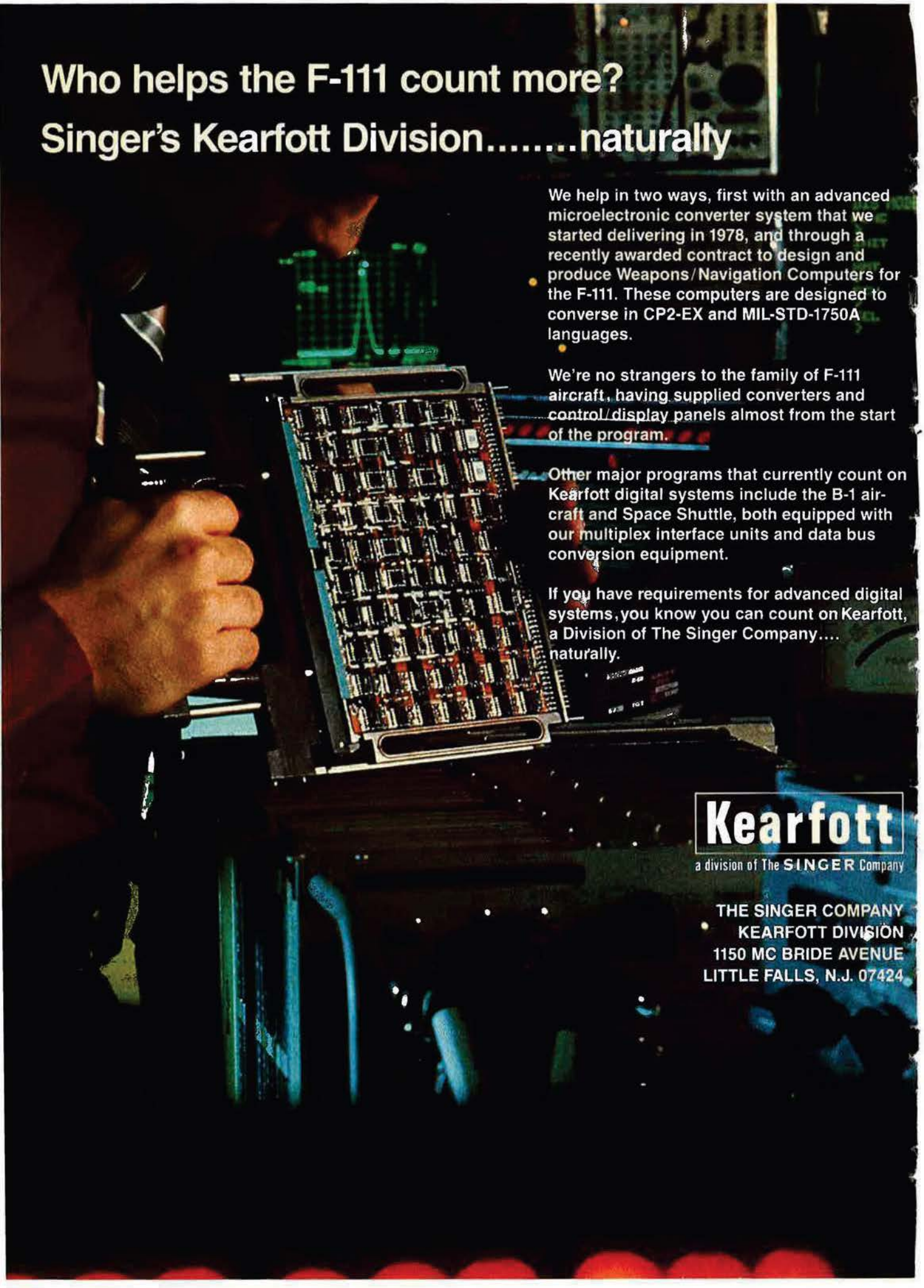
The damage inflicted by the Raiders was slight. But the audacity of the attack, as well as the boost to Allied morale, made the raid a success, though all sixteen planes were lost.

The Japanese slowed their thrust toward Australia as they sought to drive US forces out of the western Pacific and the Aleutians. In this, they chose to attack Midway, a battle that turned the course of the war in the Allies' favor.

"It was on the *Hornet*," said Doolittle, "that I promised the crews that if we got out alive I'd throw the biggest party for them they ever saw. In October 1945 we met in Miami Beach. As the reunion ended, I said, 'I paid for this one, but if you want to do it again, go ahead and make the arrangements, and I'll be there.' And I haven't missed one yet." —BY ALLAN R. SCHOLIN

At a get-together dinner April 18, 1943, in a North African farmhouse, Jimmy Doolittle and his veterans of the Tokyo raid toast "to giving them more of what we gave them before." Aboard the Hornet *prior to takeoff, Doolittle promised his crews "the biggest party they ever saw." The first formal reunion of the Raiders took place at Miami Beach in October 1945, and this April marks the fortieth anniversary of the aerial raid on Japan.*

Who helps the F-111 count more?
Singer's Kearfott Division.....naturally



We help in two ways, first with an advanced microelectronic converter system that we started delivering in 1978, and through a recently awarded contract to design and produce Weapons/Navigation Computers for the F-111. These computers are designed to converse in CP2-EX and MIL-STD-1750A languages.

We're no strangers to the family of F-111 aircraft, having supplied converters and control/display panels almost from the start of the program.

Other major programs that currently count on Kearfott digital systems include the B-1 aircraft and Space Shuttle, both equipped with our multiplex interface units and data bus conversion equipment.

If you have requirements for advanced digital systems, you know you can count on Kearfott, a Division of The Singer Company.... naturally.

Kearfott

a division of The SINGER Company

THE SINGER COMPANY
KEARFOTT DIVISION
1150 MC BRIDE AVENUE
LITTLE FALLS, N.J. 07424

first step leading to the production of 480 F-16 fighters from FY '82 to FY '85.

The $480.5 million transaction, signed in late January, ensures multiyear advance procurement that is expected to lead to continued production on aircraft to cost about $3 billion. The full production contract is to be signed later in the year.

Through the stability of the long-term contract, the manufacturer reaps financial benefits such as being able to purchase materials—and produce components—in economic quantities, thus reducing cost per unit. These savings can be shared with or passed on to the customer—in this case USAF.

In the past, multiyear agreements on major programs were unlawful, but the 1982 Defense Authorization Bill reversed that policy.

In addition to the benefit noted above, multiyear contracts can lower acquisition costs by improving industrial productivity, work force management, and capital investment by prime contractors and subcontractors, Air Force officials declared.

Delivery of the F-16s is to take place between June 1983 and May 1987 at a rate of ten aircraft per month.

AEROSPACE WORLD

★ **NEWS NOTES**—The **169th Tactical Fighter Group,** McEntire ANGB, S. C., has been tagged as the first Air Guard unit **to convert to the F-16 Fighting Falcon.** The 169th's A-7s are to be redistributed to other ANG units at the completion of the conversion, scheduled for the fourth quarter of FY '83. Delivery of the F-16s will continue the trend of equipping ANG units with direct-from-the-factory aircraft such as A-10s and C-130Hs.

USAF's Junior Reserve Officers' Training Corps **has openings throughout the country** for retired Air Force officers and NCOs as aerospace education instructors in high school JROTC units. Qualifications call for less than four years' retirement. JROTC offers education in aviation, national defense, aerospace careers, space, and leadership. Call either John Grisham or O. L. Johnson at toll-free (800) 633-8750, ext. 7741, or write Air Force Junior ROTC/OTU, Maxwell AFB, Ala. 36112.

Died: Brig. Gen. John A. Hilger, USAF (Ret.), of cardiac arrest at the Lackland AFB, Tex., medical center in February. He was seventy-three. The longtime AFA member was **deputy commander during the Doolittle raid** on Japan in 1942. See also the feature beginning on p. 28. ■

Former Astronaut Michael Collins, an Air Force Reserve brigadier general, straps into an F-16 for a final flight before his retirement. Assisting the Apollo-11 pilot at the AF Flight Test Center, Edwards AFB, Calif., was F-16 pilot Capt. Gregory Lewis.

INDEX TO ADVERTISERS

CAPITOL HILL

By Kathleen G. McAuliffe, AFA DIRECTOR OF LEGISLATIVE RESEARCH

Washington, D. C., Feb. 19

Yielding on Defense?

OMB Director David Stockman told the House Budget Committee that the Administration is now willing to talk about reductions in the FY '83 Defense budget in order to reach a compromise. The figures submitted to Congress are $258 billion in total obligational authority and $215.9 billion in outlays. The budget chief, while not giving any specifics on numbers, ruled out excessive cuts, hinting that anything above $10 billion would be unacceptable.

At the Pentagon, Secretary of Defense Caspar Weinberger told his defense team early on that no one was to have a "hit list" for cuts despite pressure for suggestions from the Armed Services Committees. The Secretary fears leakage of such a list would jeopardize his overall defense plan.

On Capitol Hill, Sen. Ernest Hollings (D-S. C.), no dove on defense, offered a plan to freeze DoD spending at the FY '82 level to save an immediate $19 billion in FY '83 and then let DoD grow by three percent in real terms in the following years. This plan has little chance of adoption, but few others have offered any specifics on where to save defense dollars. Expectations are high that a $5 billion to $10 billion cut will be put together by a coalition of conservatives looking to reduce the impending deficit and liberals looking askance at defense growth vis-à-vis social welfare cuts.

For now, at least, defense officials are following the direction of the Secretary and offering no sacrificial lambs to congressional committees. In fact, Deputy Secretary Frank Carlucci told Congress that management initiatives and program kills have already trimmed $7.4 billion from the FY '83 total. He said further that cutting such big procurement programs as MX, B-1B, cruise missiles, Trident submarines, and aircraft carriers now would yield only $5 billion in immediate savings. Congressional spokesmen believe that some large procurement cuts are inevitable, *e.g.*, the Navy's second nuclear aircraft carrier. But along with the procurement reductions, Congress will be forced to look where it hates most to cut—readiness (military personnel and operations and maintenance accounts that have high immediate rates of spending).

Supplemental Questioned

Overshadowed by the high FY '83 defense figures, little attention has thus far been paid to the submission to Congress of a $2.6 billion FY '82 DoD supplemental request. The Administration requested the funds to protect programs "jeopardized by higher than anticipated inflation." However, most of the funds are earmarked for purposes other than inflation, and the initial reaction on Capitol Hill is negative.

Stating that the main purpose of a supplemental is to cover cost growth of authorized programs and urgent needs, one congressional staffer said the request is unjustified. Asking $460 million for real property maintenance, underfunded by DoD for years; $110 million for more fuel when the price per barrel has dropped; and two KC-10s canceled six months earlier by DoD shows decision-making "so bad that it will raise questions about DoD judgment," according to the congressional source.

Prospects for getting any significant additional money approved by Congress are slim. It's expected that the closer Congress looks at the request, the less money DoD will get.

Cost Increases

Air Force Secretary Verne Orr complied with the Nunn Amendment, which requires the service Secretaries to report to Congress any system whose procurement cost increases by more than fifteen percent over the unit cost in the March 31, 1981, Selected Acquisition Report (SAR). The amendment, part of the FY '82 Defense Authorization, gives greater congressional oversight to cost-escalation of defense systems.

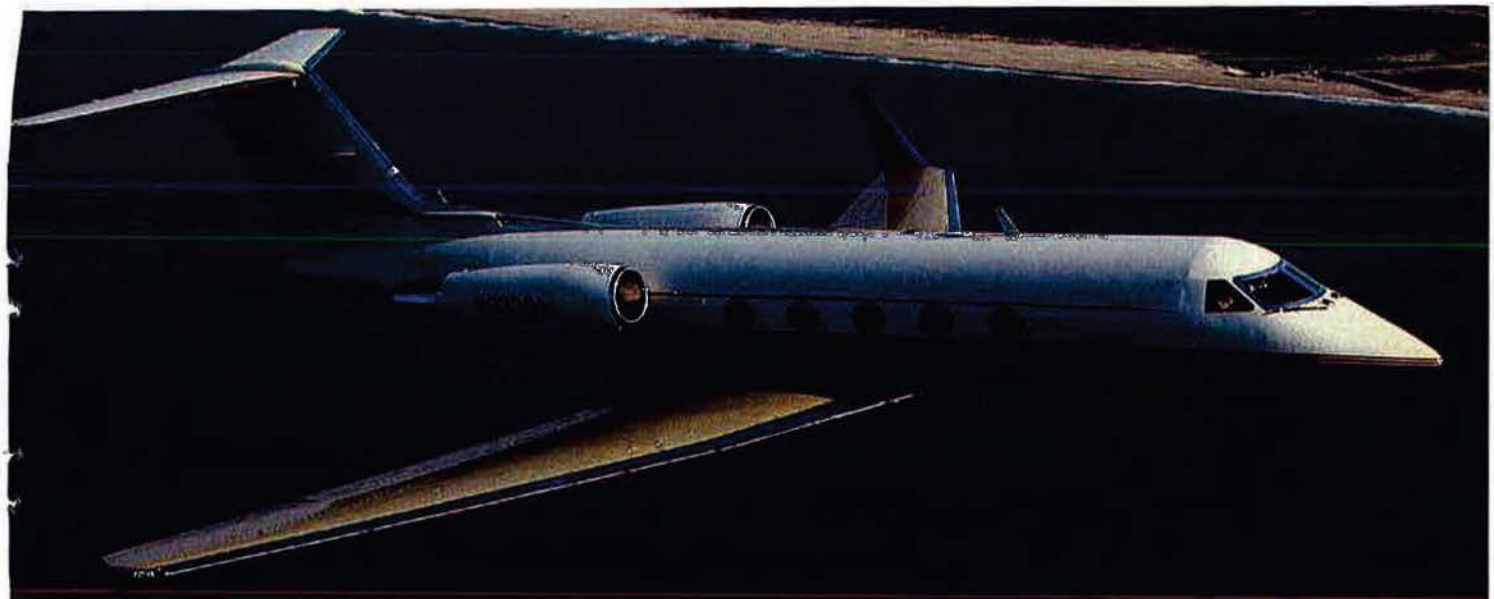
Secretary Orr reported to the Armed Services Committees that six Air Force programs exceed the threshold. Of the six, the F-15, F-16, A-10, AIM-7M, and the Defense Satellite Communication System exceed SAR unit costs by more than twenty-five percent. Secretary Orr attributed the cost growth in most cases to inflation and the additional quantity and related support equipment projected for the outyears.

Deputy Secretary of Defense Carlucci warned Congress that the first reports on threshold breaches would be high because of several management initiatives, *e.g.*, increasing production to achieve more economical rates, resulting in high "up front" costs for FY '83. He said, however, that the real test of the Nunn Amendment and DoD efforts to control costs will come after the initial reports and will be measured by the number of systems surpassing the ceiling in following reports.

CBO Options

The Congressional Budget Office (CBO) told Congress that defense spending is unlikely to rekindle inflation and then presented its version of different defense strategies to help reduce the projected FY '83 deficit. CBO suggested one option that in its view would alter the composition of the planned strategic force buildup and reduce defense costs by $23 billion over five years. It offers as a primary option dropping the B-1B in favor of acceleration of the Advanced Technology Bomber (ATB) program and increasing the number of B-52s on alert from thirty to forty percent.

However, a USAF spokesman for the B-1B echoed Secretary Weinberger's statement last year that the ATB is on track and currently proceeding at the fastest reasonable pace. Any further acceleration could mean unwarranted program risks and put the Air Force in a position of no new bomber for the 1990s. Further, increasing the aging B-52s on alert would exacerbate the existing support problems and require further extensive costly modifications, *e.g.*, reengining and additional electronic countermeasures to keep them viable. The bottom line, as DoD affirmed last year, is that a B-52/ATB force would cost more over a twenty-year period than the current bomber program. ■



It took a Gulfstream III less than 48 hours to set a new around-the-world record.

It will take another Gulfstream III to break it.

23,314 statute miles in 47 hours, 39 minutes.

On Sunday, January 10, 1982, a Gulfstream III executive jet completed an around-the-world flight in 47 hours, 38 minutes, 41 seconds.

The total elapsed time established a new World Class record for such a trip by any business aircraft, eclipsing the previous mark by nearly nine hours. The actual flying time was 43 hours, 42 minutes.

A standard Gulfstream III, a routine trip.

There was nothing unusual about this Gulfstream III or the preparations made for the flight.

The aircraft was a standard production model, Serial Number 301, produced by Gulfstream American in Savannah, Georgia. It was fully outfitted for normal executive use by its owner, New York-based National Distillers and Chemical Corporation. In service with National Distillers only since April 1981, the Gulfstream III had less than 255 hours in its log when it began its mission on the morning of January 8.

Starting from Teterboro, New Jersey, with six passengers and a crew of four, the Gulfstream III covered 23,314 statute miles (20,246 nautical miles) and made only 6 stops enroute. Each of the legs was flown over regular airlanes according to a pre-established flight plan.

Significantly, no mechanical difficulties were encountered during any part of the flight.

The chief pilot, in fact, saw no reason why the Gulfstream III could not have begun a repeat of its entire globe-circling effort immediately upon its return to Teterboro.

By any standard, the world flight of this Gulfstream III was a convincing demonstration of the superiority of this remarkable airplane in terms of performance, engine reliability, systems dependability – and endurance.

No alternatives to superiority.

As we see the flight, it illustrates why the world's major corporations and governments already have ordered more than 100 Gulfstream III executive jets for transporting their key executives and staff.

They are convinced that the only alternative to all the Gulfstream III offers is something less. And where providing the means of efficient, productive world-wide air travel for business and government leaders is concerned, aircraft with lesser capabilities are not desirable alternatives.

Think of the missions of Special Air Missions.

They, too require an airplane that can do everything well.

It has to have superior performance under every conceivable operating condition. Optimum range/payload/speed versatility. Outstanding dispatch reliability. Unquestioned dependability, proven in every system. Incomparable in-flight environment for passengers and crew. Maintainability. World-wide support.

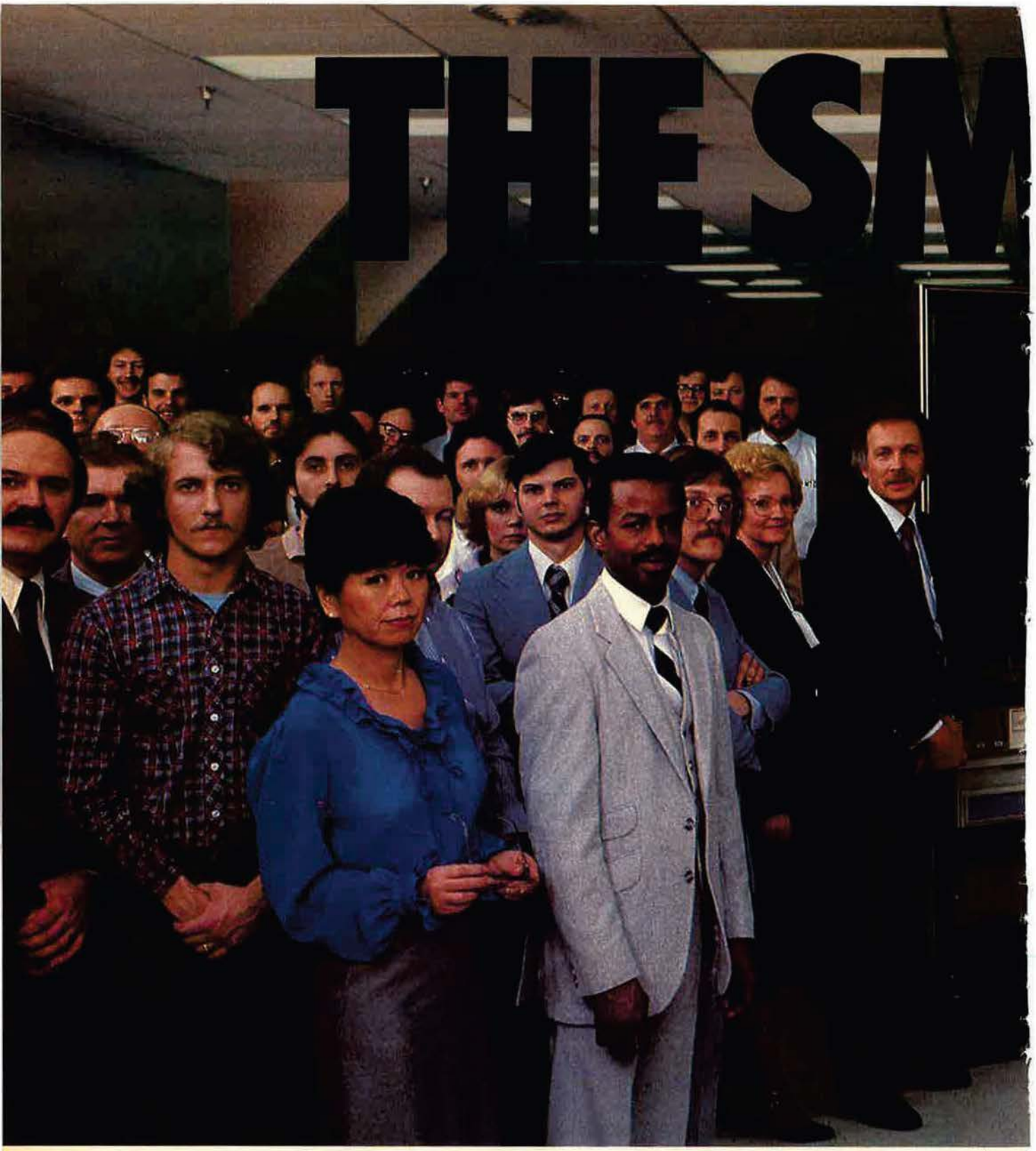
In short, it has to be an airplane that enhances the total effectiveness of our government leaders because it is totally effective in itself.

That is the Gulfstream III. There is no alternative.

For more information about the Gulfstream III, contact Gulfstream American Corporation, P.O. Box 2206, Savannah, Georgia 31402; or 1000 Wilson Blvd., Suite 2701, Arlington, Virginia 22209.

The Gulfstream III. The Ultimate.

Gulfstream American



This automated test unit from the AAI Corporation is one very smart set. So, too, is the team of AAI experts responsible for it. At AAI, we've always felt it takes one to know one.

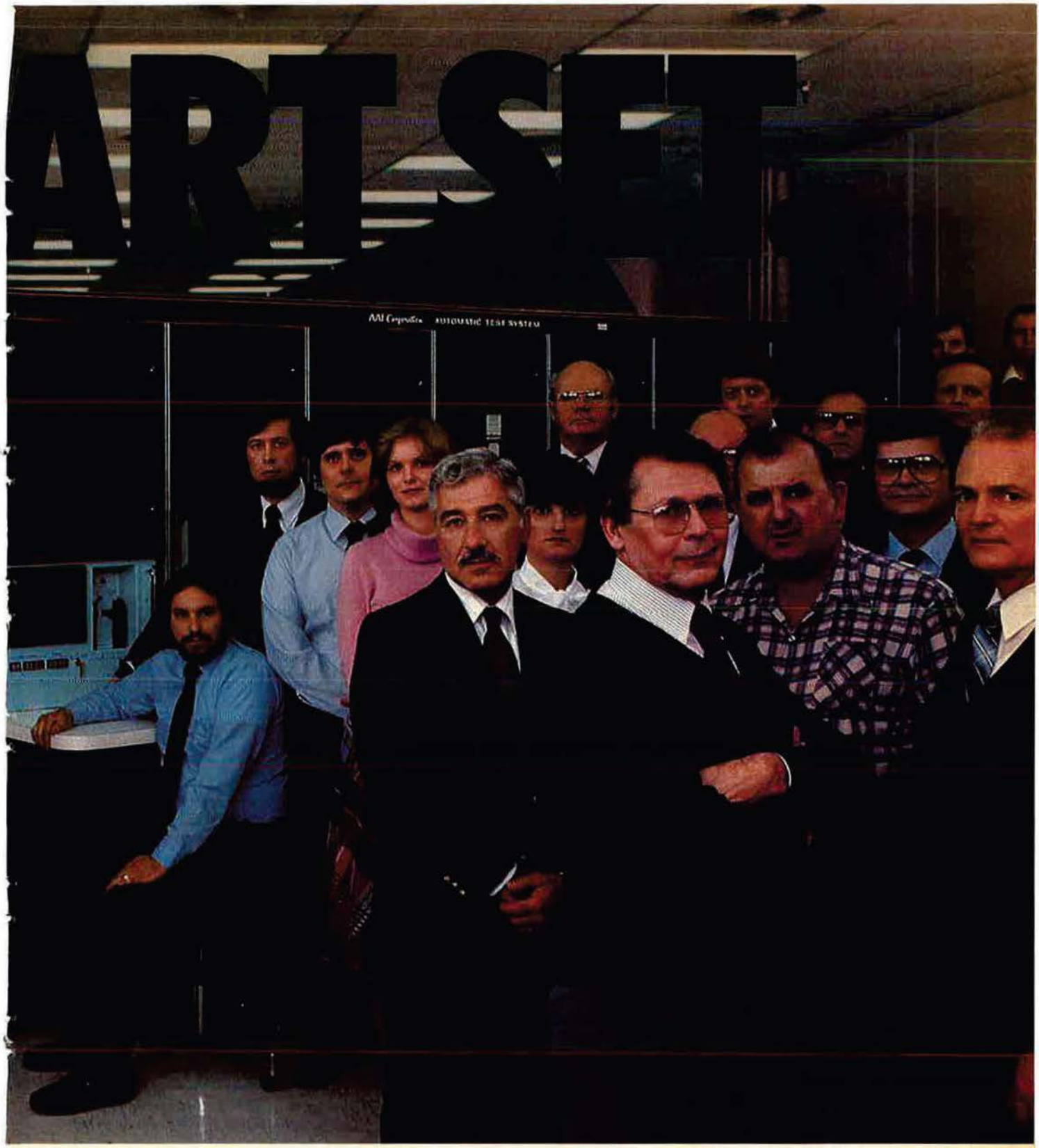
Take this Model 5565 Automatic Test System. It performs automated testing on a myriad of the military's defense electronics at all levels. This $150 million program at AAI includes 40 of these sophisticated systems and more than 6,000 Test Program Sets. These systems are now in service at military electronics maintenance facilities at 30 sites in 10 different countries.

But aside from our global reach and more than 20 years' ATE experience, what sets our hardware and software apart is our team concept of total program management and continuous support.

From situation analysis to engineering design, production, and logistics support, AAI project teams provide comprehensive management of large-scale, high-dollar-volume programs on time and on budget.

And even long after delivery, that AAI team continues to support its systems, to keep pace with users' new or changing test needs.

To keep pace with evolving



technology and military ATE requirements, AAI stays at the forefront of innovation, applying our mature management capabilities and technical resources. For example, our newest ATE systems address and incorporate the needs for modularity, reconfigurability, transportable software, and BUS-controlled architecture.

As a leading developer and producer of ATE systems, AAI has always believed in providing more than just hardware. And for more than 30 years, we've been applying this same team concept of total program management and support to our other high technology product areas: training and simulation systems, mechanical support equipment, combat vehicles, and ordnance systems.

To learn more about AAI's capabilities, be smart: write or call the Marketing Director for our most recent brochure. AAI Corporation, P.O. Box 6767, Baltimore, MD 21204. Telephone (301) 666-1400. Telex 8-7849.

AAI
CORPORATION
A subsidiary of United Industrial Corporation

TOP PHOTO: F-5E of the Aggressors of 57th Fighter Weapons Wing shows one of the Warsaw Pact camouflage schemes in which they are painted. ABOVE: An Aggressor on deployment at Langley AFB, Va., is painted in the desert scheme. (Photo by William A. Ford, Art Director) RIGHT: An Aggressor has another F-5E dead center in his gunsight during a training engagement.

Two USAF F-5 fighters are engaged in aerial combat training fifty miles north of Las Vegas, Nev. In silhouette they look like other F-5 or T-38 aircraft. Seen in good light, however, their paint schemes are different. They are painted in camouflage patterns typical of Warsaw Pact aircraft. Another difference: The identifying marks on their forward fuselages are painted in large red numerals instead of the usual black USAF block numbers. These F-5s differ in other ways, too. Their call signs are MiG-1 and MiG-3, and they are being flown as MiG-21 "Fishbed" aircraft. The pilots emulate Warsaw Pact fighter pilots in their aerial formations and tactics. These two aircraft belong to one of the Air Force's top flying units—the Aggressor squadrons of Tactical Air Command's 57th Fighter Weapons Wing.

The purpose of this particular fight—a student syllabus training mission to upgrade one pilot to Aggressor status—is to teach the student adversary intercept and engagement philosophy. This flight differs from procedures normally used by American pilots in that the student is being trained in a highly structured environment designed to teach him to fly, think, and react like a Warsaw Pact pilot.

MiG-3 is the attacker for this engagement. He is hunting from south to north under the direction of a GCI (Ground Control Intercept) controller in the Range Operations Center back at Nellis AFB. MiG-1 is the defender. He has flown to the northern portion of the assigned maneuver area, and turned south. Listen now as the fight unfolds.

GCI: "MiG-3, your bandit [MiG-1] is at bearing 010, range twenty miles." A few seconds pass.

USAF's Aggressor squadrons accurately emulate enemy fighter performance, tactics, and fighting philosophy in providing realistic training for the tactical air forces. Born of hard lessons from Southeast Asia, their task is to . . .

THINK AND FLY LIKE THE ENEMY

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

GCI: "MiG-3, your bandit is 010, seventeen miles."

A few seconds later, the range closes, and GCI reports, "MiG-3, the bandit is at 010, thirteen miles."

(Meanwhile, MiG-1, on a 180-degree heading, is descending into the assigned block for the fight to begin—19,000 to 21,000 feet. He swoops into it from 26,000 feet, building a reserve of airspeed as he descends through 21,000 to 20,000 feet.)

The controller continues vectoring the hunter. GCI: "MiG-3, bandit is now 020, nine miles." The controller is bringing MiG-3 into position for a beam approach on MiG-1's right side.

GCI: "MiG-3, turn right to 025, your bandit is at seven miles." Then, GCI: "MiG-3, begin turning right to heading of 180." Now the controller is bringing MiG-3 into a sweeping right turn to position him on MiG-1's tail. That is, if MiG-1 doesn't see him first and make initial moves to thwart MiG-3 and his controller's intentions. Note that GCI is directing the intercept in the Warsaw Pact way—vectoring the fighter into the target under tight control.

MiG-1 spots the enemy first, and sounds off: "Tally-ho, two o'clock high." He's made the first sighting, and now takes initial moves to deny the attack.

Inside MiG-1, Lt. Col. Mike Press, Commander of the 65th Aggressor Squadron, fights the engagement while giving a running commentary to an AIR FORCE Magazine editor in the back seat of his F-5F, tail number 00889: "I'll start a defensive turn now, and we'll keep him out of missile range. The objective here is to negate his initial attack. Now we build up airspeed. There's 450 knots. Pull in some Gs. 4.5 Gs; now we'll tighten the turn and hope he'll overshoot."

The G-meter needle advances to 5.0, then 5.5 Gs. Until now, the engagement has been pretty much in a horizontal plane. But that changes rapidly.

"Now we go into burner and take it vertical. We'll see if we can come over the top on him." The rate of climb zooms past 6,000 feet per minute as the F-5F needle nose points straight up.

"OK, he's at six o'clock low. Now we'll kick hard rudder . . . there he is, over the top of the canopy. He has his nose buried now. Now he's very low left at seven o'clock." Suddenly MiG-1 is on MiG-3's tail. "Now I'll try a gun shot and separate." The gun shot works.

MiG-1: "OK, knock it off and separate."

The aircraft turn away from each other, returning to assigned regions of the maneuver area ready to begin the next fight.

That engagement took two minutes, twelve seconds in elapsed time. Horizontally it ranged over twenty miles and vertically from 20,000 down to 12,000 feet. Air-

speeds began at about 450 knots, and ranged from a low of 150 knots to supersonic as the fighters dueled.

Aggressor Background

A major reason the US tactical air forces have a high degree of confidence in future air-to-air fighting is the realistic training provided through the skills of the Aggressor squadrons. Two units, the 64th and 65th Aggressor Squadrons, are based at Nellis AFB, Nev., as part of the 57th Fighter Weapons Wing. A third, the 527th, is based at RAF Alconbury, England. The fourth, the 26th, flies out of Clark AB in the Philippines. The 64th and 65th cover domestic US training requirements; the other two cover Europe and the Pacific respectively.

The mission of the Aggressor squadrons is to provide realistic training for tactical fighter aircrews by accurately emulating the threat in aerial combat. Activation of the first Aggressor squadron (the 64th) in 1972 had its genesis in USAF evaluation of air-to-air experience during the Vietnam War. The long-term study, called "Red Baron," spanned seven years. In it, all Southeast Asia air-to-air engagements by US pilots were recorded, analyzed, and dissected.

If one wanted to personalize the reason behind the "Red Baron" study, it would be Nguyen Van By's combat record. He was North Vietnam's leading ace during the conflict. In the 1965–68 period, flying MiG-17s, he shot down six US aircraft. After upgrade training in Russia, he returned to the war flying MiG-21s. By the time of the 1972 Linebacker campaign, he had shot down seven or eight more US aircraft. His total kills made him the war's leading ace.

The findings of the "Red Baron" study can be summarized in three brief statements. First, most attacks were unobserved by the US aircrews. Second, USAF air combat training was found deficient by the crews themselves. Third, knowledge of the threat was also deficient.

Forming the Aggressors

Recommendations of the "Red Baron" study aimed to overcome the deficiencies. After the recommendations were approved, USAF, through TAC, activated the 64th Aggressor Squadron at Nellis AFB in October 1972. The 64th got its first aircraft—twenty-four T-38 Talons—in February 1973 and became operational in June that year. A second unit, the 65th Aggressor Squadron, became operational in 1975 with the F-5E fighter. All four Aggressor squadrons now fly the F-5E, a total of seventy-two aircraft worldwide. Eighteen are at Alconbury, twelve at Clark, and forty-two at Nellis.

The Aggressors accurately emulate the enemy's current fighter performance, tactics, and fighting philosophy. The Aggressor pilots actually perform as air combat instructors through flying air-to-air engagements against USAF fighter units. In addition, they are expected to present current and comprehensive classroom instruction on the full spectrum of enemy fighter pilot training, equipment, and operations.

Nellis's 64th AS is commanded by Lt. Col. Russ Everts. Lt. Col. Mike Press, one of the charter members of the 64th in 1972, commands the 65th AS. They are under the guidance of the 57th FWW's Deputy Commander for Adversary Tactics, Col. Loren Timm. Commander of the 527th AS at Alconbury is Lt. Col. Bob Mendell; the 24th at Clark is commanded by Lt. Col. Ralph Femrite.

The two Nellis squadrons log more than 12,000 sorties per year in the flying training mission. About fifty percent of those sorties are flown "on the road"; that is, deploying to the home stations of USAF tactical fighter units and flying engagements against the home squadrons for periods, typically, of up to two weeks.

A typical deployment package comprises six aircraft, eight pilots, two GCI controllers, an instructor from the Fighter Weapons School, seventeen maintenance persons, and kits of spare parts for the aircraft. With each host unit, the Aggressors tailor their flying instruction to its capabilities and status in a structured approach. The flying might involve enemy fighter maneuvers—offensive, defensive, and neutral. Or it could be at intermediate level, involving enemy sequential attacks, split plane maneuvers, and integrating much of the basic material. For units at the top of their prime, the training would be at an advanced level with variable sequences of attacks or conduct of patrol or intercept missions. Since Aggressors are continuously visiting USAF, ANG, and AFRES bases and maintaining close liaison with them through TAC headquarters, flying training can be tailored to the needs of the host wing.

Thinking Russian

The key to a payoff from the Aggressors' existence is the requirement that they always use enemy tactics and maintain an enemy mindset. If they should revert to USAF tactics and thinking, the training has a negative value. It would repeat the practices of the 1950s and 1960s, proved wrong in combat. This means that selection of pilots and GCI controllers for the Aggressor units is a very discriminating process. The men who fly and instruct in the four squadrons must have at least 500 hours in operational fighters. In fact, the average is more than 1,600 fighter hours. They need mature individuals with disciplined minds who can fly and fight the way the enemy is trained. Moreover, at the conclusion of each air-to-air engagement, they must instruct the USAF opponents in the lessons learned during the fight. This is a delicate task. It sometimes means telling a proud fighter pilot that he did poorly, but at the same time showing him how to improve and win against the tactics he could expect to meet in the air against Soviet or Soviet-trained adversaries.

Selection is rigorous, and so is the training, once new pilots join the Aggressors. To become qualified to train others, a new member must first complete the "Adversary Tactics Instructor Course, F-5E," conducted at Nellis. The course comprises forty-one flying sorties and 121 formal academic hours over a period of four months.

Although sorties typically are 0.8 to 1.0 hours of flying, each consumes five to six hours. That includes at least an hour of preparation, one and one-half to two hours for briefing, the mission itself, then one and one-half to two and one-half hours for reconstruction, debriefing, and instruction after the flight.

The course syllabus helps the

FOREGROUND: Two Aggressor F-5Es on the ramp at Nellis AFB, with F-5F 00889 of TAC's 405th Tactical Training Wing in background. Forty-two Aggressor aircraft are based at Nellis, and thirty overseas at RAF Alconbury, UK, and Clark AB, Philippines. LEFT: Aggressors on deployment at Langley AFB between aerial engagements. (Photo by William A. Ford)

new Aggressor pilot make the transition to thinking like a Soviet fighter pilot. The first six flights are transition—learning to handle the F-5E to emulate the MiG-21. The next nine sorties are Single Air Combat. (The USAF analogy is Offensive Basic Fighter Maneuvers.) Then the new instructor flies ten sorties in Element Air Combat as part of a two-ship fighting force. After that, he flies ten sorties of Element Combat Tactics, operating as Russian elements actually fly.

Next are four Specialized Aggressor Training sorties. Their purpose is to develop the skills of reconstruction, debriefing, and critique of air-to-air missions to get the maximum instructional benefits from the flying. The course ends with three sorties called Step-Down Training. That is single-ship level flights for interception of low-altitude targets. Until then, sorties have been flown at medium to high altitude.

In addition to flying, the Aggressor instructor is required to achieve certification on a particular subject of the enemy air forces. That might be acquiring expert status on MiG-21 weapon systems, or its avionics, or element air tactics, or frontal aviation fighter philosophy. In all cases, the subject is needed in Aggressor training with US units, and the individual becomes one of the Aggressors' resident experts on the topic. Certification is continuously updated, at least monthly. Much of the updating is accomplished through liaison with the intelligence agencies.

A side note here. The Aggressors are not intelligence collectors or analysts. Their role is to take the information that has been collected and analyzed, then look at it from the fighter force point of view. That done, they present it promptly to fighter units in ways they can understand and use.

Soviet-bloc doctrine of fighter engagements relies heavily on Ground Controlled Intercept (GCI). In fact, GCI control of their pilots is much more extensive and pervasive than ours. That means instead of exploit-

Preparation beforehand, and reconstruction afterward, are the keys to . . .

FLYING WITH THE AGGRESSORS

In the fight described at the beginning of this article, MiG-3 was flown by Lt. Col. "Skip" Harbison. He attacked MiG-1, piloted by Lt. Col. Mike Press. Two more engagements followed. In the second, MiG-1 attacked MiG-3, under the direction of GCI controller Capt. Ed Miller. In a third engagement, MiG-3 practiced attacking MiG-1 again, working on perfecting roll slides into gun attacks. The mission was SAC-7, part of the Adversary Tactics Instructor Course. A 1v1 (one vs. one) engagement, its purpose was instructor pilot (IP) upgrade of Colonel Harbison through Specialized Aggressor Training. SAT includes, in addition to the fight itself, requirements for debriefing, reconstructing the engagements, and error recognition. An important part of the Adversary Tactics Instructor Course, it sharpens the skills needed to train USAF operational fighter units who fly against the Aggressors.

Specific objectives for the mission include radio communication and discipline, practice on initial moves of the engagements, and practice in recovery, approach, and landing. The GCI controllers contribute much to achieving the objectives.

Briefing the Mission

Before the briefing for the mission, the normal egress training was conducted by Capt. Craig Bovenizer, an Aggressor pilot instructor of the 65th Aggressor Squadron. Life-support equipment fitting and orientation was admirably done by Sgt. Susan Broom and A1C Norman Lehner. (Airman Lehner was Life Support Airman of the Quarter for TAC for the quarter ending December 31.)

In flying time, the SAC-7 mission occupied fifty minutes from takeoff to landing. In elapsed time, it took five hours. Briefing began two hours before takeoff. Colonel Press covered mission objectives, flying objectives, and details of the mission. That included step time (10:40 a.m.), engine start and check-in with Nellis Ground Control (11:05), and takeoff (11:25).

Also included in the briefing were rules of engagement, emergency procedures, actions in case an aircraft had to abort, and coordination procedures with GCI controller Capt. Ed Miller. For their visitor, the clear but comprehensive details covered by the briefers made the subsequent rapid and intense actions in the air intelligible.

After the briefing we walked to the aircraft. Checkout with the crew chief was done, and the normal preflight accomplished. Subsequent events took place precisely on time as briefed.

Aggressor flights require additional radio coordination over the normal heavy load in a high-traffic area. For this flight, that includes checks with the GCI controller and the ACMI range (Air Combat Maneuvering Instrumentation). Each aircraft mounts an ACMI pod for downlink of aircraft flight and weapon system information to the sensors located throughout the maneuvering areas. The sensor sites receive and pass on the information to the central ACMI computer in the Adversary Tactics building at Nellis. There, the computers process the data and provide information to the display subsystems. The displays present three-dimensional, dynamic representations of each air-to-air engagement. They are used in aircrew debriefing and reconstruction of each fight.

Into the Air

Now for the mission. Nellis is busy this day because a Red Flag exercise is in progress. The radio traffic sounds as dense as that at JFK or O'Hare. But the transmissions are briefer, more clipped, reflecting the stringent communication discipline required at Nellis.

Cleared to taxi, we promptly roll out of the Aggressor ramp area and taxi north to the arming area just short of Runway 21R. There, ground personnel perform final checks on the aircraft. All is well, and the flight is cleared to hold short of 21R. We are third for takeoff, behind flights of two F-111s and two F-4Es. They are quickly off, and Nellis Tower clears the MiG flight into position for takeoff on 21R.

We poise in position, with 10,000 feet of 21R ahead. Cleared for takeoff and switched to Nellis Departure frequency, Colonel Press leads his flight on takeoff. Afterburners ignite, and airspeed builds rapidly. At 150 knots, he rotates the nose, and the aircraft leave the ground at 165 knots. As we come out of afterburner to military power, fuel consumption is reduced. Yet airspeed builds quickly to 300 knots in a gentle climbing right turn (2,000 fpm) out of traffic. The flight forms into an extended echelon right en route to the maneuver area. Departure Control vectors the flight toward the assigned area (Alamo 62/63) as the climb continues in military power. Passing through 11,000 feet, the pilots perform aircraft system checks.

Ranging exercises are conducted while still en route to the training area. MiG-3 falls back to about two nautical miles of distance and then begins to overtake MiG-1. As he does, Colonel Press estimates the range at distances of 8,000, 6,000, 4,000, and 2,000 feet. Colonel Harbison in MiG-3 confirms the accuracy of the estimates on his radar. Pod checks are made with ACMI, and readiness checks with Captain Miller, the GCI controller.

Another routine pre-engagement exercise is G-awareness. For this, the pilots unload to an airspeed of 400 knots. They begin a left turn and tighten it to raise the G-meter needle to 5.0. That turn complete, they unload again to 400 knots, then turn to the right, tightening to 5.0 Gs without looking at the G-meter. The object is to sense the G-forces by body awareness, not the meter.

Then the fight is on. Its first engagement occurs as described at the beginning of this article. The two subsequent engagements are fought, then the flight joins in an echelon formation for return to Nellis. Rate of descent is 4,000 fpm through the vectors assigned by Approach Control. Turned over to Nellis Tower, the flight performs a standard approach pattern for the landing practice and subsequent landing to a full stop.

Debriefing and Teaching

Back at the Aggressor ramp, engines are shut down. The pilots huddle with the maintenance specialists for debriefing on aircraft status. Both are in Code One shape, ready for quick turnaround for the next mission. We walk over to the 65th building for the debriefing and reconstruction of the flight.

It is in the reconstruction that the full range of Aggressor instructor capabilities is realized. The process takes about forty-five minutes, with both Colonels Press and Harbison reconstructing the engagements and identifying learning points throughout. Their recollection and reconstruction of the unfolding engagements shows a rare skill. It is vital to the teaching process, both within the Aggressor units and with USAF fighter squadrons.

Then we walk to the nearby ACMI installation to replay the engagements on its display systems. The ACMI displays show three-dimensional representations of the aircraft throughout the fights. It also displays real-time continuous numerical data on the engagement on a large screen next to the spatial reconstruction. Among the data shown are closure or separation speeds, altitude, airspeed, angle of attack, and G forces of each of the aircraft. The ACMI is a valuable tool for supplementing the reconstructions already made by the pilots. It is not available at all bases. In addition to the installation at Nellis, others are at Langley AFB, Va.; Luke AFB, Ariz.; Eglin/Tyndall AFBs, Fla.; Yuma and Miramar NASs, Ariz./Calif.; Sardinia; and soon at Holloman AFB, N. M.

Other tools for reconstruction and briefing are, of course, the pilots' memories and notes, their tape-recorded comments during engagements, and the gun-camera film from each fight. (Processing that film takes up to half a day; video cassette recorders would provide instant replay capability.) Another—and most vital—participant in reconstruction and teaching is the GCI controller, who provides lessons learned from his unique perspective.

—F. C. B., Jr.

ing individual fighter pilot initiative and imagination, they want conformity and predictable compliance with GCI direction. To emulate this practice, each of the Aggressor squadrons has seven GCI controllers organic to it. This is unique in the US Air Force. The GCI controllers earn qualification through the Adversary Tactics Controller Course. Conducted at Nellis, it encompasses seventy-seven academic hours, plus participation in twenty-two air-to-air missions. Each of the controllers also gains certification in a specific subject.

The result of the training of Aggressor fighter pilots and GCI controller instructors is a unique cadre. It consists of skilled, mature, operationally experienced individuals who can instruct others from the Soviet point of view. This requires considerable mental discipline and flexibility.

Attesting to the Aggressors' achievement of their goals is the increased confidence among the American fighter forces and those who evaluate them. Gen. W. L. Creech, Commander of TAC and responsible for the tactical air forces, says: "The Aggressors meet a critically important need. I am convinced that their rigor and skill in emulating adversary tactics will significantly shape our overall success or failure in actual air combat. They are pros at their work—no doubt about it—and I am very proud of the job they are doing."

The training is an emulation of what our fighters will meet when they engage Soviet or Soviet-trained adversaries. They make possible the criterion for US tactical fighter forces: to train the way they plan to fight.

Looking Ahead

What does the future hold for USAF's Aggressors? Certainly continuation of their successful deployments with operational squadrons, possibly expanding the number of flying hours as budget constraints permit. Also, they plan continued development of tactics and equipment through dissimilar air combat with the 57th FWW's Tactics and Testing organization at Nellis, as well as steady participation in dissimilar air combat in the Red Flag exercises. Those are certain; an issue arising now is where the Aggressors will go from here in equipment terms.

Certainly, Soviet fighter development has not stood still since they fielded the MiG-21, which first flew in 1956. It is now the most numerous fighter aircraft in the world, serving in thirty-six air forces. The more modern MiG-23 "Flogger" is now deployed in large numbers in Soviet and bloc forces, including Cuba, and soon the Russians will field even newer fighters. In fact, at least four new models are nearing production decisions, and three of them are swingwing types like the MiG-23.

Before long, then, the Aggressors will need a more advanced aircraft than the F-5E to emulate accurately the newer Soviet fighters. While it is premature to speculate on what such a follow-on aircraft might be, it is useful to examine the criteria it should meet. A follow-on Aggressor aircraft should emulate the foe as precisely as possible, including aircraft maneuvering and avionics performance in particular. If the performance gap is too wide, the training value is significantly downgraded.

While that matter is being decided, the Aggressors can be counted on to continue honing the sharp edge of the tactical air forces. They are a national asset whose value increases with every engagement. ■

ABOVE: Lt. Col. Mike Press, CO of 65th Aggressor Squadron, reconstructs and dissects the aerial engagements flown during the mission described here, in order to make the teaching points to be learned from the flight. LEFT: Lt. Col. Skip Harbison continues the debriefing and reconstruction, using precise symbology developed by the Aggressors.

When a design results in more than 3,500 production aircraft, it combines merit with evolvability. Such is the case with the F-5/T-38, whose design is a quarter-century old.

F-5 Design at Twenty-Five

USAF's T-38 Talon aircraft first flew on April 10, 1959, and production aircraft became operational in USAF service in March 1961. So April 1982 could be considered the Talon's twenty-third anniversary, or just past its twenty-first birthday in service. In fact, the design from which the T-38 and its F-5 fighter sister ship first flew was put into final form twenty-five years ago.

The F-5/T-38 design is one of those that, like fine wines, mature and improve with age. The original design met all customer specifications and was so well conceived that a whole string of later performance improvements, modifications, and refinements have been accommodated. And, although the latest versions look to the unaided eye very much like the first F-5, their capabilities and performance are much improved.

The genesis of the F-5/T-38 design was a look ahead by Northrop leadership in 1954. At the time, the company had the F-89 Scorpion in production and air defense service, and was determined to design an airplane for follow-on markets. Therefore, under a company-funded design effort, Northrop's advance thinkers began with a "blank sheet of paper."

From that beginning in early 1955, the design—known as the N-156—evolved and became the basis for the F-5/T-38 final design in early 1957. Thus the twenty-fifth anniversary.

The design culminated in the granting of Patent No. 187,405 and eventually in prototype and production aircraft. The total production figure for all versions of F-5 and T-38 through March 1982 is 3,545.

According to Lee Begin, Northrop's Vice President, Advanced Programs and Planning, and a member of the original design team, several developments in technology occurred nearly simultaneously and contributed to the success of the N-156 design. First was the availability of the General Electric J85 engine with its 7:1 thrust-to-weight ratio. That was a high figure then, and still represents a superb achievement in engine design.

Second was the recognition of the Whitcomb Area Rule. The so-called "Coke-bottle" indentation of the fuselage permits efficient transonic penetration and supersonic flight. Third, the basic wing design (nominally straight) allows excellent handling stability and control in both the subsonic and supersonic regions. Its design allows the pilot to retain both pitch and roll control after a stall begins. In addition, chemical milling of aircraft structures was just becoming feasible. That allowed construction with strength while reducing overall weight.

The aircraft found a ready market in USAF's requirement for a supersonic-capable trainer and front-line fighter for allied and friendly nations. As they say, the rest is history.

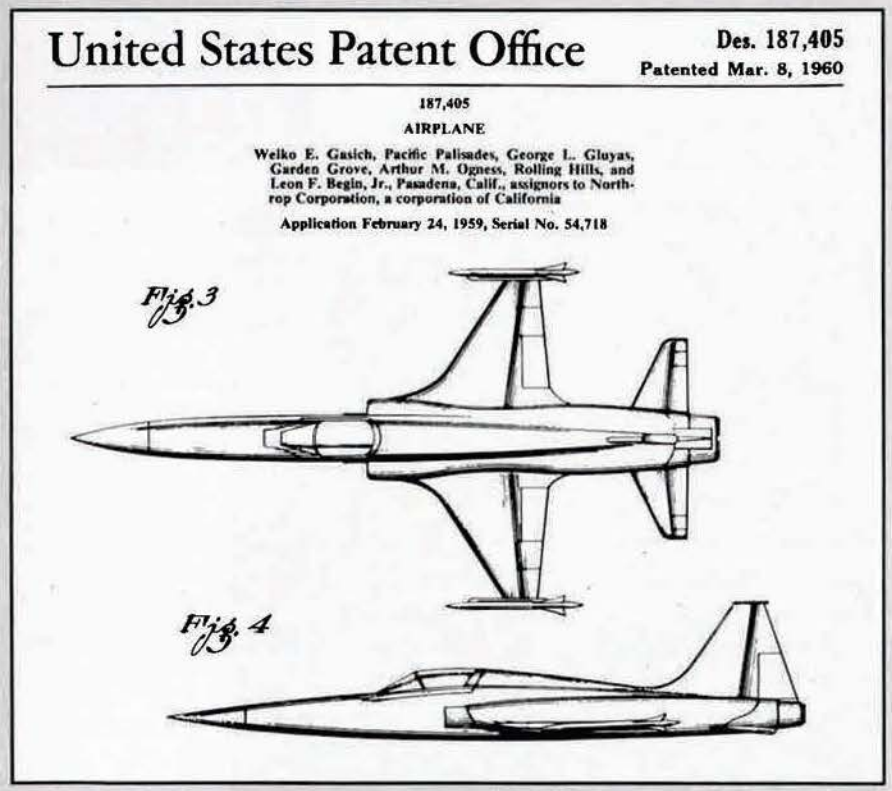
The wing shape, incidentally—nominally straight—has continued through all versions of the F-5 through the F-5F, and in the Northrop family to the YF-17 (then F/A-18) and the F-5G designs. The main visible variant on the wing design is the addition of leading edge extensions. In the E and F models, the extensions add fifteen percent more lift; in the F-5G they add thirty percent more lift, compared with the original design.

—F. C. B., Jr.

F-5/T-38 Production to March 1982

T-38	1,187
F-5A	906
F-5B	293
F-5E	997*
F-5F	162*

*NOTE: Production continues at rate of four to five per month. Also in production: RF-5E and F-5G.



United States Patent Office

Des. 187,405
Patented Mar. 8, 1960

187,405

AIRPLANE

Weiko E. Gasich, Pacific Palisades, George L. Gluyas, Garden Grove, Arthur M. Ogness, Rolling Hills, and Leon F. Begin, Jr., Pasadena, Calif., assignors to Northrop Corporation, a corporation of California

Application February 24, 1959, Serial No. 54,718

Fig. 3

Fig. 4

Reproduction of the patent drawings as granted in 1960 shows the timeless quality of the design.

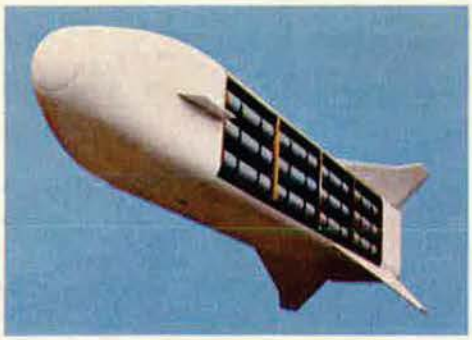
Low Altitude Dispenser

LAD

Provides safe, LOW-COST, stand-off submunitions delivery.

Brunswick's LAD is a *flight proven* advanced development program for the U.S. Air Force. LAD will provide *low-cost*, submunitions delivery with maximum survivability for *high-value* aircraft. The system will compute its own trajectory, either pre-mission or at launch. Launched below radar coverage LAD will climb behind the delivering aircraft fulfilling requirements for both direct attack and standoff delivery. LAD will fly off axis and down range to dispense its armament.

LAD is a fire and forget delivery system travelling by inertial navigation to its target using locating information made available from the delivering aircraft. LAD is most effective in defeating key threat targets such as masses of armor, entire air defense sites and airbases including all support facilities by delivering large submunition patterns with destruction of everything within its footprint.



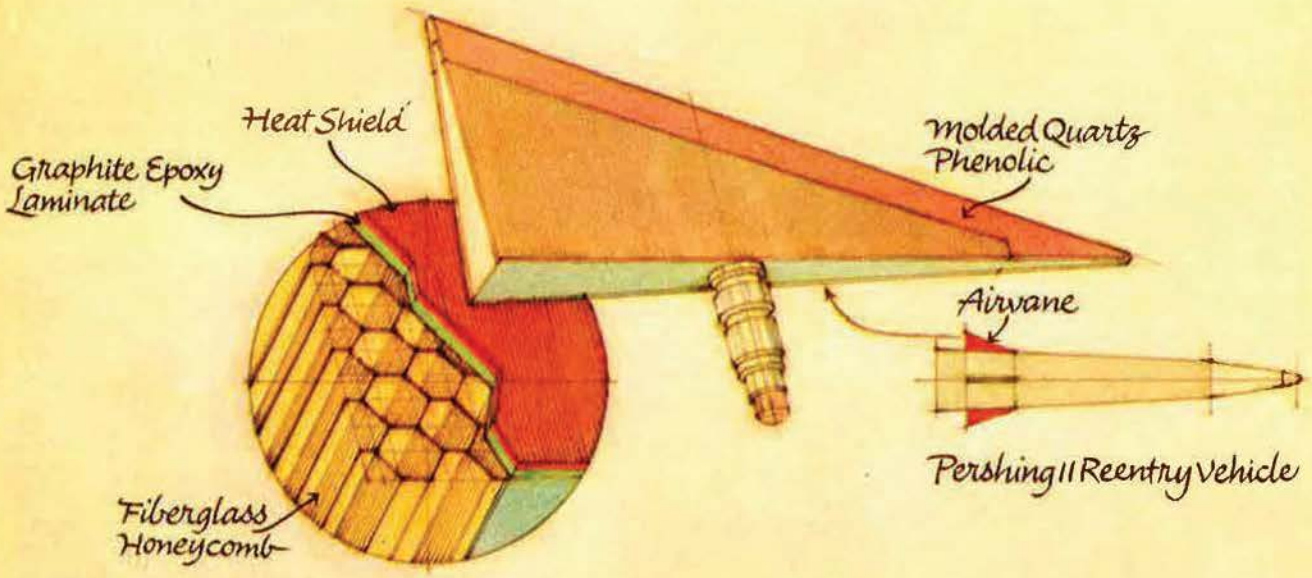
Brunswick Defense—versatile technologies for defensive systems. For further information contact Marketing Director, Brunswick Corporation, Defense Division, 3333 Harbor Boulevard, Costa Mesa, CA 92626. Phone (714) 546-8030.

BRUNSWICK DEFENSE

Brunswick Corporation, Defense Division • One Brunswick Plaza • Skokie, Illinois 60077 • (312) 470 4700

How do you approach tomorrow's systems problems?

Start solving them today.

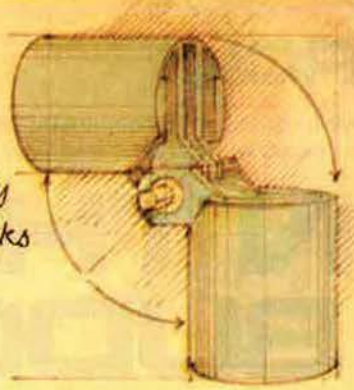


Composite Pershing II Airvane
25% weight saving increases performance of reentry vehicle.

Reducing weight while increasing serviceability and strength are prime requisites in future defense and aerospace systems.

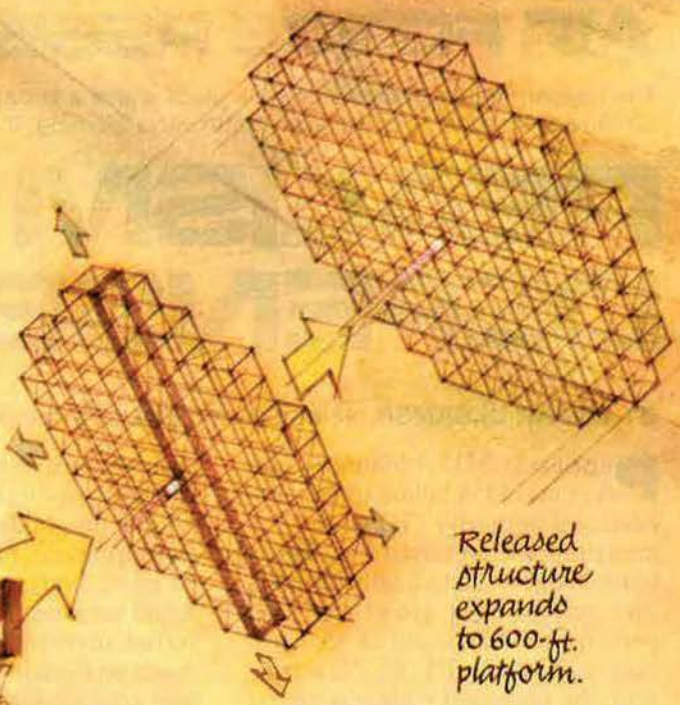
Looking toward this need, Martin Marietta is combining new production technologies with innovative design and testing techniques for graphite/epoxy composites.

For example, unique arrangements of many different composite fabrics and honeycomb materials are involved in the precision manufacture of fan reversers for the next generation of commercial transports and their military counterparts.



Mid Link
Hinge Assembly

Unfolds and locks into place to expand space structures.

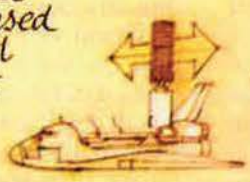


Released structure expands to 600-ft. platform.

Expandable Space Structures

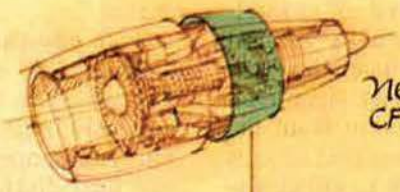
Packaged for Space Shuttle and released by remote control to unfold in orbit.

Package opens for deployment

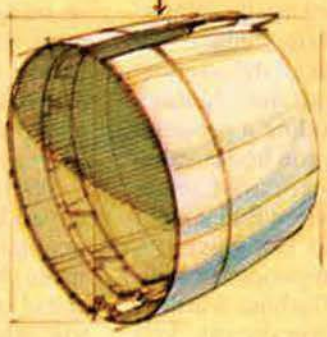


26-ft. module rises to vertical

Shuttle opens cargo doors



Next generation CF6-80C engine



Advanced-composite Transcowl for Fan Reversers

Meets fuel-saving and noise reduction requirements for new widebody jets.

Composites also play an important role in the Navy Vertical Launch System (VLS) and the Air Force mobile MX missile. And we're conducting independent research and development programs on the use of composites in large orbiting space structures.

In more than 30 years of developing successful systems, we have backed the vision of our people with the facilities to transform concepts into realities. Composites are but one case in point.

MARTIN MARIETTA

Martin Marietta Aerospace
6801 Rockledge Drive, Bethesda, Maryland 20034 U.S.A.

AIR FORCE RESEARCH

The Reagan Administration's defense plans signal a strong move to further its commitment to revitalizing national security. With controversy looming, this year bears witness to . . .

REALISM IN THE DEFENSE BUDGET

BY EDGAR ULSAMER, SENIOR EDITOR (POLICY & TECHNOLOGY)

PEGGED at $215.9 billion in outlays and $258 billion in total obligational authority (TOA), the Administration's proposed FY '83 Defense budget is statistically formidable, reflecting a growth of 10.5 percent in outlays and of 13.2 percent in TOA over FY '82. Nevertheless, the proposed budget is sparse and confined to the "minimal" requirements of America's national security, according to Deputy Secretary of Defense Frank C. Carlucci. The proposed funding, he told the press and Congress, represents an essential response to the Soviet military buildup that continues unabated and absorbs about fifteen percent of the USSR's gross national product, or more than twice the US ratio. Further, the '83 budget request, in a deliberate departure from past practice, is not underpriced, underestimated, or cosmetically slimmed down by hidden costs, Secretary Carlucci stressed.

The new budget met significant congressional opposition from the outset amid indications that serious attempts will be made to inflict major cuts. As proposed by the Administration, the Defense budget will give the US "enhanced deterrence; support for a strong and vigorous foreign policy, including a program for arms reduction; and better value for the taxpayer," Secretary Carlucci claimed. As President Reagan put it in his message to Congress, "A year ago, every component of military strength was flashing warning of neglect, underinvestment, and deteriorating capability. Today, health is being restored."

The new Defense budget, the Administration asserted, "incorporates several new management and cost-reduction initiatives compared to previous budget submissions. A comprehensive effort was made to identify savings and efficiencies within this budget; major acquisition programs have been budgeted to most likely cost at inception to avoid surprises later on; and higher initial investment in programs is made up front in order to ensure real unit cost savings in the future."

As part of the "reform" aspects of the proposed budget, the Defense Department instructed all program managers to be "more realistic in estimating their costs, even to including reserves for technological uncertainties, changes in contractors' business bases, and other unspecified but unavoidable costs," according to Secretary Carlucci. Procedures for projecting inflation were revised to "reflect more accurately the impact of inflation on specific segments of Defense purchases."

Such adjustments, the Pentagon believes, "do not raise total costs; they will show higher costs up front but avoid larger cost overruns later. This is an important element of the new cost discipline. The increases in budget authority for multiyear contracts, economical production rates, and productivity improvements are an up-front investment in lower unit costs, rather than merely increasing total outlays."

While the result will be higher unexpended balances, the full cost of acquisition decisions will be kept more visible. To the extent that these initiatives accelerate spending, other programs "have been sacrificed or held in the development stage until [DoD] can afford to pursue them in an economical way," according to Secretary Carlucci.

Strategies Driving the Budget

The Annual Report to Congress by Secretary of Defense Caspar W. Weinberger that accompanied the FY '83 budget draft sets forth in detail the global strategies the Reagan Administration plans to pursue. In the strategic nuclear arena the US seeks a force posture "such that, in a crisis, the Soviets will have no incentive to initiate a nuclear attack on the United States or our allies. US forces will be capable under all conditions of war initiation to survive a Soviet first strike and retaliate in a way that permits the United States to achieve its objectives." Special emphasis is on "enduring survivability" of the force, rather than on a "facade" of maintaining a simplistic symmetry between US and Soviet forces in terms of "some superficial tally of missiles or aircraft deployed in peacetime."

Pointing out that "this Administration must cope with the severe inadequacies it inherited in the realm of strategic and other nuclear weapons," the Annual Report finds advantages in the fact that the President had to decide how to replace or expand all major elements of the US strategic forces: "It permitted us to shape our strategic nuclear force as a coherent instrument responsive to national policy and to eliminate some dangerous contradictions between the capabilities of our nuclear forces and the objectives of our policy."

The purpose of the strategic nuclear forces, in the view of the Administration, is to deter nuclear attack on the US and its allies; help deter major conventional attack against US forces and our allies, especially in NATO; impose termination of major war—on terms favorable to the US—even if nuclear weapons have been used, and in particular to deter escalation in the

level of hostilities; and to negate possible Soviet nuclear blackmail against this country and its allies.

Arms control, an ancillary element of nuclear strategy, stands in jeopardy because a "set of facts has come to light that creates a most serious problem for any new arms agreement with the Soviet Union," Secretary Weinberger reported to Congress. Citing detailed evidence that suggests Soviet violations of the Biological Weapons Convention, he asserted that "cosmetic agreements—those that would merely legitimize a further buildup of Soviet military power—are not in our national interest."

So far as conventional warfare capabilities are concerned, the Administration believes that "our overall defense effort . . . must be based on much broader and more fundamental judgments than some arbitrary and facile assumptions about the number of 'wars,' or fronts, that we must be prepared for." Warning against confusing the defensive orientation of this country's peacetime strategy with the tactics and strategy that would confront an attacker under war conditions, he stressed the wisdom of "counteroffensives at places where we can affect the outcome of the war." Counteroffensive thrusts that offset the enemy's attack "should be launched against territory or assets that are of an importance to him comparable to the ones he is attacking."

Pointing out bluntly that the Soviet empire is vulnerable because "unlike our alliance, [it] is not a voluntary association of democratic nations," he said that "our plans for counteroffensive in war can take account of such vulnerabilities on the Soviet side." Secretary Weinberger told Congress that "strategic planning for counteroffensives is not provocative. It is likely to increase the caution of the Soviet leaders in deciding on aggression, because they will understand that if they unleash a conventional war, they are placing a wide range of their assets—both military and civilian—at risk."

In a marked departure from past defense policy, the Administration rejects assumptions that conventional wars will be "short wars," because, as Secretary Weinberger put it, "common sense and past experience tell us otherwise. I have, therefore, instituted changes in defense policy to correct this fallacy." He added that "deterrence would be weakened if the enemy were misled to believe that he could easily outlast us in a conventional war. In particular, for a vulnerable and vital region like Southeast Asia, a US strategy that promised our adversaries a 'short war' could be an invitation to aggression."

. . . the '83 budget request . . . is not underpriced, underestimated, or cosmetically slimmed down by hidden costs.

Among the initiatives meant to correct the "short war" syndrome of the past are improved sustainability for US forces, a strengthened capability to expand defense production, and appropriate changes in strategy and tactics, according to the new Defense Report.

Building on President Reagan's tenet that "the West won't contain communism, it will transcend communism," the Administration's long-term strategy is an amalgam of military and economic policies with two specific objectives: "First, [US geostrategic policy] must bring to a halt the further expansion and consolidation of the Soviet military empire, whether this expansion would proceed through direct Soviet military intervention (as in Afghanistan) or through less direct intervention (as in Angola, Nicaragua, and elsewhere). Second, our strategy must see to it that the productivity and technological creativity of the free societies are not exploited to make good the chronic deficiencies of the Communist system."

Secretary Weinberger's report to Congress warned pointedly: "If the economy of the Soviet empire is propped up by Western credits, the Soviet Union is enabled to divert more of its resources to its military buildup. If the Soviet Union earns foreign currency by exporting raw materials to our allies, it can purchase more equipment to facilitate its arms production and give more to its client states. If it continues to obtain advanced technology from the West, it can later threaten us with advanced weaponry."

Summarizing the Administration's long-term defense policy, Secretary Weinberger asserted that "in the nuclear age, more than in any other period of human history, military strategy must be the servant of national policy, a policy that is the ultimate trustee of the nation's interests. But to paraphrase Clausewitz, policy cannot make demands on military strategy that strategy cannot fulfill."

Warning that no defense policy, no strategy, could succeed unless it is supported by military strength, he urged Congress to join the Administration in pursuing "a policy that ensures that our resources are not diverted to strengthen our adversary but instead fully serve the cause of freedom." He argued with incontrovertible logic "that whatever strengthens the Soviet Union now weakens the cause of freedom in the world."

Recognizing that "the best strategic thinking will be of little use unless it can be translated into concrete policy decisions, budgetary choices, and specific strategic plans," the Defense Department, therefore, is taking "initiatives both to improve the translation of strategic thought into policy decisions and utilize intellectual work that can inform and guide our decisions," he reported to Congress. Toward this end, DoD "instituted more flexible and efficient ways of using established outside research organizations and . . . created a new group, the Strategic Concepts Development Center, located at the National Defense University. This Center will take advantage of the rich resources of the National War College and will provide advice to me, the

Deputy Secretary of Defense, and the Chairman of the Joint Chiefs of Staff," Secretary Weinberger announced.

The Five-Year Defense Plan

The Five-Year Defense Plan announced by the Administration in extension of the FY '83 budget request envisions an average real growth rate in TOA of 7.4 percent a year between now and 1987. Expressed in current dollars, the FY '83 Defense budget level is scheduled to increase in TOA from $258 billion to $400.8 billion by FY '87. The corresponding outlay growth would boost the $215.9 billion requested in FY '83 to $356 billion five years hence. As a percentage of GNP, the Defense budget is slated to grow from 6.3 percent to 7.4 percent by 1987.

Even though the Administration proposes to spend $1.6 trillion over the next five years, that total is still less than the $1.8 trillion earmarked for social and welfare programs over the same period. The White House contends that "fears that the Defense budget of this Administration will strain the American economy are unfounded. In the 1950s and 1960s, when defense spending as a percentage of GNP was much larger than today, annual inflation rates ranged from about one to seven percent. Economic studies have found little difference in the effect of defense and nondefense spending on inflation. Defense spending, like other federal spending, produces something which contributes to the people's needs. The very purpose of our economy is to meet the needs of our people."

People, their needs, their training, and their morale are singled out as the top priority of the new budget and Five-Year Defense Plan on grounds that "no military force, no matter how sophisticated its equipment, will be any better than its people." Claiming that the Administration's efforts in this regard have just begun, the new Defense Report asserts that "we can already observe genuine improvements. For the first time in over a decade, force size is beginning to increase: the end strength of the Active and Selected Reserve grew by 80,000 in FY '81 alone. And we plan to continue to make increases of this magnitude for each year through FY '87 so that we can meet our worldwide military needs."

Cautioning that the need for military compensation programs is being obscured by perceptions that personnel costs are rising at disproportionate and accelerating rates, Secretary Weinberger reported that "the share of the DoD budget that goes for personnel (including retired pay) has declined every year since 1975—from nearly sixty percent in FY '75 to forty-one percent of the FY '83 budget outlays. Even with the significant military compensation improvements granted last year, the personnel share of the budget is seven percent less than in FY '81. These costs compare favorably with manpower costs in labor-intensive industries which run about forty-eight percent of expenditures."

The military pay rate assumptions of the just announced Five-Year Defense Plan drop from an annual percentage increase of 14.3 percent in FY '82 to eight percent in FY '83, 7.6 percent in FY '84, 5.5 percent in FY '85, and hold steady in FY '86 and FY '87 at five percent. The percentage boost for military retired pay drops from 6.6 percent this year to 6.5 percent in FY '83 and is envisioned to decline to 2.9 percent by FY '86.

The manpower levels of the active-duty force, including full-time Reserve and Guard, increase from 2,132,000 this year to 2,189,000 in FY '83. This increase includes a boost by 19,000 slots to 600,000 for the Air Force. Civilian employment of the Air Force, however, is scheduled to drop by 4,000; the other services and the Defense agencies, by contrast, are authorized to increase civilian employment. Total DoD manpower, including military and civilians, is to reach 3,224,000 in FY '83. This total, combined with the employees of defense-related industry, brings total Defense manpower to 6,086,000 by FY '83, according to the Administration's forecasts.

Readiness and Sustainability

About twenty-three percent of the proposed FY '83 budget goes to strategic and other nuclear forces. The remainder, or seventy-seven percent, is subdivided to defray the cost of military pay and allowances; research and development as well as acquisition of weapon systems and equipment; ammunition, spare parts, fuel, and other consumables; and other operations, maintenance, and support costs.

Among these, two broad categories get special attention in the FY '83 budget request: readiness and sustainability. The emphasis here is on increased funding for war reserve stocks, fuel inventories, ammunition, and depot maintenance. Fuel inventories are to be increased by about seven percent to ensure adequate supplies for readiness-related training levels without drawing down war reserve fuel stocks. The ammunition budget provides increases for training consumption, the introduction of new munitions, and increased war reserve ammunition stocks. In addition, there is a thirty-nine percent increase in ammunition production base support to provide modernization, expansion, and maintenance of the ammunition industrial base.

A cardinal goal, Secretary Weinberger told Congress, is to attain as soon as possible a level of combat sustainability "at least equal to that of the threat we face." Under this policy, he explained, "procurement of stocks needed for immediate combat sustainability has nearly as high a budget priority as . . . readiness. Beyond that, we will continue to increase our war reserves gradually so that those inventories, com-

People, their needs, their training, and their morale are singled out as the top priority of the new budget . . .

plemented by a broader and more responsive industrial base, will give us the capability to sustain our combat forces for the likely duration of conflict."

Conventional Force Expansion and Modernization

The new budget places heavy emphasis on modernization and expansion of the US Navy, setting a goal of 600 deployable battle-force ships by the end of this decade. Also, authorization and funding are requested this year for two nuclear-powered aircraft carriers of the *Nimitz* class.

In the area of tactical airpower, the new Five-Year Defense Plan envisions a relatively rapid modernization program resulting in an Air Force inventory of 4,800 tactical aircraft with an average age of 10.8 years. For the Navy and Marine Corps, the force will increase from roughly 1,770 to 1,930 aircraft, a nine percent increase, while average age will decline from 10.2 to 9.6 years. This modernization program, the report claimed, represents an important step toward meeting the ideal average age for the US tactical aircraft inventory—ten years for the Air Force aircraft and 7.5 years for Navy aircraft.

As a function of total DoD investments proposed for FY '83, air warfare and related command control communications and intelligence (C^3I) capabilities absorb about 12.6 percent, compared to 23.4 percent for sea warfare and related C^3I. Comparable values for the 1983–87 period are 14.1 and 25.0 percent, respectively. By the 1990s, Secretary Weinberger reported to Congress, "we propose to expand the Air Force from its present level of approximately thirty-six notional wings to more than forty. At the same time, we plan to increase our Navy active carrier wings from twelve to fourteen."

The Air Force plans to procure twenty A-10s, forty-two F-15s, and 120 F-16s in FY '83. The F-15 procurements will make possible the retirement of obsolete aircraft from the active CONUS air defense forces; the F-16 buy aids in the modernization of the active and reserve forces. The F-16s are slated primarily to replace F-4s in the active force; the F-4s, in turn, will be used to replace older aircraft in the Air National Guard and Air Force Reserve. One Guard and one Reserve unit will receive F-16s in FY '84. By the end of that year, twenty-two percent of the fighter aircraft in the reserve forces will consist of A-10s and F-16s.

The acquisition of aircraft at efficient and economical rates is a prime concern of the new budget proposal. By FY '85, F-15 procurement is scheduled to reach ninety-six aircraft per year and in the following year F-16 production rates are to climb to 180 aircraft annually. In the case of the F-15, the original procurement program of 729 aircraft has been increased to 1,107 units by FY '87, and there are tentative plans to continue its acquisition into the 1990s.

Development funds are being made available for a ground support derivative of the F-15 that is to feature enhanced range, payload, and delivery capabilities. Similar plans are in store for the F-16 with the intent of conducting a "competition between the F-15 and F-16 air-to-surface derivatives," only one of which may be chosen for acquisition, according to Secretary Weinberger. In the period 1982–85, 480 F-16s will be procured under a multiyear acquisition program, and there are plans to acquire additional aircraft of this type at an annual rate of 180 units in 1986 and beyond.

Secretary of the Air Force Verne Orr and Gen. Lew Allen, Jr., USAF's Chief of Staff, reported to Congress in a joint statement that "the growth potential of the F-15s and F-16s provides a solid foundation for continuing force modernization. By modifying both these aircraft we will be able to maintain their margin of superiority in the next decade and avoid the high costs of developing new aircraft. The multinational staged improvement program makes it possible for the F-16 to accommodate the advances in weapon systems and sensors necessary to meet the mid- to late-1980s threat. A similar staged improvement plan for the F-15 has also been initiated to upgrade its radar, communications, electronic warfare, and armament systems."

They added, however, that by the early 1990s, these designs "will be twenty years old and . . . approaching the limits of feasible modification. Therefore, to meet expected threats and evolving mission needs in the 1990s and beyond, we must begin work now on a new generation fighter aircraft." The FY '83 budget proposal includes some $27 million for concept exploration and validation work, including initial development of an advanced technology engine for such a new fighter.

Other investments proposed by the new budget that enhance tactical airpower capabilities include some $123 million for LANTIRN (low-altitude navigation and targeting infrared system for night) that is to assist F-16 and A-10 aircraft in penetrating enemy defenses at low altitude and in finding and destroying enemy targets at night and in bad weather. Tactical C^3I is boosted by the acquisition of two E-3A AWACS aircraft and long-lead funding for yet another unit. In the Electronic Combat (EC) arena, the budget funds the last nine of a programmed forty-two EF-111As that counter Soviet early warning, acquisition, and ground control intercept radars, along with a host of other pertinent programs.

This country and its allies lack an effective chemical warfare (CW) capability, while the Soviet Union deploys large and well-equipped CW forces. Soviet forces train extensively for chemical warfare, including the use of live agents, according to Secretary Weinberger. The Air Force's CW program is to offset these Soviet capabilities by correcting current deficiencies. The importance of this program, according to the Air Force Posture Statement, "cannot be overemphasized. Until we have a viable CW capability, our theater forces remain at risk."

In addition to correcting deficiencies in terms of defensive capabilities, the USAF CW program funds "major research and development efforts to design more effective and comfortable equipment. These include improved, 'breathable' fabrics for overgarments, more sensitive detection devices, improved decontamination equipment, and collective protection systems."

The Air Force's budget request points out further that "as with nuclear weapons, deterrence of CW requires a viable offensive capabili-

ty. Our present capability is limited due to the lack of usable munitions and the need for additional persistent agent weapons. We must speed the development and procurement of binary weapons such as the Bigeye chemical spray bomb. Binary weapons, which do not contain toxic substances until the components are mixed, give us both required offensive capability and safe handling characteristics."

Improved Mobility and Force Modernization

The Administration's long-term goal, Secretary Weinberger told Congress, "is to be able to meet the demands of a worldwide war, including concurrent reinforcement of Europe, deployment to Southwest Asia (SWA), and support in other areas of conflict. In building toward this goal, mobility forces will be acquired first to meet the intertheater and intratheater demands of each theater independently, and then to meet the demands of concurrent deployment."

The Air Force Posture Statement elaborates on this point: "The global character of US interests and commitments makes it imperative that we maintain forward deployed forces and be able to deploy effective combat forces worldwide with great dispatch. The fact that many of our allies and areas critical to the West are close to the USSR and far from the United States places added demands on our mobility forces." As a result, the FY '83 budget request places a premium on improving the mobility and force projection capabilities of the Air Force and the other services.

As a recently completed mobility study that had been requested by Congress brought out with stark clarity, a critical shortfall in airlift capacity seriously impedes US rapid deployment and reinforcement capabilities. The Defense Department concluded from this study that additional KC-10 tanker/cargo and C-5B cargo aircraft are required. The new budget request funds eight KC-10s and two C-5B aircraft. Overall, the Air Force allots about $5 billion for mobility-related programs. USAF's Posture Statement explains that forty-four additional KC-10s and fifty C-5Bs are to be acquired over the next few years. Programs to modify existing airlifters are to be continued concurrently.

Prepositioning of Air Force wartime materials and equipment is to intensify in the coming year, with emphasis on NATO and Southwest Asia. The European program will preposition equipment for tactical fighter forces. The Southwest Asian prepositioning program provides funds for procurement, transportation, storage, and maintenance of mobile bare-base kits, resupply, and ammunition.

Hand in glove with boosts in prepositioning and airlift enhancement are Air Force initiatives to increase aerial refueling capacity. The current tanker fleet of 615 operational KC-135As is to be augmented by a force of sixty operational KC-10s "to provide air refueling and cargo support for long-range strategic airlift and tactical deployments," the Air Force reported to Congress.

Another measure to boost aerial refueling capacity for both strategic and conventional warfare missions is to reengine KC-135A aircraft. The Air Force plans to reengine 300 KC-135As over the next five years by equipping them with modern CFM56 engines. This modified aircraft, designated the KC-135R, will be able to do the job of one and a half KC-135As and have a useful service life well into the next century. Reengining will provide increased operational flexibility since the modified aircraft can operate from shorter runways.

Between twenty and twenty-five reengining kits are to be acquired in FY '83. The first production aircraft was modified in February of this year, and the total developmental effort will be completed after flight-testing the first production aircraft in mid-1983.

The new budget increases the Air Force's contributions to the Rapid Deployment Joint Task Force in a number of ways. Several Air Force units have been earmarked for deployment in RDJTF contingencies. Included are four tactical fighter wings; a Strategic Projection Force (SPF) composed of bombers and supporting tankers; and airlift, reconnaissance, air rescue, and combat communications units. The combat readiness and sustained fighting capabilities of these units were increased by allocating munitions and spare parts from other units.

The Air Force Posture Statement asserts that USAF's ability to respond in RDJTF contingencies is hampered by mobility deficiencies, inadequate access to support facilities in potential conflict areas, and shortage of advanced munitions. Three initiatives are meant to allay these problems. The SPF Contingency Support Package funds exercises and procures supplies and equipment to enable that force to operate under austere conditions. Also, about $280 million is being allocated for facility construction in Southwest Asia, consisting in the main of runway and taxiway improvements and munitions storage facilities for airfields in that theater. Lastly, $110 million was earmarked for a range of mobility support equipment.

In its analyses and actions the Defense Department recognizes the symbiotic relationship between airlift and sealift. Secretary Weinberger's Annual Report explains that "over the course of a conflict, sealift would be the primary provider of strategic lift in terms of tonnages delivered. However, during the critical early periods of conflict, before sealines of communications are established, airlifts and prepositioning would be our primary means of rapidly deploying and sustaining combat forces."

In the SWA theater, adverse geographic and climatic conditions, combined with the limited availability of airfields and ports, conspire against the RDJTF's task and place a premium on intratheater airlift, he told Congress. Without enhanced intratheater mobility, "we could be forced to concentrate on less defensible locations near major airfields and seaports, rather than in key defensive positions of our choosing," Secretary Weinberger said. While the FY '83–87 program adds airlift at an accelerated rate, he said, "it does not satisfy entirely our future airlift requirements. As we refine our long-term requirements and design future mobility programs, we will continue to evaluate new designs, including the C-17 [the inter/intratheater airlifter recommended by the Air Force], that enable us to increase the capability, responsiveness, operational flexibility,

and reliability of our airlift forces."

Sealift enhancements include conversion of eight high-speed (thirty-three-knot peak) SL-7 sealift ships to roll-on/roll-off (RO-RO) cargo-handling configuration. Secretary Weinberger's report on RDJTF improvements also disclosed that, effective January 1, 1983, the RDJTF Commander will become Commander in Chief (CINC) of a Unified Command for SWA, reflecting the "importance we have placed upon SWA and our ability to deter or oppose Soviet aggression in the region."

Strategic Forces

Over the next five years, 18.5 percent of all Defense Department investments is allocated to modernization and maintenance of the strategic nuclear forces and related C³I functions. During the past decade, while US strategic modernization programs were consistently stretched out, reduced, or deferred, the Air Force's Posture Statement points out, "the Soviet Union developed and deployed a steady stream of new, more powerful, and increasingly accurate strategic systems." The Air Force warns of "substantial Soviet superiority in the years ahead" if there is no vigorous US response, and stresses that the "most threatening aspect of the Soviet strategic buildup has been the vast improvement in their ICBM force."

At this time, the Soviet ICBM arsenal consists of 1,398 silo-based missiles carrying in the aggregate 5,540 warheads. The US ICBM force consists of 1,052 missiles carrying 2,152 warheads. Because of the numerical superiority in warheads and their greatly increased accuracy, it becomes "imperative that we develop with dispatch a survivable basing mode for our ICBMs," the Air Force reported to Congress.

Among the short-term actions taken within the strategic nuclear program of the Air Force is the replacement of fifty Minuteman IIs with a like number of Minuteman IIIs "to help offset the decrease in strategic capabilities resulting from the phaseout of the Titan IIs," the Posture Statement disclosed. A significant portion of the strategic force modernization program—about $4.5 billion—is allocated to MX. Of this total, about $1.5 billion goes to the acquisition of nine missiles. Research and development work on long-term survivable basing options is being funded to the tune of $310 million and includes: deployment of MX aboard a new, long-endurance continuous patrol aircraft; deep basing of the missiles several thousand feet underground; and ballistic missile defense, possibly in association with some form of "deceptive basing." In the interim, while a long-term survivable deployment mode is being developed, the Administration has decided to deploy a minimum of forty MX missiles in existing Minuteman silos.

. . . the FY '83 budget request places a premium on improving mobility and force projection capabilities of the Air Force . . .

The Army, in step with the Air Force's MX program, is slated to invest about $930 million in ballistic missile defense (BMD) in FY '83. Secretary Weinberger cautioned that "today's BMD technology is not adequate to defend against Soviet missiles," adding there are questions about how well such systems will be able to work, what they will cost, and "how additional Soviet ballistic missile defenses—which would almost certainly be deployed in response to any US BMD system—would affect US and allied offensive capabilities." Nevertheless, OSD announced that the Army's "Low-Altitude Defense [LoAD] program will be restructured to accelerate development of an advanced terminal defense for ICBMs. Work will continue on the exoatmospheric overlay program to provide a 1990s response to unconstrained growth in Soviet reentry vehicles."

The new budget request funds a three-pronged program to modernize the strategic bomber force. Over the near term, the Air Force's 151 B-52Gs and ninety B-52Hs will be retrofitted with a new Offensive Avionics System and equipped with approximately 3,000 cruise missiles. As the penetration capability of these bombers declines during this decade, they will transition from penetrators to a "shoot-and-penetrate and eventually a pure standoff delivery role." More than $1.8 billion is sought by the Air Force in FY '83 for B-52 modifications and cruise missiles.

Step two in USAF's bomber modernization program involves the production of 100 B-1Bs. FY '83 funding of this program is pegged at $4.787 billion and provides for the acquisition of seven aircraft. Initial operational capability (IOC) of the new bomber is scheduled for 1986.

The third element of the bomber program involves development and production of an Advanced Technology Bomber (ATB or "Stealth"), with IOC expected in the 1990s. The funding levels sought for this program were not announced for security reasons. USAF's Posture Statement stressed that "we are proceeding with development of the ATB at the fastest reasonable pace. We recognize that it is essential . . . to deploy a bomber that is effective across a range of combat applications and that it be durable and maintainable as well. Our ATB program is designed to meet these objectives. If technology and our development efforts permit, we will try to accelerate this important program. And if problems arise, we are determined to solve them effectively."

The bottom line of the Air Force's FY '83 budget request for $78.6 billion (TOA—up by about $13.75 billion from this year) is captured by this introductory comment of Secretary Orr's and General Allen's statement: "It is the imperative to counterbalance Soviet military capabilities that sets our military requirements and fundamentally sizes and shapes our forces." It is now up to Congress to heed this admonition. ■

AIR FORCE RESEARCH

USAF's DCS for Research, Development and Acquisition recently answered AIR FORCE Magazine's questions about the FY '83 Air Force RDT&E budget. Implementing the President's strategic force revitalization program, improvements to command control and communications systems, improved low-level night/adverse weather fighter capabilities, and meeting the urgent requirement for additional airlift are among USAF's priorities.

'IT'S A GOOD BUDGET'

AN INTERVIEW WITH LT. GEN. KELLY H. BURKE,
DCS/RESEARCH, DEVELOPMENT AND ACQUISITION, HQ. USAF

SINCE 1971, the cumulative Soviet military investment (procurement, research, development, test and evaluation [RDT&E] and military construction) has outpaced the United States investment by $440 billion expressed in 1983 dollars. During the same period, the Warsaw Pact military investment exceeded that of the Atlantic Alliance plus Japan by more than $100 billion. To lend some perspective to the significance of these numbers, AIR FORCE Magazine turned to Lt. Gen. Kelly H. Burke, Deputy Chief of Staff/ Research, Development and Acquisition. With his permission, we adapted his 1983 aircraft and missile procurement and RDT&E budget statement to address some of the major issues in this year's Air Force budget. His answers are presented here in response to AFM questions.

—THE EDITORS

★★★

AIR FORCE Magazine: First of all, General Burke, what do these figures really tell us?

General Burke: Although comparisons of military expenditures are useful for illustrating relative trends, it is Soviet hardware and capabilities that form the real basis of our concern. The Soviets have and are continuing to outproduce us in almost every category of military equipment. For instance, they are producing about 1,300 modern fighter aircraft each year, more than twice as many as in all the free world. In addition to growing numerical superiority, the Soviets are fielding systems of increasing quality and sophistication. In Soviet airpower, we are seeing fighter aircraft with increased payload and range and with improved avionics, armaments, and electronic countermeasures. These advances not only enhance their offensive capability, but also are eroding the qualitative superiority we have traditionally relied on to offset the quantitative imbalance.

AFM: How will the programs you are advocating in the FY '83 budget meet this Soviet challenge?

General Burke: Our success in meeting this challenge will, to a great extent, depend on our maintaining a continuing commitment to stronger defense. The Air Force's RDT&E and procurement programs are vital elements within the overall defense program. Through these programs, we will develop and procure the systems needed to redress the imbalance and reverse the erosion of our technological lead. Our Fiscal Year 1983 request is a strong step toward meeting the Soviet challenge.

AFM: Where are you placing the major emphasis on RD&A in this new budget?

General Burke: This budget continues to reflect emphasis on aircraft spares and repair parts to improve our operational readiness and sustainability. However, this has been balanced with continued production of aircraft and other systems. In addition, this budget supports a strong RDT&E program that will provide a foundation for the Air Force of the future. In developing the budget, we have tried hard to take an appropriate balance between near-term and long-term requirements.

AFM: What mission area would you call your number-one priority?

General Burke: Strategic force modernization is one of the highest priority efforts contained in the budget request. It is imperative that we end the relative decline in our strategic capabilities and restore a margin of safety in the US-Soviet strategic balance.

The fundamental objective of our strategic nuclear forces is to deter nuclear attack or the threat of such attack on the United States, our allies, or others whose security is vital to our national interests. This objective is supported by the strategic triad concept—a highly credible, capable, and well-hedged force structure that is designed to deter and, if necessary, respond to a wide range of threats.

The triad consists of submarine-launched ballistic missiles (or SLBMs), land-based intercontinental ballistic missiles (ICBMs), and the bomber leg, which includes cruise missiles and supporting tankers. These forces must be capable of surviving a first strike with a credible counterstrike capability of such magnitude as to deny the Soviets any prospect of a favorable strategic outcome.

AFM: How significant is the shift in our nuclear deterrent force, vis-à-vis the Soviet Union, over recent years?

General Burke: Very. The nuclear superiority we enjoyed for so many years is gone. That edge was a major factor in maintaining stability in the world. Today, however, the Soviets have fielded powerful strategic forces which have markedly shifted the strategic balance in their favor. This shift provides an added incentive for Soviet adventurism, and makes meaningful and equitable arms-reduction agreements more difficult to achieve. Unless the Soviet momentum is checked, we face the ominous prospect of unambiguous Soviet superiority in the years ahead. We must not allow this to happen. In short, we must proceed quickly and resolutely with a

vigorous strategic modernization program.

AFM: Last October, President Reagan announced a broad and coherent plan to revitalize our strategic deterrent posture. What is the Air Force doing to implement this program?

General Burke: The Air Force is responsible for two legs of the strategic triad—land-based ICBMs and the bomber leg. Maj. Gen. Robert D. Russ, my Director of Operational Requirements, has addressed *(see p. 56)* our bomber-modernization plans and rationale, and I will discuss here our land-based deterrent.

The MX missile is being developed to improve ICBM capability through a phased modernization plan. The plan provides for survivability and endurance of the MX over the long term, while taking advantage of the MX's unique capability and flexibility in the near term. Survivability and endurance will be pursued through vigorous research and development on three different basing options: (1) Continuous Patrol Aircraft—a survivable, long-endurance aircraft platform for MX; (2) Deep Basing—deployment of MX in survivable locations deep underground; and (3) Ballistic Missile Defense (BMD)—active defense of land-based MX missiles. Within the BMD option, we will work with the Army to explore various combinations of active defense, silo hardening, and deceptive basing.

The Air Force is responsible for the first two options, while the Army, in cooperation with the Air Force, is responsible for BMD. These development efforts will permit selection of one or more of these options by July 1983, as directed by Congress.

To provide improved capability in the near term, we will deploy a minimum of forty MX missiles in Minuteman silos. Deploying MX in silos is a reasonable and prudent approach for improving the deterrent capability of our ICBM force. Since MX will be ready for deployment in 1986, placing MX in existing silos is the fastest way to improve our capability. MX in silos will also serve as a near-term counterbalance to the growth in Soviet hard-target, counterforce capabilities. Furthermore, the decision to produce and deploy MX in silos will enhance the US position for favorable strategic arms-reduction talks.

In FY '83, we will continue development of MX and procure the first nine missiles and prepare for deployment of MX in silos beginning in 1986. We will also vigorously pursue the long-term basing options.

AFM: What about improvements to our existing Minuteman force?

General Burke: First, we are doing everything necessary to keep the Minuteman force—550 Minuteman IIIs and 450 Minuteman IIs—as ready and reliable as possible.

Second, we will replace fifty of the Minuteman IIs at Malmstrom AFB, Mont., with Minuteman IIIs, which will add 100 warheads.

Finally, we are making a number of improvements including: completion of the Mk 12A upgrade program; continuation of Minuteman communications upgrade; guidance improvements through software improvements; and critical production of lithium batteries to provide extended power.

AFM: Is the Titan II missile system being phased out completely?

General Burke: Yes, for budgeting reasons we will retire the existing fifty-two Titan IIs, which are becoming more costly and difficult to operate and maintain. As part of the President's strategic modernization program, Titan IIs will be deactivated between FY '83 and FY '87. We will make the necessary modifications to maintain the safety and effectiveness of the Titan II system throughout the planned deactivation period.

AFM: The Reagan strategic modernization program also calls for major improvements in our strategic command control and communications (C^3) systems. What are your plans in this area?

General Burke: Command control and communications (C^3) systems are essential to implement strategy, control forces, and employ weapons in modern warfare. These systems support day-to-day operations, provide time-critical warning information to decision-makers, facilitate accurate situation monitoring and allocation of resources in crisis situations, and permit the appropriate and effective employment of military power in wartime. Recognizing the critical role of C^3, the Soviets place heavy emphasis in their doctrine on its disruption.

In response to this growing threat, our primary objective is to increase the survivability, security, and jam-resistance of our C^3 links. Another objective is to improve both the reliability and interoperability of our systems. Finally, we want to use new technologies to meet future threats and satisfy our requirements.

AFM: Could we refocus for a minute and turn to the tactical world and general-purpose forces? What major initiatives are under way here?

General Burke: We are pursuing several programs that will enhance the flexibility, responsiveness, and firepower of our tactical air forces. In the near term, we plan to continue balanced procurement of both the F-15 and F-16 while making evolutionary improvements in their capability.

One of our greatest general-purpose force needs is to increase our capability to operate at night and

General Burke is the Deputy Chief of Staff/Research, Development and Acquisition at Hq. USAF. He has an MS degree in international affairs from The George Washington University, and is a graduate of the Industrial College of the Armed Forces, the Royal Air Force Staff College, the Naval War College, and Squadron Officer School. General Burke, who began his Air Force career as an OSI special agent in 1952, has logged more than 775 combat hours in various aircraft types and has commanded two SAC wings.

under the weather at greater ranges, and with increased payloads. Fortunately, variants of both the F-15 and F-16 offer the potential to redress this deficiency without degrading their air-to-air capability.

While the F-15 is a premier air-superiority fighter, it can perform the air-to-surface mission as well, and with its new conformal fuel tanks, it can deploy worldwide—without tanker support. We are evaluating the development of a two-seat version of the F-15 with avionics and armaments improvements to use its strike/attack capability.

In July of this year, we will begin the flight tests of a new F-16 prototype design incorporating a new cranked-arrow wing. This larger wing will accommodate both increased internal fuel for longer range and the semiconformal carriage of additional weapons.

We plan to conduct a comparative flight evaluation of these F-15 and F-16 derivatives to determine which design best fulfills our need for a two-seat, dual-role fighter.

AFM: Will the Air Force continue to buy more A-10 ground attack aircraft?

General Burke: Our FY '83 procurement of twenty A-10 aircraft completes the planned force of 727 aircraft. All six of the planned USAFE squadrons are now operational. Four of the five planned Air National Guard squadrons are operational, as are two of four Air Force Reserve squadrons. The balance of the squadrons will be operational in FY '83.

AFM: Since one of your greatest needs is to operate at night and under the weather, what else are you doing to open the night window to tactical aircraft?

General Burke: Based on current technological assessments and the need to field a capability quickly, we are planning to procure the LANTIRN system—Low Altitude Navigation and Targeting Infrared System for Night—for our single-seat F-16 and A-10 fighters.

LANTIRN will allow us to capitalize on our fighter force investment by providing a twenty-four-hour, under-the-weather, air-to-surface precision attack capability. It also allows our fighters to penetrate at low altitude, thus reducing exposure to defenses. Also, beyond that, in the Night Attack Program and in the Technology Base mission area, we are investigating technologies that can expand our capability to attack targets in all weather conditions.

At the same time, we are pursuing a number of weapons development and procurement programs to achieve much higher effectiveness through accuracy and lethality, while reducing aircraft attrition through standoff or reduced exposure.

AFM: Do you see a new Air Force fighter aircraft on the horizon?

General Burke: We are planning to develop an Advanced Tactical Fighter (ATF) for the 1990s. In 1983, we will begin work to evaluate potential solutions prior to full-scale development in 1987. Engines have traditionally had the longest development time of all fighter components; hence major emphasis will be placed in this area.

AFM: What about airlift improvements?

General Burke: As you will remember, the Air Force had supported the CX (C-17) as the preferred option to help to redress our airlift shortfall. It was our assumption that funding for airlift would be limited to that already in the 1982 budget. However, during the final review of the FY '83 budget request, we were asked to examine alternatives for earlier acquisition of airlift through increased funding. Specifically, we assessed delivery schedules for both the C-5B and C-17 under the assumption that either could be funded at the fastest prudent pace. Under this assumption, it was evident that the C-5B could be operationally available significantly earlier—at least three years—than could the C-17.

Recognizing our urgent requirement for additional airlift and the availability of additional funding, the Air Force chose the C-5B rather

TABLE I
DEPARTMENT OF THE AIR FORCE
FISCAL YEAR 1983 AIRCRAFT PROCUREMENT ESTIMATES
(In Millions of Dollars)

	QTY	FY '83 ESTIMATES
COMBAT AIRCRAFT		
B-1B Strategic Bomber	7	$ 3,868.1
A-10 Attack Aircraft	20	357.3
F-5F Tactical Fighter	3	28.5
F-15 Tactical Fighter	42	1,602.2
F-16 Tactical Fighter	120	1,958.7
KC-10A Advanced Tanker/Cargo Aircraft	8	790.1
E-3A Airborne Warning and Control System	2	166.3
	202	8,771.2
AIRLIFT AIRCRAFT		
C-5B Airlift Aircraft	2	800.0
European Distribution Aircraft	2	5.0
	4	805.0
OTHER AIRCRAFT		
TR-1	4	156.5
MODIFICATION OF IN-SERVICE AIRCRAFT		2,600.0
AIRCRAFT SPARES AND REPAIR PARTS		3,656.6
AIRCRAFT SUPPORT EQUIPMENT AND FACILITIES		
Common Ground Equipment		332.6
Industrial Responsiveness		147.4
War Consumables		140.8
Other Production Charges		960.5
NATO Airborne Early Warning and Control		186.1
		1,767.4
AIRCRAFT PROCUREMENT, AIR FORCE		$17,756.7

Note: Totals may not add due to rounding.

than the C-17. At the same time, we further recommended the procurement of the remaining forty-four KC-10s for which we had options.

We believe this additional C-5B and KC-10 procurement is the best way to provide substantial near-term improvement to our defense mobility posture. Both aircraft are already in the Air Force inventory, and their training and support elements are in place. The KC-10 is in production and the C-5B can be placed in production in a relatively short time.

We also recommended continuation of C-17 R&D at a low level. We will need additional airlift beyond the fifty C-5Bs for which we are committed, and the C-17 could compete for that purpose. In time, we will also have to consider replacing C-130 and C-141 aircraft, and the C-17 would be attractive for that purpose as well.

AFM: The Space Shuttle has contributed significantly to our nation's ability to explore and work in outer space. As the DoD executive agent for the Shuttle, what are the Air Force's responsibilities?

General Burke: We are developing and producing the Inertial Upper Stage (IUS), which provides the capability to deliver spacecraft from the Shuttle parking orbit to higher orbits. We are also responsible for the development, construction, and operation of the West Coast Shuttle launch and landing facilities at Vandenberg AFB, Calif. Polar and near-polar launches will be conducted from Vandenberg AFB in support of all Shuttle users—civil as well as military. In addition, we are working with NASA to modify their existing facilities and equipment at Houston to meet unique defense requirements.

The importance of our space assets to national security makes it essential that we maintain our current space booster capability during the transition period to the Shuttle. This backup capability will protect against delays or any unanticipated problems while bringing the Shuttle to operational status. These efforts are being supported by our Space Boosters program. We will maintain the critical Titan III production base until the Shuttle's ability to support DoD missions is demonstrated.

AFM: What is the status of the proposed Consolidated Space Operations Center (CSOC)?

General Burke: We are continuing work on the new Consolidated Space Operations Center. CSOC combines two major space missions for DoD: satellite control, and Space Shuttle flight planning, readiness, and command and control. In the role of satellite control, CSOC will provide greater mission responsiveness and increased survivability. In its other role, CSOC will directly control DoD Shuttle missions that require tight security.

AFM: And finally, what is your personal assessment of the Air Force FY '83 budget request and its importance to our overall national security?

General Burke: It's a good budget. I think it represents a balanced approach to meeting the needs of today—looking after our people and providing for high levels of readiness and sustainability—while preparing the Air Force to meet the requirements of the future. ■

TABLE III
DEPARTMENT OF THE AIR FORCE
FISCAL YEAR 1983 RDT&E BUDGET ESTIMATES
(In Millions of Then-Year Dollars)

RDT&E PROGRAM BY MAJOR MISSION AREAS

TITLE	FY '83
Strategic	$ 4,753.1
General Purpose	1,245.9
Space	699.5
Command Control and Communications	706.4
Technology Base	1,135.7
Management, Support, and Defense-wide Systems	1,226.7
Intelligence and Classified Programs	1,453.4
TOTAL	$11,220.4*

*Note: Total does not add due to rounding.

TABLE II
DEPARTMENT OF THE AIR FORCE
FISCAL YEAR 1983 MISSILE PROCUREMENT ESTIMATES
(In Millions of Dollars)

	QTY	FY '83 ESTIMATES
BALLISTIC MISSILES		
MX	9	$1,446.4
OTHER MISSILES		
ALCM	440	664.5
GLCM	120	519.9
AIM-7M Sparrow	1,300	198.6
AIM-9M Sidewinder	1,920	114.7
AGM-65D Maverick (IIR)	2,560	342.6
AGM-88A HARM	206	159.8
Rapier		98.9
Aerial Targets		40.2
	6,546	2,139.2
MODIFICATION OF IN-SERVICE MISSILES		160.0
SPARES AND REPAIR PARTS		274.0
OTHER SUPPORT		
Space Programs		1,297.4
Industrial Facilities		27.2
Special Programs		1,483.7
		2,808.3
MISSILE PROCUREMENT, AIR FORCE		$6,827.9

Note: Totals may not add due to rounding.

AIR FORCE RESEARCH

President Reagan's package of strategic decisions includes several that restore a margin of safety, particularly in the bomber force. This article sets out the . .

RATIONALE FOR STRATEGIC BOMBER DEVELOPMENT

BY MAJ. GEN. ROBERT D. RUSS, USAF

In September 1980, the Ninety-sixth Congress directed the Department of Defense to pursue vigorously full-scale engineering development of a strategic multirole bomber, maximizing range, payload, and ability to perform the missions of conventional bomber, cruise-missile launch platform, and nuclear weapons delivery system in both the tactical and strategic roles. Congress also directed an Initial Operational Capability (IOC) as soon as practicable, but no later than 1987.

In response to this mandate, the Air Force worked closely with the Office of the Secretary of Defense and the Office of the Joint Chiefs of Staff on a joint study to compare the merits of various bomber modernization alternatives.

Concept of a Mixed Force

During the course of this analysis, the Air Force strongly supported the concept of a mixed force of manned penetrating aircraft and air-launched cruise missiles, for we are confident that such a force applies maximum stress on Soviet air defenses. For this reason, we gave high marks to those alternatives that simultaneously improved both these capabilities.

On October 2, 1981, President Reagan announced his long-awaited comprehensive plan for revitalizing our strategic deterrent forces and for restoring a margin of safety in the strategic balance of power. With regard to bomber force modernization, Mr. Reagan's program calls for:

- Modifying newer B-52s (G and H models) to carry cruise missiles and modernizing selected B-52 aircraft to enhance their resistance to the effects of nuclear explosions as well as to improve their ability to survive Soviet defenses.
- Retiring older B-52s (D models) starting in 1982.
- Constructing and deploying some 100 B-1B bombers, a variant of the original B-1 design, with an Initial Operating Capability in 1986.
- Procuring and deploying some 3,000 cruise missiles on B-52Gs, B-52Hs, and B-1Bs.
- Pursuing a vigorous program to develop an advanced technology bomber (ATB) with Stealth characteristics to be deployed in the 1990s.
- Reengining the existing KC-135 aerial tankers to provide increased airborne refueling capabilities.

This program is totally consistent with the Air Force recommendations resulting from the earlier study efforts—recommendations that were carefully formulated to permit needed modernization while at the same time ensuring necessary affordability.

Part of the revitalization plan, ALCM-equipped B-52Gs are now being tested at Griffiss AFB, N. Y. Initial Operational Capability is expected in December of this year.

Two Areas of Cost Avoidance

There are two major areas of cost avoidance associated with the proposed bomber program that are not generally recognized. First, were we to follow original plans and place almost total reliance on our aging B-52 force out to the year 2000, then the cost of this effort, including modifications for cruise-missile carriage and essential improvements, would have exceeded the entire cost of the B-1 program. Second, if we were to follow this course, we would still have eventually been faced with the need to develop and produce a new cruise-missile carrier aircraft to replace the B-52s. The cost of this program alone would again exceed the cost of the proposed B-1 effort.

However, introduction of the more capable B-1B and a follow-on ATB aircraft reduces the ultimate reliance we will have to place on the B-52s as well as the size of the required cruise-missile force. Therefore, we intend to modify only those B-52s required to carry sufficient numbers of these missiles. These reduced modification and procurement requirements, the eventual phaseout of the G and H forces, as well as the programmed retirement of the B-52Ds, results in significant cost avoidance, which goes a long way toward offsetting the burdens of critically needed force improvements.

Features of the B-1B

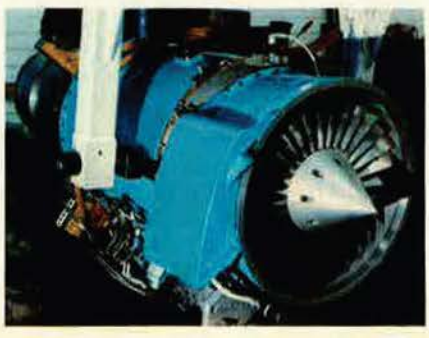
The B-1B itself will be a much

NOVA

High performance, low risk.

The NOVA Trainer offers dramatic capability improvements for the Air Force's Next Generation Trainer (NGT) competition. Rockwell International's North American Aircraft Operations has assembled an airframe/engine combination that will expand the primary trainer envelope while reducing fuel usage over 50% and required maintenance by a third.

The NOVA design concept has evolved from over four years of study and refinement by Rockwell and the Air Force Air Training Command. The recent successful test of the Garrett TFE 76 engine is the latest major milestone in the NOVA development. The TFE 76 engine run underscores Rockwell's dedication to the lowest risk approach to the NGT.

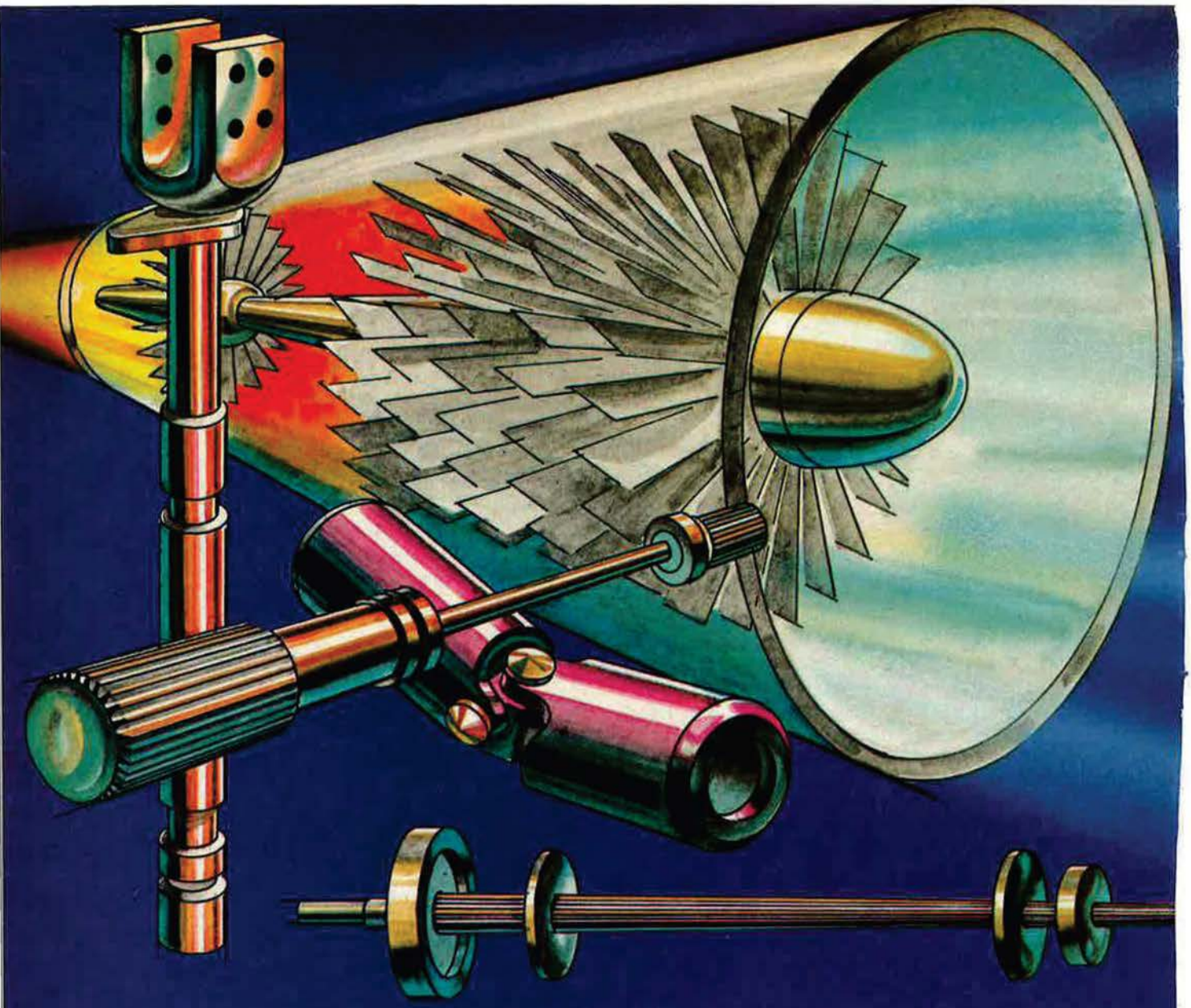


NOVA. It has Rockwell's technical excellence behind it, and a bright future ahead.

Rockwell International, North American Aircraft Operations, P.O. Box 92098, Los Angeles, CA 90009.

Rockwell International

...where science gets down to business



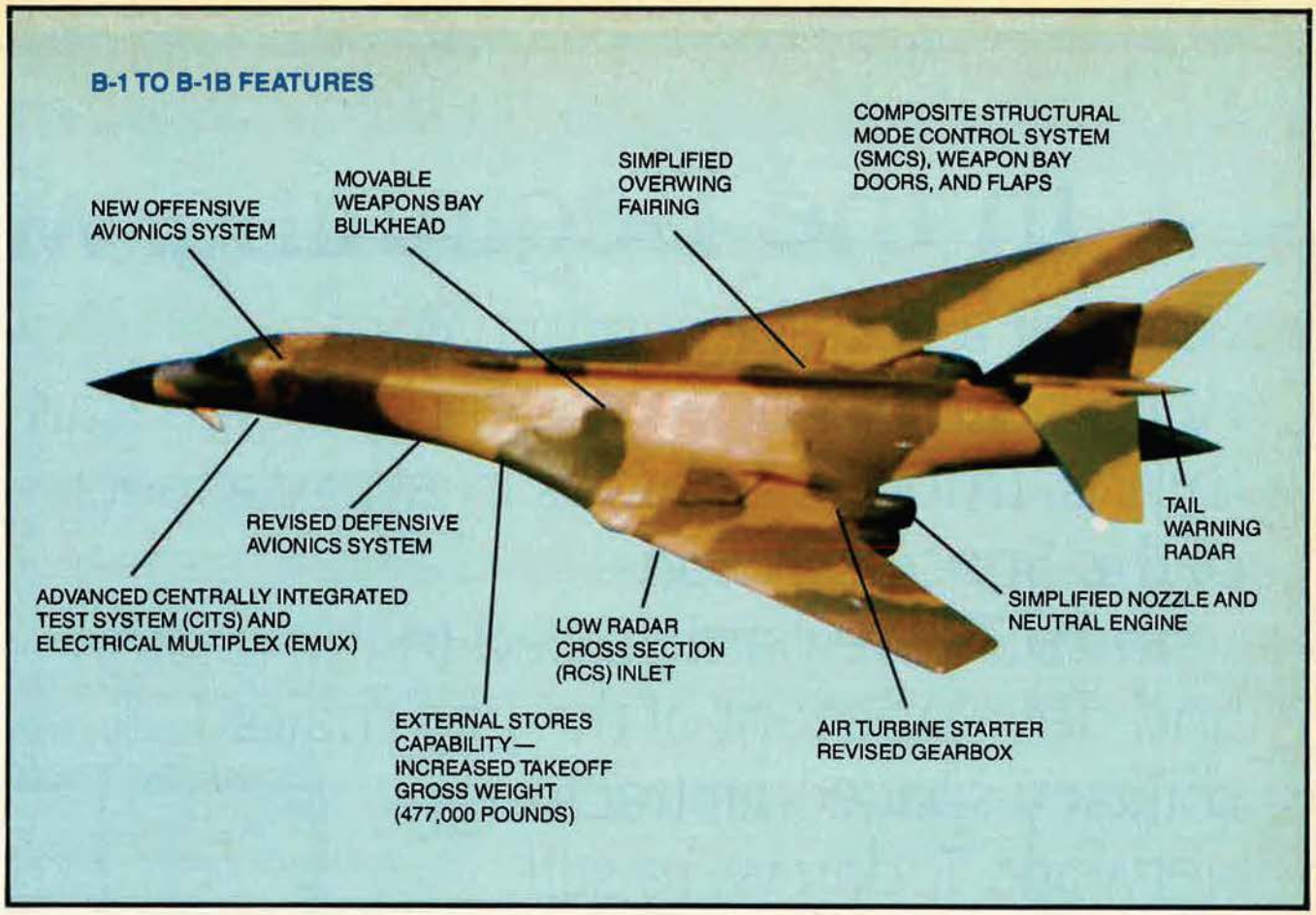
New **cobalt-free** material for high-performance shafts.

VascoMax® T-250

Strength levels to 250,000 psi, combined with greater toughness than carbon-strengthened materials! This 18% nickel maraging steel is a metallurgical breakthrough. VascoMax T-250 is exceptionally stable during heat treatment, with uniform and predictable shrinkage on all dimensions. Rejections due to warpage or distortion during heat treating are eliminated. ☐ Ease of fabrication, strength and ductility, with no distortion and *no cobalt* — that's VascoMax T-250! Put it to work for you.

TELEDYNE VASCO

(formerly Vanadium-Alloys Steel Company)
Latrobe, PA 15650 • Phone 412/537-5551 • Telex 86-6653
Metallurgy is our business



more efficient and capable version of the original B-1. Improvements include simplifications in the airframe and propulsion systems resulting from the decision to use the aircraft primarily as a subsonic bomber. Other additions include a cruise-missile carriage capability, a much improved defensive avionics system capable of countering the most advanced Soviet radars, as well as a much lower radar cross section resulting from application of advanced "Stealth" techniques.

Overall, the new B-1B will represent a significant and long-term addition to our strategic forces. Most importantly, it will provide the necessary additional force during a period when the US must depend heavily on bombers while we take the proper steps to strengthen our land-based missiles. We are confident the aircraft will be able to penetrate well into the 1990s; and later, when the B-52's ability as a cruise-missile carrier becomes questionable, and as new ATBs begin to enter the force in numbers, the B-1Bs can be used to shoulder a greater share of the cruise-missile carriage mission, eventually replacing the B-52 in this role. The B-1B will then serve as a standoff cruise-missile carrier and conventional bomber well into the next century.

Orderly Development of the ATB

This time-phased modernization program provides the breathing room necessary to pursue the orderly development of an advanced technology bomber. Concentrating solely on the development of an ATB would be a risky course to follow. The ATB is now in the very early stages of design and concept development. At this time, it is basically a "paper design." The technologies involved are exciting and promising, but because of the major advances required in several technologies and the consequent uncertainties involved, there would be a high degree of program risk in concentrating solely on an ATB. For these reasons and others, a significant acceleration of this program simply does not appear to be either prudent or feasible.

In summary, the Air Force wholeheartedly endorses President Reagan's decisions regarding bomber force modernization. The program satisfies the congressional mandate contained in the FY '81 Authorization Act to field a new bomber not later than 1987; it is consistent with the preferred Air Force strategy of a mixed bomber force; it provides needed modernization at an affordable price; and it offers the important ancillary benefits of stimulating competition and giving the Defense Department the flexibility, by timephasing the introduction of two new aircraft, to adjust procurement in accordance with changes in estimates of cost, availability, and effectiveness. ■

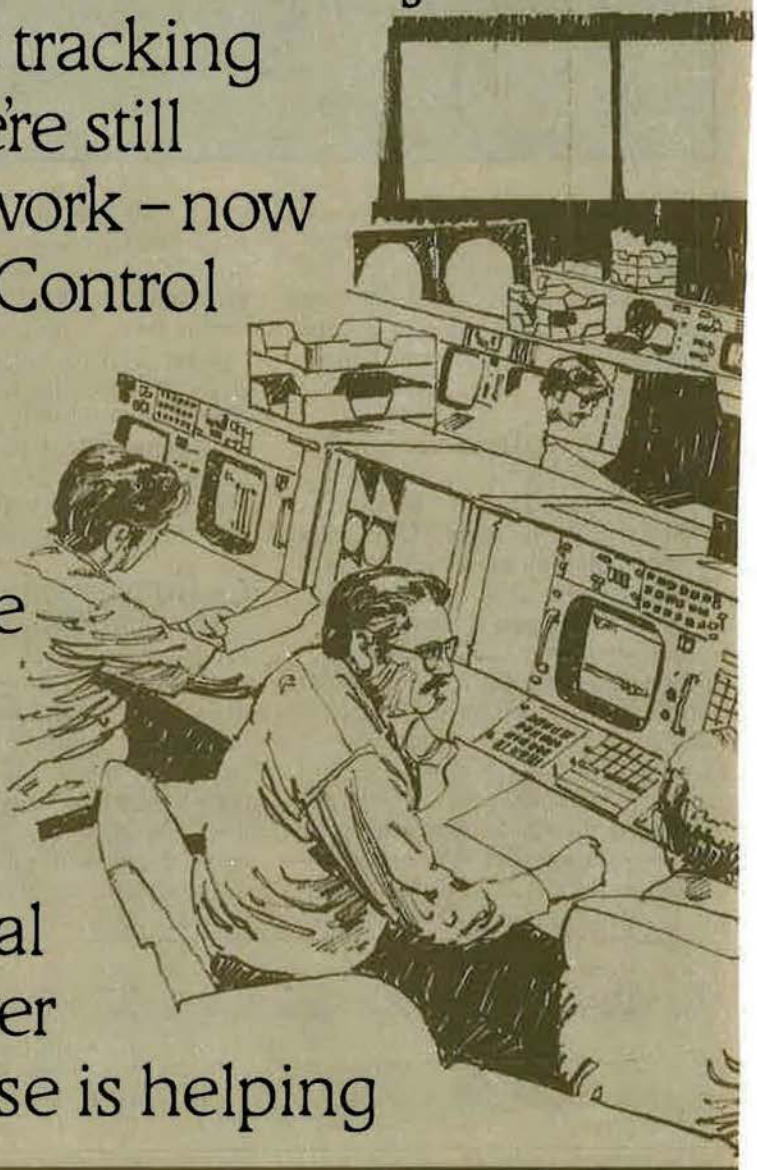
Maj. Gen. Robert D. Russ has been Director of Operational Requirements in the Office of the Deputy Chief of Staff, Research, Development and Acquisition since November 1979. Commissioned through AFROTC at Washington State University, he flew F-84F, F-100, F-101, and F-4C fighters in operational units. He commanded the 4th Tactical Fighter Wing at Seymour Johnson AFB, N. C., before serving with TAC headquarters and the Air Staff.

In the Beginning, we

For over a quarter-century, Ford Aerospace has been the company to start things. Important things in every aspect of the Space Mission.

In 1957, we participated in the design and development of the first major U.S. military spacecraft tracking network. Today, we're still servicing that network – now the USAF Satellite Control facility, the largest of its kind.

In 1963, we began building the Mission Control Center at Johnson Space Center, and we've provided total system support ever since. This expertise is helping



were there.

us today to design the Operational Control Centers for the NASA and DoD Space Shuttle and the Spacelab payloads.

In 1965, the NORAD Combat Operations Center became operational within Cheyenne Mountain and we were there as prime contractor for major segments of the communication, display, and space computational systems. We've been in the Mountain ever since providing total system support.

And what of future challenges? Ford Aerospace is prepared to meet those challenges, as it was in the beginning.

Ford

Ford Aerospace & Communications Corporation

AIR FORCE RESEARCH

Guns or butter? Things aren't that simple today. With the need to rearm the military, revitalize the economy, and counter inflation competing for national attention, the economics of defense spending becomes critical.

DEFENSE SPENDING AND ECONOMIC HEALTH

BY MAJ. STEPHEN H. RUSSELL, USAF

THE Reagan Administration is now committed to substantial growth in defense spending. On an inflation-adjusted basis, the Administration's program calls for nine percent annual growth rates in military spending between 1981 and 1987. Over this period, defense spending will rise from 5.6 percent to 7.8 percent of the nation's Gross National Product (GNP), and from twenty-five percent to thirty-seven percent of total federal spending.

Such a herculean commitment of resources to defense in the 1980s begs an assessment of its economic impact. Concern is again rising about the reallocation of resources from civilian output to defense and whether new defense spending initiatives will spawn a new era of inflation. A review of the fundamental economic issues pertaining to defense spending and the Reagan program in the context of these concerns may be helpful.

Economic Side Effects of a Defense Buildup

Defense is a "big swinger" in the American economy. The Department of Defense is this nation's largest employer and the largest customer of American business. In fact, defense essentially holds captive a number of firms in its capacity as their life-blood customer. Military programs consume up to one-half of the scientific and engineering talent of this country, and the prosperity of entire regions of the country is linked to the rise and fall of the defense budget. In short, the impact of defense on the economy is pervasive.

Is this pervasive impact a blessing or an economic ill?

Most professional observers describe the economic side effects of defense spending as essentially positive. Defense spending initiatives tend to create jobs if there is slack in the economy and push the state of technology in the pure and applied forms. The "spin-off" of defense-related technology to civilian goods is also a very positive side effect.

The contributions of past defense programs to production technology and new products have been impressive. For instance, scientific management, in the form of operations research, originated with defense funding. The Rand Corp.'s large-scale project scheduling system, PERT, was also developed under a defense contract. The worlds of electronic microminiaturization, nuclear power, jet-engine technology, and helicopters germinated from defense spending. The transferability of defense technology has also given civilian markets such things as flameproof fabrics, fire-retardant paint, new adhesives, new high-temperature and lightweight alloys, and food preservation and packaging innovations.

We can also expect new technologies and spin-off commercial and consumer products from this new era of defense spending.

On the other hand, there is substantive concern about the cyclical impact of escalating defense budgets on regional economies. The economic fortunes of entire cities and regions of the country rise and fall with Pentagon budgets. Virginia and Maine are the shipbuilding states; Texas has been heavy in aircraft assembly, aircraft equipment, and ammunition. California industry absorbs a colossal portion of defense budgets because it fills missile, space, aircraft, and ammunition contracts, while Michigan and Ohio provide more than half of the Army's combat vehicle production.

The geography of defense spending can be even more specific. In the 1960s and early 1970s, the fortunes of the Fort Worth economy corresponded with the level of F-111 R&D and production efforts at General Dynamics. Similar relationships exist between the economies of Denver and Martin Marietta, St. Louis and McDonnell Douglas, Atlanta and Lockheed, Wichita and Boeing, and Los Angeles and Rockwell, McDonnell Douglas, Northrop, Hughes, and Lockheed.

The rise and fall of defense budgets introduces cyclical instability into these economic units. The buildup of the B-1 program in the early 1970s, for example, made Rockwell International in Los Angeles a magnet for aerospace engineers, draftsmen, machinists, assembly laborers, etc. The Pentagon dollars pouring into Rockwell had a secondary effect on the Los Angeles economy because the supporting industrial base—the parts suppliers, machine shops, and metal fabricators—was in the local area. When the B-1 program was canceled in

1977, segments of the Los Angeles economy experienced a substantial rise in unemployment.

The Reagan defense program will be a bonanza for the defense industry. From prime contractor to forgings and castings supplier, defense dollars have the potential to translate into profits, payrolls, and prosperity for the regions of the country that host these defense industries. But over time, the programs will be completed, canceled, or rescheduled, and regional economic pain will set in.

Defense Budgets and Social Choice

A fundamental principle of economics is that while resources are limited, human wants are unlimited. Societies must devise some mechanism (such as the price system of capitalism) for allocating scarce resources to competing demands.

This concept is best illustrated with the PPC, or Production Possibilities Curve *(see Figure 1)*. The idea behind the curve is that an economy's productive capacity is limited, and that resources have alternative uses. Points on the PPC represent combinations of defense and civilian sector output that are possible given the resources and technology of an economy operating efficiently *at full employment*. Point A_1 on the PPC of Figure 1, for example, is a full employment, efficient level of output comprised of 0–X quantity of civilian goods and 0–Y quantity of defense goods. Point B_1 is also a full employment, efficient level of output because it too is on the PPC. Point A_2, however, implies a recession because it lies below the Production *Possibilities* Curve. Here the economy has idle capacity because only 0–W of civilian output is attained, whereas the extra W–X quantity of output could be achieved if all resources were fully employed. Point B_2 is outside the PPC, and is therefore unattainable with existing resources and technology.

The PPC portrays graphically the proverbial "guns and butter" dilemma: In an economy operating at full employment, any increase in the production of "guns" (defense goods) forces a reduction in "butter" production (civilian goods). For Figure 1, the reallocation of resources to sustain new defense initiatives of the quantity Y–Z is at a cost of X–W lost output in the civilian sector.

The change in the civilian vs. defense goods mix from Point A_1 to Point B_1 is typically accomplished by commandeering resources from the private sector via taxation.

The guns and butter dilemma does not exist, however, if the economy is operating at Point A_2, a point reflective of unemployed resources. In this case, *idle* resources can be pressed into the production of Y–Z defense output. Rather than forcing a reduction in civilian output, new defense spending initiatives move the economy out of recession (Point A_2) and onto its PCC (Point B_1).

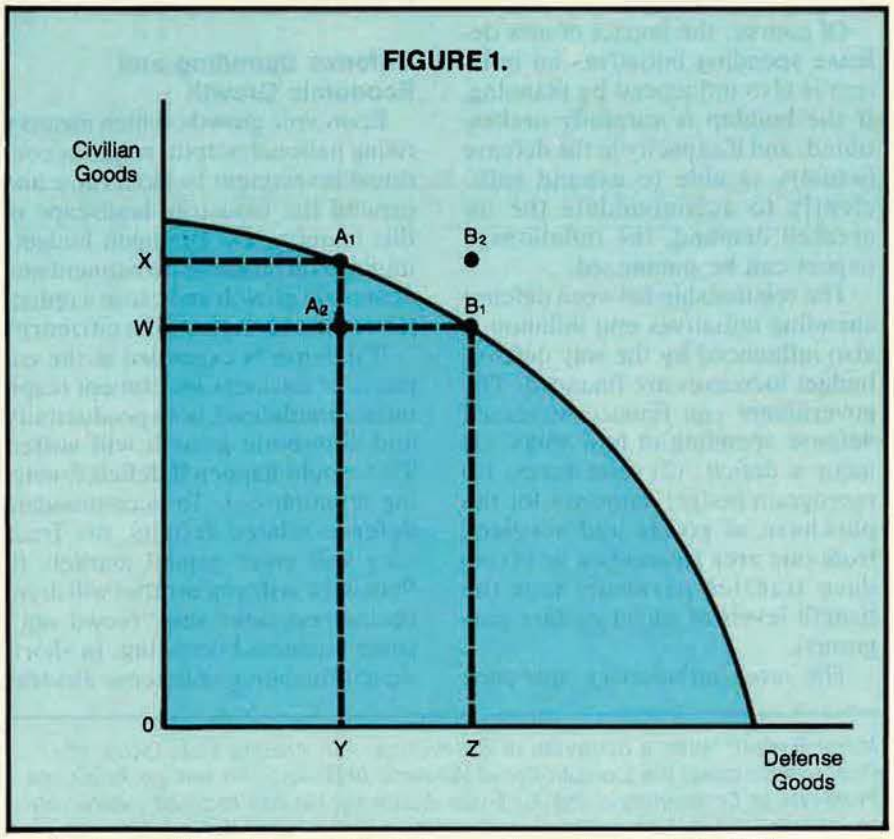
Hence the critical question in assessing rising defense budgets hinges on whether the economy is on its PPC already. If it is, the expanded production of military goods will confiscate people and resources which would otherwise be producing in the private sector. In this case the choice boils down to whether society is willing to tolerate fewer cars, video recorders, and vacations in favor of more missiles and tanks.

If society is not on its PPC whenever new defense initiatives are launched, the expanded production of military goods tends to employ idle labor and unused plant capacity. In this case, the social choice is whether the unemployed productive capacity of the economy should be used for nondefense government spending initiatives (flood-control projects, disease-eradication programs, urban transit systems, etc.), or for expanded defense programs.

An always contemporary question is "How much defense can this country afford?" The PPC makes the answer clear. The United States can afford any level of defense desired—if society is willing to pay the price. That price is either the dislocation of other governmental programs, reduced production (and consumption) in the civilian sector, or some combination of both.

The US economy in 1982 is off its PPC. The unemployment rate is expected to average 8.9 percent this year; most economists would consider 5.9 percent as acceptable in a robust economy. The capacity utilization rate in manufacturing is now

FIGURE 1.



Production Possibilities Curve (PPC), illustrating that an economy's productive capacity is limited and resources have alternative uses.

in the seventy-two percent range, considerably below the benchmark figure of eighty-six percent for full production in an economy with substantial obsolescence in its industrial base.

In an *aggregate* sense, it would appear that the slack in the 1982 economy means that escalating defense expenditures would more likely employ idle resources than displace production in the civilian sector. As recovery from recession occurs and the economy moves back onto its PPC, a continuing defense buildup would then put defense programs in competition with civilian output—especially in the durable manufacturing sector.

. . . increases in defense spending will probably contribute more to real economic gains and less to inflation, depending on how far the economy is under its PPC.

Defense Spending and Inflation

A generally accepted proposition of macroeconomics is that the level of economic activity is a function of aggregate demand (total spending by households, the business sector, and government). When aggregate demand is sluggish, inventories accumulate, production turns down, and unemployment rises. On the other hand, a high level of aggregate demand usually means upward pressure on prices.

To the extent that defense spending pushes aggregate demand upward, it may indeed contribute to inflation. But defense spending is not unique in this respect. Surges in spending from any source in the public or private sectors can put inflationary pressure on prices.

In terms of the PPC of Figure 1, increases in defense spending will probably contribute more to real economic gains and less to inflation, depending on how far the economy is under its PPC. Point A_2 is such a position. Speaking loosely, the contribution to aggregate demand of defense spending initiatives will not be particularly inflationary in an economy with economic slack. Conversely, if new defense programs are launched when the economy is already at full employment (Point A_1 of Figure 1, for example), capacity constraints may cause prices to balloon.

To be sure, inflation *can* occur in an under-used economy. It would be grossly misleading to suggest that an increase in defense spending in a slack economy will be noninflationary. Supply bottlenecks in raw materials, purchased parts, and labor markets unique to defense can raise prices even in the midst of a recession. Nonetheless, unused capacity in the economy (conceptually Point A_2 of Figure 1) greatly reduces the potential inflationary pressure of rising defense budgets.

Of course, the impact of new defense spending initiatives on inflation is also influenced by planning. If the buildup is carefully orchestrated, and if capacity in the defense industry is able to expand sufficiently to accommodate the increased demand, the inflationary impact can be minimized.

The relationship between defense spending initiatives and inflation is also influenced by the way defense budget increases are financed. The government can finance increased defense spending in four ways: (1) incur a deficit, (2) raise taxes, (3) reprogram budget authority for the purchase of goods and services from one area to another, or (4) reduce transfer payments (cut the benefit levels of social welfare programs).

The most inflationary approach to government finance is deficit spending. This is especially true if the Federal Reserve System expands the money supply to stave off the deficit-induced rise in interest rates.

The optimal approach, in terms of macroeconomic efficiency, is probably to reduce federal transfer payments to states and to individuals to offset the increase in defense spending. This approach is not inflationary and it is free of the disincentives associated with raising taxes, but it does result in reduced federally subsidized social services.

The potential for inflation in the Reagan program is difficult to assess because the macroeconomic policies of this Administration are unconventional and untested. But the likelihood of defense-induced inflation seems to be very low at present because the economy contains substantive slack. In addition, for the first time in history, Pentagon planners are attempting to manage the defense industrial base to accommodate effectively the increased demand of the Reagan program. The President's fiscal plan seems to be financing more defense by reducing transfer payments—a noninflationary approach.

Defense Spending and Economic Growth

Economic growth, which means a rising national output, requires continual investment to modernize and expand the industrial landscape of this country. Do Pentagon budgets impinge on business investment and economic growth and cause a reduction in the lifestyle of the citizenry?

If defense is expanded at the expense of business investment (capital accumulation), both productivity and economic growth will suffer. This would happen if deficit financing is employed. To accommodate defense-related deficits, the Treasury will enter capital markets to float debt instruments that will drive up interest rates and "crowd out" some business borrowing. In short, deficit financing of defense absorbs

Major Russell holds a doctorate in Economics from Arizona State University. Prior to becoming the Comptroller at Williams AFB, Ariz., he was an Associate Professor of Economics at the Air Force Academy. He has lectured extensively to military and civilian audiences about the economics of defense spending, and delivered the keynote address to the 1977 National Defense Colloquium at the Air Force Academy.

private saving flows which would otherwise finance growth in the private sector. In this case, the whole society suffers from lower productivity and a lower long-run growth rate for the economy.

Tax-financed defense budgets do not affect capital markets like deficit-financed defense budgets, but tax financing *can* impact unfavorably on economic growth. The linking pin is incentive. To the extent that higher taxes are a disincentive to the business sector to take risks, to innovate, and to invest in plant and equipment, defense financed by additional taxes acts as a drag on productivity gains and growth.

If new defense spending is offset by reducing nondefense programs, the impact on growth is largely speculative. Merrill Lynch economists, however, have found evidence that such reprogramming would actually contribute to economic growth.

The Merrill Lynch Simulation Model of the US economy suggests that the sum total of sequential spending rounds associated with an initial federal expenditure is much larger for defense spending than for nondefense programs. Specifically, the Merrill Lynch macroeconomic model finds the expenditure multiplier over a six-year period for defense spending to be 2.4; for nondefense, 1.62. This means that an initial injection of defense spending is likely to generate more than forty percent more new income than a similar injection in nondefense spending. Merrill Lynch economists attribute this result to the fact that defense spending goes to industries that are more labor-intensive in their production methods, and hence tend to generate more jobs.

Although nonconclusive, the Merrill Lynch model implies that a larger national income base may accrue from defense spending vis-à-vis nondefense spending. This larger base, in an aggregate sense, means more profits and savings to fund capital formation. Based on this evidence, the Reagan program to increase defense and reduce nondefense programs may actually foster economic growth, as long as the Treasury deficit is under control.

Defense and Deficits

Because the Reagan Administration is expanding the commitment of resources to national defense at the very time the deficit position of the federal government is eroding, some might argue that the worrisome rise in projected budget deficits is attributable to the President's defense buildup.

The real pressures on the deficit from the spending side, however, are associated with the growth in the entitlement programs of the federal government. Harvard economist Martin Feldstein, for example, argues in the February 18, 1982, issue of the *Wall Street Journal* that the key to balancing the budget is to reduce *nondefense* spending to the 1970 relative level of thirteen percent of GNP, vis-à-vis the 1982 figure of eighteen percent of GNP. (In 1970 defense was 7.4 percent of GNP; the projection for 1982 is 6.2 percent of GNP, up from 5.6 percent in 1981, and five percent in 1980.)

Pentagon planners are attempting to manage the defense industrial base to accommodate effectively the increased demand of the Reagan program.

The President's commitment to "rearm America" works against the goal of a balanced budget, and the Reagan Administration must deal with the problem of deficits. But the deficits have multiple origins and, on the spending side, are largely due to the relative growth in nondefense programs. To tag the Reagan *defense* program as deficit-financed seems strained.

Conclusions

Pentagon critic Seymour Melman, Professor of Industrial Engineering at Columbia University, once warned the Senate Committee on Appropriations that defense spending was destructive to the quality of our lives. The Reagan program for national defense—in the framework of economic side effects, social choice in the use of resources, inflation, and economic growth analyzed in this article—presents a very different picture.

An enlarged defense program in the 1980s will create additional jobs in a slack economy, but will also introduce economic instability into regions of the country that host the various segments of the defense industry. We can also expect technological advances that will benefit society as a whole and spin-off benefits in the form of new commercial and consumer goods.

Given the slack in our economy, increased defense spending will more likely press idle resources and unused capacity into service rather than force a reduction in civilian goods production. Although the "guns and butter" dilemma will be a factor in the long term, the sluggish condition of the US economy in 1982 makes the current social choice more one of competition among federal programs rather than a choice between defense and civilian production.

Macroeconomic conditions and the manner in which the defense buildup is being planned point toward little impact on inflation rates.

There is no evidence that new defense spending initiatives hamper economic growth as long as they are not financed by deficit spending. On the contrary, the Merrill Lynch Simulation Model of the US economy demonstrates that a recomposition of federal spending toward more defense and less nondefense programs may actually contribute to economic growth.

Finally, current projections of rising budget deficits create challenges on the economic growth and inflation fronts. However, the deficit problem on the spending side is more attributable to the relative growth in nondefense programs than to the Reagan plan for national defense. ■

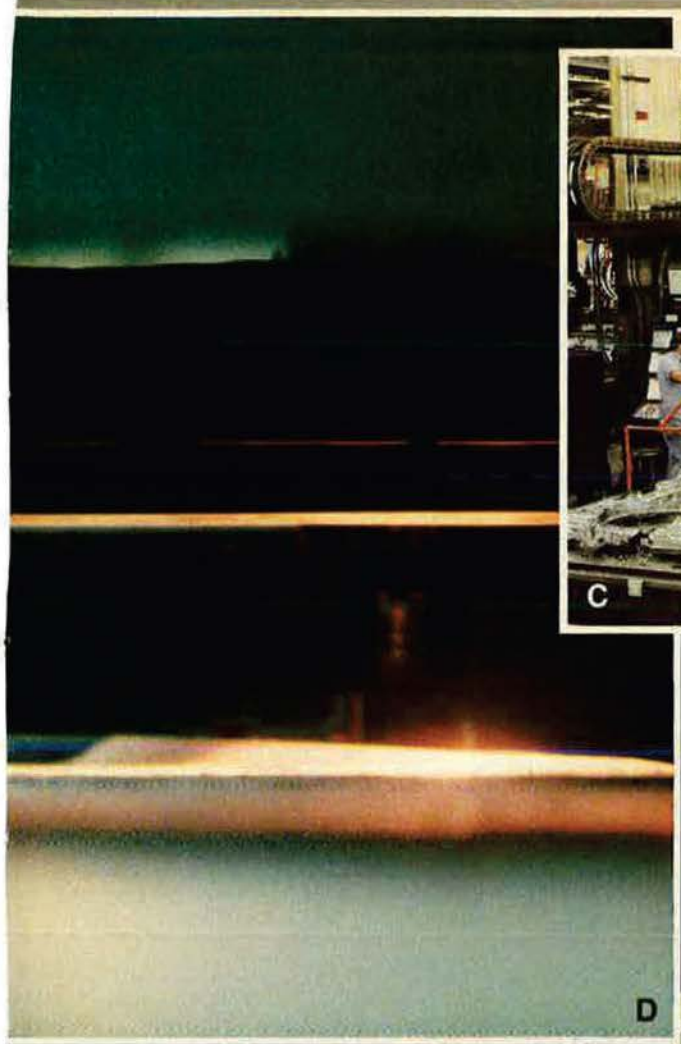
AIR FORCE RESEARCH
BUILDING THE F-15

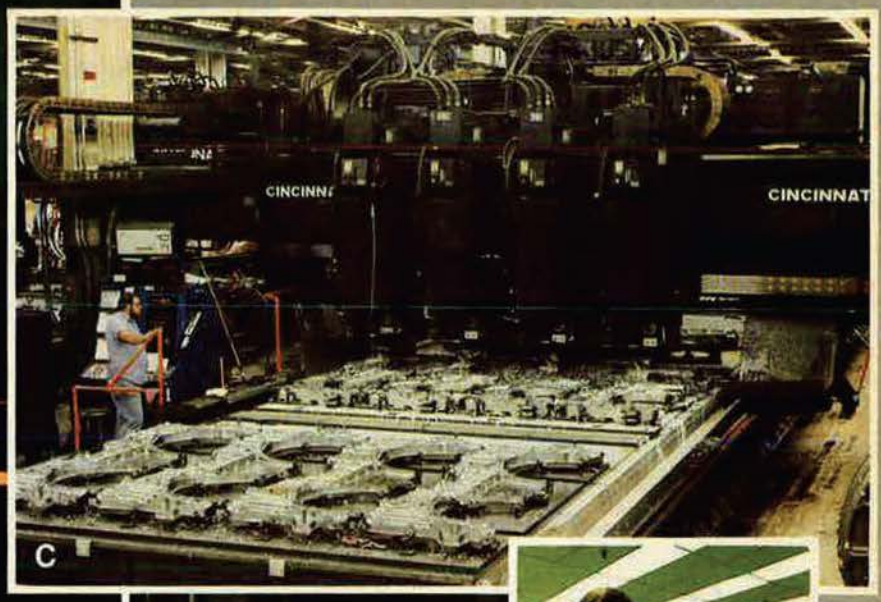
BY WILLIAM A. FORD, ART DIRECTOR

Editor's Note: We wanted to show how a first-line aircraft is put together, and decided to pick USAF's F-15 Eagle as representative of current production processes. Thus this photo feature, the brainchild and product of Art Director William A. Ford. The concept and most of the photos are his, taken at the McDonnell Aircraft Co. plant at St. Louis, Mo. Other photos are by McDonnell photographers, and the text was written by Doree Martin of McDonnell Aircraft.


A

BUILDING USAF's F-15 Eagle requires a blend of skilled hands and the most modern equipment and technology. Raw material has to be cut, drilled, formed, and machined, then fastened into place. Here is a basic guide to how Eagles are built at McDonnell Douglas to endure the most demanding combat missions. For the most part the airframe is made from aluminum, titanium, and composite materials. Aluminum sheet-metal structural parts are automatically drilled and routed (Photo A). Larger aluminum structural parts are formed (B) by 7,000 tons of pressure in a two-story press. Titanium is used for areas that will experience high stress, fatigue, or temperature. A typical numerically controlled machine located in the world's largest profile milling shop (C) here simultaneously cuts four titanium forgings into finished fuselage bulkheads. Other areas that require both stiffness and minimum weight use composite material; graphite skin for an Eagle speedbrake is cut out by a high-speed laser cutter (D) and bonded to aluminum honeycomb that was custom-shaped by a core carver (E). Welded titanium frames are used with boron composite-material skins on the vertical stabilator (F). While structural parts are readied for assembly, the electrical system's 290 wire bundles are made (G).



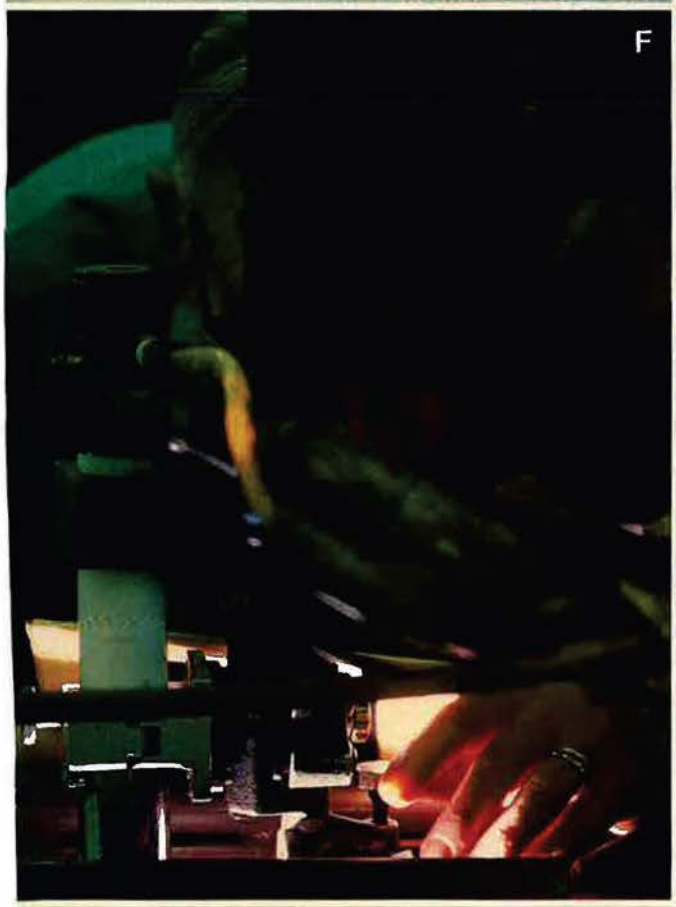


C

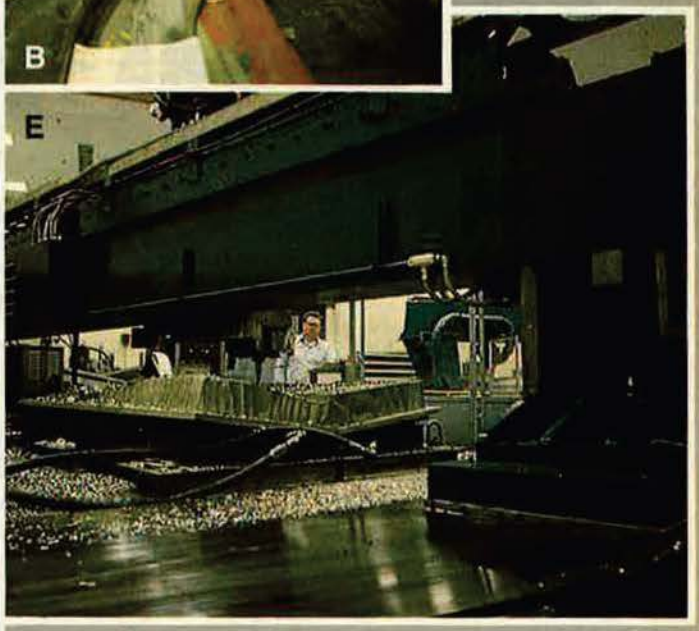
G

B

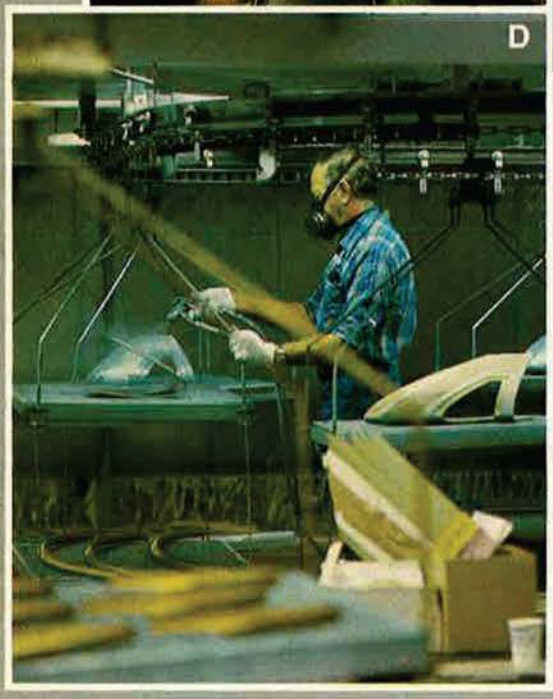
D



F

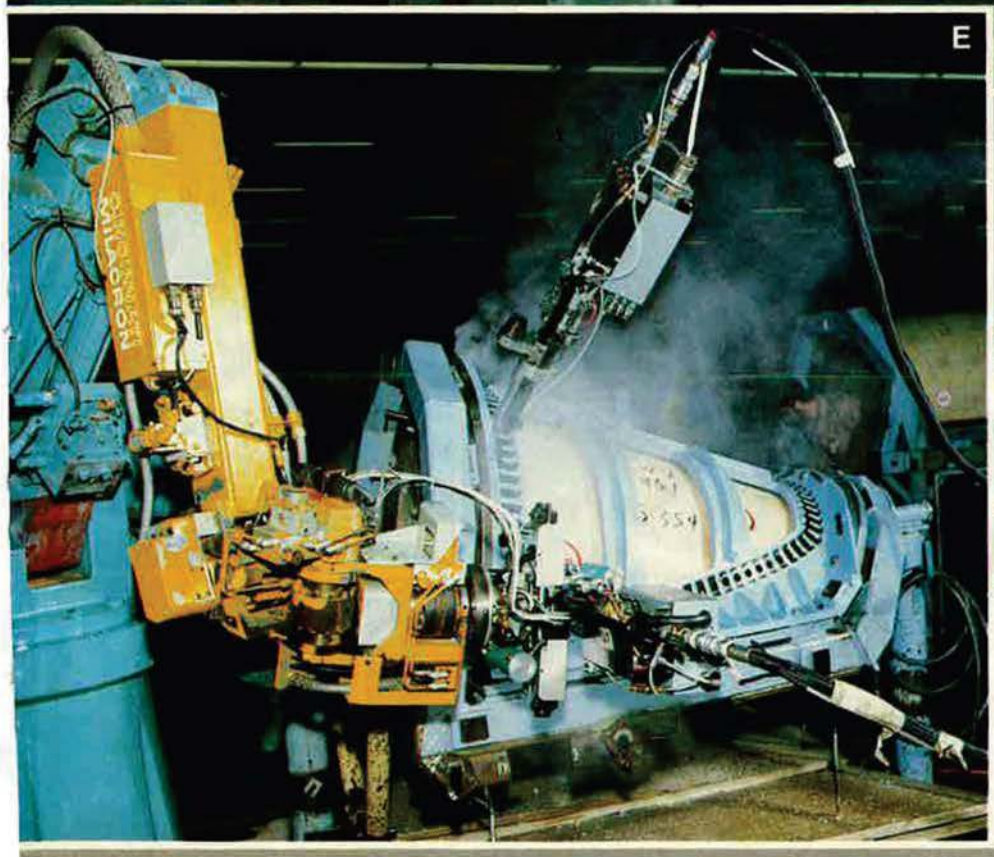


E



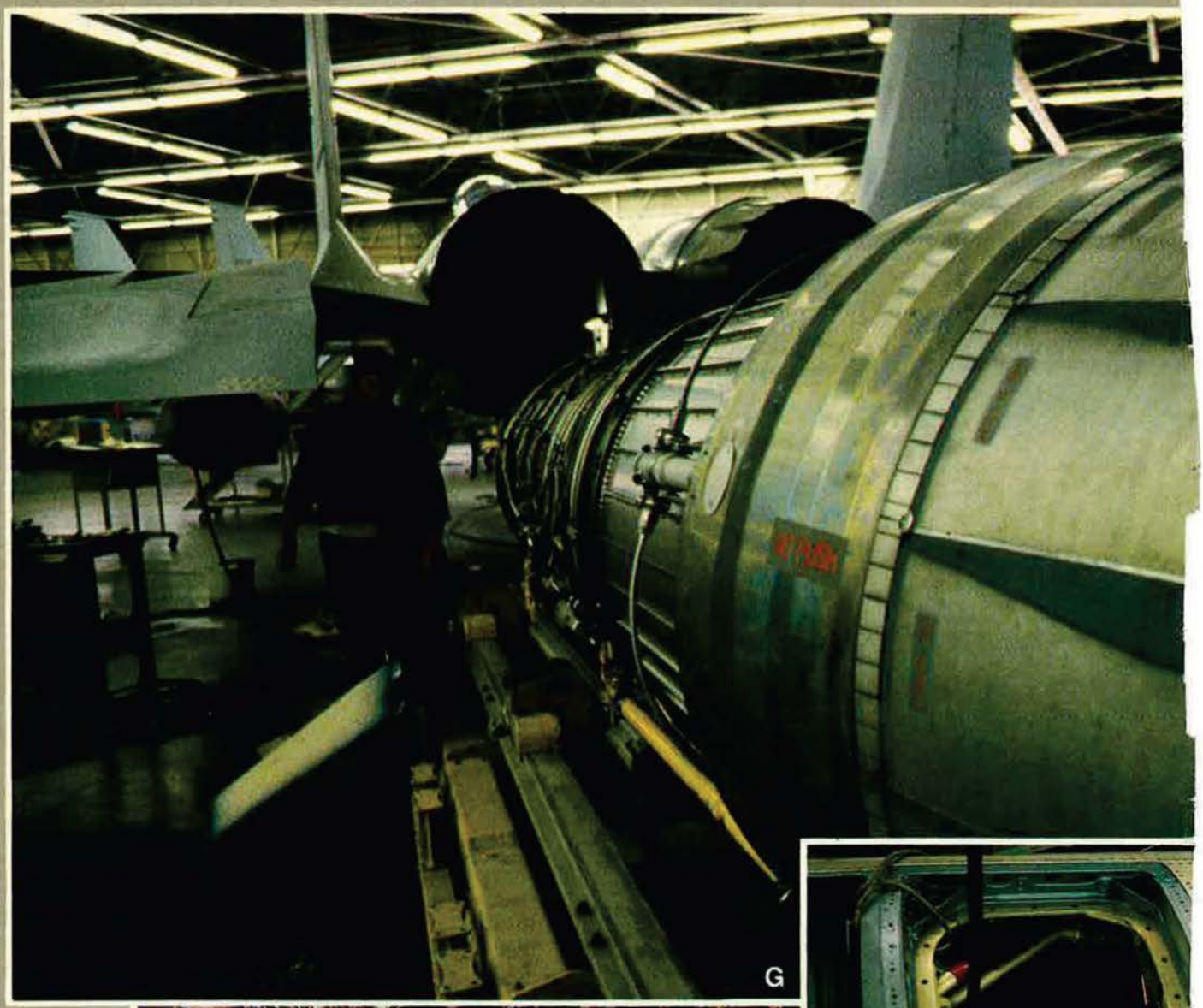
SHEETS of composite material are oriented on top of one another for maximum strength (Photo A) and bonded together using a combination of heat and pressure in an autoclave (B). A process known as superplastic forming/diffusion bonding is used to shape titanium sheet metal that is as pliable as plastic when this furnace's intense heat (1,650°F) and pressures (250 psi) are applied; instead of complex assemblies, single, seamless parts can be produced, such as aft fuselage subassemblies (C). Paint protects metal parts from corrosion (D). A nonmetallic part, like the F-15's acrylic windshield, is fitted to its metal frame and a robot-like machine automatically positions and drills the attachment holes four at a time (E). Computer-controlled machinery (F) bends tubes efficiently and accurately, increasing productivity. In contrast to the use of automated machinery to manufacture parts, skilled hands are needed to drill precision holes in the F-15's circular air intake (G) and to rivet sheet metal for the wing's leading edge (H). Vertical stabilators, critical to aircraft stability at extreme angles of attack and supersonic speeds, are securely attached to the aft fuselage during final assembly (I).

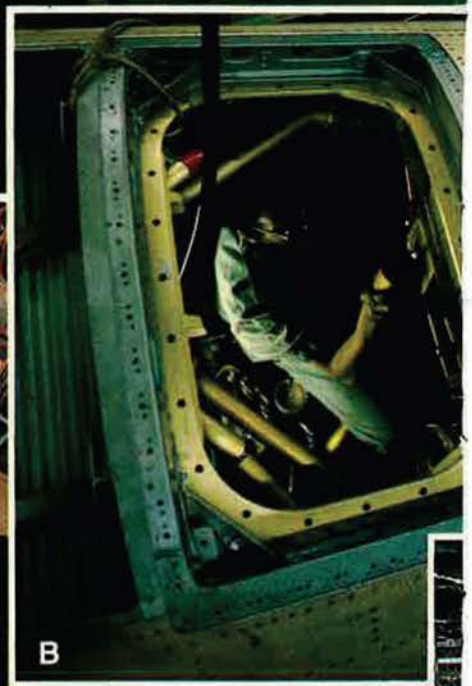
I

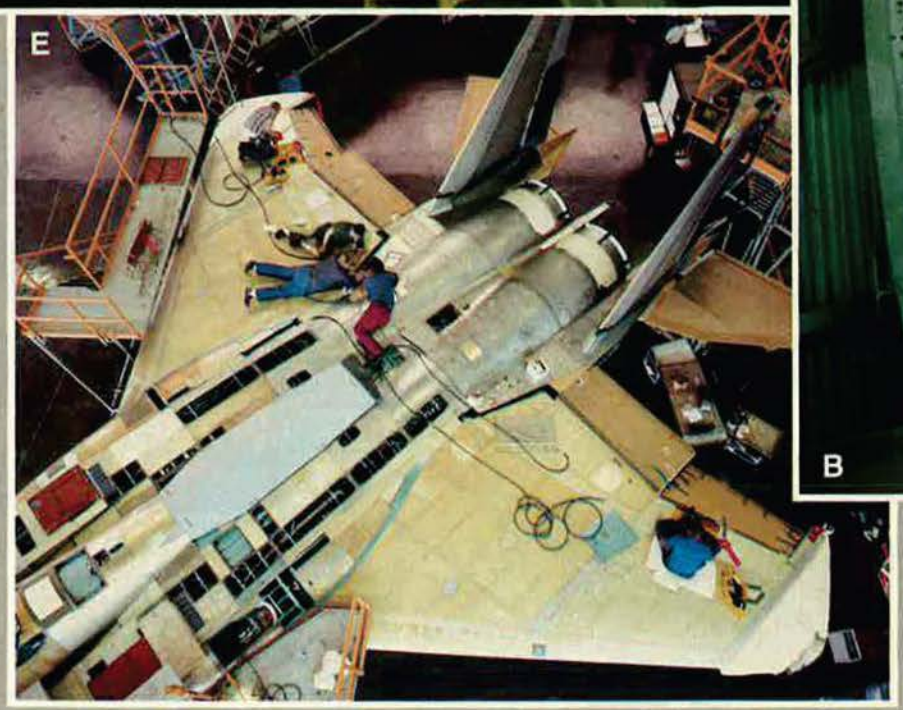


E

C


G


B


E

DURING assembly of the forward fuselage, electrical wire bundles are installed (Photo A) where they will be easily accessible to maintenance crews. Reductions made in the weight and volume of the aircraft's eighteen miles of electrical wiring make it practical to install a backup system that enhances its ability to survive in combat, as do self-sealing fuel lines (B). Colored dust caps ensure cleanliness of tubes (C) used to connect fuel lines running through the Eagle's seven fuel cells. During center fuselage buildup, fuel cells, hydraulic systems, main landing gear, and the speedbrake are installed (D). Splicing the forward, center, and aft fuselage sections (E) and wings begins in final assembly. The blue arm extending into the cockpit checks the electrical circuitry to ensure it is functioning properly (F). Once the airframe is completed and the aircraft is moved to the ramp, two F100 engines are installed, each in less than thirty minutes (G). After the avionics and radar gear are put in, the F-15 is ready for final checkout (H). During the production test flight, a McDonnell Aircraft pilot operates the radar verifying targets can be detected and tracked at all altitudes, above and below the aircraft, to ranges of 100 nautical miles (I). Only after the pilot signs his name attesting that all systems are functioning to specification does McDonnell Douglas release the aircraft to the customer.

The F-15 is the result of the labors of the prime contractor, McDonnell Douglas, and 1,200 subcontractors. The latter received in FY '81 about fifty percent of the prime contract dollar value of the aircraft.

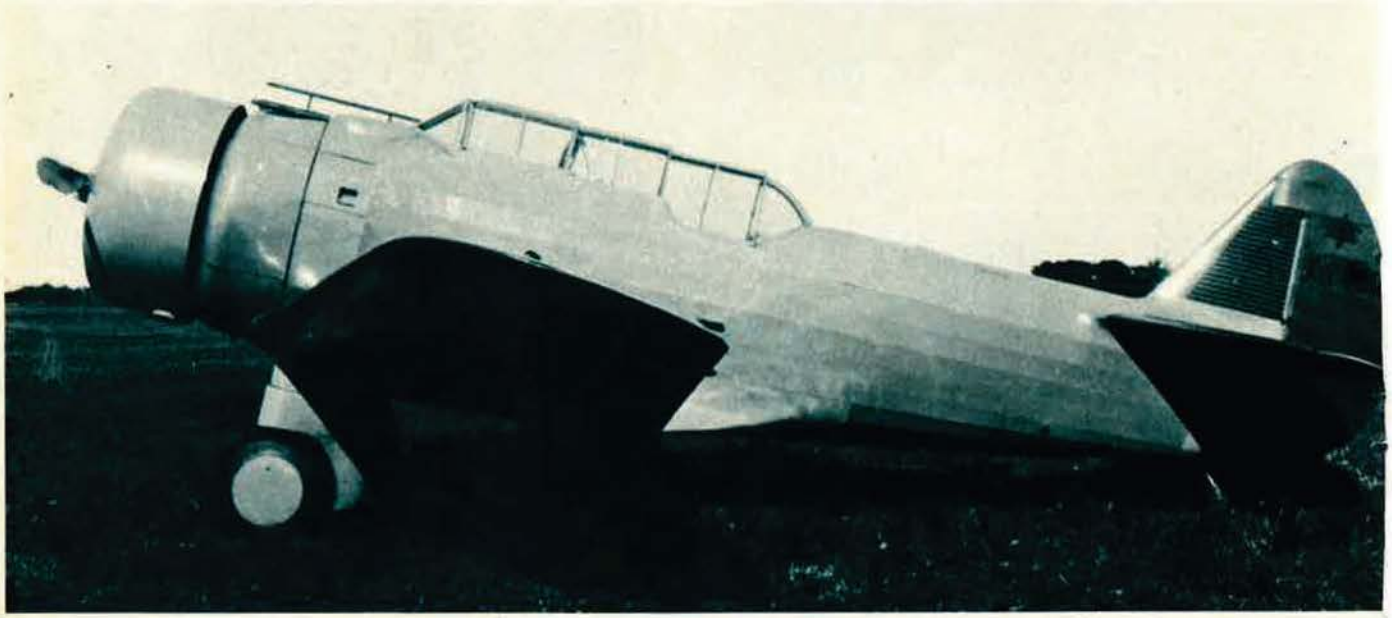
In future issues, we will be showing more of the roles and innovations of subcontractors in the USAF acquisition process. ■

AIR FORCE RESEARCH

When an aircraft is ready in time to meet a national emergency need, it's usually the result of foresight years before. Such was the case with the ubiquitous T-6 of WW II and Korea.

THE T-6: READY WHEN NEEDED

BY JEFFREY L. ETHELL



The beginning of more than 20,000 successful trainer aircraft: Prototype NA-16, photographed on August 26, 1935, after being modified with an enclosed canopy and wheel fairings. (Norm Avery)

THE depression era of the 1930s was a wrenching time for military aviation. The armed services were seeking new equipment with meager funds, and manufacturers often lived or died on the basis of a single order for a few aircraft. Quite often, a single type of aircraft would establish the reputation of a fledgling company, good or bad.

In the mid-1930s, a small firm, North American Aviation (NAA), was struggling for a slice of the military market under two engineers who had previously worked for aircraft builder Donald Douglas. James H. "Dutch" Kindelberger and John Leland Atwood staked the company's future on a US Army Air Corps requirement for a basic trainer. Up to that time, North American Aviation had produced but one in-house design, a military observation aircraft later known as the O-47.

With less than nine weeks to get a prototype to Wright Field, Ohio, for trials in the Basic Trainer competition, Kindelberger, Atwood, and Raymond H. Rice, Chief of Stress and Design, opted for a departure from the biplane era. The team stuck with Kindelberger's concept for ease of maintenance, and the NA-16 emerged—an all-metal, low-wing monoplane with two open cockpits in tandem, a fixed landing gear, and a 400-hp Wright R-975 radial engine.

On April 1, 1935, company test pilot Paul Balfour took the prototype, X-2080, into the air over Dundalk, Md., for the first time. Later that month the NA-16 was flown to Wright where it won the competition, although the Army requested several modifications, including enclosed cockpits. With an order for forty-two of the trainers, designated BT-9, NAA moved to California where a factory was being constructed adjacent to Mines Field in Los Angeles.

Simultaneous with construction of the factory, a production line was started. Just a year after the prototype's first flight, Balfour flew the first BT-9. The new aircraft was found to have vicious wingtip stall characteristics, solved to some degree by the addition of slats on the outboard leading edge sections of the wings. With the BT-9A, a two-degree washout built into the outer wing solved the bad stall problem for the most part.

By 1937, "B" and "C" versions had been ordered and the US Navy had become interested in the trim monoplane, but with a "Navy engine" in place of the Wright. Not wanting to lose so crucial a contract, NAA, with in-house funds, mated a Pratt & Whitney 600-hp R-1340 to the first BT-9C. The 1340 would remain standard for all derivatives of the NA-16 for the remainder of a production run that extended into the 1950s.

When the Air Corps ordered 251 BT-14s, with new outer wing panels and tail and metal-covered fuselage,

it was one of the largest purchases of training aircraft ever made. NAA also embarked on an ambitious export program, and numerous versions were sold worldwide.

Enduring Relationship

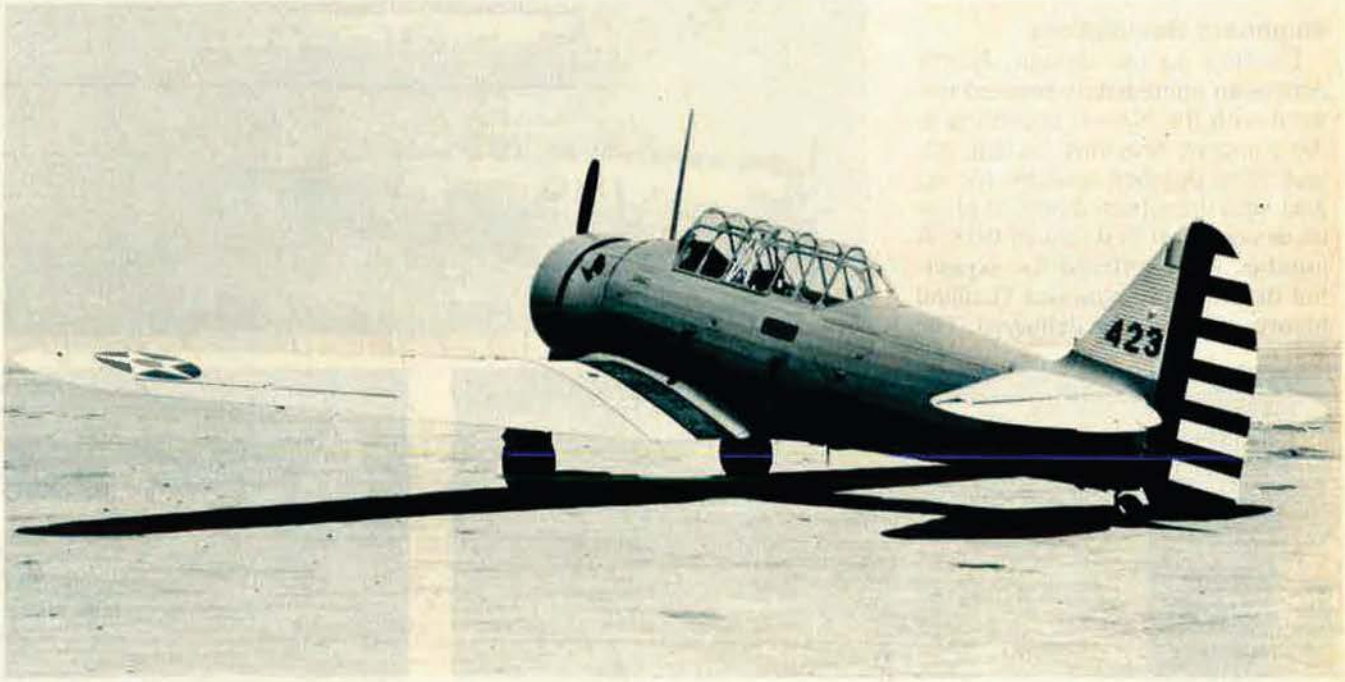
With Dutch Kindelberger selling his aircraft to a satisfied Army Air Corps, he and AAC Chief Henry H. "Hap" Arnold formed a working relationship that was to carry them through World War II. The two often bypassed the normal bureaucratic red tape to accomplish things, and their first partnership was to prove very significant, resulting in what was essentially to become the AT-6, SNJ, and Harvard series of aircraft.

Ken Hamilton, who began at NAA with some detail drafting on BT-9 components, recalled "that Dutch Kindelberger met with Gen. Hap Arnold and went over a proposal for new trainer aircraft. . . . Hap listened with interest and, upon conclusion of the presentation, said to Dutch that the airplane looked great, that he wanted and needed it in the worst way, but that he didn't have any trainer money, every red cent of USAAC money being earmarked for combat aircraft. Without missing a beat, Dutch is said to have responded, 'Hap, you must have misunderstood. . . . These aren't trainers, these are Basic *Combat* aircraft' [they would have a fixed .30-caliber machine gun firing forward, a swivel .30-caliber in the rear]. Hap is said to have replied, 'Why, of course, how dense of me,' and the Basic Combat class was born and an order placed!"

The resulting 1937 Army Circular Proposal 37-220 ordered a competition for a Basic Combat aircraft, a short-lived category that would incorporate armament to approximate front-line machines. NAA added retractable landing gear through the talents of Lloyd Royer, and the aircraft's forthcoming performance proved outstanding. The AAC bought 180 of the aircraft under the designation BC-1.

On February 11, 1938, Paul Balfour flew the first BC-1, just one day after Louis Wait had flown the first BT-14. In looking at the progression of NAA's trainers, all derivatives of the original NA-16, it is clear many were being developed simultaneously rather than in the usual fashion of one after another. Thus, the series is often confusing, with numbers and types out of sequence.

North American was struggling



ABOVE: The BC-1, with a fabric-covered fuselage, was the first version of the trainer to have retractable landing gear. The Basic Combat designation allowed AAC to order the aircraft, as there was no money in the trainer budget. (Dusty Carter/AAHS) LEFT: The BC-1A took on all the characteristics of the future AT-6, excepting the DF loop, fuel selector blister under the center section, and the venturis on the sides. (USAF photo)

to obtain a larger slice of the military procurement pie by exploiting one basic design to the fullest—from trainer, to fighter, to attack bomber (the last two for export). It was on this single aircraft that Kindelberger would build his reputation, eventually leading to orders for genuine fighter and bomber types.

Shipboard Requisitions

Beefing up the design, North American immediately pressed forward with the NA-44, according to the company brochure "a light Attack Dive-Bomber available for export with unrestricted pursuit plane maneuvers." It first flew in 1938. A number were ordered for export, but the Japanese attacked Thailand before they could be delivered. The USAAC requisitioned them from merchant ships in the Philippines en route. Designated A-27, the ten aircraft were appropriated by Gen. Douglas MacArthur's command in the Pacific.

TOP: A gunnery training flight from Harlingen, Tex., in the near-impossible tight echelon formation. (USAF photo) LEFT: Rat racing! Pity poor number 8 in this mandatory wartime game. (USAF photo) ABOVE: Quality design lasts: A T-6G serves out its time with the California Air National Guard in the 1950s. (Norm Taylor)

North American developed another export version, a fighter, with a shorter wing and the R-1820 engine of 870 hp. This was armed with two .30-caliber Colt machine guns in the cowl and could carry 550 pounds of bombs. Paul Balfour undertook the maiden flight on August 1, 1938. Ordered by Thailand with two 22-mm cannon in fairings under the wings, six were completed in November 1940. These were absorbed by the USAAF in reaction to Japan's hostile moves toward Thailand. They were used as advanced fighter transition P-64s by the Army during World War II.

By far the largest export order was placed by Great Britain, in need of an advanced trainer similar to the BC-1. With British-specified equipment, the famed Harvard first flew on September 28, 1938. The initial contract for 200 Harvards was completed in June 1939. British contracts reached 1,100 before Lend-Lease, and total deliveries to British Commonwealth air forces exceeded 5,000. The Harvard would be built

into the 1950s, a testimony to the aircraft's success. In the early days of the Harvard, one British spokesman was quoted as saying that if the aircraft had the range to fly over Berlin, he was sure that all it would take to obtain a Nazi surrender would be to throw the prop into low pitch and run it up to max rpm—the noise would do the rest.

The Navy's "J-Bird"

The need for a modern scout trainer surfaced as a Navy requirement in 1938. Scouting, as it was then called, was an extremely important part of carrier aviation in seeking out the enemy. The Navy Bureau of Aeronautics did not have to look far—the Air Corps's successful BC-1 would fill the bill, as the British thought it would for them, and the SNJ was born. The first production "J-Bird" was delivered to NAS Anacostia in Washington, D. C., on May 29, 1939, for flight testing.

Three BC-2s were built as trial aircraft to improve the BC-1, featuring all-metal construction (rather than a fabric-covered fuselage), squared wingtips, a triangular vertical tail, and several other improvements (including engine changes). Most of these features had already been tested on the NA-44 so there was very little innovation, but the changes brought significant flying improvements. The new aircraft, designated BC-1A, was ordered by the Army for the National Guard and the Air Corps Reserve. For all intents and purposes, the aircraft would remain virtually unchanged for the rest of its production life.

The last nine BC-1As were ordered under a new Advanced Trainer number, and the beloved AT-6 was born, to be flown by Louis Wait initially on February 6, 1940. The Navy was quite pleased with the Air Corps version, and ordered them as SNJ-2s. But it was not until the AT-6A, SNJ-3, and Harvard II that the aircraft became virtually identical. The three different aircraft rolled off the assembly lines at Inglewood together. So similar were the Army and Navy products that both the AT-6A and the SNJ-3 were ordered under an Army contract and approved for both services by Army inspectors. By this time, the Dallas plant was open, and AT-6As and SNJ-3s began to roll out in ever-increasing numbers.

As the first AT-6s found their way into Army Air Corps units in 1940, it was evident that a new generation of military aircraft was being introduced from the bottom up. The 36th Pursuit Squadron received some for night and instrument training at Mitchel Field, Long Island. Since the aircraft handled and performed like a fighter, the training was very realistic.

Before Pearl Harbor, the AAF planned for the training of 30,000 pilots a year. But by October 1942 that figure rose to 50,000, and the AT-6 came into its own as the aircraft that was there in numbers when needed. It was instrumental in training more pilots than any other single type built.

North American Aviation had earned its reputation with this one airplane but would soon be producing two other World War II classics—the P-51 Mustang and B-25 Mitchell. ■

Jeff Ethell, the son of an Air Force officer, grew up around military aircraft and has been writing about aviation since 1967. A commercial pilot with instrument and multiengine ratings and a certified flight instructor, he flies regularly with USAF, the Navy, and the Marine Corps, and in older warbird aircraft. His article on flying the T-6 appeared in the January '81 issue of AIR FORCE *Magazine. His article this month resulted from research for his most recent book,* Pilot Maker: North American's Fabulous AT-6 *(Specialty Press, North Branch, Minn., 1982).*

MOSQUITOES: ANOTHER ERA—ANOTHER WAR

The T-6 lasted well into the 1950s as a USAF trainer, but during the Korean War it was called on to fly combat as a forward air control aircraft—the Texans got shot up just like everyone else while working down in the weeds marking targets for the jet and prop fighter-bombers.

Beginning in July 1950 with a weary T-6C, pilots started working F-51s and F-80s the first day out—the F-80s were directed onto forty-two tanks and seventeen were destroyed. From that point on, the faithful T-6 was given a fighter priority on repair and replacement within Fifth Air Force.

More Texans built in the 1940s were assigned to the mission, but North American was asked to come up with a special version of the newly rebuilt T-6Gs that were heading for Training Command. The LT-6G, specifically modified for FAC service in Korea, resulted. It featured radios that could communicate with ground and flying units in the "police action," racks for a dozen white phosphorous smoke rockets, and a single .30-caliber forward-firing gun. When the new birds finally arrived in combat, the gun was removed after eager pilots tried to take out hostile positions with their pea shooter.

Before July 1950 was over, the nickname "Mosquito" was given to the new unit, and it stuck. By the end of August, of the fifty-five pilots on the 6147th Tactical Control Squadron (Airborne) roster, seventeen had already completed a normal tour of fifty missions. By the end of the second month of flying, the Mosquitoes counted 183 tanks, 119 trucks, and 778 other vehicles (not including fifteen oxcarts) damaged or destroyed.

As the war dragged on, pilots began to stay on for second tours, doing every imaginable job—pursuing retreating troops, dropping leaflets, making deep penetrations, and conducting search and rescue, night direction of B-26s, drop mission coordination, and artillery adjustment.

Hostile ground fire squeezed the safe altitudes for operations between 1,200 feet (small-arms fire) and 3,000 feet (20 mm and 40 mm). It was unusual for an LT-6 to come back without holes since there was nowhere to hide, except through the use of terrain masking. Low flying found new definitions with the 6147th, which was expanded to group status with two flying squadrons and one support squadron by March 1951. The Communists soon became aware that great destruction would usually follow the buzzing sound of an LT-6, so the Mosquitoes were singled out with particular vengeance.

One LT-6 pilot even went round and round with a Yak-9, firing his rockets, without effect, in frustration. When the enemy was reported to be operating a captured L-19, the frustrated fighter pilots in the 6147th bounced every L-19 in sight hoping for an honest to goodness kill. Needless to say, Army and Marine L-19 crews became gun shy. As one pilot replied over the radio to a Navy flight asking his type, "I'm an F-6!" When the final Mosquito mission, number 40,354, was flown in 1953, a wealth of knowledge on the forward air control mission disappeared from military studies and the lessons would have to be learned all over again ten years later in another part of the Far East.

—J. E.

A Blessed and Troubled Land

For our series of reports on foreign air forces, AIR FORCE *Magazine's Gen. T. R. Milton traveled recently to South America for a first-hand look at conditions and trends there. Following last month's look at Brazil, General Milton reports here on Argentina.*

BY GEN. T. R. MILTON, USAF (RET.)

FEW nations in this world have been so blessed by nature as is Argentina. The topsoil is six feet or more deep in some parts of the almost boundless agricultural lands, making even Iowa look barren by comparison. It is no problem for Argentines to grow everything they need and export heavily to the world besides, a fact brought home to us during President Carter's grain embargo when Argentina simply picked up our slack. That they did so should have come as no surprise to an Administration whose policy toward Argentina had been emphatically disapproving.

It is hard to realize that this vast country had scarcely 2,000,000 people a hundred years ago and was largely settled in the twentieth century. Most of the immigrants were southern Europeans, Spanish and Italians for the most part, although there was a sprinkling of Yugoslavs, Hungarians, Scandinavians, and Germans. The British, while not numerous, built the railroads and had an important role in developing the agricultural industry. Argentina, more than any other nation on this side of the Atlantic, is Europe transplanted. Those Indians who survived the systematic slaughter in the nineteenth century live mainly in the isolated border regions of the north.

One-third of the population, which numbers about 27,000,000, lives in the Buenos Aires metropolitan area. Eighty percent of the population is centered in cities of more than 100,000, despite the vast pampas and the agricultural tradition of the country. That tradition is carried on by the great landholders, another way of saying that Argentina is still in the process of being settled.

There is enough oil to make Argentina more than ninety percent self-sufficient in that precious commodity. To the west, in the foothills of the towering Andes, are some of the world's great trout streams. If you like polo, the Argentines are the world standard, and the riding horses one sees hacking through the parks are evidence of a nation that takes equitation seriously.

This Catholic, Spanish-speaking country has no religious problem, no language disputes, and no racial strife. It would seem to have everything, and so it does, including an inflation rate of 140 percent.

Peron's Legacy

Inflation overshadows everything else in Argentina these days. The most visible evidence of economic deterioration is the peso, a currency that is now traded in six-figure sums for the most casual purchases. Still, one way or another, the daily routine goes on. A stroll through downtown Buenos Aires, certainly one of the most elegant cities anywhere, gives no hint of economic crisis.

Much of the immediate difficulty is traceable to the handout policies of Juan Peron, urged on, of course, by his celebrated wife, Evita, with her following of shirtless ones. Peron's legacy of openhanded government welfare, along with the militant and powerful labor unions he fostered, is a hard one to dispose of. There seems little doubt, according to various knowledgeable observers, that free elections held now would see the Peronists, in one form or another, returned to power. There is small chance of that happening for the simple reason that the military shows no sign of an early abdication. Nor does there appear to be any great enthusiasm among the more affluent populace for the renewed uncertainties of civilian rule.

Until recently, which is to say the last year or two, Argentines seemed content with their military junta, an authoritarian but not now, at any rate, oppressive government. The terrorism days of the People's Revolutionary Army (Ejército Revolucionario del Pueblo, or ERP) and the Montoneros guerrillas are still remembered, bad days when no one felt safe and anarchy seemed the imminent next step. When the military stepped in, it was with the approval of the populace at large, for the terrorists had made life unbearable.

With that kind of popular support, the armed forces made short work of the guerrillas in a classic example of counterinsurgency. Now, what is left of the merged ERP-Montonero movement hangs out in Havana where, presumably, they spend their days justifying Castro's hospitality by planning another try at tearing Argentina apart. The few small cadres that have tried to slip back have evidently all been intercepted by an alert Argentine security network.

As a consequence of this vigilance, Argentina is a peaceful place these days. The parks and streets in the major cities are far safer than those in our cities, and there is little violent crime anywhere in the country. The price Argentines pay for this tranquility is their loss of a voice in the governing process. For the first several years after the military takeover this was apparently an easy price to pay. Lately, as memories of terrorism fade, there have been signs of discontent with the military regime's performance.

The Argentine Junta

Whatever the general attitude of the country, the Argentine junta cannot be labeled totalitarian: authoritarian, certainly, but it is a far cry from being an oppressive dictatorship, although there are some dissidents who disagree. The newspapers, for instance, are allowed considerable freedom in criticizing the government and

calling attention to its shortcomings. As another example of the junta's tolerance, the park in front of the presidential palace—the Casa Rosada—is the scene every Thursday afternoon of a small parade of women— "the Mothers of Plaza de Mayo"—demanding an accounting for unexplained disappearances during the insurgency years. The junta views this weekly protest, despite its clear leftist ties, with an indulgence one would not find in Havana or in Sandinista Nicaragua. As for those who did disappear, the answer seems to be that most were probably killed in the bloody antiterrorist campaign.

According to Argentine newspaper accounts of those days, the Montoneros operated along the established lines of modern terrorism, with murder, arson, and apparently senseless violence everyday tactics, all calculated to bring about a military takeover and thus create the climate for a Marxist revolution. The difference this time is that the plan backfired. The Argentine military still feels puzzled and slightly betrayed at the behavior of the American government following this defeat of a Marxist insurgency. True, the initial days of the junta under General Jorge Rafael Videla were marked by heavy-handed suppression of any remaining guerrillas or their supporters, and there are unexplained disappearances from that time, but the end, in the opinion of the junta, justified the means.

As is almost invariably the case when a country is ruled by military forces, the Army is the dominant service. It is certainly so in Argentina where a succession of Army generals has served as President since the 1976 coup, the latest being General Leopold Galtieri who moved into the presidency last December when the military became disenchanted with his predecessor, General Roberto Viola. Since Viola's health was deteriorating, his removal from office was easily explained and went almost unremarked. General Galtieri has a reputation for both ability and toughness, in contrast to the ineffective General Viola, and so there may be some remedial measures in store for Argentina's sick economy. Just as a casual observation, tightening up of the bureaucratic overhead, both civilian and military, would be a good place to start.

The Military Mission

While there is no real military threat to Argentina, the southern border with Chile is causing a problem. The dispute has to do with the Beagle Channel—named after Charles Darwin's celebrated ship—and the ownership of three windswept little outcroppings. These islands are presently claimed by Chile, thus giving the Argentine-Chile border an east-west orientation at the continent's tip. More to the point, this line through the Beagle Channel puts Chile into the Atlantic and clouds Argentine claims to the Antarctic. Since oil and minerals are involved, the argument is not a trivial one. The Vatican has been brought in to referee this dispute, and the Pope, being a wise man, will probably continue to omit Chile and Argentina from his travel schedule for some time to come.

There is another quarrel, this time with the United Kingdom over ownership of the Falkland Islands, a rocky group 300 miles east of Tierra del Fuego and referred to very firmly by Argentina as the Malvinas. When the British Navy seized these islands early in the last century, no one much cared. Now, it seems, there may be oil somewhere about, and attitudes have changed. Meanwhile, the 1,500 or so Falkland/Malvinas sheep farmers, principally of Welsh and Scottish descent, go about their lonely occupation. Like the argument with Chile, this business of the Falklands, or Malvinas, is not likely to cause shots to be fired.

A principal mission, then, of the Argentine military is the maintenance of internal security. This is especially true of the Army, the organization and deployment of which, in five military districts or corps areas, reflects this concern. Within each corps boundary the commanding general is the final authority. The Argentine Army's presence is an unobtrusive one, but there is no doubt as to its readiness to deal with any renewed insurgency. The 130,000-man army, two-thirds of which is conscripted, with career officers and noncoms, is

The IA-58B Pucará is a product of Argentina's Fabrica Militar de Aviones (FMA), designed for the trainer/attack role in Third World countries, where it has created interest. The designers intentionally omitted and limited US components to remain free of the strings imposed by US export rules.

backed up by a large (200,000-man) National Guard. This latter, along with the Territorial Guard, can be quickly mobilized in an emergency.

The Argentine Navy, like that of Brazil, has an old ex-British aircraft carrier as its main showpiece. Unlike the Brazilian Navy, however, the Argentine Navy flies its own airplanes aboard. These presently consist of a few A-4Qs, together with some other assorted aircraft, all making for a one-squadron combat force. On order are fourteen French Super Etendard fighter aircraft to replace the A-4s. The Argentine Navy, small as it is, does not seem to have any real concerns beyond its considerable responsibilities for a coastline 3,100 miles long.

Career Air Force

The Argentine Air Force is the smallest of the three services, numbering about 20,000, of whom roughly half are conscripts. The noncommissioned officers, as well as practically the entire officer corps, are career people—conscripts don't get above the rank of corporal—and, in this increasingly unisex world, all are men. The education and training of the career half of the air force follows a carefully structured pattern.

Córdoba, a city of 800,000 400 miles northwest of Buenos Aires, is the location for both the Noncommissioned Officer's Academy and the Air Force Academy. The NCO school is an immaculate, somewhat Spartan place where budding noncoms learn technical skills in an atmosphere of strict military discipline. The NCO Academy is a three-year course, and the people it turns out are in for the long haul.

The Air Force Academy is just down the road. This is the place, the only place, save for doctors and dentists; where all Argentine Air Force officers start out. It is a most attractive school: white Spanish-style buildings set back around a parade ground that, with its trees, looks like a park. The 500 cadets enrolled in this four-year academy have an attrition rate of about forty percent over the four years, much the same as the rate at our own Air Force Academy. As nearly as I could determine, Argentine cadets leave for about the same reasons: physically disqualified for flying, academic failure, or the discipline is not to their taste.

As at our own service academies, there is a heavy emphasis on mathematics and engineering, while the military side reflects a German influence of earlier days. It is an influence that is felt in the career progression system, one that ties the career ladder to a successful completion of schools along the way. Beginning with graduation from the Air Force Academy, the Argentine officer can look forward with reasonable certainty to reaching the rank of colonel providing he negotiates the schools satisfactorily.

The Army plainly runs the government, the Navy patrols the Rio de la Plata, or River Plate, and guards the coast line, and the Air Force fills in the spaces, so to speak. Beyond the traditional task of air defense, a mission carried out for the present by aging Mirage IIIs, the Argentine Air Force has a number of other duties.

It is responsible for air traffic control and operates all the main airports. The modest but interesting Argentine space effort is supervised by the Air Force, as is the resulting cartographic interpretation of the results. This space program does not stop, however, with satellite mapping. Argentina is experimenting with weather modification, solar observation techniques, and solar energy. Wind energy is being studied with an eye to harnessing the incessant winds in Patagonia and along the coast.

The space organization is doing studies in geophysics, economic geology, and it is tied in with the Exametnet program, a cooperative international study of the upper atmosphere using sounding rockets.

Aircraft Manufacturing

Then there is the aircraft manufacturing plant, FMA, which is operated by the Air Force's material command.

FMA—Fabrica Militar de Aviones—is also located in Córdoba, making that city very much an Air Force town—the San Antonio, Tex., of Argentina. This moderate-sized—the work force is about 4,000—aircraft plant and overhaul facility is Argentina's bid for relative independence from foreign suppliers. While FMA has neither the evident aspiration nor the capability to develop and build big transports or advanced fighters, it has made important developments in less sophisticated airplanes.

The showpiece of FMA thus far is the Pucará, a twin-engine two-seat design aimed primarily at counterinsurgency (COIN) warfare, although it also makes a useful trainer. So far, the Pucará has been equipped with French Turboméca Astazou turboprops, an engine that has given a few problems with surge—an unsettling event during tactical maneuvers—and excessive shaft torsion during high-G pullups. The factory is presently testing a Garrett engine as a replacement. The Pucará carries a good bomb load; it is simple to fly and maintain, and has excellent STOL characteristics. All in all, a useful COIN airplane that may have a market in the Third World.

FMA has also built a number of small turboprop transports, the Guarani. Like the Pucará, the Guarani has Turboméca turboprops and occasionally has the same surge difficulties, unless my own experience as a Guarani passenger was unique. Since this airplane is unpressurized, it cannot take real advantage of its turbine engines. The Guarani is roughly the size of the Beech C-12 and thus is in a very competitive field so far as foreign sales are concerned.

The new development at FMA, the one that really has the staff's attention, is a joint venture with Dornier of Germany. This project involves a two-seat high-wing jet trainer that can also double as a fighter-bomber. The prototype and first four airplanes are to be built in Munich. Then, if all goes well, serial production will take place in Córdoba, with certain components, like landing gears, produced in Germany.

FMA also produces general-purpose bombs up to 500 kilograms, air-to-ground rockets, fuzes and rocket launchers, together with parachutes and various other life-support items. The presence of Córdoba University nearby is of mutual benefit to both the school and to FMA.

The Argentine Air Force, then, is small but busy. While it never forgets its role in any guerrilla war that might break out, the Air Force has acquired an interesting and productive peacetime mission for itself.

US-Argentine Relations

The United States has had little influence on the Argentine Air Force's development or, for that matter, on Argentina itself these past three decades. When the neo-fascist government of Juan Peron came to power in 1946, it was a regime that had too many reminders of Hitler's Germany, or more exactly, Mussolini's Italy, to be a friend of the United States. The times since Peron, including his brief second coming, have been bad ones for Argentina and its relations with America. This past year has seen the first friendly overtures made by this country toward Argentina in a long time.

Even now, however, the suspicion lingers in the press and elsewhere that Argentina remains an unreconstructed latter-day fascist state, violating human rights and practicing anti-Semitism. This latter charge has been given a boost by the tale of Jacobo Timerman—*Prisoner Without a Name, Cell Without a Number.* Timerman's book enjoyed great success in the United States last year as the story of a man persecuted in Argentina because he was a Jew. The Argentines have a different version of why Mr. Timerman was jailed. According to them, and the evidence is persuasive, Timerman was jailed because of his tie-in with the radical terrorist movement. As for anti-Semitism, it may have had a brief run during World War II, but there seems to be no evidence of any such activity now.

Despite the coolness that has marked Argentine-United States relations in recent years, the cordiality of Argentine Air Force people toward an American visitor is uninhibited and warm. There is an evident desire on the part of the Argentines to move closer to the USAF. Since there seems to be a similar friendliness on the part of Argentine Army and Navy officers toward their United States counterparts, the thought naturally comes to mind as to whether we might look forward to a more formalized military relationship.

We are in an early and tentative stage of our new Argentine friendship. So far, the prospects look encouraging for it to prosper, if for no better reason than that it is in the interests of both countries. Thinking in terms of hemispheric security, it is clearly in both our interests to share some feeling of mutual trust since we both share the same potential enemy. There are other reasons why we and the Argentines should get along well, not the least being that Americans find it easy to like the Argentine people.

Argentina, however, is far away, and our recent relations have been pretty distant as well. For now, the best course would appear to be a careful one of cultivating this friendship, meanwhile working to get the restrictive laws off the books that inhibit and even prevent the easy exchange of military people for training and schools. ■

Gen. T. R. Milton's by-line is one familiar to AIR FORCE *Magazine readers from his monthly columns on airpower issues. A 1940 graduate of the US Military Academy, General Milton went on to command air units in Europe during World War II. Later assignments included service as Chief of Staff of Tactical Air Command and as Comptroller of the Air Force. Just prior to his retirement in 1974, he served as the US Representative to the NATO Military Committee. His report on Brazil appeared in the March '82 issue; his report on Venezuela will appear in a future issue of* AIR FORCE *Magazine.*

Agents W. A. Ahl, left, and James E. McNeil, Jr., demonstrate apprehension procedure on OSI's A1C Paul J. Skinner.

—USAF photo by A1C Lisa M. Tilly

For more than thirty years, the Air Force Office of Special Investigations has been countering criminal and hostile intelligence threats to Air Force people and resources. The tactics, people, and priorities have changed, but the OSI is still . . .

AFTER THE BAD GUYS

BY CAPT. PHIL LACOMBE, USAF
CONTRIBUTING EDITOR

NOTHING to this operation. Spend a while "drycleaning" myself to make sure I am not being followed, pick up a package at the post office, and make the "drop" into a green pickup truck parked outside the base bowling lanes.

I'll start with coffee at the Bolling AFB Officers' Club. Walking quickly, I scan the parking lot and street. Nobody in sight except a blue-suited NCO shifting his weight from one foot to the other in an impatient dance at the bus stop. Maybe he's watching me.

Approaching the club, I'm sure no one is watching. I don't hear the muted click of the Air Force Office of Special Investigations' (AFOSI) camera hidden in the back of a truck.

Inside, I decide on a cup of coffee in a deserted bar/dining room. A young woman, dressed in jeans and down-filled vest walks in. Probably just someone looking for the cashier's cage. To be on the safe side, I slip into the kitchen and out through the trash loading dock. No one watching.

Walking around the base, I begin to think I'm being watched. No worry—a couple of briskly walked miles including ducking in and out of two buildings and a tramp through the woods—and I now see no signs that I'm being followed.

Into the bowling center and out a different door. Across a parking lot and into the post office. My contact hands me the package and I'm out the back door. No one around—I'm in good shape.

Now to head for the drop. There's the woman from the club again, and the guy she's with was in the BX, I've seen that fellow in cowboy boots before, and that man in the red jacket is back, but he's now wearing a blue jacket. No doubt about it—the OSI is closing in.

I head away from the drop, hoping to throw them off and stop at the Air Force Chief of Chaplains' office for a cup of coffee with an old friend—maybe I can slip out the back door and lose them again.

After coffee and apologies for so short a stay, I head for a side door. As I hurry through the door, I realize the couple discussing their marriage plans with one of the Chaplains are really agents also.

It's almost 3:00 o'clock. I have to make the drop. Into the bowling alley, duck into the men's room and loiter for a minute. When a young man, surely an agent, enters, I leave and head out another door. Quickly walking toward a tractor trailer in the parking lot, I am aware of footsteps behind me—make a U-turn and walk right back to the bowl-

ing alley—in one door, out the other—pause to let the couple I spotted before walk by—and toss the package through the open pickup truck window. Success! They had their backs to me and surely didn't see the drop.

But the other five agents did, and they are in position, waiting for the pickup truck owner to appear.

My career as a spy and courier was short. In fact it lasted only one day, as I played "bad guy" for a team of seven OSI trainees at Bolling AFB. The game is an important part of the training program preparing Air Force members to become OSI agents. If this training scenario reads like a scene from a book about the Federal Bureau of Investigation (FBI), it's not by accident.

In fact, AFOSI's heritage can be traced directly to the FBI. In 1948, Air Force Secretary W. Stuart Symington responded to a congressional suggestion that the Air Force needed a special investigating organization, separate from the existing command structure, to eliminate command influence on investigations.

Thus, OSI was established under the Air Force Inspector General. The new investigative agency modeled its structure and procedures after those of the FBI, and the first director of the OSI was Joseph F. Carroll, formerly the Special Assistant to the Director of the FBI.

Over the years the OSI evolved into its current position as the Air Force Office of Special Investigations, a separate operating agency under the supervision of the Inspector General.

Today, the AFOSI, known around the Air Force as the OSI, is headquartered at Bolling AFB, D. C. AFOSI Commander Col. (Brig. Gen. selectee) Richard S. Beyea, Jr., and a headquarters and base support staff of about 140 officers, 210 enlisted people, and ninety Air Force civilians direct AFOSI's activities around the world. Most of the agency's more than 150 detachments and offices are located on Air Force bases; some, like the offices in Seattle or Paris, are not.

In addition to the detachments, which may range in size from a couple of OSI agents to twenty, the agency has twenty-six District Offices commanded by senior OSI agents (lieutenant colonel and colonel). These District Offices provide an intermediate level of command—each District Commander is responsible for OSI operations within the district's geographic area. Detachment commanders report to the District Commanders and conduct operations within their own areas of responsibility.

Special Agent Danny Marks and Security Police TSgt. Richard Hutchings gathering evidence during an exercise to sharpen their crime-scene investigation skills. AFOSI and Air Force Security Police work closely together on crime investigations.

In addition to the almost 450 people at Bolling AFB, there are about 370 officers, 1,210 enlisted people, and 250 civilians assigned to OSI field units. Though the agency has all the traditional staff functions of any separate operating agency, most OSI people (more than eighty percent of the military and twenty percent of the civilians) are trained investigators, known as agents. These are the people who carry the gold OSI badge and credentials.

For the most part, the agents handle the operational portion of the OSI mission. Basically, the mission is to provide professional investigative support for Air Force commanders at all levels. At the headquarters, the agency divides its tasks into criminal, counterintelligence (which includes counterespionage, antiterrorism, and Protective Services Operations), technical services, and fraud investigations. Though agents sometimes specialize in a specific investigative arena, especially while assigned to the headquarters or a district office, at the detachment level the size of the work load is so great that agents often have to leave one detail to assist with another, depending on the changing priorities.

New Priorities

Though criminal investigations still account for about sixty percent of an OSI field office's effort—with drug investigations accounting for sixty percent of that effort—Colonel Beyea notes that the worldwide terrorist threat to Air Force people and resources requires the agency to spend more time on security-oriented operations. In addition, responding to the Presidential emphasis on combating fraud, waste, and abuse, the agency is committing more resources to fraud investigations. At the same time, Colonel Beyea says, "Counterintelligence operations can become our number-one priority on any given day, based on the evolving threat."

But the agency's new priorities are not limited to the investigative missions performed. "When I was Chief of Staff here," Colonel Beyea mentions, "one person read every piece of incoming and outgoing message traffic." Other senior OSI people note that authority and responsibility were so centralized that the headquarters reviewed every investigation and controlled many field investigations.

Those days are gone. Each func-

tional director is now responsible for activities within that directorate. Although the headquarters does conduct its own investigations, those of field units are no longer routinely supervised by the headquarters staff. "We have good people in the OSI," says Colonel Beyea. "They are professionals and are going to be treated like professionals."

Colonel Beyea's confidence in the quality of OSI people is shared at all levels of command within the agency. Agents often refer to themselves as being among the Air Force's best. In part, that attitude results from the stringent selection process. Air Force enlisted people can apply for the OSI only after selection for career status. Following a series of interviews, which begin at the applicant's home base, a background investigation, testing, and other procedures, applicants may be selected for OSI training.

In addition, OSI agents subscribe to a written code of ethics that goes beyond the UCMJ (Uniform Code of Military Justice) and other guidelines common throughout the Air Force. This code describes the very strict standards that agents believe are required to ensure that they, and their work, are always free from criticism or the potential for compromise. To enforce the code, the agency relies on the agents themselves and a special internal investigations unit in the OSI Inspector General's office.

This view of the OSI as a high-quality organization is not limited to OSI people. Supervising Special Agent Robert Hazlewood, an instructor at the FBI Academy at Quantico, Va., who has taught law-enforcement officials from around the nation, notes that OSI agents are among the most professional he has encountered. Agent Hazlewood says, "They are very professional people. In fact, they are our favorite group of students because they are sincerely interested, open-minded, and they want to learn." He also indicates that OSI and FBI agents have the same image within the law-enforcement community—as professionals, who do their jobs very well. The similarities between the two organizations—policies, structure, selection criteria, and quality of people—and the results of the many joint investigations conducted serve to reinforce the FBI agents' positive view of the OSI, according to Agent Hazlewood.

Another priority for Colonel Beyea is echoed by many senior staff members: to ensure that the Air Force and OSI itself understand that the OSI mission is to support Air Force commanders in maintaining the combat readiness of their forces. The agency is now briefing Air Force commanders' courses—"Telling them who we are, what we have, and what we can do," says Colonel Beyea. These briefings, coupled with others at Professional Military Education (PME) schools and increased interaction between local commanders and OSI detachment commanders, are designed to assist Air Force people in understanding the OSI's role in the Air Force.

"We are very much a part of the blue-suit Air Force, even though our duties often require that we wear civilian clothes," says Col. Joe L. Harvell, Jr., a veteran of twenty-six years in the OSI and recently retired Director of Criminal Investigations at OSI headquarters. However, OSI agents tend to spend their entire careers in OSI and, in the past, OSI agents were discouraged from leaving the career field. As a result of this attitude and OSI's specialized mission, Colonel Beyea says, agents may not have developed the same intimacy with the Air Force and its mission as their colleagues in other career fields.

This is a particular concern for Colonel Beyea. Prior to being named OSI Commander, he was the base commander at Kadena AB, Okinawa, Japan. "I learned that when your primary mission—being able to launch airplanes—can't be accomplished for one reason or another, you can't really make drugs in the dormitories your number-one worry. When the mission-hindering situation is resolved, other concerns become important again." Making OSI more responsive to the needs of Air Force commanders requires increased interaction between commanders and OSI staffs, according to Colonel Beyea. To promote that interaction and provide better support at all levels of the Air Force, OSI is now assigning senior agents to the staffs of selected major commands. The primary objective for these agents is to enhance counterintelligence support to Air Force commanders. They also act as a focal point for their commanders on other aspects of OSI investigations.

Another aspect of the agency's push to attain an Air Force perspective, rather than an OSI-only perspective, is the current emphasis on PME for agents. CMSgt. Alan H. Minor, the senior enlisted representative and source manager of District 4 at Andrews AFB, Md., encourages district agents to volunteer for PME courses. Chief Minor's boss, Col. Fred N. Hopewell, District 4 Commander, says he never refuses to release agents for PME residence schools. The same is true at headquarters, where more than one agent has heard the senior staff endorse the value of PME.

The OSI Family

Like many commands, OSI's leadership often refers to the OSI family. Though it sounds trite, in this case it is true. "We're a kind of extended family," says Colonel Harvell. He means it, and most OSI people agree.

Such closeness and camaraderie might be expected among a group of people involved in specialized and secretive work—especially when you consider that many of them find potential Air Force friends are somewhat suspicious of the OSI. But that's easily overcome, say several of the senior NCOs and officers. Likewise, you might expect to find that agents and support people don't mix in the agency. Not true, according to AFOSI senior enlisted advisor CMSgt. David O. Goodman. An administrative support specialist, Chief Goodman notes, "We're all part of the OSI team. There is no difference between agents and support people here." In fact, as the Chief says, some support specialists enjoy the agency so much they stay for quite a while—with sixteen years in OSI, the Chief is a pretty good example of that. Agents and support people agree: "This is the best job in the Air Force."

Perhaps for them it is, but it isn't an easy job. Chief Goodman says OSI agents typically spend a lot of nights and weekends at work. They are always responding to events, so personal and official schedules are

Lt. Col. John Adams, OSI Academy Commandant, demonstrates crime-scene photography techniques.

often disrupted. In addition, the limited resources within the command require a lot of TDY trips in support of operations worldwide. These factors put the agents and their families under a lot of pressure, with the potential for increased people problems.

For just that reason, the agency's leadership has been attending more actively to the personal needs of OSI people. Colonel Beyea and others from the headquarters are visiting all OSI offices and meeting with OSI people to identify and resolve situations that may become problems. They have also been briefing OSI families about their mission—removing the cloak of secrecy wherever possible.

A major undertaking for the agency this year is its own Family Conference, scheduled for mid-April at Bolling AFB. The meeting will address the peculiar problems OSI families face.

Criminal Investigations

OSI has definitely changed. New mission priorities, additional attention to people programs, efforts to support Air Force commanders more effectively, and decentralization of authority are only part of the story. There are also changes within the investigations or operations areas.

With the increased emphasis on fraud and protective service operations, the agency is finding new ways to accomplish its criminal investigations mission. The crimes investigated by the OSI are diverse—everything from the most serious crimes of homicide, rape and other sex offenses, major thefts, assault, drug trafficking, and destruction of government property, to the less serious crimes of fraudulent enlistment and minor document forgery. To give all crimes the attention they deserve, despite limited manpower, the OSI is working closely with Security Police investigators to ensure that criminal activity is addressed properly. OSI is being supported, in some less serious crimes (simple possession and minor theft, for example) that do not require specialized investigative techniques, by local Security Police units.

"This doesn't mean we don't care about the drug user," says Colonel Harvell. "Rather, we are concentrating more on the drug pushers and the crimes that require our specialized resources," he continues.

OSI's efforts in criminal investigations are as diverse as the crimes being investigated. In some cases the sophisticated surveillance techniques of the Technical Services Division are required. In others, undercover agents and sources are used. In still others, the routine gathering of evidence eventually leads to solution of the case. When sophisticated techniques are required, they are readily available from within the agency.

Among the most frequently used investigative tools is forensic science. The OSI has specially trained agents, known as Regional Forensics Consultants, stationed around the country and overseas. These consultants are OSI agents who received AFIT-sponsored master's degrees in forensic science, including a seven-month course at the Armed Forces Institute of Pathology. They are available to OSI offices within their region to provide expert advice on the processing and interpretation of evidence, as well as conducting the sophisticated tests required to analyze evidence.

Also available to OSI agents and commanders throughout the Air Force are OSI's polygraphers. These agents are specialists in interviewing and polygraph interpretation. As an investigative tool, the polygraph, sometimes called a "lie detector," has been successful in helping agents to elicit confessions, as well as in establishing innocence.

Another tool available for criminal investigations is the headquarters' Criminal Investigations Directorate's crime analysis capability. According to Colonel Harvell, the new technique of crime analysis is computer-aided analysis of specific crimes, techniques used to commit crimes, circumstances surrounding crimes, and so on. This data can provide useful results for investigators and Air Force commanders. Since intentional aircraft damage is sometimes a significant problem in the Air Force, for instance, the agent-analysts at the headquarters went to work on it. By analyzing relevant investigative reports, they were able to categorize people who intentionally damage aircraft according to motive, which they correlated to the types of damage. What finally resulted is a "blueprint" for investigating aircraft damage that is useful in identifying the guilty party. In another case, the analysts assisted a district office searching for a rapist by using computers to identify Air Force people fitting the victim's description who were in the area on the day of the crime. In this case, a suspect was identified, and later convicted.

You Talk—You Die!

Perhaps the most exciting investigative tool available is the undercover agent. The headquarters recruits agents for its formal undercover agent program. "We try to get them before they develop the three-piece-suit look," says Chief Minor. After training for undercover work at the OSI Academy, these agents work at various bases on different investigations.

The work is stress-filled, difficult, and sometimes dangerous, but undercover agents are successful. In a recent drug case, two Air Force members convicted of heading a large drug ring overseas hired a "hitman" to kill a witness. Unfortunately for the ringleaders, the "hitman" presented staged photos of the dead victim, received his final payment, and then assisted in arresting the conspirators. He was working undercover for OSI.

Another recent success involved an undercover agent at a different overseas location. "I was given two weeks of OJT [on-the-job training] in supply at a base here in the

States," the agent says, "and then off to supply." The agent's job was to infiltrate a supply theft ring.

After weeks on the job, the agent was recruited into the ring by one of his coworkers. "He told me what he wanted me to do and then he said, 'If you talk, you're dead!' He wasn't kidding—these guys thought they were the Mafia. The boss called himself the godfather, and he even had a hitman on retainer." This agent, a veteran of five years of undercover work, took the threat as seriously as it was intended. During the remaining months, while he waited to advance far enough within the organization to be able to bust it, the agent said that the key to survival was to remain alert—"And for me that means staying scared."

This ring was so extensive and so well organized that it stole more than $750,000 of government property in one day. Eventually, this undercover agent and another undercover agent also assigned to the case had enough evidence to break the ring, which had operated for between nineteen and twenty-six years. Thirty-one civilians and seven Air Force people were arrested.

Closely related to the use of undercover agents is OSI's use of sources in various base organizations. Sources are volunteers, who may be airmen in a dormitory, in the BX, or other people in positions likely to encounter crime. Sources are especially helpful to the Air Force in OSI's offensive operations attempting to combat crime or put the pusher or theft ring out of business rather than just investigate incidences of drug abuse or theft. When sources are used, appropriate commanders are informed. Information from these sources, whose identities are protected, is channeled through the district source manager. Source managers guide agents in handling sources, help evaluate source credibility, and analyze source information.

Psychologist—Agent

OSI headquarters is the only federal investigative unit with a Clinical Psychologist assigned, according to Maj. Neil S. Hibler, the agency's psychologist. Dr. Hibler, who was already an agent before becoming a psychologist, provides a unique service to the agency's investigators. He consults with investigating agents to help clarify the psychological status of witnesses, suspected offenders, and victims. With his assistance, agents are better able to conduct sensitive interviews and determine the facts in a case.

When agents are conducting investigations where the subject is unknown—an arson case for instance—Dr. Hibler can produce psychological profiles that may assist in identifying potential suspects. He also performs psychological autopsies to aid in determining whether a death was suicide or homicide. Finally, Dr. Hibler, a trained hypnotist, conducts hypnotic interviews with witnesses and victims to enhance their recall of the circumstances surrounding an incident being investigated. Though hypnosis has been effective in OSI investigations, it is only authorized when traditional investigative techniques prove inadequate. Further, according to Dr. Hibler, the agency requires corroboration of information learned from hypnotic interviews.

Technical Services

Among the most sophisticated of OSI's investigative techniques are those performed by the technical agents assigned to the Technical Services Directorate at the headquarters and throughout the command. Technical agents provide the covert optical and electronic surveillance required in some investigations. OSI's technical surveillance activities are limited by legal constraints and used only after a comprehensive approval process is satisfied.

When called upon, technical agents provide photographic surveillance using hidden cameras or video recording equipment—to catch a dishonest cashier in the act, or capture an Air Force member passing information to a hostile intelligence service. They also have starlight scopes for visual surveillance at night and a number of carefully controlled electronic eavesdropping, wiretapping, and concealable two-way radio devices.

In addition, technical agents perform Technical Surveillance Countermeasures surveys at the request of Air Force commanders. These physical, electronic, and visual inspections are designed to detect and neutralize the technical surveillance devices of hostile organizations. The agency doesn't discuss methods used to "de-bug" Air Force facilities, but it does acknowledge that hostile collection devices have been found in US facilities worldwide.

Fraud

One area receiving increased attention by the OSI is fraud. Lt. Col. Ed Drane, Director of Fraud Investigations, describes the OSI's work in this area as part of the federal effort to combat fraud, waste, and abuse. OSI operates within the Air Force's structure of the Air Force Audit, Inspection and Investigations Council (AFAIIC), which is chaired by the IG to coordinate efforts of the OSI, Security Police, Air Force Audit Agency, the General Counsel, Air Force Safety and Inspection Center, and the Judge Advocate General, to eliminate fraud, waste, and abuse.

Within AFOSI, all field offices are striving to dedicate thirty percent of their time to fraud investigations, and the OSI has requested forty-eight new fraud-dedicated investigators. Colonel Drane acknowledges the size of the task and explains that fraud investigations are particularly difficult since there is no starting place—no proven crime to work from—and people seldom report fraud. This means investigators often have to detect fraud themselves, although increased sensitivity of Air Force people and the publication of the *Indicators Handbook* by the AFAIIC have helped increase the number of fraud complaints. Further, auditors and inspectors have developed checklists and programs to detect fraud.

Fraud investigations are complicated and may involve sophisticated manipulations of supply and other Air Force systems—these things take time and resources to check. They also require an intimate knowledge of the Air Force logistics, computer, contracting, and other systems. To provide this, Maj. Terry Owens, of the headquarters Fraud Investigations Directorate, says that OSI agents are recruited from those fields, and other agents are trained in those fields during

basic and advanced investigator training. Selected OSI agents also attend the same technical schools as the officers and NCOs who work in career fields where significant resources are managed. This approach allows investigators to better assess the potential for fraud and, during crime prevention surveys, investigators can point out weaknesses for resource managers.

When allegations of fraud point to wrongdoing by contractors, there are special problems for a military investigative agency. For example, contractors could falsify employee time cards, expand the payroll with fictitious names, charge costs from a commercial contract to the Air Force—contractors even bill the Air Force for products never delivered.

There may also be coconspirators in those Air Force offices where discrepancies are likely to be spotted. The list is endless—especially when you consider the potential inherent in some computer manipulation schemes, such as redirecting government property for personal gain. There are limitations on the OSI's ability to investigate civilians and contractors. For the most part, says Major Owens, close cooperation with the FBI resolves this problem.

The agency's efforts to combat fraud cover many areas. They work closely with the Air Force Office of Computer Security to identify opportunities for computer-aided fraud operations and they pursue an aggressive educational program to make Air Force members aware of fraud indicators. The cooperation of Air Force members is critical to detecting and stopping fraud—so critical, in fact, that District 4 at Andrews set a goal of briefing forty percent of the local Air Force population about fraud and fraud indicators. Their effort met with a good response from local Air Force people, and more than seventy percent have already been briefed.

Counterintelligence

Another OSI mission is counterintelligence. This too is a large mission. Col. Richard F. Law, headquarters' Director of Counterintelligence, describes the mission as "ensuring that, to the best of our ability, the Air Force commander is prepared to perform the Air Force mission. We inform Air Force commanders of the threat to their resources and personnel—whether from a hostile intelligence service, a terrorist group, or another foreign-directed threat."

There is no doubt among the counterintelligence people about the importance of their mission. Such subjects as dealing with possible KGB penetration of the Air Force, protecting the lives of Air Force people, and collecting threat data are standard fare among OSI agents assigned to counterintelligence. "Before any threat can be countered," Colonel Law says, "it must be detected. OSI does this by collecting, analyzing, and disseminating information impacting on USAF security. OSI's 'clearinghouse role' for terrorist threat information has assumed critical importance in recent years."

The counterintelligence mission, in part, involves developing and maintaining a network of sources that can provide information about potential threats to Air Force people and resources, analyzing that information, combining it with additional information received from other agencies, and making an assessment of the terrorist and hostile intelligence threat to Air Force bases, missions, and people. Special analytical reports, briefings for Air Force leaders about terrorist and hostile intelligence threats, and other products are produced from this information by the counterintelligence agents. In addition, counterintelligence agents also perform vulnerability studies to identify weaknesses in security procedures and systems.

Counterintelligence agents also spend a portion of their time communicating with local base populations about the threat. Through the required annual briefing for Air Force members about hostile intelligence threats, which includes instructions to report all contacts with Communist country nationals to the OSI, counterintelligence agents help Air Force members remain aware of the threat.

When a specific intelligence threat is identified—for example if an Air Force member reports that he met a Soviet official who asked a lot of questions about the Air Force member's job—the OSI acts to neutralize the threat.

The hostile intelligence threat is significant, but what worries Colonels Law and Beyea more is the terrorist threat. Recent episodes of kidnapping and killing of US officials only reinforce their concern.

Naturally, high-ranking Air Force members, especially those overseas, face the greatest threat as targets for terrorist organizations. For this reason, the OSI has been placing increased emphasis on its Protective Service Operations (PSO) mission. Threat assessment, according to Colonel Law, is still the key to effective protection of Air Force officials, but the OSI goes beyond that.

Antiterrorist Operations

Many OSI agents have been specially trained for the PSO mission. They are completely prepared for this mission and have been performing it for many years—in fact, the OSI is relied upon by other federal agencies, like the Secret Service and State Department, to assist in protecting foreign dignitaries who are visiting the US. Today, the threat is so great that permanent details of OSI agents have been assigned to some Air Force officials. These agents are armed with automatic handguns and other unique weaponry, the latest in communications devices, and various other protective equipment. They are also trained in evasive driving and other exotic skills.

Maj. Frank Johns, an agent in the headquarters' PSO office, says PSOs are only part of the agency's antiterrorist mission of maintaining the safety of Air Force people and resources. This is distinct from the missions of counterterrorist units, which tactically engage the terrorists, such as in a rescue attempt.

Though the primary targets of terrorist groups are likely to be senior officers, Major Johns notes that the terrorist objective—publicity—can be gained by attacking any American military person, regardless of rank. Because of this, the OSI has been active in educating all Air Force people about the terrorist threat and how to reduce their vulnerability to terrorist attack.

An important part of this effort, according to Major Johns, is understanding that "guns and body armor alone aren't the answer. Rather,

common sense, being alert, and taking care are the secrets to staying alive. In short, informed awareness."

Colonel Law and Major Johns point out that terrorists today are more sophisticated than ever before. Colonel Law's section has reviewed various reports of terrorist incidents and has graphic evidence of the sophisticated tactics, equipment, and techniques employed by terrorists. They don't kidnap an American at random. Rather, they watch their intended victim to identify behavior patterns, determine when the victim is most vulnerable, and effectively plan the operation.

Major Johns, a veteran of hostile antiterrorist assignments who claims that "When it comes to staying alive, I won't take a back seat to anybody," has some suggestions for Air Force people in high terrorist threat areas. A few can be cited here: Vary your route wherever you go—be unpredictable. Do not allow strangers into your house until you can verify who they are. Include security among the criteria for selecting a place to live. Become familiar with your neighborhood and be able to spot unusual people, circumstances, or cars that do not belong. Finally, report your suspicions to the OSI. If you don't report it, nothing can be done. Though you might be apprehensive about making such a report, the OSI will take it seriously—more than one Air Force member has avoided becoming a terrorist victim by making just such a report.

The OSI Academy

These sophisticated missions require more than high-quality people and exotic equipment; they require people who are well trained for these jobs. The heart of OSI's training and education program is the USAF Special Investigations Academy, operated by the OSI at Bolling AFB.

Known as the OSI Academy, the school conducts an intensive twelve-week course. The faculty of sixteen officers and one NCO, many of whom have master's degrees, annually teaches five to six basic investigator classes of about forty students. Among the subjects covered in the course are such practical skills as surveillance techniques, making plaster casts, fingerprinting, photography, and self defense; and other classes that are indispensable to the agents, like rules of evidence, the UCMJ, OSI information collections, Base Exchange system operations, the Air Force supply system, hostile intelligence services, and so on.

Special Agent Bill Brown, an instructor at the Academy, describes the instructors' job at the Academy: "We try to prepare these people for their roles as investigators. We give them the basic elements they will need to perform at a base detachment. However, that's where the learning will really begin to take place."

In addition to the basic course, Lt. Col. (Col. selectee) Hugh W. Barber, Jr., OSI Director of Training, says the Academy also provides specialized and advanced courses. Courses on PSO operations, undercover operations and source management, and others provide the specialized education agents require.

The Academy also conducts a continuing education course, called the Senior Investigators' Course. About forty agents, each with a minimum of three years of investigative experience, attend the course each time it is offered. This course builds on the basic course with additional information and complicated field exercises, requiring the use of sophisticated techniques and equipment.

OSI's training program is enhanced by cooperation with other agencies. The Secret Service, FBI, OSI, and others provide special courses for each other. Senior OSI investigators, for instance, spend several days at the FBI Academy. There, the agents benefit from the best training available in investigative matters in the country. But the experience at the FBI Academy is more than training. In one course, for example, an FBI agent delivered a particularly poignant class designed to increase the agents' sensitivity to rape victims. During the class, the instructor played a telephone tape recording of an actual rape, made several years ago by a police dispatcher. In the hall afterwards, several "hardened" OSI agents were obviously affected by the recording. One expressed the determination of the whole group—"When I get back to my base, I'll handle the next rape case myself!"

Retention

The OSI, elite as it is, has not been insulated from the Air Force-wide problem of keeping experienced people. There is much competition from the private sector and other federal agencies for people with the training and experience of OSI agents, according to Colonel Harvell. The problem would be greater, say OSI officials, if it weren't for the high quality of Air Force people who become OSI agents. OSI leaders are confident the new agents will learn quickly and continue to provide the support Air Force commanders expect.

Also helping to ease the burden are OSI's reservists. These reserve agents, most of whom are law enforcement specialists in their civilian jobs, are an integral part of OSI's mission today. They work in every aspect of OSI's mission, but, Colonel Hopewell says, are particularly valuable on PSO operations. Since PSO operations take priority over other missions, OSI agents are taken from other investigations for the intense work of a PSO. When reservists are used, fewer agents have to be pulled from their other duties.

Colonel Hopewell is enthusiastic about reservists. In New York City, where he has only three active-duty agents, a PSO operation would require him to shift agents from detachments all over the district. However, he has been able to use OSI's reservists in New York to provide much of the manpower. The result for District 4: they are able to provide protection as good as that provided by the Secret Service, while limiting the impact on other operations in the district.

The use of reservists is just one change among many in the AFOSI today. There's no doubt that the agency has changed and OSI agents tell you that the agency has changed for the better—it's stronger, better trained, more versatile, and, most important, more responsive to the needs of Air Force commanders. But they also tell you that some things haven't changed—the basic mission—"We're still after the bad guys." ■

The US press coverage of the El Salvador situation compounds the absence of an Administration strategy there. Decisions and actions may be taken without fitting them into an overall plan.

Develop Strategy, Then Act

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

IF THE Battle of Waterloo had been recorded for evening television in living and gory color, Wellington would have been lucky to have remained a general, let alone a Duke and England's most celebrated figure. Waterloo, like any combat situation, had some unpleasant aspects to it: teen-agers ripped apart by cannonballs, bayonet stabbings, the desperate violence of men fighting at close quarters to the death. Then there was the matter of the battlefield wounded who were largely left to their fate during the long night after Napoleon's retreat, with no water and no medics, and with scavengers roaming the field.

It was Wellington's good luck that television crews were not around to join his camp followers. For that matter, it was good luck for everyone, even the French, that Waterloo's glory was not tarnished by modern reporting, for it did represent a great moment in European history. A Napoleonic victory there would have meant, almost certainly, years more of war and further decimation of Europe's young men.

Now the ever-present electronic eye has caught our own young soldiers in the act of carrying M-16 rifles in El Salvador, to the immense glee of self-righteous critics of militarism in any form. The rules say our handful of advisors in that land must not engage in combat. Since it is not clear the Salvadoran rebels understand those rules, or have even heard of them, a certain risk goes along with an advisor's job. Apparently, our fellows, while sedulously avoiding starting a fight, felt safer with M-16s in their hands. The television crew was safer as well, a point I have not heard made.

It is hard to imagine a matter more trivial for a major power. The excuse for the commotion comes from an expressed fear that El Salvador may turn into another Vietnam. All of which brings back old memories of Vietnam itself, perhaps the most-publicized and least-understood conflict in history.

Without embarking on an argument about the tactics we used—certainly an arguable matter—let's remind ourselves of why we went to Vietnam in the first place. It was, after all, during the first year of John F. Kennedy's New Frontier, a time when our young President had announced that we would go anywhere and to any lengths to defend freedom. Looking around for a place to make good that pledge, Kennedy chose Vietnam. President Diem was anti-Communist and a devout Catholic to boot, and was having a difficult time in 1961 dealing with a growing Viet Cong insurgency.

President Kennedy dispatched Gen. Maxwell Taylor, then retired and serving as White House military advisor, to Saigon for the purpose of finding out what the United States should do in Diem's support. It is interesting, in retrospect, to realize that Taylor's mission was to find out what to do, not whether anything should be done. At any rate, Taylor, with White House security advisor Walt Rostow as his deputy and an assorted group of staffers, set out on what proved to be a historic mission.

They picked me up along the way, presumably on the grounds that I, as Thirteenth Air Force Commander, might know something useful. We spent ten days on that survey and then repaired to Baguio in the mountains of Luzon to write the report.

The recommendations to the President resulted in more advisors, a tactical air control system, helicopters, and other weaponry—in other words, US involvement well beyond the military assistance program then in force.

What is really significant, however, is that we concentrated all this new help on South Vietnam, with only a passing thought about Cambodia, Laos, or the source of all the trouble, North Vietnam. The United States in its innocence truly believed, as no one else in Indochina believed, that there were borders within which people would agree to fight. Ho Chi Minh, not a naïve man, knew the war was about Indochina, a continuation of the war he had fought with the French.

To put it plainly, Ho Chi Minh had a strategy, and we did not. Once in awhile, notably in 1967 and again, briefly, in December 1972, we tried out the strategy of destroying Hanoi's will to fight, but we stopped both times just short of the goal. Instead, we lost our will to fight, victims of our own propaganda, as we fulfilled Ho's prophesy that we could never stick the course.

Any mention of Laos and its critical importance as a North Vietnamese supply route was met with a rebuke in those early days. Laos, it seems, was a different situation and was not to be discussed by people who did not understand our curious and private arrangements for that country. Cambodia was still another matter, and it, too, was out of bounds.

The rest is history, and there is no need to go over the dreary tale of how the great superpower failed to win a war against a second-rate country like North Vietnam. The fact is, of course, we never really fought North Vietnam except on its terms.

Now we are back in the advisor business, and the opponents of any sort of new involvement have begun to march. People forget the magnificent job our advisors did in Vietnam during the early days. If that had been the extent of our commitment within the country, and if we had used our airpower wisely in the North, the ending would at least have been different.

We have a great deal more at stake in Central America than we ever had in Vietnam, and this time we had better have a strategy. So far as El Salvador itself goes, the provision of advisors, particularly Army advisors, seems a sound and constructive thing to do. These young professionals set high standards for the people they train, just as they did in Vietnam in the early 1960s. They are more than a match for the Cuban training the other side gets.

As for the air force, if it were up to me, I would move slowly. There is no sense in providing airplanes without first establishing an air/ground communications net and a responsible targeting capability. This, in turn, means accurate intelligence, without which air strikes can do more harm than good.

Fidel Castro clearly has a strategy for Central America and the Caribbean basin, just as Ho Chi Minh had one for Indochina. And so, while we do what we can in El Salvador with professional military advice, we will have to decide the really tough question: How do we deal with Castro's master plan? ■

The members of the 89th MAW provide airlift for US and foreign leaders, and thus often stand witness to historic events. Though unobtrusive, their proximity to newsmakers can't help but thrust them into the glare of national and international attention. This exposure—and the unit's missions—have led inevitably to the evolution of certain characteristics unique to . . .

THE 89th MILITARY AIRLIFT WING: Selectivity, Stability, Autonomy

BY WILLIAM P. SCHLITZ, SENIOR EDITOR

A bone-chilling winter downpour is making life miserable on the flight line at Andrews AFB in Maryland. Television and other news people, penned for control reasons into an adjacent area known as "The Pit," stamp around in place trying to keep warm. Clad in parkas and rain gear, they hold outsize umbrellas over their video and recording equipment to protect it from the wet.

Meanwhile, high over the Atlantic, a sleek, four-engine jet transport streaks toward them at just under supersonic speed.

The aircraft is not, however, a commercial jetliner on an international run. Nor are its passengers typical travelers.

Aboard the plane, a US official and his aides are hard at work. The Cabinet member, returning from an important conference in Europe, has already composed a secure teletype message to the White House, to brief the President on the conference's results. And now, among other details to be wrapped up, the official and his staff hash out the language of a statement to the media, certain to be awaiting an interview on landing.

Following touchdown and taxi, the aircraft comes to a halt on the ramp near the terminal building within seconds of its estimated time of arrival, despite the storm. The official and his entourage descend in the glare of spotlights to meet the press. And another smoothly run Special Air Mission is concluded by the 89th Military Airlift Wing.

The 89th Wing has the primary mission of providing airlift for top US government and foreign officials. Not least of these is the President of the United States. For this, and other reasons, the 89th is unique among Military Airlift Command units.

Appropriately, the Wing is stationed at Andrews—the "Gateway to the Nation's Capital"—ten miles southeast of Washington, D. C.

Generally, the Wing can be characterized in three words: "selectivity," "stability," and "autonomy."

With minor exceptions, Wing personnel are handpicked for their assignments—from the pilots of its two flying squadrons to its maintenance specialists. This policy has been dictated by the Wing's mission, which requires a high degree of responsibility by those entrusted with the safety and well-being of the nation's leaders.

As an example of selectivity, interviews of Air Force pilots volunteering to join the Wing's 1st Military Airlift Squadron are conducted twice yearly. And despite records that have to be outstanding even to bring them into consideration, fewer than half of the dozen or so prospects will actually be "hired." The basic minimum qualification for selection is 3,000 hours of flying time, including 200 hours as instructor pilots. Needless to say, this limits the number of applicants.

"In fact," said 89th Wing Commander Col. John F. Sievertson, "a larger-than-normal percentage of our pilots are senior majors in line for promotion. And with our navigators required to have at least 2,000 hours of flight time, our rated personnel make up one of the most experienced groups in the Air Force."

Enlisted Careerists

Because of the planes they work on, maintenance specialists being considered for "hire" are likewise carefully screened. Most are demonstrated careerists who must have three successive "nines" in their airman performance reports to qualify.

Also, regardless of the job being sought at the Wing, a person's record must be free of any behavioral blemish. And those selected will be subjected to stringent background checks by the Defense Investigative Service.

All this for mere entry into the select organization. In the case of new Wing pilots, for instance, each must serve an "apprenticeship" of about a year to upgrade to Aircraft Commander. This is part of a controlled tour of four years with the possibility of a voluntary extension tacked onto that. In short, what could be a generous slice of one's Air Force career. Maintenance personnel face more or less the same situation.

For the pilots, at least, this means an extended period of prestigious duty followed eventually by return to the "conventional" Air Force. In the interim, though, all parties benefit: the Wing can count on stability in its manning; and Wing personnel—and their families—experience a period of stability in solid mid-career tours.

As for autonomy, it can be found throughout the Wing's organizational structure and support elements. On an organizational chart, the 89th is under the 76th Airlift Division (also headquartered at Andrews), which is answerable to MAC's Twenty-first Air Force, McGuire AFB, N. J. In effect, though, tasking of the Wing's fixed-wing 1st Military Airlift Squadron

Above, the presidential C-137 known as Air Force One. Left, choppers of the 89th Wing's 1st Helicopter Squadron provide Distinguished Visitor airlift and are active in a medevac role, among other missions. Below, flanked by two Security Policemen in civilian clothes (on the left, Chief of Presidential Aircraft Security CMSgt. John J. Kelly), President Ronald Reagan is welcomed home by Vice President George Bush.

for its Special Air Missions (SAMs) comes directly from the Office of USAF's Vice Chief of Staff through Wing Operations.

According to its pilots, flying with the 89th is among the best duty in MAC. "On just a few days' notice," said Lt. Col. Newt Carpenter, "we'll go to Africa or other places where conventional MAC aircraft just don't go. And with our DV [for Distinguished Visitor; Very Important Person (VIP) being no longer in vogue] aboard it's usually red-carpet treatment because in foreign lands the aircraft and crew become symbols of the United States. As one manifestation of this, in 1961 the MAC service markings were re-

moved from all of the Wing's larger aircraft. They were replaced by the 'United States of America' logo and American flag on the tail to underline the intrinsic peaceful nature of the Special Mission aircraft."

The best part, according to Colonel Carpenter, is the autonomy an Aircraft Commander enjoys. "Once Wing Operations selects an Aircraft Commander—from among the squadron's pool of seasoned pilots—to organize and conduct a Special Air Mission, that pilot more or less runs his own show. The title 'Aircraft Commander' is a misnomer; actually, 'Mission Commander' would be more accurate."

First, the newly assigned Aircraft Commander contacts the office of the DV for whom the SAM is being planned to get a handle on such information as destination, length of stay, etc. "Say the Secretary of State plans to attend a high-level conference in Brussels," said Maj. Donald E. Brown, who actually was Aircraft Commander during such a mission recently. "That will mean one of the squadron's big birds, a C-137. [*For a rundown on 89th Wing aircraft, see the accompanying box, on p. 93.*]

"A plane that size is required because aboard will be not only the Secretary and his party, but a sizable crew, a media pool, a contingent of Security Police, and lately, in the face of terrorist threats, added security people."

Crew Makeup

Besides the aircraft commander, the aircrew will include a copilot, navigator, radio operator, and flight engineer. "Because of the flexibility required on Special Missions, almost every mission leaving Andrews has an augmented crew," said 1st Military Airlift Squadron Commander Lt. Col. James R. Johnston. "On every mission directed by the Vice Chief of Staff, these crews have a twenty-seven-hour crew duty day vs. twenty-four-hour augmented crew day for other MAC crews. This enables crews to complete 'red-eye' missions to and from Europe, and nonstop missions to the Far East."

With the addition of flight attendants, the crew aboard a C-137 alone will number almost two dozen 89th Wing personnel. A key member of the crew is the Chief Flight Attendant, in all likelihood an NCO with considerable experience in that line of work. The Chief Flight Attendant shares the autonomy and has the authority to contact the DV's office with the objective of planning menus for each meal during the time aloft for everyone aboard, based on the DV's itinerary. The CFA will be provided funds to purchase all required foodstuffs and drinkables. (All costs of the entire SAM—in the case of the Secretary of State—will eventually accrue to the State Department.)

And the times are changing, with younger and more junior-rank people being given Chief Flight Attendant responsibility. For example, SSgt. Marcie Mutun—in her mid-twenties—recently assumed complete CFA responsibilities for a Special Mission to the Mideast.

A CFA may be required to plan meals—gourmet meals—for up to twenty-two days and must be resourceful. He or she may be required to forage for meals in foreign lands because of delays or revised schedule.

The 89th Wing has seventy flight attendants assigned—all volunteers who have trained into the field from other duty specialties and no first termers. They start out as menu apprentices and later become acquainted with the complex financial management system. As representatives of their passengers while abroad they must also become experts in visas and customs practices.

Meeting "Block" Times Essential

Without going into laborious detail, the Aircraft Commander and cockpit crew select routes, stops, fuel requirements, etc. A key feature is the overall mission briefing of the assembled crew, including flight attendants, to ensure a smooth operation—a matter of pride and duty in the eyes of 89th people. "On Special Missions, with DVs aboard, a minor breach of protocol brings major attention," said Colonel Carpenter.

Flight mechanics—flying crew chiefs—aboard the Wing's C-137s and C-135s are specialists in maintaining these "one-of-a-kind" aircraft while on the road. If an aircraft should break down, for example, in the middle of North Africa, conventional Air Force maintenance procedures just won't apply. These "flying crew chiefs" can diagnose and solve all but the most unusual maintenance problems. *(Also see section on the Wing's specialized supply activity.)*

The 89th Wing's two-person Intelligence section at the Command Center maintains an up-to-date library of intelligence documents distributed from Hq. MAC, which it uses to brief interested parties. The basic subject: terrorist threats. Intelligence briefs SAM aircrews on a mission-by-mission basis as necessary, as well as conducting routine staff briefings. Organizationally, the Intelligence section is under the Wing's Director of Operations.

Final SAM actions before takeoff include weather check, boarding crew and passengers, engine start, and "block-out time," followed by taxi from ramp to runway.

At the destination—say, a foreign capital—"block-in time" is especially important to 89th aircrews. This means meeting estimated time of arrival right on the money. Early or late arrivals are not acceptable. They disrupt carefully timed ceremonies, for example. As with smooth-running operations, punctual arrivals are also a matter of pride and duty. (The use of the word "block" derives from the blocks or chocks placed as tire brakes following engine shutdown and removed before taxi for takeoff.)

In yet another example of the autonomy of Wing elements, its President's Pilot Office is tasked directly—and exclusively—by the White House for presidential-type Special Missions. The PPO is independent of Wing operations and has four pilots permanently assigned who are replaced when they move on from the very best of the 89th's pool of crack pilots (the Wing is authorized seventy-two fixed-wing pilots for its 1st MAS and thirty-one navigators). It is said of the PPO that it is the chief reason for the existence of the 89th Wing.

In conjunction with the PPO, wing maintenance specialists are assigned solely to tend presidential aircraft.

In regard to Wing aircraft maintenance generally, the 89th employs

Right, pilots check maintenance status of an aircraft prior to a Special Air Mission. Below, 89th Wing flight attendants prepare to serve meal to DV guests and aircraft crew.

the dedicated crew chief concept. Wing maintenance people stand four-year tours and must be at least second-termers. They are all sergeants or above.

The Helicopter Squadron

The second of the two 89th Wing flying units is its 1st Helicopter Squadron, another exception to the rule in terms of Air Force mission and equipment. For example, its activities require the direct approval of the Director of Operations, Hq. USAF, rather than being tasked through the Office of the Vice Chief of Staff as is the Wing's 1st Military Airlift Squadron.

Its primary mission—necessarily a standby one—is to provide aerial transport for key government officials under national defense contingency plans. In this role, the unit maintains a fleet of seven helicopters on alert at all times. *(For a rundown on the squadron's aircraft, see box, p. 93.)*

Routinely, the squadron conducts aircrew proficiency flying and training in line with its secondary mission of providing highly qualified aircrews for Special Air Missions on a day-to-day basis. That is, the unit provides transport for usually flag-rank DVs on official travel in the Washington, D. C., area that could extend as far east, say, as Dover AFB, Del.

The only helicopter unit at Andrews AFB, the 1st HS renders rescue coverage for the base, including medevac flights. It conducted a total of twenty-three of those in 1981.

The 1st HS also supports the national search and rescue plan and, with Pentagon permission, has been involved in 154 medical evacuation missions since 1966. As do Air Force people involved in rescue work, the squadron's thirty assigned pilots derive great satisfaction from this humanitarian contribution.

The unit is distinguished in the Air Force for its unprecedented flying safety record of better than 105,000 hours. The 1st HS is also uncommon in that its eighteen flight engineers are authorized to fly in the left-hand seat of the unit's UH-1 helicopters, the only such in the Air Force so permitted.

Because of the requirements of its mission and its adherence to stringent maintenance procedures, the 1st HS has the highest operational in-commission rate of helicopter units throughout the Air Force. The squadron is also unique in that its supply and maintenance systems are self-contained and integral to it. Said line pilot Capt. Charlie Bowman, "The rapport between squadron Operations and maintenance is the best I've ever seen. Our aircrews fly every day. And even when unusually heavy mission loads generate unusually high maintenance requirements, it's always there."

"The majority of the squadron's pilots are dual-qualified in the two types of helicopters we fly," commented Capt. Lee Meador. "That's against only three percent of dual qualifications throughout the Air Force."

Said MSgt. Jeremiah Tuohy, "The squadron's mission has a lot of appeal because of its diversity. We transport people in the news. In one day a single helicopter might be required to airlift a four-star general to the Pentagon from Andrews, followed by a medevac flight, and then transport a DV to Norfolk, Va."

Many of the squadron's pilots are highly decorated veterans of combat in Southeast Asia. It is one of the few units in the Air Force that is kept fully manned on the operations side.

The Security Police

The 1776th Security Police Squadron stationed at Andrews is marked with that streak of autonomy that so often characterizes units associated with the 89th Wing. While one of the squadron's two sections is engaged in conventional law enforcement on base, the other is charged with guarding the 89th's aircraft. In fact, whenever the aircraft are on the ground—at home or abroad—safeguarding them is the responsibility of the Security Police.

But that's not all. It's not generally known that thirty-eight members of that section actually fly with Air Force One and the Wing's other big birds on SAMs in CONUS and abroad. "They are first off the aircraft and last on," said Squadron Commander Lt. Col. David M. Southworth. "For trips to foreign lands, these Security Policemen travel in civilian clothes paid for by a clothing allowance granted under Air Force regulations. All NCOs—and all men because they are considered members of a combat-ready unit—the 'Flying Cops,' as they are known, provide routine flight-line security for the 89th's aircraft when at home. When traveling, the Secret Service act as bodyguards for the President and others, and the Se-

curity Police guard the aircraft," said Colonel Southworth.

"Five of them, including CMSgt. John J. Kelly, Chief of Presidential Aircraft Security, have been assigned specifically to fly with the President," Colonel Southworth said. "Others fly with the First Lady, the Vice President, and other top government officials like the Secretaries and members of Congress. While the Flying Cops don't draw flight pay, they are allotted hazardous-duty pay under the regulations as well as TDY during SAMs. They all receive special training pertaining to their flying duties, including how to handle onboard emergencies."

As with 89th Wing members and generally those of units that support it, the Flying Cops are careerists who serve four-year tours at the squadron and have been carefully selected from within its ranks. They've all volunteered by application through USAF's personnel system to serve with the squadron in the special-duty assignment.

While being picked for the role of Flying Cop is considered a plum within Security Police ranks, the drawback is lengthy periods away from home and family. But there is an exciting *now* side to the duty. Security Police were aboard the C-137 that brought Secretary of State Alexander Haig back prematurely from Brussels following the military takeover in Poland. They were among the contingent that brought the American hostages home on their release by Iran. They beefed up the security for the hostages during their stay in Washington. And they fly with foreign heads of state during SAMs in the US.

The flying airplane guards—who must earn three successive nines in their airman performance reports to qualify for assignment to the squadron—are also among the unit's most ardent recruiters. In contact with other Security Police during trips, they distribute information packets on how to apply for assignment to the squadron and otherwise recommend likely candidates in "old boy network" fashion.

First-rate maintenance is an essential contributing factor that has earned the 89th Military Airlift Wing a superb flying safety record.

Wing Logistics Support

In what could be termed a mini-logistics center, the FN 4404 Specialty Supply Account is the activity of Andrews that supports the 89th Wing and its SAM aircraft.

With some 22,000 line items in its warehouses, the supply agency goes considerably beyond responding to requirements for replacement parts during at-home maintenance on the aircraft. It ships spares by the quickest means anywhere in CONUS or overseas to keep the presidential and other Wing DV aircraft in service. "A request from the maintenance people aboard will be sent via radio to the Wing's Command Center and the Center will notify us," commented Chief of Supply Lt. Col. Robert D. Shaw. "We have our own shipping system and experts in expediting items. They'll use MAC flights or commercial and sometimes foreign airlines. Items will move embassy to embassy to expedite customs handling and the spares will be hand-carried to an aircraft if need be."

The supply facility is autonomous in several areas. For example, because the Wing's SAM aircraft are unique to the Air Force inventory, parts resupply of them is often independent of conventional USAF supply channels. The Account, therefore, is authorized to deal directly with the vendors in acquiring replacement items.

What's more, while typical Air Force logistics centers could not hope to cope in storing and keeping track of spares without their considerable computer capabilities, the supply facility at Andrews has retained its old-style, hand-written-card catalogs on replacement spares—the most efficient method for its particular system.

"Power outages are no threat to us," said Colonel Shaw. "All we need is a flashlight and the part's code number. Furthermore, the card catalog provides a complete history of a spare from the time it entered the inventory. This indicates the aircraft it's been on, number of times repaired, etc. The FN 4404 activity is the largest manual supply account in the Air Force."

Not a few of the 4404th's nearly 100 people—about one-quarter civilian—have served several decades at the facility. The standard military tour is four years, with extensions not uncommon. A number have served two or more tours at the facility. All enlisted applicants must have had three successive nines on performance reports to qualify.

The supply agency operates a Micap (mission capable) Control Center around the clock, seven days a week.

Another unique aspect of the FN 4404 supply account: It supplies the 89th's flight attendants with their flight attire—both military and civilian.

Aerial Port and Protocol

Since Washington is not only the nation's capital but headquarters for

all the military services, aerial port and protocol functions are important adjuncts to 89th Wing activities.

To state several impressive statistics, some 1,000 Code 6s and above (brigadier general up through the President) pass through Andrews each month. About 164 heads of state, including the President, are greeted each year. In all, Andrews processes 1,680 DVs per month, more than half general officers. On the organization chart, the 93d Aerial Port Squadron of the Wing rates right up there with the fixed-wing and helicopter squadrons because of the services it provides for DVs. Routinely, 12,000 other passengers a month pass through the Andrews terminal.

Support of presidential activities by the aerial port squadron alone is of major proportions. Consider this. The President plans to leave from Andrews to make brief appearances in three cities. He'll travel in Air Force One and be accompanied in one form or another by 150 to 200 people. For example, there'll be an entirely separate commercial aircraft for the news media that Andrews will service. In each of those cities there must be prepositioned a full complement of presidential communications equipment loaded by the aerial port and flown there aboard MAC transports. The aerial port works hand in hand with the White House Communications Agency in this (as does the flightline Security Police with the Secret Service in assuring the President's safety).

Then there is the matter of the presidential ground transport and that for the Secret Service, all of which must come from Washington. Well, the picture emerges.

As to the matter of the DVs, all must be greeted and sent on their way appropriately. For this purpose, a DV Lounge is maintained at the Andrews terminal, manned by a Protocol Officer and hostess during business hours.

The aerial port's Air Terminal Operations Center is operated by three people twenty-four hours a day to keep matters on the flight line—such as fuelings and ground transport arrangements—running smoothly.

Andrews, with its proximity to the State Department and foreign embassies, is the agent for the acquisition of passports and visas, not only for 89th people flying SAMs abroad but for all MAC personnel going overseas. A staggering 1,100 passports and about 300 visas are supplied each month. The visa applications are *hand-carried* from Andrews to the various embassies in the nation's capital to ensure prompt action.

With Andrews being the focal point for matters of national and international importance, DVs arriving and departing the base generate considerable news media interest and coverage. To answer queries and otherwise lend assistance, a Press Center is operated at the Andrews terminal, managed by one of the largest Public Affairs staffs within USAF. ■

The 89th MAW's Unique and Diverse Aircraft

In terms of aircraft assets, the 89th Military Airlift Wing can be considered one of the most unusual units within Military Airlift Command—and USAF for that matter.

Among the Wing's heavy hitters are its five C-137s. These intercontinental Boeing 707s were originally configured as commercial jetliners and were purchased by the Air Force from Continental Air Lines. Aircraft No. 27000 is known as Air Force One and is the President's primary aircraft (although any aircraft he used would automatically carry the designation "Air Force One" for communications and air traffic control identification purposes). These aircraft are partitioned into the presidential quarters, a staff/office section, a communications center, and limited seating for passengers including the news media pool that travels with the President. They are equipped with kitchens, and several sleeping berths (aside from the presidential accommodations) can be made up.

Backup to 27000 is 26000, most famed of the presidential airplanes. Lyndon Johnson was sworn in as President aboard it in November 1963 and then—with the body of assassinated President John F. Kennedy aboard—returned from Dallas, Tex., to Washington, D. C. In less traumatic times, No. 26000 set a Washington-to-Moscow speed record in May 1963 of eight hours, thirty-eight minutes, and forty-two seconds while averaging a blazing 580 mph. During President Johnson's globe-girdling flight in December 1967, 26000 logged 28,210 miles in six days. In 1972, it flew President Richard Nixon on his historic mission to mainland China.

While any of the Wing's major aircraft would undoubtedly rate star billing at any aerial exposition, they never attend such events.

The Wing's four C-135Bs are smaller and longer-range 707s initially designed as military tankers but modified to carry passengers. The 89th also has six four-engine C-140 JetStars, which operate as short-range executive transports for the Wing's Distinguished Visitor clients. These Lockheed-built planes have flight mechanics assigned as crew, and they carry eight passengers. One C-140 has been assigned exclusively to the President's Pilot Office. All presidential pilots are dual-rated in the C-137 and C-140.

The Wing has three specially modified twin-jet C-9C versions of the McDonnell Douglas DC-9 that carry forty-two passengers.

In its unique mission of providing flying training for attaché pilots serving at US embassies and with Military Assistance Groups abroad, the Wing employs two twin-turboprop C-12A versions of the Beechcraft Super King Air 200. These also double as DV transports and can seat eight passengers.

The Wing's single Beechcraft King Air 90, designated C-6B, is assigned by USAF's Vice Chief of Staff to short-range missions. The twin-turboprop seats four passengers.

While not part of its inventory, the 89th maintains ten MAC twin-jet CT-39 Sabreliners assigned to the 375th Aeromedical Airlift Wing at Scott AFB, Ill., but stationed at Andrews AFB, Md., under the 1402d Military Airlift Squadron. These Rockwell International-built aircraft also double to provide airlift for high-level DoD officials and can accommodate up to seven passengers.

The Wing is also charged with performing below-depot maintenance on thirty-seven other CT-39s stationed at various bases along the east coast.

In its helicopter squadron, the Wing has nine Bell UH-1Ns (Hueys) and four Sikorsky CH-3Es similar to the combat rescue Jolly Green Giants. These twin-engine aircraft have been modified in-house by the squadron from the spartan military configuration to include padded seating and carpets, among other amenities. In fact, all the Wing's aircraft have been designed internally to offer a comfortable working environment.

The 89th Wing aircraft are assigned to DV Special Air Missions on a priority basis, with demand almost always exceeding aircraft availability.

AIRMAN'S BOOKSHELF

The Road to Alamein

Monty: The Making of a General, 1887–1942, by Nigel Hamilton. McGraw Hill, New York, N. Y., 1981. 871 pages, with maps, index, notes, bibliography, and photos. $22.95.

Even as sympathetic a biography as this could not hope to conceal the human failings of a man who was to become a British field marshal. Bernard Law Montgomery is variously described as "tyrannical," "ruthless," "petty," "vicious," "ambitious," "vain," "opinionated," "self-righteous," "vindictive," "capricious," "obsessive," "mad," and (little wonder) "unpopular."

Montgomery was a "peacetime misfit" declares Hamilton, but a great wartime leader. This first volume of two carries Monty's biography from before birth to the defeat of Erwin Rommel's Afrika Korps at El Alamein in the autumn of 1942.

Monty's personality is laid at the feet of his strong-willed mother. The author finds that the future general grew up under a "loveless tyranny" as the family's "black sheep" with an obsessive desire to prove himself to his unloving mother. His life at a series of boarding schools and later college was marked by poor grades and an unparalleled viciousness at rugby. He aimed at the soldier's life with his mother's approval because she did not think him useful for much else.

Yet, soon after commissioning, it became apparent to his superiors that Montgomery was born to a military career. He was exceptionally self-disciplined, hardy, brave, able to concentrate on the mission at hand without distraction, and supremely able to articulate his objectives to his forces.

On an early assignment in India before World War I, he was faced with the difficulties of training and leading Punjabi troops. Unlike Winston Churchill who was faced with a similar situation earlier, Monty learned both Urdu and the local dialect of Pushtu in order to communicate with all of his troops.

In World War I, he was awarded the Distinguished Service Order for conspicuous gallantry in leading a bayonet charge to clear the enemy from a trench. Although seriously wounded, he forbade his men to retrieve him until night because of the risk, and lay semiconscious and bleeding severely until dark.

During the interwar years he progressed very quickly in a series of staff and troop assignments in Britain and overseas, most notably in Ireland and Palestine. He earned universal respect as the finest trainer of troops in the British military. His career at this point was capped by his writing the *Infantry Training Manual,* imbued with his philosophy. (Rommel also wrote a landmark infantry manual, *Infantry Attacks.*)

He believed that officers and men must be given orders that were "clear, as well as objectives that they could identify and attain." The "whole art of war," he wrote, "is to gain your objective with as little loss of life as possible." "Never react to enemy moves or thrusts," Monty asserted. "The point is to pursue your object and to work continuously on your own plan; once you have to react to the enemy's thrusts you will begin to react to the enemy's tune, and once this happens you are done. Grasp the initiative as soon as you can, and having done so keep it." These thoughts became the keys to Monty's success.

He oversaw a successful rear-guard action at Dunkirk, and that was followed by the most challenging task of shaping up the home-defense troops to ward off what all believed was inevitable invasion. His success in infusing often unfit troops with his optimism and desire to take on the Germans earned him his position in Egypt in the desperate summer of 1942.

Monty found a demoralized Eighth Army at El Alamein. He immediately put a halt to all planning for further retreat. In two short weeks he built the confidence of the men to the point that they could withstand a full-scale offensive by Rommel's troops.

Seven weeks later, Monty attacked the Afrika Korps, shattering it. The British, who had experienced a dismal series of defeats from Dunkirk to Tobruk, tasted for the first time in more than two years the headiest of spirits, victory. If Montgomery did nothing more in his long life, El Alamein would have guaranteed him a place in the soldier's Pantheon.

—Reviewed by Col. Alan L. Gropman, USAF, a military historian currently serving as Director of Research at the National War College.

Strategic Mainstay

B-52: A Documentary History, by Walter J. Boyne. Jane's Publishing, Inc., distributed by Franklin Watts, Inc., New York, N. Y., 1982. 160 pages, with photographs, diagrams, and index. $19.95.

Trying to capture in words a work of art, a piece of music, or a stage play is a challenge for any author; but to attempt—and succeed—in capturing a feeling for those men and women who created the B-52, flew it, and maintained it for a quarter century stands as a remarkable achievement. Walter Boyne, who is Assistant Director of the National Air and Space Museum, has managed to do just that.

The Boeing B-52, Boyne writes, was conceived in a room in the Van Cleve Hotel in Dayton, Ohio, following an exhausting nonstop working weekend in 1948. Boyne interviewed those key engineers who made the B-52 possible back when military aircraft were still being designed by instinct and genius, not by committee. The Boeing proposal amounted to only thirty-three typed pages, and the Air Force bought it with a nod from Gen. Curtis E. LeMay, who would head SAC for most of the decade to follow.

By November 1951, the prototype B-52 saw the light of day, and it looked much like the 1948 balsa wood model carved in Dayton by Ed Wells (of B-17 fame) and George Schairer. Only five months later, the bomber was in the air and a new era of strategic air superiority was born on the vision and

foresight of a few men at Boeing and their Air Force counterparts.

Boyne's research is about the aircraft and the men and women who contributed to its success in war and peace.

Boyne constantly includes little-known bits of information he has gathered from hundreds of Air Force and Boeing personnel. Most readers will for the first time learn that one secret for keeping the B-52 a first-rate strategic system all these years has been a lady in Wichita. Helene K. Little, Boyne discovered, heads a little known Operations Analysis unit there. She and her team of aerospace experts work to stay about a decade or more into the future. Their job is to keep abreast of *all* conditions the bomber might face and provide solutions before problems are encountered.

In fact, it is this close-knit cooperation between Boeing and the Air Force, Boyne finds, that gives the "military-industrial complex" a newer and finer meaning, one that has become a matter of pride.

As a professional pilot turned author, Boyne flew SAC B-52s and was involved in many of the major Pacific weapons tests. When he writes of the B-52, his expertise comes through.

The book is laid out in a proper manner with a strong lead-in on strategic air and the role played by the B-47 in the development of the B-52. The author then moves through the stages of B-52 design, development, and testing, to squadron use.

Most important, he reviews the many mods and models of the B-52 that kept the system viable when the Johnson and Carter Administrations failed to deliver a new strategic bomber (the B-70 and the B-1) in the 1960s and 1970s.

Boeing B-52 is more than a one-man effort. It came from the collective memories of hundreds of civilian and military people who have literally spent a lifetime working with the bomber. It is their personal experiences and memories, most never before printed, that make the book come to life. In many cases the excellent photographs were not culled from Air Force and Boeing archives, but from the personal collections of people involved with the bomber. It is the photos that first arrest the reader's attention and have him leafing through the book before a word is read.

Like the faithful B-52, this book is a winner to be passed to the new generation—just as the bomber itself has been.

—Reviewed by Lt. Col. George L. Weiss, USAF (Ret.).

New Books in Brief

The Balance of Military Power, by Col. William V. Kennedy, USAR, *et al.* Though public opinion polls show consistently that a majority of Americans favor a defense buildup to redress growing Soviet military capabilities, budgetary constraints and strategic and theoretical disagreements promise fierce debate over what needs to be done to restore a "military balance." A starting point for those who wish to follow this impending debate can be found in this book. Though it concentrates on the NATO/Warsaw Pact balance of power, the narrative, accompanied by a wealth of charts and illustrations, outlines the significant factors in assessing the balance of military power in an accessible, clear format. A penetrating foreword by NATO Secretary General Dr. Joseph Luns expresses the hope that "the military facts . . . will help to dispel any illusion that the world has become sufficiently risk-free as to enable the West to forego the effort and sacrifice, however great or unpleasant, that may be required to keep the East/West balance from veering towards a dangerous, and possibly catastrophic, disequilibrium." With glossary and index. St. Martin's Press, New York, N. Y., 1982. 208 pages. $24.95.

B-52 Stratofortress, by Jeff Ethell and Joe Christy; *F-104 Starfighter,* by Arthur Reed; and *F-105 Thunderchief,* by J. C. Scutts. These books provide a fine overview of the development and operational history of each respective aircraft. With photos and appendices. Charles Scribner's Sons, New York, N. Y., 1981. 112–128 pages. $17.50/$17.95.

Eagles of Mitsubishi: The Story of the Zero Fighter, by Jiro Horikoshi; translated by Shojiro Shindo and Harold N. Wantiez. For Americans steeped in stereotypical attitudes toward the Japanese, the appearance of modern, capable Japanese aircraft at the beginning of World War II came as nothing short of a shock. In particular, reports from China on the seemingly invincible Zero fighter were discounted by US authorities. Its performance after Pearl Harbor in the Philippines could not be discounted, however, and the Zero dominated the Pacific skies in the early days of the war. Though unsuited for defensive combat against the heavier American planes that eventually entered the war, the Zero went on to establish itself firmly as a classic military aircraft. Dr. Jiro Horikoshi, chief designer of the Zero, describes here the problems he faced in the 1930s as Japan struggled to develop fighter aircraft equal or superior to those in the West. Of special interest to the reader will be Dr. Horikoshi's descriptions of the war from a Japanese perspective; perhaps more relevant for the present will be his thoughts on Japanese employee/employer relationships and design philosophies. With photos. University of Washington Press, Seattle, Wash. 98105, 1981. 176 pages. $18.95.

Fighters of the Fifties, by Bill Gunston. Author Gunston observes in his introduction: "In many ways the 1950s were unique in aviation history." This quiet assertion may be ascribed to the English tendency for understatement, as the decade witnessed an almost wholesale switch to jet propulsion for fighter aircraft, the development of sweptwing and deltawing designs, revolutionary changes in mission concepts, and an explosive 830 mph increase in top speeds. The book catalogs thoroughly these and other changes over the decade in its detailed descriptions of sixty-seven aircraft designs, arranged in alphabetical order according to manufacturer. With photos. Specialty Press, Box 426, 729 Prospect Ave., Osceola, Wis. 54020, 1981. 252 pages. $22.95.

The German Air Force, 1933–1945: An Anatomy of Failure, by Matthew Cooper. In histories of the Second World War, the Luftwaffe usually rates highly for its early accomplishments and victories. Though author Cooper praises the individual actions and bravery of the officers and men of the German Air Force, he indicts the Luftwaffe High Command and especially Hitler for blunders in strategy and tactics. It is the author's contention, for instance, that a retaliatory bombing of Berlin by the British after an accidental German bombing of London so infuriated Hitler that he ordered his air forces to begin the Blitz against London. This diverted his air forces from delivering the crucial knockout blow against a hard-pressed RAF Fighter Command and allowed the British to retain air superiority over Britain, effectively forestalling a German cross-Channel invasion. Cooper goes on to catalog how such high-level blunders ensured the ultimate defeat of the Third Reich. With photos, appendix, notes, bibliography, and index. Jane's Publishing Inc., New York, N. Y., 1981. 406 pages. $27.95.

—Reviewed by Hugh Winkler, Assistant Managing Editor.

A Perfect "7"

(on a scale of 7)

Well, maybe not *perfect,* but very close. With 7-fold time diversity, 7-fold frequency diversity and 7 seconds delay (providing immunity to signal fades or noise bursts of up to 3 seconds duration), the 6029C Time Diversity Modem provides RTTY over HF or troposcatter radio of unprecedented quality and reliability. Interested? Contact us for details of the 6029C. We'll gladly tell you how we're making HF work!

BR Communications
Barry Research Corp

1249 Innsbruck Drive P.O. Box 61989,
Sunnyvale, CA 94088 USA
(408) 734-1600 Telex 357-484

JANE'S

ALL THE WORLD'S AIRCRAFT SUPPLEMENT

APRIL 1982

Prototype of the Gulfstream American Peregrine, a developed version of which has been offered as USAF's next-generation trainer

GULFSTREAM AMERICAN

GULFSTREAM AMERICAN CORPORATION: Head Office: PO Box 2206, Savannah, Georgia 31402, USA

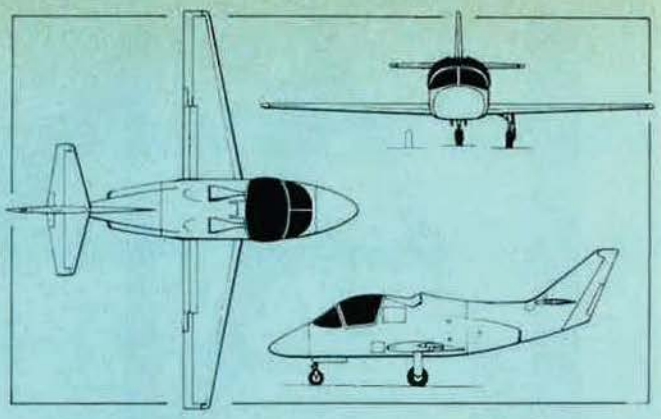
Gulfstream American Corporation has undertaken a major redesign of its Peregrine primary/basic military trainer, following its decision to enter the aircraft in the current USAF competition for a next-generation trainer to replace the Cessna T-37.

GULFSTREAM AMERICAN PEREGRINE

The Peregrine had its origin in a 1975 decision by American Jet Industries Inc to build a new general aviation aircraft named the Hustler, before the acquisition of Grumman American Aviation Corporation led to AJI's change of name to Gulfstream American Corporation. The Hustler design embodied a pressurised cabin, to permit cruising at heights up to 10,670 m (35,000 ft). The original intention was to provide STOL capability by use of a supercritical wing with full-span Fowler type trailing-edge flaps, and by fitting spoilers for lateral control instead of ailerons. Most unusual feature was to be the power plant, comprising a nose-mounted Pratt & Whitney Aircraft of Canada PT6A turboprop and a small Williams turbofan standby engine in the rear fuselage. The prototype of this aircraft, designated Hustler 400, made its first flight on January 11, 1978, using only the turboprop engine.

Desirability of obtaining certification of the Hus-

The Peregrine prototype, shown here at the time of its first flight is single-engined; the production model has been redesigned around two Williams FJ44 turbofans



Proposed configuration of the twin-turbofan production Gulfstream American Peregrine military trainer *(Michael A. Badrocke)*

tler as a twin-engined aircraft, coupled with a likely delay of two years before the Williams standby turbofan engine would be available, brought the decision to install a Pratt & Whitney Aircraft of Canada JT15D-1 turbofan in the rear fuselage of the prototype. At the same time, the nose engine was replaced with a Garrett TPE331-10-501 turboprop, the single low-mounted exhaust of which seemed likely to minimise gas ingestion by the rear engine. Redesignated Hustler 500 in this form, the prototype resumed its test programme in early 1981. By that time, however, the potential of a military trainer based on the Hustler design seemed so much greater that the Hustler programme was reported to be dormant by mid-year. Details of the Hustler 500 prototype, and the airframe structural changes involved in its development, can be found in the 1980–81 *Jane's*.

Gulfstream American had announced its intention to build a prototype of the Peregrine two-seat basic and primary military trainer, based on the Hustler 500, on July 25, 1979. In its initial form, it differed primarily by deletion of the forward engine and wingtip tanks of the civil aircraft, the latter being replaced by small winglets. The prototype (N600GA), which flew for the first time on May 22, 1981, has side-by-side seating and is powered by a single 11.12 kN (2,500 lb st) Pratt & Whitney Aircraft of Canada JT15D-4 turbofan engine mounted in the rear fuselage.

An accompanying three-view drawing indicates the extensive changes that are proposed to ensure optimum characteristics for the Peregrine trainer as an NGT contender. It will have two Williams International FJ44 turbofan engines, each rated at 5.38 kN (1,210 lb st) in the rear fuselage, although a single 14.67 kN (3,300 lb st) JT15D-5 will still be available optionally. The original divided intake forward of the fin is replaced by a pair of intakes in the top of the fuselage immediately aft of the canopy. Fuselage tanks for 515 kg (1,135 lb) of fuel supplement the former integral wing tanks; and it is proposed to make more extensive use of composite materials in the airframe structure.

Gulfstream American intends to offer both the single- and twin-engined versions to potential customers during 1982, and would be in a position to start production of the Peregrine trainer early next year. Simultaneously, it is involved in market research to determine the potential for a new executive transport known as the Peregrine II. This would follow closely the configuration of the existing Peregrine prototype (N600GA), and can be described in more detail than can the new military versions at this stage. The following description of the Peregrine II should, however, be regarded as provisional:

TYPE: Twin-turbofan executive transport.

WINGS: Cantilever low/mid-wing monoplane. Supercritical section GAW Mod 4. Thickness/chord ratio 12.5%. Dihedral 2°. Incidence 0°. Sweepback at quarter-chord 15°. Conventional light alloy two-spar fail-safe structure with ribs, stringers, and chemically-milled skins, flush riveted, with outward-canted and sweptback winglet above each tip. Double-slotted hydraulically actuated light alloy trailing-edge flaps extending over two-thirds span. Conventional ailerons of light alloy construction. Trim tab in port aileron.

FUSELAGE: Semi-monocoque light alloy structure of circular cross-section. Divided engine air intake above fuselage forward of fin.

TAIL UNIT: Cantilever light alloy structure, with sweptback vertical surfaces. Trim tab in rudder and port elevator. Control surfaces horn-balanced.

LANDING GEAR: Hydraulically retractable tricycle type, with single wheel on each unit. Main units retract inward into wings, nosewheel aft. Oleo-pneumatic shock-absorbers. Hydraulic brakes.

POWER PLANT: Two Williams International WR44 turbofan engines, each rated at 6.67 kN (1,500 lb st), mounted side by side in rear fuselage. Integral fuel tanks in wings.

ACCOMMODATION: Pilot and five passengers, in pairs. Luxury interior options will include adjustable and side-tracking seats, foldaway tables, refreshment centre, toilet, and pressurised baggage space in the rear part of the cabin, with a volume of 0.99 m³ (35 cu ft).

SYSTEMS: Pressurisation system, with max differential of 0.59 bars (8.6 lb/sq in), with integral cabin heating and cooling systems. Electrical, hydraulic, and pressurisation systems all fully redundant. Solid-state controls for electrical system. Anti-icing and de-icing systems optional.

AVIONICS AND EQUIPMENT: Provision for full IFR instrumentation and avionics.

DIMENSIONS, EXTERNAL (A, production trainer; B, Peregrine II):

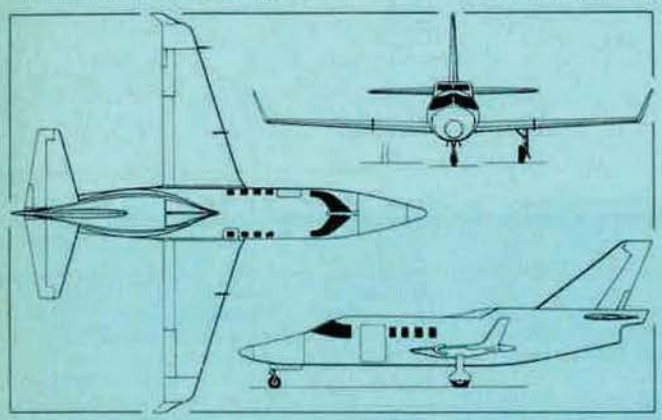
Wing span:	
A	10.87 m (35 ft 8 in)
B	11.00 m (36 ft 1¼ in)
Length overall:	
A	9.70 m (31 ft 10 in)
B	11.95 m (39 ft 2½ in)
Height overall:	
A	3.94 m (12 ft 11 in)
B	4.09 m (13 ft 5 in)
Tailplane span: B	4.67 m (15 ft 4 in)

WEIGHTS (estimated, A, production trainer with FJ44 engines; B, Peregrine II):

Weight empty:	
A	1,866 kg (4,115 lb)
B	1,937 kg (4,270 lb)
Max T-O weight: B	3,629 kg (8,000 lb)
Max landing weight: B	3,447 kg (7,600 lb)

PERFORMANCE (Peregrine II, estimated, at max T-O weight, ISA, except where indicated):

Max cruising speed at 10,670 m (35,000 ft), at average cruise weight	403 knots (746 km/h; 464 mph)
Stalling speed at max landing weight	70 knots (129 km/h; 80 mph)
Max rate of climb at S/L	1,090 m (3,570 ft)/min
Max operational ceiling	13,410 m (44,000 ft)
T-O run	355 m (1,166 ft)
T-O to 15 m (50 ft)	532 m (1,745 ft)
Landing from 15 m (50 ft)	457 m (1,500 ft)
Range, max cruising speed at 10,670 m (35,000 ft), 45 min reserves	1,429 nm (2,649 km; 1,646 miles)



Gulfstream American Peregrine II twin-turbofan executive transport *(Pilot Press)*

Model of the Peregrine II executive jet developed from the prototype trainer *(Howard Levy)*

Range, max cruising speed at 12,200 m (40,000 ft), 45 min reserves
1,675 nm (3,104 km; 1,929 miles)

SAAB-SCANIA

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

In June 1980 the Swedish government approved the allocation of SKr 200 million to finance project definition and initial development during 1980–82 of a Viggen replacement to enter service in the early 1990s. Under this programme, which is known as JAS (Jakt/Attack/Spaning: fighter/attack/reconnaissance), the new multi-role combat aircraft would replace, successively, the AJ/SH/SF/JA 37 versions of the Viggen. A similar financial commitment was made by Industri Gruppen JAS, a Swedish aerospace industry group formed in 1980 by Saab-Scania, Volvo Flygmotor, L. M. Ericsson, SRA Communications, and FFV (Förenade Fabriksverken).

On June 3, 1981, the group submitted to the Swedish Defence Materiel Administration (FMV) its detailed proposals for an aircraft to meet the JAS requirement. Saab-Scania would be prime contractor for this aircraft, which has the manufacturer's designation Saab 2105.

SAAB 2105

Of similar aerodynamic configuration to the Viggen, the Saab 2105 structure would use some 30% of composite materials, permitting the max T-O weight to be kept down to approx 8,000 kg (17,635 lb). The selected power plant is a single General Electric F404J afterburning turbofan engine, developed to improve aircraft single-engine safety and produced in collaboration with Volvo Flygmotor; Volvo would build approx 50% of the engine, and be responsible for its final assembly and testing. Avionics would include a multi-mode radar with three times the capability of that installed in the Viggen, yet only 60% of the size; a new central digital computer; a fly-by-wire control system; and an extremely advanced cockpit. Saab has technology transfer agreements with MBB (West Germany) and Rockwell International (USA) providing for assistance with composite structures, computer design, and FBW systems.

On June 3, 1981, detailed proposals for the Saab 2105 were submitted to the FMV, which evaluated them against a number of possible contenders from the US and French aerospace industries. On September 17, 1981, Lt Gen Dick Stenberg, Commander-in-Chief of the Swedish Air Force, recommended to General Lennart Ljung, Supreme Commander of the Swedish Armed Forces, that the Saab 2105 be adopted to meet the JAS requirement. General Ljung subsequently advised the Swedish government that he endorsed this selection, which also would enable the Swedish aerospace industry better to maintain its support for Draken and Viggen aircraft in service beyond the year 2000.

Under current procurement plans the last JA 37 Viggen is due for delivery to the Swedish Air Force in 1988. If, as recommended, a government go-ahead for the Saab 2105 is received during 1982 (which marks the beginning of a new five-year defence plan), this would permit a first flight in late 1986/early 1987, followed by replacement of the first AJ 37 Viggens in the early 1990s.

TYPE: Single-seat all-weather multi-purpose combat aircraft.

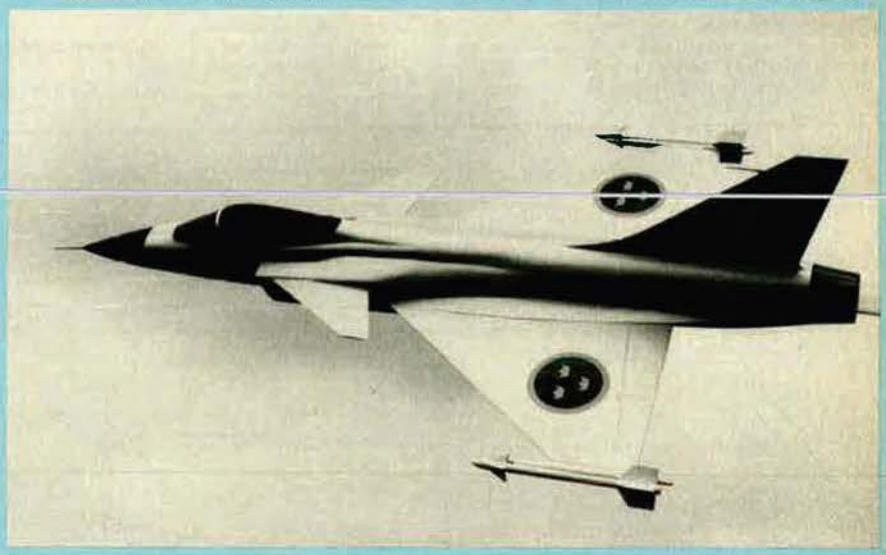
AIRFRAME: Tandem-wing arrangement of sweptback all-moving foreplanes, and a delta-shape main wing with two-section powered elevons on each trailing-edge. Elevons, actuated by fly-by-wire control, can be operated differentially or in unison. Conventional semi-monocoque fuselage. Tail unit comprises vertical surfaces only, consisting of sweptback fin and inset powered rudder. Fly-by-wire control of rudder. Approx 30% of main airframe structure of composite materials. Retractable tricycle-type landing gear.

POWER PLANT: One General Electric/Volvo Flygmotor F404J afterburning turbofan engine, in the 80 kN (18,000 lb st) class.

SYSTEMS: Include fly-by-wire system for actuation of control surfaces.

AVIONICS AND EQUIPMENT: L. M. Ericsson multi-mode pulse-Doppler radar (air-to-air, air-to-ground, and air-to-sea) for interception, attack, and reconnaissance roles; Ericsson FLIR camera (to be tested in 1982); Ericsson/SRA/Datasaab SDS 80 onboard central digital computer; cockpit head-up display incorporating wide-angle diffraction optics (holography); and three other SRA cockpit head-down CRT displays, of which the left-hand one will replace all conventional instrumentation (although four conventional dials will be installed as backups), the centre one will give a computer-generated map showing the area immediately surrounding the aircraft, and the right-hand one will indicate to the pilot all targets acquired by the radar and FLIR.

ARMAMENT: May have a built-in 30 mm Oerlikon KCA cannon. Attachment for one air-to-air missile at each wingtip. Four underwing hardpoints for other external stores, including heavy anti-shipping missiles, RB71 (Sky Flash) or similar air-to-air missiles, 'iron' bombs, and reconnaissance pods. Total military load comparable with that carried by Saab 37 Viggen.



Model of the Saab 2105 multi-role combat aircraft, intended to replace the Swedish Air Force Viggen

EHI

EH INDUSTRIES LTD; Head Office: 132–135 Sloane Street, London SW1X 9BB, UK

PARTICIPATING COMPANIES:
Costruzioni Aeronautiche Giovanni Agusta SpA
Westland Helicopters Ltd

EH INDUSTRIES EH 101

In the mid-1960s, Westland Helicopters began the development of an advanced helicopter required by the Royal Navy for anti-submarine operations and which, through a licence agreement with Sikorsky, was based on the S-61. Named Sea King, the initial HAS.Mk 1 version began to enter service in the Summer of 1969, but the growing importance of this category of aircraft led to proposals in the mid/late 1970s for a Sea King Replacement (SKR) helicopter. British Ministry of Defence (Navy) studies, completed in the Spring of 1977, had taken a close look at the potential of a ship-based SKR, and of the equipment that it would need to provide advanced ASW capability. These studies indicated:

(i) a requirement for the aircraft to be able to operate at long range from its base, and independently of other units;

(ii) that this autonomy of operation would require the use of sonobuoys, rather than traditional active dipping sonar;

(iii) a need for automated data handling to maximise the capability of the acoustic sensors, and also to manage supporting systems that could include MAD, radar, and radar intercept equipment;

(iv) that it was essential for the SKR to have an operational load capability greater than that of the in-service Sea King, not only to carry an additional weight of avionics, sensors, and weapons, but also for the increased fuel capacity needed to provide the desired endurance/range capability; and

(v) that overall dimensions should be similar to those of the Sea King, maintaining compatibility with the size of ships that would carry this new aircraft.

Westland initiated design and development of an aircraft to meet these requirements, under the designation WG 34, and a mockup was built at the company's factory at Yeovil, Somerset. It was soon clear that a helicopter of this capability would not only meet the Royal Navy's requirements, but would be suitable also for other civil and military applications. Earlier, in 1975, there had been a Memorandum of Understanding linking Aérospatiale, Agusta, MBB, and Westland as potential partners in the development and construction of three new military helicopters. These were required for service with West European military forces in the late 1980s. In July 1978, these same partners signed a Declaration of Principles. Westland had by then contracted Ferranti Computer Systems for design study and project definition of an airborne digital data handling system for the WG 34; similarly, Louis Newmark and Smiths Industries were linked to develop an AFCS incorporating a four-axis fail-safe autopilot/automatic stabiliser. More or less simultaneously, the MoD Procurement Executive had selected Marconi Avionics to initiate project definition of the acoustic processing system. This latter company was to receive subsequently a contract for project definition of a complete communications system for the WG 34.

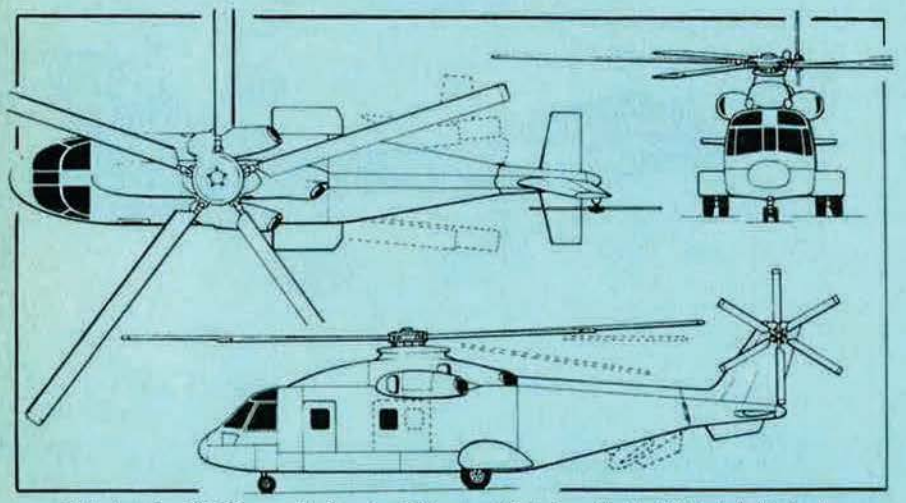
The fact that the Italian Navy also needed an ASW helicopter, and one matching very closely the requirements of the Royal Navy, led to more positive negotiations. Thus, it was announced in August 1979 that Agusta and Westland had reached an agreement to establish a joint, equally-owned company to manage the development, production, and marketing of a Sea King/SH-3D replacement for service with the navies of both nations. Almost exactly a year later came the news that the joint company, EH Industries Ltd, had been formed in June 1980.

Since that date, a head office for the company has been established in London where, side by side, British and Italian engineers have been finalising design proposals for the initial ASW helicopter

which now has the designation EH 101. The project is very much a fifty-fifty effort. Towards the end of 1980 an extensive market survey was undertaken, and this highlighted a requirement for a helicopter that would slot between the Sikorsky S-61 and its derivatives, and Boeing Vertol's Model 234 Chinook. A go-ahead for the nine-month project definition phase was received from the British and Italian governments on June 12, 1981, and in late October 1981 this was on target. During this period, a considerable amount of related research and development work was carried out in the works of the parent companies at Milan and Yeovil. At the latter factory the WG 34 mockup is finding a new lease of life for cockpit simulation, and also for simulation of naval avionics.

At this intermediate stage the design is not fully 'frozen', but a decision has been made to use three turboshaft engines, as opposed to two. This is based on the installation of a power plant that is more than adequate for the standard requirement, but one that will enable the EH 101 to perform efficiently in an engine-out situation. Furthermore, for operations requiring extended endurance, two engines only can be used. The main transmission system is being developed under subcontract by Fiat Aviazione SpA.

The physical dimensions of the helicopter are limited by frigate hangar size. Fortuitously, this also matches the requirement for civil use, especially for the offshore support role, and systems developed for operation to and from the pitching deck of a frigate at sea are equally valid for the deck of an offshore platform. It is envisaged that a civil EH 101 would be operated by a crew of three, including a steward, and carry 30 passengers. The army version, in a logistic transport configuration, would incorporate a rear loading ramp for the direct loading of vehicles or cargo if required, and would be able to airlift a payload of more than four tons; alternatively, 24 fully-equipped troops could be carried.



EH Industries EH 101 naval helicopter. Tail rotor will be four-blade *(Michael A. Badrocke)*

Present plans involve the reporting of project definition on March 12, 1982. Subject to approval by the British and Italian governments, it is hoped that an initial order will follow within approximately three months. It is likely that a number of prototypes will be required, and an on-target programme should provide the first flight of a prototype in 1984–85, and of a production aircraft during 1988–89. The fact that the project definition phase still had some four months to run at the time this entry was written makes a detailed description of the proposed EH 101 impossible. The details which follow must serve as a general guide, and apply more particularly to the naval version:

TYPE: Multi-role helicopter.

ROTORS: Five-blade main rotor of advanced construction. This will fold for stowage, and incorporate anti-icing features. Four-blade tail rotor, mounted on port side of rotor pylon. Tailcone folds for stowage.

ROTOR SYSTEM: Rotor transmission rated at approximately 3,393 kW (4,550 shp).

AIRFRAME: For general appearance, see accompanying illustration. Tail unit incorporates a ventral fin, and a tailplane mounted on the tailcone. Fully retractable tricycle landing gear, with twin wheels on each unit. Main units retract into fairings on fuselage sides.

POWER PLANT: The prototypes are likely to be powered by three 1,193 kW (1,600 shp) turboshaft engines related to the General Electric T700-GE-401. No decision has yet been finalised regarding the power plant of production aircraft. Maximum fuel weight 3,856 kg (8,500 lb).

ACCOMMODATION: Normal crew of three for ASW version, comprising pilot, observer, and acoustic systems operator. Provision for co-pilot if required. Up to 24 fully-equipped troops, or 30 passengers, in military and civil transport versions respectively.

ARMAMENT (ASW version): Fully-enclosed weapons bay, able to accommodate homing torpedoes and other weapons. No details of individual weapons yet available.

AVIONICS: Advanced avionics systems under development; no detailed information yet available.

DIMENSIONS, EXTERNAL:

Main rotor diameter	18.60 m (61 ft 0¼ in)
Length overall, rotors turning	22.80 m (74 ft 9¾ in)
Height overall	6.50 m (21 ft 3¼ in)

DIMENSIONS, INTERNAL:

Cabin:	
Length	6.50 m (21 ft 4 in)
Width	2.50 m (8 ft 2½ in)
Height	1.80 m (5 ft 10¾ in)

AREA:

Main rotor disc	271.72 m² (2,924.9 sq ft)

WEIGHTS (estimated):

Basic empty weight	approx 7,031 kg (15,500 lb)
Max fuel weight, internal tanks only	3,856 kg (8,500 lb)
Max T-O weight	12,474 kg (27,500 lb)
Alternative max T-O weight	14,175 kg (31,250 lb)

PERFORMANCE (estimated):

Cruising speed, ISA	150 knots (278 km/h; 173 mph)
Still-air range, with reserves, civil version:	
with 30 passengers	520 nm (964 km; 599 miles)
with 18 passengers	770 nm (1,427 km; 887 miles)

ERRATUM

MCDONNELL DOUGLAS/BRITISH AEROSPACE AV-8B HARRIER II

In the 'Avionics and Equipment' paragraph of the description of this aircraft, which appeared in the *Jane's* Supplement to the December 1981 issue, the contractor for the dual combining glass head-up display and display computer was wrongly identified as Marconi Avionics. This equipment is, in fact, supplied by Smiths Industries.

AISA

AERONÁUTICA INDUSTRIAL SA; Head Office, Works, and Airfield: Cuatro Vientos (Carretera del Aeroclub Carabanchel Alto), Apartado 984, Madrid 25, Spain

This company was founded in 1923 by Ing Jorge Loring Martinez, assuming its present title in 1935. Among its early products were several biplanes of Loring design, as well as licence-built examples of the Fokker C.IV and F.VIIb/3m, and of the C.5, C.6, C.7, and later Autogiros designed by Juan de la Cierva. Its design office has, since the second World War, been responsible for several liaison, training, and sporting aircraft for the Spanish Air Force and aeroclub flying schools, including the I-11, I-11B, AVD-12, and I-115. The Cuatro Vientos factory has a covered area of 8,000 m² (86,110 sq ft) and employs about 140 persons.

AISA is engaged in IRAN work and general overhaul of several types of US aircraft, in particular the North American T-6, Beechcraft Baron B55, Bonanza F33, and King Air C90, and Piper PA-23 Aztec aircraft operated by the Spanish Air Force and the National School of Aeronautics. It is also engaged in the repair and overhaul of Bell 47, 204, 205, and 206, and Boeing Vertol CH-47 helicopters, and their dynamic components, for the Spanish Army, Spanish Air Force, and civilian operators. As a subcontractor to Messier-Hispano-Bugatti, it is producing landing gear shock-absorbers and hydraulic actuators for the Dassault Mirage and Falcon series, Dassault-Breguet/Dornier Alpha Jet, and other European aviation programmes. Under subcontract to CASA, it produces structural components for the C-212 Aviocar, the C-101 Aviojet, and the MBB BO 105 helicopter.

In the design stage are the I-122 two-seat trainer and I-124 four-seat light aircraft, related designs of which the former is under consideration, together with the CASA C-102, to fulfil a Spanish Air Force requirement. AISA's most recent project to reach the hardware stage is the GN autogyro, which was completed in 1981.

AISA GN

Design of the GN was started in the early 1970s, and the construction of two prototypes (one for ground testing) began in 1979; most structural static testing had been completed by January 1980.

Rollout of the first flying prototype took place in the Autumn of 1981, and flight testing was scheduled to begin before the end of that year. It is intended to seek certification of the GN to FAR standards.

TYPE: Four-seat light autogyro, with jump take-off capability.

ROTOR SYSTEM: Fully articulated four-blade rotor, with all-metal blades of the type fitted to the Bell Model 47G. Hydraulic blade dampers. Rotor brake fitted. Rotor rpm 1,380–1,680 in normal forward flight (autorotation), increasable to 1,884 rpm for jump take-off. Conventional collective and cyclic pitch controls.

ROTOR DRIVE: By power take-off from engine, via two-stage reduction gear, for spin-up on ground. Transmission can be disconnected manually, or will occur automatically when correct rpm and blade pitch angle for T-O are reached.

WINGS: Short-span all-metal wings, of NACA 0024 section, enclosed at each tip by tailboom. No tabs.

FUSELAGE: Pod-shaped semi-monocoque structure of aluminium alloy, with moulded Plexiglas transparencies.

TAIL UNIT: Twin tailbooms, with enclosed tailplane, cable-actuated elevator, and twin fins and rudders, all of metal construction. No tabs.

LANDING GEAR: Non-retractable tricycle type, with single wheel and oleo-pneumatic shock-ab-

First photograph of the new AISA GN autogyro

sorber on each unit. Steerable nosewheel. Independent disc brakes on main wheels. Tailskid under each tailboom.

POWER PLANT: One 224 kW (300 hp) Avco Lycoming IO-540-K1A5 flat-six engine, with direct drive to a Hartzell two-blade constant-speed metal pusher propeller with spinner. Engine also provides power for rotor spin-up on ground. Four bag-type fuel tanks in wings. Overwing gravity refuelling points.

ACCOMMODATION: Seats for four persons in fully enclosed cabin. Front seats are independently three-way adjustable; bench seat for two persons at rear. In prototype, all four seats have provision for seat-type parachutes; production version will have space for baggage aft of rear seat. Forward-opening car-type door on each side (jettisonable on prototype). Full dual controls, except for single centrally-located collective pitch control. Cabin ventilation standard.

SYSTEMS: 24V battery for engine starting; provision for ground power receptacle. Fire extinguishing system.

DIMENSIONS, EXTERNAL:

Rotor diameter	12.00 m (39 ft 4½ in)
Rotor blade chord (each)	0.28 m (11 in)
Rotor disc area	108.62 m² (1,169.2 sq ft)
Wing span (incl tailbooms)	2.60 m (8 ft 6¼ in)
Wing chord (constant)	0.85 m (2 ft 9½ in)
Length overall, excl rotor	6.50 m (21 ft 4 in)
Height overall	3.20 m (10 ft 6 in)
Max width (over main wheels)	2.83 m (9 ft 3½ in)
Wheel track (c/l of main wheels)	2.67 m (8 ft 9 in)
Wheelbase	2.89 m (9 ft 5¾ in)
Propeller diameter	2.14 m (7 ft 0 in)
Doors (each): Height	1.085 m (3 ft 6¼ in)
Max width	0.93 m (3 ft 0½ in)

DIMENSIONS, INTERNAL:

Cabin:	
Max width	1.14 m (3 ft 9 in)
Max height	1.24 m (4 ft 1 in)

WEIGHTS:

Weight empty	978 kg (2,156 lb)
Max payload	308 kg (679 lb)
Max fuel	120 kg (265 lb)
Max T-O weight	1,400 kg (3,086 lb)

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

Max level speed at S/L	129 knots (240 km/h; 149 mph)
Max cruising speed at S/L	114 knots (212 km/h; 132 mph)
Min speed, power on	27 knots (50 km/h; 31.5 mph)
Max rate of climb at S/L	360 m (1,180 ft)/min
Min sinking speed, power off	3.73 m (12.24 ft)/s
Landing run (zero wind)	0–5 m (0–16.5 ft)
Range: pilot and 3 passengers	432 nm (800 km; 497 miles)
Endurance: pilot and 3 passengers	4 h
pilot and 2 passengers	6 h
g limits	+3.5/−1.0

CESSNA

CESSNA AIRCRAFT COMPANY; Head Office and Works: Wichita, Kansas 67201, USA

CESSNA MODEL T303 CRUSADER

On February 14, 1978, Cessna flew the prototype of a new lightweight twin-engined aircraft which had the company designation Model 303. At that time it had four-seat accommodation, and was powered by two 149 kW (200 hp) engines. It was superseded subsequently by a new Model T303, named initially Clipper, but since renamed Crusader as the result of a trademark dispute. The T303 makes use of bonded structures, has six-seat accommodation, and more powerful turbocharged engines driving counter-rotating propellers. Both propellers turn inboard, neutralising the spiral effect of propwash along both sides of the fuselage and over the tail unit. This improves directional control, and reduces rudder pedal forces during single-engine operation. A distinctive feature of the Crusader is a cruciform tail unit, claimed to provide aerodynamic advantages. The tailplane is positioned some 0.23 m (9 in) above the propeller slipstream, providing good elevator effectiveness at all speeds, and excellent longitudinal stability. Minimal pitch trim changes are required as a result of variations in flap or power settings. The Crusader is marketed with full IFR avionics and instrumentation as standard.

The first deliveries of production aircraft were made during October 1981, following the receipt of FAA certification under the latest FAR Pt 23 regulations, and Cessna plans to produce 280 Crusaders during its 1982 model year.

TYPE: Twin-engined cabin monoplane.

WINGS: Cantilever low-wing monoplane. Wing section NACA 23017 at fuselage centreline, NACA 23015.5 at station 91.643, and NACA 23012 at tip. Dihedral 7°. Incidence 3° at root, 0° at tip. Structure is primarily of light alloy. Conventional ailerons and trailing-edge flaps. Trim tab in starboard aileron.

FUSELAGE: Oval-section semi-monocoque structure of light alloy.

TAIL UNIT: Cantilever structure, primarily of light alloy, with horizontal surfaces mounted part-way up fin. Vertical surfaces swept back. Long dorsal fin. Trim tab in rudder and starboard elevator.

LANDING GEAR: Retractable tricycle type, with single wheel on each unit. Main units retract inward, nosewheel forward, and all wheels are enclosed by doors when retracted. Main units of articulated (trailing-link) type. All wheels of same size, with tyres size 6.00-6. Heavy-duty wheels and brakes optional.

POWER PLANT: Two 186 kW (250 hp) Continental flat-six turbocharged engines, comprising one TSIO-520-AE (port) and one LTSIO-520-AE (starboard), each driving a McCauley three-blade constant-speed fully-feathering metal propeller with spinner. Propellers are counter-rotating. Fuel in integral wing tanks with combined capacity of 587 litres (155 US gallons), of which 578 litres (153 US gallons) are usable. Refuelling point on upper surface of each wing, adjacent to wingtip. Oil capacity 17 litres (4.5 US gallons).

ACCOMMODATION: Standard seating for pilot and five passengers; or pilot, co-pilot, and four passengers. Six individual forward-facing seats can be replaced by optional club arrangement. Outboard armrests are standard; inboard retractable armrests and adjustable headrests are normally optional, but are standard with club seating. Wide range of optional cabin furniture and equipment. Clamshell-type two-piece cabin door, with integral airstair, on port side at aft end of cabin. Emergency exit at front of cabin on starboard side. Baggage stowage in nose compartment (with door on port side), wing lockers, and at rear of cabin, with combined capacity of 267 kg (590 lb). Accommodation heated and ventilated.

AVIONICS AND EQUIPMENT: Standard avionics include dual ARC 485B nav/coms, Cessna Nav-O-Matic 400B two-axis autopilot, slaved directional gyro, ADF, glideslope and marker beacon receivers, and transponder. Standard equipment includes navigation lights and flashing beacon. Optional equipment includes club seating with armrests and adjustable headrests, writing tables, refreshment units, storage drawer, ice chest, stereo equipment, and wingtip strobe lights.

DIMENSIONS, EXTERNAL:

Wing span	11.90 m (39 ft 0½ in)
Wing chord at root	1.75 m (5 ft 9 in)
Wing chord at tip	1.24 m (4 ft 1 in)
Length overall	9.27 m (30 ft 5 in)
Height overall	4.06 m (13 ft 4 in)
Tailplane span	5.18 m (17 ft 0 in)
Wheel track	3.81 m (12 ft 6 in)
Wheelbase	2.29 m (7 ft 6 in)
Propeller diameter	1.88 m (6 ft 2 in)

AREA:

Wings, gross	17.6 m² (189.2 sq ft)

WEIGHTS AND LOADINGS:

Weight empty	1,499 kg (3,305 lb)
Max ramp weight	2,347 kg (5,175 lb)
Max T-O weight	2,336 kg (5,150 lb)
Max standard landing weight	2,268 kg (5,000 lb)
*Max permissible landing weight	2,336 kg (5,150 lb)

*With optional heavy-duty wheels and brakes

Model T303 Crusader, Cessna's latest contender in the six-seater market

Features of the Crusader include bonded construction, a cruciform tail, counter-rotating propellers, and full equipment for IFR operation

Max zero-fuel weight 2,200 kg (4,850 lb)
Max wing loading 132.7 kg/m² (27.2 lb/sq ft)
Max power loading 6.28 kg/kW (10.3 lb/hp)

PERFORMANCE (at max T-O weight, ISA, except speeds are those at mid-cruise weight):
Max level speed at 5,485 m (18,000 ft)
216 knots (400 km/h; 249 mph)
Max cruising speed, 71% power at 6,100 m (20,000 ft) 196 knots (363 km/h; 226 mph)
Cruising speed, 72% power at 3,050 m (10,000 ft)
180 knots (334 km/h; 207 mph)
Stalling speed, flaps up, power off
68 knots (126 km/h; 78 mph) CAS
Stalling speed, flaps down, power off
62 knots (115 km/h; 71 mph) CAS
Max rate of climb at S/L 451 m (1,480 ft)/min
Rate of climb at S/L, one engine out
67 m (220 ft)/min
Max operating altitude 7,620 m (25,000 ft)
Service ceiling, one engine out
3,960 m (13,000 ft)
T-O run 389 m (1,275 ft)
T-O to 15 m (50 ft) 533 m (1,750 ft)
Landing from 15 m (50 ft) 442 m (1,450 ft)
Landing run 250 m (820 ft)

RANGE (416 kg; 918 lb usable fuel, at recommended lean mixture, with allowances for start, taxi, T-O, climb, descent, and 45 min reserves):
71% power at 6,100 m (20,000 ft)
895 nm (1,658 km; 1,030 miles)
72% power at 3,050 m (10,000 ft)
835 nm (1,547 km; 961 miles)
Long-range cruise power at 6,100 m (20,000 ft)
1,005 nm (1,862 km; 1,157 miles)
Long-range cruise power at 3,050 m (10,000 ft)
1,020 nm (1,890 km; 1,174 miles)

defence weapons system, but meets the basic requirements for Pave Coin missions. A tandem-seat dual-control trainer version has been developed and could be produced if the demand existed. This would retain the combat capability of the standard Enforcer, making it suitable also for armed reconnaissance. Its training capability would include bombing and gunnery, formation and instrument flight, tactical procedures, and transition. The armament and specification details which follow applied to the Enforcer as proposed initially for further USAF evaluation. Development is leading to changes, which will be recorded in the June 1982 *Jane's* Supplement.

TYPE: Single-seat turboprop attack aircraft.

WINGS: Cantilever low-wing monoplane. NAA-NACA high-speed wing section. Dihedral 5°. All-metal stressed-skin structure. Sealed metal ailerons. Hydraulically actuated trailing-edge flaps. Structure incorporates wingtip tanks to increase fuel capacity. Three weapon pylon stations beneath each wing as standard, with two additional stations per wing optional.

FUSELAGE: All-metal semi-monocoque structure, incorporating extensive armour protection for power plant and pilot.

TAIL UNIT: Cantilever all-metal structure.

LANDING GEAR: Hydraulically-retractable tailwheel type, with single wheel on each unit. Main units retract inward, tailwheel forward. Oleo-pneumatic shock-absorbers. Main wheels 70.48 cm (27.75 in) diameter, with high-flotation tyres. Multi-disc brakes.

POWER PLANT: One 1,823 ekW (2,445 eshp) Avco Lycoming T55-L-9 turboprop engine. Standard fuel capacity, in self-sealing and foam-protected tanks, totals 1,605 litres (424 US gallons). Auxiliary fuel can be carried optionally in four 416 litre (110 US gallon) and two 265 litre (70 US gallon) drop-tanks, to provide a maximum capacity of 3,800 litres (1,004 US gallons).

ACCOMMODATION: Pilot, on Stanley ejection seat, in enclosed cockpit with cast acrylic windscreen and canopy. Optional heating and cooling of accommodation.

SYSTEMS: Electrical system. Hydraulic system for actuation of landing gear, wheel brakes, and trailing-edge flaps.

AVIONICS AND EQUIPMENT: Solid-state avionics. Autopilot optional.

ARMAMENT: Six underwing pylons have a maximum loaded capacity of 2,486 kg (5,480 lb), with 454 kg (1,000 lb) on each inboard pylon, and 394.5 kg (870 lb) on each of the four outer pylons. Standard armament will comprise two 30 mm gun pods, on inboard underwing pylons. Other weapons can include AN-M47A4 smoke bombs; B-37K1 practice bomb containers; BLU-1C/B, -23B, -27B, -32B, -52B incendiary bombs; CBU-14A + 14A/A, -22A + 22A/A, -24A/B, -24B/B, -25A + 25A/A, -29A/B, -29B/B, -49A/B, -49B/B, -53B, -54B cluster bomb units; CBU-19A canister clusters (riot control); LAU-3A, -32A/A, -32B/A, -59A rocket launchers; M117/M117A-1, Mk 81, Mk 82, Mk 82 Snakeye GP bombs; SUU-11A/A minigun pod; SUU-20A bomb/rocket dispenser; SUU-25A + 25A/A flare dispenser; and XM75 40 mm gun pods.

DIMENSIONS, EXTERNAL:
Wing span (over tip-tanks)
12.15 m (39 ft 10¼ in)
Wing chord at root 2.64 m (8 ft 8 in)
Wing chord at tip 1.27 m (4 ft 2 in)
Mean aerodynamic chord 2.02 m (6 ft 7½ in)
Height overall 2.97 m (9 ft 9 in)
Wheel track 3.61 m (11 ft 10 in)
Propeller diameter 3.40 m (11 ft 2 in)
Propeller ground clearance 0.20 m (7¾ in)

AREAS:
Wings, gross 23.41 m² (252 sq ft)
Ailerons (total, incl tabs) 1.18 m² (12.73 sq ft)
Trailing-edge flaps (total) 2.99 m² (32.22 sq ft)
Fin 1.44 m² (15.50 sq ft)
Rudder (incl tab) 0.87 m² (9.40 sq ft)

WEIGHTS (estimated):
Weight empty 3,066 kg (6,759 lb)
Operating weight empty 3,499 kg (7,714 lb)
Max T-O weight at 8*g* load factor
5,216 kg (11,500 lb)
Max T-O weight at 6*g* load factor
6,350 kg (14,000 lb)
Normal landing weight 3,674 kg (8,100 lb)

PERFORMANCE: (estimated, A: 8*g* T-O weight; B: 6*g* T-O weight; C: normal landing weight):

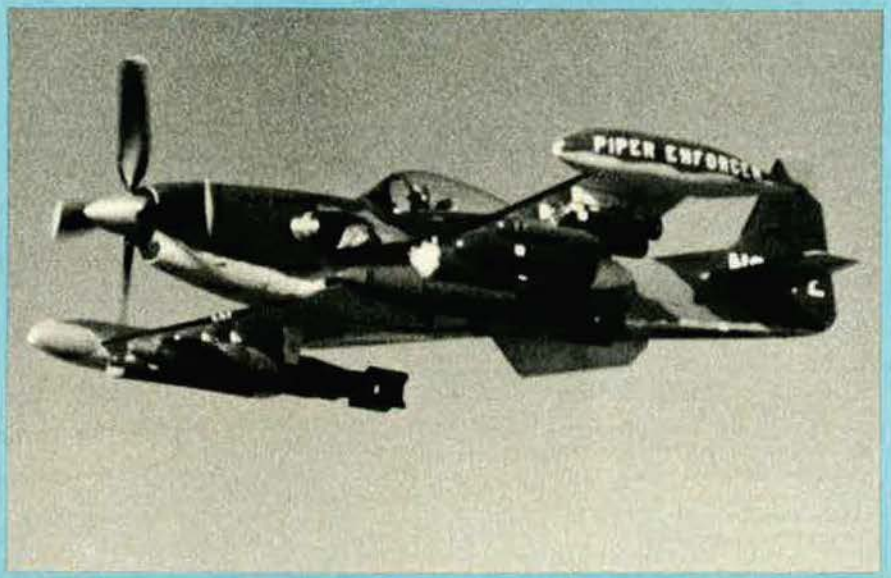
PIPER

PIPER AIRCRAFT CORPORATION: Head Office and Works: Lock Haven, Pennsylvania 17745, USA

PIPER ENFORCER

Piper Aircraft Corporation announced on September 4, 1981, the receipt of a contract from the US Air Force covering the design, development, and testing of two prototypes of a lightweight turboprop-powered close-support aircraft known as the Enforcer. This is based on the North American P-51 Mustang of the second World War and, as reported in the 1980–81 *Jane's*, Piper acquired the original programme from Cavalier Aircraft Corporation. Total contract value of the current two-year programme is expected to be about $12 million.

Piper has made significant changes to the original Enforcer design, including aerodynamic improvements to the tailplane, which will be increased in area by 36%, modifications to the aileron control system, removal of the six 0.50 in machine-guns from the wings, and provision for modern weapons. The length of the fuselage will be increased by 0.48 m (1 ft 7 in). The first flight of an Enforcer is scheduled for December 1982, with an operational demonstration in the late Summer of 1983. The aircraft is being evaluated primarily for use as an internal



Piper Enforcer evaluated by USAF in the 1971 Pave Coin programme. An updated version is the subject of a new evaluation aimed at lower-cost airpower

Max level speed, A at 4,570 m (15,000 ft)
403 knots (747 km/h; 464 mph)
Cruising speed, B at 4,570 m (15,000 ft)
284 knots (526 km/h; 327 mph)
Stalling speed, C
78 knots (145 km/h; 90 mph)
Max rate of climb at S/L, B
1,460 m (4,790 ft)/min
Service ceiling, B 11,460 m (37,600 ft)
T-O run at S/L, A 335 m (1,100 ft)
T-O to 15 m (50 ft) at S/L, A 512 m (1,680 ft)
Landing from 15 m (50 ft), C 524 m (1,720 ft)
Landing run, C 268 m (880 ft)

IML

IML GROUP (AEROSPACE PRODUCTS DIVISION); New Zealand Office: PO Box 1202, Gisborne, New Zealand

The IML Group is a partnership of individual companies and consultants, who advise on and establish new ideas and concepts for the aerospace, automotive, and other industries. A subsidiary is engaged in the manufacture of aircraft models for wind tunnel use and display.

For some years, IML's Aerospace Products Division has been undertaking low-key studies of the effectiveness of modern airborne weapons platforms, and comparing them with types used for equivalent duties during the second World War. Simultaneously, it was examining closely the problems associated with cryogenic-fuelled commercial transport aircraft, particularly those concerned with freight-carrying. It concluded that, in order to package the fuel systems to the best advantage, without losing the ability to accommodate large payloads, it was necessary to design an aircraft employing a high degree of enclosed volume utilisation (EVU).

This theory, developed by Mr David Williams, examines the total volume 'boxed in' by the aircraft's span, length, and height, including all probes and other excrescences, measuring how much of that enclosed volume is used for primary mission equipment (payload, weapons, ammunition, crew), and how much for secondary mission support (*e.g.*, airframe, engines, fuel). A design efficient in EVU is one employing the greater percentage of its volume for primary mission equipment, and using the minimum of secondary support to achieve the carrying out of that mission. The percentage of total 'enclosed' volume represented by the sum of the primary and secondary components provides a further measure of EVU efficiency.

Following on from these studies, IML enhanced the theory of EVU, mating it with one derived from the Group's concurrent investigations of combat sensitivity (CS). It then evaluated a number of civil and military transport configurations employing the EVU theory, and also made several studies which applied that theory to a close-support attack aircraft.

In simple terms the CS theory, also developed by Mr Williams, breaks down an aeroplane into combat damage zones, rating each zone on a scale of 100. It then examines the aircraft's combat sensitivity—*i.e.*, how effectively it can still fulfil its mission—when one or more of these zones is eliminated. Only a small allowance is made for the efficiency of armour protection: CS assumes a 'worst case' of impaired armour, or no armour at all. On this basis, according to IML, most modern US combat aircraft appear as very combat-sensitive: the A-10A, for example, has a much lower CS rating than might be expected, partly due to a high concentration of critical weapons functions in a comparatively small space. Modern Soviet military aircraft appear far less combat-sensitive when similarly judged, and most second World War aircraft have high CS ratings—three of the best being the P-51 Mustang, P-47 Thunderbolt, and Hawker Hurricane.

IML had also been aware for some time that, apart from work undertaken in Poland and the USSR, hardly any company or government anywhere in the world had developed any essentially new configuration for agricultural aircraft, most of which were conventional low-wing or high-wing monoplanes. It also became obvious that none of them, not even specialised new configurations such as the Soviet/Polish PZL Mielec M-15 Belphegor, employed a high level of EVU.

Further study revealed that the utilisation and performance envelopes of 1939–45 fighter-bombers and strike aircraft seemed to be remarkably similar to those of modern agricultural aircraft, and that the availability of low-cost airframes was not the only reason why many agricultural operators were flying revamped second World War aircraft. This prompted an obvious question: would it be possible to design an effective agricultural aircraft that could serve also in the light attack role?

In 1980, IML began to investigate this possibility. The result was a configuration which, according to the company, has a higher EVU, especially in its turbofan-engined forms, than any aircraft designed for many years, and a better CS rating than any currently-serving USAF or Soviet military aircraft. An important feature of the design is its ability to be adapted to any customer power plant, thus making it independent of any political alignment by the countries in which it might be built. The aircraft is known by the basic designation AX.

IML AX

Preliminary details of the AX were released on November 9, 1981, when IML formally assigned responsibility for the agricultural version to its New Zealand office, of which designer Mr David Williams is Director. Project definition and conceptual packaging are being undertaken in Gisborne; wind tunnel testing and stress analysis will be carried out in Australia. The project, originally codenamed 'Bandit', began as a design for a single-seat, high-capacity, small-airframe agricultural aircraft, featuring a radical configuration and unprecedented payload/range capability for an aeroplane of its size.

The IML Group is acting in a design capacity only, and it was originally expected that the agricultural version would be handed over for production to an airframe manufacturer in Asia or South America. Current plans call for preliminary design work to be completed by the end of 1983, and it was hoped that a prototype of the agricultural AX would be flying by the end of 1985, enabling series production to begin in 1987. However, a subsequent shift of design emphasis to the military developments of AX means that the programme will be rescheduled to meet the demands of the selected prime contracting country.

Military variants of the AX are aimed primarily at fulfilling the role of a low-cost backup to the Fairchild A-10A Thunderbolt II, able to serve as a cost-effective 'hold off and destroy' aircraft in areas such as Central Europe and the Middle East. It is claimed that military AXs would be able to carry more ordnance per dollar than types such as the A-10A and Piper Enforcer, with a more effective performance. When not being used in its designated attack role, the AX can serve as a flight refuelling tanker, missile carrier, water bomber, and chemical dispersal aircraft.

IML believes that the AX is the first small-airframe, land-based aircraft of its kind, designed to carry an internally-stowed free-fall weapons load, since the Grumman Avenger and de Havilland Mosquito of the second World War. One new concept is the installation of a large number of guns across the width of the nose, offering a wide spread of firepower during the run-in and a far greater extent of target damage than that inflicted by a single-location multi-barrel weapon. From this was developed the location of a rearward-firing swath gun emplacement in the lower rear bay of the fuselage, permitting extensive firepower to be brought to bear after the flyover and weapons drop. In the low-specification turboprop versions, modification to and from the agricultural configuration is relatively simple, enabling an operator quickly to convert a fleet of agricultural aircraft to military configuration in the event of a localised conflict or threat of a more serious outbreak of hostilities. Turbofan versions of the AX are dedicated to the attack role.

Turboprop-powered variants of the AX are designated AXA, and those with turbofans AXM. At the time of writing, IML had assigned type designations to eight variants, as follows:

AXA-D7. Agricultural version, with single 1,581 kW (2,120 shp) Rolls-Royce Dart RDa.7 Mk 536-2 turboprop engine and Dowty Rotol propeller. Convertible to attack role.

AXA-G33. Agricultural version, with single 1,227 kW (1,645 shp) Garrett TPE331-15R turboprop engine and Dowty Rotol or Hartzell propeller. Convertible to attack role.

AXA-P20. Agricultural version, with single Pratt & Whitney Aircraft of Canada PW120-1 turboprop engine (1,566 kW; 2,100 shp for take-off and 1,268 kW; 1,700 shp max continuous) and Hartzell or Dowty Rotol propeller. Convertible to attack role.

AXA-D12. Dedicated attack version, with single 2,420 kW (3,245 shp) Rolls-Royce Dart RDa.12 Mk 210 turboprop engine and Dowty Rotol propeller.

AXM-F10. Attack version, with twin Pratt & Whitney PW1115 turbofan engines (66.7 kN; 15,000 lb st class); otherwise similar to AXM-S68.

AXM-G36. Attack version, with twin Garrett ATF3-6-2 turbofan engines (each 22.5 kN; 5,050 lb st); otherwise similar to AXM-S68.

AXM-S68. Attack version, with twin Rolls-Royce RB.168 Spey Mk 101 turbofan engines (each 48.9 kN; 11,000 lb st).

AXM-T34. Attack version, with twin General Electric TF34 turbofan engines (40.0 kN; 9,000 lb st class); otherwise similar to AXM-S68.

Of these eight, the AXM-S68 was at that time regarded as the lead AXM version, and certain nations had requested proposals for versions powered by SNECMA, Tumansky, and Ivchenko engines.

The following description of the AX is based upon information corrected to mid-February 1982. However, since project definition was still continuing at that time, some details may have changed before this issue of AIR FORCE is published.

TYPE: Single-seat agricultural and/or attack aircraft.

WINGS: Cantilever high-wing monoplane, with wide-chord aerofoil section, tapering in thickness from root to tip. Dihedral 2°. Sweepback at quarter-chord 1°. Fail-safe steel structure, with three tubular spars, and welded steel tube ribs and diagonals. CFRP skin panels. Constant-chord centre-section, over width of fuselage; outer panels are tapered in planform, cambered downward at the tips, and fitted with a winglet at each tip. Integral tip-tanks on long-range versions. Inboard leading-edges are extended sharply forward, with compound sweep, to blend with nose on each side of cockpit. Four-point attachment to fuselage, over top of main frame. Single-segment, single-slotted trailing-edge flaps inboard, and Frise-type CFRP ailerons outboard, the latter capable of being drooped in conjunction with flaps. Centrally located plate-type spoiler/lift dumper above and below each outer panel. Lift of turboprop versions enhanced during take-off and landing by deflector system which spreads airflow over upper surfaces of wings and fuselage. Control surfaces actuated hydraulically by triple-redundant, armour-protected system.

FUSELAGE: Unpressurised fail-safe flat-box-shaped lifting-body structure, comprising a welded chrome-molybdenum steel tube frame of Warren truss type, with aluminium alloy formers and longerons. Unstressed skin panels of carbon-fibre and boron epoxy, and aluminium honeycomb sandwich. Multiple-shutter rotating bomb bay doors in underside. Most left- and right-handed components interchangeable. Entire fuselage is devoid of all mission-critical hardware except ordnance storage area and cockpit area, which have armour protection.

TAIL UNIT: Semi-stressed cantilever structure, with steel tube spars and aluminium alloy skin; honeycomb leading-edges on tailplane. Non-swept, fixed-incidence tailplane (−2°), with sweptback endplate fin and rudder at each tip on military versions. Agricultural versions have a single T tail. Fins, rudders, and large-area elevators are interchangeable left/right. Rudders and elevators actuated hydraulically, with manual

backup. Electrically operated trim tab in each elevator, mechanically operated trim tab(s) in rudder(s).

LANDING GEAR: Semi-retractable tailwheel type, with single wheel and shock-absorber on each unit. Hydraulic actuation, with manual override; emergency gravity extension. Main wheels (size 36 × 11, Type VII) retract rearward and upward, into fairings on fuselage sides which cover the oleos and struts but leave the wheels and tyres exposed. Tailwheel (size 24 × 7.7-10, Type VII) retracts rearward and upward, partially into rear of fuselage; it is not covered by doors when retracted. Main units are interchangeable left/right, and are fitted with large-diameter, low-pressure tyres for operation from soft and rough terrain. All three wheels are interchangeable with those of Fairchild A-10A Thunderbolt II. No brake parachute.

POWER PLANT (AXM versions): Two turbofan engines, as detailed in individual model listings, installed in side-by-side nacelles close-mounted directly on top of fuselage just aft of cockpit. Standard internal fuel (see under 'Weights and Loadings' heading) contained in armoured and self-sealing tank in each wingtip fairing, and in additional outer-wing fuel cells. All fuel cells filled with reticulated foam. Non-spill, leakproof venting and feed systems; fuel lines, located in the main wing spars, have self-sealing, projectile-retarding cladding. Provision for in-flight refuelling on each tank, and on fuselage station alongside cockpit. Provisions for ferry tanks to be installed in fuselage bays, and for jettisonable auxiliary tanks to be carried under wings.

POWER PLANT (AXA versions): One turboprop engine, as detailed in individual model listings, driving a four-blade constant-speed propeller. Engine nacelle mounted on cantilever pylon above fuselage/wing junction, enabling propeller to provide a degree of 'Coanda effect' which further enhances lift capability of airframe. Fuel system as for AXM versions.

ACCOMMODATION: Pilot only, on Martin-Baker Mk 10L (standard) or lightweight Mk 11 (optional) zero-zero ejection seat, in fully-enclosed, heated, and ventilated cockpit well forward of wings, with forward field of view comparable to that afforded by a helicopter. Rearward-sliding framed canopy, and bulletproof windscreen, are made up of flat panels, to facilitate replacement in non-controlled combat spares facilities. Armoured panels on each side and at rear of pilot's seat in military versions. Entire cockpit area of military AX is protected by a projectile-retarding composite structure.

SYSTEMS: Hydraulic system, pressure 207 bars (3,000 lb/sq in), for actuation of control surfaces, flaps, landing gear, and wheel brakes. Electrical system includes two 30/40kVA 115/200V AC engine-driven generators (one on turboprop versions), plus standby battery and inverter. Cockpit environmental control using engine bleed air. No APU.

AVIONICS AND EQUIPMENT: Blind-flying instrumentation standard. Provision for wide variety of equipment to customer's requirements, including weather and tracking radar in flat nose at sides of cockpit.

ARMAMENT AND OPERATIONAL EQUIPMENT (attack versions): Lateral row of six or eight fixed, forward-firing Oerlikon KCA 30 mm cannon in underside of forward fuselage. Ventral barbette in underside of fuselage, aft of bomb bays, with six rearward-firing 0.50 in machine-guns. Provision in turboprop versions for dorsal barbette aft of engine pylon, with three rearward-firing 20 mm cannon. Up to twenty 500 lb 'iron' bombs (Mk 82 LDGP or similar) can be carried in internal fuselage bays with rotating doors. Options can include head-up display, Pave Penny laser system, and underwing hardpoints for rockets, missiles, and other stores.

DIMENSIONS, EXTERNAL:

Wing span (over tip-tanks)	14.04 m (46 ft 0¾ in)
Wing chord: at root	6.97 m (22 ft 10¼ in)
at tip	1.98 m (6 ft 6 in)
Wing aspect ratio	5.56
Length overall	13.32 m (43 ft 8.4 in)
Length of fuselage	13.09 m (42 ft 11.2 in)
Fuselage: Max width	2.67 m (8 ft 9.2 in)
Height (AXA-D12):	
over engine nacelle	5.13 m (16 ft 9.9 in)
over propeller disc	6.525 m (21 ft 4.9 in)
Tailplane span	8.115 m (26 ft 7½ in)
Wheel track	5.33 m (17 ft 5.8 in)
Wheelbase	6.75 m (22 ft 1¼ in)
Propeller diameter (AXA-D12)	3.66 m (12 ft 0 in)

AREAS:

Wings: gross	35.41 m² (381.14 sq ft)
gross effective (incl fuselage lift)	57.71 m² (621.18 sq ft)
Ailerons (total)	2.14 m² (23.03 sq ft)
Trailing-edge flaps (total)	3.58 m² (38.53 sq ft)
Spoilers (total)	1.20 m² (12.92 sq ft)
Vertical tail surfaces (twin tail, total net)	7.42 m² (79.92 sq ft)
Horizontal tail surfaces (total net)	9.12 m² (98.17 sq ft)

WEIGHTS AND LOADINGS:

Manufacturer's weight empty:	
AXA-G33	2,903 kg (6,400 lb)
AXA-P20	3,175 kg (7,000 lb)
AXA-D7	3,538 kg (7,800 lb)
AXM-G36	5,443 kg (12,000 lb)
AXA-D12	6,123 kg (13,500 lb)
AXM-S68	6,441 kg (14,200 lb)
Max standard internal fuel:	
AXA-G33	2,268 kg (5,000 lb)
AXA-D7	2,721 kg (6,000 lb)
AXA-P20	2,812 kg (6,200 lb)
AXM-G36	3,402 kg (7,500 lb)
AXA-D12	3,628 kg (8,000 lb)
AXM-S68	4,082 kg (9,000 lb)
Max payload:	
AXA-G33 (chemical)	3,674 kg (8,100 lb)
AXM-G36 (ordnance)	4,536 kg (10,000 lb)
AXA-P20 (chemical)	5,125 kg (11,300 lb)
AXA-D12 (ordnance)	6,305 kg (13,900 lb)
AXA-D7 (chemical)	6,622 kg (14,600 lb)
AXM-S68 (ordnance)	6,804 kg (15,000 lb)
Max T-O weight:	
AXA-G33	8,845 kg (19,500 lb)
AXA-P20	11,113 kg (24,500 lb)
AXA-D7	12,882 kg (28,400 lb)
AXM-G36	13,290 kg (29,300 lb)
AXA-D12	16,057 kg (35,400 lb)
AXM-S68	17,463 kg (38,500 lb)
Max wing loading:	
AXA-G33	153.2 kg/m² (31.4 lb/sq ft)
AXA-P20	192.3 kg/m² (39.4 lb/sq ft)
AXA-D7	223.0 kg/m² (45.7 lb/sq ft)
AXM-G36	230.3 kg/m² (47.2 lb/sq ft)
AXA-D12	278.1 kg/m² (56.98 lb/sq ft)
AXM-S68	302.6 kg/m² (62.0 lb/sq ft)
Max power loading:	
AXA-D12	6.6 kg/kW (10.9 lb/shp)
AXA-P20	7.1 kg/kW (11.7 lb/shp)
AXA-G33	7.2 kg/kW (11.9 lb/shp)
AXA-D7	8.1 kg/kW (13.4 lb/shp)
AXM-S68	177.5 kg/kN (1.74 lb/lb st)
AXM-G36	295.9 kg/kN (2.9 lb/lb st)

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

Never-exceed speed:	
AXM-S68	550 knots (1,019 km/h; 633 mph)
Max level speed at S/L, ISA:	
AXA-P20	260 knots (482 km/h; 299 mph)
AXA-G33	265 knots (491 km/h; 305 mph)
AXA-D7	266 knots (493 km/h; 306 mph)
AXA-D12	294 knots (545 km/h; 338 mph)
AXM-G36	390 knots (723 km/h; 449 mph)
AXM-S68	430 knots (797 km/h; 495 mph)
Max cruising speed at S/L, ISA:	
AXA-G33	230 knots (426 km/h; 265 mph)
AXA-P20	240 knots (445 km/h; 276 mph)
AXA-D7	244 knots (452 km/h; 281 mph)
AXA-D12	275 knots (509 km/h; 316 mph)
AXM-G36	360 knots (667 km/h; 414 mph)
AXM-S68	400 knots (741 km/h; 461 mph)
Max rate of climb at S/L:	
AXM-S68	2,133 m (7,000 ft)/min
T-O run:	
AXM-S68	290 m (950 ft)
T-O to 15 m (50 ft):	
AXA-D7	220 m (720 ft)
AXA-G33	235 m (760 ft)
AXA-P20	240 m (780 ft)
AXA-D12	300 m (980 ft)
AXM-S68	400 m (1,300 ft)
AXM-G36	425 m (1,400 ft)
Landing from 15 m (50 ft):	
AXA-G33	390 m (1,280 ft)
AXA-P20	415 m (1,350 ft)
AXA-D7	430 m (1,410 ft)
AXA-D12	445 m (1,450 ft)
AXM-S68	450 m (1,470 ft)
AXM-G36	455 m (1,480 ft)
Landing run:	
AXM-S68 (with thrust reversal)	202 m (660 ft)
Operating radius with max payload, 45 min reserves:	
AXA-D7	600 nm (1,110 km; 690 miles)
AXA-P20	650 nm (1,205 km; 750 miles)
AXA-G33	700 nm (1,295 km; 805 miles)
Combat radius, fully equipped, incl reserves:	
AXM-G36, close support (incl 2 h loiter)	250 nm (465 km; 290 miles)
AXM-S68, close support (incl 2 h loiter)	450 nm (835 km; 520 miles)
AXA-D12, close support (incl 2 h loiter)	540 nm (1,000 km; 620 miles)
AXM-S68, reconnaissance	650 nm (1,205 km; 750 miles)
AXM-S68, deep strike	800 nm (1,485 km; 920 miles)
Max ferry range:	
AXM-S68	2,300 nm (4,260 km; 2,650 miles)
AXA-D12	2,400 nm (4,450 km; 2,765 miles)
AXM-G36, AXA-P20	2,500 nm (4,635 km; 2,880 miles)
AXA-D7	2,600 nm (4,820 km; 2,995 miles)
AXA-G33	3,000 nm (5,560 km; 3,455 miles)

IML AX in desert camouflage scheme. The long-range tip tanks give the aircraft range comparable to that of the F-111

Fairchild Stratos is now Fairchild Control Systems Company

In the 1940's we designed and manufactured cabin superchargers which enabled aircraft such as the Convair 240 commercial transport to operate in the stratosphere, hence the name "Stratos".

The aerospace/defense industry has changed significantly since the 1940's and so have we. For nearly 40 years we have pioneered concepts and applications in propulsion and environmental control systems.

Our new name reflects a broader commitment to the design and manufacture of mechanical and electro-mechanical control systems and components utilizing our expertise in thermodynamics, pneumatics and cryogenics.

Fairchild Control Systems Company... a company fully committed to meeting the challenges of today's and tomorrow's aerospace/defense industry. For more information and product literature write to:

Fairchild Control Systems Company
Dept. AF-2
1800 Hosecrans Avenue,
Manhattan Beach, California 90266
Telephone: (213) 675-9111
Telex: 910-325-6216

We've changed more than our name.

FAIRCHILD
CONTROL SYSTEMS COMPANY

Environmental Control Systems
Fluid & Propulsion Control Products
Pressure Regulators
Couplings/Disconnects
Fill & Drain Valves
Thrusters
Specialty Energy Valves
Air Turbine Motors

THE BULLETIN BOARD

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

Record High VA Budget Proposed

The Administration's proposed FY '83 budget for the Veterans Administration was unveiled in February to mixed reviews. Before a gathering of representatives of veterans' groups, including AFA, VA Administrator Robert P. Nimmo characterized the record-high totals as "a lot to be pleased about." Other observers, including congressional veterans affairs experts, have labeled some of the figures suspect because they are based on legislation yet to be passed. Still others maintain that some of the proposed program stretch-outs and cutbacks will seriously hurt needed vet benefits.

The President is asking for a FY '83 VA budget authorization of $25.6 billion, an increase of just under a billion dollars from FY '82. VA's share is around three percent of the total federal budget.

Unlike many other agencies, VA projects an increased number of employees in FY '83. A sizable increase in the health programs area and a planned loss of about 200 employees in benefits administration will leave a net gain of about 1,000.

Of concern to many is that balancing this budget will require passage of several pieces of potentially controversial legislation. For example, the Administration will seek laws to delay payments of VA benefits to the first full month of entitlement; eliminate dependency allowances for vets rated less than fifty percent disabled; issue benefits checks in even dollars, rounded off to the lower dollar amount; and establish a one-half of one percent loan processing fee on GI home loans, paid for by the veteran. It is anticipated that this latter provision alone is worth some $94.6 million as a budget "plus." If Congress balks at passage of such a law, then money must be found elsewhere within the VA to balance the figures.

Other budget highlights reveal that VA anticipates paying out almost $4 billion in pensions based on financial need in FY '83 to about 820,000 veterans and 943,000 survivors. Another $10 billion in compensation payments will go to more than 2,300,000 veterans with service-connected disabilities, including payments to survivors of this group.

Burial benefits, recently cut, will drop to about $141 million (from $208 million in FY '81) and Vietnam Era Readjustment Benefits will also decline as that force loses eligibility. On the other hand, VA insurance payouts are increasing and fast approaching the billion-dollar mark.

FY '83 should see the opening of the Quantico, Va., and Indiantown Gap, Pa., National Cemeteries, as well as more VA funds spent in planning for and administering to the burgeoning over-age-sixty-five veteran group.

Doolittle Designated Honorary Naval Aviator

AFA's first President, Lt. Gen. James H. Doolittle, USAF (Ret.), was recently named an honorary Naval aviator by the Chief of Naval Operations, Adm. Thomas B. Hayward. The presentation occurred during "Doolittle Day" observances in Los Angeles. The eighty-five-year-old hero is only the fifteenth person and the first Air Force officer so designated since the award was established in 1949. The honor is conferred on non-Naval aviators who have made significant contributions to Naval aviation.

Forty years ago, on April 18, 1942, General Doolittle led sixteen B-25 bombers from the flight deck of the aircraft carrier USS *Hornet* on a raid against industrial centers in Japan. This first US air strike of World War II against the Japanese mainland earned Doolittle, then a lieutenant colonel in the US Army Air Forces, the Medal of Honor *(see also p. 28).*

X-Factor-One Specialties
(100 Pounds to Height of Six Feet)

Survival Training
Missile Systems Maintenance
Electronic Warfare Systems
Cable and Antenna Systems Installation/Maintenance
Aircrew Egress Systems
Helicopter Mechanic/Technician
Missile Maintenance
Electric Power Line
Refrigeration and Cryogenics
Heating Systems
Pavements Maintenance
Construction Equipment
Fire Protection

Strength and Stamina Standards Raised

The Air Force has noted increasing complaints by unit commanders and supervisors that their people lack adequate strength or stamina to perform tasks called for by their jobs. A special effort is under way to establish better entry criteria for heavy work specialties. The Air Force Aerospace Medical Research Laboratory (AFAMRL), the Air Force Surgeon General, and personnel specialists are working to improve the matching of individual capabilities with physical demands.

The AFAMRL-directed effort includes on-site measurements of job requirements (tasks, tools, equipment, etc.), development of an advanced Strength Aptitude Test Battery (SATB), and new recommendations for strength and stamina criteria for each job. This large-scale research effort is expected to be completed late this year.

Meanwhile, pending a new SATB, changes are being made for known strength-problem skills. Specifically, heavy work skills (those categorized as X-1) now require an individual to demonstrate the ability to lift 100 pounds to a height of six feet, compared to a previous weight requirement of seventy pounds. The lifting of seventy pounds to a six-foot height criteria is now tagged to skills requiring moderate strength (X-2). The criteria for standard light-duty specialties (X-3) is now forty pounds to elbow height vs. the previous twenty-pound requirement. This is now the minimum strength level required for enlistment.

The specialties to which the new X-1 criteria are currently being applied cover several AFSCs *(see box).* Changes will be made to X-Factor

standards for other AFSCs as the AFAMRL review data become available.

GI Bill Use Under-Reported

A recent congressionally mandated study of GI Bill usage over a twelve-year period indicates that more Vietnam-era veterans used their educational entitlements than has been previously reported.

The independent study perused more than 8,000,000 veterans records and reviewed more than 11,000 personal interviews from the VA's 1979 National Survey of Veterans.

Highlights of the study include:

- The percentage of veterans trained has increased over time from sixty percent among post-Korean conflict veterans to seventy-two percent among veterans who served during the Vietnam era only.
- Three-quarters of the veterans who trained after discharge used some form of VA educational assistance, and an average of sixty percent completed training or reached an intermediate goal.
- The study debunks the "Vietnam walkaway phenomenon," and indicates that more peacetime veterans left training than have Vietnam-era veterans.
- The state of California had the highest number of veterans who trained (916,000)—that's fourteen percent of the national total, while Alaska had the lowest number, 0.2 percent or 9,927 veterans.
- Almost eighty percent of the veterans studied stated they were satisfied with the amount of financial assistance received.

In other GI Bill news, the VA estimates that as many as 39,000 Vietnam-era veterans will take advantage of a one-time, two-year extension of their GI Bill delimiting date. This very limited program covers only those veterans who want to use their remaining entitlement to obtain a high school diploma, or its equivalent, or pursue a program of apprenticeship, other on-the-job training, or a program with a vocational objective. Enrollment in college degree, flight, or correspondence courses is not included in the extension. Veterans who have already earned college degrees are ineligible for the extension, which is specifically designed to help educationally disadvantaged or unskilled Vietnam-era veterans whose ten-year delimiting date has expired.

Since the inception of the original World War II GI Bill in 1944, nearly 18,000,000 men and women have used one of the three GI Bills at a cost of about $51 billion. The current program for those who entered the military after December 31, 1976, requires financial participation by service members.

The VA Advisory Committee on Former Prisoners of War

Former POW members, in addition to **General Flynn**, are:

Edward Fisher, Fairhaven, Mass., a Korean POW.

George Juskalian, Vienna, Va., World War II POW.

Samuel B. Moody, Longwood, Fla., prisoner of Japan, World War II, and founder of American Defenders of Bataan and Corregidor. (He also has served as the AFA Central Florida Chapter President.)

Lyle Pearson, North Mankato, Minn., prisoner of Germany, World War II, and past national commander of Disabled American Veterans.

Charles S. Prigmore, University of Alabama, prisoner of Germany, World War II.

Stan Sommers, Marshfield, Wis., prisoner of Japan, World War II, and former national commander of American Ex-POW, Inc.

Joseph H. Vater, McKees Rocks, Pa., prisoner of Japan, World War II, past national commander of American Defenders of Bataan and Corregidor.

James Howie Warner, Plymouth, Mich., prisoner of North Vietnam.

Medical members are:

Paul B. Beeson, M.D., Seattle, Wash., former VA Distinguished Physician, internationally famous gerontologist, former professor at Oxford University Medical School.

George Christakis, M.D., Miami, Fla., Professor in Department of Epidemiology and Public Health at University of Miami School of Medicine, consultant to VA clinical Advisory Group.

Calvin Kunin, M.D., Columbus, Ohio, Chairman of the Department of Medicine at Ohio State University, Cochairman of VA Infectious Diseases Advisory Committee.

John E. Nardini, M.D., Washington, D. C., psychiatrist in private practice, ex-prisoner of war (Bataan-Corregidor).

Theodore E. Woodward, M.D., Baltimore, Md., Professor and Head, Department of Medicine, University of Maryland School of Medicine, consultant to VA since 1948, consultant to Walter Reed Medical Center since 1950.

AFA Veterans Advisor Named to Chair VA Committee

A fourteen-member advisory committee *(see box)* of physicians and former prisoners of war has been appointed by VA Administrator Robert P. Nimmo to advise him on the administration of new and liberalized VA benefits for former POWs. *(See related item, February "Bulletin Board.")*

Nimmo named Lt. Gen. John P. Flynn, USAF (Ret.), of San Antonio, Tex., to head the group. General Flynn, a POW in North Vietnam for five and a half years, was the highest ranking American POW. He has served for a number of years as AFA's Advisor on Veterans Affairs, a voluntary position he recently accepted for another year, at the initiative of AFA President John G. Brosky.

Nine of the VA committee members will provide representation from each major component of the POW population such as the European and Pacific theaters of World War II, Korea, Vietnam, and each branch of military service. Five committee members were selected for their medical expertise bearing on problems of former POWs.

Slot Machines Well Received

It's been a year now since the Air Force began a test-program of reinstatement of slot machines in overseas clubs. Eleven clubs, on five installations, got the one-armed money-makers.

AIR FORCE Magazine asked the Air Force, "How goes it?" Although couched in cautious language, the response clearly indicates that the program is going well. A Pentagon official said, "Player response has been spontaneous and enthusiastic. Feedback from both open mess personnel and commanders has been very positive."

Asked about the outlook for the program, the official noted that expansion is not contemplated until the Air Force is done "thoroughly evaluating and validating the results of the test program," which is expected to take a little while yet. At the moment, however, it looks as if the slots will continue to be a feature of overseas clubs. Placing slot machines on bases in the United States, its territories, or possessions is against federal statute; this is not expected to change in the foreseeable future.

Families Continue to Receive Air Force Emphasis

Support for the family unit throughout an Air Force career continues to be a high priority for Air Force leaders, as recent activity indicates. The four prototype Family Support Centers that opened late last year at Moody AFB, Ga.; Travis AFB, Calif.; Bitburg AB, Germany; and Kadena

THE BULLETIN BOARD

AB, Okinawa, Japan *(see "Bulletin Board," August '81 issue)* are the subject of a recent study to see if they're doing the job they were set up to do. Medical people, chaplains, family services volunteers, social action people, wives clubs, senior enlisted advisors, and commanders, among others, were interviewed.

This was a preliminary look at the operation, and Air Force officials cautioned that definitive findings were not to be expected. A more complete study, leading to firm recommendations, is due later this year.

However, it already appears evident that the problems of Air Force families center on the areas of financial and economic pressures, separation from familiar places and people, and employment hassles for spouses. Programs aimed at strengthening the family unit will almost surely have to be aimed in these directions.

Leading the force, Bolling AFB, in Washington, D. C., has established the first Air Force Military Spouse Skills and Resource Center. The office is planned as a job information and skills bank as well as a study center for spouses who seek paid employment or volunteer experience in the communities surrounding Bolling.

Recognizing that "two incomes have almost become a necessity for the military family," the Center aims to:

- Maintain up-to-date information on jobs and company training programs in the area;
- Prepare spouses for job market entry with marketable skills; and
- Provide positive support and encouragement to spouses in their career searches.

Free referral sources are offered, and workshops on self-assessment, job-hunting, interviewing, and allied endeavors are planned. Plans are also under way for sponsoring on-base courses in such office skills as typing and shorthand.

Interestingly, while much of the Center effort will be directed toward paid employment, volunteer training efforts also will be stressed, with the view that volunteering not only fills a social need, but often is an important aid to gaining a variety of experience that can later be converted to paid positions.

Finally, the Air Force is actively reaching out to spouses of about-to-retire members. It is asking bases to recognize that spouses have a more difficult time adjusting to retirement than the military member and "while family members are invited to participate in retirement counseling sessions, few do." Headquarters is recommending seminars in which presently retired members will actively interact with those planning to leave. "All sessions will be family-oriented," the information stresses, and Base Level Directors of Personnel are asked to "strongly encourage" family participation in pre-retirement activities.

Short Bursts

Backed by congressional authority, the VA will be collecting interest and administrative costs on delinquent debts and also, for the first time, charging interest on the unpaid balance of **debts being paid by installment.** The VA notes, dryly, that charging interest "will motivate debtors to pay more promptly." The rate will be based on an average of quarterly Treasury Department rates.

Pentagon staffers are looking at a proposal to **allow Medal of Honor recipients space-A travel for life.** Just like other vets, current MOH holders can travel worldwide while on active duty. However, when they leave service, unless as a retiree, they are barred from overseas space-A, although they have been allowed CONUS trips. The proposal would allow Medal recipients' family members to go along overseas, but not Stateside.

Civil Air Patrol and the Federal Emergency Management Agency have agreed on cooperative **responsibilities for disaster relief.** FEMA is the federal overseer for natural and man-made disasters and emergencies, including nuclear attack. CAP has a long history of knowledgeable participation during disasters.

Chief master sergeants and E-9 selectees now will attend the **Senior NCO Academy** only if they volunteer, rather than as a result of central selection. Senior master sergeant selectees will still be tabbed for attendance from a centralized screening point, but will now have the option to decline "with prejudice," a status that can be removed by subsequent attendance. Previously, the only options for E-8s and E-8 selectees picked for the school who didn't want to go were separation or retirement.

The familiar all-green **government checks** will gradually be replaced with stock that will retain the existing

green color on the face, but be a light tan with orange ink on the back. Reason—better quality microfilming.

Nearly 4,000,000 veterans with **GI life insurance** are sharing a record $664.6 million dividend this year. Don't apply—the dividend will be paid automatically on your policy anniversary date. World Wars I and II and Korean conflict policyholders and those disabled veterans holding Veterans Special Life Insurance will benefit. The participating insurance program funds are separate entities, and thus dividends will vary.

Senior Staff Changes

PROMOTIONS: To be **Brigadier General:** Claudius E. **Watts** III.

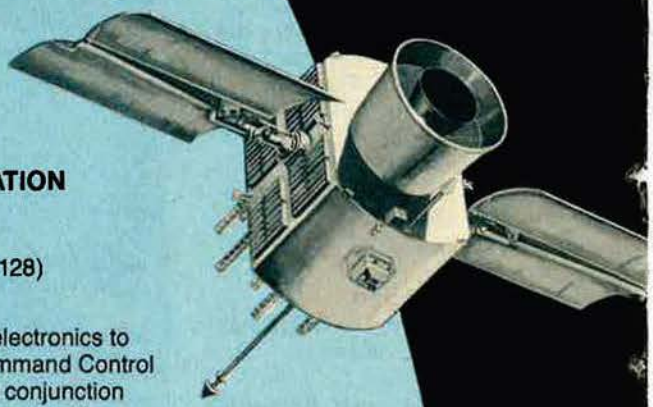
CHANGES: L/G James H. Ahmann, from Mil. Dep. Dir., Defense Security Assistance Agency, Washington, D. C., to Dir., Defense Security Assistance Agency, Washington, D. C. . . . **M/G Melvin G. Bowling,** from C/S, AIRSOUTH, AFSE, Naples, Italy, to Spec. Ass't to Cmdr., ATC, Maxwell AFB, Ala. . . . **M/G George C. Lynch,** from Cmdr., Hq. AFAFC, Lowry AFB, Colo., to Cmdr., Hq. AFCOMS, Kelly AFB, Tex., replacing retired M/G Charles E. Woods.

B/G Robert B. Patterson, from Ass't DCS/Plans, Hq. MAC, Scott AFB, Ill., to Vice Cmdr., 21st AF, MAC, McGuire AFB, N. J., replacing B/G Rano E. Lueker. . . **B/G Donald L. Rans,** from Dep. Auditor General & Cmdr., Hq. AFAA, Norton AFB, Calif., to Cmdr., Hq. AFAFC, Lowry AFB, Colo., replacing M/G George C. Lynch. . . **Col. (B/G selectee) Claudius E. Watts III,** from Cmdr., 63d MAW, MAC, Norton AFB, Calif., to Ass't DCS/Plans, Hq. MAC, Scott AFB, Ill., replacing B/G Robert B. Patterson.

An Air Force initiative to promote harmony among the troops? No, just 2d Lt. Frances L. Schubert congratulating her father, 89th Military Airlift Wing Senior Enlisted Advisor CMSgt. Earl T. Schubert, after swearing him in for reenlistment. Chief Schubert said that it was the first time he had ever "received a kiss from the officer who swore me in." (USAF photo by A1C Bill Firaneck)

SENIOR ENLISTED ADVISOR CHANGES: CMSgt. William H. Strickland, from Directorate of Intel. Plans & Systems, Ass't C/S for Intel., Hq. USAF, Washington, D. C., to SEA, Hq. AFIS, Washington, D. C. ■

ELECTRONICS AND THE AIR FORCE



A NATIONAL SYMPOSIUM OF THE AIR FORCE ASSOCIATION
(In conjunction with Air Force Systems Command)

Hilton at Colonial, Wakefield, Mass. (near Hanscom AFB on Route 128)
April 26–27, 1982

An authoritative review and expert preview of the importance of electronics to the Air Force, with special emphasis on Electronic Warfare and Command Control Communications and Intelligence (C^3I) for national security. Held in conjunction with Air Force Systems Command and timed to coincide with congressional hearings on the Administration's proposed $18 billion upgrade of strategic C^3, this program is a must for planners in government and industry concerned with the scope and trends of the military application of modern electronics. It will also provide excellent background for all those interested in the role of electronics in future planning for our nation's security.

Keynoter will be Gen. Robert T. Marsh, AFSC Commander. Four individual panels of prominent military and civilian experts will probe and analyze the challenges and prospects of Command Control Communications and Intelligence (C^3I) and Electronic Warfare in a uniquely informative manner.

SPEAKERS AND PANELISTS INCLUDE:

(1) Requirements Panel:

Chairman
Dr. James P. Wade
Principal Deputy Under Secretary of Defense for R&E

Dr. Robert S. Cooper
Director, DARPA

Lt. Gen. Hillman Dickinson
Director for C^3 Systems, JCS

Dr. Robert J. Hermann
Former Special Assistant to the Under Secretary of Defense for R&E

(2) Capabilities Panel:

Chairman
Lt. Gen. James W. Stansberry
Commander, Electronic Systems Division, AFSC

Dr. Robert R. Everett
President, MITRE

Lt. Gen. Richard C. Henry
Commander, Space Division, AFSC

Dr. O. Charles Williams
Deputy for Advanced Systems
Office of the Assistant Secretary of the Air Force, R&D/Logistics

(3) Organization Panel:

Chairman
Dr. Alexander H. Flax
President, IDA

Lt. Gen. Lincoln D. Faurer
Director, NSA

Maj. Gen. Christopher S. Adams, Jr.
DCS/Operations Plans, Hq. SAC

Maj. Gen. Winston D. Powers
DCS/Communications, Electronics and Computer Resources, NORAD

(4) Electronic Warfare Panel:

Chairman
Dr. Donald C. Latham
Assistant Secretary of Defense/R&E for C^3

Gen. Charles A. Gabriel
CINC USAFE

Maj. Gen. Doyle E. Larson
Commander, Electronic Security Command

Lt. Gen. Lawrence A. Skantze
Commander, Aeronautical Systems Division, AFSC

Dinner Speaker

Dr. George A. Keyworth, Director of the Office of Science and Technology Policy, and Science Advisor to the President

Registration fee for all Symposium events is $175. This fee includes all presentation sessions, coffee breaks, continental breakfast, lunch, and dinner. For information and registration, call Jim McDonnell or Dottie Flanagan at (202) 637-3300, Air Force Association, Suite 400, 1750 Pennsylvania Avenue, N.W., Washington, D.C. 20006.

INTERCOM

Far West Region Hosts Management Conference at March AFB, Calif.

Top AFA leadership from national headquarters and the western United States met in a day-long management conference at March AFB, Calif., on January 30. The conference, attended by more than forty chapter, state, and regional leaders, was deemed a success by participants and its sponsor, Edward A. Stearn, AFA National Vice President for the Far West Region.

Host for the event was Lt. Gen. John Murphy, USAF, Commander of SAC's Fifteenth Air Force, who welcomed the participants to March AFB and who took part in all conference events.

According to Ed Stearn, the meeting had its genesis in AFA President John G. Brosky's 1981 meeting with national vice presidents and the excellent results produced there.

In making the keynote address, "Challenge for the West," President Brosky noted that this conference was a first and expressed his hope that the concept would be extended to other parts of the country. He congratulated AFA leaders nationwide on the successful "Operation War Veteran" that gained thousands of new members for AFA and preserved AFA's war veteran membership at seventy-seven percent *(see the following item).* He noted that at year's end, AFA membership stood at 170,251 (by mid-February the total had reached 173,000).

President Brosky spoke of key issues facing AFA in 1982. Among them are control of expenses, increased contact by national vice presidents with chapters and individuals, long-range planning for the Association, increased efforts to attract young people and minorities to join AFA, help for the Air Force, and expansion of communication with other organizations.

Other speakers included conference host General Murphy, who impressed on the AFA leaders the fact that the United States will not have the luxury of time to prepare for the next conflict—"We will have to fight with what we have." General Murphy continued, "We do not generate our own requirements; they come from the elected leaders of this government. . . . Congress and the people provide us with the wherewithal; if they give us broomsticks, then we'll fight with broomsticks."

Among those participating in the Conference were (from left): AIR FORCE *Magazine Editor in Chief Clif Berry; Dave Noerr, AFA Assistant Executive Director/Field Organizations; Lt. Gen. Jerome O'Malley, DCS/Plans and Operations, Hq. USAF; AFA President John G. Brosky, who keynoted the Conference; and AFA Executive Director Russ Dougherty.*

Enjoying coffee and a chat before kicking off the Far West Management Conference are (from left): Richard C. Doom, California State AFA President; Sherman Wilkins, AFA National Director; AFA Executive Director Russ Dougherty; and Ed Stearn, National Vice President for the Far West Region, and Conference host.

Lt. Gen. Jerome O'Malley, DCS Plans and Operations, Hq. USAF, covered the Washington situation as the Fiscal Year 1983 budget process was beginning. He noted the importance of educating people who are interested in defense topics so they can help educate the public, and underscored AFA's important role in that process. He discussed several current important high-priority programs, both in systems and in people. He also cited the important contributions of Air National Guard and Air Force Reserve units to Air Force readiness.

AFA's Executive Director, Russell E. Dougherty, spoke with the participants about the "on-going crusade for airpower." He pointed out that the Air Force is changing and evolving, and

Ed Stearn, who organized and hosted the Conference, presents opening remarks to the assembled Conference participants.

that AFA's crusade for airpower must recognize and accommodate the changes. He said that "we should think of ourselves as disciples who can help educate the people about the contributions of aerospace to the security of the country."

Russ Dougherty highlighted the changing composition of Air Force families in stressing the need to adapt. He also noted that AFA is not a single-issue association, but rather has concerns across the entire spectrum of aerospace interests. He reported that Jim Straubel's book, *Crusade for Airpower*, is in production now and will be published in mid-May. He also cited the forthcoming series of AFA symposia and meetings that will contribute to the process of educating individuals on key aerospace power events. He concluded that "the crusade for airpower is in transition."

Most of the afternoon was devoted to three panels composed of experienced persons and led by AFA Assistant Executive Director Dave Noerr. The panels were on "Field Fundamentals," "Broadening the Membership Base," and "Communicating." During the panels a lively interchange of views between panelists and participants in the conference contributed to the spread of tips, information, and working techniques in all those areas.

New Members, Merging Chapters, and Other Items of Interest

The January issue of *Crossfeed*, AFA's monthly bulletin for Association leaders, carried several items of interest for AFA members. The following is a summary of highlights.

- AFA chapters recruited 21,327 new members in the 1981 calendar year, with the number of new members recruited during the last quarter of 1981 breaking the AFA record for that quarter. The year's net gain for new members reached almost 14,000.
- Five AFA chapters in the Los Angeles area have merged to form the General Doolittle Los Angeles Area Chapter. The new chapter consists of the former Air Harbor, Los Angeles, Jimmy Doolittle, South Bay, and Long Beach Chapters.
- AFA President John Brosky congratulated AFA leaders recently on the results of "Operation War Veteran," AFA's war veteran membership drive: "With your help we ended 1981 with 170,251 members and patrons, and our percentage of war veterans was seventy-seven percent—well above the required minimum of seventy-five percent. In the October to December period, we obtained 5,707 new war veteran members against our national goal of 5,500 . . . what a superb record of accomplishment!"

President Brosky cautioned, however, that the need for war veteran members

Planeside at Vandenberg AFB, Calif.: Air Force Secretary Verne Orr with (from left) Maj. Gen. Jack L. Watkins, Commander of 1st Strategic Aerospace Division; AFA National President John G. Brosky; and Edward A. Stearn, AFA National Vice President, Far West Region. The occasion of the meeting was Secretary Orr's dedication of the Integrated Test Facility building for the MX system at Vandenberg AFB.

Gen. Jack J. Catton, USAF (Ret.), left, was appointed recently to the Air Force Historical Foundation's governing board of trustees. He confers here with newly appointed Foundation Executive Director Col. Louis H. Cummings, USAF (Ret.). (USAF photo)

INTERCOM

Edward B. Kenney (center), for fifteen years a key staff member of the US Senate Armed Services Committee, was recently awarded an AFA Presidential Citation by President John G. Brosky in recognition of his distinguished career in support of national defense requirements. With Mr. Kenney are AFA Executive Director Russ Dougherty (left) and AFA Consultant John Gray.

Dr. Stephen K. Marks, who is with the NASA Aerospace Education Project at Oklahoma State University, Stillwater, Okla., gave an illustrated talk at a recent AFA Tulsa Chapter meeting. Dr. Marks described future uses of the Space Shuttle at the meeting. Pictured examining a Shuttle model are, from left: John Loerch, Tulsa Chapter Vice President; L. S. "Tad" Allen, immediate past president of the Chapter; and Dr. Marks.

continues, and urged that AFA leaders stress this need in their 1982 membership campaigns: "We are pressing forward with our tax relief legislation so that seventy-five percent of our membership will only need to be veterans—rather than war veterans. We are hopeful that this legislation can be enacted during the current session of Congress, but until this is accomplished, our need for new war veteran members will remain a priority item."

• In the last several months, AFA has had a hand in a number of legislative victories. While the Association doesn't lobby, it does work to provide information to interested parties about the impact of pending legislation. Among the successes in personnel issues were the following.

(1) A 14.3 percent raise in military pay and benefits for enlisted personnel and officers.

(2) Increases in aviation career incentive pay and in enlisted aircrew flight pay.

(3) A cost of living allowance for overseas bachelors living on-base.

(4) Payments for temporary lodging during a PCS move.*

(5) An increase in hazardous-duty pay.

(6) A bonus for each additional year of service for scientific and engineering officers with from three to fifteen years of service.*

(7) An increase—from 6,500 to 9,500—in Air Force ROTC scholarships.*

(8) The removal of the ceiling on the number of dependents allowed to live overseas.

(9) An increase in basic pay for Air Force Reserve and Air National Guard personnel.

Maj. Gen. Jack L. Watkins, right, Commander of SAC's 1st Strategic Aerospace Division, and Carrol Buford, left, AFA Robert H. Goddard Chapter President, were at the Vandenberg AFB, Calif., "Operation Big Brother" Christmas party. General Watkins accepted a check from the Goddard Chapter to help finance the annual event, where more than 200 underprivileged children, escorted by Vandenberg AFB personnel, received gifts bought with funds raised by Base personnel.

* Not yet funded. Funding expected in FY '82 Supplemental.

INTERCOM

Air Force Chief of Staff Gen. Lew Allen, Jr., presided over the annual Air Force Suggestion Award ceremony. With General Allen are recipients (from left) Clinton S. Campbell, Norma I. Henderson, and Benjamin H. Haralson. See item.

Three Air Force Civilian Employees Honored for Cost-Saving Suggestions

Three Air Force civilian employees were honored recently at the Pentagon for their cost-saving suggestions. Air Force Chief of Staff Gen. Lew Allen, Jr., presided over the ceremony honoring Benjamin H. Haralson, Norma I. Henderson, and Clinton S. Campbell.

Mr. Haralson is employed at the Warner Robins Air Logistics Center at Robins AFB, Ga. His suggestion to modify radar data processors on F-15C/D aircraft resulted in a saving of almost $7 million.

Ms. Henderson and Mr. Campbell are employed at Ogden Air Logistics Center, Hill AFB, Utah. They suggested using an in-house work force to retrieve government-furnished equipment on termination of the Boeing LGM-30 Minuteman contract, rather than award a contract for retrieval of the equipment to private industry. This idea resulted in a cost savings of approximately $6 million.

Both suggestions enabled the Air Force to fulfill mission requirements and, at the same time, saved the government approximately $13 million.

Each employee received a certificate, plaque, and monetary honorarium.

Newly Formed Misawa Chapter First AFA Chapter in Japan

The newly formed Misawa Chapter of the Air Force Association at Misawa AB, Japan, elected its first board of directors on January 13.

Maj. Robert Smith and Capt. Alan Orser, both of the 6112th Air Base Wing at Misawa AB, spearheaded the effort to form the chapter, which now has 125 members.

The new chapter officers are: President, Maj. Robert Smith; Vice President, Lt. Col. Nancy Caldwell; Secretary, 1st Lt. Gene Barr; and Treasurer, Capt. Mary Greenwood.

The Misawa Chapter is the first to be formed under a resolution adopted at the 1981 AFA National Convention allowing active-duty members to hold of-

AFA National President Judge John G. Brosky, center, met recently at a Washington, D. C., luncheon with Evan L. Hultman, left, National President of the Reserve Officers Association; and with Air Force Chief of Staff Gen. Lew Allen, Jr. General Allen was the featured speaker at the luncheon.

INTERCOM

Anthony Casamento, hero of Guadalcanal who had to wait for thirty-nine years before receiving his Medal of Honor, has been named an Honorary Member of AFA's H. H. Arnold Chapter in Syosset, N. Y. On the occasion of the Chapter's annual Military Ball, Irwin Hansen (left), Arnold Chapter President, and Frank X. Battersby (right), Chairman of the Chapter's Executive Council, presented Mr. Casamento with his Honorary Membership certificate.

fice in overseas chapters. Previously only civilians were allowed to hold office, making it difficult for AFAers overseas to participate in chapters.

"This chapter is the first AFA chapter formed in Japan and Fifth Air Force," Major Smith said. "The Misawa Chapter now forming was accomplished after three years of hard work."

Victor Kregel, AFA Chairman of the Board, was expected to visit Misawa this month to charter the new Chapter.

UNIT REUNIONS

Air Weather Service
A reunion will be held for Air Force weathermen on June 25–27, 1982, at the US Air Force Academy, Colo. **Contact:** Col. Bob Bundygaard, USAF (Ret.), 1405 Eagle View Dr., Colorado Springs, Colo. 80909.

East Coast Fighter Pilots Ass'n
East Coast Fighter Pilots will get together on April 16, 1982, at 5:00 p.m. in the Presidential Suite of the Sheraton National Hotel, Columbia Pike and Washington Blvd., Arlington, Va. **Contact:** Doc Broadway at (703) 938-4047.

Kelly Class of 1930
The Kelly Field Class of February 1930 is holding its fifty-second reunion at the US Air Force Academy, June 25–26, 1982. Our letters may not have reached some members who have moved. If you were missed, please **contact** Col. Dyke Myer, USAF (Ret.), Rte. 2, Box 310, Comfort, Tex. 78013; or Gen. E. W. Rawlings, USAF (Ret.), 1914 1st National Bank Building West, Minneapolis, Minn. 55402.

29th Air Service Group, 13th AF
Members of the 29th Air Service Group will hold their thirty-sixth reunion in Clarksburg, W. Va., on July 12–16, 1982. **Contact:** Frank Pace, 29th Air Service Group Association, 315 W. 15th St., Dover, Ohio 44622.

44th Bomb Group/44th Strategic Missile Wing
The 44th Bomb Group and the 44th Strategic Missile Wing, along with the 66th, 67th,

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): **Arthur R. Brannen,** 605 N. Hospital Dr., Jacksonville, Ark. 72076 (phone 501-982-2585).

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, Yuba City, Vandenberg AFB): **Richard C. Doom,** P. O. Box 2027, Canyon Country, Calif. 91351 (phone 213-887-2923).

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): **Lee C. Lingelbach,** P. O. Box 1086, Warner Robins, Ga. 31099 (phone 912-926-3768).

GUAM (Agana): **Joe Gyulavics,** P. O. Box 21543, Guam 96921 (phone 671-734-2369).

HAWAII (Honolulu): **Don J. Daley,** P. O. Box 3200, Honolulu, Hawaii 96847 (phone 808-525-6296).

IDAHO (Boise, Mountain Home, Twin Falls): **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, 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,** 514 Ridgewood Dr., Bellevue, Neb. 68005 (phone 402-291-4780).

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. 73521 (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 412-884-5257).

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): **L. J. Reiners,** 4907 Copper Hill Court, Rapid City, S. D. 57701 (phone 605-343-2538).

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): **James Hazelrigg,** Rte. 3, Box 32, Barboursville, W. Va. 25504 (phone 304-736-9337).

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).

N T E R C O M

Tommy Lasorda, manager of the world-champion Los Angeles Dodgers, chats with AFA National President John G. Brosky, center, and Col. (Brig. Gen. selectee) Claudius E. Watts III during a recent National Prayer Breakfast observance held at Norton AFB, Calif. Mr. Lasorda was the principal speaker at the event.

and 68th Bomb/Strategic Missile Squadrons, will hold a reunion on May 27–31, 1982, in Rapid City, S. D. **Contact:** Lt. Col. Bob Wilson, 44th Strategic Missile Wing, Ellsworth AFB, S. D. 57706.

60th Troop Carrier Group
A reunion for the 60th Troop Carrier Group (including the 10th, 11th, 12th, 28th, and Headquarters Squadrons) will be held in Birmingham, Ala., on June 10–12, 1982. **Contact:** John Diamantakos, 7216 Pine Tree Lane, Fairfield, Ala. 35064.

82d Troop Carrier Squadron
Members of the 82d Troop Carrier Squadron and the 436th Troop Carrier Group will hold their second reunion on April 30–May 1, 1982, at the Crown Center Hotel, Kansas City, Mo. **Contact:** Loren E. Herrick, 5332 N. Michigan Ave., Kansas City, Mo. 64118. Phone: (816) 452-1537.

319th Bomb Group
The 319th Bomb Group will be observing its fortieth anniversary with a special reunion with the current 319th Bomb Wing, on June 24–27, 1982, in Grand Forks, N. D. **Contact:** Harold E. Oyster, 662 Deering Dr., Akron, Ohio 44313. Phone: (216) 836-4716.

350th Fighter Group
The 350th Fighter Group will hold a fortieth anniversary reunion in San Diego, Calif., on June 3–6, 1982. **Contact:** Hugh Dow, P. O. Box 2045, Santa Barbara, Calif. 93120.

351st Bomb Group Ass'n
Members of the 351st Bomb Group, including the 508th, 509th, 510th, and 511th Bomb Squadrons, will hold their reunion on June 16–20, 1982, in Wichita Falls, Tex. **Contact:** Ben Schohan, 398 Catawba Ave., Westerville, Ohio 43081.

Coming Events

April 26–27, **AFA Symposium, "Electronics and the Air Force,"** Colonial Hilton, Wakefield, Mass. . . . April 30–May 1, **Northeast Regional Meeting,** Harrisburg, Pa. . . . May 7–8, **South Carolina State Convention,** Myrtle Beach . . . May 8, **Connecticut State Convention,** Vernon . . . May 14–15, **Tennessee State Convention,** Chattanooga . . . May 28, **AFA Nominating Committee and Board of Directors Meeting,** The Broadmoor, Colorado Springs, Colo. . . . May 29, **Twenty-third Annual Outstanding Squadron Dinner,** The Broadmoor's International Center, Colorado Springs, Colo. . . . June 11–13, **Alabama State Convention,** Selma . . . June 18–19, **Ohio State Convention,** Columbus . . . June 24–25, **AFA Symposium, "Airlift—The Key to Modern Military Mobility,"** St. Louis Marriott Hotel at Lambert International Airport, St. Louis, Mo. . . . June 25–27, **New Jersey State Convention,** Cape May . . . June 25–27, **New York State Convention,** Garden City . . . July 9–11, **Texas State Convention,** Kerrville . . . July 16–18, **Pennsylvania State Convention,** Coraopolis . . . July 23–25, **Florida State Convention,** Tallahassee . . . July 31, **Louisiana State Convention,** Barksdale AFB . . . August 27–28, **Colorado State Convention,** Vail . . . September 12–16, **AFA National Convention,** Washington, D. C. . . . October 21–22, **AFA Symposium,** Hyatt House Airport Hotel, Los Angeles, Calif.

AFA CHAMPLUS ... New, Strong Protec

When a Single Accident or Illness Could Cost *You* Thousands of Dollars, You Need AFA CHAMPLUS ... for *Strong* Protection against Costs CHAMPUS Doesn't Cover!

For military retirees and their dependents . . . and dependents of active duty personnel . . . more and more medical care is being provided through the government CHAMPUS program.

And, of course CHAMPUS pays 75% of allowable charges.

But today's soaring hospital costs — *up to $500 a day* in some major metropolitan medical centers — can run up a $20,000 bill for even a moderately serious accident or illness.

Your 25% of $20,000 is no joke!

AFA CHAMPLUS protects you against that kind of financial catastrophe *and* covers most of your share of routine medical expenses as well.

HOW AFA CHAMPLUS WORKS FOR YOU!

WHO IS ELIGIBLE?

1) All AFA members under 65 years of age who are currently receiving military retired pay and are eligible for benefits under Public Law 89-614 (CHAMPUS), their spouses under age 65 and their unmarried dependent children under age 21 (or age 23 if in college).
2) All eligible dependents of AFA members on active duty. Eligible dependents are spouses under age 65 and unmarried dependent children under age 21 (or age 23 if in college).

EXCEPTIONAL BENEFIT PLAN

(See chart at right)

FOUR YEAR BASIC BENEFIT. Benefits for most injuries or illnesses may be paid for up to a four-year period.

PLUS THESE SPECIAL BENEFITS . . .

1) Up to 45 consecutive days of in-hospital care for mental, nervous, or emotional disorders. Outpatient care may include up to 20 visits of a physician or $500 per insured person each year.
2) Up to 30 days care per insured per year in a Skilled Nursing Facility.
3) Up to 30 days care per insured per year and up to 60 days lifetime in a CHAMPUS-approved Residential Treatment Center.
4) Up to 30 days care per insured per year and up to 60 days lifetime in a CHAMPUS-approved Special Treatment Facility.
5) Up to 5 visits per insured per year to Marriage and Family Counselors under conditions defined by CHAMPUS.

YOUR INSURANCE IS NON-CANCELLABLE

As long as you are a member of t Force Association, pay your premiu time, and the master contract rema force, your insurance cannot be ca ed.

ADMINISTERED BY YOUR ASSOCIATION . . . UNDERWRITTEN BY MUTUAL OF OMAHA

AFA CHAMPLUS insurance is adm tered by trained insurance professio on your Association staff. You get pro reliable, courteous service from pe who know your needs and know e detail of your coverage. Your insuranc underwritten by Mutual of Omaha, largest individual and family health ins ance company in the world.

AFA OFFERS YOU HOSPITAL BENEFITS AFTER AGE 65

Once you reach Age 65 and are cove under Medicare, AFA offers you pro tion against hospital expenses covered by Medicare through the *Se Age Benefit Plan* of AFA Hospital Ind nity Insurance. Members enrolled in A CHAMPLUS will automatically receive information about AFA's Medicare s plement program upon attainment of 65 so there will be no lapse in covera

AFA CHAMPLUS BENEFIT SCHEDULE

Care	*CHAMPUS Pays*	*AFA CHAMPLUS Pays*
	For Military Retirees Under Age 65 and Their Dependents	
Inpatient civilian hospital care	CHAMPUS pays 75% of allowable charges	CHAMPLUS pays the 25% of allowable charges not covered by CHAMPUS.
Inpatient military hospital care	The only charge normally made is a $5.00 per day subsistence fee, not covered by CHAMPUS.	CHAMPLUS pays the $5.00 per day subsistence fee.
Outpatient care	CHAMPUS COVERS 75% of outpatient care fees after an annual deductible of $50 per person ($100 maximum per family) is satisfied	CHAMPLUS pays the 25% of allowable charges not covered by CHAMPUS after the deductible has been satisfied.
	For Dependents of Active Duty Military Personnel	
Inpatient civilian hospital care	CHAMPUS pays all covered services and supplies furnished by a hospital less $25 or $5.00 per day, whichever is greater.	CHAMPLUS pays the greater of $5 per day or $25 of the reasonable hospital charges not covered by CHAMPUS.
Inpatient military hospital care	The only charge normally made is a $5.00 per day fee, not covered by CHAMPUS.	CHAMPLUS pays the $5.00 per day subsistence fee.
Outpatient care	CHAMPUS covers 80% of outpatient care fees after an annual deductible of $50 per person ($100 maximum per family) is satisfied.	CHAMPLUS pays the 20% of allowable charges not covered by CHAMPUS after the deductible has been satisfied.

NOTE: Outpatient benefits cover emergency room treatment, doctor bills, pharmaceuticals, and other professional services.

There are some reasonable limitations and exclusions for both inpatient and outpatient coverage. Please note these elsewhere in the plan description.

Against Costs CHAMPUS Doesn't Cover

APPLY TODAY!
UST FOLLOW THESE STEPS

noose either AFA CHAMPLUS In-patient overage or combined In-patient and Out-atient coverage for yourself. Determine ne coverage you want for dependent nembers of your family. Complete the nclosed application form in full. Total the remium for the coverage you select from he premium tables on this page. Mail the pplication with your check or money rder for your initial premium payment, ayable to AFA.

Get AFA's new

CHAMPLUS

QUARTERLY PREMIUM SCHEDULE

Plan 1—For military retirees and dependents

In-Patient Benefits

Member's Attained Age	*Member*	*Spouse*	*Each Child*
Under 50	$19.03	$23.30	$11.00
50-54	$23.78	$29.10	$11.00
55-59	$30.13	$36.90	$11.00
60-64	$39.65	$48.55	$11.00
In-Patient and Out-Patient Benefits			
Under 50	$26.80	$31.05	$27.50
50-54	$33.48	$38.80	$27.50
55-59	$42.43	$49.18	$27.50
60-64	$55.83	$64.73	$27.50

Plan 2—For dependents of active duty personnel.

In-Patient Only	None	$ 8.80	$ 4.40
In-Patient and Out-Patient	None	$35.20	$22.00

Note: Plan II premiums are listed on an annual basis. Because of the very low cost, persons requesting this coverage are asked to make annual payments.

LIMITATIONS

overage will not be provided for conditions for which treatment has been received during the 12-month period prior to the effective date of insurance until the expiration of 12 consecutive months of insurance coverage without further treatment. *After coverage has been in force for 24 consecutive months, pre-existing* conditions will be covered regardless of prior treatment.

EXCLUSIONS

This plan does not cover and no payment shall be made for:

a) routine physical examinations or immunizations

b) domiciliary or custodial care

c) dental care (except as required as a necessary adjunct to medical or surgical treatment)

d) routine care of the newborn or well-baby care

e) injuries or sickness resulting from declared or undeclared war or any act thereof

f) injuries or sickness due to acts of intentional self-destruction or attempted suicide, while sane or insane

g) treatment for prevention or cure of alcoholism or drug addiction

h) eye refraction examinations

i) Prosthetic devices (other than artificial limbs and artificial eyes), hearing aids, orthopedic footwear, eyeglasses and contact lenses

j) expenses for which benefits are or may be payable under Public Law 89-614 (CHAMPUS)

APPLICATION FOR
AFA CHAMPUS SUPPLEMENT INSURANCE

Group Policy GMG-FC70
Mutual of Omaha 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 _____ (Month/Day/Year) Current Age____ Height____ Weight____ Soc. Sec. No. _____

This insurance coverage may only be issued to AFA members. Please check the appropriate box below:

☐ I am currently an AFA Member.

☐ I enclose $13 for annual AFA membership dues (includes subscription ($9) to AIR FORCE Magazine).

☐ I am over 65 years of age. Please send information on AFA's Medicare Supplement.

PLAN & TYPE OF COVERAGE REQUESTED

Plan Requested (Check One)	☐ AFA CHAMPLUS PLAN I (for military retirees & dependents) ☐ AFA CHAMPLUS PLAN II (for dependents of active duty personnel)	
Coverage Requested (Check One)	☐ Inpatient Benefits Only ☐ Inpatient and Outpatient Benefits	
Person(s) to be Insured (Check One)	☐ Member Only ☐ Spouse Only ☐ Member & Spouse	☐ Member & Children ☐ Spouse & Children ☐ Member, Spouse & Children

PREMIUM CALCULATION

All premiums are based on the attained age of the AFA member applying for this coverage. Premium payments are normally paid on a quarterly basis (see table for rate table). Upon request, however, they may be made on either a semi-annual or annual basis.

Quarterly premium for member (age____) $_____

Quarterly premium for spouse $_____

Quarterly premium for ____ children @ $____ $_____

Total premium enclosed $_____

Requests for active duty dependent coverage under Plan 2 should include annual premiums.

If this application requests coverage for your spouse and/or eligible children, please complete the following information for each person for whom you are requesting coverage.

Names of Dependents to be Insured	Relationship to Member	Date of Birth (Month/Day/Year)

(To list additional dependents, please use a separate sheet.)

In applying for this coverage, I understand and agree that (a) coverage shall become effective on the last day of the calendar month during which my application together with the proper amount is mailed to AFA, (b) only hospital confinements (both inpatient and outpatient) or other CHAMPUS-approved services commencing after the effective date of insurance are covered and (c) any conditions for which I or my eligible dependents received medical treatment or advice or have taken prescribed drugs or medicine within 12 months prior to the effective date of this insurance coverage will not be covered until the expiration of 12 consecutive months of insurance coverage without medical treatment or advice or having taken prescribed drugs or medicine for such conditions. I also understand and agree that all such pre-existing conditions will be covered after this insurance has been in effect for 24 consecutive months.

Date_____, 19____ _____ Member's Signature

4/82

NOTE: Application must be accompanied by check or money order.
Send remittance to:
Insurance Division, AFA, 1750 Pennsylvania Ave., NW, Washington, D.C. 20006.

Form 6173GH App.

Bob Stevens'

"There I was..."

Research and Development!

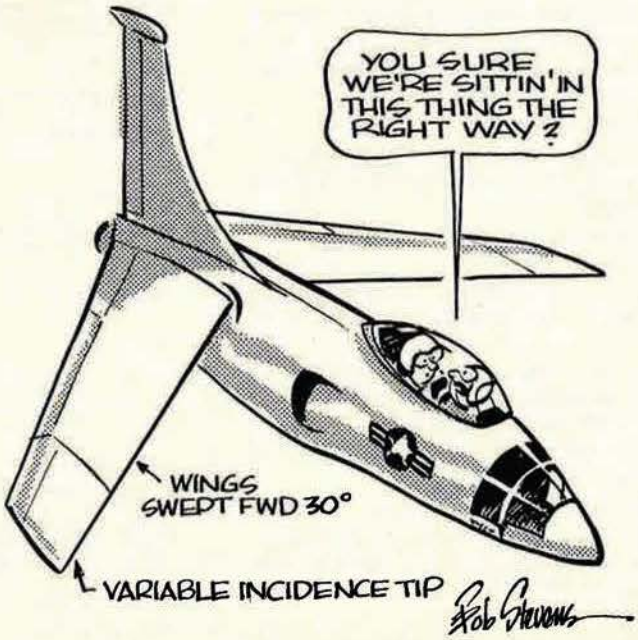
THE WORDS CONJURE UP VISIONS OF WEIRD THINGS GOING ON BEHIND LOCKED DOORS, UNDER TARPS, OR IN REMOTE DESERT DRY LAKES! KELLY JOHNSON'S "SKUNK WORKS", WRIGHT-PAT, and EDWARDS AFB COME TO MIND. HERE ARE A FEW R&D X-RATED MACHINES THAT ARE PROBABLY BEST FORGOTTEN:

XP-54: "SWOOSE-GOOSE" HIGH-ALT. FIGHTER ORDERED IN 1941. DID NOT APPEAR (1 ea.) UNTIL 1944.

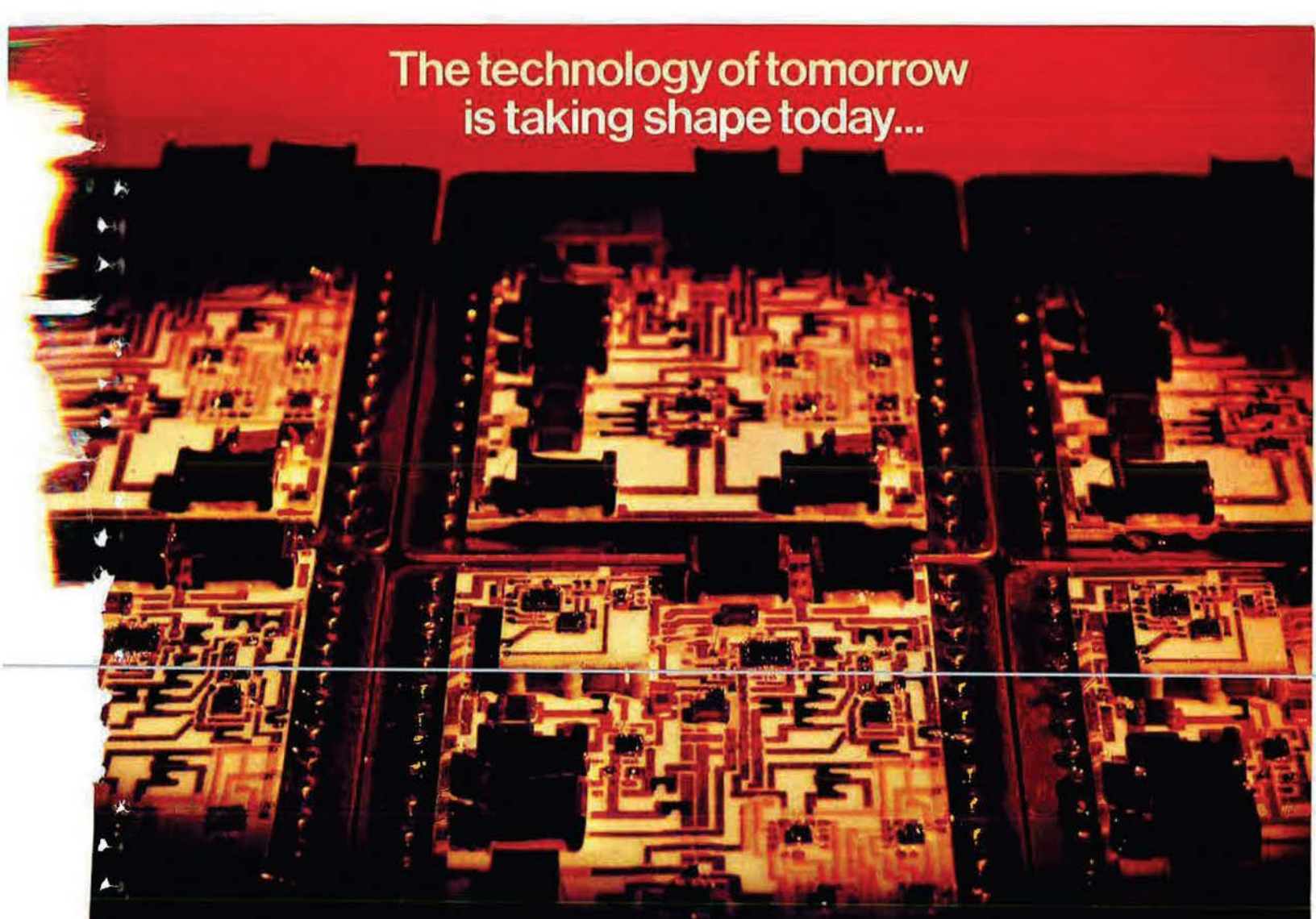
XP-77: METAL WAS SCARCE IN WWII WHEN THIS LITTLE PLYWOOD FIGHTER APPEARED.

NOT ALL WEIRDOS WERE IN THE FIGHTER RANKS. THE **XB-42** "MIXMASTER" HAD A TOTAL OF *TEN* PROP SHAFTS TO DRIVE THE CONTRA-ROTATING PROPS IN THE TAIL!

THE **XB-53** (1948) WAS SUPPOSED TO HIT 583 mph – IT NEVER LEFT THE DRAWING BOARD.



The technology of tomorrow is taking shape today...



because someone asked Sperry.

Sperry's engineering leadership is a direct result of our commitment to advancing technology. We're hard at work developing the technologies which will meet the needs of the future. For example, we're advancing processor and sensor technologies today for the defense systems of the 1990's.

To detect and track the next generation of threats in heavy ECM environments, we're working with advanced doppler processing and spread spectrum techniques which will enhance radar survivability and performance. And our new cylindrical antenna concepts will provide low sidelobes with high system mobility.

We're working to miniaturize millimeter wave systems for the missiles of tomorrow.

We're exploring digital beam forming as a technique to reduce the cost and increase the capabilities of electronic scanning antennas.

We're developing new fiber optic laser sensors and systems, improving their sensitivity and dynamic range. We'll employ them to improve navigation systems and undersea listening devices.

From sensors to systems, Sperry is constantly developing new techniques for the future.

For more information on what we're up to in research and development, just ask us...we understand how important it is to listen.

Write to: Sperry Division Headquarters, Gyroscope Marketing, Great Neck, NY 11020. Or call (516) 574-2647.

SPERRY

SPERRY IS A DIVISION OF SPERRY CORPORATION

Eyes on the olive branch, but arrows at the ready.

The American Eagle's stance on the Great Seal of the United States symbolizes what our country's great leaders have taught for two centuries: Seek peace from a position of strength.

President George Washington captured its meaning in his first message to Congress in 1789. "To be prepared for war is one of the most effectual means of preserving peace."

Today, the United States Air Force F-15 Eagle is a manifestation of the Great Seal's symbology. Strong enough to win, awesome enough to deter. By its very presence it is an expression of national will.

F-15 Eagle

MCDONNELL DOUGLAS