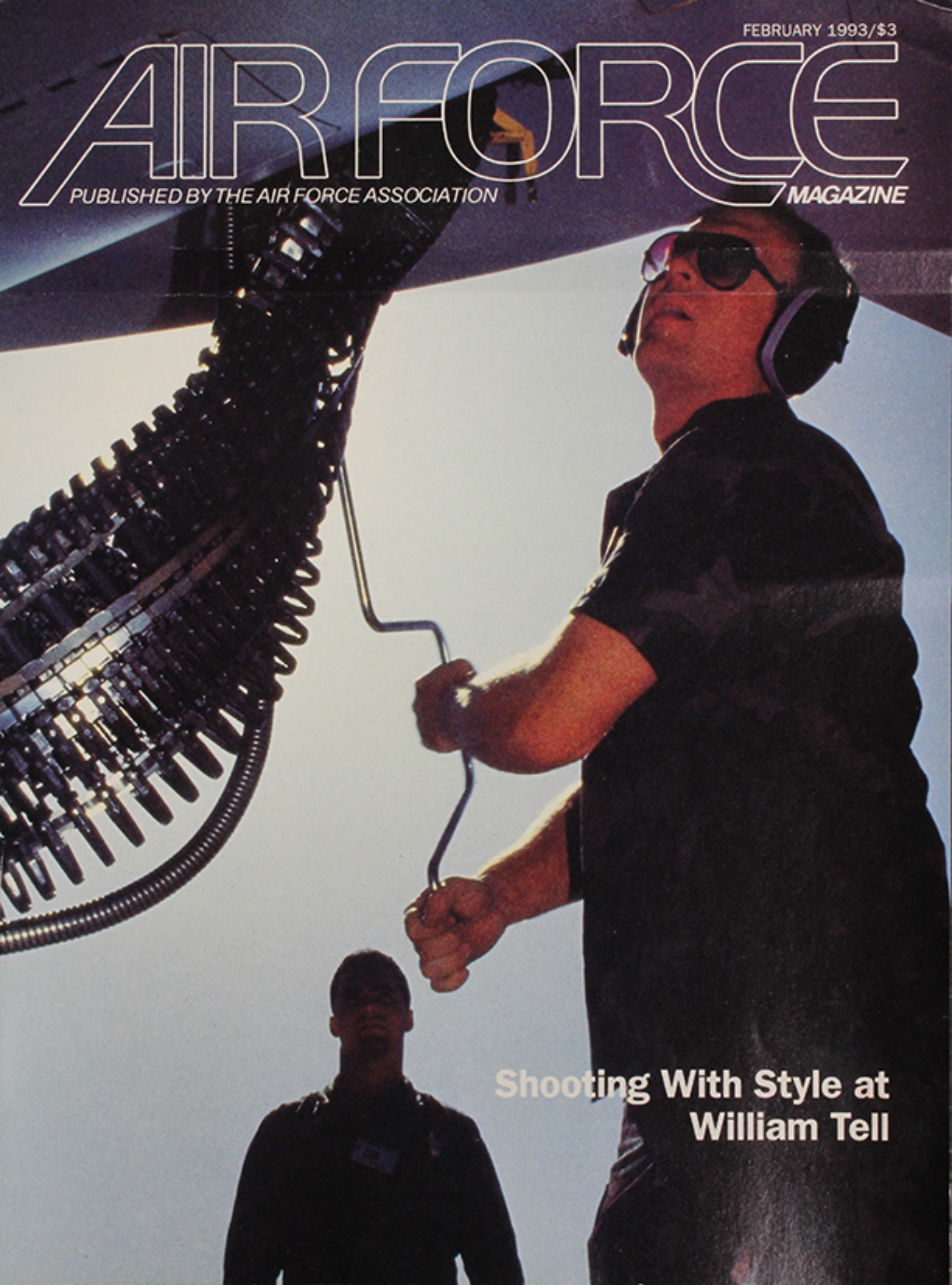
FEBRUARY 1993/$3

AIR FORCE MAGAZINE

PUBLISHED BY THE AIR FORCE ASSOCIATION



Shooting With Style at William Tell

THE JET FOR JPATS.

The Grumman/Agusta S211A is the best trainer for the Joint Primary Aircraft Training System (JPATS). Originally designed to replace the T-37 and built to U.S. Aerospace Technology and Manufacturing Standards, the S211 has more than 60,000 hours of simple, reliable, efficient training service. It allows trainees to readily transfer their skills to more advanced aircraft. Operating at the heart of the JPATS envelope, the S211A features superb low-speed handling, a cockpit conducive to learning, and low cost of ownership. And Hughes brings to the team a proven ground-based training capability. No JPATS alternative matches this cost-effective, totally integrated training system.

Grumman Aircraft Systems, Bethpage, Long Island, NY 11714. Tel: (516) 575-3350.

GRUMMAN

AGUSTA

GRUMMAN

HUGHES

HUGHES TRAINING, INC.

February 1993, Vol. 76, No. 2

AIR FORCE MAGAZINE

PUBLISHED BY THE AIR FORCE ASSOCIATION

About the cover: TSgt. Alan Ridl of the 120th Fighter Group, Montana ANG, loads 20-mm rounds into an F-16 at the 1992 William Tell competition. USAF photo by SSgt. John Lasky.

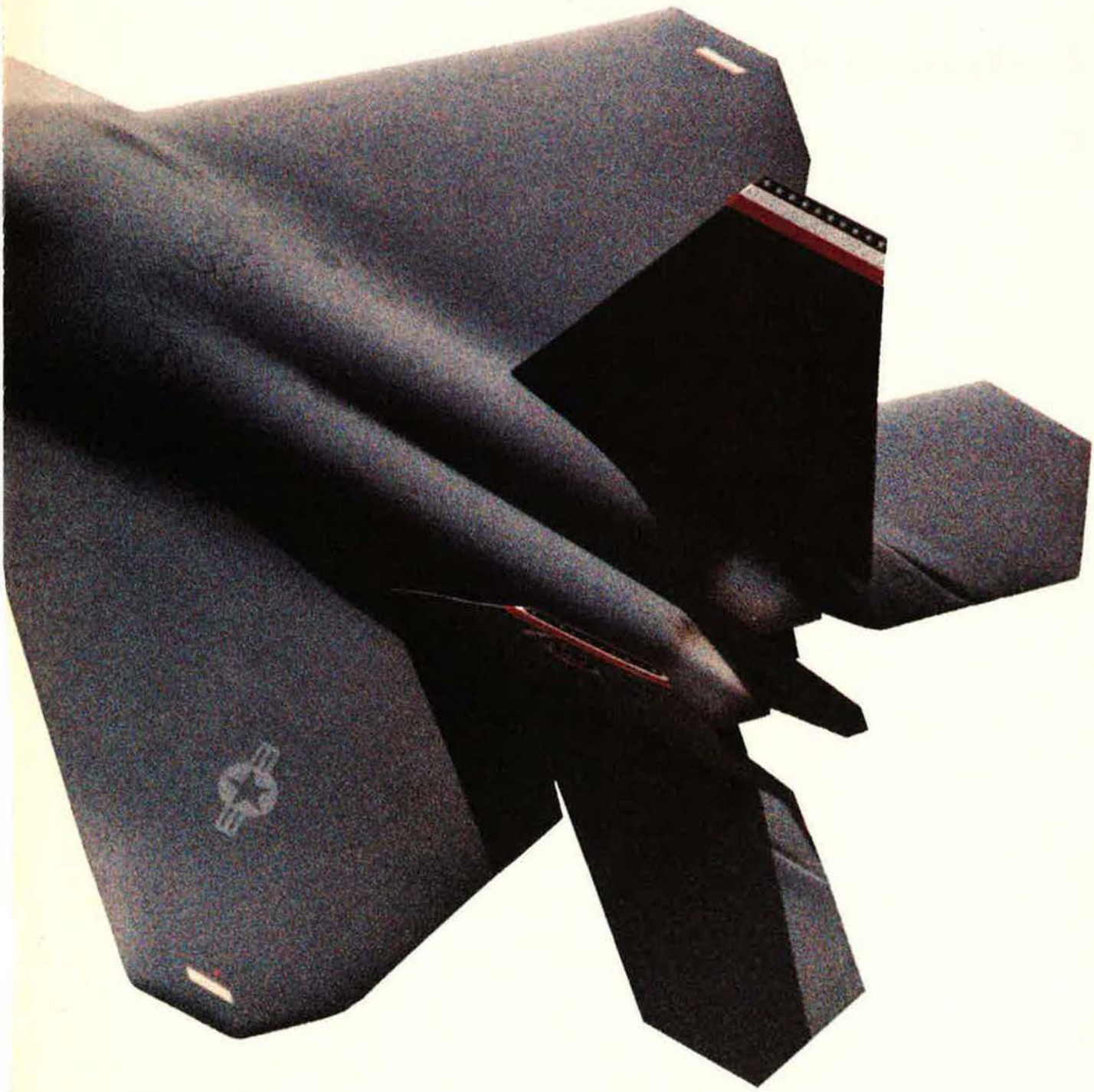
AIR FORCE Magazine (ISSN 0730-6784) February 1993 (Vol. 76, No. 2) is published monthly by the Air Force Association, 1501 Lee Highway, Arlington, VA 22209-1198. Phone (703) 247-5800. Second-class postage paid at Arlington, Va., and additional mailing offices. **Membership Rate:** $25 per year; $60 for three-year membership. **Life Membership:** $400 single payment, $420 extended payments. **Subscription Rate:** $25 per year; $25 per year additional for postage to foreign addresses (except Canada and Mexico, which are $8 per year additional). Regular issues $3 each. Special issues (USAF Almanac issue and Anniversary issue) $5 each. **Change of address** requires four weeks' notice. Please include mailing label. **POSTMASTER:** Send changes of address to Air Force Association, 1501 Lee Highway, Arlington, VA 22209-1198. Publisher assumes no responsibility for unsolicited material. Trademark registered by Air Force Association.

REMEMBER HOW THE PEACE DIVIDEND WAS EARNED?

While the Cold War had its price, the alternative would have cost much more than money. Now, as defense expenditures ramp down, it is imperative that America keep her defenses strong. More than ever, we must maintain adequate capability with a reduced, but high quality force.

This is precisely the strength of America's F-22 Advanced Tactical Fighter.

The F-22 has the remarkable ability to clear the 21st century airspace of enemy aircraft and protect friendly forces, while keeping ownership cost low. It arrives in theater ready to fight



using airlift requirements that are less than half of those currently in the inventory. It also requires fewer support personnel. Once airborne, the F-22 dominates anything in the sky through low observability, advanced avionics, supercruise, thrust vectoring, and revolutionary F119 engines.

Because of the F-22, the United States' ability to achieve and maintain air superiority in the 21st century is secure and affordable.

F22

LOCKHEED · BOEING
GENERAL DYNAMICS
PRATT & WHITNEY

Editorial

By John T. Correll, Editor in Chief

A Strange Hour in Stockholm

FOR NEARLY an hour in Stockholm on December 14, time lurched backward. The cold war was suddenly on again. Russian Foreign Minister Andrei Kozyrev, speaking to delegates from fifty nations at the Conference on Security and Cooperation in Europe, served notice that the interlude of international cooperation was over.

Mr. Kozyrev accused NATO of pursuing goals that are "essentially unchanged" and seeking military advantage in eastern Europe. He threatened "unilateral measures" unless the West removed sanctions against Serbia, which, he said, "can count on the support of Great Russia." Furthermore, he declared, Russia would defend its interests by military and economic means. The former republics of the Soviet Union must join a new federation immediately. Russia, he warned, was "a state capable of looking after itself and its friends."

As the delegates learned within the hour, however, Mr. Kozyrev did not mean what he said. He left the hall to confer with US Secretary of State Lawrence Eagleburger, then returned to announce that his first speech had been a "rhetorical device" to illustrate what *could* happen if hard-liners in Russia gained the upper hand.

Pravda dismissed Mr. Kozyrev's action as a "prank." The delegates went back to their conference. Russian President Boris Yeltsin went back to battling the hard-liners. The United States went back to cutting its defense budget. History will determine whether Mr. Kozyrev was an alarmist, a prophet, or a bit of both.

A more interesting point now is, what if his speech hadn't been a prank? It won't wash to claim that everybody knew all along what he was up to. All reports depict the delegates as shaken and stunned. Ukraine and Estonia rose to speak in protest. According to *Izvestia,* representatives of several former Soviet republics used the time between Mr. Kozyrev's two appearances to start drafting an appeal to NATO for protection. The Washington *Post* found diplomats talking about a renewed arms buildup. Foreign ministers of leading nations apparently thought it credible that Mr. Kozyrev was expressing Russian policy. In less than an hour, until he revealed otherwise, the logic of military preparedness had already begun to shift.

In this respect, the Kozyrev incident was reminiscent of the morning of August 19, 1991, when the Western world awoke to the news that a hard-line coup in Moscow had ousted Soviet leader Mikhail Gorbachev during the night. For the next three days, until the coup collapsed on August 21, the radical reduction of US armed forces did not look nearly as sensible as it had August 18.

Mr. Kozyrev may be an alarmist, a prophet, or both. In any case, his "rhetorical device" reminds us of how surprises can change our perceptions.

"By the end of this decade, the [US] defense budget will be thirty percent to forty percent, possibly even fifty percent smaller than it was in 1990," said a commission chaired last year by Sen. Sam Nunn (D-Ga.) and Sen. Pete Domenici (R–N. M.). "At some point in this decade we will reach the minimum defense establishment necessary to promote American interests and peace in the world."

US defense funding has declined for eight years in a row. Congress set the 1993 budget for national defense at $274.3 billion, about $17 billion less than in 1992. The universal assumption is that it will drop significantly lower. In its ten-year forecast, the Electronic Industries Association predicts that the defense budget will fall to $197 billion (in constant 1993 dollars) by 2002.

The armed forces might stabilize at forty percent below their peak strength of the 1980s, but deeper cuts could be demanded. In the two years since the Persian Gulf War, the services have been constantly disbanding troops, deactivating units, and shedding combat power. Eventually, the decline must reach its bottom. The question is what level represents the "minimum defense establishment." How do we know when we reach it? How can we be sure we don't drop below it?

It is not so much that the United States cannot afford a better defense. Americans spend $222 billion a year on gambling. In the not-too-distant future, the nation's betting bill will overtake and surpass its expenditures for defense. It's a matter of priorities and perceptions. We are making long-range decisions at a moment when there are no awesome challenges in sight.

Consider, though, how quickly our perceptions were changed by the oil crisis, Ayatollah Khomeini, the Moscow coup, the demise of the Soviet Union, and the Persian Gulf War. Once events are in motion and the fat's in the fire, it's too late to wish we had made different decisions in more tranquil times.

Mr. Kozyrev did not get the results he wanted from his desperate maneuver, but some indirect good may come of it if it serves as a reminder that circumstances have a way of changing on short notice. As we define the "minimum defense establishment" for the United States, we should remember the way the world looked for three days in August 1991 and for about an hour in Stockholm last December.

Would we still be comfortable with our defense arrangements if we awoke tomorrow to another such bombshell and this one turned out to be the real thing instead of a false alarm? If not, we'd better adopt a different standard in our planning. ■

Now government employees can meet face to face across the country in minutes, not hours.

Turn your desktop computer into a *real-time* video conferencing system.
Send and receive video, image, voice, and text in seconds.
Get VISIT™ personal video conferencing and watch your productivity take off.
With VISIT, distance is no longer a barrier to your success.

Call 1-800-NORTHERN and press 5 for more details.

NORTEL
FEDERAL SYSTEMS
A subsidiary of Northern Telecom.

nt northern telecom

Letters

An Officers Club?

I would like to comment on "Neglecting the Enlisted," a letter by John P. Dillon that appeared in the December 1992 issue *[p. 6]*.

Since the early 1950s, I have been with the Air Force Association. Early in my membership, I might have agreed with Mr. Dillon, but I soon came to realize that the Association was very much involved with enlisted matters and supported our "cause" just as strongly and sincerely as it did the commissioned side of things. . . .

In October 1976, shortly after serving on the Enlisted Council of AFA, I submitted a letter to reply to an individual who felt that AFA was an "Officers Club." I would like to submit two paragraphs of that letter:

"If you check the definition of 'association,' you will see that it reads, 'an organization of people with a common purpose.' 'People' in this case includes all those who have a desire to associate with our common goal, which is maintaining and strengthening USAF.

"In the AFA policy paper on Defense Manpower Issues that was adopted on September 20, 1976, more than fifty areas of people programs were listed and more than half of these were for 'enlisted folks.' The year before, fifty-six General and Continuing Resolutions were adopted and thirty-four were for the benefit of the enlisted men and women."

I do not agree that "a few gratuitous articles give the enlisted men, women, and families their due" sums up AIR FORCE Magazine's attitude, as Mr. Dillon claims. I believe that, in meeting its objectives and goals, AFA serves the entire spectrum of the Air Force, and that includes all of us.

My congratulations to our new AFA President CMSAF James M. McCoy, USAF (Ret.). May he continue to serve the entire Air Force as he did for many years as an enlisted man.

CMSgt. John E. Schmidt, Jr., USAF (Ret.)
Tallahassee, Fla.

Second-Class Citizens?

Reader John P. Dillon, who complained of AFA's neglect of the enlisted force, homes in on a problem, long ignored and sometimes swept under the rug. It has bugged many of us officers and airmen who, for whatever reason, do not fly the big birds but who manage throughout whole careers to somehow "keep 'em flying."

While we are all well aware that the mission of the Air Force is to fly and to fight, too little attention and recognition is accorded to those (officers and enlisted personnel) whose support underpins every successful mission. While we are told about and believe in the team concept, we are often made to feel like second-class citizens by our own service, which glamorizes the few to the exclusion of the many.

True, an F-117 is more photogenic and exciting than some personnel program or administrative procedure, but it takes both to get the mission accomplished.

Years ago, when I instructed Air Force Reserve Officers Training Corps cadets at Iowa State University, I stressed (and believed) in the team concept. Experience in the field taught me otherwise—that nonrated support personnel were decidedly second-class citizens.

It is to be hoped that in this interlude of peaceful "downsizing," AIR FORCE Magazine will find the time, occasion, and heart to correct this impression.

Maj. Roy L. Goodale, USAF (Ret.)
Prescott, Ariz.

Do you have a comment about a current issue? Write to "Letters," AIR FORCE Magazine, 1501 Lee Highway, Arlington, VA 22209-1198. Letters should be concise, timely, and preferably typed. We cannot acknowledge receipt of letters. We reserve the right to condense letters as necessary. Unsigned letters are not acceptable. Photographs cannot be used or returned.—THE EDITORS

B-1, Second to None

Thanks for highlighting the capabilities of the B-1 in your September 1992 issue *["The Bone," p. 34]*. As a flyer with both B-52 and B-1 experience, it is my job to evaluate and use the B-1's capabilities against a wide range of possible threats. There is no comparison! The B-1 is the only weapon system we have that can respond rapidly over intercontinental distances with conventional or nuclear weapons.

With a massive joint force of fighters, jammers, Weasels, etc., sure, B-52s can make their way to some targets, but B-1s are the only aircraft on the ramp that have a shot at a defended target without a huge prepositioned support force. When available, the tiny B-2 force could be a good "silver bullet" for certain situations. There just won't be enough of them for long-term, sustained, heavy attacks. . . .

I am thoroughly sick of the media smear campaign against the superb B-1. The bomber's maintenance problems are due to logistical shortfalls and nothing else. The B-1's development and safety record stand very well against any other state-of-the-art fighting jet. I am talking about tangible performance.

I have a BS in aerospace engineering and more than 1,200 hours in B-52s and B-1s. I know when to be confident and when to be concerned. I am confident of the B-1's ability to penetrate and evade high-tech defenses and fly safely at low level under any wartime conditions. The idea that B-52 performance is somehow "equivalent" is ridiculous.

Another item with which the public is unfamiliar is the B-1's role during the Gulf War. Ask yourself: Who was "minding the store" while everybody else was out of town? The Soviet Union was still a big factor in 1991. Their high-tech military hardware still is. It was their only "cash crop," and we will see it again. The versatility and performance of the B-1 make it critical to handling nascent high-tech threats worldwide.

The politics of the media bias are

Interceptor

Defense Suppression

Tactical Strike

Armor Attack

Night Attack

Precision Strike

Reconnaissance

BUY AN AIRPLANE, GET AN AIR FORCE.

In these days of tightening defense budgets, air forces are demanding more from their aircraft programs. Pound for pound, dollar for dollar, no other fighter in history has delivered more than the F-16. It simply performs more roles with more reliability than anything else that flies.

No matter what the mission, air-to-air, air-to-ground, or air-to-surface. No matter what the weather, day or night. No matter what the tactic.

The F-16, getting the job done.

GENERAL DYNAMICS

Fort Worth Division

AIR FORCE MAGAZINE
PUBLISHED BY THE AIR FORCE ASSOCIATION

Publisher
Monroe W. Hatch, Jr.

Editorial

Editor in Chief
John T. Correll

Executive Editor
Robert S. Dudney

Senior Editor
James W. Canan

Associate Editors
Tamar A. Mehuron, Frank Oliveri

Contributing Editors
John L. Frisbee
Brian Green
Bob Stevens
John W. R. Taylor

Managing Editor
Francine Krasowska

Assistant Managing Editor
Daniel M. Sheehan

Director of Production
Robert T. Shaughness

Art Director
Guy Aceto

Assistant Art Director
Sherryl Coombs

Research Librarian
Pearlie M. Draughn

Editorial Associates
Grace Lizzio, Kesha T. Moorefield

Administrative Assistant
Wendy L. Rivera

Advertising

Advertising Director
Patricia Teevan
1501 Lee Highway
Arlington, Va. 22209-1198
Tel: 703/247-5800
Telefax: 703/247-5855

Manager, Industry Relations
Elizabeth B. Smith—703/247-5800

Manager, East Coast and Canada
By Nicholas—203/357-7781

Manager, Midwest
William Farrell—708/295-2305

Manager, West Coast
Gary Gelt—213/295-3050

BPA Circulation audited by Business Publication Audit

Letters

obvious and don't need to be rehashed here. If the Air Force doesn't do a better job of educating the public, we stand to lose the primary components of our national defense in the stupidest scenario of all: a political foodfight.

Capt. R. Liebman,
USAF
Wichita, Kan.

The Vulnerable Bone

With reference to "The Bone," check the history books, and you'll find the "Bone" is not as invincible as its crews may think.

Throughout aviation history, bombers have been on the cutting edge of technology. With this advantage, they have been able to outrun fighters or at least fly high enough to make interception difficult. However, the next generation of fighters usually eclipses the bombers' advantage.

When the B-17 Flying Fortress came into the inventory, it could outrun contemporary fighters or at least climb above them. Soon, fighters like the Supermarine Spitfire, Messerschmitt Bf-109, and Mitsubishi Zero could outfly it. Even the B-29 Superfortress, a very fast, high-flying airplane for its day, was outperformed by the P-51 Mustang and FW-190. The situation worsened during the Korean War when the B-29 went up against the MiG-15.

The B-47 and B-52 were supposed to have enough speed and altitude to make fighter interception unlikely. SAMs and MiG-21s proved this idea wrong. Even the XB-70 would have been vulnerable to the MiG-25.

The best historical argument in favor of the "Bone" crews would be the de Havilland Mosquito. From 1941 to 1944, few if any Axis planes could make a good intercept on the speedy Mosquito. It had speed, range, and a good degree of stealth because of its wooden construction. By the end of the war, however, Mosquito losses were mounting due to improved German night fighters.

I would like to say to the "Bone" crews, "Watch out, the F-22 is on its way." The F-22 has supercruise speed at altitudes and should be outstanding down low. The F-22 has stealth features, and with AMRAAM it will give little or no warning until launch of the missile. The F-22 is going to get you!

1st Lt. Chris Van Decar,
USAF
Macon, Ga.

Recruiting Goals

I am writing to help keep members of the Air Force Association informed about the status of recruiting for our new, smaller Air Force.

The number of people we recruit plays an important role in our overall force-shaping effort. In Fiscal 1993, we will recruit 31,500 enlisted men and women, and we anticipate that our accession levels will be more than 30,000 annually for the next few years. Meeting these recruiting goals will help us preserve the right mix of skills and experience to meet today's requirements and ensure future mission accomplishment.

The widespread media attention given to the Air Force's downsizing with its attendant separation programs and base closures has led many people to assume that the Air Force is not recruiting. This assumption contributes to an already challenging recruiting environment—with a shrinking market and fewer advertising dollars than ever before. These challenges affect recruitment not only in our enlisted programs but in our health professions as well. As always, the recruitment of health professionals remains a difficult challenge—particularly physicians, nurses, physician assistants, and physical therapists.

People have always been the Air Force's most valuable resource, and recruiting the best and the brightest continues to be our highest priority. We need every member of the Air Force Association—civilian and military, active-duty and retired—to help us communicate that message.

Brig. Gen. M. G. Vergamini, USAF
Commander, USAF Recruiting Service
Randolph AFB, Tex.

Checklist Error

On p. 34 of the August 1992 issue, in "A Checklist of Space Systems" under the Defense Support Program Office, you list "Aerospace Electro Systems" as one of the contractors.

Please note that Aerojet Electronic Systems has served as the sensor manufacturer under contract to the Air Force for more than twenty years on the DSP.

I know you'd want to correct this error.

Edie S. Cartwright
Azusa, Calif.

Misplaced Squadrons

"Squadrons" by George W. Cully *[December 1992, p. 48]* was not only of interest to those who study the past, but was also certainly a timely explanation of Air Force unit lineage. The 458th Operations Group is proud to be assigned two of the oldest squad-

rons in the Air Force, the 2d and 32d Air Refueling Squadrons. These units were incorrectly established in your list of "The Oldest Squadrons." Both are assigned to the 458th Operations Group, 22d Air Refueling Wing, Barksdale AFB, La. The 22d Air Refueling Wing's headquarters is at March AFB, Calif.

Col. Arthur J. Lichte, USAF
Commander, 458th Operations Group
Barksdale AFB, La.

Boyd's Better Idea

"Here Am I. Send Me" *["Valor," December 1992, p. 71]* flooded my mind with memories of my interactions with Karl Richter at Korat RTAFB, Thailand, in 1966. Karl was an inspiration to us all, no matter what rank we were. He was the most dedicated person I had ever met or will probably ever meet.

Karl personified the spirit of commitment to duty and country. He was then, and still is, a genuine American hero. I commend General Boyd for having the "better idea" of honoring Lieutenant Richter when it came to establishing the memorial at the Air University. The General remembered that people are the soul of a military organization, not aircraft.

Col. Terry A. Arnold, USAF (Ret.)
Azle, Tex.

Reward the Wrench-Turners

After reading "Stripes on the Line" *[September 1992, p. 48],* I got the impression that the Air Force thinks it has reinvented the wheel. Air National Guard flying units have been doing more with less ever since they were formed. When I was a squadron maintenance officer, we begged, borrowed, and, yes, appropriated everything necessary to keep our antiquated birds in commission. It wasn't easy, but with dedicated, highly skilled troops, we were successful.

We in ANG used master sergeants as crew chiefs when the Air Force was using two-stripers and could not understand how ANG could do so much and do it so well. Thirty years ago, ANG was beating the active-duty Air Force in William Tell and many other competitions because it used its personnel to the best of their abilities.

ANG flight-line maintenance troops have always been jacks-of-all-trades. We were spread so thin that crew chiefs had to possess many skills. . . .

I can fully understand how elated Colonel Russell must be to have his skilled people where the job is and not to waste them shuffling paper. Having crews of many different skills is a step in the right direction. Now it is necessary to throw out the old promotion system and reward those truly dedicated, hard-working wrench-turners rather than the paper-shufflers.

Another way to improve reliability and cut costs would be to scrap the whole stack of military specs and start over. Standard, off-the-shelf civilian components usually work better and are zillions of dollars less costly. After all, they do operate in the same atmosphere, and it is not really necessary for them to be able to survive a drop from a ten-story building.

Col. Robert C. Stephens, USAF (Ret.)
Toledo, Ohio

The Fortunate Few

The August "There I Was . . ." *[p. 88]* brought back many memories. I first flew the T-33 in August 1949 when they came to Williams Field, Ariz. My last flight was in March 1968, as a prelude to checking out in the RF-101.

I finished with about 1,700 hours in the old lady, most of it as an instructor pilot (IP), but with many hours while stationed in the Pentagon.

Somehow, the "boost off" trick related in the cartoon escaped me, although there were hundreds of times I could have used it to great advantage. I was about four inches taller than the IP in Mr. Stevens's cartoon, but a good thirty pounds lighter, especially in the Arizona summer. I gave rides to a lot of people, some so self-important that deflating them would have been particularly satisfying.

My thanks and appreciation to Mr. Stevens for his continued humorous insight into a profession limited to so few very fortunate people.

Brig. Gen. H. M. Chapman, USAF (Ret.)
Farmville, Va.

Illusory Peace

Having read "A Russian View of Russian Interests" *[October 1992, p. 42],* I feel the need to comment on Russia's new military doctrine.

According to author Mary C. FitzGerald, Gen. Igor Rodionov has noted that "Russia's vital interests, which include the Baltic states, require that these states recognize Russia's right to free access to seaports, unconditionally reject both the stationing of third-country military forces on their territory and entry into military blocs aimed against Russia, and guarantee the civil rights of the Russian population."

Does the General sound like a leader of a democratic nation? Hardly. He seems to echo Adolf Hitler's call for *Lebensraum* for the expanding population of the Third Reich at the territorial expense of other nations.

Small they may be, but since the abortive coup of August 1991, the Baltic states are independent, sovereign states. Thus, decisions regarding the use of their ports, joining of military alliances, and stationing of United Nations forces or other forces on their respective territories should be made in Vilnius, Riga, and Tallinn, not in Moscow. A nation cannot have "rights" to another nation's ports any more than it can have the right to meddle in another nation's affairs. General Rodionov's views may point to the real reason for the extremely slow withdrawal of former Soviet military units from the Baltic territories—unwillingness to do so on the part of Russia's leaders rather than the oft-stated lack of suitable quarters in the CIS.

The coup brought the Soviet empire, as the world knew it, to an end. The military doctrine espoused by General Rodionov makes it clear that Russian dreams of a Pan-Slavic Empire, covering a large part of the world, did not die in Moscow in August 1991.

A world of true peace, brotherhood, and mutual respect for the rights of other nations remains an illusion.

SMSgt. O. V. Klans, USAF (Ret.)
Cleveland, Ohio

A Trip Through the Years

I enjoyed very much reading "Pieces of History" in the October issue *[p. 36].* It prompted me to dig into my archives for two of the USAAF cloth charts pictured on p. 36. They had been issued to me as a recalled Reservist in 1950. Other items found were two safe-conduct passes, my .45 holster, and a blood chit. I had completely forgotten about the blue flying clothes issued at the time. Thank you for a well-done article and a trip through the years.

Harold Kenneth Richter
Barrington Hills, Ill

An Air Force Uniform?

On p. 19 of the September 1992 "Aerospace World," a photo of General Horner assuming command of US Space Command shows an officer behind General Horner wearing a blue uniform that looks like a Navy Admiral's, with silver braid.

Is this an Air Force uniform?

Joram Kagan
New York, N. Y.

■ *The Air Force officer depicted is Gen. Michael P. C. Carns, USAF Vice Chief of Staff. He is wearing the new uniform, which was then undergoing a six-month wear test.*—THE EDITORS

Capitol Hill

By Brian Green, Congressional Editor

The "Nondefense" Defense Budget

More than $4 billion of next year's Pentagon funding is for collateral purposes.

THE DEFENSE budget increasingly is being used to finance activities unrelated to the combat mission of the armed forces. Funding of this type underwrites a wide variety of operations, ranging from environmental cleanup programs to breast cancer research and youth employment opportunities.

The final 1993 National Defense Authorization, which funds the Pentagon and certain defense programs in the Department of Energy (DoE), totals $274.3 billion. While no precise definitions exist and no exact figure can be calculated, this "nondefense" spending in the Department of Defense comes to more than $4 billion, and another $4.8 billion goes to DoE for defense environmental restoration and waste management. Experts on Capitol Hill say that this far exceeds amounts in previous years, and it is likely to grow.

Some of this money goes to quasi-military missions, such as the effort to safeguard the food distribution system in Somalia *[see "When The Mission is Aid," p. 60]*. Much of it, however, goes to cover increased costs of doing business, without contributing in any direct way to military strength. Base closures, for example, are necessary in the long run to control overhead costs in a smaller military. They also have large short-term costs.

Programs to help industry survive the defense downturn also account for a larger and larger share of the budget. A variety of defense conversion programs seeks to encourage the development of advanced technology in that part of the private industrial sector still able to meet US defense needs. Congress appropriated $1.8 billion for such activities in Fiscal 1993. These programs are not universally popular. Rep. Bill Dickinson (R-Ala.), who until last month was the ranking Republican on the House Armed Services Committee, criticized the conversion outlays as "little more than domestic spending dressed up to look like defense."

Another major growth area is spending on environmental cleanup. The need for such actions has been underscored by base closures and the requirement to transfer long-time military lands to civilian hands. Former Defense Secretary Dick Cheney and former Deputy Secretary Don Atwood vowed that the Department of Defense would be a leader in the environmental field. Pentagon and congressional leaders generally agree about the validity of these expenditures.

The cost of the cleanup, however, is staggering—and it is growing. In Fiscal 1984, funds for environmental restoration consumed $150 million of DoD's budget. In Fiscal 1991, at the behest of Senate Armed Services Committee Chairman Sam Nunn (D-Ga.), Congress established the Strategic Environmental Research and Development Program and authorized $200 million for it, along with $1.1 billion for actual restoration. For Fiscal 1993, funding for environmental research and development is $200 million but the funding for actual cleanup has risen to $1.5 billion.

DoE defense cleanup and waste-management spending have grown comparably. That effort did not become a focused DoE initiative until FY 1989, when it was funded at $1.4 billion. In FY 1993, the figure was $4.8 billion, of which $1.5 billion was earmarked for restoration of defense sites being closed or going out of the defense business.

Other programs, similar in that they contribute little or nothing to the traditional forms of military might, are showing similar growth. In Fiscal 1989, the Pentagon got $300 million to perform the antidrug mission and was designated the lead agency in the detection, surveillance, and monitoring of drug smugglers—in essence, police rather than military functions. Today the authorized expenditure on this mission is $1.3 billion.

A National Guard youth opportunities program and the Civilian Community Corps are new programs that were authorized at $50 million and $30 million, respectively, in the most recent budget.

Even health-care research has been caught up in what many see as endeavors not directly related to the military mission. The most noticeable recent case was the last-minute inclusion of $200 million for breast cancer research in the Fiscal 1993 authorization bill. Some lawmakers explicitly noted that the funding should be viewed as a tradeoff against funding for the main military mission of the armed forces.

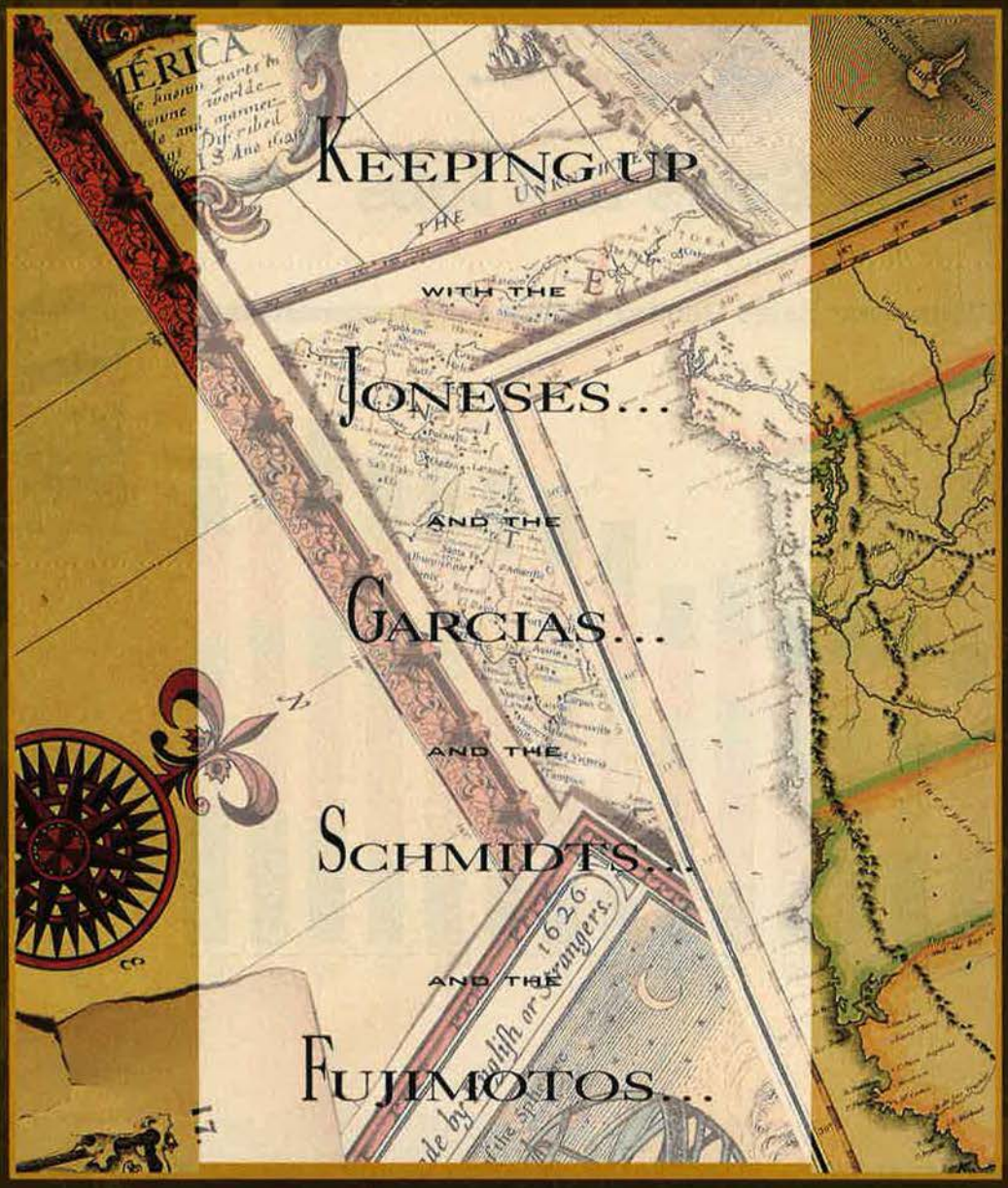
International aid and assistance missions have also taken a large chunk of money in the recent past. The military was called upon not only to help protect Kurds from Iraqi oppression but also to provide food and shelter for Kurdish refugees. More recently, the military led the effort to provide immediate relief to victims of natural disasters worldwide.

For some, these trends raise a number of concerns. They point out that the armed services face an increased "cost of doing business." Reforms within the Defense Department and the services may have streamlined their administration procedures and improved efficiency, but both are now paying for many more activities than before.

Few argue that these expenditures are unjustified or that the military has no responsibility for the problems they address. Officials, for example, state that research and development related to environmental cleanup is important. They note, however, that it has no relationship to the development of new weapon systems.

Another concern is psychological. Some critics worry that troops who spend much of their time doing "good deeds" may be less willing or less able to fight effectively when and if the need for combat arises.

Furthermore, while some missions, such as humanitarian airlift, resemble those that would be performed during a wartime emergency, many do not. Time and effort spent on those endeavors could take away from time and effort spent on combat training and could degrade capability. ■



IT'S NOT EASY TO KEEP UP WITH THE REST OF THE WORLD when there are so many new opportunities in the marketplace. So if you've been searching the globe for professional management in one diversified portfolio, look no more. The new WORLD GROWTH FUND, managed by USAA Investment Management Company, offers you a convenient, low-cost method of global investing through one mutual fund. Give us a call today. 1-800-235-0424

USAA®

USAA INVESTMENT MANAGEMENT COMPANY

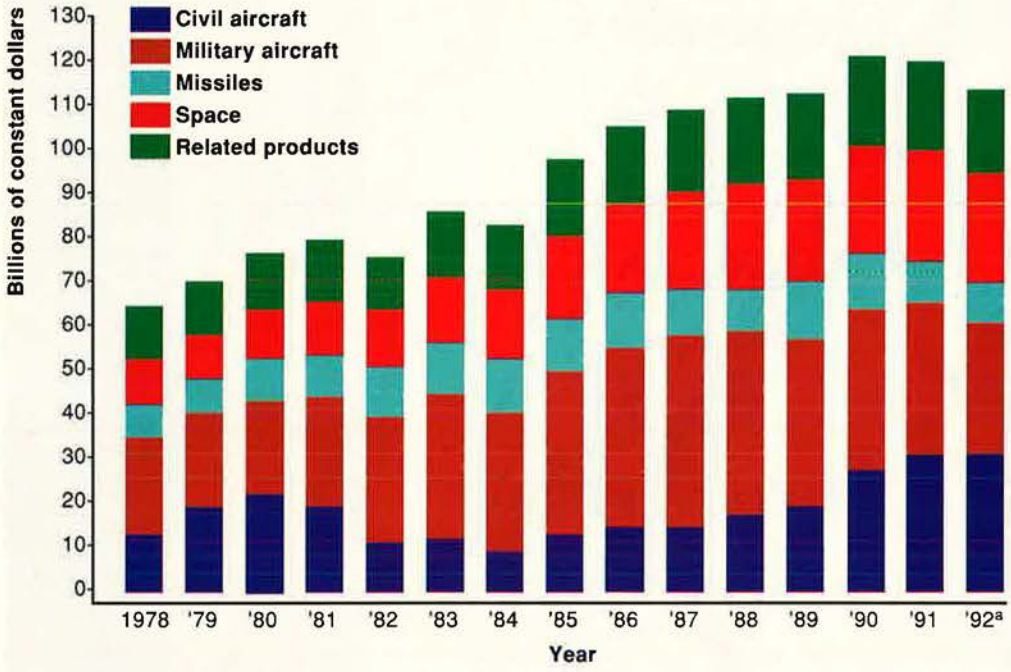
FOR MORE INFORMATION ON THE WORLD GROWTH FUND, MANAGED AND DISTRIBUTED BY USAA INVESTMENT MANAGEMENT COMPANY, INCLUDING MANAGEMENT FEES CHARGED AND EXPENSES, CALL FOR A USAA INVESTMENT TRUST PROSPECTUS. READ IT CAREFULLY BEFORE YOU INVEST OR SEND MONEY. FOREIGN INVESTING IS SUBJECT TO CERTAIN RISKS, WHICH ARE DISCUSSED IN THE FUND'S PROSPECTUS.

The Chart Page

By Tamar A. Mehuron, Associate Editor

Aerospace Sales and Jobs

The Fifteen-Year Sales Record



Total aerospace sales fell $5 billion in 1992. Department of Defense purchases fell $4 billion. Commercial sales were flat. Orders for commercial jet transports accounted for $28 billion, or ninety-four percent, of total civilian shipments.

[a]Preliminary

Employment dropped by 117,000 to 1,063,000 in 1992. None of the industry sectors added jobs. The missiles and space sector dropped twelve percent, or 31,000 jobs. The civil aircraft sector lost the most, dropping 38,000. An additional 26,000 employees lost jobs in 1992 in the military aircraft sector.

Aerospace Employment

Year	Aircraft: Civil	Aircraft: Military	Missiles and Space	Related Products	Total
1983	174,000	310,000	259,000	284,000	**1,027,000**
1984	184,000	333,000	286,000	294,000	**1,097,000**
1985	210,000	378,000	294,000	324,000	**1,206,000**
1986	238,000	401,000	309,000	324,000	**1,272,000**
1987	257,000	396,000	316,000	331,000	**1,300,000**
1988	280,000	386,000	313,000	332,000	**1,311,000**
1989	326,000	376,000	306,000	323,000	**1,331,000**
1990	321,000	370,000	278,000	301,000	**1,270,000**
1991	334,000	325,000	251,000	270,000	**1,180,000**
1992[a]	296,000	299,000	220,000	248,000	**1,063,000**

[a]Preliminary

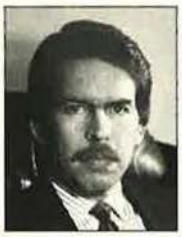
Source: Aerospace Industries Association

Washington Watch

By Robert S. Dudney, Executive Editor

Operational Realities

For a different view of cuts and force-mix options, listen to the commanders who must field the forces and carry out the deployments.



If the Clinton Administration wants to get a good fix on the state of the Air Force, it would do well to listen to the key operational leaders. At or near the top of the list would be Gen. Ronald Fogleman, the commander of Air Mobility Command, and Gen. John Michael Loh, the commander of Air Combat Command.

The AMC and ACC chiefs are in charge of a huge chunk of the operational force. They command a total of 250,900 active-duty troops and 183,700 Guardsmen and Reservists and have authority over 5,439 long-range bombers, intercontinental ballistic missiles, fighters, attack airplanes, transports, refuelers, and other systems, plus their support establishments.

Not long before the January 20 change of administrations, Generals Fogleman and Loh came to Washington, where they had wide-ranging, back-to-back sessions with defense correspondents. They discussed their efforts to build on the strengths and minimize the weaknesses of today's Air Force.

They implicitly addressed claims by some in the capital that the armed services can further cut budgets and force size or change the current mix of forces without losing their combat edge. That kind of talk makes little sense to Generals Fogleman and Loh, who, as officers in charge of maintaining US transport and air combat forces, have to deal every day with the question of what is truly necessary.

General Fogleman heads a sprawling military organization covering 116 US and foreign installations. He commands some 87,200 active-duty troops and 96,700 reservists, along with 724 C-5 and C-141 strategic transports and C-130 theater airlifters, 525 KC-135 and KC-10 aerial refuelers, and 140 other aircraft. His headquarters is at Scott AFB, Ill., where he also maintains a headquarters as commander in chief of US Transportation Command.

At the time of his Washington visit, General Fogleman was preoccupied with Operation Restore Hope, the US-led humanitarian effort in Somalia that began December 9. "It is a classic case," he said, of having to deploy to "a part of the world we didn't anticipate going into. There was no contingency plan for it."

A New Operational Concept

That's not to say AMC was starting from scratch. The US had been analyzing the area for a while, studying transportation feasibility. General Fogleman had spent a few days in Somalia, where he saw the situation firsthand. "When the decision was made to go," he said, "we knew we were going into a very austere location, with absolutely no infrastructure."

The Air Force had to cope with great distances. Then there was the problem of finding water and fuel. AMC decided to introduce an entirely new concept of operations, maximizing the use of its air refueling aircraft and refueling-qualified airlift crews and bypassing the need for fueling in Somalia.

The process went like this: Transports would depart March AFB, Calif., undergo two aerial refuelings, and land at a staging area in the Middle East. Fresh crews would finish the flight to Mogadishu. They would land, disgorge cargo, and take off for staging bases in nearby countries, where they would take on just enough fuel to reach the primary staging base. The original crew members, now rested, would reboard the planes and return nonstop to California. "It initially allowed us to use fewer aircraft and fewer crews to get the job done," said General Fogleman.

Also helping to speed the operation was AMC's recently established Tanker Airlift Control Center (TACC), the Scott-based system that directs KC-135, KC-10, and transport aircraft to provide global mobility. Until now, said General Fogleman, efficient use of tankers and airlifters was impaired by bureaucratic layers that came between the operational forces and top leaders. AMC has eliminated air divisions and restructured numbered air forces such that they no longer have a role in day-to-day command and control of aircraft. Operational authority runs directly from TACC to the wings.

"We have pooled the command and control of tanker and airlift forces," said General Fogleman. "Now what you have is one organization which has system visibility." When something is going wrong, he explained, the operator on the ground can make a direct call to TACC, where an officer has the authority to fix the problem and divert needed equipment or personnel.

These measures helped, but even the modest first phase of the Somalian operation tied up a lot of mobility assets—on a daily basis, some sixty KC-135s, ten KC-10s, thirty C-141s, and twenty-five C-5s. The demands on mobility assets grew as the Air Force developed ground capability in Somalia.

For General Fogleman, the Somalian venture drove home the critical value of en route structure—that is, access to foreign facilities, fuel stocks, and the like. He worries about access to such facilities in the future, given the reduced US presence in Europe and the Far East. "That's something everybody overlooks," said he. "We really have to pay attention to that, whether we're involved in a conflict or humanitarian efforts. That's lost on a lot of people. They just assume they're going to be there."

General Fogleman expressed concern that the current spate of long, high-tempo deployments was straining the airlift fleet. He notes that AMC's airlifters have been operating virtually nonstop since summer 1990, when the US embarked on its troop and materiel buildup for the Persian Gulf War of 1991.

"We've never really had a respite since the Gulf," said the General. "It took us a long time to come out of the

Gulf. About the time we came out, we got involved in the airlift into the former Soviet Union. Just about the time we were coming out of that, we found ourselves in a number of humanitarian operations," including relief efforts in the wake of Hurricane Andrew and Typhoon Omar and the Somalia relief efforts.

AMC had little option but to defer the scheduled depot maintenance of the strategic airlift fleet for a couple of years. Now, said General Fogleman, the catch-up effort has begun, and it is creating some problems. The command has three times as many C-5 and C-141 aircraft in the depot as it would have under normal circumstances, thus reducing the flexibility of the force. The problem is especially acute in the C-141 fleet, where a large fraction of the 253-plane fleet is in depot.

Flying Under Restrictions

The C-141 is bedeviled by other problems as well. Many of the workhorse lifters are flying under two kinds of restrictions. One stems from the discovery of a wing crack, which restricts the maximum weight the aircraft can carry and restricts aerial refueling. The second restriction is related to weakness in the cockpit window post. This defect has caused the Air Force to limit the aircraft's maximum altitude.

The two defects are widespread. General Fogleman said that, at present, only sixty-three Air Force C-141s are free of restrictions. The rest are flying under one or both constraints. "In the aggregate, . . . it forces you to be inefficient in many ways," said the General. "It really is a significant impact over time, if you're engaged in a long, sustained operation."

Weighing on the General's mind was the question of whether to pursue yet another Service Life Extension Program (SLEP) for the venerable C-141. The first SLEP, launched in 1984 and due for completion in 1997, will increase useful service from 30,000 to 45,000 hours. The Air Force claims that the program will keep C-141s in action until 2010, by which time the new C-17 transport will have been deployed in large numbers.

Congress questioned that claim and ordered the Air Force Scientific Advisory Board to study the utility of a second SLEP that would raise the service life to 60,000 hours. AMC's chief says he first wants to find out if it's possible. "I am extremely interested in knowing the answer," said General Fogleman. "I think it's absolutely critical that we get that answer."

He maintains that one cannot get it through analytical means but only through physical inspection of a large sample of airplanes. The judgment will be difficult, said he, because the plane already has had one life extension and has been used in ways for which it was never intended, such as low-altitude flight. Moreover, he adds, the aeronautics industry has no tool with which to accurately predict effects of corrosion.

"I feel so strongly about it," he said, "that I've made the offer: We'll give up a C-141 and allow them to go tear the skin off the thing." Another possibility, the General explained, would be to conduct inspections of C-141s currently in depot maintenance at Warner Robins Air Logistics Center, Ga. He did not predict when the Air Force would come up with an answer.

For General Fogleman, the C-141 problem only underscores AMC's urgent need to modernize its fleet with production of the C-17 transport, the mobility command's number one acquisition priority. The value of the C-17, he said, can be seen by taking a hard look at the operation in Somalia, where there is a major need for aircraft that could show greater agility on the ground.

General Fogleman noted that the Air Force, at the Mogadishu airport, had the capability to park only one C-5 and one C-141 at any time, due to wingspan and turning requirements of the two planes. It would be a different story with the C-17.

"We could probably be about forty percent more efficient," said the General. "Where we're restricted to one C-141 and one C-5, . . . you could put three or four C-17s on the ground."

General Fogleman also argued that the nation needs to do something to ensure the continued health of the Civil Reserve Air Fleet (CRAF), the backup force of commercial aircraft committed to support the transportation of military forces and materiel around the world in event of an emergency.

The Gulf War marked the first time that CRAF aircraft had actually been activated for wartime use. That forced some airlines to think again about whether they really wanted to take part in the program. Moreover, CRAF participants signed up at least in part to be eligible to bid on lucrative peacetime Pentagon charter and freight contracts. However, as the force shrinks and more and more troops return from overseas, there is less business, and some airlines are losing interest.

Concern for the Future

Though no one has dropped out yet, General Fogleman said that Air Force officials "have concern about the next CRAF contract," covering Fiscal Year 1994. The Defense Department is examining ways to create new economic incentives for CRAF participants—perhaps by placing more of the Pentagon's total air transport business into the pot.

Similar concerns and challenges preoccupy General Loh, the ACC commander in charge of all combat forces based in the US except special operations forces. He controls 163,700 active-duty troops and 87,000 reservists and commands about 3,100 combat aircraft and 950 long-range, nuclear-tipped ballistic missiles.

At the time of his Washington visit, ACC forces were involved in four major contingencies around the world. They were Operation Southern Watch, the enforcement of a no-fly zone in southern Iraq; Operation Provide Comfort, enforcement of a no-fly zone in northern Iraq; Operation Restore Hope in Somalia, where about 600 ACC support, civil engineer, and combat communications personnel had set up shop; and a major antinarcotics operation throughout Latin America and the Caribbean. This was taking place at a time of major cutbacks in the structure of Air Combat Command. General Loh said that in 1992 his command lost 15,000 troops, shut down three major air bases, and started the planning to close four more in 1993.

ACC units are going overseas frequently these days. In General Loh's view, the day of the temporary yet long-lasting international deployment is here to stay, and he's talking about more than actual contingencies. He says that he is increasing the number of planned ACC overseas deployments. In 1993, ACC forces will conduct twenty-three such operations—up forty percent from last year.

"I believe that, as we bring back our forces from overseas, to become basically a home-based military . . . we need to exercise our deployability more frequently than in the past," said General Loh. The goal is "to demonstrate that we are an expeditionary air force with a major role to respond rapidly anywhere in the world with integrated airpower."

The ACC commander took note of the fact that, in the 1960s, Strategic Air Command crews pulled long temporary duty abroad, with damaging effect on morale and family life. He said that ACC is controlling such deployments carefully and working to

make sure that those problems do not recur. Even so, said General Loh, "we are going to be away from home in this expeditionary air force quite a bit." He noted that some aircraft units are away from home 120 days a year. In the case of the E-3 Airborne Warning and Control System, the rate is 180 days a year.

The new emphasis on overseas deployments is only one facet of General Loh's effort to create a new "culture" at Air Combat Command, which merged Tactical Air Command and most of Strategic Air Command into a single repository of integrated airpower. The deployments include not only fighters but also long-range bombers and support aircraft. This blurs the long-standing distinction between "tactical" and "strategic" aircraft and units.

In the new system, said General Loh, "I want the former SAC people to get involved in theater-level targeting and matching up with other conventional forces to operate in a theater. I want our former TAC people to get away from the mindset that they're just a bunch of fighters that operate at short range in a theater. They've got to worry about the deployment aspect, the interoperability of the theater command-and-control systems."

In General Loh's estimation, SAC veterans have done a better job in making the transition than have their TAC brethren. He said that B-1 and B-52 crews, in particular, are "absolutely excited" about having a mission that includes major conventional operations. ACC is putting bombers into all conventional exercises and conventional overseas deployments.

"Relief" From the Nuclear Mission

In fact, said General Loh, the Air Force is now trying to win for the B-1 bomber "full relief" from the nuclear mission and leave it to the B-2 and B-52 fleets. "I think it will happen in time," said the ACC chief. "It will be a conventional long-range combat aircraft. It will be the workhorse of our long-range bomber force. Therefore, we are committed to an upgrade program to give it a state-of-the-art conventional capability."

The command's heavy emphasis on swift, overseas deployment of combat units also influences General Loh's attitude on whether and to what extent ACC should expand the role of the Air National Guard and Air Force Reserve.

The Air Force relies heavily on the Guard and Reserve, and the performance record of both is outstanding. Even so, General Loh's view is that ACC should not put a greater proportion of its missions in the Reserve Component, despite general congressional sentiment in favor of expanding the mission of reserves at the expense of the active component of the armed forces.

"All of those forces that deploy for these contingencies from my command are from the active part of the force, not the Guard and Reserve force," said General Loh. "They [Reserve Component forces] can't handle extended time away from the States and their units."

In General Loh's view, temporary yet long-lasting international deployment is here to stay. The goal is "to demonstrate that we are an expeditionary air force" able to "respond rapidly anywhere in the world with integrated airpower."

ACC's 87,000 assigned Reserve Component troops function primarily as direct operators—pilots, crews, weapon maintainers. Of ACC's active-duty force, a large share is assigned to the general support structure required to back up all operations. This includes combat planning, logistics, and intelligence. Thus, when it comes to the actual number of "shooters"—members of squadrons that can deploy for overseas combat—the breakdown is fifty-seven percent active-duty and forty-three percent reserve.

General Loh further pointed out that ACC already has expanded its reliance on the Reserve Component. Just three years ago, the ratio of active-duty to reserve was sixty-seven percent to thirty-three percent. Said General Loh, "I believe that [of] the force we're structuring now, that will be heavily tasked to go overseas on short notice, remain there for some period of time, and be able to operate at the operational tempo with the equipment we have, about sixty percent should be active-duty and forty percent should be in the Guard and Reserve."

What if Congress tries to force the command to put more of its combat power in the Guard and Reserve? "To transfer more of our missions in the active force to the Guard and Reserve is not smart, from our standpoint," said the ACC commander.

As he has on many occasions, General Loh strongly endorsed the F-22 fighter program. He maintained that the technical and manufacturing aspects of the program to produce the new fighter are well in hand.

The General surprised many, however, with his public call to renew production of limited numbers of F-15E dual-role fighters. The Air Force, which once had planned to buy about 400 of the powerful and versatile fighters, eventually agreed to settle for about 200, with the final purchase approved in Fiscal 1993. Some aircraft are still being produced.

"We're still buying F-15Es from McDonnell Douglas," said General Loh. "We'd like to continue to buy those fighters from McDonnell Douglas." He said that he would like to see the Air Force procure new F-15Es "on the order" of about a dozen or so.

"I'm willing to take another look at that," said General Loh, "because . . . that procurement was cut short. I'm finding that we could use some additional F-15Es" for attrition reserve and to help manage temporary overseas deployments.

The General said the Air Force will "look at" the notion of funding new F-15Es as it develops future budgets. With Saudi Arabia set to buy a large number of F-15XP fighters, a lesser version of the F-15E, the production line will stay open, and thus the Air Force can afford to wait a few years before making a final decision.

Managing the ACC pilot force during the drawdown has been General Loh's "biggest headache this year." There was a "dramatic" reduction in the number of available cockpits during 1992, and the result was a "tremendous" reduction in the number of Air Force pilots. The General makes it clear that this is a distasteful part of his job.

"Much of the action is to find ways to induce pilots to leave the Air Force," said General Loh. "It's a very painful thing for me to do. We've tried to take pilots who have graduated from pilot training, put them in support jobs for three years, and then put them in a cockpit.

"We're trying to manage that, day by day and week by week, but it has been painful. We've had a lot of excellent pilots leave the Air Force this year because there's just no room for them." ■

Aircrews flying sea surveillance missions will be able to detect and identify surface vessels at extended ranges using an infrared system called Hi-Mag, which is an upgrade to the AN/AAQ-16 Hughes Aircraft Company Night Vision System (HNVS). Its three-power telescope includes the high-magnification capability required for long range target identification, and the wide field of view capability needed for safe night and low-visibility pilotage. Hi-Mag stays within the size and weight constraints dictated by the various helicopters currently equipped with HNVS, and can also be installed on fixed-wing patrol aircraft. HNVS is currently in service on a variety of U.S. Army, Air Force and Navy helicopters.

Printed technical manuals may soon be replaced by an electronic display, as part of the Integrated Logistics Information Support System (ILISS), developed by Hughes. ILISS combines an interactive electronic technical manual with artificial intelligence diagnostics and job aids in an integrated software package that can run on most portable computers. With this system, repair technicians will no longer require extensive technical training or cumbersome printed technical manuals, and maintenance time can be significantly reduced.

A new wide field-of-view sensor will provide the U.S. Army with improved target acquisition using an advanced IR seeker configuration for armor-type targets in cluttered scenes and large targets such as air fields and bridges. This sensor, developed by Hughes, scans by means of a gimbal, providing a wide area search over gimbal positioning constraints. Unlike current IR imaging systems, this sensor provides the wide angle image with high resolution and higher sensitivity. In addition to military applications for missile seekers and acquisition systems, the Hughes wide field imaging technology may be applied to automatic target recognition systems and even commercial surveillance systems.

Integrated circuit manufacturers will be able to design faster, smaller electronic components — for higher output — now that Hughes has developed a precision method for thinning bonded Silicon-on-Insulator (SOI) semiconductor wafers. This new AcuThin™ process thins wafers to optical tolerances through a non-contact fabrication technology called Plasma Assisted Chemical Etching (PACE), also developed by scientists at Hughes. It yields a wafer with silicon film thickness of less than 100 nanometers and uniformity of +/- 10 nanometers or better. It also preserves all bulk silicon properties, so manufacturers do not have to retool their fabrication equipment. Hughes has begun producing these new wafers for customers' initial process evaluation.

Hughes is helping solve industrial hydrocarbon contamination of soil and ground water with a state-of-the-art steam injection process that removes and treats hydrocarbons without excavating the soil. First, steam is injected into the ground. At the right temperature and pressure, it forces the hydrocarbons to migrate to extraction wells. Once stripped from the soil, these hydrocarbon vapors and liquids are safely extracted for treatment. This in-place method of hydrocarbon removal has definite advantages. Being nonobtrusive, it does not require a plant to shut down, which accelerates cleanup and reduces costs. This remediation process is one of many examples in which Hughes is using existing technology to solve environmental problems.

For more information write to: P.O. Box 80032, Los Angeles, CA 90080-0032

HUGHES

Subsidiary of GM Hughes Electronics

Aerospace World

By Frank Oliveri, Associate Editor

In Somalia, the Airlifters Deliver

During the first weeks of Operation Restore Hope in Somalia, the Air Force moved in most of the planned 28,000-troop US ground-force contingent along with equipment and supplies. The Air Force transported more than 2,000 tons of cargo.

Air Force officials reported that thirty-three active and reserve component units took part in the initial deployment. More than seventy Guard and Reserve crews volunteered for flights during the early stages of the operation. *[See box on p. 18 for unit list.]*

The US-led international humanitarian operation, launched last December, sought to safeguard food supplies and aid workers from armed bandits in the anarchic east African nation.

The Air Force's Air Mobility Command, Scott AFB, Ill., marshaled C-5, C-141, and C-130 transports as well as aerial refueling aircraft and other specialized units for Restore Hope. USAF planes had been delivering food supplies to the nation since August 8, 1992, in Operation Provide Relief. AMC provides to US Transportation Command the airlift assets required to move US forces.

Clinton's National Security Team

When he confronts challenges abroad, President Bill Clinton will get his advice and counsel from a seasoned, centrist team of defense and foreign policy advisors.

The newly elected President chose security advisors known to be short on ideology but long on practical experience.

The Defense Department will be headed by Rep. Les Aspin, the Wisconsin Democrat who served as chairman of the House Armed Services Committee from 1985 to 1993 and who used the panel to exert influence not only in the defense field but also over foreign policy. On December 22, Mr. Clinton declared Representative Aspin his nominee for Secretary of Defense.

At the same time, Mr. Clinton nominated as his Central Intelligence Agency director R. James Woolsey, formerly an Under Secretary of the Navy (1977–79) and general counsel of the Senate Armed Services Committee (1970–73). Mr. Woolsey served as US representative to the Conventional Forces in Europe talks (1989–91) and played key roles behind the scenes in many presidential panels, notably the 1983 Scowcroft Commission that rescued the Peacekeeper ICBM and gave impetus to the Midgetman ICBM. As CIA director, Mr. Woolsey will work closely with the Air Force's National Reconnaissance Office.

Other key Clinton appointments:

- National Security Advisor: Anthony Lake, head of policy planning at the State Department (1977–81) and former aide to Henry Kissinger during the Nixon Administration.
- Secretary of State: Warren M. Christopher, deputy secretary of state (1977–81) under Secretaries of State Cyrus Vance and Edmund Muskie. In that post, Mr. Christopher functioned mainly as an administrator and manager. He is not expected to be an activist secretary in the mold of Kissinger or Vance.

GAO Urges Stronger Hazing Ban

The Air Force Academy has not conducted an in-depth review of its fourth-class indoctrination system, which in some cases is difficult to distinguish from illegal hazing.

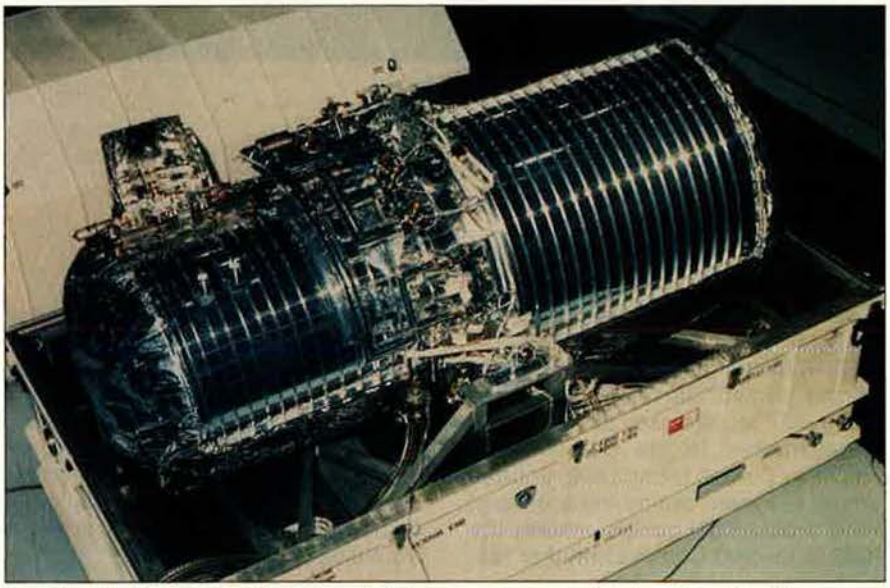
USAF photo by MSgt. Don Wetterman

USAF Chief of Staff Gen. Merrill A. McPeak receives an AMC patch before flying his first AMC KC-10 Extender in November. Instructor pilot Capt. Matthew H. Arens (left) of Barksdale AFB, La., commanded the aircraft, which carried General McPeak and other officers to Scott AFB, Ill., for a meeting of the Air Force Quality Council.

So declares a new report from the General Accounting Office, whose investigators add that they saw no perceptible decline in such questionable activities at the Colorado Springs school.

The November report said each service academy operates a fourth-class system to indoctrinate freshmen and give leadership training to upperclassmen. Each has established traditional practices. Though some are sanctioned, others are not and can be viewed as illegal hazing.

GAO said that students are rarely charged with hazing offenses and that hazing causes lower grades, greater



Lockheed's Cryogenic Limb Array Etalon Spectrometer is observing Earth's ozone layer while attached to NASA's Upper Atmosphere Research Satellite for a fifteen-month experiment. The $60 million system was transported across the US protected from moisture damage by special desiccant packaging by United Desiccants.

stress, and a diminished desire to make a career of military service. Hazing has sometimes resulted in death and serious injury.

GAO called for the Air Force Academy to conduct a thorough assessment of its fourth-class system, similar in scope and scale to those conducted at the other academies, and prescribed certain steps to strengthen existing bans on hazing. In response, the Pentagon said issues raised by GAO are being addressed by the academies and services. GAO acknowledged that some positive steps had been taken at the academies.

C-17 Wing Redesign Unnecessary

Air Force Secretary Donald Rice said in December that the service will not have to undertake a costly, time-consuming redesign of the C-17's wings. Instead, said Dr. Rice, the new transport will require only a beefing up of its wing structures.

In October, C-17 static test wings buckled at a point well below the required level of 150 percent of designed load. The aircraft withstood 128 percent of the designed limit, raising concern that the current wing would have to be scrapped.

"Everything learned to date indicates a straightforward, manageable refinement of the wing structures," Dr. Rice said. "We have designed and built a good, safe airplane and will continue to refine the C-17 based on what we learned during ground and flight testing."

Dr. Rice based his statement on a December briefing by the Executive Independent Review Team of aeronautical experts who performed an analysis of the wing test. Air Force experts have also conducted tests.

Crashes Claim USAF Lives

For the Air Force, December 1 turned out to be a disastrous day: seventeen servicemen lost their lives in two separate airplane crashes. *[See box on p. 19 for names of the lost crew members.]*

In the first accident, two C-141 aircraft from McChord AFB, Wash., collided in midair over central Montana during a training mission. The crash claimed the lives of all thirteen crew members in both planes. A few hours later, a B-1B bomber from Dyess AFB, Tex., crashed near Van Horn, Tex., on a training mission. All four crew members were killed.

The Air Force is investigating both accidents. The service continues to use both aircraft types in routine training since there was no evidence of system failure.

USAF to Certify B-2 Avionics

The Air Force plans to certify the B-2 Stealth bomber in compliance with the Fiscal 1993 defense authorization act. The General Accounting Office warns, however, that the service will take the step without flying the integrated offensive and defensive avionics in the aircraft. The Air Force says testing in a laboratory and a flying

The Forces of Restore Hope

317th Airlift Control Squadron, Pope AFB, N. C.
362d Airlift Control Squadron, Rhein-Main AB, Germany
436th Airlift Control Squadron, Dover AFB, Del.
437th Airlift Control Squadron, Charleston AFB, S. C.
438th Airlift Control Squadron, McGuire AFB, N. J.
60th Airlift Wing, Travis AFB, Calif.
62d Airlift Wing, McChord AFB, Wash.
63d Airlift Wing, Norton AFB, Calif.
108th Air Refueling Wing (ANG), McGuire AFB, N. J.
141st Air Refueling Wing (ANG), Fairchild AFB, Wash.
151st Air Refueling Group (ANG), Salt Lake City, Utah
157th Air Refueling Group (ANG), Portsmouth, N. H.
164th Airlift Group (ANG), Memphis, Tenn.
172d Airlift Group (ANG), Jackson, Miss.
190th Air Refueling Group (ANG), Forbes Field, Kan.
349th Airlift Wing (AFRES Associate), Travis AFB, Calif.
433d Airlift Wing (AFRES), Kelly AFB, Tex.
434th Wing (AFRES), Grissom AFB, Ind.
436th Airlift Wing, Dover AFB, Del.
437th Airlift Wing, Charleston AFB, S. C.
438th Airlift Wing, McGuire AFB, N. J.
439th Airlift Wing (AFRES), Westover AFB, Mass.
445th Airlift Wing (AFRES Associate), Norton AFB, Calif.
446th Airlift Wing (AFRES Associate), McChord AFB, Wash.
452d Air Refueling Wing (AFRES), March AFB, Calif.
512th Airlift Wing (AFRES Associate), Dover AFB, Del.
907th Airlift Group (AFRES), Rickenbacker ANGB, Ohio
910th Airlift Wing (AFRES), Youngstown, Ohio
913th Airlift Group (AFRES), Willow Grove ARFF, Pa.
46th Air Refueling Squadron, K. I. Sawyer AFB, Mich.
906th Air Refueling Group, Minot AFB, N. D.
940th Air Refueling Group (AFRES), Mather AFB, Calif.
1701st Air Mobility Element, McGuire AFB, N. J.

test-bed will supplement partial B-2 flight testing.

The Air Force's reliance on laboratory and flying test-bed testing results from slippage in the B-2 schedule. The flight test program began in 1989.

In its Fiscal 1993 authorization, Congress said the B-2 would have to demonstrate specific performance characteristics before $1 billion in Fiscal 1992 funds could be obligated for the sixteenth aircraft. The requirements deal with flying qualities, navigation, radar cross section, air vehicle performance, structural integrity, offensive and defensive avionics, and weapons separation. The Secretary of Defense is required to certify that those requirements have been met.

Military Clothing Catalog Extends Reach

The military clothing mail-order catalog will make Air Force service and Battle Dress Uniforms available, the Air Force said.

The catalog, available in both an Air Force and Army edition, also features boots, shoes, shirts, insignia, patches, socks, towels, and accessories. The catalog will include size charts and procedures for those who need nonstandard size orders. Catalogs are available to anyone authorized to buy uniforms from Army/Air Force Exchange Service military clothing sales stores and can be ordered by writing to Headquarters AAFES/PD-U, P. O. Box 660202, Dallas, TX 75266-0202.

Fuqua Blasts Government

Don Fuqua, president of the Aerospace Industries Association, charged that the federal government was fostering the nationalization of the US aerospace industry.

In a December address to AIA members, Mr. Fuqua said that this situation was "occurring under the benign umbrella of what the government calls 'depot maintenance.' " The AIA leader stated, "The term 'depot maintenance' embraces much more than overhaul and maintenance; it also includes such work as modifications, conversions, system upgrades, and service life extension programs." The US spends about $20 billion annually in those areas, he said, with a large portion of the money going to thirty-six Defense Department facilities with 150,000 workers.

Mr. Fuqua said he had learned that the Air Force has discussed "constructing new manufacturing facilities at which they could assemble F-22 aircraft. . . . Clearly this far exceeds mere depot maintenance."

Lockheed's F-22 Program Manager Micky Blackwell said the company was to build two sets of tooling for each part of the aircraft. One would be used in production of the fighter and the other would be given to the Air Force for depot use.

"Historically . . . we deliver the airplane, and then the ALC [air logistics center] . . . designs support equipment from scratch," said Mr. Blackwell. This process reduces the number of spare parts and the amount of support equipment needed.

Mr. Fuqua said it is not surprising that the government wins most of the competitions because the government "writes the RFPs [requests for proposals], creates the rules of selection, and then picks the winners of contracts for which they themselves compete."

The Toll of Two Crashes

December 1, 1992

C-141 Crew Members Killed
Capt. David J. Sielewicz
Capt. Jimmy L. Jenkins
Capt. Mark A. Elster
Capt. Edward D. Parent, Jr.
Capt. Banks E. Wilkinson
Capt. Kevin M. Maguire
1st Lt. Edward H. Hoyle III
TSgt. Peter L. Osterfeld
TSgt. David R. Young
SSgt. Terrence J. Miyoshi
SSgt. Monte L. Bissett
SrA. Wilbert T. Brown III
A1C George A. Moreland

B-1B Crew Members Killed
Maj. Zenon C. Goc, aircraft commander
1st Lt. Paul S. Ziemba, pilot
Capt. Scott D. Genal, instructor offensive systems officer
1st Lt. Timothy A. Cookson, defensive systems officer

Services Meet Recruiting Goals

All four US military services met their recruiting goals for Fiscal 1992, taking in 200,810 personnel, the Pentagon announced. The Air Force attracted 35,100 recruits.

Ninety-nine percent of new enlistees had completed high school, said Christopher Jehn, assistant secretary of defense for Force Management and Personnel. The percentage of individuals who scored average or above average on the enlistment test edged up three-tenths of a point in one year, to 99.8 percent.

Two Giant Aerospace Mergers

At year's end, the US aerospace industrial community felt shock waves from two enormous mergers.

In November, Martin Marietta purchased GE Aerospace for $3.05 billion, combining two of the nation's leading aerospace research and development firms and expanding Martin Marietta's strength in space, communications, defense, electronics, information, technical services, materials, and energy.

Lockheed Corp. acquired the Tactical Military Aircraft business of General Dynamics for $1.5 billion in cash in December. The move makes Lockheed the only contractor currently building Air Force fighters. Pictured here is the formidable duo of the F-22 and F-16.

In December, Lockheed purchased General Dynamics' Tactical Military Aircraft business for $1.5 billion in cash. With the purchase of the Fort Worth–based fighter unit, Lockheed becomes the sole proprietor of the Air Force's F-16 and F-22 programs, which represent the present and future of the Air Force fighter business.

Daniel Tellep, Lockheed's chairman and chief executive officer, said, "This combination will further the much-needed consolidation of the nation's defense industry while preserving key capabilities within the defense industrial base that are critical to national security." Mr. Tellep characterized his firm as "a strong, efficient, and highly focused military aircraft competitor." The combination will create a $6.5 billion military aircraft company, which ranks first in the industry and is the second largest defense prime contractor.

Norman Augustine, Martin Marietta's chairman and chief executive officer, said, "Through the more efficient use of facilities and resources and with the application of a broader range of advanced technologies, Martin Marietta will enhance its effectiveness." Annual revenues will nearly double to $11 billion, and its backlog of orders will increase to $19 billion.

Spot Image Corp.'s network of satellite positioning systems, receiving stations, and image-processing facilities proved invaluable in mapping, particularly for mission planning, during Operation Desert Storm. This is an image of Kuwait on February 9, 1991, south of Kuwait City, showing oil wells set on fire by Iraqi soldiers.

USAF's Medical Partnership

Air Force hospitals continue to augment their staffs with civilian doctors and other medical specialists to provide top medical care in a cost-effective manner, says Capt. Brian Hurley, the Air Force's health care policy officer.

The partnership program allows medical facility commanders to augment their staffs with civilian providers using CHAMPUS funds, without copayment or deductible costs to the patient. About $100 million in CHAMPUS funds went toward this program. Ninety percent of all Air Force hospitals participate in the program, which is credited with improving access to primary care and expanding capabilities in such areas as obstetrics, gynecology, general surgery, cardiology, and orthopedics.

An external partnership program allows Air Force doctors to work in civilian hospitals where they can treat military beneficiaries and gain access to high-technology equipment not available at smaller USAF facilities.

Add One to the Joint Chiefs

The 1993 defense authorization bill, signed into law in October, permits the vice chairman of the Joint Chiefs of Staff to function as a full voting member.

Formerly, the vice chairman was only a full member if the chairman was absent or unable to fulfill his duties. "Because of the need for complete continuity during the absence of the chairman, General [Colin] Powell and [Defense] Secretary [Dick] Cheney thought that the vice chairman should be designated as a full member of the Joint Chiefs of Staff," former DoD spokesman Pete Williams said.

The vice chairman plays an active role as the chairman's representative to the Interagency Deputies Committee, participates in deliberations of the joint staff, and chairs the Joint Requirements Oversight Council.

The current vice chairman is Adm. David Jeremiah. The position of vice chairman was created as a part of the Goldwater-Nichols Reorganization Act of 1986. It has a two-year term.

NASP May Scale Down

In December, Dr. Robert R. Barthelemy, the National Aerospace Plane Joint Program Office director, said that NASA and the Air Force could begin to take a more incremental approach to the NASP program. The original program was to cost $10 billion, a sum many feel is too great given the state of current technology.

The original conceptual vehicle, X-30, would have been a single-stage-to-orbit vehicle capable of reaching Mach 25. However, Dr. Barthelemy said, NASA and the Air Force are considering changing the program so that modified Minuteman II missiles can be used in experiments leading to development of an X-30X vehicle that could reach Mach 15. Such a change is subject to presidential approval.

The tests, known as boundary layer transition experiments, would study the passage of model air vehicles, in the shape of the X-30X, propelled by Minuteman II missiles through the atmosphere and into space. The air vehicle will go through two phases: laminar flow, which creates a protective air layer around the vehicle, and turbulent flow, which builds up heat as the vehicle moves through the atmosphere and into space. With this kind of information, engineers would better understand where the aircraft structure should be strengthened. This would help reduce the weight of the vehicle, which will subsequently reduce cost.

Design of the X-30X would begin in 1994 and manufacture in 1997. First flight of the X-30X would be in 1999. The cost of conducting between five and ten Minuteman II flight experiments and building the X-30X is set at between $3 billion and $5 billion. Dr. Barthelemy said that the X-30X would not be able to achieve orbit but would enable further assessment of most of the technologies needed for single-stage-to-orbit vehicles.

He explained that the Minuteman

missile would carry a forty-foot-long payload on the second stage, including the model of the X-30X. The model would likely have scramjets, engine inlets, and other engine technologies. Data would be collected through telemetry links.

More Oversight for Officer Programs?

The General Accounting Office has recommended that the Pentagon get a better grip on officer management.

The services have three types of commissioning programs: academies, Reserve Officers Training Corps (ROTC), and Officer Candidate School (OCS). The academies are by far the most expensive source of new officers, ranging from about $197,000 to $299,000 per graduate. ROTC costs from $60,000 to $70,000 per graduate for those receiving scholarships and $40,000 for those who do not. Basic OCS programs are the least expensive, ranging from $17,000 to $27,000 per graduate.

The problem, says GAO, is that the services are not systematically assessing the effectiveness of their programs or the quality of the officers they produce.

GAO recommended that the Department of Defense develop and put into effect a single standard of cost reporting for all three types of programs and periodically check the effectiveness of each. In addition, DoD should "coordinate the planning and oversight among the commissioning programs in each service to create a unified, comprehensive management of the system that determines the most

The first Beech-built production prototype of the firm's Joint Primary Aircraft Training System (JPATS), the PC-9 Mk. II, made its first flight in December. The production prototype, shown in the foreground, flew for an hour and a half. Three PC-9 Mk. II prototypes will participate in operational flight evaluation in 1993.

cost-effective mix of production by its components and develops ways to reduce costs while preserving quality," GAO said.

The Resurrection of EFA

The European Fighter Aircraft program has been renamed the Eurofighter 2000. Germany, Britain, Italy, and Spain have agreed to go forward with a less expensive variant of the original EFA, German officials said in December. Each nation will be able to carry what it needs on the aircraft.

Germany had planned to drop out of the program because it could not afford the original EFA. One of its requirements was that the aircraft cost less than DM100 million per copy, about $60 million. Officials said the German variant would cost considerably less than $60 million, but this price does not include R&D.

The German version will not include the Euroradar ECR-90 but will probably carry an upgraded APG-65 Hughes radar. The Hughes radar, currently being installed on older German F-4 fighters, will be taken from those F-4s and installed in the German EFA.

While the agreement saves the EFA program, it is expected to cut the overall buy of the Eurofighter 2000. Initial deliveries are expected to begin in 2000, officials said.

Williams, Mather AFBs to Close

The last pilot training class at Williams AFB, Ariz., graduated on January 22, ending more than fifty-two years of flight training for the US and allied nations. The final graduating class was thirty-three aviators strong.

Williams has trained more than 26,000 students since the first class graduated in 1941. The base will officially close on September 30.

Mather AFB, Calif., will graduate its final undergraduate navigator class in April, marking seventy-five years of aviation training for the US and allied nations. The first pilots started training on June 14, 1918; more than 33,000 aviators earned their wings at the base. Undergraduate navigator training began on August 2, 1941. The Air Force Electronic Warfare School arrived in January 1962.

All four services have conducted some or all of their navigation training at Mather since 1976. The final graduation will include students from the Air Force, Marine Corps and Navy, plus foreign students. Inactivation ceremonies will take place in May. Like Williams, Mather will close officially on September 30. All training will transfer to Randolph AFB, Tex., where navigator classes will begin in April.

Overseas Sites to Shut Down

The Department of Defense said in December that it will end or reduce operations at thirty European sites, including fourteen Air Force locations.

In Germany, the Air Force will end operations at Wueschheim Communications Annex 1 and 2 at Hahn AB, Zweibrücken Contingency Hospital and Domaueschingen Contingency Hospital Annex at Ramstein AB, and Reisenbach Communications Annex at Sembach AB.

In Turkey, the Air Force will end operations at Elmadag Water Systems Annex, Sahin Tepesi Commissary Annex, Ankara Maintenance Annex No. 2, Ankara Recreation Annex No. 5, Ankara Service Annex, Ankara Storage Annex, and Pirinclik Communications Annex, all at Ankara AB.

In the United Kingdom, the Air Force will end operations at Bicester and Little Rissington Contingency Hospital and Housing at RAF Upper Heyford.

Reserve Faces Shortfall

The Air Force Reserve imposed hiring restrictions for air reserve technician (ART) and non-ART civilian positions in AFRES headquarters and in the unit program.

The action was taken to offset a $60 million shortfall in funding for operations and maintenance activities in Fiscal 1993. Air Force Reserve Vice Commander Maj. Gen. Robert A. McIntosh asked the Reserve as a whole for greater belt tightening to help cover the shortfall and other budget challenges. "It is unfortunate that these actions are necessary, and I fully realize the difficulties you face in these challenging times," he said.

Top NCO Selections Tighten

The Air Force selected only 9.3 percent of those eligible for promotion to the rank of chief master sergeant, the service said in late November.

The Air Force selected 442 of the 4,711 eligible for promotion. The 93S9 Chief Master Sergeant Evaluation Board met October 19 at the Air Force Military Personnel Center, Randolph AFB, Tex.

The average total score of selectees during the Fiscal 1993 cycle was 692.20. The average selectee had 3.94 years time in grade and 20.87 years in service.

AMC Permits Disabled on Flights

Disabled passengers are now allowed to travel on Air Mobility Command aircraft, the command said in December. The decision came after a thorough review of safety, legal, and passenger service quality issues.

The change in policy was prompted by two related but separate incidents involving retired disabled veterans.

Retired Army Lt. Col. Osgood Tower was denied travel aboard a C-9 in June 1992. He was barred again in

Former F-15 pilot Tom Berry, a consultant to Lockheed Sanders' F-22 mission support element, plots a practice mission on the Sanders Air Force Mission Support System. The Air Force's Electronic Systems Center, Hanscom AFB, Mass., has selected Lockheed Sanders to develop the automated planning system.

September. Retired Marine Capt. Mason H. Rose V was denied travel in September. Both veterans wrote letters to AMC Commander Gen. Ronald R. Fogleman challenging the policy of not allowing disabled personnel on board aircraft.

The General said, "Although our military aircraft aren't as well suited to provide this service as the commercial industry, we are changing the rules and asking our personnel in the field to be sensitive to the needs of disabled travelers."

Junior ROTC to Expand

More than fifty new high schools nationwide and throughout the Air Force will carry Air Force Junior ROTC in an attempt to help at-risk youth.

The Air Force Junior ROTC offers high school students opportunities to belong and excel and offers post–high school enlistment with advanced rank and scholarships.

By the end of 1996, there will be a total of 609 AFJROTC units, an increase of 289 since 1990. As a result, the Air Force is looking to hire more retired Air Force officers and NCOs as instructors. Active-duty personnel within six months of retirement may also apply. For more information on employment as an instructor, call DSN 493-7741 or commercial (205) 953-7741.

USAF Wants Astronauts

The Air Force will assemble a selection board to convene at the Air Force Military Personnel Center on May 3 to select nominations for shuttle crew members, the service announced in December.

The list of Air Force nominees will be consolidated with other military service nominees. The DoD list will be forwarded to NASA for the final selection, which will be made in January 1994. Those selected as astronaut candidates will enter a one-year training and evaluation program. Those selected after this period will serve a five-year tour with NASA.

For more information or to request an application package, call DSN 487-5035/6117 or commercial (210) 652-5035/6117.

Air Rescue Service to Realign

In January, the Air Force began realigning the Air Rescue Service to work more closely with the combat missions it supports. Chief of Staff Gen. Merrill A. McPeak said that the move reinforces the "one base, one wing, one boss" concept.

The new plan requires that all CONUS-based rescue forces be transferred to Air Combat Command, except the 55th Weather Reconnaissance Squadron, McClellan AFB, Calif., and the 815th Airlift Squadron/403d Consolidated Aircraft Maintenance Squadron, an AFRES unit at Keesler AFB, Miss. Those units will remain with Air Mobility Command. All Guard and Reserve rescue groups will fall under ACC. Overseas rescue forces will be turned over to the control of USAFE or PACAF.

News Notes

■ For active-duty families, the cost of daily inpatient care at civilian hospitals increased from $8.95 to $9.30 under new CHAMPUS changes instituted on October 1, 1992. Family

Index to Advertisers

members admitted to civilian hospitals under CHAMPUS will now pay the daily rate of $9.30, or a flat fee of $25, whichever is greater.

■ With just over three years to go before construction of the space station Freedom begins, NASA has decided to add spacewalks to upcoming space shuttle flights. The spacewalks were planned to begin in January 1993 during STS-54.

■ Dassault Aviation delivered the last three of forty Mirage 2000EG fighters to the Hellenic Air Force in November.

■ Loral Corp.'s Scout launch vehicle successfully boosted an SDIO Miniature Seeker Technology Integration satellite in December. The satellite demonstrates advanced miniature midwave infrared sensor technology.

■ NASA and Russian officials began discussions in November to see if the Russian Soyuz TM capsule could be used as a means for crews to leave the space station Freedom in case of an emergency. NASA sees the Soyuz capsule as a possible interim answer to the question of early permanent manned capability for the space station.

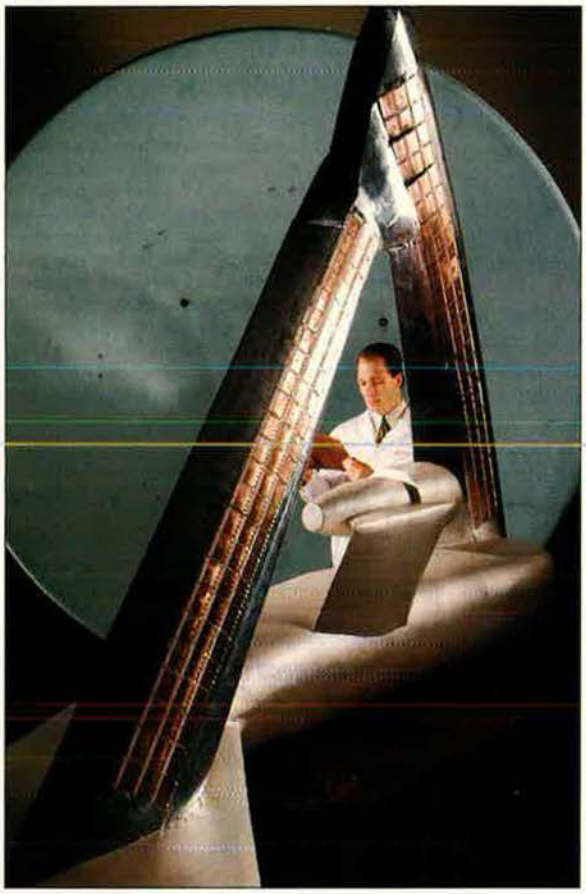
■ C-130 transports ordered by DoD for Fiscal 1992 will be equipped with new monopulse precision ground-mapping radars with beacon, weather, and windshear modes, Lockheed said in December. The Westinghouse color radar units meet Air Force performance, cost, reliability, and maintainability needs.

■ A joint agreement, signed in December, between the Air Force's Phillips Laboratory at Kirtland AFB, N. M., United Technologies Industrial Lasers of South Windsor, Conn., and UT Pratt & Whitney of East Hartford, Conn., will lead to the development of a new 1,000-watt-class, high-beam-quality commercial laser that can be used for welding, drilling, and machining. This will be accomplished with the help of Phillips's photolytic iodine laser technology.

■ Through the Hubble space telescope in November, NASA got its first look at what it believes is a black hole. NASA identified a disk of material that surrounds a suspected black hole and is being pulled into it. The disk is at the core of a galaxy in the Virgo Cluster, forty-five million light years from Earth.

■ The 21st Space Operations Squadron, Onizuka AFB, Calif., converted from paper satellite scheduling to the Automated Scheduling Tools for Range Operations (ASTRO) system, a $12 million computer system, in November. The 21st SOS had been using paper scheduling for twenty-five years.

■ The Community College of the Air Force awarded 13,343 degrees in 1992. Air Combat Command was first among major commands, with 2,271 degrees. Air Training Command was second, with 1,056 degrees, and Air Mobility Command was third, with 823.



Boeing engineer Mike Taylor examines an antenna panel on the joined wing of the firm's E-X aircraft concept model. The E-X is envisioned as a replacement for the Navy's E-2C carrier-based surveillance aircraft. The joined-wing technology provides full spherical coverage for the aircraft's sensors.

Purchases

The Air Force awarded Martin Marietta a $9 million face-value increase to a firm fixed-price contract for additional spares for the Low-Altitude Navigation and Targeting Infrared for Night pods for use on F-16 aircraft. Expected completion: July 1995.

The Air Force awarded Chrysler Technologies Airborne Systems a $10.6 million face-value increase to a firm fixed-price contract for ten C-27A short takeoff and landing intratheater transport aircraft. Expected completion: September 1993.

The Air Force awarded Sparta Inc. a $5 million face-value increase to a cost plus fixed-fee contract for the High-Energy Railgun Integration Demonstration. The purpose of this effort is to fabricate and test a high-energy electromagnetic railgun. Expected completion: September 1993.

Senior Staff Changes

RETIREMENTS: Gen. Jimmie V. **Adams;** L/G James T. **Callaghan;** B/G James W. **McIntyre.**

PROMOTION: To be Brigadier General: Michael J. **McCarthy.**

CHANGE: B/G Arnold R. Thomas, Jr., from Vice Dir., NORAD Combat Ops. Staff (J-31), Cheyenne Mountain AFB, Colo., to DCS/Ops., 2d ATAF, AAFCE, Rheindahlen, Germany, replacing B/G Lee A. Downer.

SENIOR ENLISTED ADVISORS (SEA) CHANGES: CMSgt. Kenneth C. **Maynard**, to SEA, Hq. AFIC, Kelly AFB, Tex., replacing CMSgt. Robert L. Munns . . . CMSgt. Wayne G. **Norrad**, to SEA, Hq. AFSOC, Hurlburt Field, Fla., replacing CMSgt. James R. Robertson . . . CMSgt. Richard G. **Griffis**, to SEA, Hq. AFSPACECOM, Peterson AFB, Colo., replacing CMSgt. Delamar T. Jones. ■

JOINT STARS— A 21ST CENTURY SYSTEM FOR TODAY'S NATO.

Joint Stars successfully melds airborne electronic surveillance with real-time links to both air and ground forces.
This was emphatically proven in Operation Desert Storm.
Warfighting: Joint STARS can provide fixed and moving ground targeting, as well as low-speed helicopter detection to NATO and/or National Command Authorities and tactical units.
Crisis Management: In times of tension Joint STARS is the rapid deployment solution to deter aggression with its stand-off, non-provocative and multi-mode radar capabilities.
Peacekeeping: Nothing can match Joint STARS' capability to provide non-intrusive, deep-looking, wide-area surveillance data on moving and stationary ground targets. For more information, contact Grumman Melbourne Systems, P.O. Box 9650, Melbourne, FL 32902-9650.

GRUMMAN®

® A registered trademark of Grumman Corporation

The Air Force is drawn down and thinned out but still looking good, thanks to having its act together.

A Sense of Direction

By James W. Canan, Senior Editor

THE AIR FORCE is rounding into shape to take on all comers in an unruly world. It has reorganized its structure and operations more smoothly than might have been expected. It faces the future with its surest sense of direction since the cold war came to an end and change became an unaccustomed way of life.

This is not to say that everything is coming up roses or that Air Force leaders take the future for granted. They acknowledge a wide variety of difficulties and warn that many will worsen if times get tougher at home and abroad.

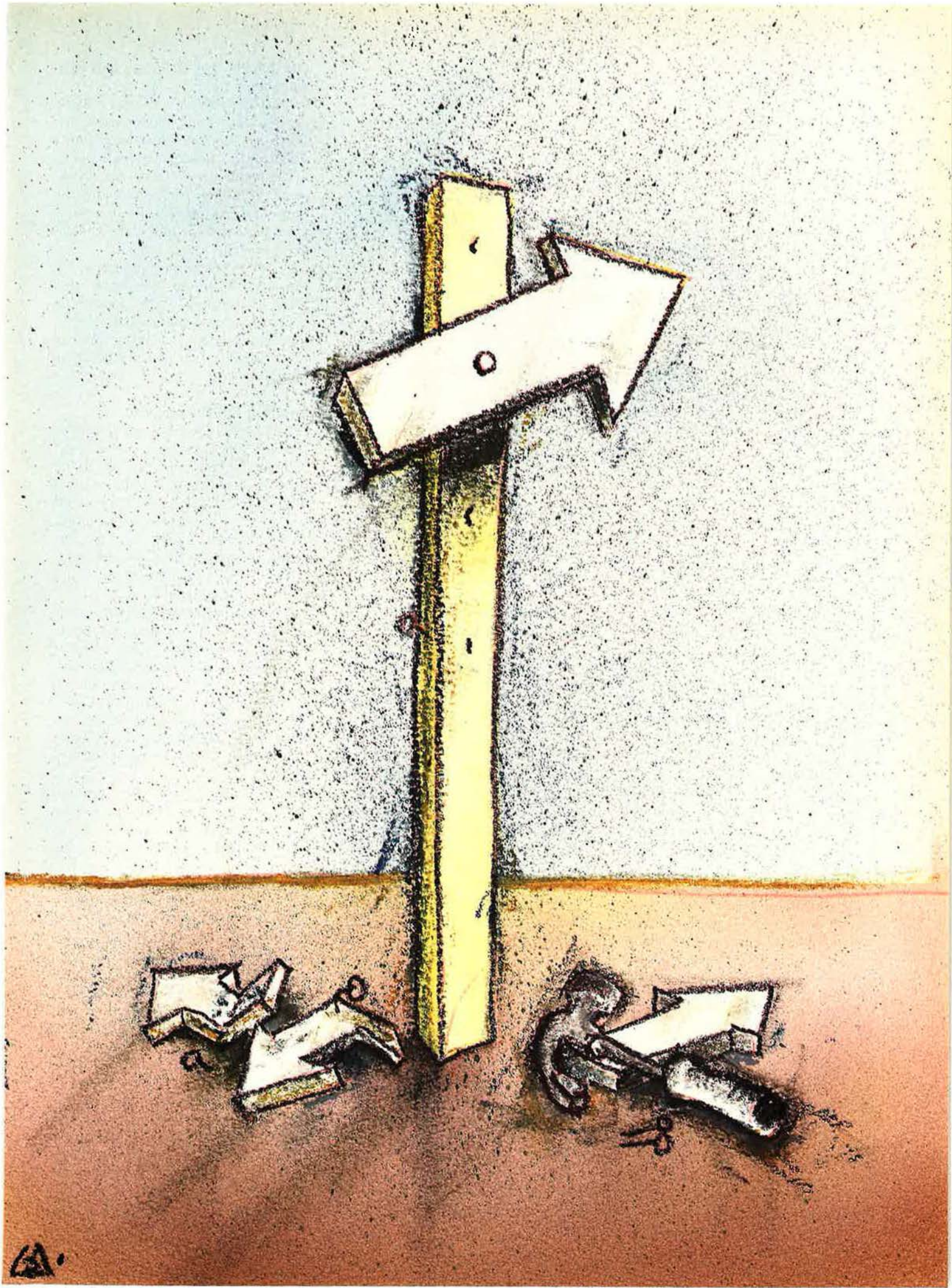
Their message to the nation's political leadership is this: Beware of cutting forces and resources too sharply and too quickly amid wishful thinking that big peace dividends are just around the corner.

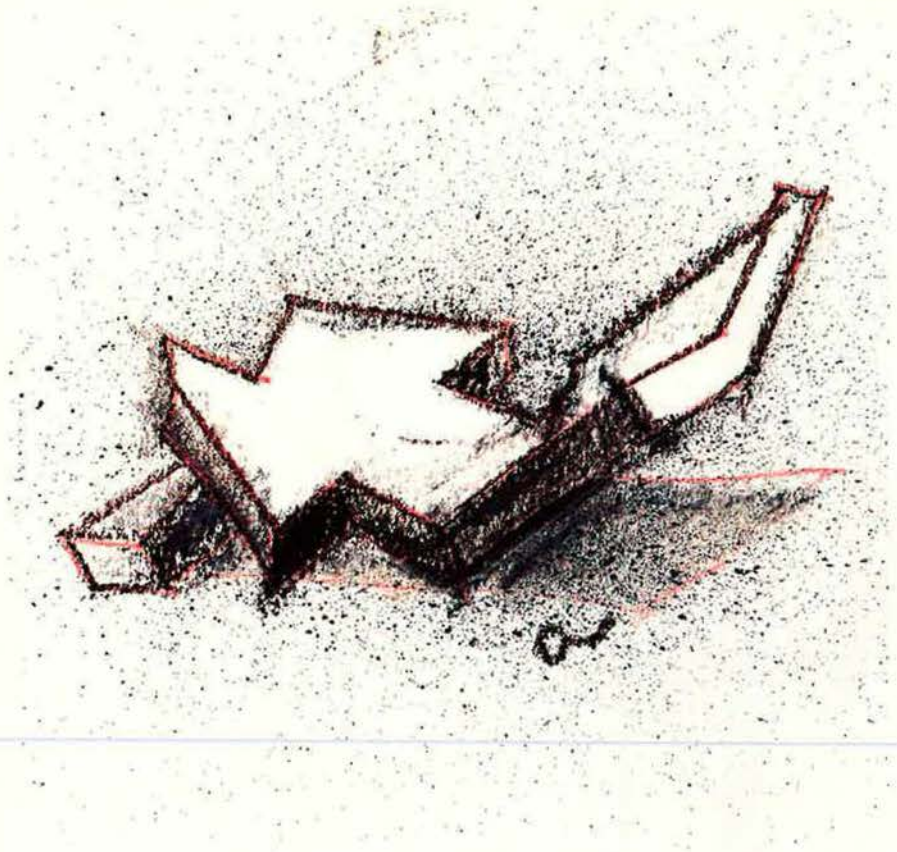
On balance, though, confidence runs high in the new-look Air Force, at least in its upper reaches. Reorganization is a big reason. Begun in mid-1991, it is running its course with the look of a winner. New major commands—Air Combat Command, Air Mobility Command, and Air Force Materiel Command—took hold in a hurry and are creating distinctively new cultures and ways of doing business that are gaining favor.

Such is the situation depicted by Air Force uniformed and civilian leaders at AFA's national symposium "The US Air Force: Today and Tomorrow," held late last year in Los Angeles, prior to the 1992 presidential election. The keynote speaker was Gen. Merrill A. McPeak, Air Force Chief of Staff.

He set the tone: "We know we will get smaller, perhaps a lot smaller, but the objective Air Force—that is, the Air Force we plan to have—will not be simply a miniature version of the cold war Air Force. We have radically reshaped and restyled ourselves."

General McPeak reminded his audience that the mission of the Air Force, as he redefined it last June, is "to defend the United States through control and exploitation of air and space" and that the Air Force is determined to stay on top of that mission.





Smaller but Better

"Watch us," the Chief of Staff declared. "We know what we're doing, we know where we're going, and we know how to get there." He said the Air Force has "an exciting future—a future holding the promise that we can be a better organization, even though we will be smaller."

Besides General McPeak, speakers included Air Force Secretary Donald B. Rice; Gen. Jimmie Adams, commander in chief, Pacific Air Forces; Gen. Charles A. Horner, commander in chief, US Space Command, and commander, Air Force Space Command; Gen. Ronald R. Fogleman, commander in chief, US Transportation Command, and commander, Air Mobility Command; Gen. Ronald W. Yates, commander, Air Force Materiel Command; Gen. James B. Davis, chief of staff, Supreme Headquarters Allied Powers Europe; and Lt. Gen. Steven B. Croker, vice commander, Air Combat Command.

All discussed the moves in their operational spheres to surmount such difficulties as force cuts, budget cuts, flight pay cuts, flight training transitions, "banked" pilots, overseas drawdowns, acquisition uncertainties, and overly expensive, sluggish space-launch operations. All took note of ominous developments around the globe, including numerous small wars verging on larger ones, the spread of nuclear weapons and ballistic delivery systems, the difficulties of the new democracies, and threats galore to US interests.

"In this condition of generalized uncertainty, we cannot know who the next enemy will be," General McPeak told his symposium audience. There is little doubt that the Air Force would have to wage war "at some distance" from the US, he said, and that it must have enough size and strength to steamroll any enemy it may encounter.

How big should the Air Force be? "There is no precisely right answer" to that question, said General McPeak, but circumstances should never be allowed to get to the point where the Air Force must depend on its last squadron to beat the enemy's last squadron in order to win the air battle that decides the war.

"Given a choice, we will opt for short, low-casualty combat, and we therefore need a high-tech force," General McPeak said. "The American people are not likely to support a conflict in which lots of blood is spilled—'ours' or 'theirs'—over a prolonged period. . . . To maintain political support for military action, we will have to win quickly. This drives us to a high-technology force."

The Chief of Staff spoke out strongly against any future move to cut Air Force end strength below the currently projected level. He contended that such a cut could prove fatal. An undersized, high-tech Air Force would be impossible to reconstitute in a hurry amid big losses in full-scale combat, he predicted.

"Leaving aside the problem of the industrial base, the training process alone is enormously time-consuming . . . so we need to maintain a comprehensive, baseline capability that can be expanded if the nation calls upon it," he said.

Leading the Drawdown

"As a service, we are, unfortunately, leading this [defense] drawdown," General McPeak declared. By 1995, he said, Air Force personnel strength will be down by one-third, total budget by forty-three percent in real terms, and investment budget by fifty percent from their peak levels in the mid-1980s. At least twenty-seven major bases will have been closed.

"We are a bargain Air Force these days," he said, noting the cancellation of "lots of strategic programs—SRAM II, small ICBM, Peacekeeper rail-garrison, OTH-B [over-the-horizon backscatter] radar, and many more" and the restructuring of others, including the B-2 bomber, AGM-129A Advanced Cruise Missile, and C-17 airlifter.

Embodying "about one hundred wings," the active Air Force will be less than half as large in 1995 as it was in 1990 when it had 205 wings, the Chief of Staff said. Guard and Reserve wings will number fifty in 1995, bringing USAF's total force number—"our Base Force contribution"—to "150 wings or thereabouts," he said.

"Basically," he continued, "the resources and end strength that produce a given [Air Force] size come from decisions made outside the organization." The Air Force, he said, has "a limited input" in such decisions.

A looming concern for the Air Force in the face of force cuts already in progress is its overabundance of pilots. There are far too few flying jobs to go around. More than 1,000 new pilots have been banked in nonflying jobs until cockpits open up for them. To make room, the Air Force is removing many veteran pilots from cock-

pits and from the service. Despite such juggling, pilot backlogs are building. Pilot recruiting is in low gear.

Having acknowledged all that, General McPeak assured the symposium audience that the pilot problem, though "worrisome," is manageable for now. "I'm reasonably confident we'll be okay unless we get another big chop in force structure," he said. He noted that the Air Force is programmed to level off at a total force of 100 active-duty wings and fifty Guard and Reserve wings in 1995 and said, "If that drops, we'll have additional problems of personnel management across the board in all areas, but the pilot problem [will draw] the most attention."

He continued, "What really caused the pilot problem is the rate at which we're coming down to the Base Force level. I've closed fifty-six squadrons in . . . two years. The pilots from those squadrons [went] into the residual force [and] are occupying all the cockpits that we would normally put our new pilots into. . . . If we had a few more years [in which] to come down to the Base Force size, we would be able to keep some cockpits open out there and continue to train [undergraduate pilots] at a fairly robust rate."

The Chief of Staff observed that the Air Force is turning out new pilots at the "historically low rate, for us" of five hundred a year and that this "constitutes a significant risk." Why? Because, he explained, the Air Force must count on today's pilot trainees to provide combat leadership fifteen years from now, and there may not be enough of them left in the service to fill leadership positions when their time comes to do so.

Not Happy

"It's a worrisome problem to have to drive pilot training down to such low levels, but we must do it so that we can bring [pilots] out of the bank," he declared. "If our force structure gets cut again, following the [presidential] election or at any time in the immediate future, the [pilot] problem will get worse. I would not be happy."

The Chief of Staff said the Air Force is witness to "lots of individual tragedies" in the loss of high-quality officers, NCOs, and enlisted personnel. Last year, he said, USAF had to turn away 1,000 enlisted men and women who tried to reenlist, with the backing of their commanders, following four years of service. He said many of those rejected have found or will find jobs in the civilian sector as a result of their Air Force training but at the expense of other civilians competing for those jobs.

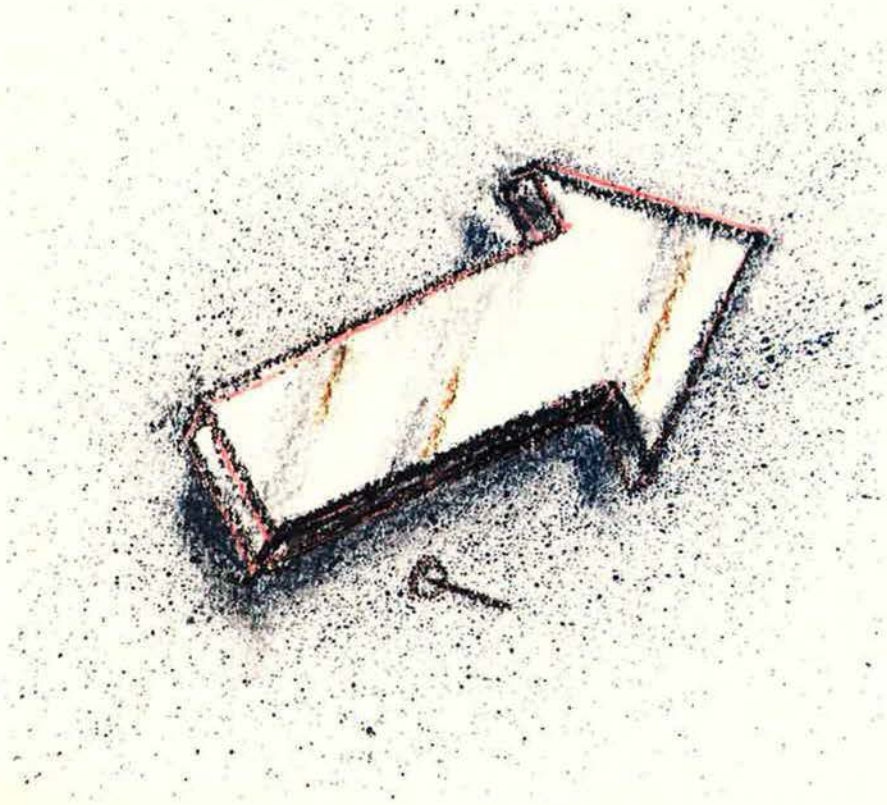
The Chief of Staff counseled against pessimism, assuring his audience that "the objective Air Force will have the capabilities needed to deal with an uncertain world." Despite its difficulties, "this is going to be a fine Air Force, a wonderful Air Force," he said.

ACC's General Croker said USAF's fortunes rest with its new commands. Air Combat Command, Air Mobility Command, and Air Force Materiel Command are the service's chief stewards of change and must "do more than pay lip service to [Air Force] initiatives," he said. "People want to see if we've been paying attention, if this thing called 'global reach, global power' is really going to work."

ACC is hurting here and there. For one thing, General Croker noted, base closures have "thinned out" the command's operations and maintenance funding, leaving much less money to go around and necessitating a morale-threatening three percent cut in flight pay to help make up the difference. ACC is determined not to let O&M slide. "We're trying very hard not to have a hollow force," General Croker declared.

In response to questions, General Croker discussed ACC's role in rearrangements of Air Force training organizations and practices then in the works. He confirmed reports that Air Training Command would be expanded, renamed, and commanded by Gen. Henry Viccellio, Jr., currently the ATC commander.

"We're taking the basic crew training from Air Combat Command and putting it into the new, revised Air Force Training and Education Command," he said. By his account, AFTEC will enfold Air University, the Air Force Academy, technical training, undergraduate pilot training, and fighter and bomber lead-in training. The Air Force's three largest combat crew training units—F-15C/D CCTUs, F-16 CCTUs, and A-10 CCTUs—will transfer from ACC to AFTEC, he said. Smaller CCTUs—those for the F-15E, the B-1B, the B-52, the RC-135, and the U-2—will remain in ACC.



Still Engaged

The ACC vice commander made it clear that ACC will continue to have a big say in all advanced aircrew train-

ing. "Even though the new training command will take over responsibility for our larger CCTUs, we will still have control of the curriculum, the ranges, the doctrine, and the tactics, and we will do all of the follow-on training," he said.

ACC must retain such control to ensure that advanced training programs stay abreast of the fast-changing demands of real-world combat flying, General Croker explained. "For example, during the [Persian Gulf] War, we were changing the curriculum in our lead-in fighter training almost within days of lessons we learned in the war. We want to be able to do that in the future."

When all is said and done, Air Combat Command will retain "about forty-five to fifty percent of the training we do today," the ACC vice commander said.

He emphasized that jointness—joint training, joint operations, joint acquisition—is the order of the day for ACC and the Air Force at large.

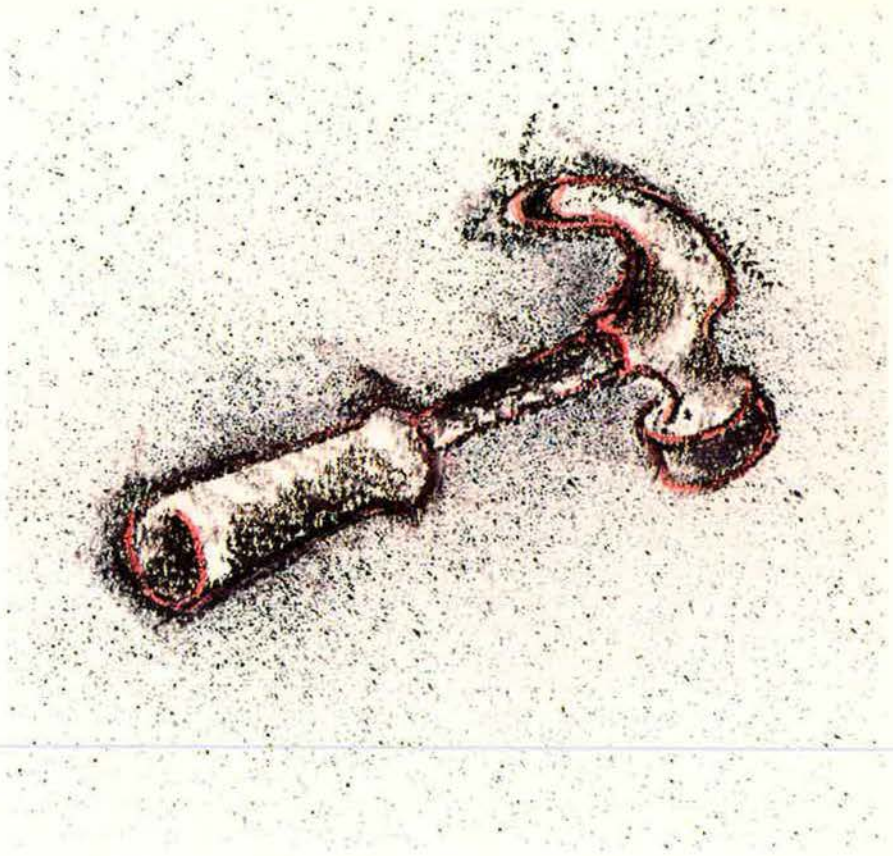
"Power in military circles is transitioning from the uniformed services to the unified commanders," he said. "That's a reality that comes home to us in Air Combat Command every day. If we want something done—if we want to change doctrine, change the way we train and deploy—it is no longer sufficient for us to deal with the Air Staff, the Chief, or the Secretary."

ACC constantly works closely with Navy and Army commands, General Croker noted. "There's a lot going on in the joint world that's completely separate from what's going on in the Air Force itself," he asserted.

General Croker said ACC is "into joint requirements in a big way" for "all new precision weapons," computers, and communications and intelligence gear. He noted that ACC sets requirements for all Air Force combat commands, including USAFE and PACAF, and is intent on "making sure that, wherever possible, we have joint requirements that we can defend."

He pronounced himself "bullish on ACC. . . . Whatever struggles we face in the next couple of years, you'll find us ready, willing, and able to do the job with a smaller but very highly trained and dedicated force."

Secretary Rice made it apparent at the AFA symposium that Air Combat Command would be assigned a different role in the multiservice US military command structure. He told reporters that ACC, now an Air Force major command, likely would become either an Air Force specified command or the air component of a unified command in partnership with the Army's Forces Command (FORSCOM).



The Dominant Player

Dr. Rice also suggested that the Air Force assume command responsibility for space operations now overseen by the other services. "The Air Force plays the dominant role in space programs," he said, "and yet we have three space commands and a unified command." In roles and missions discussions, military leaders "ought to stop and ask ourselves if that's what we want for the future," he said.

Air Force contributions to the long-range mobility of US military forces came in for considerable discussion at the AFA symposium. General Fogleman contended that the Air Force, Navy, and Army mobility commands making up his unified command "will play an ever-increasing role in the military defense of this nation." He gave special attention to his own component command, Air Mobility Command, calling it "the key to employing forces more effectively at greater distances and with fewer casualties."

"Air Mobility Command is the cornerstone of the national military strategy," General Fogleman declared. "It is absolutely vital. This country cannot go to war, cannot respond to a crisis, cannot put forces anywhere on the face of the earth, without Air Mobility Command."

The trouble is that AMC's planes and crews are constantly on the go and are overworked. "Our airlift fleet is tired," he said. "Heavy commitments have taken their toll. We have never had a respite since the [Gulf] War, never had a chance to stand the force down and get it back up to speed."

As a result, he said, AMC has "far too many" C-141s and C-5s in repair depots. AMC's C-130 fleet "is not quite in such bad shape from a maintenance standpoint," but it is made up of "old airplanes, old equipment, old technology" and is "maintenance-intense and crew-intense," he said.

AMC is moving to "give our crews a little slack" in the form of more time off every now and then, he said. The command is also moving to upgrade the C-130 fleet's avionics and cockpit technologies, provide defensive systems, and "generally just sustain the force . . . over the next ten to twenty years," General Fogleman explained.

AMC urgently needs to modernize

its fleet, and that means the C-17, General Fogleman said. He said he flew the C-17 and taxied it extensively to test "its agility on the ground in areas where we have less than optimum infrastructure." He came away convinced that the new airlifter "will do for us what we want it to do."

Nobody Will Back Away

"The issue, of course, is [the plane's] producibility and affordability," the General acknowledged, "but nobody should ever doubt our requirement for the C-17. We absolutely need it. I don't think anybody will back away from it."

AMC's role as the mainstay of global reach becomes all the more important as the US pulls back from overseas. General Davis, addressing the AFA symposium, warned against diminishing the US forward presence in Europe to the danger point.

The US has "brought home from Europe thousands of troops at an ever-increasing rate, and it is unclear where this will stop," said General Davis. He noted that the Fiscal Year 1993 defense authorization bill imposes a ceiling of 100,000 on the number of US forces in Europe by 1996—down one-third from the 150,000 earmarked for Europe under the Base Force concept—and that there is a move "in Washington and elsewhere" to lower the ceiling to 75,000.

Recalling that the US paid a high price in lives and money for its past withdrawals from Europe, General Davis contended that the nation "must resist isolation" and must maintain its military commitment to Europe. "Our Air Force is the key to that commitment," he declared.

General Adams struck the same theme, though less urgently, with respect to the Pacific region. "When we're through with planned reductions, we'll have shrunk by less than fifteen percent of PACAF's cold war strength, compared to a loss of some sixty percent in USAFE," he said. PACAF will be left with "about three and a half fighter wings, roughly equivalent to [USAFE's number]," he said.

"This modest drawdown doesn't alarm me, because it's balanced by the increased mobility and flexibility of our forces," General Adams said. He warned against incautious drawdowns in the future. "Our friends and allies want and need America to stay engaged, and it's in our best interest to do so. We must capitalize on the many opportunities this changing world affords us, especially in the Pacific."

General Horner, who commanded US Central Command's air component in the Gulf War, used the AFA symposium as a pulpit for plain speaking about the problems and promise of his new bailiwick—space. He called for drastic change in the "basic philosophies" and practices of space acquisition and launch operations to make space more responsive and more useful to combat forces in the fight.

"We are at a turning point with regard to space," he declared. "We have to change the way we do business. In the past, we designed a satellite, we designed and built a vehicle to launch it, and then we designed a control facility to control it. In the future, we have to take a look at our customer needs, at the environments [a space] system will have to work in, and at what's available to put it in space and then design the satellite—a complete turning upside down of how we did business in the past. We cannot start with the satellite and the launch vehicle and then go to what it takes to do the job."

Harsher Demands

US space systems for navigation, communications, weather forecasting, early warning, and intelligence performed handsomely in the Gulf War, General Horner said. He warned, however, that a future war, perhaps out of the blue, could make much harsher demands on space systems and operations.

The USSPACECOM commander in chief proposed standardizing the design and construction of each type of satellite instead of custom-building every new satellite. He also proposed integrating the individual control systems for each type of satellite into a standard control system for all types; delivering space payloads and delivery systems to launching pads ready to fly, instead of mating them and making final adjustments, such as trying out solar panels, on the pads; putting uniformed personnel rather than civilian contractors in charge of launches; and using more enlisted men and women, and fewer officers, to monitor satellite operations in space.

"We spend too much on our launch [and] on our control, and I will . . . try to get those costs down," General Horner said. A launch delay costs "millions of dollars," and "only four percent of all our scheduled launches were on time" in the last two years, he said. He also noted that it costs $12,000 to $16,000 per pound on the average to launch a US payload, compared to $8,000 a pound for a French payload and $4,000 for Chinese or Russian payloads.

The US space control network "is across the globe and expensive," he said. "We have to get a handle on it. We need to get rid of these overseas sites, and we can do that with satellite cross-linking."

General Horner offered an optimistic outlook, emphasizing that space operations, despite drawbacks, have become indispensable to US military readiness and warfighting prowess and are in high favor with the CINCs and the services. "Space is truly a growth industry," he asserted.

In his symposium address, General Yates made it clear that Integrated Weapon System Management (IWSM) is Air Force Materiel Command's master key to a successful future. "For the first time, we are integrating research, test, evaluation, development, acquisition, and logistics," he explained.

"Next year," he said, "we'll have 450 programs in IWSM," including the F-22 and B-2 programs. He explained that IWSM programs are built around integrated product teams that "streamline the management process and speed up the development process" in any number of ways. IWSM, he said, "breaks down barriers between acquisition and support" that at times obstructed cooperation between the two commands—Air Force Systems Command and Air Force Logistics Command—that merged into AFMC.

General Yates said IWSM offers contractors and users "a consistent set of practices and a single focal point: a single program director responsible for integrating all aspects of the weapon system throughout its life cycle."

AFMC expects its contractors to respond in kind. General Yates said contractors "will have to form integrated product teams [and] combine the development sides and the support sides" of their companies in order to speak the same language as AFMC and to be eligible for weapon system contracts.

"The payoffs for this are high—better management, better use of resources, greater customer satisfaction, and saving the taxpayers money," General Yates declared. ■

The F-15Cs from Kadena took top honors at the fighter meet, but all contenders looked good.

USAF photo by SSgt. John Lasky

Shooting With Style at William Tell

By Frank Oliveri, Associate Editor

USAF photo by Sgt. Joe Springfield

The William Tell competition had the feel of a sporting event. Above, aircrew members celebrate a successful launch with a high five exchange. Opposite, Capt. Michael Stapleton of the 18th Wing, Kadena AB, Japan, awaits his turn to compete in the skies.

AT TIMES, high-spirited ground crews formed up beside the runway, doing the wave as their fighters accelerated and took off. Others chose to stick close to the flight line, quietly focusing on the demanding technical tasks at hand. Fighter pilots demonstrated a similarly diverse set of styles and attitudes.

For all the stylistic differences, however, the action at the 1992 William Tell competition at Tyndall AFB, Fla., underlined a single truth: When it comes to air-to-air combat, Air Force pilots and ground crews are exceedingly hard to beat.

Take, for example, the kinds of "threats" that the fighter pilots in the competition routinely met and just as routinely defeated. One combat profile called for two fighters to scramble with simulated missiles, take up positions in combat air patrol, and engage and defeat four onrushing "enemy" QF-106 drone fighters, all within five minutes while flying at speeds around Mach 1. That wasn't even the hardest part.

The tasks were equally demanding for ground crews. At the end of each sortie, mechanics had to return their jet to mission capable status within two hours. One day, three of a team's four F-15Cs returned with "hard breaks," mechanical problems that ordinarily would have grounded them for some time. By the appointed deadline, however, all had been regenerated and were gassed up and ready to go.

William Tell is the Air Force's premier air-to-air meet. However, it is more than an occasion for gunslinging, *mano a mano* fighter duels. USAF uses it to assess tactics and weapons and to fine-tune air and support crews. "The key to the competition . . . is that


SSGT ROBERT GREER

USAF photo by TSgt. Dave McLeod

Capt. Matt Fenton of the 33d Fighter Wing, Eglin AFB, Fla., waits in his F-15C to hear if his mission has been scrubbed because of fog. Weather was an obstacle in the early part of the competition.

it peaks performance," said Lt. Col. Dave Deptula of the 33d Fighter Wing, Eglin AFB, Fla. "Anybody participating in this competition . . . does their absolute best to get up to speed in their particular area of expertise. By the end of the competition everybody has earned their Ph.D.s in their respective areas."

The Shoguns Prevail

Eight fighter teams took part in the annual competition, which spanned ten days last October. The teams came from USAF's Air Combat Command, Pacific Air Forces, US Air Forces in Europe, the Air National Guard, and Canadian Forces Air Command. Each team arrived with four primary aircraft and one backup. The USAF units flew in either F-15Cs or air-superiority models of the F-16, which made its first appearance at the biennial William Tell meet. The Canadian aircrew flew CF-18 fighters. The units flew in four dissimilar mission profiles designed to test aerial gunnery, aircraft-missile interface, and area defense skills. The maximum score was 35,000 points.

The 18th Wing, based at Kadena AB, Japan, won the 1992 competition. The F-15C-flying "Shoguns" took first place in two of the four combat profiles. The wing's Capt. Jeffery Prichard took Top Gun honors, and its ground crews won the maintenance team and munitions loading competitions.

If there's a word that describes William Tell, it's "pressure." Pilots begin training for the competition two months early, using about thirty flying days specifically to prepare for the meet. Home units make great sacrifices to give these pilots and crews time to train, which usually proves crucial throughout the competition.

Nowhere is that fact more evident than in Profile I, where a single missed shot could knock a team out of the competition.

In this profile, two fighter elements of two aircraft each fire at a target drone, with each aircraft firing one missile. Within each element, one aircraft must fire a front-aspect AIM-7F/M radar-guided missile at a medium-altitude, maneuvering BQM-34A target drone. The second member of the element fires an AIM-9 heat-seeking missile at the same drone if the first missile hasn't speared it. Once the first element is clear, the second element repeats the actions of the first. Scores are determined through mission tapes and telemetry packages.

Profile II requires two fighter elements to fire their 20-mm cannon at an aerial gunnery target flying about 2,000 feet behind a "towing" aircraft. Each competitor carries 400 rounds. Pilots are graded on how quickly they position their aircraft to shoot the target and how many shots hit the mark. The gun, though one of the simplest of fighter weapons, is among the most difficult to employ. One pilot with the 33d FW, Capt. Brad Olson, said it is "one of the most challenging things we have to do."

Some have questioned the need for guns on modern fighters, but Captain Olson is one of the many fighter pilots who think it is indispensable.

"There are certain times that you are engaging a target and you've got a missile and you're inside the range of that missile," he said. "It's just going to be faster to shoot this guy with a gun. There are lots of variables. You might have shot all your missiles, and there are more coming at you."

Concert of Forces Needed

Profile III, based on a four-vs.-sixteen scenario, requires a concert of weapons, tactics, and actions if a team is to succeed. This, say pilots who took part in William Tell, is by far the most challenging of all profiles. The basic four-ship competition team has to provide area defense against B-1Bs, B-52s, F-111s, ET-33s, and Learjets, which enter the area as part of a mass raid formation. Moreover, sophisticated electronic countermeasures are employed against the defending aircraft.

In Profile IV, two warplanes scramble and take on the four QF-106 aggressors during a period of five minutes, another challenging scenario. To achieve a maximum score, the defenders must defeat the enemy in three minutes and thirty seconds. After the first two-ship element has completed its work, the second element must repeat the performance.

In the latest meet, officials gave the aggressor planes limited offensive capability. If one of the competition planes inadvertently flew into the gunsights of an enemy aircraft, it would be considered shot down.

The enemy planes also employed electronic countermeasures. However, Lt. Col. Bruce Dean, William Tell '92 project officer, said that ECM was deemphasized this year. "Where before we had a very sophisticated advanced threat, there's no one like that now," Colonel Dean said. "So we picked something that is representative of what we think is out there, and we turned the switches down."

Profile III nevertheless provided the greatest challenges for the fighter teams. Each jet in each of the two elements carried four missiles, with the entire four-ship having sixteen missiles to kill sixteen attacking aircraft. The area had to be defended for forty-five minutes.

Top Team (35,000 Possible Points Total)

Unit	Location	Score
18th Wing	Kadena AB, Japan	30,573
1st Fighter Wing	Langley AFB, Va.	29,276
33d FW	Eglin AFB, Fla.	28,964
Canada	CFB Cold Lake, Alberta	27,684
36th FW	Bitburg AB, Germany	27,589
120th Fighter Group (ANG)	Great Falls IAP, Mont.	26,032
125th FG (ANG)	Jacksonville IAP, Fla.	25,715
102d FW (ANG)	Otis ANGB, Mass.	25,338

Profile I

(10,000 Possible Points)

Unit	Aircraft	Score
36th FW	F-15C	9,825
1st FW	F-15C	9,800
Canada	CF-18	9,800
18th Wing	F-15C	9,675
102d FW	F-15A/B	9,600

Profile II

(5,000 Possible Points)

Unit	Aircraft	Score
120th FG	F-16A	2,382
36th FW	F-15C	1,964
18th Wing	F-15C	1,778
33d FW	F-15C	1,674
125th FG	F-16A	1,560

Profile III

(10,000 Possible Points)

Unit	Aircraft	Score
18th Wing	F-15C	10,000
33d FW	F-15C	10,000
1st FW	F-15C	9,300
36th FW	F-15C	9,300
125th FG	F-16A	9,300

Profile IV

(10,000 Possible Points)

Unit	Aircraft	Score
18th Wing	F-15C	9,120
1st FW	F-15C	8,820
33d FW	F-15C	7,840
Canada	CF-18	7,310
36th FW	F-15C	6,500

Weapons Director Team

(10,000 Possible Points)

Unit	Score
1st FW	9,325
Canada	9,000
18th Wing	8,950
120th FG	8,500
33d FW	8,450

Maintenance Team

(4,000 Possible Points)

Unit	Score
18th Wing	3,927
33d FW	3,917
102d FW	3,915
120th FG	3,881
36th FW	3,872

Munitions Load Team

(3,000 Possible Points)

Unit	Score
18th Wing	2,760
1st FW	2,630
102d FW	2,600
125th FG	2,560
Canada	2,560

USAF photo by SSgt. John Lasky

SSgt. Ronald Andrews and TSgt. James Williams of the 18th Wing review last-minute details. The Kadena wing won top honors in munitions and maintenance and fielded the overall top team, which scored 30,573 of 35,000 possible points.

Colonel Deptula described his unit's engagement this way: "We're defending or we're searching a piece of airspace that's 100 miles long by fifty miles wide—5,000 square miles of airspace. At the back end of this airspace, ninety miles deep, is a line called the bomb release line. The adversaries [are] allowed to come in anywhere within this fifty-mile stretch to the east at any aspect, any altitude, and attempt to get to the bomb release line.

"It's not just a targeting problem, it's also a weapons management problem, so everybody's got to employ each one of their missiles. It has to be exactly correct."

His unit, Colonel Deptula said, "divided up the airspace. We established a reference point right in the middle of the area. We had two single-ship CAPs splitting the airspace forty miles

USAF photo by SSgt. John Lasky

Guard and Reserve forces gave a good accounting of themselves at William Tell. Here, top shooter Capt. Duane Kautzmann of the 120th Fighter Group (ANG), Great Falls IAP, Mont., prepares to strap on an F-16A prior to his mission.

from the eastern boundary, and we put those CAPs in the 15,000- and the 19,000-foot block. Then, in the rear CAP, back orbiting between eighty and sixty-five nautical miles from the eastern edge of the airspace, we had two aircraft in what we call counter-rotating CAPs. So one aircraft is always looking to the east to provide area coverage, while the other is going back to maintain CAP."

Catching Leakers With Goalies

The basic philosophy behind the formation was that the fighters in forward positions would cover low-flying attackers and those in the rearward CAP would focus on supersonic targets above 20,000 feet and any leakers. Colonel Deptula referred to the rear aircraft as "goalies."

"This," said Colonel Deptula, "was a lot more challenging than what we had practiced for, simply because of the type of adversaries. At one time we had all four of us committed on separate targets, with two more coming into the airspace, so it got quite busy."

The greatest challenge to the fighters came from the swift B-1B bomber. The competition controllers frequently sent two of the big aircraft screaming into the vulnerability area on both edges of the airspace at very low altitude at near supersonic speeds.

"They added a degree of realism that we had never seen," said one pilot. "The B-1 was most impressive down at low altitude and high speed, but again we managed to intercept them."

Several fighter pilots said they had to make supersonic runs at about 10,000 feet to catch the B-1s—a move, said one, "that tends to suck up some gas." Enemy targets came into the area throughout the full forty-five-minute duration of the profile, intentionally adding fuel managment to the profile problems.

Capt. Bob Hartwig, a Desert Storm veteran with the 1st Fighter Wing, Langley AFB, Va., said that Profile III would be a realistic scenario for a war in Europe against a numerically superior foe, such as the old Soviet Union. "That didn't happen against Iraq, but it could happen," he said, adding that Air Force units are training for that challenge.

The enemy's ECM in Profile III was effective, according to Maj. Mitch Fryt of the 1st FW, who nevertheless noted that "we killed them all." Capt. Rod Zastrow of the 1st FW said that his F-15C handled the ECM well. ECM made the digital radar screen in his fighter "look bad." However, with some self-adjustment and some help from the pilot, the radar system overcame the jamming, and each adversary aircraft was downed.

Long Days for Maintainers

Men and women of combat service teams, maintenance crews, and weapons loading units are the foundation of fighter operations, often putting in twelve- to sixteen-hour days to keep fighters operational with judges watching over their shoulders. Competitions are often won and lost on the flight line.

Combat servicing crews are tested in the Integrated Combat Turn (ICT) and the static load competition. Maintenance crews are evaluated on sortie generation and regeneration, appearance, technical data, and the condition of their equipment, among other things.

For William Tell, each participating unit brings its best workers to-

USAF photo by SSgt. Lemuel Casillas

Ground controllers from the 475th Weapons Evaluation Group, Tyndall AFB, Fla., worked feverishly to track the range during William Tell. The synergy of ground and air complements was evident on the winners' board.

gether. Often crew members don't know each other until they begin training together. Working seventy-hour weeks helps weld the team together as a unit, fostering *esprit de corps*.

"There are back shops and front shops, and there's the line," said SSgt. James Wilkerson, a launch assistant with the 18th Wing. "When you come together at William Tell, you bring all those people together. Of course you're going to fight like cats and dogs, just due to the pressure."

Following a sortie, mechanics must return the aircraft to mission capable status within two hours. One day during the competition, the 18th Wing came up with three problem aircraft. One had a hydraulic failure, another an engine problem, and the third a radio failure. "We've got two hours after they are chocked to gas them and preflight them," said TSgt. Tim Birrenbach, the crew chief. "We troubleshot them, got parts over there, and did removal and replacement. The pilots worked with us. They did the ops checks. They checked out good. We were able to regenerate the aircraft. Otherwise we would have been out of the maintenance competition."

In the ICT, what normally takes forty-five minutes was getting done in twenty-three minutes, and the static load was being cut from ninety to fifty-five minutes. Judges observe and score the team on every move. Each procedure has some 500 steps that must be taken in sequence. One small mistake could easily snowball into serious problems. The pressure is evident in the faces of the crew members as the rest of the team cheers them on.

USAF photo by SrA. Jason Petrillo

This F-15C came from the 36th Fighter Wing, Bitburg AB, Germany, to Tyndall for William Tell. The wing won Profile I and boasted high scores in other competition areas. There were no real losers in the exercise, but the Air Force surely won.

Weapons director teams face tremendous scrutiny. Each starts the competition with 10,000 points and loses points if it makes mistakes, such as relaying faulty data to pilots or using incorrect radio procedures. The teams also must monitor air combat and warn pilots of bandits coming into an area.

A1C Jennifer O'Brien from the 18th Wing said that while the experience was trying at times, she wouldn't have missed it. However, she wouldn't want to do it again "unless we could work with the same group of people."

As a result of the intense training and even more intense flying and flight-line activity, pilots and ground crews gain confidence, proficiency, and grace under pressure. Pilots and maintenance personnel all must draw up a report on the lessons they learn at William Tell. That information then is spread throughout home units.

"The endgame result," said Colonel Deptula, "is that the performance of the entire wing is lifted up a notch."■

Top Two-Ship (17,500 Possible Points)

Crew	Unit	Aircraft	Score
Capts. Jerry D. Kerby and Thomas W. Bergeson	33d FW	F-15C	15,328
Capts. David R. Uzzell and Brian Kamp	36th FW	F-15C	15,193
Maj. Marcel Major and Capt. Pierre Morissettee	Canada	CF-18	14,800
Capts. Rod Zastrow and Robert C. Hartwig	1st FW	F-15C	14,271
Lt. Col. David Deptula and Capt. William Olson	33d FW	F-15C	13,636

Top Gun (10,000 Possible Points)

Crew	Unit	Aircraft	Score
Capt. Jeffery Prichard	18th Wing	F-15C	8,266
Capt. Jerry D. Kerby	33d FW	F-15C	7,922
Capt. Thomas Dean	18th Wing	F-15C	7,800
Capt. Biff Mott	1st FW	F-15C	7,642
Capt. Rod Zastrow	1st FW	F-15C	7,551

Top Shooter (1,250 Possible Points)

Crew	Unit	Aircraft	Score
Capt. Duane Kautzmann	120th FG	F-16A	846
Capt. Jeffery Prichard	18th Wing	F-15C	766
Maj. Michael McDonald	120th FG	F-16A	760
Capt. David R. Uzzell	36th FW	F-15C	754
Capt. Douglas Ray	102d FW	F-15C	630

It didn't settle the issues on women in combat, but it did sharpen and define them for the continuing debate.

What the Herres Commission Found

By John T. Correll, Editor in Chief

In the end, the Herres Commission on women in combat did not settle very much, and it satisfied almost nobody. Partisans on both sides started blasting the commission's report well before it was turned in November 15.

Hard-line conservatives said the report went too far in recognizing circumstances in which women might be assigned to combat. Feminists said the Bush Administration had stacked the commission with conservatives whose verdict was predetermined.

Read closely, however, the 377-page report is more informative than the detractors have pegged it. The opinionated parts are easy to identify, and there is a wealth of well documented data. In their own way, the stark disagreements in the report are also useful. They help define the specific questions on which the continuing debate will center.

The President's Commission on the Assignment of Women in the Armed Forces, chaired by Gen. Robert T. Herres, USAF (Ret.), spent eight months studying the issue last year. It heard testimony from 300 witnesses, conducted several opinion polls, and received more than 11,000 statements and letters.

The fifteen commissioners found virtually nothing on which they all agreed. A strong majority felt that women should be excluded from ground combat. It was by a margin of only one vote, however, that the commission said women should not fly aircraft on combat missions. In another close vote, the commissioners proposed repealing legislation that bars women from combatant ships.

Five conservative panelists walked out and demanded the inclusion of a chapter written by them, "The Case Against Women in Combat," in the final report. They got their chapter—labeled an "alternate view"—but a hefty number of other dissenting opinions were included, too.

Four of the commission's six flag officers—including General Herres—signed a statement dissenting from the recommendation that women should be excluded from combat aircraft.

Values and the "American Experience"

The commission decided that the "American experience," a combination of military, religious, and cultural traditions, "does not preclude assigning capable women to direct

Split Votes on Major Issues

Not all of the fifteen commissioners recorded a vote on every issue. Here's how they voted on the critical half dozen questions that commanded high public interest. Votes are given in Yes-No-Abstain order.

- There are circumstances when women might be assigned to combat: 8-1-1
- Women should be excluded from ground combat: 10-0-2
- Women should be excluded from combat aircraft: 8-7-0
- Repeal legislation excluding women from combat ships: 8-6-1
- When physical strength and endurance are relevant to performance, men and women should meet the same standards: 14-0
- Women should not be required to register for the draft: 11-3-0

USAF photo by SSgt. F. Lee Corkran

combat positions for which they are qualified." It noted that "American history is replete with examples of women defending the nation with courage and dedication." It also recognized the strength of the argument for "selecting the best qualified person for a position, regardless of gender."

Opinion polls conducted for the commission found the public divided almost evenly on the question of women in combat generally and in agreement with the idea of women serving in some combat roles. "A majority of the commissioners believe that under some circumstances, American society not only allows, but actually encourages and approves, the further integration of women into combat roles," the report said.

The conservatives on the panel declined to vote on this issue and put their blistering response in the "alternate view" chapter of the report. "The assignment of women to combat could be justified *only* in the most dire emergency where the nation's very survival is at risk and there is no reasonable alternative," they said.

They charged that the proponents of women in combat are basically arguing an equal opportunity case that has nothing to do with military requirements. Furthermore, they said, the use of women in combat is contrary to "deep-seated cultural and family values" that can be expressed as, "Good men respect and defend women."

As the commissioners turned to specific areas of combat, they considered not only the ability of women to perform but also the consequences of their doing so.

Standards and Strength

In a rare moment of accord, the commission said that, when strength and endurance are important to performance, standards should be the same for men and women. The commission suggested that the services set specific requirements for those specialties where muscular strength, endurance, and cardiovascular capacity are relevant.

Medical testimony confirmed the obvious: Most men are bigger and stronger than most women. That was a major reason for the finding that women should be excluded from four specialties (infantry, armor, artillery, and combat engineers) in which troops must be prepared for direct, close-quarters combat. A few women—but only a few—are physically qualified for the constant exertion in these specialties or for the hand-to-hand fighting, digging, lifting, carrying heavy loads, and other tasks the commission said were central to ground combat.

Adding to the conclusion that "the case against women in ground combat is compelling and conclusive," the commission said, are the forced intimacy and lack of privacy on the battlefield and the risk of capture by an enemy that may not abide by the Geneva Convention in the protection it provides for prisoners of war.

"During our nation's major wars in this century, except Vietnam, the number of POWs has been greatest from the ground forces," the report said.

Unit Cohesion

The issue of women in ground combat is further compounded, the commission held, by a host of considerations that bear on unit cohesion.

In their deliberations on both ground and air combat, the commissioners were confronted constantly by the question of how the assignment of women might affect cohesion. The prevailing opinion was that women would have an effect—probably negative—on unit

cohesion, which derives from such factors as common values and experiences, shared norms, and mutual dependence and confidence.

In a Roper poll of the armed forces done for the commission, forty-one percent of the respondents predicted that changing current policies would damage unit cohesion. The concern is most pronounced among military members serving in combat specialties.

Navy Lt. Tom Downing told the commission that "there are women out there who can fly the jets" and that some of them "can lift more weights, maybe pull more G than I can," but that the net effect on unit cohesion would be to degrade combat effectiveness.

Those who disagreed point out that such judgments are only speculation. Since women have not been assigned to combat units, there is no real evidence of what the effect would be.

In their minority statement, General Herres and six other commissioners cited data from the integration of noncombat aviation units with demanding missions. They said that the data showed that "cohesion either remained at the same level as in the all-male unit or improved after the entry of women into the unit."

They added that "the concern for cohesion voiced by fighter pilots who testified before the commission came overwhelmingly from young, inexperienced pilots" and that "the three experienced Navy and Air Force combat Vietnam veterans who appeared before the commission [USAF Brig. Gen. Lloyd W. "Fig" Newton, USAF Maj. Gen. Bob Dempsey, and Capt. Rick Hauck, USN (Ret.)], and who between them flew over five hundred combat missions, agree that the exclusion should be lifted on combat aviation."

Women in Combat Aircraft

The next round of debate about women in combat will almost certainly concentrate on combat aircraft. In December 1991, Congress repealed a law that restricted the assignment of women in the Air Force.

The commission said the law should be reinstated, but that recommendation carried by a single vote. Gen. Colin Powell, Chairman of the Joint Chiefs of Staff, said publicly that he did not believe that this finding would "hold water" and that the exclusion of women from fighter aircraft and attack helicopters in combat needed "another look."

Cultural judgments aside, the air combat question comes down to two issues: unit cohesion and the effect of women being held as prisoners of war. Few witnesses doubted that women could operate the aircraft, and the scientific evidence says women handle G-force pressures as well as men do.

Commissioners expressed concern not only about the suffering of women who might be shot down and captured but also about the demoralizing effect on male prisoners and the American public. "The record of brutal treatment of POWs at the hands of the Vietnamese is incontrovertible," the report said. "Iraq mistreated male POWs and indecently assaulted one US woman POW."

General Herres and those signing the minority report on combat aviation noted that the commission had heard testimony from the assaulted officer, Maj. Rhonda Cornum, and that the nation, as well as Major Cornum and a female NCO who was also captured, "survived their ordeal, with no evidence that their capture was a greater threat to national security than the capture of the men who were with them."

On Combatant Ships

Feminists hailed the decision concerning combat ships as their single "victory" in the report. A narrow majority of the commissioners thought women should be allowed to serve on combat ships, the exceptions being submarines and amphibious assault vessels.

Women have served on Navy tenders and service craft since the 1970s. More recently, they have been assigned to combat logistic force ships and training frigates. The Navy has accumulated more than fourteen years' worth of data, incorporating the experiences of some 40,000 women on sixty-six ships. "There are few physical differences between combatant and noncombatant ships in relation to physical strength tasks, with the possible exception of the flight decks of aircraft carriers," the commission said.

The report acknowledged the risk and hardship of sea duty but said the performance of female sailors on noncombat ships was "a major factor in the commission's recommendation supporting opening combatant ships to women" and "the commission believes that women are well qualified for sea service."

The conservative minority declared this finding inconsistent with the recommendations to exclude women from ground and air combat and said the basic arguments "are equally valid with respect to combatant vessels."

The Opinion Polls

There was no shortage of opinion on the subject of women in combat. In

Women in the Force

(as of March 31, 1992)

The Herres Commission noted the number of women serving on active duty in the armed forces as well as the fact that about 6.8 percent of US forces deployed to the Persian Gulf during Operations Desert Shield and Desert Storm were women. "Among other specialties," the commission observed, "women flew reconnaissance aircraft and helicopters, drove supplies and equipment into Kuwait, brought enemy prisoners of war back into holding facilities, and commanded brigade, battalion, company, and platoon-sized units in the combat support and combat service support areas."

	Number of Women	Percentage of Force
Air Force	70,917	14.4
Army	76,887	11.6
Navy	54,849	10.0
Marine Corps	8,643	4.5
Total active-duty	211,296	11.2

addition to the views of witnesses called and those interviewed on fact-finding trips, letters of comment flowed in by the thousands.

The commission chartered two opinion polls—one of the American public and the other of military members—by the Roper organization. It also mailed questionnaires to 6,109 retired flag and general officers, of whom 3,224 replied.

Results of the armed forces survey are reported in the box at right. Generally, the Roper polls found the American public more open than military members were to the idea of assigning women to combat. Forty-seven percent of the public (compared to fifty-seven percent of the troops) favored keeping the current exclusionary policies. Forty-four percent said the policies should be changed.

A majority of the public, however, said women should have the option to volunteer for some combat specialties. Fifty-three percent supported such an option for combat aircraft, and fifty-one percent agreed in the case of combat ships. A surprising forty-five percent believed that women should be able to volunteer for ground combat.

The response of the retired generals and admirals was a thundering rejection of assigning women to combat. Ninety percent said women should be excluded from the infantry, and seventy-one percent were opposed to their assignment to fighter and bomber aircraft.

The report notes a correlation, however, between the opinions of the generals and admirals and the duration of their retirement. Of those retired for thirty years or more (132 officers replying), seventy-six percent oppose the assignment of women to fighters or bombers. Among those who retired since 1990 (213 officers replying), the negative response declines to fifty-six percent.

What the Troops Said

The Herres Commission considered several opinion polls, including a Roper poll conducted to determine the views of military members in the four services, the Guard, and the Reserve. On the most basic question, fifty-seven percent of the troops agreed with existing policies excluding women from combat. Among military people now serving in combat specialties, the position was stronger. Seventy-two percent of them agreed with current policies.

Putting the question another way, however, drew a different reaction. Only a minority of the troops said women should be barred from combat *if they volunteer for it.* A substantial minority of those polled thought women should be *required* to accept combat assignments.

Believe women should be able to volunteer for:

Combat aircraft	43%
Combat ships	39%
Ground combat	30%

Believe women should be required to take combat assignments in:

Combat aircraft	43%
Combat ships	30%
Ground combat	19%

Believe women should not be assigned to:

Ground combat	49%
Combat aircraft	30%
Combat ships	29%

On the specific issue of women flying combat aircraft, the Roper poll found the opposition strongest among pilots, sixty-nine percent of whom were opposed. The opposition was highest among Marine Corps pilots, lowest among Navy pilots.

Marine Corps pilots	75% opposed
Air Force pilots	72% opposed
Navy pilots	57% opposed

The Air Force Personnel Survey Branch polled combat aviators (those assigned to fighters, bombers, and special operations) about the same time and also found a majority against women in air combat—but by a different percentage. Sixty-one percent were opposed, twenty-seven percent were in favor, and twelve percent said they had no opinion.

International Perspectives

Finally, the commission studied the experience of other nations that have opened combat specialties to women. Contrary to a popular misconception, Israel is not one of those nations.

Israeli women are subject to a military draft, and about seventy percent of them serve two-year tours in the armed forces, but they are not assigned to combat. They are further restricted from combat support and other duty, including service as drivers, which would require direct contact with forward units in time of war. Some women had combat roles in Israel's fight for independence, but none has been assigned to such a position since 1948.

Six nations (Belgium, Canada, the Netherlands, Norway, Spain, and Britain) currently have legislation that permits women to fly combat aircraft. In all, six women have been qualified for such duty under that legislation, and two (one in Canada, one in the Netherlands) were on flight status at the time of the commission's inquiry.

In the past ten years, Britain, Canada, Denmark, and the Netherlands have opened many or all of their ground combat specialties to women. These nations have found it difficult to attract or retain women for ground combat units in any significant numbers. ■

Potential customers for the Russian bomber include Iran, China, India, and North Korea.

Backfire Goes to Market

By Bill Sweetman

Staff photos by Guy Aceto

Russia's swingwing Tu-22M-3 "Backfire" bomber made its first appearance in the West at the 1992 Farnborough Air Show in England (above) and quickly drew crowds of highly curious onlookers (opposite). An export model is being developed for such prospective customers as Iran and China.

THE LATEST addition to Russia's military export catalog is the Tu-22M-3 bomber, known to NATO as "Backfire." Russian officials at the Farnborough Air Show, where the bomber made its first appearance in the West, confirmed that the plane has been cleared for export and that an export model is being developed.

Emerging regional powers, such as Iran and China, are considered the most likely customers. Information released at the air show underlines that the Backfire is a regional-strategic weapon, one that could inject a dangerous new long-range strike capability into the world's most explosive regions.

The Tupolev Design Bureau gives the Tu-22M's high-altitude combat radius as 1,370 miles. This is lower than most estimates and, in all likelihood, refers to the bomber's performance with a maximum weapon load, thought to be about 53,000 pounds of bombs. Though the bomber has a greater range than any variant of the Scud missile and packs fifty times its firepower, it is not covered by international arms limitations.

Russia's announcement that the Tu-22M is available for export has generated scant comment. However, the controversy that has always surrounded this warplane seems sure to reignite when it first appears in non-Russian markings and the world recognizes it for what it is—a new class of regional threat.

The Soviet Union once sold small medium-bomber fleets to a number of

its allies, including Libya and Iraq (Tu-22 "Blinders") and Egypt and Indonesia (missile-carrying Tu-16 "Badgers"). There is no evidence that any have served a militarily useful purpose, though Libya sent Tu-22s against Chad and Iraq used Blinders against Kurdish targets.

Compared to the older, nuclear-optimized bombers, however, the Tu-22M-3 is much more flexible and survivable, having been developed from the ground up for multiple conventional and nuclear missions.

Deliberate Deception

In the mid-1960s, the USSR began developing the original-model Tu-22M to replace its Tu-22 Blinder. The two aircraft have nothing in common, despite their similar designations. Tupolev officials say that the designation Tu-22M was chosen to indicate that the new plane was to perform the same missions as its predecessor and thus was not a new intercontinental-range bomber.

The first two versions—the prototype Tu-22M-0 and the preproduction Tu-22M-1—used some of the same avionics and systems as the Tu-22 Blinder. As was their normal practice, the Soviets used a single squadron of Tu-22M-1 (Backfire-A) bombers for service tests. The Tu-22M-2 Backfire-B was the first version to be produced on a large scale.

The aircraft sparked intense controversy in the Soviet-American arms-control negotiations of the 1970s. Major disputes arose between Washington and Moscow, and even within the US defense and diplomatic community, as to whether it was a strategic weapon *[see box on p. 46]*. Ultimately, its status was defined and governed by informal understandings between the two countries. The Soviets said (without signing any documents) that they would build no more than thirty Backfires per year, blank off the refueling probes of in-service aircraft, and install no cruise missiles with ranges greater than 600 miles. The US agreed not to count the Backfire as a strategic weapon so long as those conditions were met.

By 1985, Tupolev had delivered 145 Tu-22M-2s to Soviet Air Forces and 105 to Soviet Naval Aviation. After 1984, the current Tu-22M-3 Backfire-C replaced the Tu-22M-2 on the production line.

With its big wedge-shaped engine inlets, long slender nose, and squared-off body, the Tu-22M strongly recalls the US Navy's Rockwell A-5 Vigilante attack and reconnaissance aircraft. The forward fuselage accommodates the crew and avionics. Its smooth taper and low-profile, sharply raked windshield show that low transonic and supersonic drag were important concerns at the design stage.

The four crew members sit in two compartments. They enter the aircraft fighter-style through access-and-ejection hatches in the roof. There is no room for crew to change positions or to rest, as there has been on every large US bomber except the B-58. The small windows are fitted with sliding metal nuclear flash blinds.

The forward and center fuselage sections hold the fuel and weapons. These sections taper back to a structural keel between the engine tunnels. The root of the vertical fin is extended forward and thickened to accommodate the auxiliary power unit-starter and the defensive gun turret.

This Russian bomber is unique among large aircraft in being put together like a fighter, with engines in the rear fuselage and inlets placed well forward. Bomber engines are usually mounted externally or buried in the

Photo © Hans Halberstadt / Arms Communications

A Tu-22M bomber like this one, armed with Kh-22 "Kitchen" air-to-surface missiles, was displayed at an air show near Moscow as part of Russia's marketing campaign, which has made no secret of the Backfire's attributes and capabilities.

wings, leaving the entire fuselage for the crew and the disposable load of bombs and fuel. In the Tu-22M, there is practically no room for fuel or weapons aft of the wing trailing edge. Because of trim and balance requirements, this limits the disposable load that can be carried forward of the center of gravity and also limits the bomber's range.

The Swingwing Difference

Like the near-contemporary Air Force F-111 fighter-bomber and B-1 intercontinental bomber, the Tu-22M-3 uses swing wings to obtain good aerodynamic performance over a wide range of flight conditions, including supersonic speed at high altitude; medium-altitude, subsonic cruise; and takeoff and landing.

Engineers note that, when it comes to designing swingwing aircraft, the most basic requirement is to select the size of the moving wing panels relative to the fixed center section.

The ability to move a large part of the wing, which the B-1 also has, provides the greatest performance benefits but also raises major technical problems. Among these are the need to deal with massive loads on the wing pivots and substantial shifts in the aircraft's balance with every changing sweep of the wing.

Tupolev's designers elected to avoid those problems. They located the wing pivots well outboard, used a very large fixed glove, and gave the plane a moderate maximum sweep angle of sixty-five degrees. These factors, combined with a strong taper and twist on the outer wing, means that the flying qualities and trim change very little with changes in the sweep angle.

The wing design allows the Tu-22M to use conventional wide-track landing gear and to carry a remarkably large load of weapons. When Western analysts first saw the plane in the mid-1970s, they detected only one visible stores location—the weapon bay, which has fore and aft extensions with inward-opening doors so that a single Kh-22 (NATO designation AS-4 "Kitchen") air-to-surface missile can be recessed into the belly.

In NATO-observed exercises in 1978, the Tu-22M-2 was seen to have a large, nine-point multiple ejector rack (MER) beneath each inlet duct. In the mid-1980s, Soviet Navy Tu-22M-2s were seen to have a Kh-22 pylon under each fixed wing section.

All these stations can carry at least 10,000 pounds of weapons, but, with all of them loaded, the Tu-22M-2 would have had a lower thrust-to-weight ratio than a fully laden FB-111. A rule-of-thumb comparison with other aircraft indicates that, if the Backfire-B suffered an engine failure while fully loaded on a hot day, it would be in serious trouble.

Moreover, the drag of the external stores would have meant less-than-impressive speed and altitude performance on military power. For example, the FB-111 cannot exceed 14,000 feet on military power with its theoretical full load of iron bombs.

A More Powerful Engine

This is probably why the Tu-22M-3 was introduced. Tupolev officials report that practically the only difference between the two aircraft is that the new version has a much more powerful engine, with the engine inlets being redesigned in consequence. The variants of the Tu-22M family all are powered by Kubyshev (formerly Kuznetsov) low-bypass turbofan engines. The engines used on the first three variants were rated at 44,000 pounds of thrust, but the Tu-22M-3 is fitted with two 55,000-pound-thrust NK-25 engines. They increase thrust by twenty-five percent and give the Russian bomber nearly as much installed thrust as the much heavier USAF B-1 bomber.

Tupolev brochures claim that the Tu-22M-3 can carry a 53,000-pound weapon load. Those who have studied the aircraft say that the only way it can do this is to load each of its four hardpoints with a big MER, each of which would carry nine FAB-500 1,100-pound bombs, and then load six 2,200-pound bombs inside the bomber. The configuration resembles the "Big Belly" modification of B-52Ds during the Vietnam War.

The bomber could carry an alternative load of up to three Kh-22s. The 10,000-pound, 180-mile-range weapon is roughly three times the size of any operational Western air-launched missile and was designed to cripple or sink US Navy aircraft carriers. It carries a 2,200-pound warhead, and its destructive potential would be compounded by its Mach 3 impact speed and the detonation of its remaining liquid rocket fuel. The Kh-22 can be fitted with an antiradiation or active-radar seeker.

A follow-on to the Kh-22, the ASM-MSS Moskit, was displayed by the Raduga Machine Building Co. at the Moscow Air Show. About the same size as the Kh-22, the Moskit is a rocket/ramjet-powered, supersonic sea-skimmer with inertial midcourse guidance and a dual-mode seeker. It has a range of ninety miles from a low-altitude launch and 150 miles from a high-level release.

As for internal carriage capability, the Tu-22M-3 can carry bombs or up to six Kh-15P (AS-15 "Kickback") antiradar missiles on a rotary launcher.

The Kh-15P is a solid-rocket-powered missile that physically resembles the US Air Force's AGM-69 short-range attack missile (SRAM). Unlike the SRAM, it has a terminal guidance package and a conventional warhead.

Tupolev Design Bureau officials say the navigation-attack radar carried by the Tu-22M-3 has mapping and target-acquisition modes but no automatic terrain-following system. The only other weapon-aiming device is the bomber's optical bombsight. Those familiar with the aircraft contend that the most obvious ways to improve the Tu-22M-3 would be to equip it with terrain-following radar and night vision systems. They would not be surprised to find such systems on the export version of the bomber.

The Tu-22M's electronic combat (EC) system has always won high ratings in the West. In the 1970s, officials in Britain's Ministry of Defence described it as having a jamming capability comparable to the dedicated EC version of the Tu-16 Badger.

The Tu-22M-3 system visibly improves on that capability. A plethora of antennas bears witness to an extensive, multiband, active and passive EC suite. Apparently new to the Tu-22M-3 are three large, high-power transmitting antennas blended into the leading edge of each glove, where they can cover the front and side quadrants. Receiver antenna blades are located above and below the forward fuselage. The radio-frequency chain is backed up by an infrared missile-approach warning system. It uses a wide-angle sensor installed above the fuselage.

The rear quadrant includes a tail-warning radar (which can detect aircraft and missile threats while providing fire-control data for the tailgun) backed up by an optical or IR sensor located above it. Aft-facing antennas are located on either side of the fin and above the rudder. Flare and chaff dispensers are built into the underside of the rear fuselage.

A Formidable Threat

Ever since the Tu-22M-3 entered service, analysts have said that it has the performance characteristics and the equipment to test the most sophisticated defense systems. In Britain, defense officials saw Backfire as the yardstick against which the modernized air defense system of the 1980s should be measured.

The unknown factor today is how skillfully the bomber might be used by any of its several potential foreign purchasers.

The US Air Force has shown that bombers can fight and survive—given proper tactics. This fact was spelled out most recently in an authoritative account by Capt. Doug Fries, a B-52 navigator who flew in multiple combat missions in the Persian Gulf War *[see "The BUFF At War," June 1992, p. 44]*. In that war, said Captain Fries, B-52 attacks were coordinated to permit bombers to hit the target in rapid succession but from different directions, the better to defeat defensive systems capable of covering only one sector at a time.

Western analysts note that Soviet Navy Tu-22M forces trained to use a similar technique to attack US Navy carrier battle groups. They say the aircraft and its weapons give the attacker a number of options. In a multiaircraft attack, some bombers could launch the full load of three missiles while others penetrated at supersonic speed to make close-range attacks. One US Navy officer who participated in combat simulations in the early 1980s stated that battle group commanders found it almost impossible to defeat an eighteen-plane, multiaspect Backfire attack in which the Tu-22Ms would run nearly simultaneously into missile launch points surrounding a carrier battle group up to 370 miles apart.

The Tu-22M-3 can carry antiradar missiles in addition to its primary offensive load. Experts say that this capability, when combined with the presence of a full-time EW operator and a sophisticated EW suite, gives the Russian bomber an antiradiation capability similar to that of a dedicated defense-suppression aircraft.

Historically, only large and well established air forces—such as those of the US, the Soviet Union, Britain, and France—could equip bomber forces and maintain the level of training their crews must have to use them effectively. By that standard, the list of customers who can make use of the Tu-22M-3 is quite short—Iran and China at the top, followed by India and possibly North Korea.

A Tool for Intimidation?

From Iranian Air Force bases near Tehran, the 1,370-mile-range bomber could reach Istanbul, Tel Aviv, Cairo, the waters of the Persian Gulf, the northern Arabian Sea, and the whole of Saudi Arabia and Pakistan, putting any target in southwest Asia at risk. Military analysts say that, though Iran would gain little pure military advantage by using Tu-22Ms against major cities, fear of such attacks might cause some nations to knuckle under to Iranian intimidation in a crisis.

The history of bomber campaigns from World War II to the present provides some insights into how Iran might use the bomber for true military

Staff photo by Guy Aceto

Shown at Farnborough alongside the Mi-26 helicopter (also for sale), the Backfire would be a formidable, far-ranging bomber in the hands of nations intent on intimidating entire regions of the globe. Defending against it would prove expensive.

Staff photo by Guy Aceto

The Backfire Flap of 1976

The Backfire got its proverbial fifteen minutes of fame in the 1970s when it precipitated an uproar in the US intelligence community.

As SALT II got under way in 1974, Moscow insisted that the Backfire should be exempt from negotiations on the grounds it was not an intercontinental-range weapon. This was consistent with CIA estimates based on imagery and human sources. CIA ascribed to it a maximum high-altitude range of 4,800 miles.

Others disagreed. DIA and Air Force intelligence thought the Backfire had a range of at least 6,200 miles unrefueled. These agencies warned that, if the USSR improved its tanker force or made design changes, the Backfire could fly round-trip missions against the US.

The CIA-vs.-the-rest argument became so heated that in 1976 Washington commissioned two National Intelligence Estimates of Soviet strategic forces. The official estimate, NIE 11-3/8-76, was written by CIA analysts but was laced with DIA dissent. The second NIE (actually a critique of the first) was produced by a team of hawkish outside experts, led by Harvard's Richard Pipes. The members of "Team B," as the group was known, took a darker view of Soviet developments, claiming that the Backfire was strategic in nature. Both documents were declassified in 1992.

Why such a large divergence? It appears that the key difference was in estimating the plane's fuel fraction—the percentage of maximum takeoff weight devoted to fuel. This key determinant of range depends not on size but on design. To get a high fuel fraction, a designer must provide plenty of internal volume but spread it around the longitudinal center of gravity so that the plane can be trimmed whether its tanks are full or empty.

Designers had placed the USAF B-1A bomber's engines under its wings, leaving the long fuselage free to carry plenty of fuel. "High-range" analysts believed that the Backfire had a similar fuel fraction. "Low-range" analysts, on the other hand, argued that the Backfire, with its tail-mounted engine, was so different from the B-1 that the numbers from the US bomber did not apply. They claimed it could carry 110,000 pounds of fuel, 40,000 pounds less than estimated by DIA and USAF.

The controversy became academic before it was settled. The Backfire was not formally limited under the terms of the SALT II accord, and the Reagan Administration's broad strategic buildup of the 1980s was seen by Team B and its intellectual supporters as adequate compensation for the residual Backfire threat.

The brochures that the Russians handed out at Farnborough cast new light on the issue. The quoted takeoff weight of the Tu-22M-3 is higher than the estimate developed by the "low-range" analysts in the mid-1970s. However, careful examination of the data indicates that the fuel capacity is about 110,000 pounds—about where the CIA put it in 1976.

Bill Sweetman is a consulting editor to Interavia and Jane's Information Group and has written many books on aerospace. This is his first article for Air Force *Magazine.*

gain. The record of the past suggests that Tehran's high-priority bomber targets would include tanks and vehicle parks, munitions storage areas, and refineries producing aviation and vehicle fuels. These are area targets, too large to be damaged decisively by fighter weapon loads but easy for a bomber to hit even at night.

Seaports would be obvious targets; facilities capable of handling large cargo vessels are few. By damaging loading docks and cargo-handling equipment and disrupting traffic by sinking ships in port, a Tu-22M force could restrict the flow of supplies and replacement equipment from the United States. Air attacks on fuel farms at major air bases would undermine a defender's ability to generate sorties.

Naval analysts say that the proximity of Backfires would force the US to worry about long-range air attacks against battle groups. Carriers would have to devote a higher percentage of their fighter sorties to fleet air defense.

East Asia is the other place where analysts expect to see Backfires. The Tu-22M mission spectrum there might be different. If Beijing based Backfires in southern and northern China, its forces could bring within range much of India, most of southeast Asia, the Philippines, and the entire Japanese archipelago—not to mention targets in South Korea and China already within range of Chinese fighters. Also within range would be several thousand miles of sea-lanes over which pass nearly all of the oil used by Japan, Taiwan, and South Korea and the wartime patrol areas of the US Seventh Fleet.

All signs are that defense against the Tu-22M-3 would prove expensive. For example, the need to protect mainland targets and the Greenland-Iceland-UK gap against the Soviet Backfire threat drove the Royal Air Force to plan for a far-forward area defense using airborne early warning aircraft and long-range fighters. Saudi Arabia, with its E-3 Airborne Warning and Control System aircraft and F-15 fighters, could put together a similar defense force. At present, however, few if any other regional powers could do so.

At sea, say analysts, the problem is worse. They note that the Tu-22M-3 is capable of targeting and launching missiles from outside the range of most shipboard surface-to-air missiles. ■

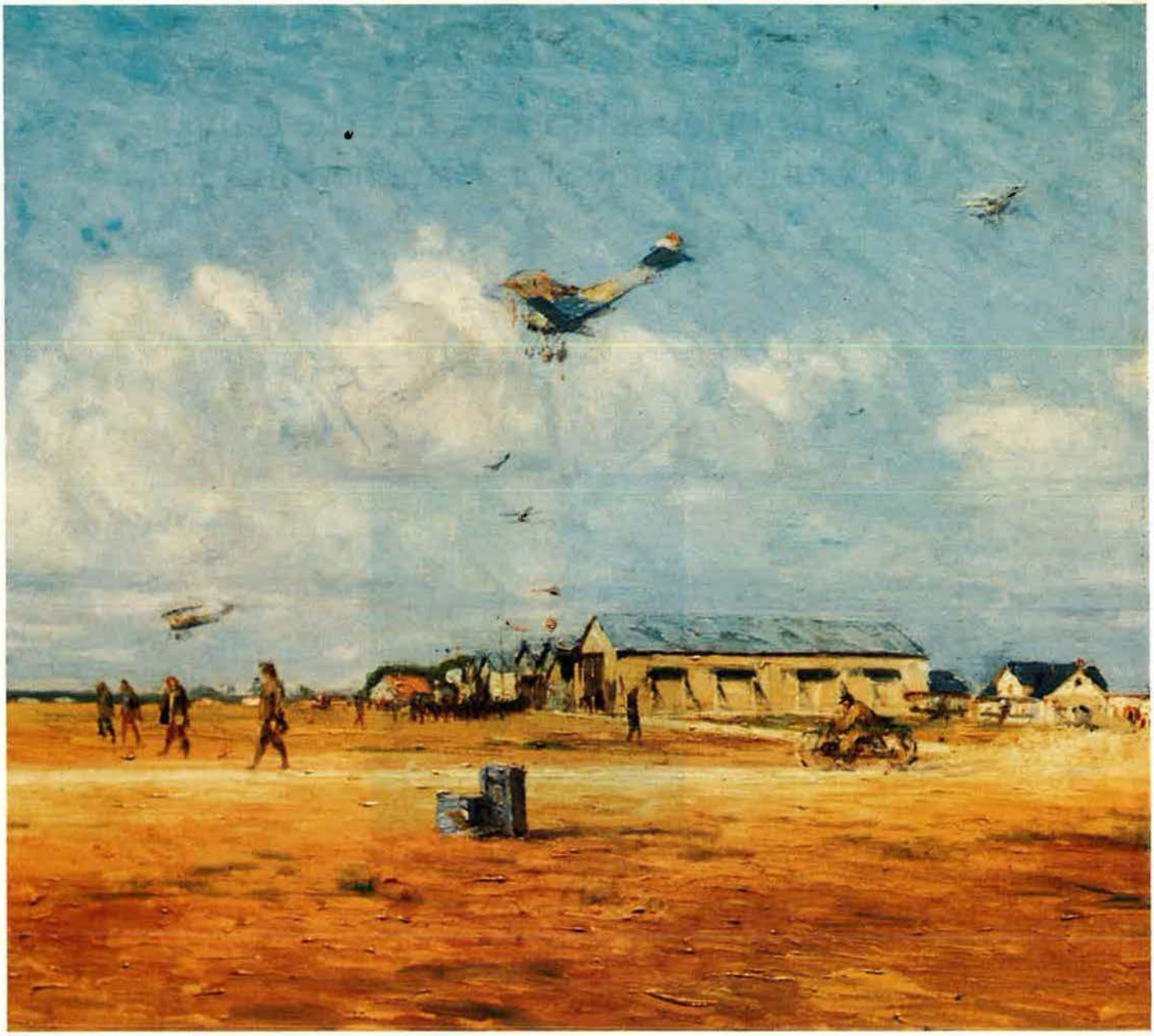
The Friendship 7 wasn't the only revolutionary mission launched in 1962.

That same year, Magnavox embarked on a rather revolutionary mission of its own. We launched a comprehensive quality program. Today, that program has evolved into the Magnavox Total Quality Management system. Through MTQM, our employees, customers, and suppliers work in teams to ensure the quality of Magnavox products and services.

Magnavox initiated its quality system decades before such programs gained worldwide acceptance. In fact, Magnavox was the first contractor to win the "Quality Excellence Award" from the U.S. Department of Defense. In 1911, people looked to Magnavox for quality in electronic systems and equipment. Over 80 years later, they still do.

Magnavox
Electronic Systems Company

For more information, contact Dave McKeeman:
1313 Production Road, Fort Wayne, IN 46808 USA (219) 429-5642 or FAX (219) 429-5226



Henry Farré wanted to serve France. In doing so, he created an entirely new genre of art.

The Art of Flying

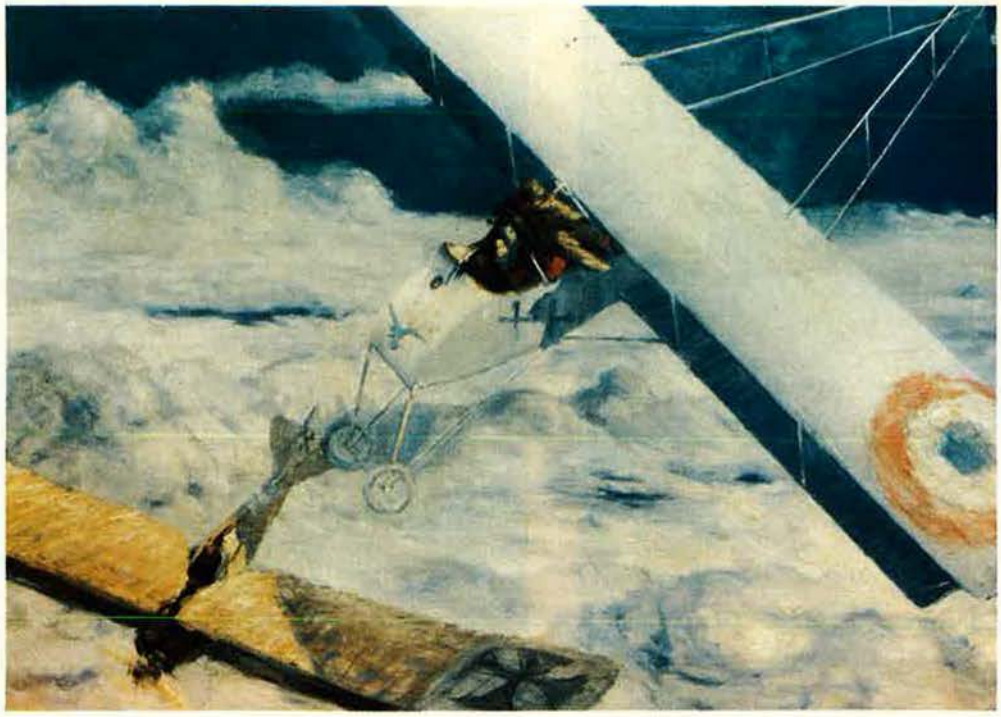
Henry Farré brought the bright colors and rough approach of late impressionism to the aerodromes of France. Scenes like the above were often painted on site. He also painted, from firsthand accounts of observers, such scenes of combat as (above right) **The Return of the Body of Captain Féquant.**

THE Air Force Art Program has acquired more than 7,000 works since its start in 1950. Within this important collection of work are the paintings of French artist Henry Farré (who Americanized his name from Henri after moving to the US in the 1920s).

Born in Foix, France, in 1871, Farré was a graduate of the prestigious École des Beaux Arts in Paris, where he began a promising career. Farré was living in Buenos Aires, Argentina, when France entered the war in 1914. He returned to France, intent on serving his country. Because of his age (forty-three) and lack of military training, he was told to go home to Paris and wait.

He didn't. With help from influential friends, he got himself assigned to a bomb squadron, with the rank of observer-bombardier. Tasked to make a visual record of military operations, Farré remained with his aviation unit and became, almost by accident, the first combat aviation artist. He flew combat missions with his sketchpad strapped to his knee and painted more than 170 canvases, sixty-nine of which are part of the US Air Force's collection. ■

Many of Farré's paintings, exhibited in Paris during the war, gave the civilian public its only view of actual air-to-air combat. Farré participated in—and painted scenes of action from—many bombardment flights, including some of the first raids over German territory. At right: **Aeroplane Cannon Bringing Down an Enemy Machine.**



When Farré began his work for the French military, the airplane, barely ten years old, was on the cutting edge of technology. Farré's paintings show just how fragile that technology was. At left: **Hydroaeroplane in Distress. Pilots Being Rescued by Another Aeroplane.**

Farré traveled to other units, painting a wide variety of subjects like the gunnery training range at left, where balloon targets were held steady by a tow line from a small blimp. Sometimes creating a painting a week, Farré was interrupted only by the missions he flew and an occasional German bombing raid. His quick brush captured much of the feeling of watching man try out his new wings, as in School of Aviation at Chateaureux. Ateliers, Motors, and Work Benches, *below.*

Farré's work is unique in that it was painted when the scenes depicted took place, not years later, in a style that was still popular. The portrayals have an immediacy that is missing from works painted years afterward—not unlike the difference between reading a history book and talking to an eyewitness. Below, unable to escape an attacking German plane on his tail, a gunner has climbed onto the lower wing of his aircraft and is firing a carbine at his attacker.

In many of Farré's paintings of aerial action, the sky dominates and the aircraft are secondary. Farré was the first artist to have seen the Earth from this vantage point, a view well suited to the impressionist style. Nieuport Fighting a Fokker in the Region of the Somme, *right, shows a French plane closing on its prey. Many of Farré's paintings of combat are done in a more somber palette than he used in the brighter, more vibrant land- and seascapes, like the view of a seaplane school below.*

Near the end of 1918, Farré took his paintings to several cities, showing them to raise money for families of airmen killed in the war. He was awarded the Légion d'honneur by the French Army for his work. After the Armistice, he continued to paint but did no more aviation scenes, concentrating on landscapes and portraits as he had before the war. Many of his paintings hang in the Musée des Invalides in Paris and at the US Air Force Academy. Farré's works in the USAF collection, presented by Laurance S. Rockefeller, form a cornerstone of the Air Force Art Program and continue to inspire others to tell their aviation tales through brush and paint.

Those who survive the force cut may find that their professional opportunities have changed.

Career Paths in the New Air Force

By Bruce D. Callander

As the Air Force was drawing down its numerical strength in recent years, it was also reinventing itself, meshing bits of its past with new, post–cold war concepts of its mission.

In the process, the service has been reshaping the career paths of its future officers and increasing the responsibilities of its noncommissioned officers. It is redesigning its training process and overhauling career fields so fundamentally that those who left service only a year ago would not recognize the latest specialty charts that will soon emerge.

The Air Force is about halfway through its planned 1990–95 troop cut of 105,000. Lt. Gen. Billy Boles, the Air Force's deputy chief of staff for Personnel, was asked to describe how the structural changes to date will affect members who survive the cuts and stay in the leaner, meaner force.

General Boles explained that, for rated officers, the Air Force's new emphasis on tight, mobile operational units will call for new career approaches. He suggested serving tours in Air Combat Command and Air Mobility Command. Given the new emphasis on joint operations, he said, it might be smart for an officer to spend some time operating with another US service or with the armed forces of another nation in order to gain greater depth. "I would caution young officers against staying in one place or in one unit too long," the General summed up.

Now that the Air Force has scrapped its air divisions and reduced some of its intermediate headquarters, groups and wings have emerged as key operational units. Command of a group, with its responsibilities for operations and maintenance, will become an important testing ground for officers on the way up. Command of a wing will be a major goal. Of the Air Force's prospective force structure of slightly fewer than 100 active wings, General Boles said, about sixty wings will be commanded by brigadier generals.

For nonrated officers, there also should be earlier career opportunities as the Air Force beefs up its support activities in squadrons. More staff jobs will open up in specialized units, and there should be new shots at command for majors and, at group level, for young colonels.

Challenges and Opportunities

Airmen also should be able to find new career opportunities. However, many will have to pay for them with additional training. In its overhaul of the service training program, the Air Force has already set goals of sending all new recruits to technical school and returning NCOs to school as a prerequisite for acquiring an advanced (seven level) skill. Along the way, they will be under more pressure to complete leadership schools and NCO academies at command and Air Force level. As of January 1, NCOs are required to take professional military education courses in residence rather than by correspondence.

For those airmen who stick with it, the reward should be assignment to more responsible management jobs, some of them in areas previously considered commissioned officer turf. General Boles used the example of personnel offices, where airmen once served as noncommissioned officers in charge and now, as a result of cuts in officer staffing, have become chiefs of sections.

For some years, the Air Force has been moving senior NCOs into jobs formerly held by commissioned officers and, before that, by warrant officers. That process is likely to continue, further reducing the gap between junior officer and senior enlisted leadership.

At some point, noncoms again may call for a return of the warrant officer ranks or some semicommissioned status, such as that of limited duty officer. The Air Force, having scrapped its warrant program several decades ago, has consistently resisted proposals to restore any additional layering of the force. USAF leaders are unlikely to be more receptive to the idea now, but further change within the enlisted force is a possibility.

As both officer and enlisted jobs broaden, the service has overhauled its career fields as well. That process still is under way, but General Boles said that the underlying pattern of change is emerging. Career fields, once designed as collections of occupational specialties, now will be tied to operational units. The result will be a complete renumbering of the Air Force Specialty Codes (AFSCs) to match the functions of units rather than those of individuals.

USAF photo by SSgt. John Lasky

As the Air Force overhauls its career fields, Specialty Codes will be renumbered and tied to operational units. Enlisted skill categories have already been reduced about ten percent, officer categories by nearly forty percent.

"People normally assigned to an operations group will have their AFSCs start with a one," General Boles said. "Those in a maintenance group would have a two, and support group is a three."

The more telling change, however, will be in the number of AFSCs that eventually will emerge. In a smaller, tighter force, General Boles said, individuals must have a broader array of talents. So far, the number of officer skill categories has been cut by nearly forty percent. Enlisted skill categories have been reduced only about ten percent, but the overhaul process is still under way.

The drawdown will bring unavoidable consequences. There already have been some cuts in overseas forces, and Congress is applying pressure to bring home even more troops. Officials say that it is too soon to tell how this will affect the chances of drawing overseas assignments, but it may mean less frequent foreign tours for some. At the same time, the increased emphasis on mobile forces and use of the military for joint operations may mean more temporary duty (TDY) for some. As the emphasis shifts from maintaining global forces to developing more-mobile units based in the US, the Air Force will need to exercise its forces to test and refine the concept. This could mean more frequent TDYs away from home.

Heavy Strain on Families?

In its heyday, SAC, which used TDY assignments extensively to keep its bomber forces ready, found that the practice put a heavy strain on the family life of the members involved. The command set up a support system to help the waiting families cope. SAC personnel still suffered higher-than-average rates of separation and divorce.

The Air Force found that temporary assignment was cheaper than moving whole families overseas and maintaining them on foreign economies, but this practice also had its costs. It is another area in which the new forces may have to deal with old problems.

When both spouses are in the service, the problems may be even more taxing. Air Force policy allows joint tours for such couples wherever both spouses can be used effectively. Assignment officials concede, however, that joint-spouse moves will be harder to make as the force shrinks and units have fewer positions to fill. They say it will become even more difficult as husband and wife both gain rank and experience in specific skill areas not common to a wide range of units. Finding billets that make the best use

of the talents of each at the same location might become impossible in some cases.

Though the rebuilding of the Air Force promises new opportunities for those who stay, getting there has had a price. Speaking of the drawdown measures last spring, General Boles told Congress that the anxiety factor in the Air Force was "almost off the charts." In his recent interview with AIR FORCE Magazine, he said that the situation had eased a bit, largely because some of the uncertainty about the drawdown had been removed.

The rhetoric about increasing the speed of the force cuts has subsided somewhat, said the General, and even with the change of administrations, talk has focused on keeping the drawdown on an even keel.

General Boles said that the Air Force has been able to avoid some of the more drastic actions that some feared would have to be taken. He said no additional involuntary reductions in force (RIFs) of either officers or airmen will be needed through Fiscal Year 1993, which ends on September 30. On the enlisted side, the Air Force attracted enough takers for the voluntary separation bonuses. Among officers, a RIF board picked 1,600 company-graders for involuntary release in 1992, but this number represents a small fraction of the total officer cuts. So far, the Air Force has been able to avoid a feared RIF of rated officers.

Austere Times to Continue

The General warned, however, that the process has not run its course. He expects calls for additional force cuts to reemerge in the next budget round, as Congress considers budgets for Fiscal 1994, which begins on October 1. Even if a faster drawdown does not materialize, the Air Force still faces some austere times.

General Boles explained that the service will continue to encourage voluntary separations and compel the retirement of specific groups in both the enlisted and commissioned ranks. The high-year-of-tenure points for noncoms—which were lowered to increase the force reductions—will remain low for some time, and Selective Early Retirement Boards (SERBs) will operate for officers again during Fiscal 1993.

Beyond 1993, General Boles said, the Air Force will have to generate additional cuts. Early release policies, SERBs, and the Voluntary Separation Incentive (VSI) will not net the numbers required for Fiscal 1994 and 1995. The question, the General said, will be to find the right mix to make the cuts as painless as possible.

SERBs for NCOs as well as for officers is one possibility. Another is use of the recently authorized power to retire active-duty members after as few as fifteen years of service. So far, the armed forces have said they are not anxious to do this, largely because it would cost them some of their most experienced midcareer hands.

General Boles conceded that this prospect worries him, but the Air Force may have no alternative. Most of the members eligible for the VSI have already been offered such blandishments, and no new year-groups will become eligible soon. "We've already gotten the majority of the people who wanted to get out," said General Boles, "so we are going to have to go to something else."

If "something else" has to be fifteen-year retirement, he said, the focus will be on officer and enlisted members in grades, year-groups, and specialties where the force can afford more losses. As with SERBs and RIF boards, the process would be selective, General Boles said, not an option for any member who wanted to leave early. Nor would he rule out the possibility of RIFs among airmen as well as officers in future years.

The General reported that further cuts also are likely in the civilian work force. So far, attrition has taken care of most of the required reductions, although there have been some RIFs at bases. During the last three years, the Air Force lost about eighteen percent of its civilian workers. Additional base closings are in the offing, and some additional civilian RIFs are inevitable, said General Boles. Like military members, many of the civilians forced out will be able to claim early retirement or separation benefits and use various transition programs to soften the impact.

USAF photo by TSgt. Dave McLeod

Flight training has reopened, and some banked pilots have returned to the cockpit. Though some 300 more will be banked in Fiscal 1993, the Air Force hopes to keep them banked no longer than thirty-four months.

Recruiting Problems

Ironically, the Air Force that worries about the need to further thin its ranks is also the Air Force that continues to have recruiting problems. General Boles blames some of the difficulties on the perception that the Air Force is not hiring because it is drawing down. So far, the service has achieved most of its recruiting goals except in some critical medical specialties, but, as the civilian economy improves and the pool of service-age people shrinks, recruiting may become tougher.

Retention also promises to get harder in coming years, say Air Force officials. Because of the drawdown, USAF has cut recruiting sharply; in the process, it is reducing the pool of future career servicemen and -women. General Boles predicted tough prob-

USAF photo by MSgt. Michael Haggerty

Though Air Force officials worry about the need to further thin the ranks, the service continues to have recruiting problems. Nevertheless, USAF has achieved most of its recruiting goals so far, except in some critical medical specialties.

lems as these members end their obligations and the Air Force woos them to stay longer. It will have to retain record numbers.

For the moment, the problem is holding the right people while letting others leave. One bright spot is that retention of rated officers appears to have improved, at least for the moment. General Boles said that pilot losses, largely to the airlines, seem to have declined since last year.

The Air Force is working its way out of its oversupply of pilots. Last year, it did not let new officers enter flight training and "banked" new graduates in nonflying jobs. Flight training is open again, and a handful of banked pilots have been returned to the cockpit.

Many still are in the bank, however, and another 300 are to be added in Fiscal 1993. General Boles said the Air Force hopes to achieve its goal of keeping them banked no more than thirty-four months. If it can do so, he said, there will be no danger of their having been out of flying so long that they risk losing their flight pay under the "gates" system. That system requires that flyers spend specific portions of their careers in cockpit jobs.

As they return to flying, some pilots will find that the system of making the transition to combat aircraft has changed. In the past, they would have learned to fly in Air Training Command and gone on to learn combat skills in their operational commands. Under the new arrangement, Air Training Command takes over a major share of the initial combat training and the using commands add only the schooling in operational flying.

Just a "Patch Change"

On the face of it, this will be only what General Boles calls a "patch change." The combat training sites will remain the same, and instructors will simply substitute the insignia of ATC for those of their former operational commands. In fact, however, the change will relieve the combat and support commands of the burden of introducing pilots to combat flying.

Air Training Command also has changed, including the change of the commander's post from a three-star to a four-star billet. General Boles flatly denied some rumors about the future of ATC. For example, he disclaimed any knowledge of a merger of ATC with Air University or the Air Force Academy.

General Boles confirmed that the Air Force will need money to make its changes work. He mentioned the need to maintain adequate pay levels, provide better housing allowances, and continue to attract and hold skilled Air Force personnel—all of which means that the Air Force's expenditures for people will not decrease in proportion to the overall reduction in strength.

That concept will be hard to sell to a Congress bent on finding and spending a "peace dividend." The job may become even harder as the bills come in for other steps taken during the drawdown. Separation benefits have been expensive. Getting some members to leave early has meant giving them up to two years' pay in advance and continuing to offer a number of fringe benefits. Early retirements also raise the near-term costs. Add in the cost of base closings, overseas withdrawals, reassignments, and the actions associated with restructuring, and the immediate savings tend to look meager.

If the Air Force has to use its authority for fifteen-year retirements, the cost could increase. It would mean not only losing more experienced people but also recruiting and training more replacements. If additional force cuts are ordered, the bill could be higher.

General Boles said that morale remains high, despite the turbulence of the past and uncertainty about the future. One reason may be the Air Force's ability to operate in a more or less normal fashion, despite the drawdown. Promotions have slowed a bit for middle officer grades, but enlisted promotions have remained fairly normal—a small miracle in a time when the civilian world is experiencing layoffs and wage freezes. The service still offers some choice in base and job assignments, and the work of the force continues.

Another reason may be that the force is not just shrinking but also evolving. The act of borrowing from the past and at the same time creating something new may have caught the imagination of members and helped keep their anxiety within bounds. If so, one can only guess whether the drawdown-and-rebuild combination made a virtue of necessity or was, in part at least, a calculated move to boost the spirits of the troops.

Whatever its intention, the Air Force seems not to be dismantling itself so much as picking up the pieces and heading in new directions. ■

Bruce D. Callander served tours of active duty during World War II and the Korean War. In 1952, he joined Air Force Times, *becoming editor in 1972. His most recent article for* Air Force *Magazine, "Gentlemen, This Is an Airplane," appeared in the January 1993 issue.*

TSgt. Zachary L. Wallace is the Air Force's Crew Chief of the Year.

The Name on the Fuselage

By Peter Grier

Photo by Paul Kennedy

For his excellent performance in maintaining U-2s and training others to do the same, TSgt. Zachary L. Wallace (center) was presented the Air Force's Crew Chief of the Year award for 1992 by AFA officers O. R. Crawford (left) and Jack Price.

FOR THE last nine years, TSgt. Zachary L. Wallace has been crew chief for the same plane: U-2 aircraft 80-1076. Only recently, however, has his name been painted on its fuselage. For years, he resisted such an overt display of ownership, he says, but he was finally overruled.

"I always said that when I looked at it, I knew whose it was," says Sergeant Wallace.

No flash. Just concentrate on the job. That kind of crew chief attitude helped produce a fully mission capable rate of ninety-eight percent for U-2 80-1076 during the Operation Desert Storm air campaign of early 1991.

It also helped Sergeant Wallace win the Air Force's Crew Chief of the Year award for 1992. Since 1988, the Air Force Association has presented the award at its annual National Convention in Washington, D. C.

The citation states that, because of Sergeant Wallace's personal attributes and commitment to excellence, he was hand-picked repeatedly for tough jobs, from a snap deployment to Saudi Arabia to emergency recoveries of grounded U-2 and TR-1 spy planes throughout the world.

He is a crew chief who is hard to get on the telephone but easy to find: He is always on the flight line. He plans to take the exam for master sergeant soon but has mixed feelings about moving up because it would mean moving away from wrench-turning.

"I tell people that when I won't be working on planes anymore, it'll be sad," he says. "It'll be like a baseball player after he's retired; he can't go out and hit anymore."

He didn't always feel that way about fixing things. Growing up in Charlotte, N. C., he was not the sort of youngster who takes apart alarm clocks to see how they work or builds a go-cart with an engine scavenged from the lawn mower when dad is not looking. His father could fix any car, he says, and he often watched and helped a little when his dad had the hood up, but he claims not to have learned that much about mechanics from the experience.

Too Many Pushups

In high school, Sergeant Wallace spent four years in the Junior Reserve Officers Training Corps. Part of the JROTC routine involved summer visits to various military bases to expose the young recruits to all the services. The young Wallace was not that attracted by his experiences at Navy and Army bases. He remembers, in particular, that soldiers at Fort Bragg seemed to be doing an awful lot of pushups.

Then he visited Charleston AFB, S. C., and the prospect of a career working on airplanes suddenly appealed to him. "It seemed almost like going to a regular job," he says.

He enlisted straight out of high school. He picked the path of technical training for aircraft maintenance because he did not feel he was a natural. It was a challenge. "I did it because I wanted to see if I could do it," he remembers.

His first job out of training was working on F-4Es at Elmendorf AFB, Alaska. He started working on the flight line there in January 1981 in weather that was quite a shock for someone who had grown up in the Carolinas. By January 1982, he was a crew chief on T-33 trainers for Elmendorf's 5021st Tactical Training Squadron.

In late 1983, the Air Force transferred Sergeant Wallace to Beale AFB, Calif., where he first started working in the U-2/TR-1 section. Three months later, he became a crew chief. According to his award nomination papers, he was selected for aircraft 80-1076 because he had extensive knowledge of the plane's unique and complex fiber-optic sensor unit.

Since then, Sergeant Wallace has been based at Beale except for short assignments in Korea and other places around the world, some of which cannot be discussed publicly. "I've been a little bit of everywhere," he says.

That includes, of course, Saudi Arabia, and Sergeant Wallace clearly was a top—if not *the* top—crew chief of Desert Storm. At first, he was not slated to go. Throughout Operation Desert Shield, which ran from the initial US deployments in August 1990 to the moment the war began on January 17, 1991, he was based at Beale, not in some dusty forward airfield in the Gulf region. At about 2:30 one afternoon in mid-January 1991, he got called into his commander's office. "I knew what it was," he recalls. "I just went in there and didn't whine. I got my notebook out and said, 'What do I need to know?' "

"Hauling Tail" to the Gulf

Suddenly, Sergeant Wallace was part of what was to become the largest deployment of U-2s in history. By "hauling tail" across the Atlantic and several continents, he says, he arrived at a base near Taif, on the Red Sea coast of Saudi Arabia, the day before the war began.

Once there, he saw immediately that the pace of operations would require new methods. He orchestrated prearranged refueling and maintenance support for his aircraft, turning its regeneration into something resembling a Daytona 500 pit stop. The time required for the job was slashed from its normal four hours to two.

"It was a madhouse," he remembers. Like many Desert Storm veterans, he knows exactly how long he was in-theater: 100 days.

His own skills weren't all he contributed to the Persian Gulf War. Shortly after Iraq's invasion of Kuwait, he had been confronted back at Beale by an airman who said that he really wanted to go overseas but had months of training to go before he reached the requisite skill level.

Sergeant Wallace says he and the airman "just busted tail" and got him ready in time. "By the time I got over there, this guy was acting like he'd been in three years. It's funny what a little conflict will do to you," he says.

The Hardest Task

His nomination papers say that one of Sergeant Wallace's significant professional qualities is an ability to make even the most complex maintenance tasks understandable to trainees. Because of that, he has been picked to teach the hardest and most technical task of U-2 maintenance: uploading wing-mounted sensor pods.

Other accomplishments helped Sergeant Wallace win the Crew Chief of the Year Award:

- He headed an emergency recovery team that sped to NAS Fallon, Nev., after a TR-1B experienced a pitch trim failure. He discovered the problem and replaced the pitch trim actuator in four hours. The plane resumed its mission the following day.
- The 9th Wing's logistic group picked him to fix a long-term hydraulic fluctuation problem on a U-2 that had defied many repair attempts. Sergeant Wallace and his team found the problem and eliminated the fluctuation for good within hours, earning them personal recognition from the squadron commander.
- For the past seven years, Sergeant Wallace has kept up a "remarkable" 100 percent pass rate on quality assurance evaluations, according to his nomination papers.

Sergeant Wallace says he has been a lot busier lately, with budget and force reductions constantly winnowing the number of people available to do needed work. After all those years of working on U-2s, does he have any suggestions for modifications that might make it easier to do more with less?

He thinks for a moment. He can't come up with anything too fancy, he says. "We've got too many panels that attach with screws. I think some of 'em could be changed to access panels that drop down," says Sergeant Wallace. ■

Peter Grier is the Washington, D. C., defense correspondent for the Christian Science Monitor *and a regular contributor to* Air Force *Magazine. His most recent article, "Hidden Trends in Readiness Rates," appeared in the January 1993 issue.*

Somalia is the largest and latest example of US military involvement in humanitarian actions.

When the Mission Is Aid

By David J. Lynch

US MILITARY forces, far from enjoying a post–cold war respite from high-tempo operations, face unusual new demands for their services. The pressure stems from noncombat missions that can be grouped, however loosely, under the banner of "humanitarianism."

Last year saw extraordinary armed service involvement in such activities: disaster relief, international peacekeeping, antifamine airlifts, and police functions. The global rash of hurricanes, typhoons, and disease, an upsurge in United Nations peacekeeping, and homegrown urban violence combined to test the ability of cash-strapped American forces to respond.

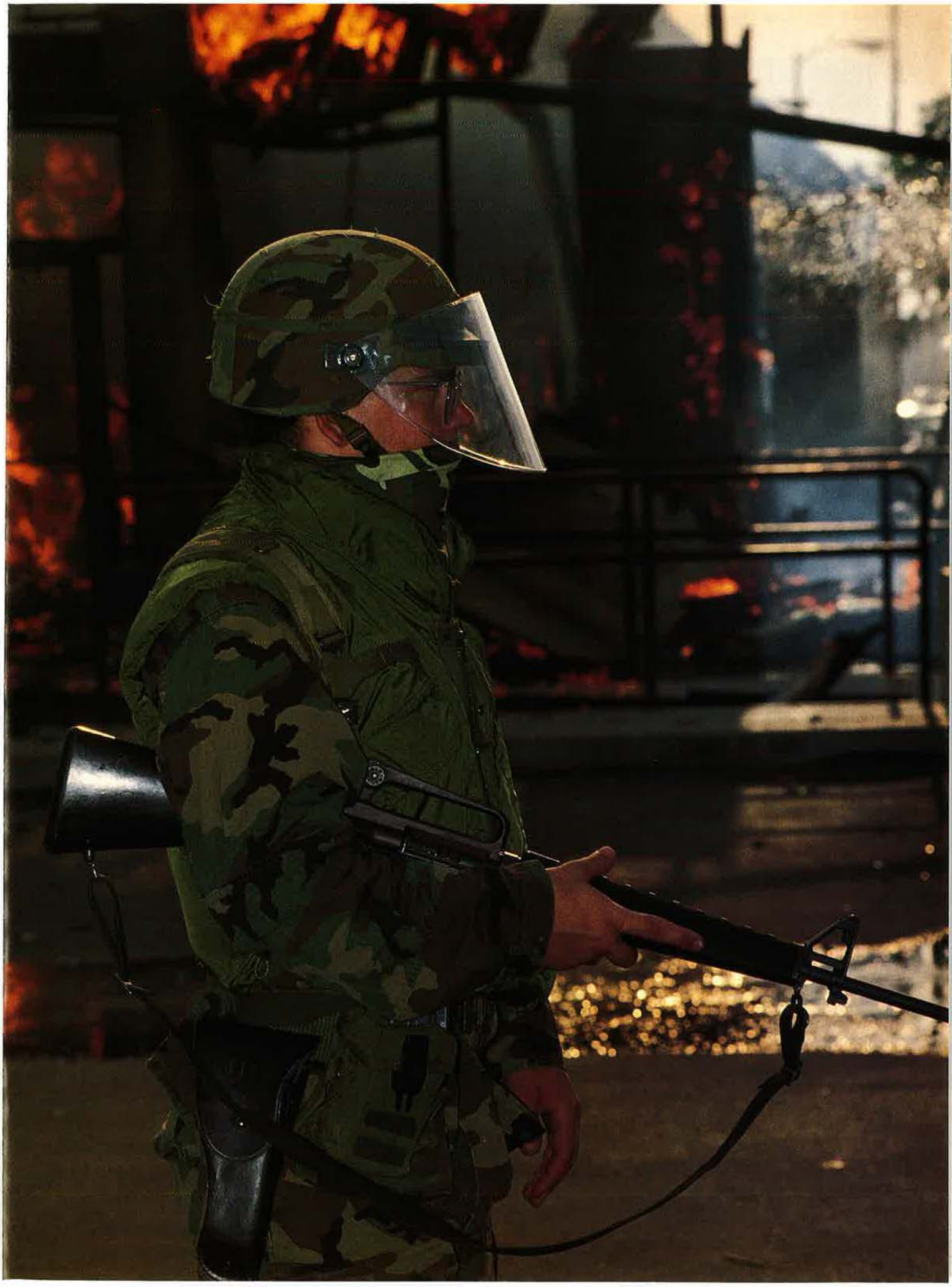
But respond they did. Last year, servicemen and -women battled enormous forest fires in the northwest US, patrolled the streets of post-riot Los Angeles, cleaned up hurricane-devastated areas of Florida and Hawaii, and carried vital food and medicine to crumbling Yugoslavia, anarchic Somalia, and chaotic Russia. At year's end, the US began dispatching into Somalia the first of an estimated 30,000 American troops to combat armed thugs interfering with UN food relief operations.

Two years ago, the Air Force subtly signaled a recognition of the shifting mission landscape. In its argument for the new C-17 cargo plane, the service claimed that the US had conducted some 300 humanitarian airlifts since World War II and that the C-17 would be better equipped to carry out these missions.

The unexpected upsurge in noncombat missions provides valuable training and a significant boost in public esteem for the military. In the wake of Hurricane Andrew, some called for the Pentagon to run future disaster relief efforts. Others suggested that the Defense Department should contribute forces to a new international army.

Jim Hoagland, the Washington *Post*'s veteran diplomatic analyst, summed up the drift of sentiment this way in a December 3 report: "Freed from cold war restraints and obligations, the American military may turn out to be the ideal organization for global humanitarian emergencies. Somalia could be a turning point in the Pentagon's search for vital new missions."

Senior Pentagon and service officials have been trying to ward off calls for more humanitarian missions.



As part of the US relief effort to assist famine-stricken Somalia, C-130s (with UN and Red Cross markings) deliver food and relief supplies to the Mogadishu Airport and, later, to remote airstrips throughout the country.

They fear that such a move would drain resources from the task of defending US national interests. Gen. Colin Powell, Chairman of the Joint Chiefs of Staff, worries that full-time humanitarian assignments would distract officers from basic national defense duties.

Violating a Principle

Gen. Ronald Fogleman, commander of Air Mobility Command (AMC), Scott AFB, Ill., warned, "To make a military agency responsible for initiating responses to situations like that which we confronted in south Florida would violate the most basic premise under which we operate: civilian control of the military."

The military leadership has won out—for the moment. Even so, troops are learning there is nothing very peaceful about peace. In the end, say experts, the Somalia operation of 1992–93, not the Persian Gulf War of 1990–91, may provide the most accurate glimpse of things to come.

The Pentagon already manages a wide array of support operations. Peacekeeping and international humanitarian efforts are handled through the Joint Staff, in much the same way that it directs combat operations. The Pentagon's host of noncombat missions are managed by a different office under the Director of Military Support (DOMS), currently Army Maj. Gen. John Heldstab.

On a daily basis, General Heldstab's four-person staff monitors situations in the United States that could develop into a need to support civilian authorities. DOMS is the conduit for military assistance to the Federal Emergency Management Agency (FEMA) in time of natural disaster, to the Justice Department during riots, to the Environmental Protection Agency for chemical spills, and to the Postal Service in the event of a labor strike.

"As we take a look at some of the roles and missions we have, our assessment of what can be done in support of federal agencies will be very closely looked at and may grow," said Col. Mike Thomas of DOMS. "When we have to provide support, we have the entire resources of DoD at our disposal."

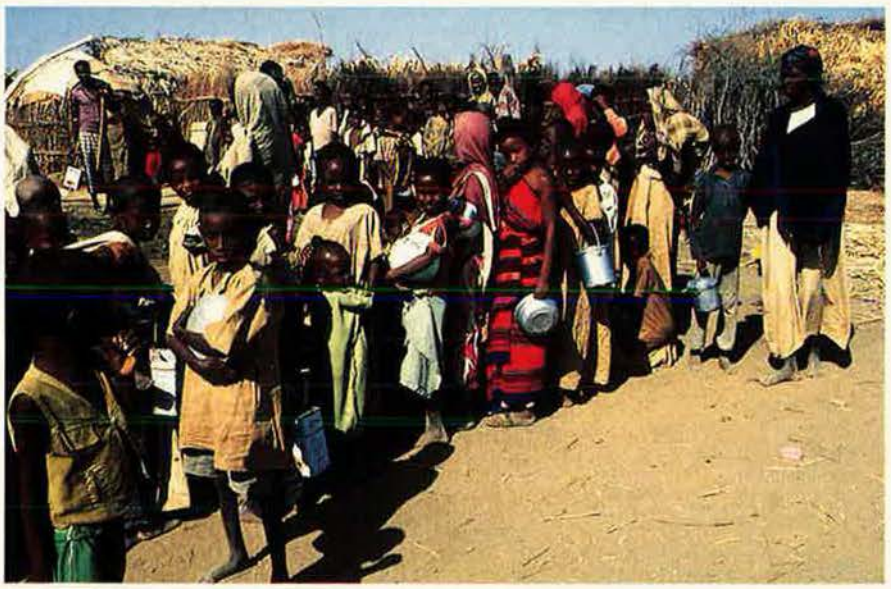
DOMS has coordinated the military's contribution in events from presidential inaugurals to the homecoming parades that followed Operation Desert Storm. Last year, natural and man-made disasters presented the stiffest challenge.

Rules of Urban Engagement

The first military units were sent into Los Angeles three days after racial violence broke out. Included in a 1,300-man detachment from the 1st Marine Expeditionary Force at MCAS Tustin, Calif., were veterans of Operation Desert Storm and a special operations unit that had been sent to Panama in 1989 to capture Panamanian dictator Manuel Noriega.

The US sent a total of 4,500 US troops into the city to assist state and local law enforcement officials. The soldiers joined 6,000 National Guardsmen placed under federal control and dispatched to the area. Typical missions, said Colonel Thomas, were to provide walking patrols and to guard local businesses.

Mindful of some soldiers' unease at patrolling their home turf and the potential for escalation, on-scene commanders wrote a six-level rule of engagement that spelled out how troops



Starving children, many of them orphaned by the famine, line up at a UN feeding center in Somalia. Some 30,000 US troops have been dispatched to Somalia to protect UN food relief operations from armed bandits.

should act in various situations. Soldiers were armed with twenty-gauge shotguns, M-16 rifles, and long-handled riot batons. Troops put their ammunition in storage pouches, not weapons. Platoon leaders were authorized to order weapons loaded if self-defense was necessary, said Colonel Thomas.

Military units played key roles in the aftermath of other California calamities, such as the 1989 San Francisco earthquake. Local military units routinely exercise with civilian authorities to prepare for the anticipated quake that everyone calls "the Big One." The federal response plan details twelve emergency support functions for government agencies to fulfill. The military would be responsible for two: Checking public works and engineering and carrying out urban search-and-rescue operations.

In the aftermath of the most recent San Francisco earthquake, the Army Corps of Engineers submitted damage survey reports of public buildings, bridges, and levees, said spokesman Mike Keuss. Officials from the corps even surveyed some private homes, a function usually performed by FEMA. FEMA was already struggling to cope with the effects in South Carolina of Hurricane Hugo, which preceded the quake by one month.

DOMS got perhaps its toughest test in August 1992, when, in the span of a few weeks, hurricanes leveled south Florida and Kauai. When bad weather threatens, the Army Operations Center begins twenty-four-hour-a-day work. Air Force weather satellites provide running updates to the DOMS staff gathered in the Pentagon. In late August, for example, officers monitored Hurricane Andrew as it neared Florida. Said Colonel Thomas, "We started to track the hurricane while it was well off the Atlantic coast."

As the storm intensified, DOMS warned the Army's Forces Command at Fort McPherson, Ga., to prepare to support federal relief efforts. Once the storm hit, DOMS became an augmented crisis team, expanded to more than 100 personnel. When President Bush officially declared south Florida a disaster area, Forces Command got the task of coordinating the military's support of FEMA.

The military operates under loose guidelines that call for the first disaster aid to be in the air within eighteen hours of an alert, but, in the case of Hurricane Andrew, it was three days before the military's full capabilities were brought to bear on the crisis.

Ultimately, 25,000 active-duty troops poured into Florida, together with 6,000 National Guard personnel. Colonel Thomas emphasized that, compared with such civilian agencies as the Red Cross, the military's efforts were limited. Nevertheless, troops served some 900,000 meals and cleared 440,000 cubic yards of debris.

A Landing Every Three Minutes

Officials said the scale of the relief effort rivaled a combat operation. General Fogleman pointed out that the amount of cargo the Air Force carried into Florida in the first ten days (14,000 tons) was nearly identical to the volume of shipments brought to Saudi Arabia at the start of Operation Desert Shield in August 1990. AMC officers calculated that, between August 25 and September 24, an Air Force airlifter touched down every three minutes bringing relief supplies to Florida or Hawaii, helping typhoon victims on Guam, or ferrying food and medicine to points in Yugoslavia and the old Soviet empire.

On August 28, the same day a typhoon slammed into Guam and activated a relief effort there, four Air Force C-130s began flying supplies from Wajir, Kenya, to Belet Huen, Somalia, where they would be distributed to famine victims.

The nerve center for such operations is the Tanker Airlift Control Center at Scott. Established by AMC on April 1, 1992, TACC is intended to streamline the control of Air Force airlift assets. The system brings tankers and cargo-carriers together for the first time. The Pentagon previously secured airlifters through numbered air forces and en route refueling from Strategic Air Command. Now top commanders can acquire airlifters and support with a single phone call. TACC maintains a computerized display that allows officials at Scott to track every cargo jet in flight and even keep tabs on the commanders of individual flights.

"It's no longer a layered organization," said Col. Charles Coolidge, Jr., TACC's vice commander. "We go direct to a unit and task that unit. . . . We can 'reach out and touch someone' around the world twenty-four hours a day, seven days a week."

At the squadron level, planning for relief missions mirrors preparations for combat operations. Late on a Saturday evening in mid-August, Lt. Col. Laurence Fariss, commander of the 50th Airlift Squadron, Little Rock AFB, Ark., got a call ordering him to begin planning the African aid flights. With a six-person team, Colonel Fariss worked through the night. By 6:00 a.m., he had drawn up a list of routes and knew how many planes he needed and what crews he wanted to fly them.

Photo © Cindy Karp / Black Star

After Hurricane Andrew cut a path of destruction through southern Florida, many were left without food and water. Between August 25 and September 24, 1992, Air Force airlifters carried relief supplies to disaster sites in Florida, Hawaii, Guam, Yugoslavia, and Russia.

As the military increases relief efforts around the globe, the C-17 cargo plane may see increased use in delivering aid and supplies to regions hit by natural disasters. USAF has argued that the C-17 is ideally suited to humanitarian missions.

Thirty-six hours later, eight C-130s—including an aircraft that had been training off Japan—were on their way to Kenya. Half of the fourteen aircrews involved were sent ahead on faster C-141s so they would be rested and ready to fly when the tactical airlifters arrived. The operation was fast-paced from the outset. Nine hours after touching down in Kenya, the first in-country aid flights were under way, Colonel Fariss said.

Security was a key concern. "We're putting our crews in harm's way every single day," said Colonel Coolidge. "Many of the missions were just like a military operation." Small advance teams were sent to scout the rough airfields in Somalia. A requirement that fire trucks be nearby was waived, and expensive radar and communication antennas were removed from the C-130s' undersides. All of the fields were in some degree of danger from the armed guerrilla bands that roamed the countryside.

Leave the Engines Running

Colonel Fariss said aircrew members, who were unarmed, took passive measures to minimize the danger. When delivering food to remote airstrips, Air Force personnel never left the relative safety of their C-130s. Engines were left running at all times. Crew members wore flak jackets.

The chance to practice mission planning, maintenance, and flight skills boosts readiness. During busy periods, however, such as last August and September, something has to give. Said Colonel Coolidge, "No question, we've been very stretched. We had to cut back many if not all of our exercises. We had to cut back on bread-and-butter daily training. We just didn't have the airframes."

Last fall, the US had 480 peacekeeping personnel in five countries even before it committed the larger force to Somalia. The largest contingent, 390, was in Yugoslavia; the smallest, eight, was in Mozambique. As of late November, US military personnel also were in Cambodia, the Persian Gulf, and monitoring various Arab-Israeli truces in the Middle East.

To some analysts, the UN's expanding peacekeeping agenda suggests expanding responsibilities for the US military—and perhaps expanded costs. The US pays thirty percent of the UN peacekeeping tab, an amount that has grown significantly over the past decade as UN operations have grown.

A major unresolved issue concerns the status of a plan, conceived by UN Secretary General Boutros Boutros-Ghali, to create a standing international army for peacekeeping missions. Citing Article 43 of the UN charter, Mr. Boutros-Ghali has called for negotiations among UN members on the creation of such a force. He said that twenty member states each should make available to the UN 2,000 troops on forty-eight hours' notice.

Said the Egyptian-born diplomat, "The ready availability of armed forces on call could serve, in itself, as a means of deterring breaches of the peace since a potential aggressor would know that the Council had at its disposal a means of response."

The Secretary General concedes that such a force is "not likely to be available for some time" and would be unable to cope with a major, well-armed foe. It would, however, be able to defeat a lesser power, he claimed.

President Bush recognized the growing demand for peacekeeping operations and pledged increased US assistance in command and control, intelligence, logistics, and troops. He directed that peacekeeping be added to the curriculum of the US military academies and that training of combat, engineering, and logistical units be stepped up. He offered the use of US facilities to train peacekeeping forces.

President Bush also insisted that the US should retain control over US units—an issue on which President Clinton has yet to declare himself. Mr. Boutros-Ghali suggested placing the UN army under command of the UN Military Staff Committee, made up of military chiefs of staff from the five Security Council nations.

Calls for creating a UN military force have received a cool reaction from some US analysts as well as from the Pentagon. General Powell is among those opposing the idea. He believes the international coalition assembled to prosecute the war against Iraq should be the model for future peacekeeping operations.

Andrew Cowin of the Heritage Foundation worries that a UN army would require ceding control over US soldiers. "I don't want the US to provide troops all around the world to fight wars we have no interest in," said Mr. Cowin. "When these guys sign up, they take an oath to defend and protect the Constitution, not to feed starving people in Somalia." ■

David J. Lynch covers the aerospace industry and national defense topics for the Orange County Register *in California. He is a former editor of* Defense Week *Magazine in Washington, D. C. His most recent article for* Air Force *Magazine was "Toward a New Launcher Lineup" in the January 1993 issue.*

Gallery of South Asian Airpower

By John W. R. Taylor and Kenneth Munson

Bombers and Maritime

Br 1050 Alizé

Twelve of these French-built antisubmarine aircraft were delivered to the Indian Navy from 1961 for service with the aircraft carrier INS *Vikrant*, five more ex-French Navy examples being acquired later. They became shore-based in 1987 when that ship was modernized with a ski-jump platform for Sea Harriers. They were intended to be phased out two years later, but about seven still remain with INAS 310. Duties now also include limited ASV, surface search, and reconnaissance missions. Sonobuoys are stowed in the front of the large mainwheel fairings.

Contractor: Société des Ateliers d'Aviation Louis Breguet, France.
Power Plant: one Rolls-Royce Dart RDa7 Mk 21 turboprop; 2,100 ehp.
Dimensions: span 51 ft 2 in (folded 22 ft 11½ in), length 45 ft 5¾ in, height 16 ft 5 in.
Weights: empty 12,566 lb, gross 18,078 lb.
Performance: max speed at 10,000 ft 322 mph, at S/L 286 mph, ceiling 26,250 ft, T-O run 1,886 ft, landing run 1,542 ft, range 1,553 miles.
Accommodation: crew of three.
Armament: for ASW, one torpedo or three 353-lb depth bombs in fuselage weapons bay and two depth bombs on inboard underwing stations. For ASV, six 5-in rockets or two AS.12 missiles on outboard underwing stations.

Br 1150 Atlantic 1

In 1975–76, the French Navy sold three of its original Atlantic maritime patrol aircraft to Pakistan. Despite having "Pakistan Navy" painted on their sides, they were delivered to No. 29 Squadron of the Pakistan Air Force, based at Sharea Faisal. A fourth Atlantic was acquired later, and more are reportedly being sought to offset the current US embargo on the sale of Lockheed P-3C Orions to Pakistan. The Atlantic's "double-bubble" fuselage has a pressurized upper deck roomy enough for both the normal operational crew (two pilots, a flight engineer, three observers, a radio navigator, ESM/ECM/MAD operator, radar/IFF operator, tactical coordinator, and two acoustic sensor operators) and a relief crew for long-duration missions. Equipment includes a retractable radar, MAD tailboom, and an Arar ESM pod on the fin-tip. Sonobuoys and marker flares are stowed in the rear fuselage.

Contractor: SECBAT consortium, France, Germany, Italy, Belgium, and the Netherlands.
Power Plant: two Rolls-Royce Tyne RTy20 Mk 21 turboprops; each 6,106 ehp.
Dimensions: span 119 ft 1¼ in, length 104 ft 2 in, height 37 ft 2 in.
Weights: empty 52,900 lb, gross 95,900 lb.
Performance: max speed at height 409 mph, max cruising speed at 19,685 ft 363 mph, ceiling 32,800 ft, T-O to 50 ft 4,430 ft, landing from 50 ft 3,215 ft, range 5,590 miles, max endurance 18 hr.
Accommodation: crew of 12 (see above), plus provision for full relief crew.
Armament: internal weapons bay accommodates all standard NATO bombs, mines, 385-lb depth bombs, four homing or nine acoustic torpedoes, or two Exocet ASMs. Underwing pylons for two more stores.

Canberra

After thirty-five years of service with the Indian Air Force, Canberras have been replaced by Jaguars in the low-level deep-penetration strike role. Surviving **B(I).58s** are now flown by No. 6 Squadron for anti-shipping strike, together with **B.66s** (refurbished ex-RAF B.15s and 16s), ex-RNZAF **B(I).12s**, a few **TT.18** target tugs modified by Hindustan Aeronautics from ex-RAF T.4s, and Jaguars. The remaining **PR.57s** are used for photographic duties by No. 106 Squadron. No. 35 Squadron has specially equipped ECM Canberras and MiG-21s. *(Data for Canberra B(I).58.)*

Contractor: English Electric Company, UK.
Power Plant: two Rolls-Royce Avon RA.7 Mk 109 turbojets; each 7,500 lb thrust.
Dimensions: span 63 ft 11½ in, length 65 ft 6 in, height 15 ft 7 in.
Weights: empty approx 23,170 lb, gross 56,250 lb.
Performance: max speed at S/L 510 mph, at height 560 mph, ceiling 48,000 ft, range 3,400 miles.
Accommodation: pilot and navigator, side by side, with blister canopy for pilot only.
Armament: in bomber role, up to 6,000 lb of 500- to 4,000-lb bombs carried internally. As interdictor, pack of four 20-mm Hispano guns in bomb bay, plus two 1,000-lb bombs or flares, and 2,000 lb of bombs, rockets, or flares on underwing pylons.

Br 1150 Atlantic 1, Pakistan Air Force (P. Steinemann)

Dornier 228-202, Indian Air Force (P. Steinemann)

F-27 Maritime, Royal Thai Navy

Dornier 228

First flown on March 28, 1981, this German STOL transport has since appeared in several variants, of which the **228-100** series (now out of production) can carry 15 passengers; the **228-200** series (of which the -212 is now the standard model) is 5 ft longer. The Royal Thai Navy has three for maritime reconnaissance.

India contracted in November 1983 to manufacture up to 150 Dornier 228s under license at HAL's Kanpur Division, but progress has been slow, and only 36 had been delivered by January 1992, preceded by a few German-built examples. First recipient was the Indian Coast Guard (36 228-101s ordered), with whom they serve at CGAS 744 and 750 for coastal patrol, anti-pollution missions, and antismuggling missions. These have 360° scan Marec radar in an underfuselage fairing, Omega navigation, an IR/UV linescan for pollution detection, a one-million-candlepower searchlight, loudspeaker, marine markers, a sliding cabin door to permit airdropping a 20-man life raft, and provisions for underwing antipollution spraypods.

To replace C-47s and other elderly transports, the Indian Air Force ordered 43 228-202s. Serving with Nos. 41 and 59 Squadrons, these have a large rear-fuselage cargo door and are used for various utility and logistic support roles. The shore-based Indian Navy version (27 are planned) is also the 228-202, equipped for maritime surveillance and ASV missions with Super Marec radar and antiship missiles. *(Data for 228-202.)*

Contractors: Dornier Luftfahrt GmbH, Germany; Hindustan Aeronautics Ltd, India.
Power Plant: two Garrett TPE331-5-252D turboprops; each 776 shp.
Dimensions: span 55 ft 8 in, length 54 ft 4 in, height 15 ft 11½ in.
Weights: empty 7,101 lb, gross 13,668 lb.
Performance: max cruising speed at 10,000 ft 266 mph, ceiling 28,000 ft, T-O run 2,250 ft, landing from 50 ft 1,760 ft, range with max payload 702 miles.
Accommodation: crew of one or two; transport, 22 troops (or 21 paratroops plus jumpmaster); ambulance, six litter patients plus nine sitting casualties/medical attendants.
Armament: none in basic transport role; two 7.62-mm Gatling-type guns and underwing ASMs optional on Coast Guard aircraft.

F27 Maritime, Friendship, and Troopship

Maritime, surveillance, and transport variants of the twin-turboprop Fokker F27 Friendship serve with four nations in south Asia. The basic **F27 Maritime** is unarmed and configured primarily for coastal surveillance or search and rescue, although a **Maritime Enforcer** variant can be equipped for ASW, ASV, or armed surveillance by the operator (Fokker does not install armament). The only true F27 Maritimes in the region are three with the Royal Thai Navy which, although armed,

do not have full Enforcer-standard avionics. The RTN also operates a pair of F27 **Mk 400M Troopships** for personnel/cargo transport. No. 12 Squadron of the Pakistan Air Force has a pair of F27 **Mk 200 Friendships** for VIP and calibration duties, plus one or two in EW configuration. Three other Mk 200s are used by the Pakistan Navy and two by the Indian Coast Guard. Fourth user is the air force of Myanmar, whose quartet comprises a single F27 **Mk 100,** with lower-rated (1,715 shp) Dart Mk 514 engines, and three Fairchild-built **FH-227Bs,** a stretched version with 2,250 shp Dart Mk 532s. *(Data for F27 Maritime.)*

Contractor: Fokker Aircraft BV, Netherlands.
Power Plant: two Rolls-Royce Dart Mk 552 turboprops; each 2,210 shp.
Dimensions: span 95 ft 1¾ in, length 77 ft 3½ in, height 28 ft 6½ in.
Weights: empty 27,600 lb, gross 45,000–47,500 lb.
Performance (at 38,000 lb weight): normal cruising speed at 20,000 ft 287 mph, ceiling 29,500 ft, T-O run 3,200 ft, landing run 2,000 ft, max range 3,107 miles.
Accommodation: crew of two or three. Maritime, two to four tactical compartment operators. Troopship, up to 46 paratroops, 24 litters plus nine sitting casualties/medical attendants, or 13,283 lb of cargo.
Armament (not fitted by Fokker): Enforcer has two stations under fuselage and three under each wing for two or four torpedoes/depth bombs and/or two antiship missiles; provision for drop tank on each center underwing station.

Il-38 (NATO "May")

The Indian Navy is the only non-CIS operator of this intermediate-range, shore-based, antisubmarine/maritime patrol aircraft. Its INAS 315 (Winged Stallions) Squadron was commissioned at Dabolim, Goa, in October 1977, with the first three of five refurbished Il-38s that now equip it.

The Il-38 was developed from the Il-18 turboprop airliner in much the same way as the US Navy's P-3 Orion was based on the Lockheed Electra. The fuselage was lengthened and most of the cabin windows deleted. The wing was moved forward to offset the effect on the aircraft's center of gravity of internal role-dedicated equipment and stores. Operational avionics include navigation/weather radar in the nose, search radar (NATO "Wet Eye") in an undernose radome, and an MAD tail-sting. There are two internal weapons/stores bays forward and aft of the wing carry-through structure.

Design Bureau: Ilyushin OKB, Russia.
Power Plant: four Ivchenko AI-20M turboprops; each 4,250 ehp.
Dimensions: span 122 ft 9¼ in, length 129 ft 10 in, height 33 ft 4 in.
Weights: empty 79,367 lb, gross 140,000 lb.
Performance: max speed at 21,000 ft 448 mph, patrol speed at 2,000 ft 248 mph, T-O run 4,265 ft, landing run 2,790 ft, range 4,473 miles, patrol endurance 12 h.
Accommodation: crew of twelve.
Armament: attack weapons and sonobuoys in weapons bays.

N24A Searchmaster/N22B Missionmaster

These are noncommercial versions of the GAF Nomad, a short/medium-range STOL utility twin. Thailand is the only operator on the south Asian mainland, its Air Force having 22 of the shorter-fuselage **N22B Missionmasters** for utility and tactical transport duties (crew of one or two, plus up to 14 passengers) and its Navy five of the longer **N24A Searchmaster L** maritime patrol and surveillance version. The latter have a 360° scan Litton APS-504(V)2 search radar with a 40-in flat-plate phased-array antenna in an undernose "lozenge" radome, Doppler, Omega, or inertial long-range navigation, and Barra SSQ-801 sonobuoys. One also has a SLAR (side-looking airborne radar) for antipiracy patrols in the Gulf of Thailand, for which the nation receives UN funding. *(Data for Searchmaster L.)*

Contractor: Government Aircraft Factories, Australia.
Power Plant: two Allison 250-B17C turboprops; each 420 shp.
Dimensions: span 54 ft 2 in, length 41 ft 3 in, height 18 ft 2 in.
Weights: empty 5,897 lb, gross 9,100 lb.
Performance: normal cruising speed 193 mph, ceiling 21,000 ft, T-O run 970 ft, landing run 780 ft.
Accommodation: crew of five.
Armament: provision for four underwing hardpoints, each for a 500-lb store, including gun and rocket pods.

Tu-142M (NATO "Bear-F")

Production of the Tu-95/142 family of combat aircraft, known to NATO as Bear, ended last year, 38 years after the first flight of the prototype. Several hundred were built for a wide variety of first-line roles with the former Soviet Air Armies and Naval Aviation. The only export customer was India, which acquired

N24A Searchmaster L

F-6, Bangladesh Air Force (P. Steinemann)

ten Tu-142M Bear-F long-range maritime reconnaissance aircraft in 1988, Naval Squadron INAS 312 at Dabolim, Goa. Equipped to the standard known to NATO as Mod 3, their J-band overwater search-and-surveillance radar is housed in a large radome under the center-fuselage. A fairing that projects rearward from the tip of the tailfin contains MAD gear. Bear-F's basic endurance of around 30 hours can be extended by in-flight refueling.

Design Bureau: Tupolev OKB, Russia.
Power Plant: four KKBM Kuznetsov NK-12MV turboprops; each 14,795 ehp.
Dimensions: span 167 ft 8 in, length 162 ft 5 in, height 39 ft 9 in.
Weight: gross 407,850 lb.
Performance: max speed at 25,000 ft 575 mph, ceiling 41,000 ft, combat radius (unrefueled) 5,150 miles.
Accommodation: basic crew of ten (commander, co-pilot, five weapon system operators, flight engineer, flight signaler, gunner) can be supplemented by relief crew members for long missions.
Armament: depth charges, torpedoes, and sonobuoys in two weapons bays in rear fuselage. Two 23-mm guns in manned tail turret.

Fighters

F-5E Tiger II

Thailand is reported to have nine of the original single-seat **F-5A** fighters and two two-seat **F-5B** combat trainer counterparts, serving alongside 38 improved **F-5E** single-seaters and six two-seat **F-5Fs.** The F-5Es are being updated with Litton LN-39 INS, AN/ALR-46 radar warning receivers, ALE-40 chaff/flare dispensers, and head-up display and weapon aiming computer, plus provision for carrying a podded GPU-5/A 30-mm gun of the kind fitted to the A-10A Thunderbolt II. Receipt by Thailand of F-16s has enabled the F-5s to be reassigned to surface attack roles, including antishipping missions. A few **RF-5** reconnaissance variants also serve with the Royal Thai Air Force. *(Data for F-5E.)*

Contractor: Northrop Corporation, US.
Power Plant: two General Electric J85-GE-21B turbojets; each 5,000 lb thrust with afterburning.
Dimensions: span 26 ft 8 in (27 ft 11⅞ in over wingtip AAMs), length (incl nose-probe) 47 ft 4¾ in, height 13 ft 4¼ in.
Weights: empty 9,723 lb, gross 24,722 lb.
Performance: max speed at 36,000 ft Mach 1.64, ceiling 51,800 ft, T-O run 2,000–5,700 ft, landing run with brake-chute 2,500 ft, typical hi-lo-hi combat radius with max internal fuel, two 530-lb bombs, and two Sidewinder AAMs 553 miles.
Accommodation: pilot only, on ejection seat.
Armament: two 20-mm M39A2 guns in nose; AIM-9 Sidewinder AAM at each wingtip; one underfuselage and four underwing stations for up to 7,000 lb of bombs, cluster bombs, rocket packs, napalm tanks, missiles, or other stores.

F-6 (NATO "Farmer")

Most of the Mikoyan MiG-19s license-built and later developed in China were produced by the Nanchang Aircraft Manufacturing Co. Those for the Chinese armed forces are designated **J-6;** export versions have **F-6** designations. The standard J-6/F-6 day fighter-bomber, corresponding to the Soviet MiG-19SF (NATO Farmer-C), was by far the most numerous model. Variants included the 634 **JJ-6** (export **FT-6**) tandem two-seat trainers designed and produced by Shenyang between 1973 and 1986.

A large number of F-6s and FT-6s (reportedly 125) were supplied to Pakistan in the late 1960s after US military aid was suspended following the 1965 Indo-Pakistan war. They were modified in Pakistan to carry Sidewinder AAMs and, later, to have Martin-Baker zero/zero ejection seats. Other exports have included 30 to Bangladesh and a similar number to equip two Myanmar squadrons. The Pakistan fleet had reduced to about 95 by the end of 1991, then still equipping three F-6 squadrons and an FT-6 training unit. Since then, however, phasing out has begun following the arrival of F-7s, and about 40 had been transferred to Bangladesh by mid-1992 to offset heavy losses sustained during that country's disastrous floods. *(Data for F-6 day fighter.)*

Contractors: Nanchang Aircraft Manufacturing Company and Guizhou Aircraft Industrial Corporation, People's Republic of China.
Power Plant: two Chengdu WP6 turbojets; each 7,165 lb thrust with afterburning.
Dimensions: span 30 ft 2¼ in, length incl probe 48 ft 10½ in, height 12 ft 8¾ in.
Weights: empty 12,700 lb, gross 22,045 lb.
Performance: max speed at 36,000 ft Mach 1.45, at S/L 832 mph, ceiling 58,725 ft, T-O run 2,953 ft, landing run with brake-chute 1,970 ft, combat radius with two drop tanks 426 miles, max range on internal fuel 863 miles.
Accommodation: pilot only.
Armament: three 30-mm NR-30 guns, in nose and each wingroot. Two pylons under each wing, inboard of hardpoint for external tank, to carry packs of eight air-to-air rockets, AAMs, two 550-lb bombs, or air-to-surface rockets of up to 212-mm caliber.

F-16 Fighting Falcon

Deliveries of 28 single-seat **F-16As** and 12 combat-capable two-seat **F-16Bs** to the Pakistan Air Force began in January 1983, but a larger follow-on order for 71 (60 As and 11 Bs) was embargoed by the US government as a result of Pakistan's refusal to sign the nuclear nonproliferation treaty, leading to attempts to offset the shortfall by acquiring Mirage 2000s and/or Chinese F-7s. Attrition has reduced the original 40 to about 35, but since spares for these are also banned by the embargo the actual number still serviceable may be lower than that figure. They equip Nos. 9 and 11 Squadrons at Sargodha, and No. 14 Squadron at Kamra. The PAF aircraft have Thomson-CSF Atlis laser target designation pods, and those of Nos. 9 and 11 Squadrons are alleged to be capable of carrying nuclear weapons. Deliveries of 12 F-16As and six F-16Bs to No. 103 Squadron of the Royal Thai Air Force began in July 1988, and a similar batch of 18 has been ordered for 1995 delivery. *(Data for F-16A.)*

Contractor: General Dynamics Corporation, US.
Power Plant: one Pratt & Whitney F100-PW-220 turbofan; 23,450 lb thrust with afterburning.
Dimensions: span 31 ft 0 in, length 49 ft 5.9 in, height 16 ft 8½ in.
Weights: empty 15,586 lb, gross 23,810–35,400 lb.
Performance: max speed at 40,000 ft more than Mach 2.0, ceiling more than 50,000 ft, combat radius more than 575 miles, range with drop tanks more than 2,415 miles.
Accommodation: pilot only.
Armament: one M61A1 multibarrel 20-mm gun, with 515 rds, in port side wing/body fairing. One underfuselage and six underwing stations, plus AAM rail at each wingtip. External stores (load limit 12,000 lb) can include wide range of single or cluster bombs, rockets, laser-guided and electro-optical weapons and sensors, Pave Penny laser tracker pod, FLIR or jammer pods, or drop tanks.

MiG-21 (NATO "Fishbed") and F-7M Airguard

By far the largest south Asian operator of MiG-21s is the Indian Air Force, for which several hundred were assembled and later built under license by Hindustan Aeronautics Limited in a program that ran for a decade and a half and embraced three major variants. First of these was the **MiG-21FL,** of which HAL produced about 200 from 1962 to 1968 before switching for the next three years to the improved **MiG-21M.** Comparatively few of these earlier models remain, the great majority of the 400 or so now in IAF service being of the upgraded **MiG-21bis** version produced by HAL from 1980 to 1987. In all, the IAF has some 17 squadrons equipped with the MiG-21. Since the Soviet withdrawal

from Afghanistan in 1989, that country's air force has received increasing numbers of ex-Soviet MiG-21s, which currently number 65 or more and equip four squadrons.

Other MiG-21 variants in the region are actually Chinese-built **F-7M Airguards**, an export version of the domestic **J-7 II** that was developed in China from the original J-7 (license-built **MiG-21F-13**). Production of the F-7M was authorized in December 1984 and brought an early order in 1985 from the Pakistan Air Force for 20 aircraft, deliveries of which, to No. 20 Squadron at Rafiqui, began in July 1988; they achieved IOC some 16 months later. Designated **F-7P** by the PAF (the early name Skybolt has been dropped), they incorporate a number of modifications to meet Pakistani requirements. The initial 20 have since been supplemented by a further 60 F-7Ps and 15 two-seat **FT-7s** (PAF designation **F-7TP**), equipping No. 2 Squadron at Masroor, No. 25 Squadron at Rafiqui, and a training unit at Mianwali. A further 40 F-7Ps were ordered in October 1992, to offset the US embargo on Pakistan's outstanding order for F-16s, and reports suggest that 40 more may be ordered for 1994 delivery. Other recent recipients of the F-7M include the air forces of Bangladesh (16), Myanmar (11), and Sri Lanka (four or more). *(Data for F-7M.)*

Contractor: Chengdu Aircraft Industrial Corporation, People's Republic of China.

Power Plant: one Chengdu WP7B(BM) turbojet; 13,448 lb thrust with afterburning.

Dimensions: span 23 ft 5⅝ in, length 48 ft 10 in, height 13 ft 5½ in.

Weights: empty 11,269 lb, gross 16,603 lb.

Performance: max speed at height Mach 2.05, ceiling 59,710 ft, T-O run 3,117 ft, landing run with brake-chute 2,953 ft, combat radius on internal fuel 230 miles, range with three drop tanks 1,081 miles.

Accommodation: pilot only.

Armament: two 30-mm Type 30-1 guns in lower front fuselage. Four underwing hardpoints for two or four PL-2/2A/5B/7 or Magic AAMs, pods of 18 x 57-mm or seven x 90-mm rockets, bombs of up to 1,100 lb, or drop tanks (one 190 and/or two 127 US gallon).

MiG-23 (NATO "Flogger")

To meet the challenge of Pakistan's F-16s, the Indian Air Force acquired sufficient **MiG-23MF** (NATO Flogger-B) variable-geometry single-seat interceptors to equip two squadrons in 1983, pending availability of more effective types. Some remain in service with No. 224 (Warlords) Squadron, under the Indian name **Rakshak**, but No. 223 reequipped with MiG-29s in 1990. The MiG-23MF has Sapfir-23D ("High Lark") radar, with a search range of 43 miles and tracking range of 34 miles, an undernose infrared sensor pod, and radar warning system. It carries both close-range and medium-range AAMs. Also in service are about ten **MiG-23UB** (Flogger-C) tandem two-seat trainers, with less powerful (22,045 lb thrust) Tumansky R-27F2M-300 turbojet.

Less is known about the squadron of MiG-23 interceptors that the Afghan Republican Air Force inherited when Soviet forces evacuated Afghanistan in 1989. They are possibly lighter-weight **MiG-23MLs** (Flogger-G), with a 28,660 lb thrust R-35-300 turbojet, much smaller dorsal fin, and improved radar and IR sensor. *(Data for MiG-23MF.)*

Design Bureau: Mikoyan OKB, Russia.

Power Plant: one Soyuz/Khachaturov R-29-300 turbojet; 27,540 lb thrust with afterburning.

Dimensions: span 45 ft 10 in spread, 25 ft 6¼ in swept, length (incl nose-probe) 54 ft 10 in, height 15 ft 9¾ in.

Weight: gross 34,725–45,570 lb.

Performance: max speed at height Mach 2.35, at S/L Mach 1.1, ceiling 59,000 ft, combat radius 600 miles.

Accommodation: pilot only, on ejection seat.

Armament: one twin-barrel 23-mm GSh-23L gun in belly pack. One pylon under center-fuselage, one under each engine air intake duct, and one under each fixed inboard wing panel, for AAMs, bombs, rocket packs, or other stores. Use of twin launchers under air intake ducts permits carriage of four R-60T (Aphid) missiles, in addition to two R-23R (Apex) on underwing pylons.

MiG-29 (NATO "Fulcrum")

Three squadrons of MiG-29s form the primary air-superiority equipment of the Indian Air Force. When delivery began, in early 1987, India became one of the first foreign nations to operate these advanced aircraft. The 70 **MiG-29** (Fulcrum-A) single-seaters and **MiG-29UB** (Fulcrum-B) two-seat combat trainers received to date equip No. 28 (First Supersonics), No. 47 (Flying Archers), and No. 223 (Tridents) Squadrons, under the Indian name **Baaz**. The aircraft appear to retain all or most of the operational equipment fitted to MiG-29s in service in the CIS, including coherent pulse-Doppler look-down/shoot-down radar, an infrared search/track sensor, anti-FOD doors in the engine air intakes, 360° radar warning system, laser rangefinder, and flare packs in the "fences" forward of the tailfins. One small difference is that the quality of translation from Russian to English made it necessary to replace the audible warning system that informs the pilot of a malfunction. India has been offered a license to manufacture MiG-29s to reequip its 17 squadrons of MiG-21s.

Design Bureau: Mikoyan OKB, Russia.

Power Plant: two Klimov/Sarkisov RD-33 turbofans; each 18,300 lb thrust with afterburning.

Dimensions: span 37 ft 3¼ in, length 56 ft 10 in, height 15 ft 6¼ in.

Weights: empty 24,030 lb, gross 33,600–40,785 lb.

Performance: max speed at height Mach 2.3, at S/L Mach 1.06, ceiling 55,775 ft, T-O run 820 ft, landing run with brake-chute 1,970 ft, range 932–1,800 miles.

Accommodation: pilot only, on ejection seat (two seats in tandem in MiG-29UB.)

Armament: six close-range R-60T (Aphid), or four R-60T and two medium-range R-27R (Alamo-A) AAMs on six underwing pylons; provision for carrying R-73A (Archer) close-range AAMs; able to carry bombs, submunitions dispensers, and 57-mm, 80-mm, and 240-mm rockets, up to maximum 6,615 lb, in attack role. One 30-mm GSh-301 gun in port wingroot extension, with 150 rounds.

Mirage III

Survivors of the Mirage IIIs ordered for the Pakistan Air Force in 1967 now serve with the country's Mirage 5s in No. 5 Squadron. The original 18 **Mirage IIIEP** all-weather low-altitude attack fighters and three **Mirage IIIDP** tandem two-seat trainers are now reduced to a combined total of about 18, plus a trio of reconnaissance **Mirage IIIRPs** (which see.) For their primary role, the fighters are equipped with Thomson-CSF Cyrano II fire-control and ground-mapping radar, GEC Marconi Doppler, and navigation/bombing computers, but they are equally effective for interception of Mach 2 targets.

The 43 **Mirage IIIOs** and seven two-seat **DOs** acquired when Australia replaced them with Hornets are being reworked by the Pakistan Aeronautical Complex's Mirage Rebuild Factory at Kamra to augment the PAF's Mirage fleet. Plans are to rebuild 36, the first of which was completed in late 1991, at the rate of one to two per month, to equip two further squadrons; the remainder are expected to be cannibalized for spares. *(Data for Mirage IIIEP.)*

Contractor: Avions Marcel Dassault-Breguet Aviation, France.

Power Plant: one SNECMA Atar 9C turbojet; 13,670 lb thrust with afterburning.

Dimensions: span 26 ft 11½ in, length 49 ft 3½ in, height 14 ft 9 in.

Weights: empty 15,540 lb, gross 21,165–30,200 lb.

Performance: max speed at 40,000 ft Mach 2.2, at S/L Mach 1.135, ceiling 55,775 ft, T-O run 2,295 ft, landing run with brake-chute 2,295 ft, combat radius (lo-lo-lo) 305 miles.

Accommodation: pilot only.

Armament: two 30-mm DEFA 552 guns in fuselage; one R.530 AAM under fuselage and two Magic AAMs under wings. Bombs or rocket pods can be carried underwing on attack missions.

Mirage 2000

Between 1985 and 1988 the Indian Air Force received a total of 42 single-seat **Mirage 2000Hs** and seven two-seat **2000THs** to equip Nos. 1 (Tigers) and 7 (Battle Axe) Squadrons, both based at Maharajpura AFB, Gwalior. They represent its only genuine modern multirole fighters and, having proved their worth in combat situations in Sri Lanka and the Maldive Islands, the IAF would like more but has to overcome budget constraints. Its current 2000Hs are generally similar to French Air Force Mirage 2000Cs, with RDM multimode Doppler radar (range 62 miles), Uliss 52 INS, head-up and head-down cockpit displays, ECM jammers and chaff/flare dispenser, Spirale passive countermeasures, and Serval radar warning receivers. Fly-by-wire flight controls are standard, contributing to a safe minimum speed of 115 mph in stable flight. In air-defense configuration, the aircraft can attain a speed of Mach 2.26 at 39,350 ft within 2½ min of leaving the runway. Indian name for the Mirage 2000H is **Vajra**. *(Data for Mirage 2000H.)*

Contractor: Dassault Aviation, France.

Power Plant: one SNECMA M53-P2 turbofan; 21,385 lb thrust with afterburning.

Dimensions: span 29 ft 11½ in, length 47 ft 1¼ in, height 17 ft 0¾ in.

Weights: empty 16,534 lb, gross 37,480 lb.

Performance: max speed at height Mach 2.26, ceiling 59,000 ft, range with four 550-lb bombs more than 920 miles.

Accommodation: pilot only.

Armament: two 30-mm DEFA 554 guns in fuselage; five hardpoints under fuselage and two under each wing for max external stores load of 13,890 lb. Two Super 530D and two Magic 2 AAMs for air defense. Mirage 2000 ground-attack weapons include 18 x 550-lb retarded bombs or BAP 100 antirunway bombs, 16 Durandal penetration bombs, two 2,200-lb laser-guided bombs, six Belouga cluster bombs, ASMs, and packs of 18 x 68-mm, or 100-mm rockets.

F-16A Fighting Falcon, Pakistan Air Force

MiG-29s, Indian Air Force (P. Steinemann)

Mirage IIIEP, Pakistan Air Force (P. Steinemann)

Attack Aircraft

A-5

Under the domestic designation **Q-5,** China scaled up and extensively redesigned the J-6 (license MiG-19) fighter-bomber into a dedicated attack aircraft, the principal external change being to adopt "cheek" intakes instead of a single bifurcated nose intake for the twin turbojet engines. Several hundred Q-5s, in various versions, were built.

The **A-5C** is a much-improved version, produced to meet an April 1981 order from the Pakistan Air Force. This has a Martin-Baker zero/zero seat and upgraded avionics and is adapted to carry weapons and drop tanks already standard on other PAF aircraft, including Sidewinder AAMs. After completing three A-5C prototypes, Nanchang delivered 52 to Pakistan, where they equip Nos. 7, 16, and 26 Squadrons at Peshawar and Masroor, although numbers are now reportedly down to little more than 40. There is still no confirmation of deliveries to Bangladesh, which was reported to have ordered 20 similar aircraft in 1987. *(Data for A-5C.)*

Contractor: Nanchang Aircraft Manufacturing Company, People's Republic of China.

Power Plant: two Shenyang WP6 turbojets; each 7,165 lb thrust with afterburning.

Dimensions: span 31 ft 10 in, length 50 ft 7 in (excl nose-probe), height 14 ft 9¾ in.

Weights: empty 14,317 lb, gross 21,010–26,455 lb.

Performance: max speed (clean) at 36,000 ft 740 mph, at S/L 752 mph, ceiling (clean) 52,000 ft, T-O run (clean) 2,460 ft, landing run with brake-chute 3,480 ft, combat radius (max external stores) 248–373 miles, range (max internal/external fuel) 1,240 miles.

Mirage 5PAs, Pakistan Air Force (P. Steinemann)

Accommodation: pilot only, on zero/zero (Pakistan only) or low-speed/zero height ejection seat.
Armament: 23-mm Norinco Type 23-2K gun, with 100 rds, in each wingroot. Ten weapon stations (two pairs in tandem under fuselage and three under each wing) for up to 4,410 lb of stores including bombs, rockets, AAMs or ASMs, other ordnance, ECM pods, or drop tanks.

A-37B Dragonfly

The A-37B is a small counterinsurgency aircraft based on USAF's T-37B Tweet trainer. Its 2,850 lb thrust turbojets, compared with the T-37's 1,025 lb thrust J69s, permit a more than doubled gross weight. Maximum speed and range are considerably greater, with added provision for in-flight refueling, and up to 4,100 lb of weapons and stores can be carried on eight underwing hardpoints. Eleven A-37Bs, plus a few T-37s, equip No. 211 Squadron of Wing 21 of the Royal Thai Air Force, based at Ubon Ratchathani.
Contractor: Cessna Aircraft Company, US.
Power Plant: two General Electric J85-GE-17A turbojets; each 2,850 lb thrust.
Dimensions: span over tiptanks 35 ft 10½ in, length 29 ft 3½ in, height 8 ft 10½ in.
Weights: empty 6,211 lb, gross 14,000 lb.
Performance: max speed at 16,000 ft 507 mph, ceiling 41,765 ft, T-O run 1,740 ft, landing run 1,710–4,150 ft, range with max payload 460 miles, ferry range 1,012 miles.
Accommodation: crew of two, side by side.
Armament: one 7.62-mm Minigun in front fuselage. Eight underwing stations for bombs, rocket packs, gun pods, cluster weapons, or other stores.

AU-23A Peacemaker

Developed in the US by Fairchild Industries, this militarized version of the Swiss Pilatus Turbo-Porter STOL utility transport is one of many aircraft adapted since World War II for counterinsurgency and border-control duties in Third World countries. Fifteen were acquired by USAF for evaluation under the Credible Chase program, in competition with the Helio AU-24A. Thirteen of these were transferred to the Royal Thai Air Force in the early 1970s under the Pave Coin program. Twenty more were acquired by Thailand from 1975, and about two dozen Peacemakers continue in use by the RTAF for armed utility missions. A few also serve with the Royal Thai Army.
Contractor: Fairchild Industries, US.
Power Plant: one Garrett TPE331-1-101F turboprop; 650 shp.
Dimensions: span 49 ft 8 in, length 36 ft 10 in, height 12 ft 3 in.
Weight: gross 6,100 lb.
Performance: max speed 175 mph, ceiling 22,800 ft, T-O run 515 ft, landing run 295 ft, range 558 miles.
Accommodation: pilot and provision for up to nine passengers on seats that are quickly removable for freight carrying. Hatch in floor for dropping supplies or leaflets, or for a camera installation.
Armament: four underwing hardpoints for total load of 1,400 lb, and one underfuselage hardpoint for 590 lb. Armament and equipment can include gun or rocket pods, bombs, napalm, smoke grenades, a loudspeaker pod, cameras, etc. One side-firing 20-mm M197 gun or two 7.62-mm Miniguns in cabin.

Jaguar

The Indian Air Force chose the Anglo-French Jaguar to fulfill its important DPSA (deep penetration strike aircraft) requirement in 1978, after evaluating the type in competition with the Swedish Viggen and French Mirage F1. It has ordered a total of 116 to date, mostly single-seaters to advanced Jaguar International standard, but including 15 tandem two-seaters and

OV-10C Bronco, Royal Thai Air Force (P. Steinemann)

MiG-25R, Indian Air Force (P. Steinemann)

eight specially equipped with Agave radar, a Smiths Industries DARIN (display attack and ranging inertial navigation) system, and Sea Eagle missiles for an antishipping role. The IAF name is **Shamsher**.

The first 40 Jaguars for the IAF were assembled by British Aerospace in the UK. On March 31, 1982, Hindustan Aeronautics flew the first of 45 assembled from knocked-down component kits manufactured in Europe. The remaining 31 aircraft have been manufactured almost entirely in India, with production approaching its end. The basic strike aircraft are operated by Nos. 5, 14, 16, and 27 Squadrons; No. 6 Squadron has a mix of the special maritime version of the Jaguar and a few Canberras for its antishipping duties. Compared with early model Jaguars flown by the Royal Air Force and French Air Force, the Indian Jaguars have more powerful engines, provision for carrying two Magic self-defense missiles on overwing pylons, and a new nav/attack system that includes Uliss 82 INS, a GEC Ferranti COMED moving-map display, and Smiths Industries HUDWACS. *(Data for single-seat Jaguar International.)*
Contractors: SEPECAT consortium, France and UK; Hindustan Aeronautics, India.
Power Plant: two Rolls-Royce Turbomeca Adour Mk 811 turbofans; each 8,400 lb thrust with afterburning.
Dimensions: span 28 ft 6 in, length 55 ft 2½ in, height 16 ft 0½ in.
Weights: empty 15,432 lb, gross 24,149–34,612 lb.
Performance: max speed at 36,000 ft Mach 1.6, at S/L 840 mph, ceiling 45,000 ft, T-O run 1,855–4,100 ft, landing run with brake-chute 1,540–2,200 ft, typical attack radius with external fuel 570 miles (lo-lo-lo), 875 miles (hi-lo-hi).
Accommodation: pilot only.
Armament: two 30-mm guns in fuselage; two Magic AAMs overwing; centerline pylon and two under each wing for 10,000 lb of stores, including eight 1,000-lb bombs, BL755 or Belouga cluster bombs, packs of 68-mm rockets, or a reconnaissance camera pack.

MiG-23/27 (NATO "Flogger")

The MiG-23B light attack aircraft was developed in parallel with the MiG-23M interceptor from the preseries MiG-23S. The forward fuselage was redesigned, with the nose sharply tapered in side elevation to house a PrNK Sokol-23S nav/attack system. The underbelly 23-mm gun was retained, but the cockpit sides were armored; low-pressure tires were fitted for off-runway operation; the fuel tanks were redesigned to fill with neutral gas as the contents were used, to prevent explosion after impact; active and passive ECM were provided; and the type of turbojet was changed to a Lyulka AL-21F more suited to low-level operation at high speed. In 1980, India ordered 95 **MiG-23BNs** (Flogger-F), generally similar except for having a 25,350 lb thrust Soyuz/Khachaturov R-29B-300 turbojet and Sokol-23N nav/attack system. These aircraft still fly with Nos. 10 (Winged Dagger), 220 (Desert Tigers) and 221 Squadrons, in which they replaced Maruts and Su-7BMKs. They have the Indian name **Vijay.**

When Mikoyan developed a more specialized tactical strike variant of the MiG-23 as the MiG-27, the Indian Government obtained license rights, and Hindustan Aeronautics began assembly of the most advanced version under the designation **MiG-27M** (Flogger-J). Known by the Indian name **Bahadur**, this has fixed engine air intakes, instead of the variable-geometry type of the MiG-23; two-position afterburner nozzles; a wider and deeper nose, housing a laser rangefinder and target tracker behind a sloping window, to permit use of laser-guided missiles; a 30-mm six-barrel gun; a PrNK-23M nav/attack system, providing automatic flight control, gun firing, and weapons release, even during maneuvers; provision for new stores, including a three-camera reconnaissance pod; and many other refinements. It has replaced Su-7BMKs and Ajeets in Nos. 2, 9 (Wolf Pack), 18, 22, 31 (Ocelots), and 222 (Tigersharks) Squadrons. With 165 HAL-assembled MiG-27Ms ordered to date, eight squadrons will eventually fly this type. Total manufacture is planned to exceed 200.

The Afghan Republican Air Force has one squadron of MiG-27s. *(Data for MiG-27M.)*
Design Bureau: Mikoyan OKB, Russia.
Power Plant: one Soyuz/Khachaturov R-29B-300 turbojet, 25,350 lb thrust with afterburning.
Dimensions: span 45 ft 10 in spread, 25 ft 6¼ in swept, length incl nose-probe 56 ft 0¼ in, height 16 ft 5 in.
Weights: empty 26,252 lb, gross 39,685 lb.
Performance: max speed at 26,250 ft Mach 1.7, at S/L Mach 1.1, ceiling 45,900 ft, T-O run 2,625 ft, combat radius at S/L 242 miles, ferry range 1,553 miles.
Accommodation: pilot only, on ejection seat.
Armament: one underbelly 30-mm six-barrel GSh-6-30 gun; seven external hardpoints for 6,615 lb of 500-kg bombs, 57-mm rockets, two Kh-23 (Kerry) ASMs, four R-60 (Aphid) ASMs, or other stores.

Mirage 5

The Mirage 5 began life as a specialized ground-attack development of the Mirage III. The radar was deleted and other avionics and systems simplified to permit increased internal fuel capacity and external stores load within the same gross weight. Options available to customers led eventually to a narrowing of the differences between the equipment standards of the III and 5. Pakistan placed an initial order for 28 single-seat **Mirage 5PAs** and two **5DP** two-seat trainers in 1970; those remaining equip No. 22 Squadron, the Mirage OCU. Ten **Mirage 5RPs**, with nose-mounted cameras, were ordered in 1975, followed by 30 single-seat **5PA2s** and **5PA3s** and two **5DPA2** trainers in 1979. The 5PA2s, with Cyrano IV multimission radar, now serve with No. 33 Squadron of the Pakistan Air Force. No. 8 Squadron at Masroor has the 5PA3s with Agave radar for compatibility with Exocet antiship missiles. *(Data generally as for Mirage III.)*

OV-10 Bronco

The twin-turboprop, twin-boom OV-10 was the first aircraft designed from the start for specialized counter-insurgency operations. In 1968–69, the US Marine Corps took delivery of 114 OV-10As, and 157 were delivered to USAF. Many of these remain in service for FAC duties. The Royal Thai Air Force deploys its **OV-10C** Broncos for more aggressive purposes. About 24 equip Nos. 411 and 711 Squadrons, based as Wing 41 at Chieng Mai and with Wing 71 at Surat Thani, respectively. They have engaged in frequent border clashes, so successfully that Thailand joined with the Philippines in an unsuccessful effort to get OV-10 production restarted in the late 1970s.
Contractor: Rockwell International Corporation, US.
Power Plant: two Garrett T76-G-416/417 turboprops; each 715 ehp.
Dimensions: span 40 ft 0 in, length 41 ft 7 in, height 15 ft 2 in.

Weights: empty 6,893 lb, gross 9,908 lb (normal), 14,444 lb (overload).
Performance: max speed at S/L 281 mph, ceiling 24,000 ft, T-O run (normal gross weight) 740 ft, landing run 740–1,250 ft, combat radius with 3,600 lb weapon load 228 miles.
Accommodation: crew of two, in tandem.
Armament: two short sponsons each house two 7.62-mm M60C machine guns, with 500 rds per gun. Four pylons under sponsons each have a capacity of 600 lb; a centerline fifth pylon can carry 1,200 lb. Stores can include bombs, fire bombs, cluster bombs, rocket packs, 7.62-mm Minigun and 20-mm gun pods, flares, smoke canisters, and Sidewinder AAMs.

Sea Harrier

The Indian Navy began receiving its 23 STOVL Sea Harrier **FRS. Mk 51s** in January 1983, only seven months after Royal Navy FRS. Mk 1s had destroyed 22 enemy aircraft without loss in the Falklands campaign. Key to this success was the exceptional maneuverability in dogfight situations that results from the Sea Harrier's ability to use its "puffer" stability control jets and thrust vectoring in forward flight ("viffing"). It has a radar with air-to-air and air-to-surface modes and is free of magnesium components that could cause corrosion problems at sea. By the use of ski-jump techniques from aircraft carriers, which it pioneered, its gross weight was increased by 2,500 lb.

India's Sea Harriers are operated by No. 300 (White Tiger) Squadron, which has its shore base at Dabolim and has served on the carrier INS *Vikrant*. A second squadron will equip the INS *Viraat*. Both ships have ski-jump ramps. The four **T. Mk 60** two-seat trainers ordered by India are based on the nonmaritime Harrier but have Sea Harrier avionics except for Blue Fox radar. *(Data for FRS. Mk 51.)*
Contractor: British Aerospace plc, UK.
Power Plant: one Rolls-Royce Pegasus Mk 104 vectored-thrust turbofan; 21,500 lb thrust.
Dimensions: span 25 ft 3 in, length 47 ft 7 in, height 12 ft 2 in.
Weights: empty 14,052 lb, gross 26,200 lb.
Performance: max speed at S/L above 736 mph, high-altitude intercept radius 460 miles, strike radius 288 miles.
Accommodation: pilot only.
Armament: one centerline and four underwing hardpoints for up to 8,000 lb of stores, including Sea Eagle ASMs, 1,030-lb free-fall and 1,120-lb parachute-retarded bombs, rockets, and flares. Four Magic 2 AAMs can be carried on outboard pylons by Indian Navy aircraft. Provision for replacing underfuselage strake fairings with two 30-mm Aden gun pods.

Su-7/20/22 (NATO "Fitter")

The arrival of a defecting Afghan Republican Air Force **Su-22M-4** (Fitter-K) single-seat attack aircraft at the Pakistan Air Force Base Peshawar, on July 6, 1989, gave the first indication that Afghanistan was operating this advanced model of the Su-17/20/22 family. It was known to have two squadrons of vintage **Su-7BM** (Fitter-A) fixed-wing attack aircraft at Shindand, operating alongside a squadron of variable-geometry Fitters, thought to be **Su-20s** (Fitter-C). It is likely that this last unit has been supplemented by Su-22M-4s, either supplied directly from Russia or left by the Soviet forces withdrawn from Afghanistan in 1989.

The Su-20 is the original export variable-geometry Fitter, with an AL-21F-3 engine. Its outer wing panels offer manually set sweep angles of 30°, 45°, and 63°. The Su-22M-4 has ranging radar and a laser rangefinder in the intake centerbody, Doppler navigation radar inside the bottom of the deepened nose, additional fuel in a deeper spine fairing, and a cooling air intake forward of the dorsal fin. *(Data for Su-22M-4.)*
Design Bureau: Sukhoi OKB, Russia.
Power Plant: one Saturn/Lyulka AL-21F-3 turbojet; 24,800 lb thrust with afterburning.
Dimensions: span 45 ft 3 in spread, 32 ft 10 in swept, length incl probes 61 ft 6¼ in, height 16 ft 5 in.
Weight: gross 42,990 lb.
Performance: max speed at height Mach 2.09, at S/L Mach 1.14, ceiling 49,865 ft, T-O run 2,955 ft, landing run 3,120 ft, range at high altitude 1,430 miles, at S/L 870 miles.
Accommodation: pilot only, on ejection seat.
Armament: two 30-mm NR-30 guns in wingroots, each with 80 rounds. Nine pylons under wings and fuselage for more than 7,000 lb of bombs, rocket packs, 23-mm gun pods, two R-60 (Aphid) AAMs, or ASMs including Kh-23 (Kerry) and Kh-25ML (Karen).

Su-24 (NATO "Fencer")

If the reported delivery of 15 Su-24MKs (NATO Fencer-D) to the Afghan Republican Air Force during the past year is confirmed, its attack capability will have increased enormously. Several hundred aircraft of this type formed the primary strike element of the western air armies of the former USSR throughout the 1980s. The Su-24M version, and its MK export counterpart, have much-improved operational systems compared with early models. This includes terrain-following instead of terrain-avoidance radar, and a laser ranger/designator. There is provision for in-flight refueling, and a wider range of weapons can be carried. Wingsweep can be set at 16°, 45°, or 68°.
Design Bureau: Sukhoi OKB, Russia.
Power Plant: two Saturn/Lyulka AL-21F-3A turbojets; each 24,800 lb thrust with afterburning.
Dimensions: span 57 ft 10 in spread, 34 ft 0 in swept, length 80 ft 5¾ in, height 20 ft 3¾ in.
Weights: empty 41,885 lb, gross 73,470–87,520 lb.
Performance: max speed clean at height Mach 1.35, at S/L Mach 1.08, ceiling 57,400 ft, T-O run 3,610–4,265 ft, landing run with brake-chute 3,120–3,610 ft, combat radius (lo-lo-lo) over 200 miles, (hi-lo-hi with 6,615 lb of weapons and two external tanks) 650 miles.
Accommodation: pilot and weapon systems officer side by side, on ejection seats.
Armament: one GSh-6-23M six-barrel 23-mm gun under fuselage; nine pylons under fuselage, wingroot gloves, and outer wings for 17,635 lb of air-to-surface weapons, including up to four TV or laser-guided bombs, conventional bombs (typically 38 x 220-lb), 57-mm to 370-mm rockets, 23-mm gun pods, and such ASMs as Kh-23 (Kerry), Kh-25ML (Karen), Kh-58 (Kilter), Kh-25MP (Kegler), Kh-59 (Kingpost), Kh-29 (Kedge), and Kh-31 (Krypton). Two R-60 (Aphid) AAMs can be carried for self-defense.

Su-25 (NATO "Frogfoot")

Among equipment transferred from the Soviet forces to the Afghan Republican Air Force in 1989 were, reportedly, 50 Su-25 (Frogfoot-A) single-seat close support aircraft. The earlier destruction in Afghanistan of 23 Soviet Su-25s, mostly to shoulder-fired SAMs carried by the *mujahedeen*, must have limited enthusiasm for this type of combat aircraft, designed to attack at low altitude and comparatively low speed, despite the fact that survivability features account for some 7.5 percent of the Su-25's normal gross weight. It is claimed to place bombs within 16 ft of a target over a standoff range of 12.5 miles, thanks to an efficient laser guidance system, but it needs dispensers for 256 IRCM flares in an effort to avoid destruction.
Design Bureau: Sukhoi OKB, Russia.
Power Plant: two Soyuz/Tumansky R-195 turbojets, each 9,921 lb thrust.
Dimensions: span 47 ft 1½ in, length 50 ft 11½ in, height 15 ft 9 in.
Weights: empty 20,950 lb, gross 32,187–38,800 lb.
Performance: max speed at S/L Mach 0.8, max attack speed with airbrakes open 428 mph, ceiling 22,965 ft, T-O run 1,970–3,935 ft, landing run with brake-chutes 1,312 ft, range with max weapon load at S/L 466 miles, at height 776 miles.
Accommodation: pilot only, on ejection seat.
Armament: one twin-barrel 30-mm gun, with 250 rounds (sufficient for one-second burst during each of five attack runs) in nose. Eight large underwing pylons for 9,700 lb of air-to-surface weapons, including SPPU-22 pods containing 23-mm guns with barrels that pivot downward; 57-mm to 370-mm rockets; laser-guided, rocket-boosted 772-lb to 1,477-lb bombs; and 1,100-lb incendiary, antipersonnel, and chemical cluster bombs. Two small outboard pylons for R-3S (Atoll) or R-60 (Aphid) self-defense AAMs.

Reconnaissance and Special Mission Aircraft

IAI-201 Arava

Production of this Israeli general-purpose STOL transport was dominated by the IAI-201 military version, which first flew in March 1972; more than 70 were built. Three delivered to the Royal Thai Air Force have specialized avionics by Elta of Israel and are employed as elint aircraft. The pod-and-boom Arava has a hinged tailcone that opens through more than 90° to give unrestricted access to the 450 cu ft cabin.
Contractor: Israel Aircraft Industries.
Power Plant: two Pratt & Whitney Canada PT6A-34 turboprops; each 750 shp.
Dimensions: span 68 ft 9 in, length 42 ft 9 in, height 17 ft 1 in.
Weights: empty 8,816 lb, gross 15,000 lb.
Performance: max cruising speed at 10,000 ft 198 mph, ceiling 25,000 ft, T-O run 960 ft, landing run 820 ft, max range 621 miles.
Accommodation: crew of one or two; up to 24 troops, 16 paratroops with two dispatchers, 10 litters with two medical attendants, small vehicles, or equivalent cargo, in main cabin.
Armament (optional): fuselage-side attachments for two 0.50-in single-gun packs, with pylon below each pack for six-round rocket pod.

MiG-25R (NATO "Foxbat-B")

No. 102 (Trisonics) Squadron of the Indian Air Force has four **MiG-25R** (Foxbat-B) single-seat reconnaissance aircraft and two two-seat **MiG-25RU** (Foxbat-C) trainers. Since their delivery in 1981, these Mach 2.83 aircraft have given India a capability unmatched in Asia outside the former Soviet Union. They are strictly "straight and level" aircraft, with no concessions to agility, but have presented no problems to pilots of Third World nations. Construction is 80 percent tempered steel, with eight percent titanium in areas subject to extreme heating, such as wing and tail leading edges, and 11 percent heat-resistant aluminum alloy, by weight. Tanks in each fin provide an additional 185 gallons of fuel compared with the MiG-25 interceptor. With a 1,400-gallon underbelly tank, the MiG-25R can fly long distances at a cruising speed of Mach 2.35. Any one of three interchangeable photographic/elint modules, with five camera windows and flush dielectric panels, can be carried aft of the small dielectric nosecap that replaces the interceptor's Smertch fire-control radar.
Design Bureau: Mikoyan OKB, Russia.
Power Plant: two Tumansky R-15BD-300 turbojets; each 24,700 lb thrust with afterburning.
Dimensions: span 44 ft 0¼ in, length 78 ft 1¾ in, height 20 ft 0¼ in.
Weights: empty 43,200 lb, gross 81,570–90,830 lb.
Performance: max speed at height Mach 2.83, at S/L Mach 0.98, ceiling 68,900 ft, T-O run 4,100 ft, landing run 2,625 ft, range at supersonic speed 1,015–1,323 miles, subsonic 1,158–1,491 miles.
Accommodation: pilot only, on zero-height/81 mph ejection seat.
Armament: none.

Mirage IIIR and 5R

Pakistan's first purchase of photoreconnaissance Mirages from France was a trio of **Mirage IIIRPs**, basically similar to the IIIE fighter except for replacement of the latter's Cyrano fire-control radar by an extended nose section containing a battery of five Omera Type 31 cameras. These can be mounted in various arrangements to provide day or night photography at low, medium, or high altitude. The two 30-mm guns and air-to-ground weaponry capability of the IIIE are retained. A later (1975) order was placed for ten **Mirage 5RPs**, with greater range and less sophisticated avionics but otherwise similar. Most of these 13 aircraft continue in service, currently with No. 5 Squadron of the Pakistan Air Force at Sargodha. *(Mirage IIIR data as for IIIE except as follows.)*
Dimensions: length 50 ft 10¼ in.
Weights: empty 14,550 lb.

Transports

An-12/Y-8 (NATO "Cub")

The Afghan Republican Air Force had 12 **An-12BP** paratroop and medium-range cargo transports at the beginning of the 1990s. The hard-worked Indian Air Force fleet has been reduced to about 12 aircraft due to airframe fatigue, but some remain in service with No. 25 Squadron, side by side with their Il-76 replacements. Powered by four 3,945 ehp Ivchenko AI-20K turboprops, the An-12 carries 90 troops, 60 paratroops, or 44,090 lb of freight. Loading is via a door under the upswept rear fuselage, but the An-12BP lacks an integral ramp for vehicles.

Except for its more pointed nose transparencies, the Chinese **Y-8** is outwardly indistinguishable from the An-12BP. It is manufactured without a license, and its redesigned Chinese turboprops have a higher rating than the AI-20K. It also introduced a rear-loading ramp/door. The first Y-8 flew at Xian on December 25, 1974. Subsequent deliveries include two **Y-8Ds** for the Sri Lanka Air Force, differing from the standard military Y-8A only in having avionics by Collins and Litton. *(Data for Y-8A.)*
Contractor: Shaanxi Aircraft Company, People's Republic of China.
Power Plant: four Zhuzhou WJ6 turboprops; each 4,250 ehp.
Dimensions: span 124 ft 8 in, length 111 ft 7½ in, height 36 ft 7½ in.
Weights: empty 78,264 lb, gross 134,480 lb.

Performance: max speed at 22,965 ft 411 mph, ceiling 34,120 ft, T-O run 4,035 ft, landing run 3,609 ft, range with max payload 791 miles, with max fuel 3,490 miles.
Accommodation: crew of five and 14 passengers in pressurized forward section of fuselage; unpressurized main cabin for 96 troops, 58 paratroops, or 60 litter patients and 20 seated casualties plus three attendants, or two army trucks. Rear loading ramp/door (not on An-12).
Armament: two 23-mm guns in manned tail turret.

An-24/26 (NATO "Coke"/"Curl")

The 50-passenger **An-24** twin-turboprop transport, first flown in prototype form in 1960, formed the starting point for a long series of transport, photographic, and general-purpose aircraft culminating in the An-32. The only operator of the earlier types in the region covered in this Gallery appears to be the Afghan Republican Air Force, which has an An-24 configured for VIP use and around 20 An-26 freighters.

Except for its redesigned "beaver-tail" rear fuselage, the addition of an auxiliary turbojet in the rear of the starboard engine nacelle, fewer cabin windows, and more powerful turboprops, the **An-26** differs little from the An-24. It was the first type to utilize Oleg Antonov's unique rear-loading ramp. This forms the underside of the rear fuselage when retracted, in the conventional way, but can be slid forward under the rear of the cabin, to facilitate direct loading on to the floor of the hold, or when the cargo is to be airdropped. *(Data for An-26.)*
Design Bureau: Antonov OKB, Ukraine.
Power Plant: two Ivchenko AI-24VT turboprops; each 2,820 ehp: plus 1,765 lb thrust RU-19A-300 auxiliary turbojet for turboprop starting and to provide additional power for takeoff, climb, and cruising flight, as required.
Dimensions: span 95 ft 9½ in, length 78 ft 1 in, height 20 ft 1½ in.
Weights: empty 32,518 lb, gross 50,706–52,911 lb.
Performance: cruising speed at 20,000 ft 270 mph, ceiling 24,600 ft, T-O run 2,855 ft, landing run 2,135 ft, range with max payload 770 miles, with max fuel 1,652 miles.
Accommodation: crew of five plus station for load supervisor or dispatcher; 12,125 lb payload. Electrically powered mobile hoist, capacity 4,409 lb, and conveyor to facilitate loading and airdropping. Provision for carrying 40 paratroops or 24 litters and an attendant.
Armament: provision for pylons on the sides of the fuselage for carrying up to 4,409 lb of weapons or supply containers.

An-32 (NATO "Cline")

The An-32 has an airframe generally similar to that of the An-26 but with much more powerful turboprops, triple-slotted trailing-edge flaps outboard of the engines, automatic leading-edge slats, enlarged ventral fins, and a full-span slotted tailplane. Together with improvements to the landing gear retraction mechanism, deicing and air-conditioning systems, electrical system, and engine starting, these changes offer greatly enhanced performance under high-altitude and hot climatic conditions. Typically, the An-32 will operate from unpaved strips at airfields 14,750 ft above S/L in an ambient temperature of ISA + 25°C.

Current production rate of the An-32 is 40 aircraft a year, mostly for CIS military use. India took delivery of 123 to replace its C-47s, C-119s, and DHC-4s, and these are named **Sutlej**, after a Punjabi river. They are operated by Nos. 12, 19, 33, 43, 48, and 49 Squadrons, plus training wings. Afghanistan is reported to have at least six. No. 3 Squadron of the Bangladesh Air Force, based at Jessore, replaced its three An-26s with two An-32s in mid-1989.
Design Bureau: Antonov OKB, Ukraine.
Power Plant: two Ivchenko AI-20D Series 5 turboprops; each 5,112 ehp.
Dimensions: span 95 ft 9½ in, length 78 ft 0¼ in, height 28 ft 8½ in.
Weights: empty 38,158 lb, gross 59,525 lb.
Performance: max cruising speed 329 mph, ceiling 30,840 ft, T-O run 2,495 ft, landing run 1,542 ft, range with max payload 745 miles, with max fuel 1,565 miles.
Accommodation: crew of three or four; up to 50 passengers, 42 parachutists and a jumpmaster, 24 litter patients and three medical personnel, or 14,770 lb of freight.
Armament: provision for carrying four bombs or other stores on hardpoints on each side of the fuselage, below the wings.

C-47 Skytrain and AC-47

The career of the inimitable **C-47** stubbornly refuses to come to an end, and among the nations covered by this Gallery, the Royal Thai Air Force operates more than 15 (and the Army one), while the Air Force also has about five examples of the **AC-47** gunship version. *(Data for C-47B except where indicated.)*
Contractor: Douglas Aircraft Company, US.
Power Plant: two Pratt & Whitney R-1830-90C radial piston engines; each 1,200 hp.
Dimensions: span 95 ft 6 in, length 63 ft 9 in, height 17 ft 0 in.
Weights: empty 18,135 lb, gross 26,000–31,000 lb.
Performance: max speed at 10,000 ft 224 mph, ceiling 26,400 ft, range 1,600 miles.
Accommodation: crew of two; up to 27 troops, 18–24 litters, or 10,000 lb of cargo in main cabin.
Armament (AC-47): up to three General Electric 7.62-mm Miniguns in main cabin.

C-130 Hercules

The appropriateness of the Hercules name is apparent from the fact that quite a number of late-1950s **C-130As and Bs** remain in service, as well as many **C-130Es.** South Asian operators of these variants include Pakistan's No. 6 Squadron at Chaklala, with four C-130Bs, seven C-130Es, and a single commercial **L-100-20;** the L-100-20 has a slightly longer (106 ft 1 in) fuselage. The 11 C-130s have recently been upgraded by Singapore Aerospace. The current-standard **C-130H,** introduced in 1964 with uprated engines and more modern avionics, and the stretched **C-130H-30,** are operated by the Royal Thai Air Force (four of each, with two more of each on order). *(Data for International C-130H.)*
Contractor: Lockheed Aeronautical Systems Company, US.
Power Plant: four Allison T56-A-15 turboprops; each 4,508 shp.
Dimensions: span 132 ft 7 in, length 97 ft 9 in, height 38 ft 3 in.
Weights: empty 76,469 lb, gross 155,000–175,000 lb.
Performance: max cruising speed 374 mph, ceiling 33,000 ft, T-O run 3,580 ft, landing run 1,700 ft, range with max payload 2,356 miles.
Accommodation: crew of four plus loadmaster; up to 92 troops, 64 paratroops, 74 litters and two medical attendants, or equivalent weight of vehicles, artillery pieces, or cargo in main cabin.
Armament: none.

An-32, Indian Air Force (P. Steinemann)

HS 748, Sri Lanka Air Force (P. Steinemann)

Skyvan 3M, Royal Nepalese Air Force (P. Steinemann)

HS 748

By far the largest user of the Hawker Siddeley 748 is the Indian Air Force, which still has more than 50 of the 64 built for it under license by the Kanpur Division of Hindustan Aeronautics: 12 as VIP transports for the Air Hq Communications Squadron, 29 as aircrew trainers (18 pilot, seven navigation, and four signals), three for aerial survey, and 20 **748(M)** freighters with side-loading cargo door. Current IAF squadrons include Nos. 11 and 106. Plans to modify some IAF 748s to ASWAC (airborne surveillance, warning, and control) configuration seem to have been put on hold since the first flight in November 1990 of an aerodynamic prototype with an empty 15 ft 9 in diameter dorsal rotodome. Alternative platform aircraft may be under consideration. Nepal's single **Series 2A** doubles as both the Royal Flight VIP aircraft and as a general troop/paratroop transport. VIP transport is also the role for two of the six Series 2/2As of the Royal Thai Air Force's No. 6 Wing at Don Muang. Three other 748s are in use by the 2d Transport Wing of the Sri Lanka Air Force. *(Data for Series 2A.)*
Contractor: Hawker Siddeley Aviation, UK (now British Aerospace).
Power Plant: two Rolls-Royce Dart Mk 532-2L/S turboprops; each 2,280 ehp.
Dimensions: span 98 ft 6 in, length 67 ft 0 in, height 24 ft 10 in.
Weights: empty 25,453 lb, gross 46,500–51,000 lb.
Performance: max cruising speed 278 mph, ceiling 25,000 ft, T-O run 2,480 ft, landing run 1,140 ft, range with 9,527 lb payload 1,624 miles.
Accommodation: crew of two; up to 58 troops, 48 paratroops and dispatchers, 24 litters and nine sitting patients/medical attendants, or up to 13,047 lb of cargo (17,547 lb at overload max T-O weight).
Armament: none.

Il-76 (NATO "Candid")

In the same class as USAF's C-141, the Il-76 (NATO Candid-B) was designed to haul 40-ton loads of freight over a distance of 3,100 miles (5,000 km) in under six hours in the harsh operating environment of areas like Siberia. It first flew on March 25, 1971, and set 25 international records four years later, lifting a payload of more than 70 metric tons to a height of 38,960 ft, and carrying this load around a 1,000 km circuit at a speed of 532,923 mph. More than 700 Il-76s have since been built, with production continuing at the rate of more than 50 a year. Like the CIS's own Military Transport Aviation force (VTA), the Indian Air Force chose Il-76s to replace veteran An-12s as its standard heavy transports. Twenty-four **Il-76MDs** equip Nos. 25 and 44 (Mountain Geese) Squadrons, with the Indian name **Gajaraj**. Compared with the original military **Il-76M,** the MD has D-30KP-1 upgraded engines that maintain full power up to ISA + 23°C, against ISA + 15°C for earlier D-30KPs. Gross weight and payload are increased; an additional 22,046 lb of fuel increases range with max fuel by 745 miles.

Freight handling is facilitated by rear ramp/doors and advanced mechanical systems for loading, unloading, and positioning containers and other freight inside the 8,310 cu ft hold. Being fully pressurized, the Il-76 can carry troops as an alternative to freight. *(Data for Il-76MD.)*
Design Bureau: Ilyushin OKB, Russia.
Power Plant: four Soloviev D-30KP-1 turbofans; each 26,455 lb thrust.
Dimensions: span 165 ft 8 in, length 152 ft 10¼ in, height 48 ft 5 in.
Weight: gross 418,875 lb.
Performance: cruising speed at 29,500–39,370 ft 466–497 mph, T-O run 5,580 ft, landing run 2,950–3,280 ft, range with max payload 2,265 miles, with 44,090-lb payload 4,535 miles.
Accommodation: crew of seven, including two freight handlers; up to 140 troops, 125 paratroops, or 110,230 lb of freight.
Armament: two 23-mm twin-barrel GSh-23L guns in manned tail turret. Provision for packs of ninety-six 50-mm flares in landing gear fairings and/or on sides of rear fuselage.

Skyvan/Shorts 330

A few examples of the Shorts family of twin-turboprop utility transports can be seen in military and government agency markings in south Asia. The basic Skyvan is a small but extremely versatile aircraft with a 6 ft 6 in square interior cross section. This enables it to accommodate a wide variety of awkwardly shaped loads or cabin installations. Loading is easy, as a full-width rear door in the upswept rear fuselage gives unrestricted access to the hold. Two of the Royal Nepalese Air Force aircraft are **Skyvan Srs 3Ms,** suitable for paratroop and supply dropping, assault landing, casualty evacuation, and troop, vehicle, and ordnance transport. The third was originally a VIP **Skyvan Srs 3** of the Nepalese Royal Flight. All have operated regularly into primitive airstrips up to 10,000 ft above sea level. The

Royal Thai Border Police operates three Skyvan Srs 3Ms and three Shorts **330-UTTs** (one ex-Army). The latter are essentially stretched Skyvans, with 1,198 shp Pratt & Whitney Canada PT6A-45R turboprops and an 8,000-lb payload that can comprise 33 troops, 30 paratroops, 15 litters and four seated casualties, or freight. *(Data for Skyvan Srs 3M.)*

Contractor: Short Brothers plc, UK.

Power Plant: two Garrett TPE331-2-201A turboprops; each 715 shp.

Dimensions: span 64 ft 11 in, length 41 ft 4 in, height 15 ft 1 in.

Weights: empty 7,400 lb, gross 13,700–14,500 lb.

Performance (at 13,700 lb gross weight): max cruising speed at 10,000 ft 202 mph, ceiling 22,000 ft, T-O run 780 ft, landing run 695 ft, range with 5,000-lb payload 240 miles, with max fuel 670 miles.

Accommodation: flight crew of one or two; 16 paratroops plus dispatcher, 22 troops, 12 litters plus two attendants, or 5,200 lb of cargo.

Armament: none.

Helicopters

AH-1 HueyCobra

The largest Asia/Far East orders for members of Bell's HueyCobra/SeaCobra gunship helicopter family have come from Japan and South Korea, but within the nations covered by this Gallery, Pakistan and Thailand have both been customers during the past decade. The Pakistan Army's first HueyCobra squadron (10 aircraft) achieved IOC in March 1985, and a further 10 to form a second squadron were received later that year. A more recent order for another 10 has been embargoed by the US government. The Royal Thai Army operates a small unit of four AH-1s, which were ordered in 1986 and delivered in November 1990.

All are to standards comparable with the US Army's AH-1F full-capability TOW version, with a Hughes laser rangefinder/tracker, Kaiser pilot's HUD, digital fire-control computer, Doppler navigation, hot metal and exhaust plume IR suppressor, IR jammer, IFF, and composite rotor blades. *(Data for AH-1F.)*

Contractor: Bell Helicopter Textron, US.

Power Plant: one Textron Lycoming T53-L-703 turboshaft; 1,800 shp.

Dimensions: rotor diameter 44 ft 0 in, fuselage length 44 ft 7 in, height 13 ft 5 in.

Weights: empty 6,598 lb, gross 10,000 lb.

Performance: max speed 141 mph, ceiling 12,200 ft, range 315 miles.

Accommodation: pilot and copilot/gunner in tandem armored cockpits.

Armament: two weapon stations under each stub-wing; outer stations can each carry four TOW antitank missiles, inboard stations each a launch tube for seven to nineteen 2.75-in rockets. GE undernose turret for 20-mm three-barrel gun with 750 rds.

AS 330 Puma and AS 332 Super Puma

The prototype of this multipurpose military and civil helicopter first flew on April 15, 1965, and by 1989 Anglo-French production had totaled 697 for delivery to 46 countries, 34 of which have used them for military duties. Production continues in Romania. Major user in south Asia is the Pakistan Army, which has about three dozen of the final **AS 330L** production model for miscellaneous transport duties; a single **AS 330J**, similar to the L, serves as a VIP transport with the Pakistan Air Force. The Air Force of Nepal has two earlier-model Pumas, an **AS 330C** (1,400 shp Turmo IVB engines) and an **AS 330G**, with metal instead of composite rotor blades. The latter forms part of the Nepalese Royal Flight, along with a single **AS 332L Super Puma** (new power plant, uprated transmission, and airframe improvements). *(Data for AS 330L.)*

Contractors: Aerospatiale, France; Westland Helicopters, UK.

Power Plant: two Turbomeca Turmo IVC turboshafts; each 1,575 shp.

Dimensions: rotor diameter 49 ft 2½ in, fuselage length 46 ft 1½ in, height 16 ft 10½ in.

Weights: empty 7,970 lb, gross 16,315 lb.

Performance: max cruising speed at S/L 160 mph, ceiling 15,750 ft, range 341 miles.

Accommodation: crew of two; 16 fully equipped troops, six litter patients and six seated persons, or internal or external freight.

Armament: provisions for side-firing 20-mm gun, two 7.62-mm machine guns, rocket packs, and other weapons.

Bell 212 and 412

About 50 of these twin-turbine helicopters are in military service or on order by south Asian countries.

AH-1 HueyCobra, Pakistan Army Aviation (P. Steinemann)

Bell 412, Sri Lanka Air Force

Mi-26, Indian Air Force (P. Steinemann)

The lower-powered **Bell 212** is in service with the air forces of Bangladesh (11) and Sri Lanka (nine), as well as the Royal Thai Air Force (one), Army (11, of 34 ordered), and Navy (eight). Those of the Royal Thai Navy are equipped for antisubmarine use, and recent interest has been expressed in possibly replacing them with Kaman SH-2 Seasprites.

The **Bell 412,** which has a four-blade main rotor and uprated power plant, has been supplied to or ordered by Sri Lanka (four) and Thailand (Air Force one, for Royal Flight, and Army one). Sri Lanka's 212/412s, which serve with No. 4 Helicopter Wing at Katunayake, are reportedly armed with rockets and machine guns for counterinsurgency duties. *(Data for Bell 212, with 412 in parentheses.)*

Contractor: Bell Helicopter Textron, US/Canada.

Power Plant: one Pratt & Whitney Canada PT6T-3B (PT6T-3B-1) Turbo Twin Pac turboshaft; flat rated at 1,290 shp (1,400 shp).

Dimensions: rotor diameter 48 ft 2¼ in (46 ft 0 in), fuselage length (both) 42 ft 4¾ in, height 12 ft 10 in (10 ft 9½ in).

Weights: empty 5,997 lb (6,495 lb), gross 11,200 lb (11,900 lb).

Performance: max cruising speed at S/L 115 mph (140 mph), ceiling 13,000 ft (16,500 ft), max range 261 miles (408 miles).

Accommodation: pilot and up to 14 passengers or equivalent cargo.

Armament (both): can include a 12.7-mm or 0.50-in machine gun in ventral turret, plus provisions for externally mounted antitank or antiship missiles, gun pods, or rocket pods.

Ka-25 (NATO "Hormone-A")

The Indian Navy continues to operate about five of the seven Ka-25 antisubmarine helicopters that it purchased for service on board its *Kashin II*-class destroyers. Their prime mission is ASW, with secondary surveillance and search-and-rescue duties. They are being superseded by Ka-28s.

The Ka-25 is a typical Kamov design, with contra-rotating coaxial rotors. Equipment of the Hormone-A version includes search radar in a large flat-bottomed undernose radome, dipping sonar, and sonobuoys stored on a rack on the starboard side of the cabin. A major shortcoming is that lack of autohover capability prevents use of the dipping sonar at night or in adverse weather.

Design Bureau: Kamov OKB, Russia.

Power Plant: two Glushenkov GTD-3BM turboshafts; each 990 shp.

Dimensions: rotor diameter (each) 51 ft 7¾ in, fuselage length 32 ft 0 in, height 17 ft 7½ in.

Weights: empty 10,505 lb, gross 16,535 lb.

Performance: max speed 130 mph, ceiling 11,000 ft, range 250–405 miles.

Accommodation: crew of two on flight deck; two or three systems operators in main cabin, which is large enough to contain 12 folding seats for passengers.

Armament: ASW torpedoes, depth charges, and other stores in underfuselage weapons bay.

Ka-28 (NATO "Helix-A")

The Indian Navy is reported to have received eight of the 13 Ka-28 ASW helicopters that it ordered for operation from its new and upgraded *Kashin*-class ships, including three for training duties. Although each of these helicopters requires little more stowage space than a Ka-25, it offers much-improved performance and military capability. The general configuration is similar to that of the Ka-25, with contrarotating coaxial rotors, but the cabin is enlarged, and twin fins replace the latter's triple tail unit. Twin turboshafts of the kind installed in Mi-25/35 attack helicopters enable flight to be maintained on one engine at max gross weight. Equipment includes an undernose 360° search radar, dipping sonar, IFF, radar warning receivers, and ESM. The autopilot provides automatic approach and hover on a preselected course, using Doppler, enabling use of the dipping sonar at night and in adverse weather. Officially released information claims an effectiveness against submarines cruising at up to 40 knots, at a depth of 1,650 ft, out to 125 miles from the helicopter's base, by day and night.

Design Bureau: Kamov OKB, Russia.

Power Plant: two Klimov (Isotov) TV3-117BK turboshafts; each 2,225 shp.

Dimensions: rotor diameter (each) 52 ft 2 in, fuselage length 37 ft 1 in, height 17 ft 8½ in.

Weight: gross 26,455 lb.

Performance: max speed 155 mph, ceiling 12,000 ft, range 310 miles.

Accommodation: crew of three; up to 16 persons on folding seats in cabin.

Armament: two torpedoes or four depth bombs, plus sonobuoys, in ventral weapons bay.

Mi-8/17 (NATO "Hip")

More than 200 of these general-purpose helicopters are in military service in south Asia. All utilize virtually the same airframe and share the NATO reporting name Hip. The **Mi-8,** first flown in single-engine prototype form 31 years ago, is the original version, produced with two TV2 turboshaft engines and a starboard-side tail rotor. Since the beginning of the 1980s, customers wanting higher performance have been able to buy the **Mi-17** (Hip-H), with 1,950 shp TV3-117MT engines in shorter nacelles, and with the tail rotor relocated on the port side. More than 10,000 new-production helicopters of the two types have been delivered.

The basic Mi-8 Hip-C is the standard heavily armed assault transport, able to put down troops, equipment, and supplies behind enemy lines within 15–20 minutes of a nuclear or conventional bombardment/air strike. The Mi-8 Hip-F is even more heavily armed, with a nose machine gun and a triple stores rack on each side of the cabin, able to carry up to 192 rockets in six packs, plus six of the manual command to line of sight antitank missiles known to NATO as "Sagger." These are the versions most used by non-CIS air forces, including those of Afghanistan (about 60), Bangladesh (12), India (125), and Pakistan (Army, 10). The **Mi-8T** and **Mi-8TB** are Hip-Cs uprated to Mi-17 standard; the **Mi-8TBK** is a similar upgrade of Hip-F. *(Data for Mi-8 Hip-C.)*

Design Bureau: Mil OKB, Russia.

Power Plant: two Klimov (Isotov) TV2-117A turboshafts; each 1,700 shp.

Dimensions: rotor diameter 69 ft 10¼ in, fuselage length 59 ft 7½ in, height 18 ft 6½ in.

Weights: empty 16,007 lb, gross 26,455 lb.

Performance: max speed at 3,250 ft 161 mph, ceiling 14,750 ft, range 311 miles as passenger transport.

Accommodation: crew of two or three; 24 troops on tip-up seats along cabin sidewalls, or 12 litter patients and an attendant, or 8,820 lb of freight or vehicles, loaded via rear clamshell doors and hook-on ramps.

Armament: twin rack on each side of cabin, able to carry 128 x 57-mm rockets in four packs, or other weapons.

Mi-25/35 (NATO "Hind")

The **Mi-25** is an export version of the Mi-24, the

Sea King Mk 42B, Indian Navy

standard attack helicopter of the CIS armed forces that has the added ability of carrying eight combat-equipped troops in its main cabin. It corresponds to the Mi-24D (Hind-D) gunship, with a 12.7-mm four-barrel nose gun, four weapons pylons under its stub-wings, and wingtip launchers for four AT-2 (Swatter) antitank missiles. The **Mi-35** is the export counterpart of the Mi-24W (Hind-E), with up to 12 AT-6 (Spiral) radio-guided, tube-launched, antitank missiles in pairs on its wingtip and underwing mountings. It has a HUD for the pilot, replacing the former reflector gunsight, and an enlarged undernose missile guidance pod. R-60 (Aphid) AAMs and the same range of alternative weapons as those of Hind-D can be carried on the underwing pylons. The **Mi-35P** is similar to the Soviet forces' Mi-24P (Hind-F), with a GSh-30-2 twin-barrel 30-mm gun (with 750 rds) mounted on the starboard side of the nose, replacing the usual Gatling. Mi-25s and -35s or -35Ps are known to have been delivered to Afghanistan (more than 60) and India (32). *(Data for Mi-35P.)*

Design Bureau: Mil OKB, Russia.
Power Plant: two Klimov (Isotov) TV3-117 turboshafts; each 2,225 shp.
Dimensions: rotor diameter 56 ft 9 in, fuselage length 57 ft 5 in, height 21 ft 4 in.
Weights: empty 18,078 lb, gross 26,455 lb.
Performance: max speed 208 mph, ceiling 14,750 ft, combat radius 99 miles with max military load, 179 miles with max external fuel.
Accommodation: crew of two; flight mechanic, and provisions for eight troops or four litter patients, in main cabin.
Armament: one GSh-30-2 twin-barrel 30-mm gun; up to 12 AT-6 antitank missiles. Alternative loads on four underwing pylons include 32-rd packs of 57-mm rockets, 20-rd packs of 80-mm rockets, UPK-23 pods each containing a GSh-23 twin-barrel 23-mm gun, up to 3,300 lb of chemical or conventional bombs, PFM-1 mine dispensers, or other stores. Provisions for firing AK-47 guns from cabin windows.

Mi-26 (NATO "Halo")

The Mi-26s of No. 126 (Feather Weight) Helicopter Unit of the Indian Air Force represent the only known military export deliveries of the world's largest production helicopter. Each can carry a payload of up to 44,100 lb, which is 66 percent more than could be hauled by the Mi-6 that it superseded. Yet, by designing an eight-blade main rotor for the Mi-26, which was once considered impractical, Mil was able to keep the rotor diameter smaller than that of the Mi-6. The prototype flew for the first time December 14, 1977, and Mi-26s were fully operational with air forces of the former Soviet Union by 1985. India received the first of 10 that it had ordered in June of the following year. Features of the aircraft include a cargo hold and payload very similar in size to those of a C-130H Hercules, loading via clamshell doors and ramp at the rear of the cabin, main landing gear legs that are adjustable individually in length to facilitate loading and to permit landing on varying surfaces, and all equipment necessary for day and night operation in all weathers. Optional items include a closed-circuit TV system to observe slung payloads, infrared jammers and suppressors, infrared decoy dispensers, and a color-coded identification flare system.

Design Bureau: Mil OKB, Russia.
Power Plant: two ZMDB/Lotarev D-136 turboshafts; each 11,240 shp.
Dimensions: rotor diameter 105 ft 0 in, fuselage length 110 ft 8 in, height 26 ft 8¾ in.
Weights: empty 62,170 lb, gross 123,450 lb.

UH-1H, Royal Thai Air Force (P. Steinemann)

Performance: max speed 183 mph, ceiling 15,100 ft, range 497 miles with max internal fuel.
Accommodation: crew of five on flight deck; compartment for four persons aft of flight deck, and about 20 tip-up seats along each sidewall of hold. Max seating for 80 combat-ready troops. Freight loads include two airborne infantry combat vehicles and a standard 44,100 lb ISO container.
Armament: none.

Sea King

In 1959, Westland Helicopters of the UK was licensed to utilize the airframe and rotor system of the Sikorsky SH-3, with extensive power plant and equipment changes, to meet a Royal Navy requirement for a long-endurance, ship-based antisubmarine helicopter. In addition to subsequent Sea King production for the UK armed forces, Westland supplied similar helicopters to various customers, including the navies of India and Pakistan, which continue to operate them in ASW, search and rescue, and other forms. India received 12 **Mk 42s** in the early 1970s, for Nos. 330 and 336 Squadrons, followed in 1980 by three **Mk 42As** and later by 20 **Mk 42Bs** and six **Mk 42Cs,** the last-named variant being an assault and transport version similar to the Westland Commando. About three dozen of India's original 41 remain in service; typical equipment, on the ASW Mk 42B, includes MEL Super Searcher radar, Doppler navigation, GEC Avionics AQS-902 sonobuoy processor and tactical processing system, Alcatel HS-12 dipping sonar, Chelton 700 sonics homing, GEC Marconi Hermes ESM, Louis Newmark AFCS, and fittings to carry Sea Eagle antiship missiles. The six **Mk 45** Sea Kings operated by the Pakistan Navy since 1975 are broadly similar but equipped for Exocet missiles. *(Data for Mks 42A/45.)*

Contractor: Westland Helicopters Ltd, UK.
Power Plant: two Rolls-Royce Gnome H.1400-1 turboshafts; each 1,660 shp.
Dimensions: rotor diameter 62 ft 0 in, fuselage length 55 ft 9¾ in, height 15 ft 11 in.
Weights: empty 13,672 lb, gross 21,000 lb.
Performance: cruising speed at S/L 129 mph, ceiling 14,000 ft, radius of action (three torpedoes, 2 hours on station) 144 miles.
Accommodation: flight crew of two; ASW, two systems operators; SAR, up to 22 survivors; transport, up to 28 troops.
Armament: provisions for Sea Eagle or Exocet missiles, up to four homing torpedoes, four depth charges, Ultra Electronics minisonobuoys, smoke floats, marine markers, and other weapons and equipment.

SA 316/319 Alouette III and Chetak

French production of the original **SE 3160** began in 1962 and ended in 1969, when it was superseded by the **SA 316B** with uprated Artouste engine, built also by Romania (230) and Switzerland (60). Final French version was the **SA 319B,** with a 600 shp Astazou XIV turboshaft, which remained in production until 1985. License manufacture of the SA 316B continues in India, where some 320 had been built by March 1991 under the Indian name **Chetak.** Most of these, some equipped for an antitank role, are with the Indian Air Force; small batches also serve with the Indian Navy (principally No. 321 Squadron) and Coast Guard. Nepal also has four Chetaks. About 10 SE 3160s are used by the air force of Myanmar for liaison duties. The Pakistan Air Force has about a dozen (average of two each with six squadrons) for search and rescue; that country's Army has about two dozen for liaison and its Navy four for liaison and ASW. *(Data for HAL-316B Chetak.)*

Contractors: Aerospatiale, France; Hindustan Aeronautics, India.
Power Plant: one Turbomeca Artouste IIIB turboshaft; derated to 550 shp.
Dimensions: rotor diameter 36 ft 1¾ in, fuselage length (incl tail rotor) 33 ft 4½ in, height 9 ft 9 in.
Weights: empty 2,711 lb, gross 4,850 lb.
Performance: max cruising speed at S/L 115 mph, ceiling 10,675 ft, range (max) 296 miles.
Accommodation: pilot and up to six passengers or equivalent cargo; normally pilot only, or pilot and gunner, in armed versions; two litters and two other persons in SAR or medevac configuration.
Armament: range of possible weapons can include a tripod-mounted 7.62-mm machine gun with 1,000 rds aft of pilot's seat, or 20-mm gun with 480 rds, turret-mounted on port side of cabin. Instead of guns, can carry two or four wire-guided antitank missiles on external rails, or 68-mm rocket pods. ASW version can carry two torpedoes or one torpedo and an MAD bird.

UH-1 Iroquois/Bell 205

Although no longer in US production, these single-engine workhorse members of the original "Huey" family still serve with many countries, mostly in light transport, search-and-rescue, utility, or liaison roles. South Asian operators, with approximate numbers in service, are Myanmar (12 **Bell 205A-1s** for liaison), Pakistan (Army 15 **UH-1Hs** for transport duties), and Thailand (Air Force 28 UH-1Hs for utility roles, Navy four UH-1Hs for SAR and utility, and Army 14 Bell 205s for utility). *(Data for UH-1H.)*

Contractor: Bell Helicopter Textron, US.
Power Plant: one Textron Lycoming T53-L-13 turboshaft; 1,400 shp.
Dimensions: rotor diameter 48 ft 0 in, fuselage length 41 ft 10¾ in, height 11 ft 9¾ in.
Weights: empty 5,210 lb, gross 9,500 lb.
Performance: max cruising speed 127 mph, ceiling 12,600 ft, range 318 miles.
Accommodation: pilot and 11–14 troops, or six litters and a medical attendant, or 3,880 lb of cargo.
Armament: normally none.

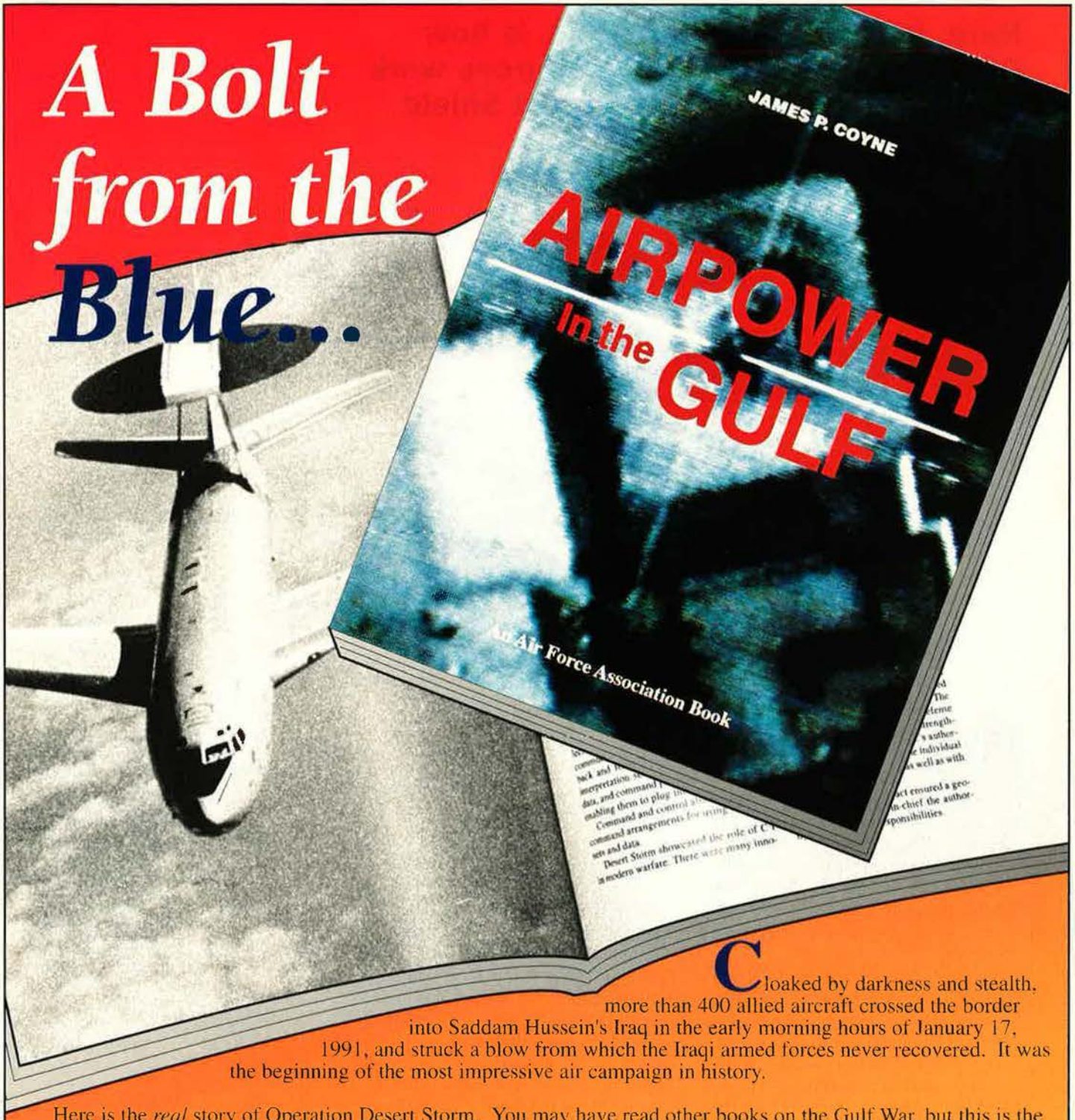
W-3 Sokół

Poland's Swidnik helicopter factory and design center has produced more than 5,250 Russian Mi-2s under license since 1965. In 1979, with US collaboration, it attempted to find a follow-on type that could compete in Western markets. This aircraft, the Kania, had 1420 shp Allison 250-C20B turboshafts; it was certificated in Poland two years later but achieved only limited success. Further development, however, led to the W-3 Sokół, with various improvements and Polish-built Russian engines.

Compared with the Mi-2, the Sokół has a fuselage some 25 percent larger, more than twice the power, and can carry some two and a half times the payload. It first flew on November 16, 1979, production began in 1985, and the 50 delivered by mid-1991 included 12 for the air force of Myanmar, primarily for search-and-rescue and liaison missions.

Contractor: PZL Swidnik, Poland.
Power Plant: two PZL Rzeszów TWD-10W turboshafts; each 888 shp.
Dimensions: rotor diameter 51 ft 6 in, fuselage length 46 ft 7½ in, height 13 ft 6¼ in.
Weights: empty 8,002 lb, gross 13,448–14,110 lb.
Performance (at 13,448 lb weight): max speed at 1,640 ft 158 mph, max cruising speed at 1,640 ft 146 mph, ceiling 16,725 ft, range (with reserves) 422 miles (internal fuel), 721 miles with auxiliary fuel.
Accommodation: crew of two; up to 12 passengers, four litters and a medical attendant, or up to 4,630 lb of internal or external cargo.
Armament (Polish Air Force, optional): one GSh-23 twin-barrel 23-mm gun on lower port side of fuselage; four AT-6 (Spiral) antitank missiles and two 12 x 80-mm rocket pods on cabin-side outriggers. ■

A Bolt from the Blue...



Cloaked by darkness and stealth, more than 400 allied aircraft crossed the border into Saddam Hussein's Iraq in the early morning hours of January 17, 1991, and struck a blow from which the Iraqi armed forces never recovered. It was the beginning of the most impressive air campaign in history.

Here is the *real* story of Operation Desert Storm. You may have read other books on the Gulf War, but this is the one you'll turn to again and again over the years. Veteran fighter pilot Jim Coyne draws on a year's research and almost 200 interviews with participants—the sergeants and the airmen as well as the generals and the captains—to explain how the air campaign was planned, fought, and won. It's loaded with eyewitness reports and first-person accounts.

Airpower in the Gulf

by James P. Coyne
An Air Force Association Book Published by the Aerospace Education Foundation

- 232 pages, large format
- Dozens of photos, maps, and charts
- Chronology of the air war

Special discount to AFA members

Aerospace Education Foundation/Airpower in the Gulf
1501 Lee Highway, Arlington, VA 22209-1198

Send me _____ copies of *Airpower in the Gulf.* $21 per copy ($18.90 for AFA members) enclosed. Add $2.95 per book for shipping and handling.
A total of $_____ is enclosed.

Name _____

Address _____

City _____ State _____ Zip _____

☐ Check enclosed (Make payable to AEF) ☐ Visa ☐ MasterCard

Account Number _____ Exp. Date _____

Signature _____ Date _____

Here, in CENTAF's estimation, is how General Horner made his resources work effectively in Operations Desert Shield and Desert Storm.

Responsive Air Support

By Lt. Col. Robert E. Duncan, USAF

RESPONSIVE air support has always been a key Air Force goal and a subject of debate within USAF. Current discussions on responsibilities for air interdiction targeting, use and meaning of the fire support coordination line, and composition of the joint targeting boards and the Joint Force Air Component Commander's staff stem from efforts to increase responsiveness.

This article seeks to establish for the record the steps by which Lt. Gen. Charles Horner, commander of US Central Command Air Forces (CENTAF), sought to effect such responsiveness during Operations Desert Shield and Desert Storm, given the threat, forces available, and command arrangements within the command and the coalition.

During Desert Storm and Desert Shield, Gen. H. Norman Schwarzkopf, commander in chief of US Central Command, assigned very broad responsibilities to General Horner. The CENTAF commander served as Joint Force Air Component Commander (JFACC), Area Air Defense Commander, Airspace Control Authority, and Interdiction Coordinating Authority.

Assigning these responsibilities to a single commander with an inherent command-and-control structure significantly helped US forces rapidly achieve unity of effort in the initial phase of Desert Shield and established a single US point of contact for allied coordination in these mission areas. As the coalition forces were blended into an integrated force, General Horner was their single point of contact for planning and executing the air effort. This allowed the use of a single Air Tasking Order (ATO) and significantly reduced the potential for fratricide.

The term "Air Tasking Order," however, is somewhat misleading. US and coalition forces performed their missions after a process of dialogue and give-and-take, not the simple issuing of orders. Integration was achieved by asking each coalition force, through liaison cells in the Tactical Air Con-

An F-16 is prepared for its next sortie in Operation Desert Storm. Responsive air support was a key goal of those who planned and carried out the Desert Storm air campaign. The Air Force has sought to make its airpower ever more responsive to combat demands.

trol Center (TACC), what they could contribute, given the taskings and targets to be struck, and what targets they could best attack. This dialogue ensured that no coalition forces were sent against targets they did not feel well suited to handle.

The command viewed responsiveness as a key goal—perhaps *the* key goal—for its command-and-control concepts, procedures, and structure. TACC's Directorate of Combat Plans (DCP) provided for responsiveness and flexibility in planning for the air campaign and for support of the land campaign. The DCP integrated the needs and desires of General Schwarzkopf (who was very active in the planning of the air campaign) and three equal land components comprising five corps or corps equivalents.

Using liaison cells from all the forces, the DCP staff developed guidance, recommendations, target lists, concepts of operations for air defense, airspace control, and air support of land forces. It also structured the command-and-control system for theater use. Realizing that no plan survives initial contact with the enemy, Col. Al Doman, director of Combat Operations (DCO), made the air effort responsive to the dynamics of the battle.

Colonel Doman used the Theater Air Control System, its personnel, and component and allied air forces liaison cells in combat operations to adjust the ATO in near-real time to meet the changing priorities of the battle.

Desert Shield: The Early Days

Throughout Desert Shield and Desert Storm, command and control changed as the availability of coalition forces and the threat changed. In the early days of Desert Shield, US and coalition forces found themselves in a tenuous situation. The command was faced with the possibility of an imminent enemy armored offensive down the east coast of Saudi Arabia. While this would have presented a target-rich array of armor and mechanized forces in narrow corridors of advance, the attack would have had to travel only 150 nautical miles to reach King Fahd Airfield and key ports and airfields in Dhahran.

Opposing this force was a thin line of mostly Arab coalition forces, forward deployed with extremely limited munitions, while US forces formed up in blocking positions north of the Saudi Arabian oil fields.

Further aggravating the situation was the inchoate command structure for the Arab and other Islamic forces in early August 1990. Although US airpower in the region was increasing, the ability to use it to support these land forces was limited by their unfamiliarity with the concepts of close air support (CAS), fire support coordination lines (FSCLs), and air request nets. There were no request nets for CAS, nor were there any air liaison officers (or their equivalents) to provide terminal control for CAS.

The plan developed to deal with all of this, had war broken out at that time, was simple. Because of limited depth for defense and the ground force's lack of CAS command-and-control personnel and equipment, the command's primary objective would have been to interdict the southbound armor forces threatening coalition ground forces and bases at Dhahran and King Fahd Airfield. It would have been a fight to survive.

Given these limitations, the theater was divided into thirty-square-mile kill zones. The kill zones were based on the Saudi air-to-air grid and were further subdivided by reference to compass quadrants. The kill zones

USAF photo by TSgt. Kit Thompson

SSgts. Rick Butler and Ken Porter are among 700 or so Air Force tactical air command and control specialists who travel with the Army. They make sure that close air support communications get through on time.

were intended as an airspace and targeting deconfliction and control measure beyond the FSCL and to reduce the need for terminal control for CAS inside that line.

Close Support and Interdiction

To take advantage of rapidly growing airpower and high sortie-generation capability, we prepared to use a "push flow" of air support. Fighters would launch at maximum sustainable sortie rates and receive targeting from the Airborne Battlefield Command and Control Center (ABCCC) aircraft.

Should coalition forces need CAS, they were to forward the requests directly to the ABCCC, which would divert interdiction assets from the flow on a priority basis. Fielding tactical air request nets, air control nets, air liaison officers, and air/naval gunfire liaison companies remained a top priority of the command. Though we concentrated on interdiction, the directive was that no unit on the ground would go without CAS—if it could get the request to an ABCCC.

By January 1991, the stage was set for the start of the air campaign, an integral part of General Schwarzkopf's overall plan. Planning for the air campaign began at CENTAF well before the deployment to Desert Shield, when the command began targeting for theater war plans and for the exercise Internal Look, which ended one week before the initial deployment of forces to Desert Shield.

Specific targeting for an offensive air campaign to liberate Kuwait began in mid-August. This offensive campaign targeting was undertaken in parallel with targeting and continued planning for defensive operations and an extensive coalition training program.

To ensure unity of effort and responsiveness, General Horner met daily with General Schwarzkopf to receive guidance and review the campaign plans. To ensure a good flow of information, JFACC headquarters maximized use of coalition air force liaison cells in planning and executing the ATO. Nearly every nation and service in the coalition had liaison cells within the TACC directorates of Combat Plans and Combat Operations, providing information on their needs and capabilities. As a final measure, the entire command-and-control structure was exercised extensively prior to the commencement of hostilities.

Planning and targeting for the air campaign were undertaken with input from all components. Information was coordinated, assigned a priority, and blended into a single target list by the JFACC, based on guidance from General Schwarzkopf. The list was then briefed to and approved by him.

The air campaign began on January 17, 1991. On the first day, the Iraqi command-and-control structure was neutralized and its air defense system's centralized control was destroyed. By day two, control of the air had been won. By day four, the Iraqi Air Force had been rendered ineffective, and the air was open for the systematic elimination by airpower of Iraq's warfighting capabilities.

Air Support of the Land Campaign

By the time the ground campaign began, significant changes had occurred on land. During the air campaign, US Army units in Central Command had moved to the western flank of the coalition in the "Hail Mary" maneuver and a theater air-control system for CAS was in place and had been tested.

Each corps and corps equivalent was served by an air support operations center (ASOC) or direct air support center (DASC). XVII Airborne Corps and VII Corps each had an Air Force ASOC, Marine units had a Marine Corps DASC, Northern Area Command had a mini-ASOC, and Eastern Area Command's air request net was served by the Marine DASC. Terminal controllers were also in the field with all major Arab coalition mancuver units.

Preparation of the battlefield for the land campaign began immediately, as a result of General Schwarzkopf's guidance and close coordination among component commanders. The JFACC had been overseeing the coordination and integration of all target nominations into a single target list with the help of component liaison officers. As the land campaign approached, however, changes were made in the target nomination process for interdiction. Integration and priority ranking of the component target nominations were overseen by the Deputy Commander in Chief, the Army's Lt. Gen. Calvin Waller, and then approved by General Schwarzkopf.

The target board members remained the same, but this change in the process was intended to assuage the US corps' concern that their target nominations were not being given sufficient weight in the deliberations.

Command and Control of Interdiction

The E-3 Airborne Warning and Control System (AWACS) fleet and its airborne command element oversaw control of deep interdiction sorties. The ABCCC aircraft and the Marine Corps DASC were used for near-real-time retargeting for inter-

diction immediately beyond the FSCL and to ensure that rapid FSCL movements associated with an armor advance could be accommodated.

The ABCCC's mission was to provide target and FSCL updates to aircraft flying air interdiction (AI) sorties. Each plane had a land component liaison officer on board, communicating with his respective headquarters to provide land component target changes.

The Marine Corps was given the responsibility for AI deconfliction and target updates for the JFACC in kill zones over southern Kuwait. The communications plan and training allowed the ABCCC and DASC to shift interdiction sorties fluidly across the entire front as required by the target array.

The E-8 Joint Surveillance and Target Attack Radar System (Joint STARS) was used primarily as a sensor platform working at night with ABCCCs and AWACS to provide target location updates to inbound fighters and a downlinked ground radar picture to the corps and TACC.

This division of labor and near-real-time retargeting was made possible by the Iraqi threat and the use of area threat suppression rather than individual flight force packaging (which was often used on deeper interdiction sorties). The DCO, in execution of the ATO, shifted control of the kill zones between AWACS and ABCCC aircraft as required to accommodate FSCL movement in the ground war.

Staff photo by G.L. Aceto

Airborne Battlefield Command and Control Center (ABCCC) EC-130s like this one provided targeting and fire-control coordination for planes flying CAS and battlefield air interdiction (BAI) sorties in Operation Desert Storm.

To further reduce the potential for fratricide in the expected rapid armor advance and aid in targeting enemy forces beyond the FSCL, F-16 "pointer scouts" worked with ABCCC planes to locate, validate, and mark targets prior to attack.

Close Air Support and Flexible Airpower

A push flow of close air support was used. The CAS sorties were planned for fuel against interdiction kill zones (or specific targets) located beyond FSCL of the corps to which they were assigned. The kill zones (or interdiction targets) assigned as backup targets were taken from the land component interdiction target nomination list when possible. Though their missions were identified in the ATO as CAS sorties, these fighters would contact their assigned ASOC for CAS tasking. If none was forthcoming, they would get target and FSCL updates from ABCCC and be employed as interdiction assets. Their preassigned AI targets could be changed to meet the needs of the battle or changing priorities of the land component provided by the land liaison officer on ABCCC.

The ASOCs and the DASC were responsible for airpower employment inside the FSCL; the ABCCC aircraft was responsible for target and FSCL updates for AI aircraft in designated kill zones immediately beyond the FSCL. The AWACS was responsible for interdiction in kill zones that were both beyond the FSCL and not specifically assigned to ABCCC. The division of targeting and deconfliction responsibilities for CAS and AI did not stifle the fluid use of airpower. Only one command-and-control agency was responsible for any section of the battlefield at any time.

Changes could be made in this structure at any time by the DCO. If an armor formation was located immediately beyond the FSCL in front of VII Corps, the corps could ask for a strike

This work station is one of twelve inside an EC-130 ABCCC capsule. ABCCC aircraft worked at night with AWACS and Joint STARS planes in the Gulf War to provide target location updates to inbound fighters and ground commanders.

USAF photo by SSgt. Dean Wagner

These done-for Iraqi military vehicles in the Euphrates River valley testify to the effectiveness of allied airpower. Accurate, timely bomb-damage assessment is vital to the continuity and responsiveness of air support during combat.

through its ASOC and through its hotline to the land component's Battlefield Control Element (BCE). The DCO could shift responsibility for this particular kill zone segment from ABCCC to the ASOC for ASOC-controlled CAS sorties. He could direct the ABCCC to retarget AI sorties, or he could use ASOC-provided CAS sorties.

Likewise, as the FSCL shifted north, the DCO would reassign responsibilities for kill zones, dividing them between the ABCCC and AWACS aircraft.

Deconfliction of unplanned surface-to-surface fire and fixed-wing aircraft was of particular concern, given the large numbers of sorties, artillery exchanges, and firings of Multiple Launch Rocket Systems. To reduce the need for coordination and promote responsiveness, the JFACC delegated deconfliction of surface-to-surface fire and CAS assets to the ASOCs and DASC and their respective air liaison officers.

In the case of surface-to-surface fire and AI aircraft, procedural deconfliction was used. Discussions with commanders of the land components revealed that approximately ninety percent of surface-to-surface fire had a maximum ordnance altitude of less than 20,000 feet. This limit was established to deconflict fixed wing and surface-to-surface fire. All interdiction aircraft would climb above 20,000 feet before reaching the front and descend below 20,000 after crossing the FSCL and entering assigned interdiction kill zones.

If the land force needed to fire beyond the FSCL or above 20,000 feet, the DCO would work out deconfliction. Notification was carried out using a corps-to-TACC combat operations BCE hotline (backed up by an ASOC-to-DCO hotline call). From the time the DCO was notified, deconfliction would take about thirty to forty-five minutes.

This deconfliction was only expected in situations in which the land commander had sufficient time to wait for coordination without unduly jeopardizing the safety of friendly forces. This was always plainly stipulated.

Execution Responsiveness

The system was built to be responsive. How responsive was it?

Data collection suggests that, as an average, AI aircraft under the control of the ABCCC or the DASC could be on target in as little as five minutes and no more than fifteen minutes after target detection. Such was the case during the battle of Khafji, when the second-echelon reinforcements for the initial Iraqi attack force were detected while they were marshaling and struck by Joint STARS/ABCCC-controlled fighters.

The same responsiveness was seen with respect to deep interdiction at Al Taqaddum airfield, where six enemy bombers were spotted on the ground while being uploaded. Within two hours, the airfield was attacked and the threat was neutralized.

With respect to CAS, a constant flow of two- or four-ship flights was scheduled into the battle area. With the command-and-control capability to shift assets fluidly between CAS and AI, up to 120 sorties per hour were available for CAS. CAS could be supplied either from the push flow of CAS or diverted from the interdiction flow by ABCCC/DASC five to ten minutes after a decision to send aircraft.

Many figures have been bandied about in postwar efforts to determine the effectiveness of the command-and-control structure used in planning and conducting the air campaign. Bomb-damage assessment is an imprecise art: Numbers change dramatically from one analyst to the next.

More than 5,100 Maverick missiles and 1,000 high-speed antiradiation missiles were fired, and countless cluster bomb units were dropped. On the Iraqi side, more than 3,800 tanks, 2,900 artillery pieces, and 1,400 armored vehicles were destroyed. This represented ninety percent of the tanks, ninety-four percent of the artillery, and fifty-two percent of the armored vehicles in the Kuwait theater of operations.

Most relevant in judging the JFACC's ability to be responsive and accomplish the missions assigned by the CINC and support the needs of the land components was the fact that, although the land forces were outnumbered three to one prior to the air campaign, these land forces defeated more than forty-three enemy divisions in just 100 hours, with fewer than a dozen friendly vehicles destroyed by enemy fire. ■

Lt. Col. Robert E. Duncan is assigned to the 9th Air Operations Group, Combat Plans Squadron, Shaw AFB, S. C., as the command and control flight commander. He served in the Persian Gulf War in the Tactical Air Control Center's Directorate of Combat Plans. He wrote CENTAF's Desert Shield and Desert Storm concept of operations for command and control of tactical air forces in support of land forces. This article is based on an unclassified CENTAF briefing document.

One horror story after another emerges as the archives of the Sovet Union are opened to inspection.

It Really Was an Evil Empire

By James Oberg

In 1962, Soviet soldiers opened fire on striking workers in the Ukrainian city of Novocherkassk, mowing down twenty-four men as they protested high food prices. The outside world never knew anything about it, and that was no accident. "They tried to wash the blood from the square for a long time, first with fire engines, then with brushes," an eyewitness reported twenty-seven years later. "At last they called in a steamroller and laid a thick layer of pavement."

In 1945, after the German defeat, the allies seized the secret archives of the Third Reich. From this trove, a shocked world received confirmation that the scope and magnitude of Nazi evil surpassed even the worst fears of its enemies. Now, half a century later, in the ruins of another collapsed totalitarian state, something similar is occurring. The darkest secrets of the 1917–91 Soviet regime are coming out, ending three generations of fear and lies and providing fresh evidence that Ronald Reagan was deadly accurate in 1983 when he assailed the USSR as "an evil empire."

Inside stories of foreign assassinations, gleaned from files locked up for decades in the archives of the KGB and its predecessors, reveal new crimes and cast new light on many old ones. For example, few doubted that Nikolai Ivanovich Yezhov, Stalin's twisted NKVD chief in the late 1930s, ran assassination teams. The news is that the teams preferred poisons to guns and that Yezhov, a lame, five-foot psychopath known as "the Dwarf," insisted his henchmen use only poisons successfully tested on humans.

Newly opened Communist files and testimony of countless victims affirm that the Soviet era was one of genuine horror. To browse through the papers is to experience the monstrous nature of the Kremlin's crimes against its citizens, against foreigners, and against the truth. Recent scholarship on the terror famine in Ukraine during the 1930s, forced collectivization of agriculture, liquidation of the kulaks and national groups, the bloody purges, and other well-known Soviet crimes have been supplemented with new revelations about less famous events.

Murder at All Levels

The files show that the stain of murder reached to the top levels of the Soviet regime. For example, Stalin personally gave the order for the as-

sassination of Ukrainian nationalist Yevgeny Konovalets. The assassin, Pavel Sudoplatov, pulled the job in Rotterdam on May 23, 1938, detonating a bomb that blew Konovalets to bits.

Within a few years, the assassination group built around Sudoplatov expanded to become the Fourth Department of the NKVD. In his recently released memoirs, Sudoplatov describes the latter phase of his career, which found him murdering anti-Soviet dissidents in the USSR in the late 1940s. He killed a Polish citizen thought to be planning to give submarine secrets to the Americans. In Saratov, he liquidated a Ukrainian leader. In Moscow, he killed an American, identified in the records only as "Oggins," for the "crime" of contacting the US embassy while imprisoned in a Soviet labor camp. On the orders of Premier Nikita Khrushchev, Sudoplatov killed a priest, one Father Romzha. As of late 1992, Sudoplatov was living on a pension in Moscow.

For long-time Western observers of the Soviet scene, such material merely confirms long-standing assessments. For citizens of the former USSR, the revelations caused a profound "reality shock" that greatly exceeds the culture shock of moving from one society to another. Russians in particular, but non-Russians as well, are finding they never really knew the nation in which they lived. Their reactions range from apathy to anger, from despairing self-loathing to militant denial.

From the start, the most shocking revelations have concerned the discovery and unearthing of mass graves.

From forest, field, swamp, and riverbank, from every distant corner of the USSR, news stories and chilling photographs have appeared again and again. Aged witnesses from half-century-old but unforgotten horrors have directed researchers to hundreds of execution locations. People had been killed in vast numbers.

The full depth of the horror within the notorious Kolyma death camps has only recently been realized as official records have been released. Between 1931 and 1957, seven million prisoners (mostly non-Russian minorities) died working at these far northeastern Siberian gold mines. Moscow failed in its cold-blooded effort to profit from the blood of victims. Western analysts assess the cost

of transportation, support, and security operations in the remote mining operation at roughly twice that of the world market price for the extracted gold. In short, Kolyma was a giant money-loser.

Grisly Reminders

Today highly mechanized mining crews are profitably reworking the gravel at Kolyma. In addition to unearthing low-grade gold ore, the machines find frozen reminders of Kolyma's past. Bodies, usually perfectly preserved in the permafrost, are being caught daily on dragline buckets and bulldozer blades.

Emerging from the Soviet files is a record of scattered instances of domestic resistance to the cruelty of the regime and of hopeless uprisings by prisoners held in the Soviet network of forced labor camps—the gulag.

For example, Trotskyites in Magadan seized their camp briefly in 1936. The following year, the Soviet authorities brutally crushed an uprising in Kolyma. In 1947, armed prisoners working at the Arzamas-16 atomic bomb plant successfully escaped. In the January 1953 Ekibastuz "mutiny," rebels held the camp in Kazakhstan for a few days before the rebellion was crushed. A similar uprising by 10,000 prisoners in Kingirsk the following year lasted forty days before being wiped out.

Soviet citizens were not the only ones to be massacred by the regime. Foreigners by the thousands were caught up in the barbarism.

The most notorious Soviet slaughter of foreign prisoners occurred during World War II in the Katyn Forest, where Red Army troops acting under orders murdered thousands of non-Communist or anti-Communist Polish officers taken prisoner after the USSR and Germany carved up Poland in 1939. Kremlin propagandists later blamed the atrocity on Nazi troops who had invaded the USSR on June 22, 1941. The Soviets cynically erected a monument to "victims of fascism" buried at Katyn.

Official Kremlin documents described the full decision process, signed by Stalin, by which the mass murders were set in motion. These documents were considered so inflammatory that former President Mikhail Gorbachev, trying to salvage the honor of the Soviet regime, refused to release them. Gorbachev's successor, President Boris Yeltsin, finally released Stalin's signed orders in 1992.

Still under investigation is Soviet treatment of World War II American prisoners of war held in the Soviet Union. In 1945, many naturalized American citizens—both military personnel and civilians caught in security sweeps—were held officially as "Soviet citizens" by virtue of birth inside the borders of the USSR. Many were forcibly detained, even imprisoned. The deaths of some native-born Americans in Soviet POW camps have yet to be adequately explained.

Soviet citizens were often killed and injured, not by deliberate Kremlin design but as a consequence of Soviet neglect. Among the newly documented examples is the case of residents left in radioactive zones for weeks following the 1957 Kyshtym nuclear waste explosion.

Into the Mushroom Cloud

On September 14, 1954, a Red Army regiment in the southern Ural Mountains near Orenburg was exposed to an atomic bomb blast as a test of resistance to the effects of nuclear war. These unfortunate troops were placed in trenches, underground bunkers with different kinds of doors (or no doors), and reinforced surface shelters. Troops were issued gas masks and protective clothing, but many were overcome by the hot autumn weather and set aside their gear to breathe "fresh air."

The bomb had an explosive force of ten to twenty kilotons and exploded at an altitude of some 1,000 feet. As soon as the bomb went off and the

blast waves passed, the troops assembled for an "assault" on the devastated areas. With the mushroom cloud still hanging in the sky, the armored regiment advanced toward ground zero, which they reached in forty minutes. Though they were issued fresh uniforms, they kept their original weapons, boots, belts, and similar equipment (one zealous commander ordered the men to put on the new uniforms *before* the test so they could look their best).

The veterans began to fall ill. Many died. Their attempts to get government aid were refused. Officially, there never had been such a test, and there were no military records to show that these men had taken part in any such test. It was not until mid-1990 that the soldiers were granted any medical benefits at all.

Soviet indifference to human life was more than matched by callousness toward its solemn commitments in formal treaties, and the two sometimes were intertwined.

In the 1980s, for example, fierce controversies raged over Soviet action in the mysterious 1979 outbreak of anthrax in the provincial city of Sverdlovsk, where the Soviet defense establishment operated a prohibited biological warfare laboratory. The Kremlin owned up to the deaths of sixty-four civilians; an unknown number of military personnel perished.

Western government analysts attributed the disaster to an accident at the facility that caused the inadvertent release into the air of the deadly anthrax toxin. Kremlin officials lied, however, staunchly and publicly denying the role of the military lab and blaming the outbreak of disease on "bad meat."

The Soviet cover-up of the anthrax outbreak involved sophisticated deception operations. In 1988, three senior Soviet doctors toured the US and gave a detailed, consistent, and—to many—persuasive account of the disaster, arguing that it was an innocent public health accident. Their three-city tour, sponsored by private American organizations, left US officials unimpressed. One State Department skeptic, Gene Crocker, asserted that the controversy would wind up on "history's junk heap," forever unresolved.

By 1989, the Soviet regime was starting to come apart, and independent investigations were picking up speed inside the USSR. In one article after another, the regime was caught in lies spanning nearly a decade. In 1990, in an indirect but unambiguous admission of guilt, authorities packed up the entire laboratory and moved it from Sverdlovsk.

Civilians Shot Down

In September 1983, a Soviet fighter stalked and shot down a civilian South Korean airliner, killing 269 passengers. Kremlin officials faced a potential public relations disaster and sought to shift the blame to the US by making the case that the airplane was on a spy mission over the sensitive Soviet Far East, with its many military installations and naval bases.

Only a small group in the Kremlin knew that KAL 007's "black boxes" had been recovered and their contents decoded. No evidence of espionage was found. Moreover, the data recorders conclusively disproved many of the original Soviet charges.

Moscow decided to conceal the existence of the flight data recorders—forever. In a blunt, top-secret memorandum to Soviet leader Yuri Andropov, Defense Minister Dmitri Ustinov and KGB Chief Victor Chebrikov spelled out the conspiracy:

"It seems advisable to refrain from handing over the recorders to the International Civil Aviation Organization or to a country that expresses a desire to decipher the recordings, and to keep these recorders' presence in the USSR a secret. In the future, . . . it is advisable for us to adhere to the position set out in the Soviet government statement of September 6, [1983,] to categorically refuse to provide damage compensation, and to place all responsibility for the loss of life on the organizer of the provocation, the US Administration."

The Kremlin's more detailed report on the shoot-down, dated November 28, 1983, listed the potential damage. The recorders, it claimed, "could be used to argue that there were crew errors, prove the absence of attempts by the intercepting aircraft to make radio contact or fire warning tracer shots, dispute the time we have stated that the flight was terminated [placing KAL 007 over international waters], and prove the absence of intelligence objectives."

Yeltsin's researchers, examining captured KGB files many years later, found a note boasting that the black boxes and the reports "are so well concealed it is doubtful our children will be able to find them." This led directly to the evidence.

Other KGB records now reaching the public confirm other long-standing cold war suspicions. During World War II, at a time of alliance with the US, the Soviets penetrated the Manhattan Project and stole enough secrets to accelerate their own nuclear weapon program by a decade while cutting its costs in half. Soviet pilots secretly engaged in air combat with US pilots during the Korean War *[see "The Russians in MiG Alley," February 1991, p. 74]*. Moscow funded, trained, protected, and assisted international terrorist organizations—as claimed by the Reagan Administration but denied by the groups themselves. Financial support to Western Communist parties continued until the very end of the Communist regime.

This listing of Soviet transgressions is by no means comprehensive. More are being dredged up each day by researchers. Some Russian officials have become Reaganesque in their view of the nature of the 1917–91 regime. ■

James Oberg, a former Air Force captain, is a space engineer now working on the space shuttle program in Houston. He has written extensively on space and Soviet topics. His most recent article for Air Force *Magazine was "The Truth About KAL 007," which appeared in the November 1991 issue.*

He was an authentic Air Force hero, with no connection to the organization named for him after his death.

The Real John Birch

By C. V. Glines

THE surprise attack on Japan by Jimmy Doolittle and his Tokyo Raiders has been well documented. The men who participated have been honored many times for their courage and willingness to take part in what could have been a suicide mission. There was, however, another participant, one whose name is well known not for his role in the 1942 raid but for its posthumous use by a postwar anti-Communist organization.

He was John Morrison Birch, a graduate of Mercer University in Macon, Ga., and later of Bible Baptist Seminary in Fort Worth, Tex. The son of missionaries, totally dedicated to the calling, young Birch joined the World Fundamentalism Missionary Fellowship, volunteered to go on assignment to China, and began work in July 1940 at $50 per month. He was twenty-three.

Birch learned Chinese at a school in Shanghai and taught at a Chinese school for boys. He conducted Christian services and worked with Chinese ministers in a wide area around Hangchow, occupied by Japan. *[Because of the historical nature of this article, the older Wade-Giles transliteration of Chinese place names is used throughout.]* When Japan bombed Pearl Harbor and Americans became targets for imprisonment, Birch fled through occupied territory to Shangjao in Kiangsi Province, a 250-mile trip.

A chance meeting involved Birch in the drama of the Doolittle Raid. Cut off from communication with his church and out of funds, he existed on handouts from Chinese converts. In April 1942, as Japanese troops searched for Jimmy Doolittle's crews, John Birch became desperate. He traveled to Chekiang Province, where he attempted to organize Baptist missions to replace those lost when the Japanese interned Americans in Hangchow in early 1942.

A few days after the Raid, which he had heard about through the Chinese underground communication system, Birch was returning to Shangjao when he stopped at a Chinese inn. He was eating at a small table alone when a Chinese peasant sat down silently opposite him with a bowl of rice. When he thought he would not be overheard, the man whispered, "You American?"

Startled to hear someone speak English, Birch quickly looked up and nodded. The Chinese man finished his meal. As he left, he whispered, "You finish. You follow me."

After finishing his meal, Birch went outside, saw his Chinese contact ahead, and followed him at a distance to the river where the man boarded a sampan tied to the dock. Hesitating at first, Birch swung aboard after him.

"Americans," the peasant said, pointing to a closed cabin door. He promptly disappeared.

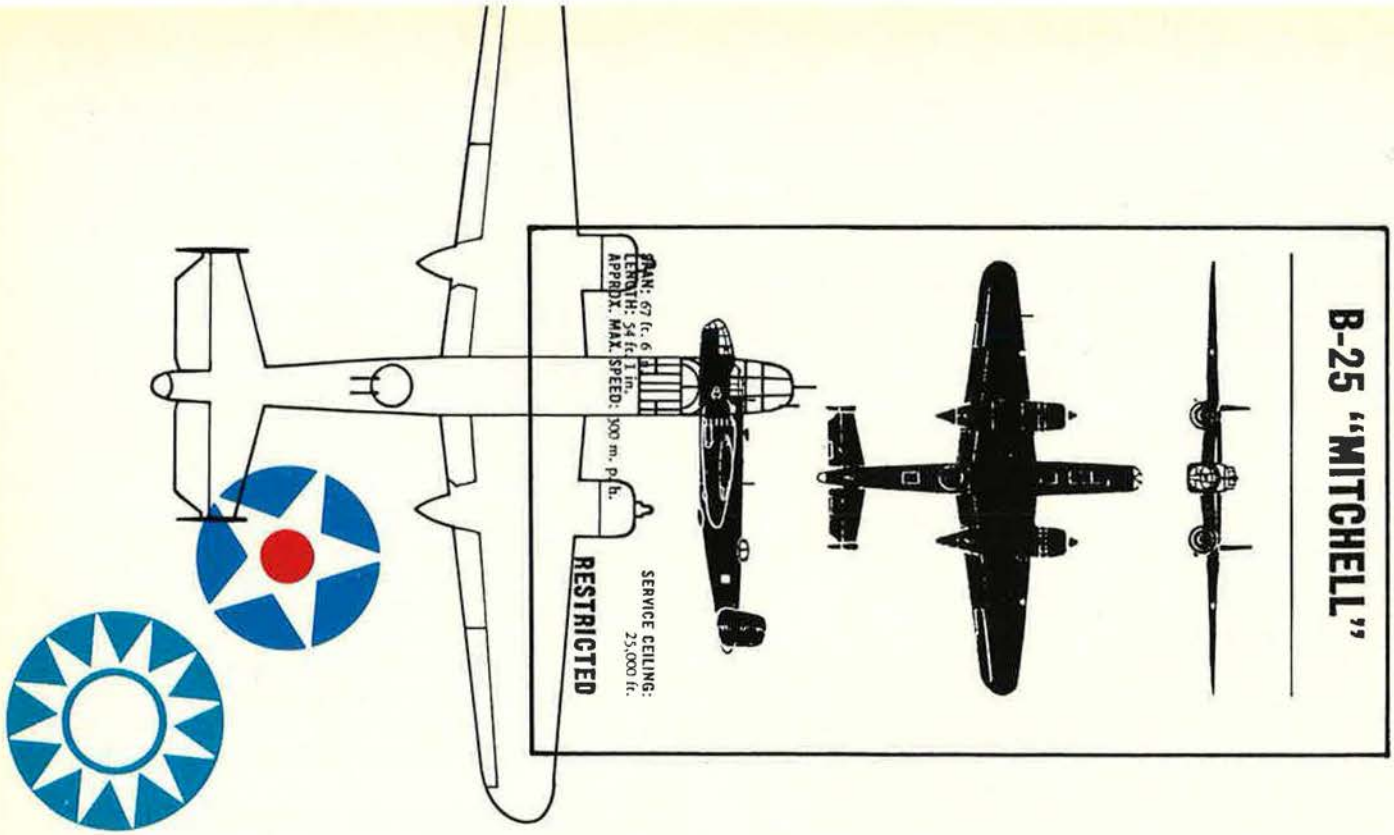
Saved by the Drawl

Birch knocked on the door cautiously and in his Georgia drawl said, "Are there any Americans in there?" There was no answer, so he asked, "Anybody in there who can speak English?"

Behind the door, five Americans grew tense. It was Jimmy Doolittle and his crew, Lts. Richard Cole and Henry Potter and Sgts. Fred Braemer and Paul Leonard. No one spoke for a minute. Finally, Sergeant Leonard, Doolittle's B-25 crew chief, spoke up. "Hell, no Japanese can talk American like that," he said. He opened the door.

Birch and the Americans were delighted to see each other. Doolittle quickly briefed him on their need to get to Chungking. Birch agreed to act as guide and translator. He accompanied the Raiders to Lanchi on the Chientang River, about halfway between Hangchow and Shangjao, gave them directions, and left. He had told Doolittle where he could be reached.

"John Birch was a fine young man," Doolittle remarked much later. "He was living 'off the cuff' and having a rough go of it. He told me he wanted to join the American military



forces in some capacity—preferably as a chaplain—and asked me to put in a word for him with General [Claire L.] Chennault [leader of the Flying Tigers] when I got to Chungking."

Doolittle did not forget. On April 27, Birch received a telegram from the Chinese air base at Ch'u Hsien asking him to report immediately and await orders from the American Military Mission in China. When he arrived, he found that Doolittle had left him 2,000 Chinese dollars and a note asking him to help with the burial of Cpl. Leland D. Faktor, a crew member killed bailing out after the Tokyo raid.

Birch went to Chungking, where he met General Chennault. For his intelligence network, Chennault needed old China hands—men who had lived in China before the war and spoke the language. He first assigned Birch duties as a civilian chaplain and then commissioned him as a second lieutenant in the Army Air Forces on July 4, 1942, the birthday of the China Air Task Force (which later became 14th Air Force). Since General Chennault already had a chaplain, he wanted Birch to set up and run his intelligence system because he could speak Chinese, was aware of Chinese social customs, and could live in the field.

The "Pioneer"

Lieutenant Birch quickly proved himself adept at disguise and infiltration of the Japanese lines. He invariably returned with valuable information about Japanese bases, aircraft, and troop movements. After returning from one foray into enemy territory, he received a commendation from General Chennault for "this hazardous mission [that] required fortitude, courage, and devotion to duty." In his autobiography, *Way of a Fighter,* Chennault called Birch "the pioneer of our field intelligence net."

Birch surveyed all the Chinese airfields in eastern China during early 1943. Chennault, crediting him with compiling "our first accurate statistics on the amount of gas available in Chinese caches scattered around these fields," went on to praise Birch's clandestine skills.

"To provide us with shipping intelligence," said the General, "Birch passed through the Japanese lines to contact Chinese guerrillas on the Yangtze and spent months with them, setting up radio stations overlooking the main river ports to give us accurate information on enemy ship movements. For more than a year after he left the area, these guerrillas reported to us faithfully."

Lt. Col. Wilfred J. Smith, a former history professor at Ohio University and one of Birch's superiors in 14th Air Force's intelligence net, said Birch's work was so thorough that Japanese forces "never moved a ship on the Yangtze without our knowledge."

Birch continually improved Chennault's intelligence-gathering. In March 1943, he went to Changsha as intelligence liaison officer to Marshal Hsueh Yo, a Chinese Army leader in the Shantung Province of north China. His mission was to obtain target data for Chennault's operations against enemy railways.

"Birch walked across the Japanese-occupied Pinghan railroad line in an interval between two large enemy armies marching down the railroad bed to join the east China offensive," Chennault said. "It was Birch who gave us our first word of these reinforcements, the first to evade our air attacks by avoiding the Yangtze. Birch contacted a large Chinese army cut off by the Japanese thrust down the railroad and put them to work building an airfield behind the Japanese lines to move in his radio equipment and also allow their first pay in six months to be flown in by 14th Air Force B-25s. Summer floods wiped out the field, but Birch had three others built, large enough to be used for refueling fighters on long-range missions."

Despite a shortage of communications and reporting facilities, Birch devised an early warning system enabling US air units to support Chinese units under attack by

enemy troops. Birch became known as "the eyes of the 14th Air Force" and performed duties like those of today's ground-based forward air controllers. He was promoted to first lieutenant, then captain.

Birch organized an effective air rescue system for pilots shot down behind the Japanese lines in 1943–44. Colonel Smith estimated that about fifty pilots were saved through his efforts during this period; in 1945, General Chennault said that about ninety percent of his downed flyers, "the highest percentage of any war theater," had been saved through Birch's system.

On one of his infiltrations into Japanese-held territory, Captain Birch discovered that the enemy was much more dependent on the iron mines and smelter at Shihweiyao than had been suspected. Chennault wrote that Birch "sent us detailed information that enabled us to cripple the blast furnaces and docks by bombing."

The Airborne Scout

On the same mission, Birch learned from his Chinese contacts that the Japanese had a big munitions dump and garrison under heavy camouflage in a small city near Hankow. When bombers were unable to locate the target, Birch returned through the lines and flew in the nose of a B-25 to lead a group to the target, which it destroyed.

In the spring of 1945, the Office of Strategic Services (OSS) took over intelligence work in China. Birch was put on detached service with the new organization. He didn't like it and radioed Chennault: "When do I return to Air Force? Would rather be a private in the 14th than colonel in OSS."

After the Japanese surrender on August 15, 1945, the OSS continued sending teams to locate and release American prisoners of war, disarm the Japanese, and seize intelligence materials. Now operating in the open, they were to assume control of key points and communicate their findings to Chungking.

For many months, a civil war between the Nationalists of Chiang Kai-shek and Communists of Mao Tse-tung had been brewing. Captain Birch was dispatched from his base to Japanese-held Hsuchow, where Japanese forces were resisting the surrender. On August 20, accompanied by two American officers and a sergeant, plus one Lieutenant Tung, five other Chinese soldiers, and two Koreans, his team proceeded on foot, horseback, and boat to a village located on the Lunghai Railroad. They boarded a train, which had to stop about halfway to Hsuchow because the tracks had been cut by Chinese Communist guerrillas. They met a Portuguese priest who told them that a Communist guerrilla unit had entered the village the night before and stolen his mission's supplies.

On August 25, 1945, ten days after the surrender, Birch and his team returned to the site of the rail break. They obtained a handcar, which they took turns operating. In the early afternoon, as they approached a station, they were stopped by a force of a hundred or so Communist guerrillas. The guerrillas permitted them to proceed. About an hour later, a smaller rebel group surrounded the party. Birch and Tung were ordered to leave the others and follow two Communists into the village.

Captain Birch, furious at being delayed, wanted to confront those responsible. Lieutenant Tung sensed danger and urged caution. A large group of guerrillas rushed from the village, shouting orders to local Chinese to get back in their homes. Birch's group was surrounded by a circle of men, their rifles cocked. One of the Communists tried to relieve Birch of his .45-caliber pistol. Birch, furious, grabbed him by the collar. "You are worse than bandits!" he cried. Tung, knowing the situation was serious, told the officer, "Ignore him. He is only joking."

The First Casualty

At that moment, the Communist commander appeared. He pointed angrily at Birch and said, "Load your guns and disarm him!" Tung quickly intervened and asked that he be allowed to talk with Birch and persuade him to surrender the weapon. The officer, pointing at Tung, ordered, "Shoot him first."

A soldier cocked his rifle and fired, hitting Tung in the right thigh. He then rushed up and smashed the butt of his rifle into Tung's face. A guerrilla shot Birch in the leg. As Birch writhed on the ground, Tung heard him say, "I can't walk," and then passed out. The guerrillas tied Birch's ankles, bound his hands behind him, and forced him into a kneeling position. A Communist officer stepped behind him, aimed a pistol at the back of his head and fired. Several guerrillas slashed him in the face with their bayonets.

The two men were dragged to a mound beside an open pit and abandoned. Early that evening, a Chinese peasant passing by said to a companion, "We must bury these dead." When he heard this, Tung roused, asked for help, and was carried into a nearby house. He was later taken to a hospital in Hsuchow. Birch, still bound, was hastily buried in the pit by the peasants.

Lt. William T. Miller had been sent with another team to rendezvous with Birch at Hsuchow. When Birch's fate and burial site became known, Chinese troops went to the village and took his body to Hsuchow, where Miller identified it. The body was placed in a mausoleum on a wooded hillside cemetery outside the city. A brief military ceremony was witnessed by Lieutenant Miller, some Jesuit priests, and Chinese Nationalist soldiers.

An April 1946 letter written by Brig. Gen. F. W. Evans reviewed Birch's service with the OSS and noted he had "operated almost exclusively behind the lines. His duty was at all times extremely hazardous. Due to his outstanding ability in gathering intelligence and organizing intelligence nets, he was an extremely valuable member of the Allied Forces and contributed immeasurably in bringing the war in China to a successful conclusion."

Within a few years, the political far right in the US began to regard Birch as a martyr in the struggle against international communism. The founder of one rightist group took to calling the fallen soldier-minister "the first casualty in the Third World War between Communists and the ever-shrinking free world." The group even took on his name, calling itself "The John Birch Society," though it is undisputed that young Captain Birch had nothing to do with the organization or its members. ■

C. V. Glines is a free-lance writer and the co-author, with Gen. James Doolittle, USAF (Ret.), of I Could Never Be So Lucky Again, *the General's memoirs. Mr. Glines's latest article for* Air Force *Magazine was "The Blue Ox" in the August 1992 issue.*

Books

By Frank Oliveri, Associate Editor

The Day the War Began, by Archie Satterfield. Representative American stories from December 7, 1941, focus primarily on events involving two destroyers, USS *Ward* and USS *Henley*. Greenwood Publishing Group, 88 Post Rd. W., Box 5007, Westport, CT 06881. 1992. Including bibliography and index, 179 pages. $39.95.

The First Information War, edited by Alan D. Campen. Looking into the use of information as a weapon and a target in the Persian Gulf War, the authors tell of systems that made dumb bombs smart and how information was denied to the enemy. AFCEA International Press, 4400 Fair Lakes Ct., Fairfax, VA 22033-3899. 1992. Including graphics, notes, and index, 195 pages. $18.95.

George Bush vs. Saddam Hussein: Military Success! Political Failure?, by Roger Hilsman. The former Assistant Secretary of State examines the 1990–91 Persian Gulf War and offers an assessment of what has been gained and lost as a result. Lyford Books, 505 B San Marin Dr., Suite 300, Novato, CA 94945-1340. 1992. Including maps, notes, and index, 273 pages. $21.95.

The German Air War in Russia, by Richard Muller. Interpreting the Luftwaffe's longest continuous air offensive of World War II, the author delineates shifts in German air strategy and the relationship between operational art, aviation technology, and the strategy of the German air staff. The Nautical & Aviation Publishing Co. of America, 8 West Madison St., Baltimore, MD 21201. 1992. Including photos, notes, bibliography, and index, 460 pages. $24.95.

Giap: The Victor in Vietnam, by Peter Macdonald. The author, drawing on interviews with Gen. Vo Nguyen Giap, tells the story of one of the twentieth century's greatest military leaders and tacticians. Here is new insight into the thinking that prompted General Giap's success. W. W. Norton & Co. Inc., 500 Fifth Ave., New York, NY 10110. 1992. Including photos, bibliography, and index, 368 pages. $25.00.

The Greatest Air Battle: Dieppe, 19th August 1942, by Norman Franks. The battle of Dieppe, France, one of the greatest air battles in the Royal Air Force's distinguished history, is played out in detail through the pages of this book. Nearly 4,000 aircraft, British and German, took part in the fight. Seven Hills Book Distributors, 49 Central Ave., Cincinnati, OH 45202. 1992. Including photos, appendix, and index, 256 pages. $35.00.

Honored and Betrayed: Irangate, Covert Affairs, and the Secret War in Laos, by Richard Secord with Jay Wurts. This is the autobiography of one of the key players in the Iran-Contra arms-for-hostages and money-diversion scandals. Mr. Secord, a retired Air Force major general, recounts his version of the roles allegedly played by President Reagan and Vice President George Bush. John Wiley & Sons, Inc., 605 Third Ave., New York, NY 10158-0012. 1992. Including photos, appendix, and index, 405 pages. $24.95.

Letters Home: From the Lafayette Flying Corps, edited by Nancy Nichols. The author has compiled and edited the correspondence of Alan Nichols, her uncle by marriage, a member of the Lafayette Flying Corps during World War I. Strictly Book Promotions, 200 Elsie St., San Francisco, CA 94110. 1992. Including index and photos, 296 pages. $14.95.

Low-Intensity Conflict: A Guide for Tactics, Techniques, and Procedures, by James J. Gallagher. This book, drawn from current Army doctrine, provides combat leaders and staff officers with guidance for commanding, planning, coordinating, and controlling operations in a low-intensity environment. Stackpole Books, P. O. Box 1831, Cameron and Kelker Sts., Harrisburg, PA 17105. 1992. Including photos, graphics, appendix, and index, 210 pages. $19.95.

The Price of Peace: The Future of the Defense Industry & High Technology in a Post–Cold War World, by William H. Gregory. The author argues that without a cold war, the US stands to lose out to commercial competitors unless it works harder to forge alliances with universities, corporations, and regional groups. Lexington Books, 866 Third Ave., New York, NY 10022. 1992. Including notes and index, 225 pages. $24.95.

Soldier Spies: Israeli Military Intelligence, by Samuel M. Katz. This history of the Israeli Military Intelligence Corps, A'MAN, also covers infighting between A'MAN and Israel's other clandestine organizations, Mossad and Shin Bet. Presidio Press, 505 B San Marin Dr., Suite 300, Novato, CA 94945-1340. 1992. Including bibliography and index, 389 pages. $21.95.

Space Age, by William J. Walter. This chronicle of space exploration and high human achievement introduces the reader to space dreamers, inventors, and the political times in which they lived. Random House, 201 East 50th St., New York, NY 10022. 1992. Including photos and index, 333 pages. $30.00.

The Strategic Bombing of Germany, 1940–1945, by Alan Levine. The author delves into the German targeting system and German countermeasures while providing dramatic accounts of bomber operations. Greenwood Publishing Group. 1992. Including notes, index, and bibliography, 235 pages. $45.00.

Tiger in the Barbed Wire: An American in Vietnam, 1952–1991, by Howard R. Simpson. The author, a career foreign service officer, is one of the few Americans to have lived in Vietnam during both the French and American editions of the Vietnam War. Through this memoir, the reader may learn what Vietnam was like during two explosive decades and what it is like today. Brassey's (US), Inc., 8000 Westpark Dr., First Floor, McLean, VA 22102. 1992. Including index, 243 pages. $23.00.

A War Imagined: The First World War and English Culture, by Samuel Hynes. The author examines how World War I affected the world's perception of reality and how it changed the way the English saw their own culture. Macmillan Publishing Co., 866 Third Ave., New York, NY 10022. 1990. Including photos, notes, and index, 514 pages. $15.00.

Other Titles of Note

Captive Warriors: A Vietnam POW's Story, by Sam Johnson and Jan Winebrenner. POW experiences in North Vietnam's "Hanoi Hilton." Texas A&M University Press, College Station, TX 77843-4354. 1992. Including photos and drawings, 301 pages. $25.00.

From Pusan to Panmunjom, by Gen. Paik Sun Yup. The foremost South Korean general of the 1950–53 war provides candid insight into some of its most desperate battles. Brassey's (US) Inc. 1992. Including photos and index, 271 pages. $24.95.

It Takes One to Tango, by Ambassador Edward L. Rowny. Anecdotes of US and Russian statesmen from an arms negotiator under five presidents. Brassey's (US), Inc. 1992. Including index, 273 pages. $22.00. ■

Valor

By John L. Frisbee, Contributing Editor

Hero of Bien Hoa

Bien Hoa was a key to the enemy's capture of Saigon. It had to be held at all costs.

Of some 160 officers and airmen who were awarded the Air Force Cross in southeast Asia, only two of the officers were not aircrew members. Both were security police officers—Capt. Reginald V. Maisey, Jr., and Capt. Garth A. Wright. Both were decorated for extraordinary valor during North Vietnam's Tet Offensive of January 1968. This is the story of Captain Maisey's heroic leadership of men assigned to the 3d Security Police Squadron at Bien Hoa AB near Saigon.

Older readers and students of the Vietnam War will remember the Tet Offensive as a critical turning point in domestic support of our military commitment in southeast Asia. The media portrayed Tet as a defeat for American forces, which, in their view, had little chance of saving South Vietnam at an acceptable cost.

In reality, Tet was a smashing defeat for North Vietnam, which had assembled an estimated 84,000 of its own and Viet Cong troops for an assault on major cities and military bases throughout South Vietnam. All of their strikes were turned back within a few days, with the exception of the city of Hue, parts of which were taken and held by the enemy until March. More than half of the invading force is believed to have been killed and many more wounded.

A major objective of the offensive was to capture Saigon, South Vietnam's capital. The North counted on support by the South Vietnamese populace and relied heavily on surprise since a cease-fire had been negotiated for the Tet holidays. Neither happened. American commanders did not believe the North would honor the cease-fire and hence were on alert when the country-wide offensive began between 3:00 a.m. and 4:00 a.m. on January 31.

Key to the capture of Saigon was seizure of the huge US air bases—Bien Hoa and Tan Son Nhut—a few miles to the north and west of the city. At 0300 hours the enemy hit Bien Hoa with two infantry battalions and a reinforced infantry company. About sixty percent of the attackers were North Vietnamese regulars, especially trained for the operation.

In order to reach the flight line, they had to bypass Bunker Hill 10 at the east end of the base. There, a

reinforced concrete bunker built by the French when they controlled Indochina was lightly manned by the 3d Security Police Squadron. The attack started with a ten-minute rocket bombardment of the bunker, followed by infiltration of a large number of Communist troops who continued to blast the bunker with rockets and automatic weapons.

When the attack began, Captain Maisey was at the west end of the base. He knew that holding Bunker Hill 10 was critical to defending the base. Maisey moved immediately to the Central Security Command Post and volunteered to lead the defense of the bunker, occupied by a handful of men who were firing furiously through the gun ports of the octagonal structure. Outside were thirty to forty security police who had come to the aid of their comrades. Maisey had to drive through the enemy's field of fire but, miraculously, was unhurt.

To organize the defense and to communicate by radio with the command post, Captain Maisey had to leave the relative security of the bunker, exposing himself to enemy fire. This he did many times. His bravery and skill in directing the defense were an inspiration to the small force of security police, vastly outnumbered by the enemy and with a third of the defenders wounded.

The ferocious battle continued with enemy troops on three sides of the bunker. Ammunition soon was running low. SSgt. William Piazza drove his truck loaded with ammunition through a hail of fire to save the defenders *[see "Valor: The Battle of Bunker Hill 10," January 1985, p. 99]*. Sergeant Piazza was shortly to find himself in command of the defense.

On one of his sorties out of the bunker, Captain Maisey was hit by enemy fire but continued his report to the command post and his encouragement to his men. Now supported by helicopter gunships and an AC-47 "Spooky," they still were in imminent danger of being overrun.

At about 0430 hours, Captain Maisey again left the bunker to contact the command post. He was hit by a rocket and killed instantly, but the men he had led so brilliantly continued to contain the enemy until Army reinforcements arrived at dawn. Many lives and millions of dollars in aircraft had been saved by holding Bunker Hill 10 against a massive assault. For leadership of the defense at the cost of his own life, Captain Maisey was awarded the Air Force Cross posthumously.

Today an imposing building at Bolling AFB, D. C., bears the name of this gallant man, the first nonrated Air Force officer to be awarded the nation's second highest decoration for valor. ■

AFA's Newest Member Benefit Can Supplement Your Retirement

START.®

JOIN NOW! It's FREE for Air Force Association Members!

Saving With *Everyday Purchases.*

START is a patented, new consumer savings plan that is funded out of your everyday purchases. That's right, from the money you spend with companies like MCI, Spiegel, Eddie Bauer, Club Med, and others. They all want AFA members to purchase their goods and services. The START program provides you with a benefit that encourages you to continue buying quality products and services, while giving you additional savings for the future.

With START, it's possible for an average 35-year-old couple with children to accumulate a very significant sum of money by age 65 . . . just by making their everyday purchases through START participating companies.

Saving While *Spending.*

As a START member, 1% to 6% of your purchases on things like long distance calling, airline tickets, clothing, electronics, exercise equipment, outdoor gear, and much more can be automatically deposited in your own tax-deferred annuity policy, issued by Metropolitan Life Insurance Company of New York, NY (MetLife). And with tax-deferred, compound interest, it really adds up. Or you have the option of receiving contributions in cash.

START. It's Easy.

Just show your START membership card, or identify yourself as a START member with your membership number and any necessary access codes, and you will automatically receive your START contribution from participating company purchases. It's that simple.

And rest assured, you won't pay more as a START member. If that SONY stereo is on sale at Spiegel, or if Eddie Bauer is having a sale, you'll get the sale price. And if you are a member of MCI's popular Friends and Family℠ program, you'll receive both your START contributions and your 20% MCI bonus discount.

START Now! It's FREE for AFA members.

Don't wait another minute – you can be saving for your future today with START! Remember, the standard enrollment fee of $25 is waived for all AFA members who join now. So activate your START membership today. You only lose by doing nothing. Call 1-800-955-7010 or complete and return the form below!

Air Force Association START® Membership Activation Form

Mail To: START • P.O. Box 468 • Herndon, VA 22070-0468

Please activate my membership in START and send my credentials and START membership Number. As a current AFA member, I certify that I am eligible for this no-cost lifetime membership in START.

Rank or Title _____ *Please print or write clearly*

First Name _____ Middle Initial _____ Last Name _____

Mailing Address _____

City _____ State _____ Zip _____

Home Phone ( ) _____ Daytime Phone ( ) _____

Date of Birth / / (So that we can personalize your START Statement)

Signature of AFA Member _____

Date _____ Agent 21 Group 310

AFA/AEF Report

Edited by Daniel M. Sheehan, Assistant Managing Editor

Twenty-First Annual L. A. Ball

On the eve of the commitment of US forces to Somalia—made possible in part through USAF's global reach—AFA's 1992 Los Angeles Air Force Ball struck a timely note with its salute to the Air Force's doctrine of "Global Reach, Global Power." The ball has raised thousands of dollars over the past two decades on behalf of Scholarships for Children of American Military Personnel (SCAMP) and the Aerospace Education Foundation (AEF).

A crowd of 1,000 attended this year's ball, led by General Chairman former Air Force Secretary Verne Orr and Honorary Chairman retired USAF Chief of Staff Gen. Lew Allen, at which four $5,000 scholarships were presented. Begun to honor US servicemen killed or missing in action in the Vietnam War, SCAMP scholarships can now go to children of any member of the armed forces killed or missing in action since that conflict, children of participants killed while serving in the US space program, and children of participants in Operation Desert Storm.

The ball has raised more than $1 million apiece for SCAMP and AEF, and that money has been well spent, funding 347 grants for 114 young Americans. After the initial $5,000 grant, recipients receive $3,500 a year if they maintain their eligibility.

Former Sen. Barry M. Goldwater, SCAMP's chairman of the board, was on hand, as were Air Force Secretary Donald Rice and Air Force Chief of Staff Gen. Merrill A. McPeak. As always, many other dignitaries attended the event, including NORAD Commander in Chief Gen. Charles A. Horner, PACAF Commander in Chief Gen. Jimmie V. Adams, AFMC Commander Gen. Ronald W. Yates, and AMC Commander Gen. Ronald R. Fogleman.

Master of ceremonies Richard Anderson introduced some of the other honored guests: National Guard Bureau Chief Lt. Gen. John B. Conaway, Assistant Secretary of the Air Force for Space Martin C. Faga, Deputy Assistant Secretary of the Air Force for Space Plans and Policy Richard M. McCormick, and Air Force General Counsel Ann C. Petersen.

In his closing remarks after a stirring performance by the USAF Presidential Honor Guard's silent drill team, Secretary Orr stressed the importance of maintaining "the industrial and military greatness of this nation" and expressed thanks to the cohosts of the event, Space and Missile Systems Center Commander Lt. Gen. Edward P. Barry, Jr., and 15th Air Force Commander Lt. Gen. John E. Jackson, Jr.

The following students are the recipients of the 1992 SCAMP scholarship awards.

Sarah J. Byrns, daughter of Air Force Col. William G. Byrns, a former POW in southeast Asia. She attends Florida State University, majoring in accounting and business finance.

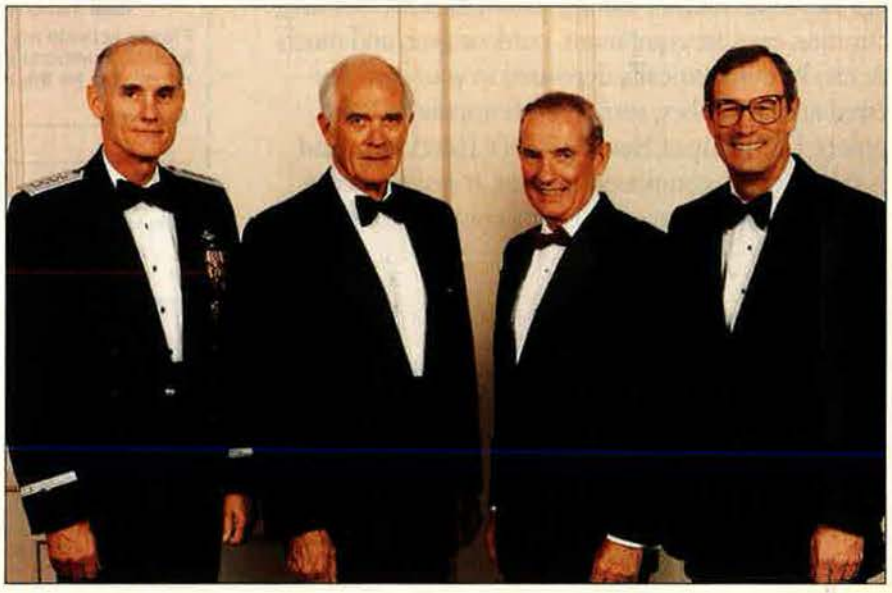
Ashley L. Gordon, daughter of Air Force Col. John M. Gordon, killed in action while serving in Operation Desert Storm. She attends Southern Methodist University, majoring in political science, and recently completed a summer program in the former Soviet Union.

Arianna N. Stackhouse, daughter of Navy Cmdr. Charles D. Stackhouse, a former Vietnam War POW. She also attends Southern Methodist, aspiring to be a lawyer.

Walter H. Sigafoos IV, son of Air Force 1st Lt. Walter H. Sigafoos III, declared killed in action in Vietnam in 1973. He attends the University of Colorado, majoring in history.

This year's ball will be held on October 29, 1993.

—James A. McDonnell, Jr.



Newly elected National President James M. McCoy (second from right) and National Board Chairman O. R. Crawford (second from left) take time during the L. A. Ball to visit with USAF Chief of Staff Gen. Merrill A. McPeak (left) and Air Force Secretary Donald B. Rice.

National Vice President (Midwest Region) Earl D. Clark (left) arranged for an AFA audience to get the Navy's perspective on US Strategic Command from Vice Adm. Michael Coley, deputy CINC of STRATCOM (third from left). President McCoy, Dr. Lee Simmons, and Executive Director Monroe W. Hatch, Jr. (left to right), listened enthusiastically to the Admiral's remarks.

AFA's National Committees

The makeup of AFA's National Committees for 1992–93 has been determined. The following members have been named to serve on the committees.

- **Executive Committee:** James M. McCoy (Chairman), O. R. Crawford, Michael J. Dugan, Craig R. McKinley, Jack C. Price, Walter E. Scott, Mary Ann Seibel, Mary Anne Thompson, William N. Webb, Gerald V. Hasler, *ex officio* (nonvoting), James M. Keck, *ex officio* (nonvoting), Monroe W. Hatch, Jr., *ex officio* (nonvoting).
- **Finance Committee:** William N. Webb (Chairman), Charles H. Church, Jr. (Vice Chairman), John R. Alison, William D. Croom, R. L. Devoucoux, William J. Gibson, William L. Ryon, Jr., James M. McCoy, *ex officio* (nonvoting).
- **Membership Committee:** Craig R. McKinley (Chairman), Donald D. Adams, Dan F. Callahan III, Harold F. Henneke, Alwyn T. Lloyd, William W. Michael, Gilbert E. Petrina, Jr., Nuel Sanders, James M. McCoy, *ex officio* (nonvoting).
- **Constitution Committee:** Martin H. Harris (Chairman), William V. McBride, William C. Rapp, James M. McCoy, *ex officio* (nonvoting).
- **Resolutions Committee:** Mary Ann Seibel (Chairman), O. R. Crawford, Michael J. Dugan, James M. McCoy, Craig R. McKinley, Jack C. Price, Walter E. Scott, Mary Anne Thompson, William N. Webb, Gerald V. Hasler, *ex officio* (nonvoting), James M. Keck, *ex officio* (nonvoting), Monroe W. Hatch, Jr., *ex officio* (nonvoting).
- **Long-Range Planning Committee:** R. E. Smith (Chairman), Col. Phillip Lacomb (Vice Chairman), Robert J. Cantu, John E. Kittelson, Stephen Mallon, H. A. Strack, James M. McCoy, *ex officio* (nonvoting).
- **Science and Technology Committee:** Robert T. Marsh (Chairman), Thomas E. Cooper, Charles G. Durazo, Charles A. Gabriel, David Graham, Thomas McMullen, William Schneider, Jr., Wayne A. Schroeder, Henry C. Smyth, Jr., Charles F. Stebbins, James Tegnelia, Richard E. Thomas, John J. Welch, Jr.
- **Audit Committee:** Jack G. Powell (Chairman), Donald D. Adams, Russell E. Dougherty, Col. Benjamin S. Roth, John Russell, Claudius E. Watts III, O. R. Crawford, *ex officio* (nonvoting).
- **Advisors:** Jerry Dalton (Communications), Ken Daly (Junior ROTC), Col. Earl Donnell (Senior ROTC), Pat L. Schittulli (Civilian Personnel), Donna L. Tinsley (Medical), Maj. Paul A. Willard II (Civil Air Patrol).

Rice Discusses Drawdown

Air Force Secretary Donald B. Rice addressed a luncheon sponsored by the **Wright Memorial (Ohio) Chapter,** giving a view from the top of Air Force streamlining methods to meet the demands of a budget that has been slashed by twenty-five percent in just three years. Crediting the 1990 white paper "Global Reach, Global Power" as the "blueprint to organize, train, and equip [USAF] for a fast-changing world," Secretary Rice acknowledged that change was a must. "Past assumptions don't work anymore," he said.

Secretary Rice said he believes the Air Force can remain "formidable" despite the downsizing by stressing core capabilities and tightly focusing on key modernization programs, such as the C-17, B-2, and F-22. No longer locked in a battle of the superpowers,

AFROTC Det. 490 from the New Jersey Institute of Technology and Manhattan College held a highly successful Air Force Ball with an assist from the Sal Capriglione Chapter in Newark. Here, posing with the cadets and their commanders, are Chapter President Joseph Capriglione (third from right) and former Teterboro-Bendix Chapter President Henry Carnicelli (third from left).

the Air Force should focus on preserving "collective security in a splintering world" with a "well-equipped, highly mobile, and trained military," he said.

More than 500 people heard Secretary Rice's remarks. After his speech, Chapter President Ron Goerges presented a replica of the Wright B Flyer to him on behalf of the chapter.

Chapter News

One of the more painful aspects of USAF's downsizing is the closure of many bases, often with extremely adverse impact on the surrounding communities. One AFA chapter is doing its best to maintain a high level of productive activity despite the imminent closure of a nearby base. Though Carswell AFB, Tex., will soon be a part of history, the **Fort Worth Chapter** is a long way from closing up shop. With more than 3,000 members, the chapter remains a strongly positive force in the Fort Worth area. The Visions of Exploration Program is one of its many thriving endeavors.

The chapter, with an assist from its Community Partners and *USA Today,* tripled the number of area schools that participate in the program, which seeks to develop the intellectual curiosity of schoolchildren through daily newspaper reading and discussions. The chapter also sponsors guest speakers to discuss aspects of exploration. Thirty schools and more than 800 children now participate in the program, and Chapter Vice President (Aerospace Education) Chris Conley hopes to expand it next year.

The **Mobile (Ala.) Chapter** brought some living history to its annual reception and dinner: sixteen of the surviving Doolittle Raiders. The raiders were honored for their achievements in the attack on Tokyo fifty years ago. After the dinner, the raiders took part in an informative question-and-answer period conducted by television reporter Scott Hunter, a chapter director.

Further north in Alabama, the **Montgomery Chapter** welcomed Air Combat Command Commander Gen. John M. "Mike" Loh as guest speaker. General Loh described the workings of his new command, which enfolded most of the assets of Tactical Air Command and Strategic Air Command last June. Chapter President Don Brown and Alabama President William Voigt also welcomed Maj. Gen. Peter Robinson, vice commander of Air University; CMSgt. Steve Beckman, Air University senior enlisted advisor; and MSgt. George Dupin, one of the twelve Outstanding Airmen of 1992.

The **Strom Thurmond (S. C.) Chapter** honored one of its own at a recent meeting in Greenville. Chapter member Ben Huneycutt received his national Medal of Merit from National Vice President (Southeast Region) Stan Hood as Chapter President Bill Austin led the applause.

The 384th Bomb Group celebrated its fiftieth anniversary at McConnell AFB, Kan., and the **Lt. Erwin R. Bleckley (Kan.) Chapter** turned out in force to honor it. National Director Nathan H. Mazer, an original member of the 384th, gave a presentation that included a videotaped history of the unit and a description of the formation of AFA. The crowd of seventy people included seven other original members of the 384th Bomb Group, Kansas State President Sam Gardner, current Commander of the 384th Bomb Wing Col. Ed Ott, Maj. Gen. William M. Charles, USAF (Ret.); and Eagle Plan award-winner MSgt. Larry E. Ogletree.

Coming Events

March 13–14, **Southwest Region Workshop,** Austin, Tex.; March 26–28, **Great Lakes Region Workshop,** Chicago, Ill.; April 16–17, **Alabama State Convention,** Montgomery, Ala.; May 14–16, **South Carolina State Convention,** Clemson, S. C.; May 21–22, **Tennessee State Convention,** Nashville, Tenn.; June 11–13, **Louisiana State Convention,** New Orleans, La.; June 12, **Massachusetts State Convention,** Boston, Mass.; June 18–20, **New York State Convention,** Griffiss AFB, N. Y.; June 18–20, **Ohio State Convention,** Mansfield, Ohio; June 25–27, **Oklahoma State Convention,** Oklahoma City, Okla.; July 16–17, **Arkansas State Convention,** Jacksonville, Ark.; July 16–18, **Kansas State Convention,** Wichita, Kan.; July 16–18, **Pennsylvania State Convention,** Trevose, Pa.; July 30–August 1, **Florida State Convention,** Cypress Gardens, Fla.; August 5–7, **California State Convention,** Sacramento, Calif.; August 6–7, **Colorado State Convention,** Colorado Springs, Colo.; August 13–14, **Mississippi State Convention,** Jackson, Miss.; September 13–15, **AFA National Convention and aerospace exhibition,** Washington, D. C.

AFA's Iron Gate Chapter and its National Air Force Salute Foundation have long been known for their generosity. Here, Secretary Rice (second from right) and General McPeak (left) meet in the former's office to accept $26,000 in checks for several worthy Air Force causes from Salute Foundation officers (from left) Richard A. Freytag, Robert Batta, Dottie Flanagan, and Thomas J. McKee.

The **Southern Indiana Chapter** had a particularly successful quarterly dinner meeting, at which newly assigned professor of aerospace studies Lt. Col. Gary Endersby was the guest speaker. Before coming to Indiana University at Bloomington, Colonel Endersby served in USAFE. His speech centered on his experiences in Europe flying F-111s and F-16s.

Have AFA/AEF News?

Contributions to "AFA/AEF Report" should be sent to Dave Noerr, AFA National Headquarters, 1501 Lee Highway, Arlington, VA 22209-1198. ■

Unit Reunions

Air Forces Escape and Evasion Society
The Air Forces Escape and Evasion Society will hold a reunion May 13–16, 1993, in Saint Louis, Mo. **Contact:** Clayton C. David, 19 Oak Ridge Pond, Hannibal, MO 63401. Phone: (314) 221-0441.

P-47 Thunderbolt Pilots
The P-47 Thunderbolt Pilots Association will hold a reunion June 2–7, 1993, in Colorado Springs, Colo. **Contacts:** Glenn Crum, 14527 River Oaks Dr., Colorado Springs, CO 80921-2841. Phone: (719) 488-2762. Robert V. Richards, P. O. Box 3299, Topsail Beach, NC 28445-3299. Phone: (919) 328-8781.

Southern Aviation School
Pilots in primary flight training and other personnel assigned to the Southern Aviation School in Camden, S. C., between 1941 and 1944 will hold a reunion September 24–26, 1993. **Contact:** Bill Hawkins, P. O. Box 789, Camden, SC 29020. Phone: (803) 432-9595.

Wilson and Bonfils AAF
Former cadets and staff of Wilson and Bonfils AAF Flying School will hold a reunion October 29–31, 1993, in Chickasha, Okla. **Contact:** Ron Baker, Rte. 1, 23 Walnut Dr., Ninnekah, OK 73067. Phone: (405) 224-5343.

2d Ferrying Group
Veterans of the 2d Ferrying Group and the 2d Foreign Transport Group who served at New Castle AAB, Del., between 1942 and 1946 will hold a reunion May 10–22, 1993, in Tucson, Ariz. **Contact:** Temple Robinson, 5961 E. 18th St., Tucson, AZ 85711. Phone: (602) 747-4466.

8th Air Force Historical Society
The Pennsylvania Chapter of the 8th Air Force Historical Society will hold a reunion April 23–25, 1993, at the Holiday Inn Gettysburg in Gettysburg, Pa. **Contact:** Dan Fisher, 7941 Langdon St., Philadelphia, PA 19111-2933. Phone: (215) 722-3527.

9th Air Force Ass'n
Veterans of 9th Air Force will hold a reunion April 28–May 1, 1993, in Colorado Springs, Colo. **Contact:** Marvin Rosvold, 600 S. 13th, Suite 1, Norfolk, NE 68701. Phone: (402) 371-6633.

Class 43-K
Members of Cadet Class 43-K (San Antonio, Tex.) will hold a fiftieth-anniversary reunion April 14–18, 1993, in San Antonio. **Contact:** Lt. Col. Harold A. Jacobs, USAF (Ret.), 17545 Drayton Hall Way, San Diego, CA 92128. Phone: (619) 485-5041.

Class 43-3
Class 43-3 mechanics (Embry-Riddle Aviation School) will hold a reunion in March 1993 in Miami, Fla. **Contact:** Joseph F. Rourke, 100 Beekman St., Apt. 21-C, New York, NY 10038. Phone: (212) 285-1732.

Class 45-C
Members of Class 45-C who served at Marfa AAB, Tex., will hold a reunion October 27–30, 1993, at the Camelview Resort Hotel in Scottsdale, Ariz. **Contact:** S. J. Wigley, 3212 Center St., Oklahoma City, OK 73120-2406. Phone: (405) 751-0187.

Class 55-K
USAF Pilot Class 55-K will hold a reunion October 8–11, 1993. **Contact:** Col. R. Thomas Roe, USAF (Ret.), 2291 N. W. 35th St., Boca Raton, FL 33431. Phone: (407) 483-7098.

58th Fighter Ass'n
The 58th Pursuit Group, 58th Fighter Group, and the 58th Fighter-Bomber Wing will hold a reunion June 3–6, 1993 in Louisville, Ky. **Contact:** Anthony J. Kupferer, 2025 Bono Rd., New Albany, IN 47150. Phone: (812) 945-7649.

68th Troop Carrier Squadron
Veterans of the 68th Troop Carrier Squadron will hold a fiftieth-anniversary reunion September 16–18, 1993. Members of the 433d Troop Carrier Group are also invited. **Contact:** Col. Joseph B. Bonner, USAF (Ret.), 4210-A Lake Underhill Rd., Orlando, FL 32803-7045. Phone: (407) 896-0579.

81st Bomb Squadron
Veterans of the 81st Bomb Squadron will hold a reunion September 30–October 3, 1993, at the St. Anthony Hotel in San Antonio, Tex. **Contact:** Alex Adair, 22925 14th Pl. W., Bothell, WA 98021. Phone: (206) 486-1221.

155th Night Photo Recon Squadron
The 155th Night Photo Reconnaissance Squadron will hold a reunion May 6–9, 1993, at the Ramada Inn in Montgomery, Ala. **Contact:** James E. Williams, 218 Glenwood Ave., Troy, AL 36081. Phone: (205) 566-1435.

311th Fighter Squadron
Veterans of the 311th Fighter Squadron (World War II) and the 311th Fighter-Bomber Squadron (Korea) will hold a reunion June 3–6, 1993, in Louisville, Ky. **Contact:** Bob James, 13083 Ferntrails Ln., Saint Louis, MO 63141. Phone: (314) 878-5953.

320th Air Refueling Squadron
Veterans of the 320th Air Refueling Squadron who served at March AFB, Calif., between 1952 and 1962 will hold a reunion May 6–9, 1993, in Colorado Springs, Colo. **Contact:** John W. Burdan, 10118 W. Roxbury Ave., Littleton, CO 80127. Phone: (303) 971-9269.

355th Fighter Group Ass'n
Veterans of the 355th Fighter Group, 8th Air Force (World War II), will hold a reunion September 9–12, 1993, in San Antonio, Tex. **Contact:** Robert E. Kuhnert, 4230 Shroyer Rd., Dayton, OH 45429. Phone: (513) 294-2986.

362d Fighter Group
Veterans of the 362d Fighter Group, 9th Air Force (World War II), will hold a reunion August 31–September 4, 1993, in San Antonio, Tex. **Contact:** Joseph Matte, 135 Palo Duro Dr., San Antonio, TX 78232. Phone: (512) 494-5073.

447th Bomb Group
Veterans of the 447th Bomb Group will hold a reunion March 18–20, 1993, at the Menger Hotel in San Antonio, Tex. **Contact:** Luther Eisenhart, 143 Terrace Rd., Levittown, PA 19056. Phone: (215) 946-7736.

456th Bomb Group Ass'n
The 456th Bomb Group will hold reunions March 31–April 4, 1993, in Norfolk, Va., and April 5–19, 1993, in Italy. **Contact:** James Watkins, 11415 Minor Dr., Kansas City, MO 64114. Phone: (816) 942-5594.

483d Bomb Group
Veterans of the 483d Bomb Group (World War II) and the 566th Air Engineers will hold a reunion September 28–October 3, 1993, in Denver, Colo. **Contact:** Robert V. Bailey, 5844 W. Rowland Pl., Littleton, CO 80123-3958. Phone: (303) 979-4983.

552d AEW&C Wing
Veterans of the 552d Airborne Early Warning and Control Wing (EC-121 aircraft unit) stationed at McClellan AFB, Calif., between 1955 and 1975 will hold a reunion May 21–22, 1993, at McClellan AFB. **Contact:** Tony Praxel, 3005 El Prado Way, Sacramento, CA 95825. Phone: (916) 487-1975.

Air Force Space Operations Ass'n
For the purpose of holding a reunion/convention in September 1993, I am seeking contact with military and civilian personnel who were assigned to military launch, satellite operations, or military space program research and development. **Contact:** Keith R. Smith, Jr., 5733 Green Meadow Dr., Agoura Hills, CA 91301.

Arc Light/Young Tigers
For the purpose of holding a reunion in late 1993 or early 1994, I am seeking contact with Arc Light Operations aircrew, PCS, and TDY personnel from all bases who served throughout the Vietnam War. **Contact:** Gerald Horiuchi, 1223 E. Mesa Ave., Fresno, CA 93710-5613. Phone: (209) 435-4312.

B-24 Crew 332
Seeking contact with Lt. Warren Hoflich's B-24

Readers wishing to submit reunion notices to "Unit Reunions" should mail their notices well in advance of the event to "Unit Reunions," AIR FORCE Magazine, 1501 Lee Highway, Arlington, VA 22209-1198. Please designate the unit holding the reunion, time, location, and a contact for more information.

Crew 332 stationed at Tonopah AAF, Nev., and Langley Field, Va., for a reunion in May 1993 in conjunction with Tonopah AAF veterans reunion. **Contact:** Lt. Col. John W. Darr, USAF (Ret.), 6811 Moreland, Cheyenne, WY 82009. Phone: (307) 635-2924.

B-24 Personnel
For a reunion in 1993, we are seeking contact with Air Force personnel who supported or participated in the 1959 and 1960 search operations for the crew of the B-24 Liberator *Lady Be Good*, which crashed in the Libyan desert. **Contacts:** James W. Walker or Wesley Neep, 1025 N. 73d Pl., Scottsdale, AZ 85257. Phone: (602) 945-6207.

Empire Air Training Scheme
Seeking contact with Americans who were trained during World War II under the Empire Air Training Scheme, a British Commonweath Air Training Plan, for a reunion April 25–May 2, 1993, in Adelaide, South Australia. **Contact:** The Honorary Secretary, 3d International Reunion, P. O. Box 251, West Perth 6872, Western Australia. Phone: 61-9-3241234.

3d Photo Recon Squadron
In order to arrange a reunion in 1993, I am seeking contact with former members of the 3d Photo Reconnaissance Squadron who served in World War II during 1944–45. **Contacts:** Col. Harold L. Wood, USAF (Ret.), 1002 Santa Barbara St., San Diego, CA 92107. Jim Allen, 1274 Monterey Ave., Berkeley, CA 94707-2719.

9th/513th Bomb Squadrons
For a reunion in 1993, I am seeking contact with members of the 9th and 513th Bomb Squadrons. **Contact:** Harold Raiklen, 4300 Cerritos Ave., Long Beach, CA 90807. Phone: (310) 426-7581.

Class 43-B-2
I would like to hear from members of Class 43-B-2 (Mather Field, Calif.) who are interested in holding a fiftieth-anniversary reunion. **Contact:** Harold E. Scott, 102 Lancelot Ln., Camillus, NY 13031.

Class 44-28
For a reunion in 1994, I am seeking contact with members of Aerial Gunners Class 44-28, Section 52, who served at Tyndall Field, Fla., in 1944. I would also like to hear from our class's instructor who came from Barre, Vt. **Contact:** Walter H. Pierson, 717 Running Creek, Seguin, TX 78155. ■

Bulletin Board

Seeking **patches** from units at Misawa AB, Japan; Kadena AB, Japan; Eielson AFB, Alaska; Elmendorf AFB, Alaska; Osan AB, Korea; Grand Forks AFB, N. D.; Castle AFB, Calif.; Mountain Home AFB, Idaho; Wurtsmith AFB, Mich.; and K. I. Sawyer AFB, Mich. **Contact:** Jimmy Fallon, 3025 S. E. Burton St., Topeka, KS 66605-2100.

Seeking members of **6208th Depot Wing Raiders** baseball team, which played in Rizall Baseball Stadium, Manila, the Philippines, in 1952. **Contact:** Bob Gage, 400 Irene St., Taft, CA 93268.

Seeking contact with US patch collectors who have an interest in **patches** from 1945 on. **Contact:** Beau Eckland, P. O. Box 427, Mudgeeraba, Queensland 4213, Australia.

Seeking a copy of the book ***Men of Valor*** by Bud J. Peaslee. **Contact:** Nathan H. Mazer, 5483 S. 2367 West, Roy, UT 84067.

Seeking contact with members of the **5th Fighter Squadron**, 52d Fighter Group, who served from 1941 to 1945. **Contact:** Lawrence Anderson, 1839 Park Ln., Saint Louis, MO 63136-3730.

Seeking contact with members of **Lt. Jack Frank's** B-17 crew at McDill Field, Fla., from late 1944–45. **Contact:** Sgt. Douglas Hersey, P. O. Box 3784, West Sedona, AZ 86340.

Seeking whereabouts of three classmates from **B-26 Transition School** at Laughlin AFB, Tex., in June 1944: 2d Lts. Donald Grinsfelder, Frederick C. Kramer, and Robert K. Loar. **Contact:** C. B. Holland, Jr., 3931 42d St., Port Arthur, TX 77642.

Seeking photos of **F-84Fs** of 20th FBW, RF-80s and -84s of the 10th TRW, or F-86Fs of the 81st FBW, 32d FDS, 45th FDS, and 357th FIS. I would like to borrow them for a book on USAFE fighters of the early and mid-1950s. **Contact:** MSgt. David W. Menard, 5224 Longford Rd., Dayton, OH 45424.

Seeking contact with those not on our mailing list who served with the **500th Bomb Squadron**, 345th Bomb Group (B-25s), from November 1942 to November 1945. **Contact:** Col. William J. Cavoli, USAF (Ret.), 2147 Encino Loop, San Antonio, TX 78259-1902.

Collector seeks one color patch from the **326th Air Division** (PACAF), once active at Wheeler AFB, Hawaii. Willing to buy or trade. **Contact:** Capt. Gerald M. Jordan, Jr., USAF, 1109 N. Pitt St., Apt. 2B, Alexandria, VA 22314.

Seeking a copy of ***Global Mission*** by Gen. Hap Arnold. The book is a history of the World War II Army Air Forces, originally printed in 1949. Reprints acceptable. **Contact:** MSgt. James B. Walker, Jr., USAF (Ret.), 888 Woodhill Rd., Dayton, OH 45431.

Seeking contact with members of World War II B-24 crew trained at Mountain Home AFB, Idaho, and assigned to the **825th Bomb Squadron**, 484th Bomb Group, in Cerginola, Italy. I am also seeking contact with an F-51 pilot with **36th FBS** (8th FBG) operating out of Pyongyang, Korea, in 1950 who got wrapped with cable while attacking a truck. He powered his plane back to Pyongyang, bellied in, and survived. **Contact:** Peter W. Richardson, 119 Durnford Hill Ct., Daphne, AL 36526.

Seeking contact with members of the **12th Bomb Group,** 12th Air Force, from June 1943 to December 1943 for a historical report on "Project 19," especially people who worked with Lieutenant Harkinson on special jobs, and reports of results with "new" bombsight modification installed in B-25s. **Contact:** John W. Swancara, 1002 E. Mariposa Ave., El Segundo, CA 90245-3114.

Patch collector seeks contact with other collectors for trading purposes. **Contact:** Joseph Zane, 417 Bergen St., Gloucester City, NJ 08030.

Seeking information on **A1C Claude W. Graybill**. He was discharged in December 1956. **Contact:** John P. Murphy, 6041 W. 83d St., Burbank, IL 60459-1974.

Seeking contact with anyone assigned to JTF-8.6 **(Operation Dominick)** at Johnston Island Atoll from January to September 1992. **Contact:** Jim Testerman, USAF (Ret.), 440 E. Ave. J-4, Lancaster, CA 93535.

Seeking contact with **2d Lt. William Riggs**, a pilot in the AAF during World War II. He is now approximately seventy years old. He was stationed in Texas in March 1944. **Contact:** Kathryn J. McDow, 16 Moya Loop, Santa Fe, NM 87505.

Can someone explain the phrase **"Goin' Jessie"** or "Going Jessies," as painted in B-17 nose art from World War II? **Contact:** Wallace R. Forman, 2161 W. County Rd. B., Saint Paul, MN 55113-5333.

Seeking information on graduates of the **Air**

Force Institute of Technology at Wright-Patterson AFB, Ohio, who have retired from the armed services and are not on the list of living graduates. **Contact:** Maj. Thomas N. Stiver, USAF (Rot.), Air Force Institute of Technology Foundation, P. O. Box 33646, Wright-Patterson AFB, OH 45433-0646.

Seeking information on the **raid on Morlaix**, France, September 26, 1942. Three Spitfire squadrons, including the 133d Eagle Squadron of the RAF, escorted B-17s of the 97th Bombardment Group. **Contact:** John Maffre, 5914 Greenlawn Dr., Bethesda, MD 20814.

Seeking information on pilots who received primary pilot training at **Hondo AFB,** Tex., 1951–58, for a written history of the base. **Contact:** Robert D. Thompson, 1504 27th South St., Hondo, TX 78861.

Seeking contact with former North Texas State University or University of North Texas **AFROTC Detachment 835** graduates to create an alumni program. **Contact:** Cadet Col. Heather F. Taylor, Det. 835, University of North Texas, Denton, TX 76203-5398.

Seeking information or photos concerning the **4146th Base Unit** Secret Rocket Test program conducted at Dover AAF, Del., in 1944. **Contact:** Mike Leister, Dover AFB Museum, 436 AW/LGMMP, Dover AFB, DE 19902-5144.

If you need information on an individual, unit, or aircraft, or if you want to collect, donate, or trade USAF-related items, write to "Bulletin Board," AIR FORCE Magazine, 1501 Lee Highway, Arlington, VA 22209-1198. Letters should be brief and typewritten; we reserve the right to condense them as necessary. We cannot acknowledge receipt of letters. Unsigned letters, items or services for sale or otherwise intended to bring in money, and photographs will not be used or returned.—THE EDITORS

Seeking contact with **David and Cindy Mitchell** and their two children, Codey and Maddison. They were stationed with the 48th Fighter Wing at RAF Lakenheath, England, until May 1992. After David left the Air Force, the family moved to Florida. **Contact:** Debbie Johnson, 19 Maids Crossway, Lakenheath, Suffolk IP27 9EL, England.

Seeking the author of an article that appeared in the Dayton *Daily News* on September 21, 1975. We think he may have been a switchboard operator at squadron or group level. The article was "They Never Came Back, Best Pair on Base Sent on Mission in Bad Shape," an account of a **B-17 squadron** on a milk run to Brest that went off course over Guernsey at a very low altitude. The lead aircraft was the only ship shot down by AA fire with no survivors. The mission was flown on September 3, 1944. **Contact:** Don Goodenow, 3128 Sunnybrook Dr., Charlotte, NC 28210.

Seeking a **B-29 propeller** to be an intregral part of a veterans memorial park in Grand Island, Neb. The 6th Bomb Group, 313th Bomb Wing, 20th Air Force, trained there in 1944 before going to the Pacific to fly missions against Japan. The 6th BG will arrange for shipping. **Contact:** Ed Allgor, 16 Canyon Ln., Westbury, NY 11590. ■

a forward-thinking way to chart

your financial course

with AFA's Level Term life insurance plan's updated benefits!

To chart a financially secure future for yourself and those who depend on you, you need to take a clear look at where you are and where you're headed.

A custom-designed life insurance program can help keep your goals in focus. Through its underwriter, Metropolitan Life Insurance Company, Air Force Association offers its members a level term life insurance plan which provides affordable and comprehensive coverage for you and your dependents.

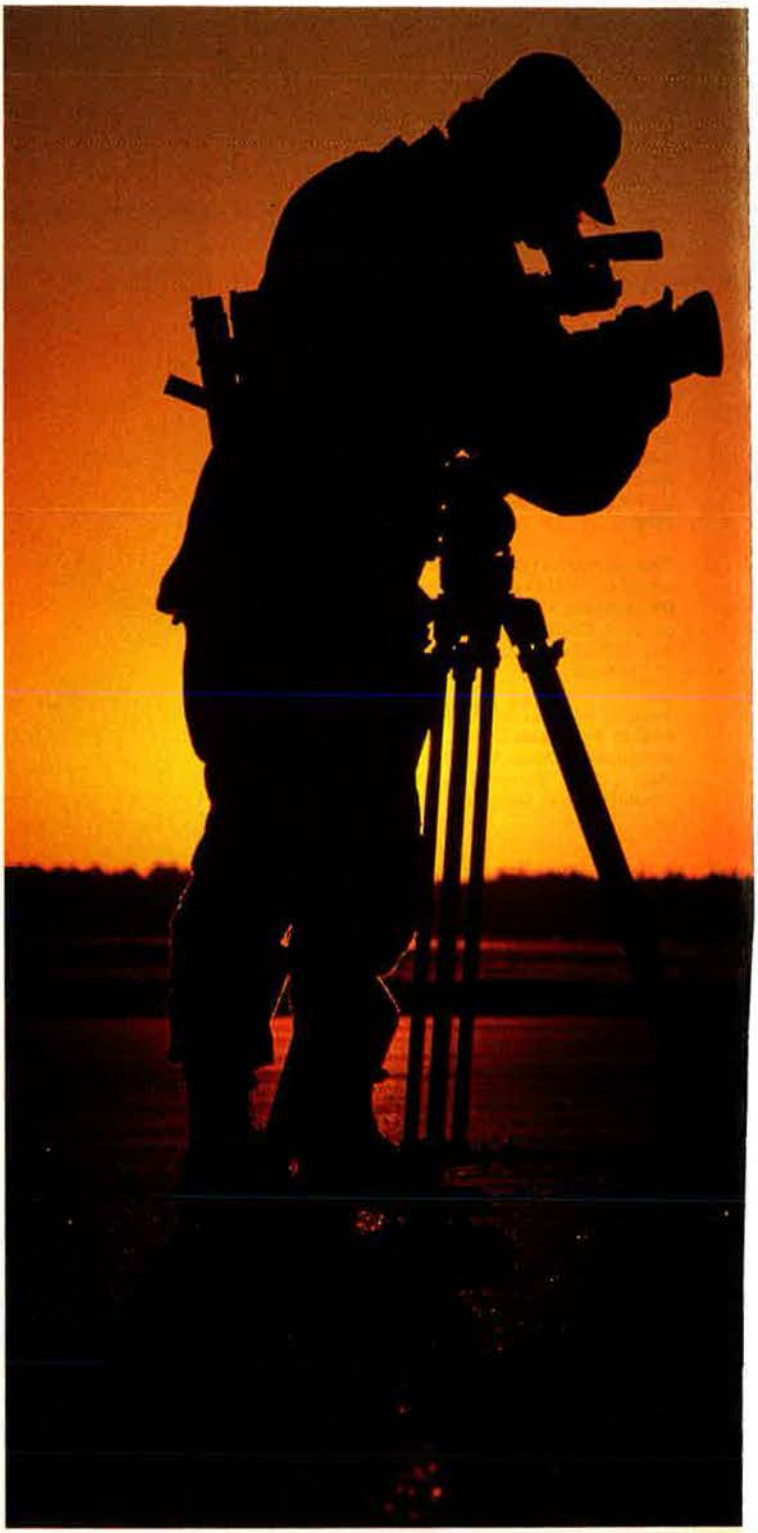
With an eye toward the recognized impact of the use of tobacco products on health, AFA has worked with MetLife to develop a premium structure which offers discounted rates to non-smokers.

This life insurance protection—available in amounts up to 240,000!—remains at the same level throughout the coverage period (with a reduction at age 65 to 50% of the coverage then in force, or $20,000, whichever is less). Your premium only changes when you move into a new five year age bracket, as outlined in the Premium Rate Schedule below.

And these other valuable new service and claim benefits!

- Expedited claim payments—depending on the amount of coverage, up to $5,000 can be issued on the same day as proof of death is received at AFA.
- Disability waiver of premium—if, while insured and under the age of 60, you become totally disabled and the disability continues for at least nine months, coverage will be continued (upon approval by MetLife) with no further premium due for as long as you remain disabled, until you reach age 80.
- Conversion privilege—when coverage reduces or terminates because of age, you may convert the amount of insurance which was decreased (regardless of your health at that time), within 31 days of the premium due date, to any permanent plan of insurance then being offered by MetLife.

Limitation: Benefits under this policy will not be effective if death results from intentionally self-inflicted injuries, whether the insured person is sane or insane, within one year from the date the insurance on that person becomes effective, or, with respect to increased amounts of insurance only, one year from the effective date of such increase. Additionally, the plan provides a reduced benefit equal to 50% of the insurance benefit in force for members under age 35 whose death is within 13 weeks of an aviation accident in which the member was operating the aircraft involved.



AFA Level Term life insurance rates

Note: Rates for members are for each $20,000 unit of coverage.
Family Plan: Spouse benefit is 50% of the member benefit (rates shown are for $10,000 units). Coverage for each eligible child who is between the ages of 6 months and 21 years is $5,000. Children under 6 months of age are provided with $250 coverage once they are 15 days old and have been discharged from the hospital.

	Non-Smoker Rates		Smoker Rates	
Attained Age	Member Only Quarterly	Family Plan* Quarterly	Member Only Quarterly	Family Plan* Quarterly
20-24	$3.12	$4.62	$3.78	$5.28
25-29	3.60	5.10	4.38	5.88
30-34	4.98	6.86	6.12	8.00
35-39	6.78	9.28	8.28	10.78
40-44	10.80	14.55	13.26	17.01
45-49	18.06	25.56	22.20	29.70
50-54	27.00	37.00	33.18	43.18
55-59	38.70	53.70	47.58	62.58
60-64	59.82	84.82	73.56	98.56
65-69	135.00	172.50	166.02	203.52
70-74	216.00	291.00	265.68	340.68
75-79	270.00	345.00	332.10	407.10
80-84	369.48	444.48	454.44	529.44

* Family Plan rate includes coverage for insured member.

Application for AFA Level Term life insurance

Your name: ○ Male ○ Female

Last/First/Middle

Address:

Number and Street/City/State/Zip

Daytime Phone: Social Security #:

Area code/Number

Date of birth: Age: Height: Weight: Flying Status: ○ Yes ○ No

Month/Day/Year

Primary beneficiary:

Name/Relationship

Contingent beneficiary:

Name/Relationship

○ I am currently insured under this program in the amount of $_____. My certificate number is_____.
Please increase my coverage to $_____ (_____ units of coverage x $20,000).
○ I am not currently insured under this program. Please issue me _____ units of coverage x $20,000 = _____.
In the past twelve months, I ○ have ○ have not used any tobacco products.
○ I am also requesting coverage for my eligible dependents:

Names of Dependents to be insured, Relationship, DOB, Height, Weight. Use additional sheets of paper if necessary.

Please select your preferred payment frequency and indicate the correct premium amount.
○ _____ Monthly government allotment (please submit a quarterly payment with your application; instructions for initiating an allotment will be sent with your certificate of coverage).
○ _____ AFA Visa or AFA MasterCard account no. _____ Expiration date
Direct billing: ○ _____ Quarterly ○ _____ Semi-annually ○ _____ Annually

The following questions should be answered for you and any dependents for whom you are requesting coverage:
1) Have you been hospitalized during the preceding 90 days? ○ Yes ○ No
2) In the past three years, have you received treatment or been told you had
   a. Cancer, leukemia, Hodgkins Disease, or other associated malignancies? ○ Yes ○ No
   b. Heart disease, stroke, or other cardiovascular disease? ○ Yes ○ No
3) Within the past two years, have you had persistent cough, pneumonia, chest discomfort, muscle weakness, unexplained weight loss of ten pounds or more, swollen glands, patches in mouth, visual disturbance, recurring diarrhea, fever, or infection? ○ Yes ○ No
4) Has any application made by you for life or health insurance been declined, postponed or issued other than as applied for? ○ Yes ○ No
5) Are you receiving, entitled to receive or would be entitled to receive upon timely application any benefits due to sickness or injury (other than medical expense benefits) under any private policy or plan or government program, whether insured or non-insured? ○ Yes ○ No

If you answered "Yes" to any of the above questions, please give the name of the person to whom your answer applies and provide details, dates, diagnosis, treatment and the names and address of the health care provider(s) and hospital(s). Use additional sheets of paper if necessary.

Information in this application, a copy of which shall be attached to and made a part of my certificate when issued, is given to obtain the plan requested and is true and complete to the best of my knowledge and belief. I agree that no insurance will be effective until a certificate has been issued and the initial premium paid. I understand that the coverage will not become effective until approved by MetLife.

I understand that if on the Effective Date I am not eligible for such insurance by reasons of (i) age or (ii) membership status, insurance will not become effective on my life. "Hospitalized" means inpatient confinement for: hospital care, hospice care, or care in an intermediate or long-term care facility. It also includes outpatient hospital care for chemotherapy, radiation therapy, or dialysis treatment.

Authorization to furnish medical information

For underwriting and claims purposes, I hereby authorize any physician or other medical practitioner, hospital, clinic or other medically related facility, insurance company or other organization to furnish MetLife, on my behalf, with information in his or its possession, including the findings, related to medical, psychiatric or psychological care or examination, or surgical treatment given to the undersigned. The authorization shall be valid for two years. A photocopy of this authorization shall be considered as effective and valid as the original.

Member's Signature _____ Date_____ 19_____

Send application with remittance to: Insurance Division, AFA, 1501 Lee Highway, Arlington, VA 22209-1198. 4571-G1-MetLife 293

AFA MetLife®

Please retain this information for your records

MetLife's Consumer Privacy Notice - Information Practices
The Underwriting Process: MetLife (hereinafter "we") will evaluate the information given by you on this enrollment form and tell you if we cannot give you the coverage you asked for. We will also tell you in general terms the reason for our decision. Upon written request, more specific reasons will be given to you.
Information Collection: This enrollment form is our main source of information. To properly evaluate your request for coverage, we obtain additional medical data from third parties about any person to be insured. For instance, we may ask physicians, hospitals, or medical care providers to confirm or add to the medical data you have given us.
Information Disclosure: In most cases, the information we have about you will be sent to third parties only if you authorize us to do so. In some cases where disclosure is required by law or necessary to conduct our business, we may send the information to third parties without your consent.
Access and correct information: Upon written request, we will make information we have about you available to you. You have certain access and correction rights with respect to the information about you in our files.
Further information about our practices: Upon written request, we will send you more information about our underwriting process and your access and correction rights. Also, upon your written request, we will give you more information about the circumstances under which we will disclose the information about you to third parties without your authorization. Please write MetLife at the following address about these matters:

Metropolitan Life Insurance Company, One Madison Avenue, New York, NY 10010-3650

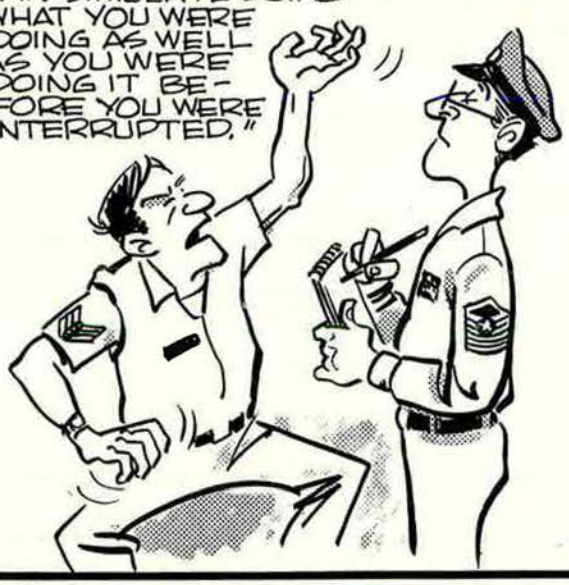
Bob Stevens'

"There I was..."

HERE'S SOME FLOTSAM and JETSAM THAT FLOATED UP IN THE OL' IDEA FILE. ACTUALLY, WE WERE CLEANIN' OUT THE FOLDER and THOUGHT THESE WERE TOO GOOD TO PASS UP. ENJOY!

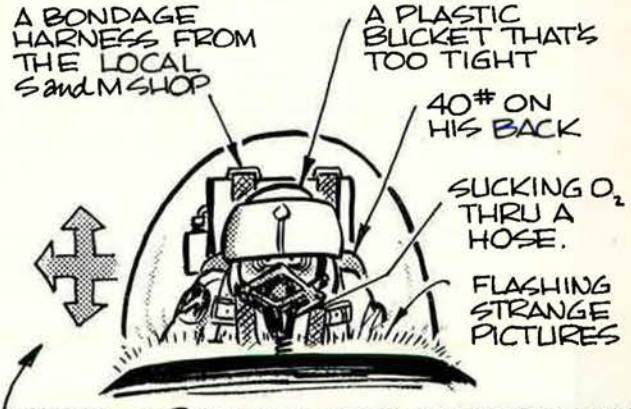
THE ORI
(OR, A VISIT BY STARS and ZEBRAS)

"AN ORI IS A SITUATION IN WHICH YOU STOP DOING WHAT YOU'RE DOING IN ORDER TO SIMULATE DOING WHAT YOU WERE DOING SO THAT YOU CAN SHOW SOMEONE ELSE THAT YOU CAN SIMULATE DOING WHAT YOU WERE DOING AS WELL AS YOU WERE DOING IT BEFORE YOU WERE INTERRUPTED."



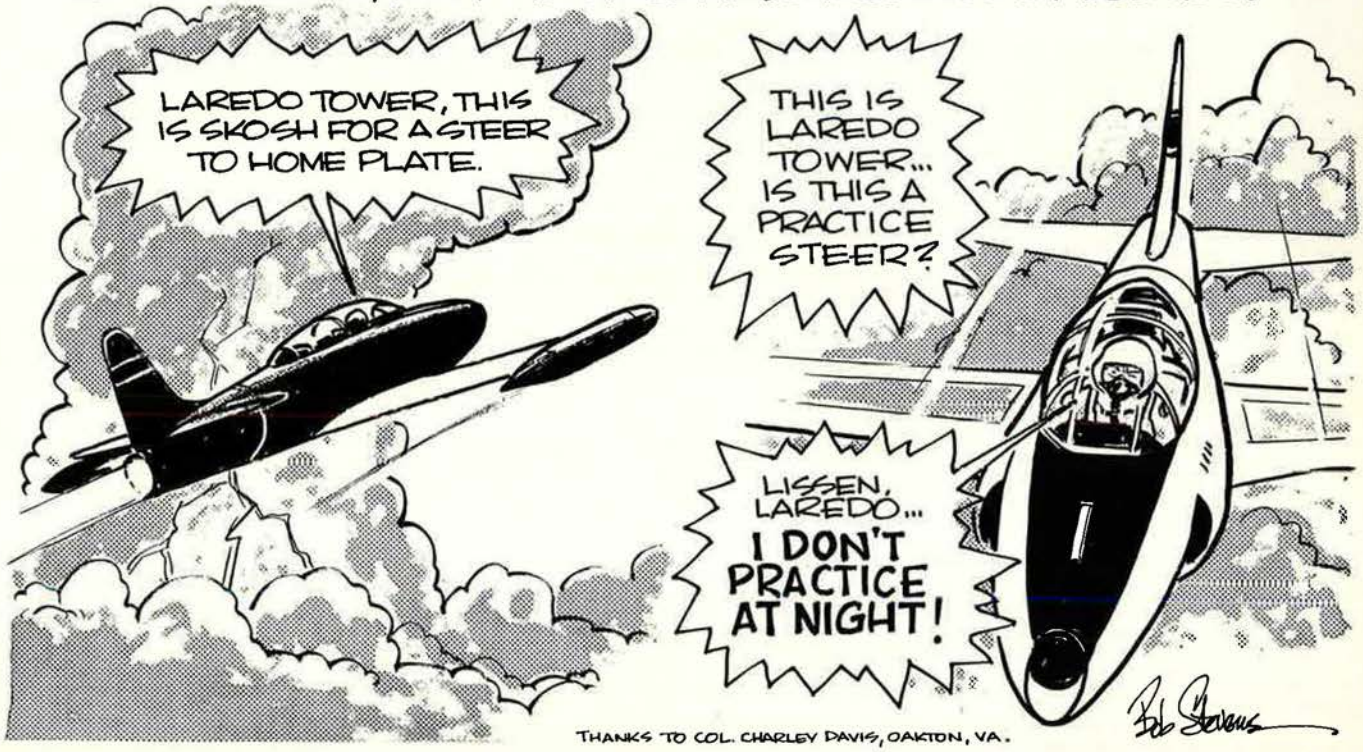
"AIRSICK & SCARED STIFF"
(OR, THE FIRST JET RIDE)

TAKE A POOR SLOB OFF THE STREET and SLAP HIM IN A SMALL, HOT, DECOMPRESSION CHAMBER THAT REEKS OF KEROSENE and SUBJECT HIM TO...



NOW, JERK HIM AROUND IN 3 DIRECTIONS WHILE HE HEARS BEEPS, HUMS, THUNKS, and FOREIGN BABBLING VOICES...
CONVINCE HIM IF HE LOSES THIS GAME OF SPACE INVADERS, HE'LL BE FRIED ALIVE... *Think he'll be scared?*

SCENE: DARK and STORMY NIGHT OVER TEXAS. IP IS LOOKING FOR WANDERING CADETS AT 37,000 FT. IP BECOMES SURROUNDED BY LOSTNESS-



THANKS TO COL. CHARLEY DAVIS, OAKTON, VA.

The first thing assembled on the Pampa 2000 was a world-class team.

The Pampa 2000 is a JPATS contender that's supported by a who's who of aviation industry leaders.

Team leader Vought Aircraft Company, formerly the Aircraft Division of LTV Aerospace and Defense, is the prime contractor and integrator. Loral provides ground-based training for the Pampa 2000. UNC provides aircraft logistics support. Allied-Signal supplies the engine, avionics and environmental control system. And FMA provides the proven Pampa airframe. This team of companies represents almost 300 years of combined experience. And with its many capabilities, the Pampa 2000 represents the perfect solution to training America's future Air Force and Navy pilots well into the 21st century.

LORAL UNC THE AVIATION COMPANY Allied Signal FMA Vought aircraft company

For the F-15, the William Tell Competition was as easy as one, two, three.

First in Team. First in Element.
And first in Top Gun.
Add to that, the fact that F-15s
have won the last five consecutive
William Tell competitions
and you have a fighter that the rest
of the world can't lay a glove on.
But then,
that's how we planned it.

MCDONNELL DOUGLAS
AIR SUPREMACY