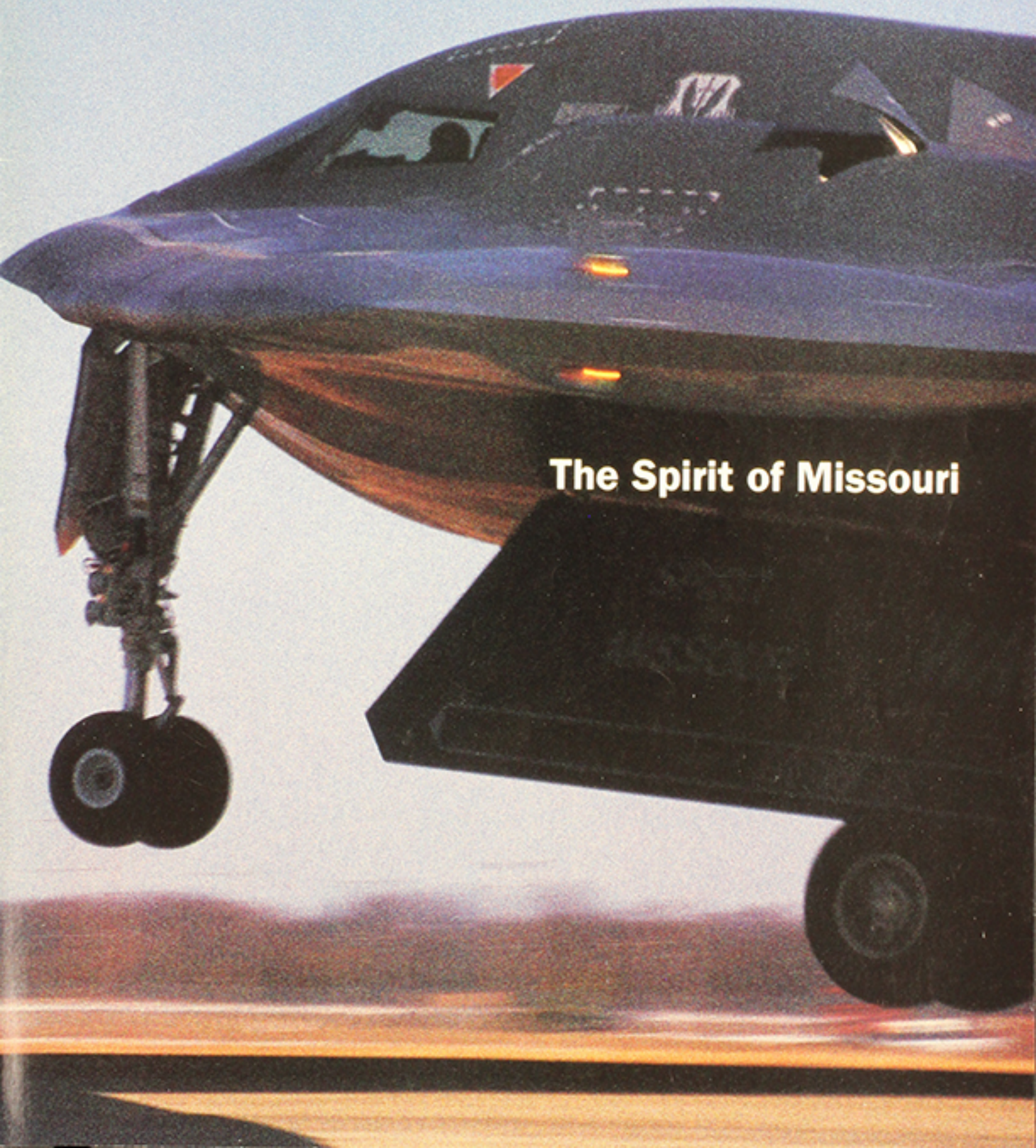
APRIL 1994/$3

AIR FORCE MAGAZINE

PUBLISHED BY THE AIR FORCE ASSOCIATION



The Spirit of Missouri

S211A: THE BEST CHOICE FOR JPATS

The Grumman S211A is the best training aircraft for the Joint Primary Aircraft Training System (JPATS). Its established production, fleet history and mature design provide ample reasons: "low risk" learning, low operating and maintenance costs, minimum downtime and support. Designed by our teammate Agusta and already operating at the heart of the JPATS requirement envelope, the S211A accommodates modern crew training with maximum utility. Built to U.S. Aerospace Technology and Manufacturing Standards, the S211 fleet has amassed more than 70,000 hours of simple, reliable efficient training. The S211A is the ideal primary trainer—no JPATS alternative matches this cost-effective aircraft. Grumman Aerospace & Electronics Group, Bethpage, Long Island, NY 11714. Telephone: (516) 575-7638.

GRUMMAN

April 1994, Vol. 77, No. 4

AIR FORCE MAGAZINE

PUBLISHED BY THE AIR FORCE ASSOCIATION

About the cover: The first B-2 bomber at Whiteman AFB, Mo., has ushered in a new era. See "The Spirit of Missouri," p. 36. Staff photo by Guy Aceto.

AIR FORCE Magazine (ISSN 0730-6784) April 1994 (Vol. 77, No. 4) 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.

Editorial

By John T. Correll, Editor in Chief

Hawkish Moves, Dovish Means

THE Department of Defense and the CIA are engaging in scare tactics about North Korean nuclear weapons, says the aggrieved *Bulletin of the Atomic Scientists.* (That is risible, coming from the bunch who invented the biggest nuclear scare tactic of all time, the doomsday clock set at five minutes to midnight.) Unconvinced that Pyongyang has the bomb, the Atomic Scientists deplore a "worst case" trick by the Pentagon to portray North Korea as a threat.

They should compare signals with their close colleagues at the Council for a Livable World, who have out a new report identifying five "declared," five "de facto," and seven "threshold" nuclear states (plus other "countries of potential concern") and saying that North Korea has enough plutonium for several bombs.

It is strange to behold the Atomic Scientists disparaging a nuclear concern rather than dramatizing one. On the other hand, disbelief in military threats is part of the liberal creed. How else could you attack as excessive a defense budget headed down to 2.8 percent of GDP? It is a difficult position to hold, especially when sinkholes develop beneath your feet.

In February, the New York *Times* objected to the unrealistic requirement that US forces be ready to fight two near-simultaneous regional conflicts. Within the month, the Clinton Administration had put Serbia and North Korea, more or less simultaneously, on what sounded very much like warnings of war.

When presenting the new defense budget, the Administration said the force projections were even lower than prescribed by the radical Bottom-Up Review in 1993. Every month this year, the armed forces will diminish on average by 7,800 active-duty troops, 2,750 Guardsmen and Reservists, 1,165 civil servants, forty-one operational aircraft, and four battle-force ships. Personnel strength will eventually drop to at least 1.3 million below the Cold War level.

These reductions—and the deeper ones demanded by the liberal community—are said to be justified by the disappearance of requirements. Recent experience says otherwise. In the Balkans, in Korea, and from the expanded mission in Somalia to the aborted venture in Haiti, potential uses for the armed forces arose with astonishing regularity during the first year of the Clinton Administration. US military force was used against Iraq nine times in 1993.

In its annual human rights report, the State Department said that armed conflict poses the most significant risk to human rights in the world today. That is no surprise to proponents of a strong defense posture, who have said much the same thing for years. A by-product of the Cold War was that the superpowers exercised a sort of global restraint on lesser powers. Most of those restraints are gone now, and it seems that regional wars will be an inevitable result.

If the two-conflict strategy is overblown, how do you account for simultaneous war warnings to Serbia and North Korea?

Lt. Gen. James R. Clapper, Jr., director of the Defense Intelligence Agency, told the Senate in January that "historic and ethnic hatreds" are likely to bring war to many nations in the next decade. "The human cost will be immense, and it will be on television," he said. If the past effects of televised atrocities are an indication, there will be enormous pressure for the commitment of US troops.

It is not easy to tell the doves from the hawks. Many of the same people who used to say the United States should not be the world's policeman now criticize the armed forces for their reluctance to intervene in troubles abroad. Furthermore, the expectations tend to rise. Just as the Somalia relief operation drifted into armed "peacekeeping," the advocates have escalated their vocabulary to "peacemaking" and "peace enforcement."

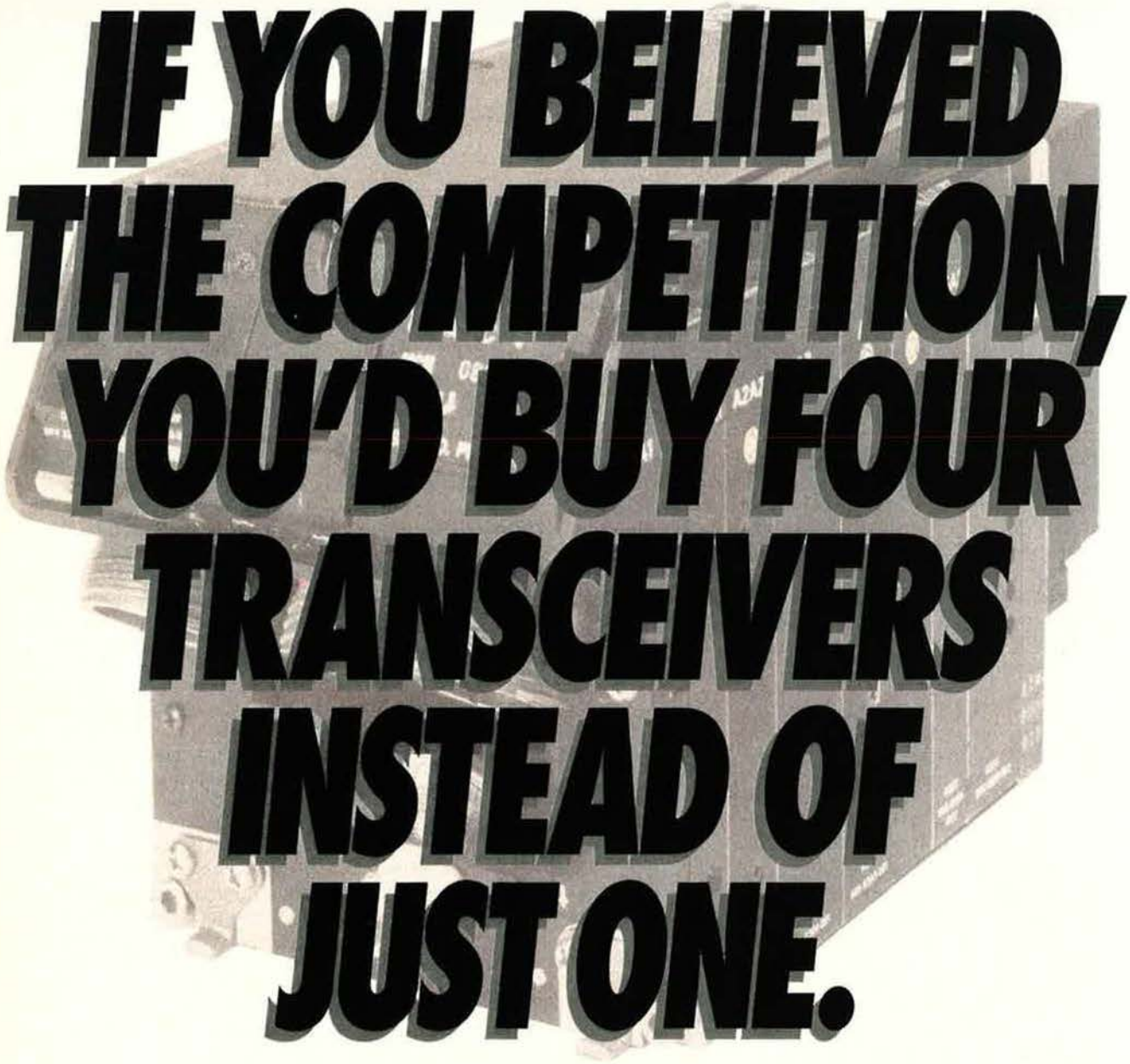
Rep. Ronald V. Dellums (D-Calif.), chairman of the House Armed Services Committee, faults the Pentagon for not explaining the new mission to the public. "We still want to put the troops out there, kick butt, and come home," he says. "The American people haven't yet internalized peacekeeping into their psyche."

According to the United Nations, 44 million people worldwide are displaced by violence and persecution. There is no telling where the next crisis will erupt. In March 1992, the liberal community was pitching fits about a draft Pentagon planning paper that outlined seven possible scenarios in which US force might be required. Six months later, the New York *Times,* candidate Bill Clinton, and many others were calling for air strikes in Serbia—which was not in the scenarios because nobody had imagined what might happen there.

If foreign policy looks more hawkish than before, spending priorities do not. Between 1990 and 1999, mandatory federal spending (mostly entitlement programs) will rise by thirty-eight percent. Domestic discretionary spending will increase twelve percent. Defense outlays will be down thirty-five percent.

It is very well for President Clinton to promise that we will have "the best-equipped, the best-trained, and best-prepared fighting force on the face of the Earth," but the words lack a certain credibility.

There is serious doubt that the budget can cover the minimal force described in the Bottom-Up Review, much less the actual requirements. The reality is that US forces, deployed on optimistic assumptions, may go to war undermanned, underfunded, and underequipped. ■



IF YOU BELIEVED THE COMPETITION, YOU'D BUY FOUR TRANSCEIVERS INSTEAD OF JUST ONE.

THE COLLINS AN/ARC-210(V) INTEROPERABLE COMM. Available immediately, it's the smallest, lightest fully interoperable DoD Mil-Spec VHF/UHF, AM/FM, ECCM, ATC, maritime and SATCOM/DAMA airborne transceiver in the world. It features HAVE QUICK I/II and SINCGARS, and is the only transceiver in production that is fully upgradable with future ECCM waveforms, such as SATURN, for the next decade or more without hardware modifications. It already has been proven on over a dozen Army, Navy, Marine Corps and Air Force platforms. And you only need one Collins AN/ARC-210(V) transceiver to be fully interoperable with all services, instead of the four completely separate transceivers that the competition needs. For more information, call us today at 1-800-321-CACD (2223). Outside the U.S., call (319) 395-5100, or fax (319) 395-4777. Collins Avionics & Communications Division Department 120-131, Rockwell, 350 Collins Road NE, Cedar Rapids, IA 52498.

Rockwell *Defense Electronics*

Collins

NAVIGATION • COMMUNICATIONS • DATA LINKS • FLIGHT MANAGEMENT • SYSTEMS INTEGRATION

Letters

Civilian Control

I take exception to the portions of Lt. Col. Donald W. Applegate's letter *["A Widening Schism," February 1994 "Letters," p. 6]* in which he discusses the relationship between the military and our civilian leadership. Colonel Applegate states, "Historically, this country's armed forces have subordinated themselves to civilian control" and "Military loyalty to civilian leadership cannot be dictated. It must be earned."

The military did not subordinate itself to civilian control. We were established as subordinate, first by act of the Continental Congress and later by the Constitution. Our loyalty to the civilian leadership structure is, in fact, dictated by the Constitution. This is a condition of service that we swear to honor when we volunteer to serve.

Colonel Applegate further states that a military-civilian confrontation "would be a disaster for both the military and the Administration." I submit it would disgrace the US military, and none of the fault would be President Clinton's. If anyone in the military can't live with the individual whom the people we serve have freely elected to office, that person can resign (and perhaps run for office).

A minor historical point: President Clinton is not the only Commander in Chief to avoid military service. Grover Cleveland, for example, bought his way out of the Civil War draft. Neither situation would excuse an officer from making disrespectful or disloyal public statements about the sitting President, which seems to be happening a lot since January 1993. Perhaps we all need to leave public politics to the staff at the Pentagon and prove we can do the job no matter who is at the helm.

Maj. Kenneth D. Worthylake, USAF
Newport News, Va.

Unattainable Objectives

"The Choppy World of Army Aviation" *[January 1994, p. 56]* fails to highlight several key issues that plague Army Aviation and military thinking in general. The author fails to point out that the lessons learned on October 3, 1993, were not new. We, as a nation, have seen the consequences of daylight operations time and time again with the loss of life and equipment. This is not limited to Army rotary-wing aviation, as demonstrated by the loss of the AC-130 gunship during Operation Desert Storm. In addition, the author overlooks the numerous successes that are public knowledge.

What really determines whether rotary-wing aviation succeeds or fails is the desired tactical and political end state. During Desert Storm, military commanders were given a free hand in selection and destruction of key military targets, which supported a clear campaign plan. In Mogadishu, targets were not linked to clearly defined military objectives. The mission was tied to a desire to achieve unattainable political objectives through military actions. The author misses the mark in comparing the tactical success in employment of operational art in Desert Storm against a political decision to jeopardize elite fighting troops to correct political failures in Somalia.

In a world characterized by media-generated credibility, David Harvey's article wrongfully taints the reputation of military units that have enjoyed numerous successes that will never reach print. The dangerous "chilling effect" of such articles on the President, Congress, the State Department, and even the Secretary of Defense heightens the anxiety of risk management at the highest levels of government. Because of the heightened anxiety, the first casualty of the next conflict will be the courage of our leaders to use the military instrument of national power correctly.

Rich Enderle
Riverview, Fla.

More Kitty Hawk Critiques

"Up From Kitty Hawk" *[December 1993, p. 22]* was a very informative and concise history of the Air Force. In his effort to cover a period of ninety years in a few pages, however, Jeffrey P. Rhodes chose to ignore one of the greatest weapon systems in the history of the Air Force—the Convair B-36 Peacemaker.

The B-36 was the first airplane to become an instrument of international policy and was the greatest deterrent to nuclear war from 1948 to 1958. Stormy controversy over its potential reached all the way to Congress, and fiery debate resulted in the resignation of several high-ranking Naval officers. The US Navy had assured Congress of the invulnerability of Hawaii to another surprise attack when, on December 7, 1948, a B-36 from Fort Worth, Tex., flew a nonstop thirty-six-hour simulated strike, dropped 10,000 pounds of bombs, and returned to Fort Worth—a distance of more than 8,000 miles. Navy opposition subsided after this feat. . . .

Col. Richard S. George, USAF (Ret.)
Fort Worth, Tex.

My compliments to Jeffrey P. Rhodes for "Up From Kitty Hawk." It was an excellent chronology of significant aerospace events since 1903. I classify it only "excellent," rather than "outstanding," because it omitted several significant events that have taken place at the nation's premier western spaceport, Vandenberg AFB, Calif. Vandenberg has been at the forefront of our nation's aerospace programs since 1958.

Four significant aerospace firsts come quickly to mind. On December 16, 1958, the Air Force first fired a ballistic missile, a Thor, under wartime operational conditions. On Feb-

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

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
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 Associate
Frances McKenney

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

US Sales Manager
By Nicholas • 203/357-7781
Stamford, CT

US Sales Manager
William Farrell • 708/295-2305
Lake Forest, IL

European Sales Manager
David Harrison • 44-81-698-9456
Kent, England

BPA Circulation audited by Business Publication Audit

Letters

ruary 28, 1959, Discover I became the world's first polar orbiting satellite when it was launched from Vandenberg. On September 9, 1959, an all-blue-suit USAF team launched the Atlas ICBM under "operationally realistic conditions" for the first time. Finally, the mighty Atlas, the free world's first ICBM, began standing strategic alert at Vandenberg on October 31, 1959.

The list of significant aerospace events that have taken place from Vandenberg goes on and on. In our thirty-five years, we have launched almost 1,700 missions, and we are busy now preparing to embark on our next big surge of launch missions: commercial space launches that need polar orbits to support scientific, educational, environmental, and communications payloads. . . .

Lt. Col. Cary Gray,
USAF
Vandenberg AFB, Calif.

When AIR FORCE Magazine considers the achievement of an altitude record by an Air Force pilot a less significant event than a Navy man hitting a golf ball, then we have a severe problem in perspective—at least, Air Force perspective. . . .

With reference to "Up From Kitty Hawk," it could be reasoned that the altitude record of 175,000 miles set by Col. Alfred M. Worden during the first interplanetary extravehicular activity (EVA) on August 6, 1971, as well as his solo flight record of more than seventy-three hours in lunar orbit on the same mission, were more significant achievements than a Navy admiral hitting a golf ball on the moon on February 6, 1971.

Colonel Worden was part of an Air Force team that achieved other firsts and records during the Apollo 15 mission, including the first "J" mission to the moon (more than doubling the productivity of previous missions); the first "flight" of a mobile vehicle on another planet; the longest EVA (tethered or untethered—seven hours, twelve minutes, twenty-six seconds); the only USAF three-man team to fly a lunar mission; and the only USAF-trained pilot to manually land a spacecraft on the lunar surface.

Mind you, hitting a golf ball was a great idea. But is that your relative scale in measuring significant achievements in "Up from Kitty Hawk"? Problems in perspective—troubling problems!

Col. David R. Scott,
USAF (Ret.)
Manhattan Beach, Calif.

It was with considerable interest that I read "Up From Kitty Hawk." I was dismayed to note that one of the most significant events of the air war in Europe was omitted from the chronology—the first daylight bombing raid on Berlin, conducted on March 4, 1944, which was led by the 95th Bomb Group. For this effort, the 95th Bomb Group was awarded its third Presidential Unit Citation—the only B-17 unit in Eighth Air Force to receive three such citations. . . .

Col. Harry G. Mumford,
USAF (Ret.)
Tiburon, Calif.

I was quite impressed with "Up From Kitty Hawk" until I got to the section dealing with the 1980s. The omission of the accomplishments of the USAF ground-launched cruise missile system completely shocked me.

This most uncharacteristic USAF mission is quickly slipping into obscurity. New troops who enter the Air Force have no idea what GLCM was or what role it had in the demise of the Soviet Union (a feat we GLCM vets take full credit for). The mention of Pershing and not GLCM in AIR FORCE Magazine is just unbelievable.

I'd just like that bit of 1980s history set right. We GLCM vets will make sure the new troops know the real truth about the fall of the Berlin Wall.

SSgt. Alan P. DesJardins,
USAF
Goodfellow AFB, Tex.

In "Up From Kitty Hawk," I saw no mention of the battle of the Bismarck Sea, which occurred on March 3, 1943.

B-25s, modified with eight .50-caliber machine guns in the nose section, were used for the first time in low-level skip-bombing tactics.

They were a great success.

Andrew J. Swain II
Savannah, Ga.

Contractual Obligations

I'm glad the October issue of AIR FORCE Magazine contained my letter concerning retired pay *["Willing to Take Less," October 1993 "Letters," p. 7]*. I have read and pondered the responses published in the December 1993 issue *["Reducing Retirement Pay," December 1993 "Letters," p. 4]*.

I don't remember any contract I signed with the US government concerning pay and retirement benefits. Maybe I did; however, the ones I remember are several I signed agreeing

to remain on active duty after completing programs that were beneficial to me as well as to the Air Force.

I have always understood the portion of the Constitution dealing with the armed forces as stating that they are the responsibility of Congress. In this regard, Congress is free to make adjustments to the pay, allowances, and other aspects of the armed forces as necessary to maintain good order and discipline within the constraints of the available funds. The President is the Commander in Chief but not the paymaster of the armed forces. Should actions of Congress concerning the military retirement system be described as "tinkering"? Or is Congress carrying out responsibilities assigned to it by the Constitution? . . .

No two ways about it—funds for maintenance of veterans' activities and for retired pay are a major expense item in the budget. I've heard several figures quoted, but the one I hear most is "about $67 billion a year." We can cast stones at other programs we consider wasteful, but our stones won't change them. We can be effective only in the area of expenditures in support of the armed forces.

Brig. Gen. John W. Harrell,
USAF (Ret.)
McLean, Va.

Same as It Ever Was

I thoroughly enjoyed "Deployment" *[November 1993, p. 40]*. My only disappointment was that it gave the impression that deployment and the mobag were relatively new in the Air Force. This is just not so. The ability to deploy fighters and other aircraft to virtually any point on the globe goes back at least thirty-five years.

Almost immediately following the end of the Korean War, the Air Force implemented a massive effort to provide in-flight refueling to its fighter and bomber forces. B-29s were converted to tankers, and some B-50s and F-84Fs were modified as receiver aircraft. With these aircraft, one record after another was broken. The first nonstop air refueled flight around the world by a B-50 and the first nonstop air refueled crossing of the Pacific by a single-seat, single-engine F-84F fighter are two examples.

By the late 1950s, Tactical Air Command (TAC) was ready to build the first fully mobile wings. The new unit was called a Consolidated Air Strike Force (CASF). The basic deployable unit was built around a single tactical fighter squadron.

Each tactical fighter wing had to keep two CASF squadrons with full equipment ready to go at all times. The primary squadron was expected to launch in roughly H-hour plus twelve and the secondary squadron, if needed, by about H-hour plus thirty-six. The initial deployment called for five elements: Initial Support Teams One, Two, and Three and En Route Support Teams A and B. The newly accepted C-130 proved to be the perfect aircraft to airlift these teams. The balance of personnel and equipment—the Tactical Support Element—traveled by C-124, C-135, or whatever was available. We suffered the same shortage of airlift as the wings do today. . . .

My deployments ended in 1965 when I left Cannon AFB, N. M., and spent a year at TAC headquarters as configuration management officer and then went to Vietnam. . . . I finished my career at Hurlburt Field, Fla., with the 1st Air Commando Wing, where we taught B-52 pilots to fly A-1Es, C-123s, and O-1s—not a pretty sight. I lost track of mobility after that, but after reading Peter Grier's article, it sounds like all the procedures we pioneered are still being followed.

Many of us mobility pioneers are old men now, . . . but we remember vividly the glory days when we were young and vigorous and roamed the airways of the world, bringing airpower to wherever it was needed. We like to think that our efforts were a major part of bringing down the Berlin Wall, freeing eastern Europe, and causing the collapse of the Soviet Union. . . .

Lt. Col. Robert A. Tonnies,
USAF (Ret.)
Cincinnati, Ohio

Bending the Static

I read "The RO-Gunners" *[January 1994, p. 74]* with great interest. Fortunately for me, the airborne radio operator career ladder did not disappear at the end of World War II.

I joined USAF in March 1958 and served as an airborne radio operator for thirty years. I was an aircrew member on C-47s, C-54s, WB-50s, EC-121Ds, EC-130s, EC-135Ps, EC-135Ks, KC-135s, VC-135s, VC-9s, and the NATO E-3A. My last assignment was chief of communications, NATO Flying Squadron One, Geilenkirchen AB, Germany.

Although they are not gunners, airborne communications systems operators (CSOs)—the 1990s name for the World War II radio operator—are often required to operate, repair, and maintain equipment so sophisticated that it would dumbfound their World War II predecessors.

Today's CSOs operate satellite, multiplex, teletype, telephone, facsimile, cryptographic, inertial navigation, flight director system, and

direction-finding equipment, as well as very-low-frequency, high-frequency, very-high-frequency, and ultrahigh-frequency radio equipment. They currently serve on the E-3 AWACS, EC-130 ABCCC, Air Force One, VC-9, VC-20, VC-135, and VC-137 Special Air Mission aircraft, as well as on EC-135 and E-4 Airborne Command Post aircraft and MC-130 Combat Talon aircraft.

The World War II RO-gunners can be proud of their 1990s successors who helped win the Cold War.

CMSgt. Kenneth D. Witkin,
USAF (Ret.)
Fort Washington, Md.

"The RO-Gunners" reminded me of my experiences with RO-gunners on B-17 aircraft.

In 1944, I was on a training flight as a gunnery instructor. I was flying out of Rapid City, S. D., over Grand Island, Neb., when our RO excitedly started pounding out Morse code. He had recognized the "fist" of an old pre–World War II buddy who was transmitting from Hawaii. Their "conversation" lasted at least fifteen minutes. Apparently not all ROs could avoid developing the personal "fist" discouraged by USAAF training.

Flying combat in Europe, I came to realize that RO-gunners had a very responsible chore in turning on the identification, friend or foe system when returning to friendly skies after a combat mission. On one occasion, an inexperienced RO failed to do this, and our group was exposed to a heavy barrage of antiaircraft fire from our own forces.

Maj. Rodman Barnes,
USAF (Ret.)
Bellevue, Neb.

I enjoyed "The RO-Gunners," but a glitch of monumental proportions appears in the box on p. 76. It reads, "When Charles Lindbergh crossed the Atlantic in 1927, he left his bulky set behind so he could carry an additional 425 gallons of fuel." Surely the author must know that 425 gallons was almost his entire fuel load, and a radio weighing 2,550 pounds would be a bulky one, indeed!

Michael Scherer
West Palm Beach, Fla.

The Obsolete Bomber

AIR FORCE Magazine asks "How Many Bombers Are Enough?" *["Washington Watch," February 1994, p. 10.]* How about none? It took the Navy more than four decades to retire the last of its battleships, although the effectiveness of aircraft carriers in World War II clearly indicated battleships were no longer needed.

When the Air Force acquired reliable missiles and standoff weapons, the day of the manned bomber should have drawn to a close, but the armed forces are reluctant to eliminate weapons that have served them well in the past. The Army kept horse cavalry until 1944.

It should be apparent that a billion-dollar B-2 isn't required to launch PGMs or a variety of other munitions. Historically, the Air Force has adapted a variety of aircraft and missiles to perform tasks other than those they were procured for, and it has been done effectively. Let's not squander limited defense dollars.

Col. Peter Boyes,
USAF (Ret.)
Rancho Murieta, Calif.

Triple-Headed Monsters

This is in response to the item headed "AMC Starts Third-Pilot Program" *["Aerospace World," December 1993, p. 17].*

The item, in substance, says, "We're short of navigators and have an excess of pilots."

The Air Force's solution is twofold: transfer KC-135 navigators to a higher-priority assignment (makes sense to me) and transfer "banked" pilots into the KC-135. The "third pilots" would attend simulator and academic classes and then be trained in key navigation skills. They would report to their units to fly as third pilots, "performing some navigation duties as they learn the aircraft and the mission."

If the item truly reflects the plan, I would suggest that USAF rethink what is entailed. The KC-135 certainly does not need a third pilot who would need continuing training (*e.g.,* simulator, takeoffs and landings, and annual hourly minimums), requiring time and money. The airplane has been operated effectively by two pilots for almost forty years.

Using banked pilots as navigators in the KC-135 makes sense. Why not a short training program (not the entire course leading to the navigator rating), either centralized or done locally? Teach the new sport the switches; give him a quickie on celestial navigation—how to point, shoot, and compute—or buy him the $250 celestial calculator that sailors use; give him the radar skills necessary to facilitate a rendezvous with receivers; and tell him if he does well, he'll be first up for a cockpit assignment.

In this day of minute scrutiny by our friends in Congress, the third-pilot program would resemble the railroad union's featherbedding practices. If the guy is going to fill the navigator's seat, call him a navigator or anything but a third pilot. I'd bet you can get all the troops you need from the banked pilots on a volunteer basis.

I was one of the "triple-headed monsters"—pilots who were recruited and trained as navigators/bombardiers by SAC in the early 1950s. It was a complete waste of time and money, but it was the shrewdest personnel move Gen. Curtis E. LeMay made during that period. He convinced the Air Force that the new B-47 was so demanding that both pilots had to be dual-rated and that the training was so expensive that only young, company-grade active-duty Air Force officers with years of service ahead of them should be considered. He drew candidates from all commands and replaced his mostly Reserve officer pilot pool with young active-duty officers.

When reductions crippled other commands, his force remained relatively intact—wonderfully clever when you realize it simply wasn't a valid requirement. Other than five crews at MacDill AFB, Fla., I don't think another pilot/navigator held a permanent navigator crew position—and that was only for a limited time. . . .

We no longer have the luxury (if we ever did) of creating such positions as third pilot without a valid mission requirement. To do so would not only be wasteful but would also expose us to needless and justified criticisms.

Col. Joseph Schreiber,
USAF (Ret.)
San Antonio, Tex.

The Busy Skyhawk

It's always a pleasure reading your fine publication. However, I am disappointed at your continued exclusion of the TA-4F/J Skyhawk from the "World Gallery of Trainers" *[December 1993, p. 64].* The "Scooter" has been training carrier aviators for more than twenty years. They complete carrier qualifications in this airframe and an advanced syllabus of air-to-ground and air-to-air flights that rivals USAF lead-in fighter training—all *before* receiving their wings. Additionally, the two-seat A-4 is a mainstay of aggressor squadrons in the Navy today.

Even with the procurement of the T-45, the A-4 will be a busy little airframe for years to come.

Lt. Rudy Llobet,
USN
Orange Park, Fla.

The Chart Page

By Tamar A. Mehuron, Associate Editor

Snapshots of the New Budget

In February, President Clinton presented his proposed defense budget for Fiscal Year 1995. The document requests $252.2 billion in budget authority and $259.2 in outlays for the direct program (DoD activities only). The budget request for the total national defense program (DoD activities and defense activities in the Department of Energy and other federal agencies) is $263.7 billion in budget authority and $270.7 billion in outlays.

In real terms, the defense budget in 1995 is thirty-five percent smaller than in Fiscal 1985, the peak year for DoD budget authority since the Korean War. Fiscal 1995 marks the tenth straight year of real decline for the defense budget.

Funding levels can be expressed in several ways. Totals are most frequently stated in **budget authority,** which is the value of new obligations that the government is authorized to incur. These include some obligations to be met in later years. Figures can also be expressed in **outlays** (actual expenditures, some of which are covered by amounts that were authorized in previous years).

Another difference concerns the value of money. When funding is in **current** or **then-year** dollars, no adjustment for inflation has taken place. This is the actual amount of dollars that has been or is to be spent, budgeted, or forecast. When funding is expressed in **constant dollars,** or **real dollars,** the effect of inflation has been factored out to make direct comparisons between budget years possible. A specific year, often the present one, is chosen as a baseline for constant dollars.

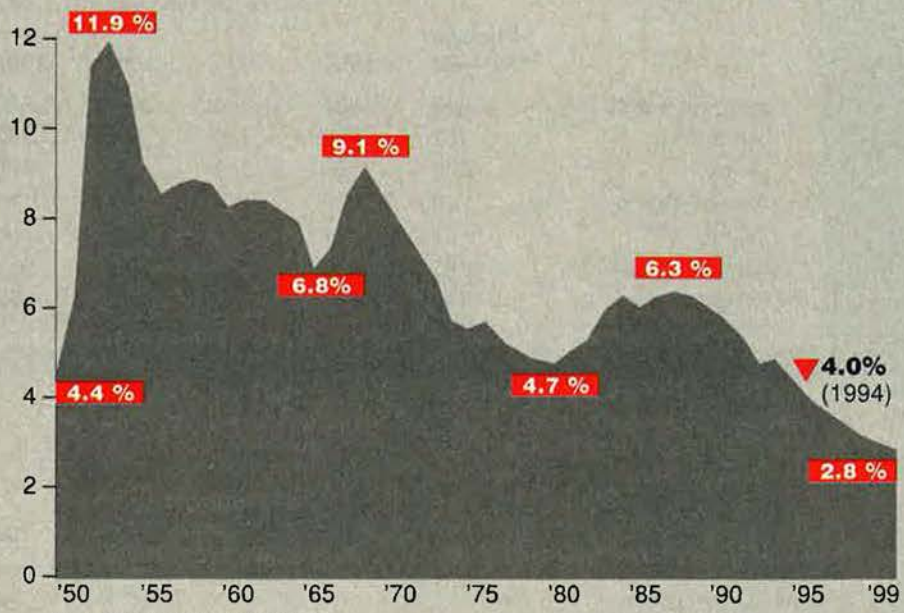
The following charts address only the Defense Department program. In some instances, numbers on the charts in this section may not sum to totals shown because of rounding. Years indicated are Fiscal Years.

Budget Topline

($ billions)

	1994	1995	1996	1997	1998	1999
Budget authority (current $)	249.0	252.2	243.4	240.2	246.7	253.0
Budget authority (constant FY 1995 $)	254.5	252.2	237.2	227.7	227.4	226.7
Outlays (current $)	267.4	259.2	249.1	244.6	244.7	245.5
Outlays (constant FY 1995 $)	273.3	259.2	242.8	231.9	225.6	220.1

Defense Outlays as a Share of Gross Domestic Product



Source: US Department of Defense.

Cutting the Pie: Who Gets What

(Budget authority in current $ billions)

	1993	1994	1995	Change 1994–95
Military personnel	76.0	70.8	70.5	−0.3
Operations & maintenance	89.2	88.0	92.9	+4.9
Procurement	52.8	44.5	43.3	−1.2
Research, development, test, and evaluation (RDT&E)	38.0	34.8	36.2	+1.4
Military construction	4.6	6.0	5.0	−1.0
Family housing	3.9	3.5	3.3	−0.2
Other	3.0	1.5	0.9	−0.6
Total	**267.4**	**249.0**	**252.2**	**+3.2**

Service Shares

(Budget authority)

	1991	1992	1993	1994	1995
Current $ billions					
Air Force	83.6	80.2	78.5	74.3	74.5
Army	72.5	67.0	63.6	56.9	60.8
Navy	94.9	84.8	82.6	74.8	78.4
Defense agencies, DoD-wide	25.0	38.9	34.2	42.7	38.5
Total	**276.0**	**270.9**	**258.9**	**248.7**	**252.2**
Percentages					
Air Force	30.3	29.6	30.3	29.9	29.5
Army	26.3	24.7	24.6	22.9	24.1
Navy	34.4	31.3	31.9	30.1	31.1
Defense agencies, DoD-wide	9.1	14.4	13.2	17.2	15.3

Fiscal 1995 figures are those contained in the Clinton Administration's budget request.

Total Funding of Major Programs

(Current $ millions, including RDT&E, procurement, and military construction funding)

	1995
Air Force	
C-17 transport	2,986.4
F-22 fighter	2,465.7
B-2 bomber	818.2
E-8 Joint STARS aircraft	802.2
Milstar satellite	648.0
Joint Primary Aircraft Training System	162.6
Joint Advanced Strike Technology	101.4
Army	
RAH-66 helicopter	525.2
AH-64 helicopter	273.4
Navy	
DDG-51 destroyer	2,926.2
F/A-18C/D/E/F fighter	2,579.3
Trident II ballistic missile	745.8
E-2C early warning aircraft	397.7

Manpower

(End strength in thousands)

	Change 1987–93	1994	1995	1996	1997	1998	1999	Change 1994–99
Total active-duty	–446	1,624	1,526	1,496	1,469	1,458	1,453	–171
Air Force	–162	426	400	396	392	391	390	–36
Army	–206	540	510	500	495	495	495	–45
Marine Corps	–18	177	174	174	174	174	174	–3
Navy	–61	481	442	426	408	398	394	–87
Selected reserves	–56	1,039	979	950	934	919	906	–133
Civilians	–169	923	873	846	822	809	794	–129

Force Structure Changes

(Budget authority in current $ billions)

	Cold War Base 1990	1993	1994	1995	Bottom-Up Review Plan
Air Force					
Active fighter wings	24	16.1	13.4	13.0	13
Reserve component fighter wings	12	11.3	8.7	7.5	7
Army					
Active divisions	18	14	12	12	10
Reserve component divisions	10	10	8	8	5+
Navy					
Battle force ships (including carriers)	546	435	387	373	346
Aircraft carriers					
Active	15	13	12	11	11
Reserve	1	—	—	1	1
Carrier air wings					
Active	13	11	11	10	10
Reserve	2	2	2	1	1
Marine Corps					
Active divisions/air wings	3	3	3	3	3
Reserve divisions/air wings	1	1	1	1	1

How the Defense Budget Dropped

(Budget authority in current $ billions)

	1995	1996	1997	1998	1999	Total 1995–99
Last Bush estimate	**258.5**	**261.5**	**266.8**	**271.1**	**274.1**	**1,332.0**
Bottom-Up Review cuts	−6.0	−13.0	−22.0	−22.0	−28.0	−91.0
Program review changes	−2.0	−6.0	−6.0	−4.0	+5.0	−13.0
September 1993 baseline	**250.5**	**242.5**	**238.8**	**245.1**	**251.1**	**1,228.0**
Pay raise adjustments	+2.4	+1.7	+2.2	+2.4	+2.7	+11.4
Revised baseline	**252.9**	**244.2**	**241.0**	**247.5**	**253.8**	**1,239.4**
Offsetting receipts	−0.7	−0.8	−0.8	−0.8	−0.8	−3.9
February 1994 DoD topline	**252.2**	**243.4**	**240.2**	**246.7**	**253.0**	**1,235.5**

Procurement of Major Air Force Systems

(Current $ millions)

	1993	1994	1995
Aircraft Procurement			
B-1B bomber	160.5	162.4	154.3
B-2A bomber	2,642.0	571.7	384.4
C-17 transport	2,065.4	2,157.0	2,662.8
C-130H transport	287.1	53.6	50.0
E-8B Joint STARS aircraft	575.0	560.0	564.2
F-16C/D fighter	666.8	470.6	100.5
Nondevelopmental airlift aircraft	0.0	97.9	103.7
Missile Procurement			
Ballistic missiles	66.9	27.1	16.2
AGM-129 Advanced Cruise Missile	98.6	5.3	0.0
AGM-130 powered GBU-15	79.9	70.4	71.8
AGM-137 Triservice Standoff Attack Missile	0.0	159.6	373.9
AIM-120A Advanced Medium-Range Air-to-Air Missile	605.8	487.2	309.5
Spares	61.9	51.5	68.3
Guided bombs & munitions	0.0	0.0	279.6
Other Procurement			
Global Positioning System	175.6	166.6	190.2
Defense Support Program	229.0	356.3	364.0
Space boosters (Titan)	380.0	463.2	422.7
Medium launch vehicle	201.1	139.0	149.0
Space shuttle operations	87.0	72.9	103.5
RDT&E			
Milstar	1,107.3	918.4	648.0
B-2 bomber	1,189.3	785.8	408.5
C-17 transport	168.6	232.5	221.4
F-22 fighter	1,925.2	2,082.9	2,461.1
E-8 Joint STARS aircraft	313.5	283.1	190.4
Joint Advanced Strike Technology	0.0	0.0	101.4
Follow-On Early Warning System	236.6	107.4	0.0
Advanced spacebased warning system	0.0	0.0	150.0

Operational Training Rates

	1993	1994	1995
Air Force			
Flying hours per crew per month			
Fighter/attack aircraft	20.7	19.7	20.7
Bombers	21.8	18.0	19.9
Army			
Flying hours per crew per month	13.5	14.5	14.5
Annual tank miles	588.0	620.0	800.0
Navy			
Flying hours per crew per month	24.0	24.0	24.0
Ship steaming days per quarter			
Deployed fleet	54.9	50.5	50.5
Nondeployed fleet	28.3	29.0	29.0

Washington Watch

By John T. Correll, Editor in Chief

Readiness First

The Air Force has traded off force structure and much else in its bid to stay modernized and ready.

The Air Force is fast falling toward twenty fighter wings and 100 deployable bombers, but its leaders are satisfied with their decision to give up force structure to preserve readiness. "It doesn't often happen in history that small but ready military forces are a problem," Gen. Merrill A. McPeak, Air Force Chief of Staff, said February 18 at an Air Force Association Symposium in Orlando, Fla.

"If you look back in history, the major difficulty is usually forces that are too large that aren't worth a darn, either because they're simply atrophied from a readiness standpoint or they're no longer relevant to the military problem," he said. "It made absolutely no difference how ready the Polish cavalry was in 1939. Their capabilities were irrelevant to the task at hand." Even a small force, if modernized and ready to go, is "tough for anybody else to pick a fight with."

Current events demonstrate why Air Force Secretary Sheila E. Widnall and General McPeak have declared 1994 the "Year of Readiness." As the General spoke in Orlando, US forces were poised for the immediate possibility of combat both in Bosnia-Hercegovina and in Korea. Lesser crises were bubbling elsewhere.

"We will continue to insist that whatever size Air Force we have, it is ready to fight" and that it have "the proper modernization programs in place," General McPeak said. At present, readiness trends are down slightly at the margins, but "I'm reasonably confident that we're ready to do just about anything you could ask us to do."

The old Soviet empire is gone, but "the Air Force certainly has not throttled back," General McPeak said. "In northern and southern Iraq, we've flown over 175,000 sorties since Desert Storm—twice as many as we flew *in* Desert Storm. In Somalia, we've delivered 83,000 tons of supplies in 6,000 missions. In Bosnia, 4,600 airlift and airdrop sorties have delivered 51,300 tons of food, fuel, medicine. We've flown over 3,900 air control sorties enforcing the no-fly zone."

Cutting Support Structure

Unfortunately, readiness is expensive, and the defense budget is dropping like a rock. "There are essentially three pots of money we have to deal with," General McPeak said: a force-structure pot, a readiness pot, and a modernization pot. The Air Force cannot shed many more operational wings, and the modernization pot is tapped out.

"We cut modernization to the bone," General McPeak said. Investment in new systems is down by about fifty percent from the 1980s. Only high-priority modernization programs are left, and modernization, "in my opinion, cannot be further cut," he said.

Gen. John Michael Loh, commander of Air Combat Command, said that to pay for readiness and modernization, the Air Force must "reduce the support structure and the portion of our budget devoted to support operations and maintenance."

In 1986, the expenditures for modernization and support were approximately equal. This year, he said, "we will spend something like $22 billion on modernization and $40 billion on operations and support." Moreover, he added, "the dominant part of our O&S budget is on the indirect, support side, not on the direct, warfighting side."

Given a choice, the Air Force would adjust by closing bases it does not need. The Army Air Corps entered World War II with some thirty main operating bases. About 100 more were opened during the war, and the net closure rate since then has been only one a year. "When the Air Corps had 130 bases, it had 2.1 million people," General McPeak said. Today's Air Force is down to eighty main operating bases, he said, "but that's still too many" because active-duty personnel strength will soon drop below 400,000.

Other support structure cuts and improvements in the tooth-to-tail ratio are possible, General Loh said, by "consolidating depots, perhaps, and reducing some of the training tail."

The 100-Bomber Fleet

According to the latest strategy, US forces must be ready for two major regional conflicts that could break loose "almost simultaneously." The Pentagon's Bottom-Up Review last year estimated that each conflict would require ten Air Force fighter wings and 100 heavy bombers. To cover the strategy, some of these aircraft would have to be shuttled from one fight to the other.

The Air Force expects to end up with a total of 140 to 170 bombers. Somewhere in that range is the rock bottom required to field 100 operational bombers for conventional deployments. (Part of the fleet must be held back for strategic nuclear missions, testing, training, and backup inventory. At any given time, some aircraft will be in the depot for maintenance.)

The numbers look small. General McPeak acknowledged that "we are taking some risk in bombers in the midyears of this decade," but "the bomber problem that is essential to solve is the quality problem, not the quantity problem. We must have guided munitions that we kick out of these bombers. It is very uninteresting to me to maintain a large, muscular bomber fleet, one capable of carrying very large payloads very long distances, and miss targets by 500 meters."

Around the turn of the century the Air Force plans to have the entire bomber fleet configured for precision guided munitions (PGMs). "Our analysis indicates we can service the entire target set which comes at you from two major regional contingencies, near simultaneously, with a

bomber force of about 100 deployable bombers equipped with PGMs, and we're on a path to get to that," General McPeak said.

Until then, the Air Force will "beef up the fighter PGM force," relying on F-15Es and modified F-16s for an extra share of the precision attack job. It will also keep the F-111s for a while longer. The F-111 is old and expensive to operate, but, in addition to having appreciable range, it is fully capable of PGM delivery. Overall, General McPeak said, the Air Force is "many times more PGM-capable" than it was just a few years ago during the Persian Gulf War.

The best of the bombers will be the B-2s, but the Air Force will have only twenty of these, sixteen of them operational. The brunt of the tasking goes to the B-1. The Air Force is conducting a six-month test to see what it would take to have the effective but temperamental B-1 match the mission-capable rates of the old B-52.

Twenty Wings for Two Wars

With only twenty combat-coded fighter and attack wings in the total lineup, General Loh said the stealthy F-22 fighter is essential to put "our forces a generational leap ahead of the competition." The existing fleet of F-15s, F-16s, and A-10s will be upgraded.

Just four wings will be allocated to the air-superiority role. The current counterair fighter, the F-15 Eagle, cannot handle that job alone, and the requirement "will stress even the F-22," General Loh said. "We will need all the F-22s we have programmed now, and they will need to be augmented by F-16s equipped with AMRAAM [the AIM-120A Advanced Medium-Range Air-to-Air Missile]."

The Air Force will soon request proposals from industry to field the AIM-9X, an improved version of the heat-seeking Sidewinder missile, "to make up for the eight to ten years of time we lost in technology leadership in short-range missiles in the now-defunct ASRAAM [Advanced Short-Range Air-to-Air Missile] program," General Loh said.

Potential assignments for deep-attack fighters continue to outnumber the aircraft available. Air Combat Command would like to have another thirty or forty F-15Es if it had the money to pay for them—which it doesn't.

"Our entire technological future is bound up in the emerging JAST program, the Joint Advanced Strike Technology demonstration," General Loh said. He sees JAST as "the progenitor of no less than three aircraft" to replace Air Force F-16s and Navy F/A-18s and A-6s. The first JAST prototype "could be flying within six to eight years" and might use "about seventy-five percent existing technologies from the F-22 and other programs." The second prototype "should reverse the technology ratio" and use existing technology for only twenty-five percent of the systems. That prototype is fifteen to twenty years away.

General Horner calls ballistic missile defense "the sucking chest wound of our defense program" and "the one thing we can't cover on the battlefield."

Forces Are Vulnerable

Fifteen nations have ballistic missiles now, and another five are on the verge of acquiring them. The Secretary of Defense reported to Congress in January that the international trade in ballistic missile technology "remains outside the bounds of Western control." At the moment, US forces are vulnerable to these weapons.

"We've got to move out on ballistic missile defense," Gen. Charles A. Horner, commander of US Space Command, said in Orlando. "I call it the sucking chest wound of our defense program. It's the one thing we can't cover on the battlefield."

Countering these weapons means locating the missile sites and attacking them on the ground or shortly after they launch. Knocking them down with Patriot defense missiles just before they hit is not enough. Midcourse intercept becomes more important with the proliferation of longer-range ballistic missiles.

"If people put poisonous material in the nose of their missile and the Patriot fuzes it, then it spreads all around and now you've got to go out with a broom and moon suits and self-contained breathing and clean it up," General Horner said. "We've got to get something that attacks these systems beyond the terminal phase."

Something else US forces will have to counter in future conflict is the Navstar Global Positioning System. Its value was showcased so spectacularly in the Gulf War that the world is rushing to acquire it. Commercial applications are on the market, and a determined adversary probably can undo the "selective availability" feature that lets the armed forces distort the signal in wartime.

"GPS is something we're going to share with our enemies," General Horner said. "The trick, then, is how do you keep the enemy from having GPS accuracy sufficient to deliver precision munitions? I think the next stage beyond selective availability is that we'll have to go to some sort of a local area jamming system. That's going to be the next counter-countermeasure involved in this war of electrons on the battlefield."

General Horner was air boss in the Gulf War before he went to Space Command in 1992. Since then, he has waged an unrelenting campaign to break down the cultural barriers that separated the technologists in the space community and the operational troops in the fighting commands.

"Without intelligence, operations is blind," he said in Orlando. "Everything starts and ends in warfare with intelligence. On the other hand, without operations, intelligence is irrelevant. We don't need it." To enforce cooperation, he said, "we need a shotgun wedding."

Beyond "Force Enhancement"

Air mobility forces—tankers and airlifters—are traditionally regarded as "force enhancers," setting up other forces to prosecute the conflict. That perspective is too narrow and overlooks the use of "nonlethal airpower as a military instrument to achieve political objectives," said Gen. Ronald R. Fogleman, commander of Air Mobility Command and US Transportation Command.

You could call the Berlin Airlift a humanitarian relief operation, "and most people do," but it was also an example of using airlift to achieve specific objectives not possible with other instruments of national power, he said.

In Somalia, in the Balkans, and around the world, Air Mobility Command is performing more often in that expanded role these days. "From 1989 to 1990, the old Military Airlift Command conducted five major air movements of national influence and nine significant humanitarian operations," General Fogleman said. "In 1991 and 1992, we were engaged in fourteen air movements of national

influence and twenty-four relief operations—almost twice as many as in the previous two years."

The tankers and airlifters do get around. "Last year, there were only seven independent countries in the world in which Air Mobility Command did not operate," General Fogleman said. "Two of those countries do not have runways."

At the same time, US forces have drawn back from overseas and are acutely dependent on airlift for troops and equipment should they be called upon to deploy from bases in the United States. Allied forces, otherwise ready to do their part in coalition actions, also depend on US airlift. Last year's round of strategy reviews identified airlift as the major limiting factor in response to regional crises.

"The United States has this unique air mobility capability, but we are in danger of losing it," General Fogleman said. "Our aircraft are old and tired. The C-141, our core airlifter, was designed in the 1950s, was built in the 1960s, stretched and made air refuelable in the 1970s, and flown hard from the very beginning." Eighty-five of them are left. "That's how many I possess, not how many I have operational, and that's what we're trying to run this worldwide operation on," he said.

The Air Force urgently needs a new core airlifter, and, in General Fogleman's opinion, it "has got to be something that looks an awful lot like a C-17—if it isn't a C-17—and in militarily significant numbers."

Also, he said, "we are in trouble with our CRAF program," referring to the Civil Reserve Air Fleet, upon which the Air Force depends for a third of its airlift capability objective of 57 million ton-miles per day. The Gulf War saw unprecedented mobilization of the CRAF, which consists of aircraft and crews that airlines divert to military use in wartime. All delivered on their agreements but suffered for it when nonparticipating and international carriers moved in on the routes the CRAF airlines had to leave unattended and took away big pieces of their business base.

The main inducement for CRAF participation is military travel contracts in peacetime, and, with force levels down, these contracts are worth less than before. As a consequence, the Air Force is finding it more difficult to enroll civil carriers in the CRAF. General Fogleman expects further erosion, especially in cargo hauling commitments, next year.

Crisis East, Crisis West

The two theater commanders present in Orlando—Gen. Robert C. Oaks of US Air Forces in Europe and Gen. Robert L. Rutherford of Pacific Air Forces—did not stray far from the telephones. Tense situations in Bosnia and Korea were the latest developments in the regional instability that has become everyday reality for forward-deployed US forces.

"We and our Allies in NATO no longer confront the mobilized Warsaw Pact that shaped our strategy for so many years," General Oaks said. "It's ironic that these changes in Europe have lifted the lid off the pressure cooker and unleashed the forces of the past that boil today throughout eastern Europe and beyond—those forces of extreme nationalism, ethnic hate, religious animosity, and political greed."

Lesser regional conflicts "have the same basic requirements for complete mission packages as do larger conflicts," says General Oaks. "Small doesn't mean easy."

It's a thin blue line in Europe and the Pacific these days. Next year, General Oaks reported, USAFE will have 168 fighters, compared to the 636 it had in 1990. General Rutherford said he'd like to have twenty fighter wings all by himself in PACAF but that he will make do with the 3.5 that he has been given.

General Oaks said it is not enough to be prepared for big regional conflicts of the Desert Storm variety. Surveying the current employment of forces in such places as Somalia, the Balkans, and Iraq, he said, "It is these lesser regional conflicts, with missions of humanitarian relief, enforcement of UN resolutions, peacekeeping, and the potential for peacemaking, that we will find the more likely tasks for the remainder of this century, I believe."

Experience thus far indicates that these lesser conflicts "have the same basic requirements for complete mission packages as do larger conflicts," he said, meaning fighters with night and all-weather capability, a lot of tankers and airlifters, electronic combat aircraft, reconnaissance, and special forces. "Small doesn't mean easy," he said.

"We've got a mini arms race going on in Asia right now," General Rutherford said. "About twenty, twenty-five percent of all arms sales are occurring out in that part of the world. I attribute that to the fact that there's a feeling of insecurity. The Cold War had certain checks and balances. [Asian nations] felt a certain sense of stability. There's also a concern that the US is about to depart the area." Exacerbating the trend, he said, is "the availability of arms at bargain basement prices."

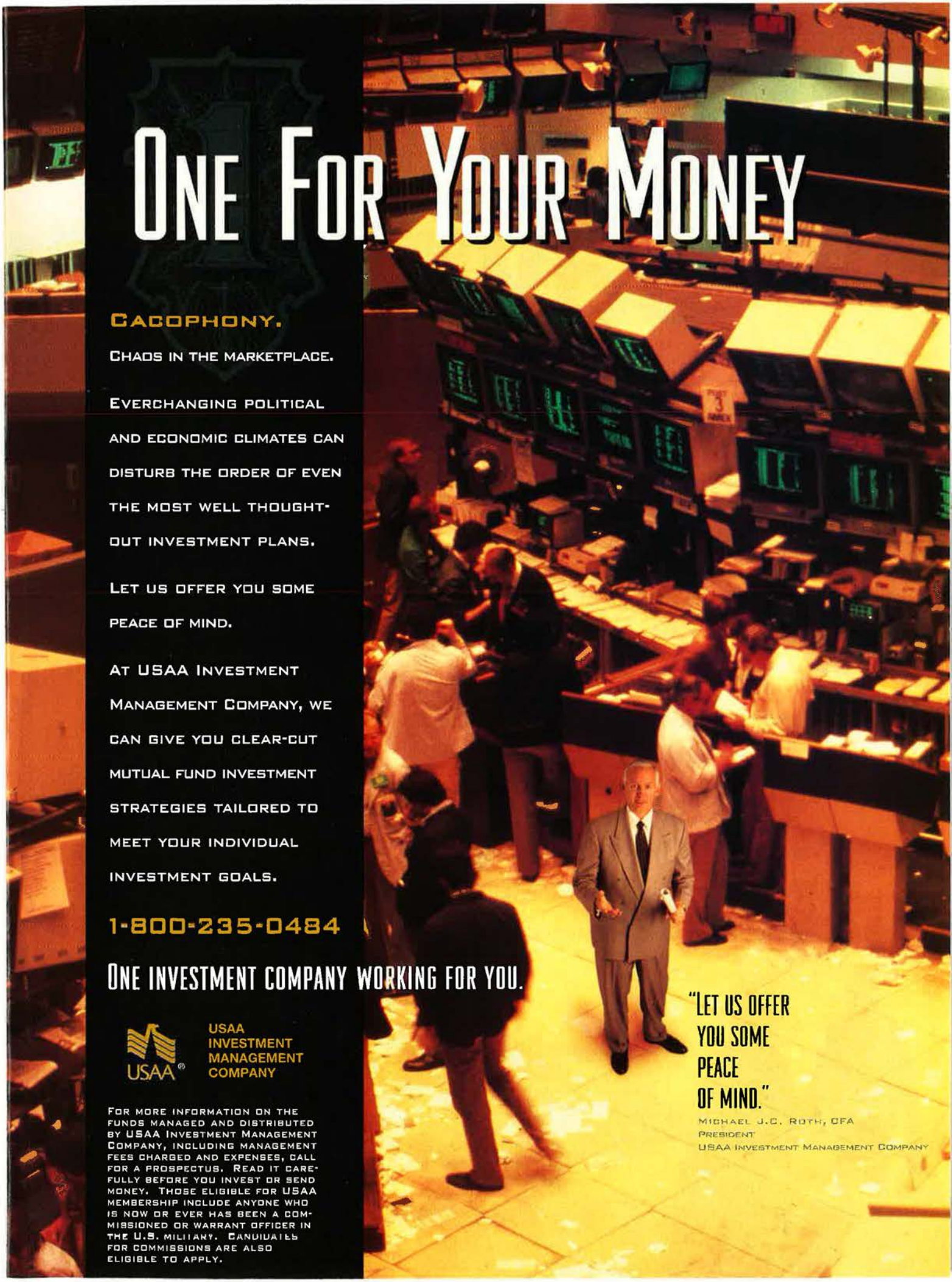
The United States is the only nation that "has both the credibility and the capability to maintain stability" in the Pacific, he said. Last year, PACAF participated in fifty-six regional exercises. That high number was necessary because it is seldom possible to exercise with half a dozen nations at once, as US forces in Europe do.

Almost everything in the Pacific is inevitably bilateral. "Name me two nations in that region that get along together," General Rutherford said. "I'll give you the first two. Australia and New Zealand. You give me the next two."

A new question facing NATO is what to do about the eastern European nations that are now free of the old Soviet Union and the Warsaw Pact. Most of them are now eager to join the Western alliance. What they want most is the protection of NATO Article 5, the common security bond, which says that all member nations will respond if any one of them is attacked.

"For a variety of obvious reasons, NATO is not ready to commit to that," General Oaks said. More likely, Allied forces will continue to exchange visits with the east Europeans, work them into exercises, and move toward what General Oaks calls "associate membership." Eastern Europe would have a tie, although a more ambiguous one than it would prefer, with NATO, and that would offer some protection. In five years or so, the Alliance could review the options.

"Our primary goal is an attitude in Europe, and really throughout the world, that violation of a nation's borders is not tolerated," General Oaks said. ■


ONE FOR YOUR MONEY
CACOPHONY.
CHAOS IN THE MARKETPLACE.
EVERCHANGING POLITICAL AND ECONOMIC CLIMATES CAN DISTURB THE ORDER OF EVEN THE MOST WELL THOUGHT-OUT INVESTMENT PLANS.
LET US OFFER YOU SOME PEACE OF MIND.
AT USAA INVESTMENT MANAGEMENT COMPANY, WE CAN GIVE YOU CLEAR-CUT MUTUAL FUND INVESTMENT STRATEGIES TAILORED TO MEET YOUR INDIVIDUAL INVESTMENT GOALS.
1-800-235-0484
ONE INVESTMENT COMPANY WORKING FOR YOU.
USAA
USAA INVESTMENT MANAGEMENT COMPANY
FOR MORE INFORMATION ON THE FUNDS MANAGED AND DISTRIBUTED BY USAA INVESTMENT MANAGEMENT COMPANY, INCLUDING MANAGEMENT FEES CHARGED AND EXPENSES, CALL FOR A PROSPECTUS. READ IT CAREFULLY BEFORE YOU INVEST OR SEND MONEY. THOSE ELIGIBLE FOR USAA MEMBERSHIP INCLUDE ANYONE WHO IS NOW OR EVER HAS BEEN A COMMISSIONED OR WARRANT OFFICER IN THE U.S. MILITARY. CANDIDATES FOR COMMISSIONS ARE ALSO ELIGIBLE TO APPLY.
"LET US OFFER YOU SOME PEACE OF MIND."
MICHAEL J.C. ROTH, CFA
PRESIDENT
USAA INVESTMENT MANAGEMENT COMPANY

Long Term Savings Plan.

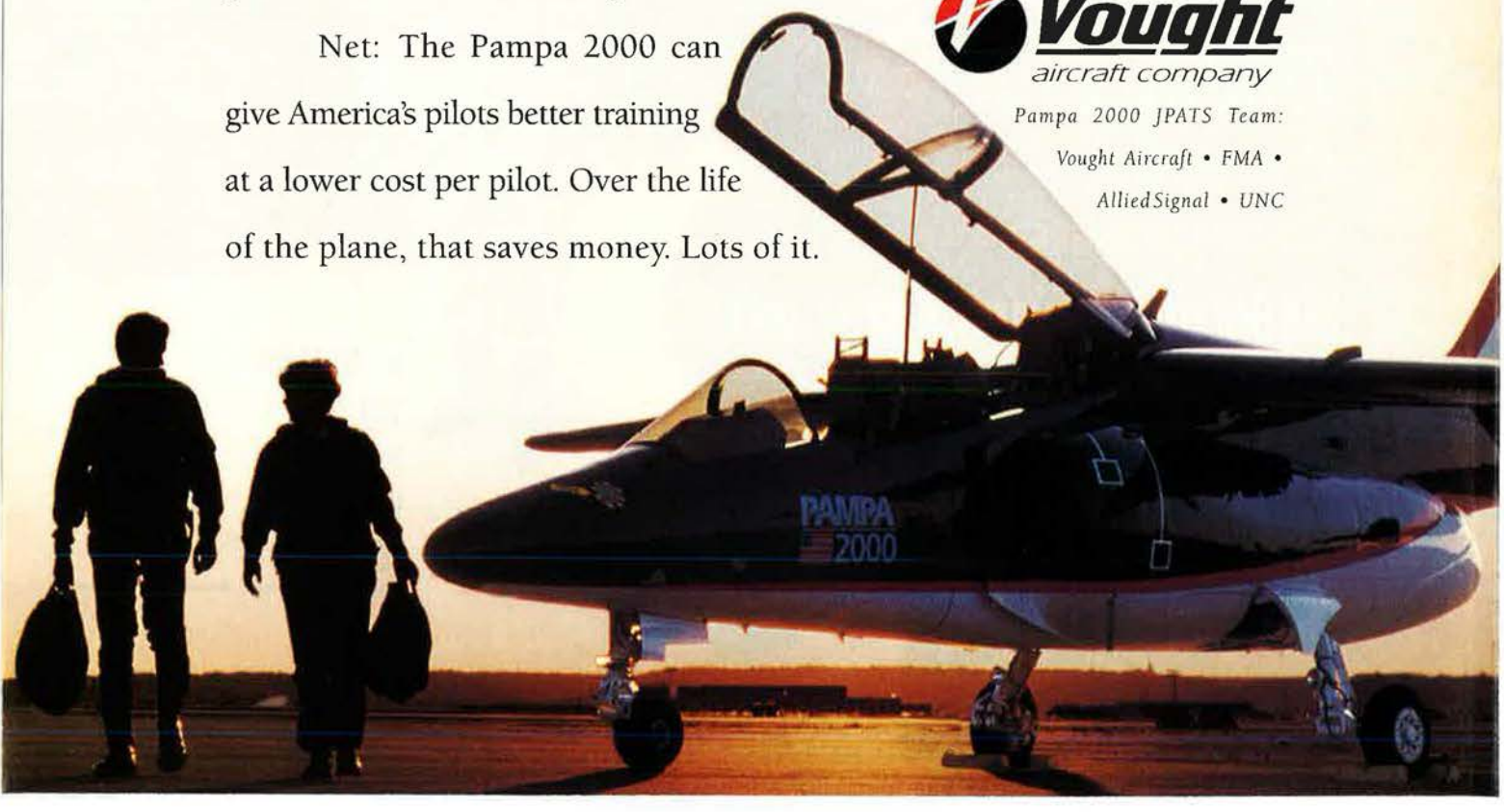
The Pampa 2000 can train beginning pilots better than other JPATS alternatives even as it saves money. Students in the Pampa 2000 will acquire more flying skills for every training dollar spent. As a result, the transition training needed between aircraft is greatly reduced, which leads to lower costs.

In addition, the wide performance envelope of the Pampa 2000 provides flexibility to meet any future training needs. Not just for today's pilots, but for tomorrow's pilots as well.

Net: The Pampa 2000 can give America's pilots better training at a lower cost per pilot. Over the life of the plane, that saves money. Lots of it.

Vought
aircraft company

Pampa 2000 JPATS Team:
Vought Aircraft • FMA •
AlliedSignal • UNC



Aerospace World

By Frank Oliveri, Associate Editor

Clinton Drops Vietnam Embargo

In a controversial move, President Clinton lifted the nineteen-year-old US trade embargo on Vietnam, angering many activists in the American POW/MIA movement.

The White House took the step in February after the Senate urged the President to remove the barrier. Those supporting the move claimed the embargo had lost effectiveness or that US companies were missing out on rich business opportunities in Vietnam.

The US imposed the embargo in 1975 when Hanoi ignored commitments made in the 1973 Paris peace accords and launched a massive attack on South Vietnam, defeating the US ally and incorporating it into the Socialist Republic of Vietnam. The embargo later was used as a lever to pry POW/MIA information out of Vietnam.

President Clinton, however, stated, "I am absolutely convinced [removal of the embargo] offers the best way to resolve the fate of those who remain missing and about whom we are not sure."

The President was supported by such Vietnam veterans as Sen. John McCain (R-Ariz.) and Sen. Bob Kerrey (D-Neb.). Senator McCain, a former Navy pilot, suffered eight years of isolation and torture in a Hanoi prison camp. Senator Kerrey, a Medal of Honor recipient, lost a leg in the war.

Veterans Groups Blast Move

The White House decision to end American economic sanctions against Vietnam drew severe criticism from a number of key veterans' and military family groups.

The National League of Families of American Prisoners and Missing in Southeast Asia firmly opposed the decision and accused the President of being duplicitous.

"The President's decision to lift the embargo and establish a liaison office in Vietnam was a serious disappointment," the league stated. It further accused the administration of knowing "full well" that Vietnam continues to withhold American remains and documents that could account for missing troops.

The government still lists 2,234 Americans as "unaccounted for" in the southeast Asian war. Half of these are known to have died but are listed as "unaccounted for" because their bodies were never recovered. The number whose fate is truly unknown is far smaller.

John F. Sommer, Jr., executive director of the American Legion's Washington office, stated, "It is wrong to give away the only bargaining chip our nation has to force Vietnam to deal openly and honestly with this situation and gain the fullest possible accounting of all POW/MIAs." The Veterans of Foreign Wars called the move a mistake. The organization does not believe the Vietnamese have done enough to warrant the favor.

At Tyndall AFB, Fla., in February, a Lockheed F-16B technology demonstrator fired a Raytheon prototype air-to-air missile in the first US launch of a high off-boresight weapon. This technology could make fighters more lethal in close combat.

Perry Kills Aspin Policy Offices

William Perry, confirmed February 3 as the new Secretary of Defense, wasted little time changing the controversial policymaking apparatus set up under former Defense Secretary Les Aspin.

At his confirmation hearings, Mr. Perry called the policy organization "ineffective." Within weeks of taking office, he had abolished two new assistant secretary posts created by Mr. Aspin and accepted the resignation of an official holding one of the positions.

Secretary Perry disestablished offices for plans and policy and democracy and human rights. Graham Allison, assistant secretary for Plans and Policy, suddenly tendered his resignation. Morton H. Halperin, the man Mr. Aspin wanted for the other post, ran into stiff Senate opposition and withdrew his nomination in January. The staffs of both offices will be released or absorbed into other policy offices.

Responsibilities once handled by Mr. Allison now fall to Assistant Secretary Ashton B. Carter, head of counterproliferation efforts. The new policy secretariat will consist of four areas: nuclear security and Russia, regional security and policy, policy

The C-17 "P-3" was deployed to Eielson AFB, Alaska, for cold-weather testing in January and flew over the North Pole in February. The polar mission set a record for the longest C-17 flight, 8.7 hours.

analysis and resource management, and special operations and low-intensity conflict.

USAF Reduces F-22 Buy

The Air Force confirmed in February that it plans to reduce the overall F-22 buy from 648 to 442 aircraft. Total program cost has been set at $71.6 billion in 1994 dollars.

In 1994 dollars, the fly-away cost of each F-22 will be $99 million. When R&D, military construction, and total production costs are factored in, unit cost reaches $162 million.

Delivery of the Lockheed-built F-22 is expected to begin in 1998 and run through 2009. The Air Force will receive four aircraft in 1998. In 1999, the service will receive twelve aircraft, followed by twenty-four in 2000, thirty-six in 2001, and forty-eight from 2002 through 2008. In 2009, the Air Force plans to take in the final twenty-six aircraft. The air-superiority fighter will be purchased in twelve lots.

The F-22 will reach an initial operational capability in 2003. Test flights are expected to begin in 1996. The next major milestone for the program will be the critical design review in Fiscal Year 1995.

McDonnell Adds Israeli F-15 Deal

For McDonnell Douglas, the F-15 business has improved considerably over the past year. The firm received major orders from Israel and Saudi Arabia, which together will buy a total of nearly 100 new aircraft based on the Air Force F-15E design.

The Israeli deal, announced in late January, entails expenditures of about $1.8 billion for twenty F-15I fighters. The precise terms still are being worked out. The sale comes on top of a Saudi deal, negotiated last year, which calls for Riyadh to buy seventy-two F-15S aircraft worth $5 billion.

The Israeli deal is especially significant because it means that the company will not have to shut down the F-15 line any time soon, as had been expected. McDonnell Douglas will expand its work force associated with the F-15 from 5,000 to 7,000. Deliveries of the Saudi F-15s will not commence until 1995. The governments did not announce when the Israeli F-15s will be delivered. McDonnell officials have acknowledged that Israeli and Saudi F-15s will be produced simultaneously.

The sales are also a boon to the Air Force, which now will have the option of buying more of the twin-engine jets if it chooses to do so. The Air Force has acknowledged a need for more F-15Es but has no immediate plans to buy more.

The sales are seen as important supports for the US fighter industrial base, which could have been down to only one assembly plant—the F-16 line in Texas—until F-22 production began in Georgia around 2000.

Perry Sees Rise in Arms Spending

Congress is starting to hear a Pentagon warning it has not heard in years: Lawmakers will soon have to expand the Defense Department's budget for procurement of new weapons. "It will have to come up again, and it will have to come up again within a few years," Secretary of Defense Perry told the Senate Armed Services Committee on February 7.

In presenting the new Fiscal 1995 budget *[see "The Chart Page," pp. 9–11]*, Mr. Perry noted that every budget in recent years has relentlessly cut procurement spending to save money for readiness and personnel. He said that the procurement budget

The Cobra Judy ship-based radar program, developed at Hanscom AFB, Mass., for verifying compliance with the SALT Treaty, has been redefined to support the Ballistic Missile Defense Organization's research and development efforts.

"is very low today"—about one-third of its size during its mid-1980s peak.

"We can make steep cuts and did make steep cuts in procurement during this period of build-down," Mr. Perry told the lawmakers, "but there will come a time when we have used up that excess inventory, and then we will have to start building at higher rates than [those at which] we are now building."

He said that the defense budget and five-year plan just recently submitted "carries this reduction down for another two years and then starts a substantial increase in procurement to accommodate the fact that we will have to start building the next-generation systems after that."

The first F-16A produced for Portugal takes off in February from Lockheed's Fort Worth, Tex., plant. Portugal will receive seventeen new-production F-16As and three F-16Bs, all tailored for the country's NATO air defense mission.

South Vietnamese Pilot Honored

A former South Vietnamese Air Force helicopter pilot was finally permitted to move, with his daughter, to the US under a one-year humanitarian visa as a parolee.

Maj. Nguyen Quy An was flown to Travis AFB, Calif., on board a C-141 transport in January, where more than 200 well-wishers turned out, along with an Air Force band, to honor him. He was awarded the Distinguished Flying Cross for risking his life to save four US soldiers in Vietnam more than twenty-five years ago.

Because Major An fought alongside the US during the Vietnam War, he was barred from normal employment in Vietnam and was watched by security police. He attempted to escape from Vietnam on four occasions, but he was caught and imprisoned each time.

Despite Major An's military record, he was not allowed to enter the US through the Humanitarian Refugee Program because he had not spent a year in a labor camp. Through the lobbying of Col. Noboru Masuoka, USAF (Ret.), the White House and some US senators took notice and persuaded immigration officials to permit Major An and his daughter to enter the US.

On January 17, 1969, US and South Vietnamese forces were inserting a platoon of Green Berets into Laos near the Ho Chi Minh Trail. Major An, then a captain with a "King Bee" squadron, was flying his Sikorsky H-34 helicopter 3,000 feet above the landing zone when he heard a Mayday call. He then spotted an American Army helicopter in flames below him. Its fuel tanks had been hit by an artillery round as it climbed out after unloading Special Forces troops.

Major An guided the damaged helicopter to a clearing, where it landed. He then descended under heavy enemy fire and waited for the Americans to hack their way through bamboo and fifteen-foot-high elephant grass before flying them to safety. Major An's helicopter took dozens of hits during the rescue.

Major An lost both arms below the elbow after suffering major burns during an American-led mission in September 1970. After the fall of Saigon in 1975, he was placed in a forced labor camp.

F-16s Overfly Pact Nations

F-16s from USAF's 480th Fighter Squadron, based at Spangdahlem AB, Germany, became the first US fighters since World War II to conduct an operational overflight of what had been hostile, heavily armed Warsaw Pact nations.

The eleven US jets and 160 military personnel were en route from Germany to Incirlik AB, Turkey, to support Operation Provide Comfort in northern Iraq. To get there, the aircraft traversed the airspace of Hungary, Romania, and Bulgaria—three of the old Soviet-led Pact's seven member states.

The other four Warsaw Pact signatories were the Soviet Union (now broken into fifteen independent nations), East Germany (absorbed into the unified Federal Republic of Germany), Czechoslovakia (split into Slovakia and the Czech Republic), and Poland.

Previously, the closed airspace of the Warsaw Pact countries forced Western combat aircraft making such a journey to fly over Italy and the Mediterranean. The new route cuts one-way travel time from five to three hours.

High Court Backs Military System

The Supreme Court ruled that the Military Justice System is constitutional, despite the fact that military judges do not serve fixed terms and are appointed by each service's Judge Advocate General.

The unanimous January decision rejects arguments in two pending Marine Corps cases—*US vs. Weiss* and *US vs. Hernandez*—that military judges are subject to improper influence by the officers who select them.

The ruling means that dozens of Air Force court-martial convictions appealed after the Weiss and Hernandez cases were accepted by the Supreme Court will not be overturned. Eric J. Weiss was discharged after a larceny conviction, and Ernesto Hernandez was discharged upon conviction for smuggling drugs into the United States.

Both men, after pleading guilty to charges, appealed to the Supreme Court on two constitutional questions. They claimed, first, that military judges are biased toward the prosecution, infringing on constitutional due process, because they lack a fixed term of office and can be removed at any time a Judge Advocate General wishes. Second, they asserted that the military justice system violates the Constitution's appointments clause, which requires the President to appoint federal judges.

Chief Justice William H. Rehnquist, writing for the court, rejected both contentions.

ANG General to Command 1st Air Force

Maj. Gen. Philip G. Killey, former director of the Air National Guard, was named commander of 1st Air Force at Tyndall AFB, Fla. He became the first officer of the Air National Guard to command a numbered Air Force, the Pentagon said in January. He is an Air National Guard general called to active duty.

The 1st Air Force is responsible for air defense under Air Combat Command.

The decision to put an ANG officer in charge was made as a result of the Pentagon's Bottom-Up Review and plans for the fuller integration of the Guard and Reserve into the overall mission of the Air Force. General Killey replaces Maj. Gen. Lester P. Brown, Jr., who is retiring after thirty-four years of active duty.

As commander of 1st Air Force, General Killey will be responsible for four air defense sectors: Northeast Air Defense Sector, Griffiss AFB, N. Y.; Southeast Air Defense Sector, Tyndall AFB; Northwest Air Defense Sector, McChord AFB, Wash.; and Southwest Air Defense Sector, March AFB, Calif. He will also command the Continental US North American Aerospace Defense Command Region.

USAF Works With American Indians

The Air Force agreed to work with American Indian groups to protect human remains and sacred items under the Native American Graves Protection and Repatriation Act, the service said.

In one case, a tribal representative was present during investigations of archaeological sites related to the closing of Williams AFB, Ariz., and the Air Force Center for Environmental Excellence will work closely with American Indians to ensure all their concerns are considered.

The agreement establishes procedures to follow if artifacts or human remains are found. At Williams, participating tribes agreed to have the Gila River community represent other communities in monitoring archaeological activities and coordinating consultation.

Archaeological work at Williams, which closed last September, is attempting to identify sites that may be eligible for the National Register of Historic Places and to develop plans to deal with the sites when they are transferred out of Air Force control. Archaeological surveys indicated that Williams is the location of a large settlement dating back 1,200 years.

IG Probes Allegations

The Air Force's top personnel officer stated that the service's Inspector General is investigating claims that senior raters of the Officer Evaluation System are following improper procedures. Among the allegations: The raters are using a board to rank-order eligible officers or are considering nonperformance-related information—such as professional military education and advanced degrees—in completing promotion recommendation forms.

Lt. Gen. Billy Boles, USAF's deputy chief of staff for Personnel, said, "There have been some reported instances of lapses in 'checklist discipline' where senior raters tried to 'help the system.' " Under current procedures, "helping the system" is considered illegal.

The Inspector General will help to identify officers who have been affected by such procedures. Major command IG offices will investigate incidents within the command, and the Air Force IG will investigate those outside the Air Force, such as in a joint organization, with assistance from Air Force personnel offices.

C-141 to Use Handheld GPS

MSgt. Jeff Yarber and A1C Jonathan Stahl, both of the 438th Aircraft Generation Squadron at McGuire AFB, N. J., designed, installed, and tested an antenna system that enables C-141 transports to use handheld Global Positioning System units. The antenna system can be plugged into a handheld Navstar user set, which provides the C-141 with a spacebased navigation and timing system.

The constellation of GPS satellites orbiting the Earth broadcasts precise signals, which are picked up by the GPS user set. The set receives the signals, computes the data, and displays the aircraft's navigational data.

The modification was originally sought for special operations missions. After overcoming many design problems, the technicians decided the new antenna would have to be mounted on the upper surface of the fuselage, behind the aerial refueling receptacle.

The first ground tests, run in November 1993, used a commercially available GPS system. The two airmen then had to design an antenna for a DoD-approved handheld GPS. Once the final design was approved, ACC ordered it as a permanent modification for the entire C-141 fleet.

Wyoming MOU Phase II Begins

The Pentagon announced that the US and Russia signed protocols in January to implement Phase II of the Wyoming Memorandum of Understanding, a bilateral verification agreement to cover chemical weapon stockpiles in those nations.

The two nations will exchange detailed data about their stockpiles this

The Integrated Mission Precision Attack Cockpit Technology program at Wright Laboratory, Wright-Patterson AFB, Ohio, tests air-to-ground technologies that will enable one pilot to perform missions that take two in some fighters.

spring and later in the year. Each will inspect the other's chemical weapons to confirm the accuracy of the data.

The original memorandum of understanding was signed in 1989, during the Bush and Gorbachev Administrations. Phase I consisted of a general chemical weapons data exchange and courtesy visits in both countries. This phase was completed in 1991.

The original intent of the Wyoming MOU—so named because the agreement was first signed at Jackson Hole, Wyo.—was to build confidence and facilitate negotiations for a Chemical Weapons Convention. The convention has been completed and was opened for signature in January.

Space-Launch Study Initiated

In late January, the Pentagon initiated the Space-Launch Modernization Study, an attempt to establish and clearly define priorities, goals, and milestones regarding modernization of space-launch capabilities for the Department of Defense and—if appropriate—for the federal government as a whole.

Former Defense Secretary Les Aspin outlined the following goals of the study: to develop a comprehensive understanding and assessment of current US space-lift capabilities and environment; to identify core DoD and national space-lift requirements; to produce a space-lift modernization roadmap and implementation strategy that includes priorities, goals, decision points, and funding, as well as alternatives and options for decision-makers; and to compare US and foreign space-lift capabilities.

Lt. Gen. Thomas S. Moorman, Jr., vice commander of Air Force Space Command, is chairing the study. The team consists of thirty members of the defense, civil, and commercial space sectors. Congress was to receive its first report this month. The second part of the study, which will compare US space lift with foreign space lift, is scheduled for completion by October 1994.

US Aircraft Deployed to France

For the first time in more than twenty years, US aircraft deployed to France in support of a NATO operation.

Five Air Force KC-135 refuelers deployed in February to Istres AB, France, as part of Operation Deny Flight, the Air Force said. France pulled out of the NATO military organization in 1966, but it remains a treaty signatory. Ever since the pullout, France's cooperation in NATO military affairs has been scant.

Some of the aircraft came from the 100th Air Refueling Wing, RAF Mildenhall, UK, and some were US-based aircraft temporarily assigned to the European theater. They moved to Istres AB from Sigonella, Italy, because of runway construction. About 140 personnel will rotate through the French base. The aircraft will refuel NATO aircraft patrolling airspace over Bosnia-Hercegovina.

C-141s Restricted Again

Sixty-one previously repaired C-141 StarLifters were once again placed under flight restriction. In January, Air Mobility Command said the move was a precautionary measure that would be in force until fuel and engine systems were analyzed.

The entire fleet of C-141s is undergoing repair to its weep holes. These are quarter-inch-wide holes that allow fuel to flow within the wing. Cracks were found in weep holes throughout the entire fleet. The recent restriction was imposed after officials found that small amounts of aluminum oxide used to prepare the internal wing structure for repairs had circulated throughout the fuel system.

One method of repairing the cracks involves applying a boron patch. A paint-like alodine substance is removed with a fine-grain aluminum oxide powder. Powder residue left in the fuel tanks can cause the aircraft's engine to drift into idle and stop running.

U-2s Assist FEMA

In the wake of the massive January 17 southern California earthquake, USAF U-2 reconnaissance aircraft gave officials of the Federal Emergency Management Agency aerial photographs of widespread damage in Los Angeles.

An aircraft from the 9th Reconnaissance Wing, Beale AFB, Calif., flew the first mission within hours of the earthquake, which measured 6.6 on the Richter scale. A second mission was flown about twenty-four hours later, with FEMA requesting more specific areas of coverage. Specialists from the 9th Intelligence Support Squadron worked around-the-clock to develop film and to select areas of interest.

Last summer Beale provided imagery of the record flooding in midwestern portions of the US.

USAF Officers Cleared

Sheila E. Widnall, the Secretary of the Air Force, announced in February that an internal USAF investigation cleared senior officers of wrongdoing and misconduct related to plans to upgrade the Defense Support Program satellite and produce the Follow-On Early Warning System (FEWS) satellite.

The DoD Inspector General's review of the Air Force's investigation determined it had adequately addressed the various allegations raised concerning the two programs. The $13 billion FEWS program was terminated last year as a cost-saving measure.

The officers had been accused by some of obstructing, suppressing, or restricting relevant contractor data, studies, or options; improperly releasing contractor proprietary data; providing erroneous data, estimates, and statements; making unfair or biased cost comparisons; and providing false or misleading information to the Department of Defense and Congress. The claims were shown to be without foundation.

C-130s Aid Wounded Bosnians

Two US Air Force C-130 aircraft arrived at Ramstein AB, Germany, in February carrying fifty people from Sarajevo who were wounded during a brutal mortar barrage that killed sixty-eight at an open market in the Bosnian capital.

The wounded were taken to a US hospital in Landstuhl, Germany, for treatment. They were among 200 people injured during the attack. The US also sent a team of medical specialists from Rhein-Main AB to Sarajevo to help determine the number of wounded who needed to be evacuated and the type of treatment needed.

USAF Downsizes Iceland Presence

Under an agreement signed last January by the US and Iceland, the Air Force reduced the number of F-15 fighters based at NAS Keflavik. The number of F-15s permanently assigned to the 57th Fighter Squadron will be reduced from twelve to the minimum of four.

The new basing document, the result of what both sides called changes in the world situation in recent years, was signed in Reykjavik by Secretary of Defense Perry and Iceland's Minister for Foreign Affairs, Jon Baldvin Hanibalsson. The agreement reaffirms the commitment of the US, Iceland, and their NATO Allies to the 1951 Bilateral Defense Agreement.

F-15s Leave Soesterberg

In January, the Air Force withdrew its last three F-15s from Soesterberg AB, the Netherlands, formally ending

its combat presence there. The step ended nearly forty years of continuous USAF operations at the base. The departing F-15s were escorted to the border by an honor guard of Dutch fighters.

The aircraft, assigned to the 32d Fighter Squadron, left for their new home, an Air National Guard unit in Massachusetts, the Air Force announced. The return of Soesterberg to the Dutch is part of a DoD plan to reduce by sixty-six the number of US fighter aircraft in the European theater by October.

AETC to Draw Down FTDs

Air Education and Training Command will begin this spring to gradually reduce its number of field training detachments from fifty-nine to thirty-nine. More than 700 FTD courses will be absorbed by AETC training wings, deleted, or realigned by the using major commands at base level, said the Air Force.

These changes are a result of the Year of Training Review commissioned in 1992 by Gen. Merrill A. McPeak, the Air Force Chief of Staff. Previously, warfighting wing commanders could expect to spend as much as twenty-five percent of their time and resources for job certification of new personnel.

AFRES, ANG Man No-Fly Zone

Since late 1993, the Air Force Reserve has assisted coalition forces in flying hundreds of sorties over Bosnia as part of Operation Deny Flight, said the Air Force.

Reserve A-10 aircraft have flown 858 hours during 285 sorties in support of the operation, while Reserve F-16 fighters logged 1,522 hours in 622 sorties. Six A-10s from the 917th Fighter Wing, Barksdale AFB, La., six F-16s from the 301st FW, Carswell ARB, Tex., and six F-16s from the 944th Fighter Group, Luke AFB, Ariz., operated from Aviano AB, Italy.

The Air National Guard also provided forces to Deny Flight, including A-10s from the 103d Fighter Group, Bradley IAP, Conn.; the 104th FG, Barnes Municipal Airport, Mass.; the 110th FG, W. K. Kellogg Airport, Mich.; the 111th FG, Willow Grove ARS, Pa.; and the 175th FG, Baltimore, Md.

USAF Tests Voice Activation System

Scientists at Wright Laboratory, Wright-Patterson AFB, Ohio, are stepping up their research into the technology of voice recognition.

Their goals are to increase mission effectiveness, improve survivability, and decrease the pilot's work load as fighter aircraft become more sophisticated.

Those building such a system must first develop samples of a pilot's voice and store them on a voice band. When a command is spoken, the system attempts to match the voice to the stored samples. If the voice matches, the computer interprets the command and sends messages to the appropriate systems. Lab testing has revealed that the voice system is ninety-nine percent accurate in recognizing individual words.

Voice activation was tested on the Advanced Fighter Technology Integration/F-16 aircraft in the early 1980s. In the AFTI/F-16, the pilot could verbally change radio frequencies and radar modes.

The Cockpit Integration Directorate will soon test voice recognition systems in a centrifuge with up to nine Gs of loading while subjecting the system to vibration to simulate flight disturbances. If successful, a system will be tested in flight. Actual demonstration could be expected in the late 1990s.

News Notes

■ The ninth B-2 bomber, *Air Combat Command Two,* completed its first flight in January, staying aloft for three hours and fifty-seven minutes over California, the Air Force said. It will be the second operational bomber delivered to USAF and will be based at Whiteman AFB, Mo. The first operational B-2 was delivered last December. *[See "The Spirit of Missouri," p. 36.]*

■ Air Force 1st Lt. Jeannie Flynn graduated from F-15E combat crew training in February, becoming the first female Air Force fighter pilot. Lieutenant Flynn dropped more than 200 practice bombs during her training at Luke AFB, Ariz. She flew day and night air-to-air and air-to-ground missions.

Senior Staff Changes

PROMOTION: To be **Lieutenant General:** Lawrence E. **Boese.**

CHANGES: M/G (L/G selectee) Lawrence E. Boese, from Dir., Ops., Hq. ACC, Langley AFB, Va., to Cmdr., Alaskan Command, USPACOM; Cmdr., 11th AF, PACAF; and Cmdr., Alaskan NORAD Region, NORAD, Elmendorf AFB, Alaska, replacing L/G Joseph W. Ralston . . . **B/G Travis E. Harrell,** from ACS/Plans and Policy, UK Air Forces, NATO, and Dep. Cmdr. for NATO Affairs, 3d AF, USAFE, RAF High Wycombe, UK, to Cmd. Dir., NORAD Combat Ops. Staff, Cheyenne Mountain AFB, Colo., replacing B/G Donald L. Peterson . . . **M/G Robert E. Linhard,** from Dir., Plans and Policy, J-5, Hq. USSTRATCOM, Offutt AFB, Neb., to Spec. Ass't for Power Projection, Hq. USAF, Washington, D. C. . . . **L/G Joseph W. Ralston,** from Cmdr., Alaskan Command, USPACOM; Cmdr., 11th AF, PACAF; and Cmdr., Alaskan NORAD Region, NORAD, Elmendorf AFB, Alaska, to DCS/Plans and Ops., Hq. USAF, Washington, D. C., replacing L/G Buster C. Glosson.

SENIOR EXECUTIVE SERVICE (SES) RETIREMENTS: Donald L. **Ball,** J. B. **Cole,** Edward T. **Constable,** Robert W. **Crittenden,** Donald H. **Eckhardt,** Robert S. **Hancock,** John C. **Mitchell,** Thomas P. **O'Mahony,** John K. **Schindler,** Kenneth E. **Seifert,** Norman N. **Tallan,** Edward J. **Trusela.**

SES CHANGES: James F. Bair, to Dir., Engineering and Tech. Mgmt., Hq. AFMC, Wright-Patterson AFB, Ohio, replacing Philip P. Panzarella . . . **Leslie L. Bordelon,** to Dir., Prgm. Mgmt., Space and Missile Sys. Ctr., AFMC, Los Angeles AFB, Calif. . . . **Robert J. Conner,** to Dir., Financial Mgmt., Oklahoma City ALC, AFMC, Tinker AFB, Okla., replacing retired Edward R. Zschiesche . . . **Robert A. Lach,** to Dep. Dir., Requirements, Hq. AFMC, Wright-Patterson AFB, Ohio, replacing retired Earl W. Briesch . . . **Thomas L. Miner,** to Exec. Dir., Ogden ALC, AFMC, Hill AFB, Utah . . . **Arthur J. Myers,** to Dir., Resource Mgmt., and Dep. Dir., Services, Hq. USAF, Washington, D. C. . . . **Michael H. Nock,** to Dir., Contracting, Sacramento ALC, AFMC, McClellan AFB, Calif., replacing James C. Barone . . . **Philip P. Panzarella,** to Exec. Dir., ESC, AFMC, Hanscom AFB, Mass., replacing retired Thomas P. O'Mahony . . . **Edward Riojas, Jr.,** to Exec. Dir., San Antonio ALC, AFMC, Kelly AFB, Tex. . . . **Marvin E. Smalling,** to Dep. Dir., Contracting, ASC, Hq. AFMC, Wright-Patterson AFB, Ohio, replacing Samuel L. Croucher . . . **Phillip W. Steely,** to Dir., Financial Mgmt., San Antonio ALC, AFMC, Kelly AFB, Tex., replacing Edward Riojas, Jr. ■

■ The Ballistic Missile Defense Organization and the Army said in February that an Extended Range Interceptor missile hit a target ballistic missile reentry vehicle at White Sands Missile Range, N. M. The test was the third in a series of planned engagements with a variety of targets. The ERINT is a small, hit-to-kill missile for possible future use in the Army's Patriot missile system.

■ The Electronic Industries Association named Norman R. Augustine, chairman and CEO of the Martin Marietta Corp., as the recipient of its highest award, the EIA Medal of Honor, in February. The medal recognizes outstanding contributions to the advancement of the US electronics industry and high personal achievement in the field of industry management.

■ DoD's Advanced Research Projects Agency launched the first Taurus Standard Small Launch Vehicle in late January from Vandenberg AFB, Calif. The launcher carried two DoD advanced technology satellites into polar circular orbits.

■ The 44th Missile Wing at Ellsworth AFB, S. D., will be inactivated July 4. The wing commanded Minuteman II missiles, which were ordered deactivated by President Bush in 1991. Its lineage goes back to the 1940s and the 44th Bombardment Group, which earned two Distinguished Unit Citations for its actions in missions against installations at Kiel, Germany, and the Ploesti, Romania, oil fields.

■ For the third consecutive year, the 438th and the 514th Component Repair Squadrons at McGuire AFB, N. J., were named the best component repair units in Air Mobility Command.

■ John M. Deutch was nominated by the President in late February to become the deputy secretary of defense, filling a void left by newly appointed Defense Secretary William Perry. Mr. Deutch was formerly the under secretary of defense for Acquisition and Technology. R. Noel Longuemare was sworn in as principal deputy under secretary of defense for Acquisition and Technology in January. Mr. Longuemare is the primary advisor to Mr. Deutch. Before his appointment, Mr. Longuemare had been with Westinghouse Electric Corp. since 1952.

■ In February, the Air Force Reserve's 93d Bomb Squadron flew its first B-52 mission. The unit, a part of the 917th Bomb Wing, will eventually have eight bombers. It received its first in December. Officials said the unit would be fully mission ready in just over a year.

■ Lockheed Corp. reported in February a twenty-one percent net earnings increase, from $348 million in 1992 to $422 million in 1993. The acquisition of its Fort Worth Co. was a significant factor in Lockheed's reduction of its outstanding debt. Lockheed's net debt-to-capital ratio was nearly forty-eight percent at the time of the acquisition, but by year's end it was down to forty-two percent.

■ The Rolls-Royce Trent 800 engine passed through the 100,000-pound-thrust barrier in January, making it the most powerful engine in the world, the firm said. The engine reached a plateau of 106,087 pounds of thrust. The engine will power Boeing 777 aircraft of Thai Airways International, Emirates, and Cathay Pacific.

■ In February, Air Force Space Command selected the 91st Missile Maintenance Group at Minot AFB, N. D., as the winner of the Col. George T. Chadwell Memorial Trophy as the command's best missile maintenance group.

Purchases

The Air Force awarded Lockheed a $12.4 million face-value increase to a cost plus award fee contract for the F-22 AMRAAM integration program. Expected completion: July 2001.

The Air Force awarded Lockheed an $11.3 million face-value increase to a fixed-price incentive firm contract for long-lead tooling for the Peace Atlantis Foreign Military Sales Program for twenty F-16A/B aircraft to Portugal. Expected completion: June 1994.

The Air Force awarded Northrop a $92.9 million face-value increase to a cost plus incentive contract for integration, development, and testing of the B-2 Global Positioning System Aided Targeting System. Expected completion: June 1996.

Obituaries

Gen. Lucius D. Clay, Jr., USAF (Ret.), former CINC of North American Air Defense Command, Continental Air Defense Command, and Aerospace Defense Command, died in February of cardiac arrest and emphysema in Alexandria, Va. He was seventy-four.

General Clay retired in 1975 after thirty-seven years of service. He was Pacific Air Forces commander in chief and commander of 7th Air Force in Vietnam, where he directed Air Force combat operations in the latter stages of the war in southeast Asia. General Clay was the son of Army Gen. Lucius D. Clay, the military governor of US-administered Germany during the 1948 Berlin Blockade.

Richard Bissell, a former senior CIA official, who took responsibility for the 1961 Bay of Pigs debacle, died of heart failure in Farmington, Conn., in February. He was eighty-four.

Mr. Bissell was the major architect of the CIA-led attempt to overthrow Cuban leader Fidel Castro at the height of the Cold War. In addition, as the CIA's director of plans, Mr. Bissell helped guide the agency's program for building the U-2 and SR-71 "Blackbird" reconnaissance aircraft and Corona, the first orbiting spy satellite. ■

Index to Advertisers

At the Smithsonian, history grapples with cultural angst.

War Stories at Air and Space

By John T. Correll, Editor in Chief

THE SMITHSONIAN Institution acquired the *Enola Gay*—the B-29 that dropped the first atomic bomb—forty-four years ago. After a decade of deterioration in open weather, the aircraft was put into storage in 1960. Now, following a lengthy period of restoration, it will finally be displayed to the public on the fiftieth anniversary of its famous mission. The exhibition will run from May 1995 to January 1996 at the Smithsonian's National Air and Space Museum in Washington, D. C.

The aircraft will be an element in a larger exhibition called "The Crossroads: The End of World War II, the Atomic Bomb, and the Origins of the Cold War." The context is the development of the atomic bomb and its use against the Japanese cities of Hiroshima and Nagasaki in August 1945.

The *Enola Gay*'s task was a grim one, hardly suitable for glamorization. Nevertheless, many visitors may be taken aback by what they see. That is particularly true for World War II veterans who had petitioned the museum to display the historic bomber in an objective setting.

The restored aircraft will be there all right, the front fifty-six feet of it, anyway. The rest of the gallery space is allotted to a program about the atomic bomb. The presentation is designed for shock effect. The exhibition plan notes that parents might find some parts unsuitable for viewing by their children.

For the "emotional center" of the exhibit, the curators are collecting burnt watches and broken wall clocks, photos of victims—which will be enlarged to life size—as well as melted and broken religious objects. One display is a schoolgirl's lunch box with remains of peas and rice reduced to carbon. To ensure that nobody misses the point, "where possible, photos of the persons who owned or wore these artifacts would be used to show that real people stood behind the artifacts." Survivors of Hiroshima and Nagasaki will recall the horror in their own words.

The Air and Space Museum says it takes no position on the "difficult moral and political questions" involved. For the past two years, however, museum officials have been under fire from veterans groups who charge that the exhibition plan is politically biased.

To aviation enthusiasts, the National Air and Space Museum is a special place, where priceless artifacts are held in trust, to be displayed with understanding and pride. At the end of the museum near the World War II gallery, both Allied and Axis warplanes, newly restored, are on exhibit.

Staff photo by Guy Aceto

Concessions to Balance

The exhibition plan the museum was following as recently as November picked up the story of the war in 1945 as the end approached. It depicted the Japanese in a desperate defense of their home islands, saying little about what had made such a defense necessary. US conduct of the war was depicted as brutal, vindictive, and racially motivated.

The latest script, written in January, shows major concessions to balance. It acknowledges Japan's "naked aggression and extreme brutality" that began in the 1930s. It gives greater recognition to US casualties. Despite some hedging, it says the atomic bomb "played a crucial role in ending the Pacific war quickly." Further revisions to the script are expected.

Despite the balancing material added in January, the curators still make some curious calls. "For most Americans," the script says, "it was a war of vengeance. For most Japanese, it was a war to defend their unique culture against Western imperialism." Women, children, and mutilated religious objects are strongly emphasized in the "ground zero" scenes from Hiroshima and Nagasaki. The museum says this is "happenstance," not a deliberate ideological twist.

The Air and Space Museum is also taking flak from the other side. A prominent historian serving on an advisory group for the exhibition, for example, complains about the "celebratory" treatment of the *Enola Gay* and that the crew showed "no remorse" for the mission.

Petition by 8,000 Veterans

The Committee for the Restoration and Display of the *Enola Gay,* "a loose affiliation of World War II B-29 veterans," has collected 8,000 signatures on a petition asking the Smithsonian to either display the aircraft properly or turn it over to a museum that will do so.

"I am saddened that veterans have seen it necessary to circulate a petition asking the museum to display the *Enola Gay* in a patriotic manner that will instill pride in the viewer," says Dr. Martin O. Harwit, director of the museum. "Do veterans really suspect that the National Air and Space Museum is an unpatriotic institution or would opt for an apologetic exhibition?"

The blunt answer is yes. Many veterans are suspicious—and for several reasons.

- Prior to the January revisions, the museum staff had not budged from its politicized plan for display of the *Enola Gay.* The perspective was remarkably sympathetic to the Japanese, whose losses in 1945 were described in vivid detail while American combat casualties were treated in matter-of-fact summations.

In a letter to Dr. Harwit last fall, Gen. Monroe W. Hatch, Jr., USAF (Ret.), the Air Force Association's executive director, said the museum's plan "treats Japan and the United States as if their participation in the war were morally equivalent. If anything, incredibly, it gives the benefit of opinion to Japan, which was the aggressor." What visitors would get from such an exhibition, General Hatch said, was "not history or fact, but a partisan interpretation."

- Veterans are also wary because of statements about military airpower by Dr. Harwit and other Smithsonian officials. In 1988, for example, while planning was under way for a program about strategic bombing, Dr. Harwit said he would like the museum to have an exhibit "as a counterpoint to the World War II gallery we now have, which portrays the heroism of the airmen but neglects to mention in any real sense the misery of the war. I think we just can't afford to make war a heroic event where people could prove their manliness and then come home to woo the fair damsel."
- Of particular concern, and viewed as a possible indication of things to come, is the last major military exhibition the Smithsonian organized. It is a strident attack on airpower in World War I.

The World War I Exhibition

"Legend, Memory, and the Great War in the Air," an exhibition currently running at the Air and Space Museum, emphasizes the horrors of World War I and takes a hostile view of airpower in that conflict. The vintage aircraft are used essentially as background props for the political message. A Spad and a Fokker are situated at ground level, fenced off and dimly lighted, but most of the aircraft (five of them) are suspended overhead. No particular attention is drawn to them.

Two themes predominate: the carnage on the ground and the unwholesomeness of military aviation. The military airplane is characterized as an instrument of death. According to the curators, dangerous myths have been foisted on the world by zealots and romantics.

The main exhibit section begins with a photo of a dead soldier in a trench. Only his skeleton remains. Nearby, another photo, labeled "The Verdun Ossuary," shows a pile of hundreds of skulls. The point, ap-

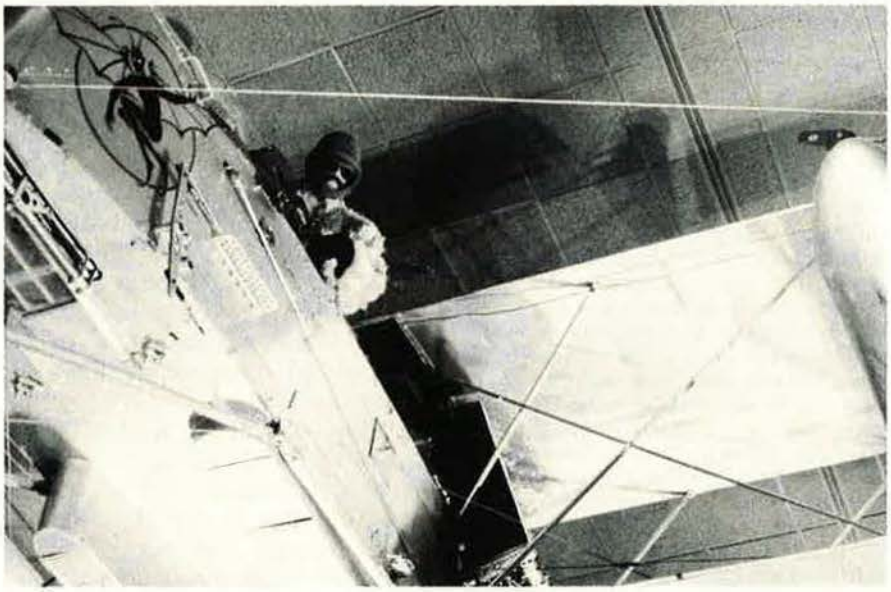
Staff photo by Guy Aceto

In 1966, the word "space" was added to the name and the charter of the museum, and the tools of rocketry and space exploration are displayed prominently.

parently, is that aviation "failed to prevent the slaughter that occurred on the ground." A large diorama shows a dead soldier slumped over a barbed wire barrier. "The price of aviation's limitations," the accompanying plaque says. "The failure of aviation at the Somme led to carnage on the ground."

The curators expand on their ideas in a companion book that quotes theories about the potential of military airpower for "scientific murder." Their major themes are the wrongful "lionization" of pilots as heroes and the ensuing "cult of air power"—Billy Mitchell is among the designated offenders—and "a myth about how air power, in the form of strategic bombing, could ultimately be decisive."

World War I, the curator-authors say, has cast "the long shadow" of strategic bombing on events ever since, and it is still evident in the conduct of US military operations. The book gives credence to speculation that "70,000 civilians were killed as an aftermath of the bombing campaign in the recent Gulf War," adding that "wherever the truth lies, the fact remains that innocent civilians died as a result of the bombing and that governments on all sides, in their eagerness to demonstrate the latest developments in military technology, are unrepentant."



Staff photo by Guy Aceto

The museum recently mounted a controversial exhibit depicting "The Great War in the Air," in which curators equated military airpower with "scientific murder."

Politically Correct Curating

The new look at the Air and Space Museum is seen as part of the cultural reinterpretation that has swept the Smithsonian complex. It is closely identified with the tenure of archaeologist Robert McCormick Adams, who became Secretary of the Smithsonian Institution in 1984.

"That Mr. Adams was moved by a political agenda was not evident until three years after his 1984 appointment when he chose to celebrate the bicentennial of the US Constitution by erecting 'A More Perfect Union,' an exhibit about the internment of Japanese-Americans during the Second World War," said Matthew Hoffman in the Washington *Times*. "Instead of celebrating the oldest still-in-effect constitution, Mr. Adams had focused on one of the few serious lapses in its enforcement."

By 1987, Mr. Adams was looking ahead to all sorts of possibilities. "Take the Air and Space Museum," he told *Washingtonian* Magazine. "What are the responsibilities of a museum to deal with the destruction caused by air power?" An early indication of what he had in mind was a 1989 program on "the Legacy of Strategic Bombing" at the Air and Space Museum, which included the "classic films" "On the Beach" and "Dr. Strangelove."

"In the past, the Museum has celebrated technology and looked at it uncritically," a spokesman said. "We want to look at it from a new perspective."

Mr. Adams, who said he was not "running an entertainment facility," soon gained a reputation—denied by some, earnestly believed by others—as not being very interested in straight exhibits. A new spirit was afoot, and not everyone approved.

In an editorial commenting on the trend toward reinterpreting Christopher Columbus (on the 500th anniversary of his voyage to the New World) as a despoiler, the *Wall Street Journal* said that the "once-respected" Smithsonian was "in danger of becoming the Woodstock Nostalgia Society" with "an exhibit that is multiculturally correct down to its tiniest sensitivity."

At the Smithsonian's National Museum of American Art, an exhibit titled "The West as America: Reinterpreting Images of the Frontier, 1820–1920," drew fire in 1991 by depicting the westward expansion of the United States as immoral, characterized by racism and greed. One of those signing the comment book near the exit was Daniel Boorstin, historian and former Librarian of Congress, who wrote, "A perverse, historically inaccurate, destructive exhibit. No credit to the Smithsonian."

(The new look at the Smithsonian is not without supporters. A Washington *Post* editorial, for example, applauded the "move away from the traditional heroes, politicians, and objects in glass cases and toward a wide, fluid, social-history approach.")

Mr. Adams has announced his intention to retire later this year, but the Smithsonian has built up considerable momentum in the direction that he set.

The Air and Space Director

Dr. Harwit was formerly a professor of astronomy at Cornell University and has been director of the National Air and Space Museum since 1987. "I do not consider myself 'politically correct,' " he says. Changes at the museum are intended to "present interesting and challenging—or thought-provoking—aspects of the history of this country, that will perhaps bring greater clarity to some issues that have, for a long time, not been discussed."

He was born in Prague, grew up in Istanbul, and came to the United States (at age fifteen) in 1946. He asks those who suspect his attitude

Airpower's Struggle on the Mall

The Smithsonian bureaucracy has a history of not sharing the public's enthusiasm for aircraft exhibits. In 1969, S. Paul Johnston—five months before retirement from his post as director of the Air and Space Museum—blew the whistle on what was happening.

"Around a place like the Smithsonian," he said, "there are any number of 'ologies' and socially oriented disciplines whose practitioners consider aircraft only as a means of getting out to the remote boondocks to look into the private life of the green spotted frog of the upper Amazon. . . . Unfortunately, from our point of view, the current art- and 'ology'-oriented management of the Smithsonian appears to favor sculpture gardens, folk art (both performing and static), and elaborate housing for the scholarly over the more practical, hardware-oriented technologies of flight."

The Air and Space Museum, even then drawing nearly a third of the total Smithsonian audience, was allotted only two percent of the Smithsonian's budget and personnel.

"There is nothing astonishing in all this," Mr. Johnston said, "if one considers the pedigree and proclivities of the Smithsonian secretariat—the top-side group, which determines the Institution's policies and priorities. Most of them hail from the Groves of Academe—holders of advanced degrees in philosophy, biology, sociology, history, and art."

Funding for a new Air and Space Museum building was hung up by a legislative hold placed in 1966 by the House Rules Committee, pending a reduction in military expenditures for Vietnam, Mr. Johnston said, but the museum's real problems were with people, specifically people in the Smithsonian.

The Air and Space Museum, he said, reported to an assistant secretary with a specialty in English history who "takes some pride in the fact that he has never come within miles of the Pentagon—physically or spiritually" and who "has little personal interest in the aerospace matters."

Sen. Barry Goldwater (R-Ariz.) read a copy of Mr. Johnston's speech and took up the cause in a blistering speech to the Senate. Congress and the Smithsonian, Senator Goldwater said, should pay attention to the "gigantic public interest in air and space" instead of "brainstorming major new sociocultural exhibits." He called for having a new Air and Space Museum ready to open for the nation's bicentennial in 1976.

Under the spotlight of congressional and public attention, things began to improve. During the directorship of former astronaut Michael Collins, who succeeded Paul Johnston as director in 1971, plans for the new Air and Space Museum building took shape. It opened to the public on July 1, 1976.

toward US forces in World War II to consider his personal background.

"I was lucky to get out of Czechoslovakia as a young boy, and if it had not been for the Allies, the chances are that I would have joined many of my family who did not manage to leave Czechoslovakia and the concentration camps from which they never came back," he says. "So I'm not a person who is going to say that World War II was fought by Americans with anything except the strongest foundation."

While serving in the US Army, 1955–57, Dr. Harwit was assigned to work on nuclear weapon testing at Eniwetok and Bikini. He acknowledges that the experience "inevitably" influenced his thoughts about the *Enola Gay* exhibit. "I think anybody who has ever seen a hydrogen bomb go off at fairly close range knows that you don't ever want to see that used on people," he says.

In the 1960s, Dr. Harwit established research groups at the Naval Research Laboratory and at Cornell that built the first rocket-borne telescopes cooled to liquid helium temperatures. In the 1980s, he chaired NASA's Astrophysics Management Working Group.

He says that veterans have the wrong perception about plans to exhibit the *Enola Gay*. "People somehow had the feeling that either we were going to apologize to the Japanese, which we never had any intention of doing, or that we were going to take service people to task for having dropped this bomb, which again, we never had any intention of [doing]."

Museum officials have talked with the Japanese about the plan because "we wanted to make sure we also included the point of view of the vanquished as well as the point of view of the victors," but Dr. Harwit says the curators flatly rejected Japanese urging that the exhibit advocate total abolition of nuclear armaments.

The Message in Gallery 103

The *Enola Gay*/"Crossroads" presentation will cover about 5,500 square feet of Gallery 103 on the first floor of the Air and Space Museum. The aircraft is in the back section. To reach the *Enola Gay,* visitors must pass through two winding introductory sections.

Suspended from the ceiling, just inside the entrance, will be a restored Ohka piloted suicide bomb. This section, labeled "A Fight to the Finish," presents the Smithsonian's view of the Pacific war in the spring and summer of 1945. It describes Japan's desperate last-ditch stand and the rising casualty toll. There will be a subunit on "The Firebombing of Japan."

The next unit of the exhibition, "The Decision to Drop the Bomb," centers visually on the casing of a "Fat Man" atomic bomb, similar to the one that fell on Nagasaki. The development of the bomb and the decision to use it are explored in words and pictures. The curators hold to the view that casualty estimates for invasion of Japan—an alternative to using the bomb—were inflated. US deaths, the script argues, would not have exceeded the "tens of thousands."

The largest section of the exhibit—the one with the forward fuselage of the *Enola Gay*—will be just around the corner. A "Little Boy" bomb casing (illustrating the device dropped on Hiroshima) will be also be displayed, along with a videotape of the *Enola Gay* mission. The 509th Composite Group, the unit that dropped the two atomic bombs, is covered extensively and with respect.

The curators intend the next section, "Ground Zero: Hiroshima, 8:15 a.m., August 6, 1945; Nagasaki, 11:02 a.m., August 9, 1945," to be the "emotional center" of the exhibition. In case the words and images are not enough, the exhibit plan states that visitors "will be immediately hit by a drastic change of mood and perspective: from well-lit and airy to gloomy and oppressive."

The first item on display will be a wristwatch, loaned by the Hiroshima Peace Memorial Museum, with its hands frozen on the moment the bomb fell. Graphic exhibits include Japanese dead and wounded, flash burns, disfigurement, charred bodies in the rubble, and such vignettes as the smoking ruins of a Shinto shrine, a partially destroyed image of Buddha, a heat-fused rosary, and personal items belonging to schoolchildren who died. *Hibakusha* (survivors of the bombing) describe what they saw and experienced.

Most of the rank-and-file Americans quoted in the exhibition script are soldiers, talking about details of their fighting. Except for the *kami-*

kaze pilots (who are seen as valiant defenders of the homeland), most of the individual Japanese speakers are persons who suffered injury themselves or who were witnesses to carnage. They talk about pain and suffering.

Visitors will take strong impressions with them as they leave.

To Collect, Preserve, and Display

The function of the National Air and Space Museum is prescribed by law, established in 1946 and amended only once, in 1966, to add "space" to the name and the charter.

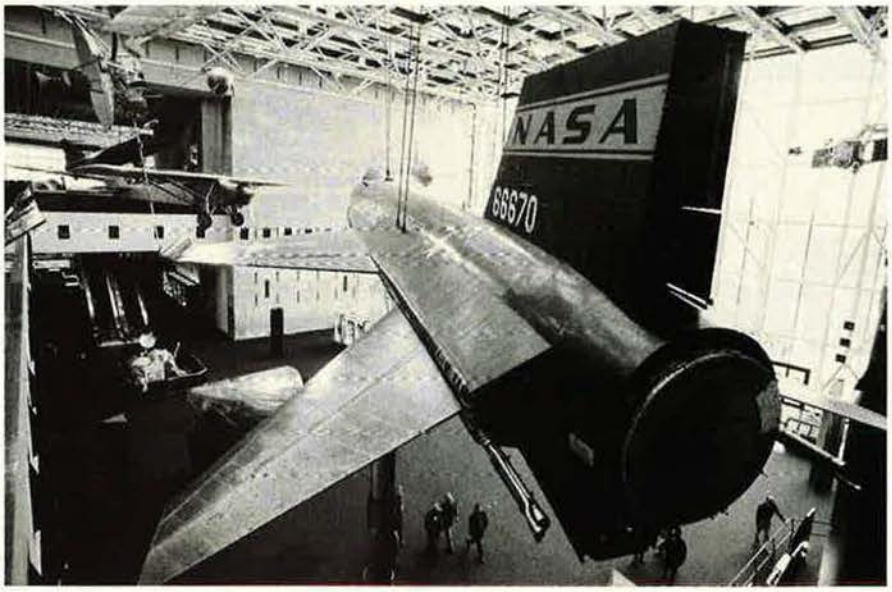
The statute reads in its entirety: "The national air and space museum shall memorialize the national development of aviation and space flight; collect, preserve, and display aeronautical and space flight equipment of historical interest and significance; serve as a repository for scientific equipment and data pertaining to the development of aviation and space flight; and provide educational material for the historical study of aviation and space flight."

Opinions differ on how the program at the Air and Space Museum squares with that law. In the view of its critics, the museum shows a limited interest in its basic job, allocating a low share of budget and staff to the restoration and preservation of aircraft. Arthur H. Sanfelici, editor of *Aviation* Magazine, has been particularly outspoken. He charges that "a new order is perverting the museum's original purpose from restoring and displaying aviation and space artifacts to presenting gratuitous social commentary on the uses to which they have been put."

Dr. Harwit disputes the accusation that the level of effort for aircraft restoration is down significantly on his watch. He says also that there are specific problems with funding. Those who supply the money, including Congress and private donors, want to contribute to "that part which is the most visible," the exhibits and the films, rather than to preservation and restoration.

Fifteen Museums and a Zoo

The Smithsonian Institution consists of fifteen museums and the National Zoo. It began with a bequest in 1826 from an Englishman, James Smithson, who left his fortune to the US to found an institution named for him. Congress created the Smithsonian in 1846. It has operated ever since with concurrent public support and private endowment. It is governed by an independent board of regents but nonetheless listens carefully to what Congress says because that's where most of the money comes from.



Staff photo by Guy Aceto

Its critics say the museum has shown scant interest in its primary job: preserving such treasures as the* Spirit of St. Louis *(at rear) and the X-15 (foreground).

About eighty-five percent of the operating budget (salaries and expenses) is from the federal government. The rest is from donations, gift shop sales, cafeterias and restaurants, the Institution's two glossy magazines—*Smithsonian* and *Air & Space*—recordings, and books published by the Smithsonian Press.

Most of the Smithsonian museums are clustered along the mall that stretches west from the US Capitol toward the Washington Monument. The Smithsonian attracts some thirteen million visitors a year, two-thirds of them drawn by the enormously popular Air and Space Museum.

Total attendance at Air and Space in 1992 was 8.6 million. Record attendance for a single day—118,437—was set April 14, 1984. The best-known holdings of the Air and Space Museum include:

- The Wright brothers' 1903 Kitty Hawk Flyer. (In 1910, the Smithsonian turned down the Wright brothers' offer to donate the 1903 Flyer, then provoked a quarrel with Orville Wright that lasted for decades. The Smithsonian did not acquire the Wright Flyer and exhibit it to the public until 1948.)
- Charles Lindbergh's *Spirit of St. Louis.*
- Chuck Yeager's X-1 *Glamorous Glennis.*
- The Apollo 11 command module *Columbia*, which took astronauts Armstrong, Aldrin, and Collins to the moon and back.

The museum's Langley Theater shows special films on a five-story IMAX screen. The first ones were a vicarious aviation experience, "To Fly," and a space epic, "The Dream Is Alive." It's a sign of the times, perhaps, that the show bill now includes "The Blue Planet" (which uses imagery from space to push a hard-line ecology message) as well as "Tropical Rain Forest" and "Beavers."

Legislation passed in 1993 established an Air and Space Museum annex at Dulles Airport in suburban Virginia. When it opens, sometime around the turn of the century, it will provide space to exhibit a number of noteworthy aircraft from the Smithsonian's collection, many of which are too large to show in the main museum on the mall.

At the Dulles annex, the public will be able to see the space shuttle *Enterprise,* a B-17 Flying Fortress, a Lockheed Super Constellation, a Concorde, and the world's fastest airplane, the SR-71.

Also on display at Dulles—fully assembled and presumably without the political trappings—will be the most famous B-29 of all time, the *Enola Gay.* ■

In April 1945, the new President learned the most closely held secret of the war.

The Decision That Launched the *Enola Gay*

By John T. Correll, Editor in Chief

As Vice President, Harry Truman had not known about the development of the atomic bomb. On the day he assumed the presidency at the death of Franklin D. Roosevelt, Secretary of War Henry L. Stimson had spoken to him briefly and told him that the United States was working on a weapon of extraordinary power. Twelve days later, on April 25, 1945, Stimson and Maj. Gen. Leslie R. Groves, director of the Manhattan Project, briefed President Truman in detail on the secret of the atomic bomb.

The bomb had not yet been tested. Once it was proved to work, Truman would consult with allies and advisors, but the decision on whether to use it would be his. Truman said later that he had no great difficulty in reaching the decision. The question before him was how to end the war and save lives. He regarded the atomic bomb as a *weapon*—an awesome one, to be sure—but still a weapon to be used. On Truman's orders, the B-29 *Enola Gay* dropped the first atomic bomb on Hiroshima August 6. Another B-29, *Bockscar,* dropped the second bomb on Nagasaki August 9.

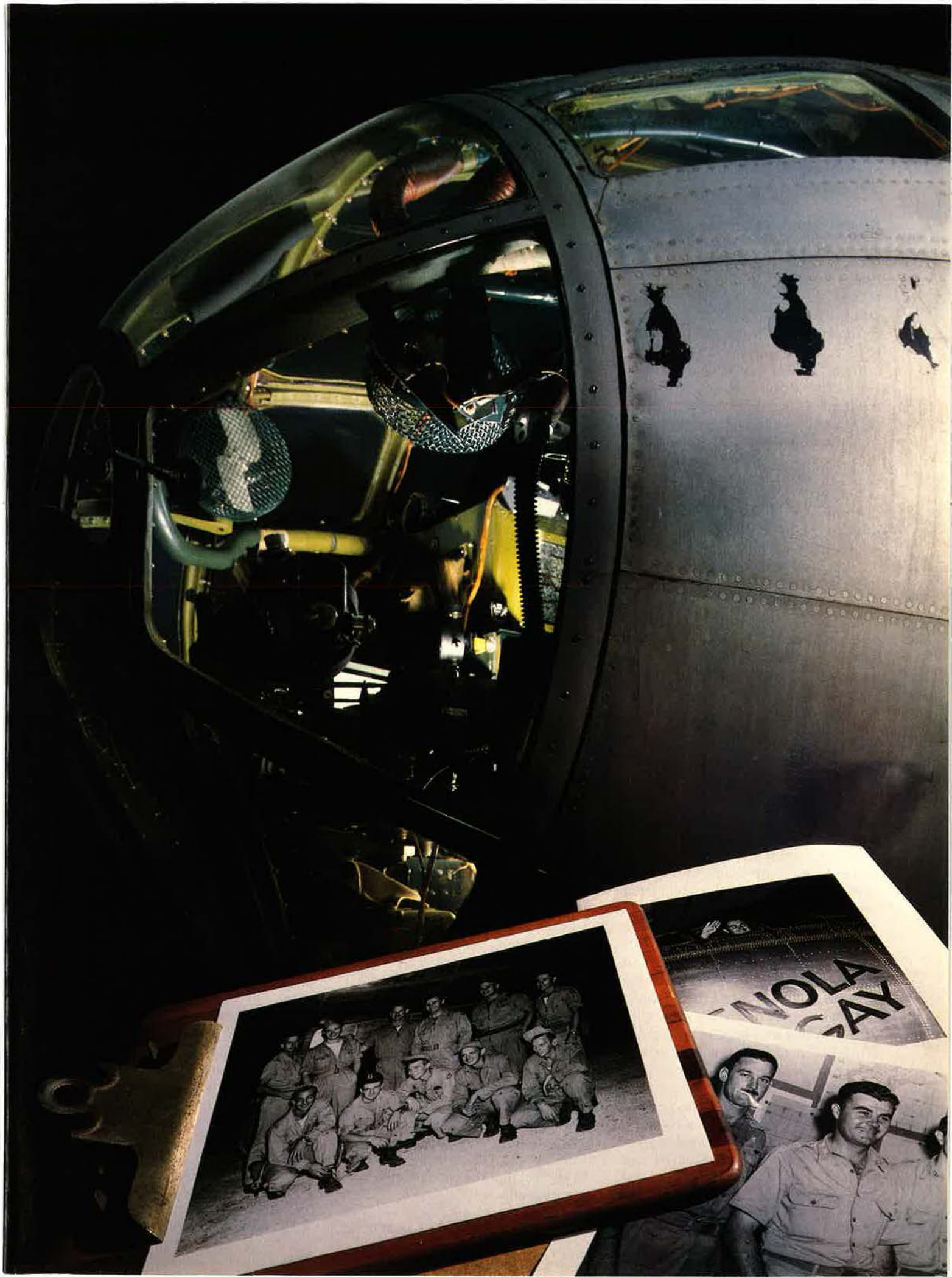
The unconditional surrender of Japan followed on August 15. For the next fifty years, however, Truman's decision to use the atomic bomb would be questioned again and again, and the retroactive judgment would often be harsh. To understand the decision, it is necessary to examine the circumstances and the options as Truman saw them in the summer of 1945.

World War II would eventually cost the United States more than a million casualties. It consumed the nation's energies and resources to an extent never experienced before or since. When Truman became President in April 1945, US casualties were averaging more than 900 *a day.* In the Pacific, the toll from each successive battle rose higher.

The war ended in Europe on V-E Day, May 9, but Japan fought on. The eventual military outcome of the Pacific war had been effectively sealed since the US took the Marianas in 1944, but the Japanese refused to accept defeat.

In 1945, the war had finally come home to Japan. B-29s from Guam, Saipan, and Tinian were striking the Japanese homeland regularly, sys-

Photo by Paul Kennedy


NOLA
AY

tematically destroying the industrial cities on Honshu and Kyushu. The US Navy and the Army Air Forces had cut off Japan's supply lines. Nevertheless, the war threatened to drag on into 1946. US and Allied forces prepared for a difficult and costly invasion of the Japanese islands.

Bushido and *Kamikaze*

As Japan's desperation worsened, the ferocity of the fighting intensified. The code of *bushido*—"the way of the warrior"—was deeply ingrained. Surrender was dishonorable. Defeated Japanese leaders preferred to take their own lives in the painful samurai ritual of *seppuku* (called *hara kiri* in the West. Warriors who surrendered were not deemed worthy of regard or respect. This explains, in part, the Japanese mistreatment, torture, and summary execution of POWs). There was no shortage of volunteers for *kamikaze* missions or of troops willing to serve as human torpedoes or to ride to honorable death on piloted buzz bombs.

Japan was dead on its feet in every way but one: The Japanese still had the means—and the determination—to make the invading Allied forces pay a terrible price for the final victory. Since the summer of 1944, the armed forces had been drawing units back to Japan in anticipation of a final stand there.

The Japanese were prepared to absorb massive casualties. According to Gen. Korechika Anami, the War Minister, the military could commit 2.3 million troops. Commanders were authorized to call up four million civil servants to augment the troops. The Japanese Cabinet extended the draft to cover most civilians (men from ages fifteen to sixty and women from seventeen to forty-five).

The defending force would have upwards of 10,000 aircraft, most of them *kamikaze*. Suicide boats and human torpedoes would defend the beaches. The Japanese Army planned to attack the Allied landing force with a three-to-one advantage in manpower. If that failed, the militia and the people of Japan were expected to carry on the fight. Civilians were being taught to strap explosives to their bodies and throw themselves under advancing tanks. Construction battalions had fortified the shorelines of Kyushu and Honshu with tunnels, bunkers, and barbed wire.

As late as August 1945, the Japanese Army thought it could destroy most of the invading force and that there was a fair chance the invasion could be defeated.

Invasion Plans and Casualty Estimates

US military opinion was divided on what it would require to induce Japan's surrender and finally bring the war to an end. Gen. George C. Marshall, Army Chief of Staff, and Gen. Douglas MacArthur, commanding US forces in the western Pacific, believed an invasion of the Japanese home islands would be necessary.

Gen. H. H. Arnold, commander of the Army Air Forces, and Maj. Gen. Curtis E. LeMay (whose XXI Bomber Command in the Marianas was pounding Japan relentlessly) believed that B-29 conventional bombing could do the job. Adm. William D. Leahy, the President's Chief of Staff, and Adm. Ernest J. King, Chief of Naval Operations, were not fully in accord with Marshall and MacArthur, either.

Truman was aware of the differences among the military leaders but was satisfied that they had been reconciled with Marshall. Furthermore, Truman respected Marshall deeply and regarded him as the nation's chief strategist, so Marshall's opinion carried particular weight.

The plan called for an invasion in two stages. Operation Olympic, a land invasion of Kyushu, southernmost of the Japanese main islands, was to begin November 1, 1945. Operation Coronet, planned for March 1, 1946, would be an invasion of Honshu, the largest island. The Joint Chiefs expected the two-stage invasion to involve some *five million troops,* most of them American. The invasion was to be preceded by a massive aerial bombardment, reaching maximum intensity before troops went ashore on Honshu.

Casualty estimates varied. Military planners figured the invasion of Kyushu alone would take between 31,000 and 50,000 US casualties in the first thirty days and that the combined US losses from Operations Coronet and Olympic would exceed 500,000. President Truman believed that, unless he used the atomic bomb, an invasion was necessary and that the casualties would be enormous.

Strategic Bombing

The capture of the Marianas in the summer of 1944 had given the AAF bases 1,300 miles from Tokyo. B-29s from Guam, Saipan, and Tinian could reach all the major cities in Japan, including the big industrial cities on Honshu. B-29s operated at altitudes too high for Japanese fighters to stop them.

In January 1945, General LeMay took over XXI Bomber Command. On the night of March 9–10, he launched a massive mission—334 B-29s—to drop incendiary bombs on Tokyo. It was the most destructive raid in history. The official casualty report listed 83,793 dead and 40,918 wounded. Sixteen square miles of Tokyo were destroyed that night. In Operation Starvation, conducted concurrently with the bombing campaign, B-29s mined the waters along the Japanese coast, cutting off maritime transportation and the import of food and raw materials.

The long-range B-29, which first struck Japan in June 1944 from bases in China, inspired fear and awe. The Japanese called it *"B-san,"* or "Mr. B." General Arnold, on a visit to Guam in June 1945, expressed his belief that the B-29 campaign "would enable our infantrymen to walk ashore on Japan with their rifles slung."

The B-29s systematically laid waste to Japan's large industrial cities. LeMay told Arnold there would soon be nothing left to bomb or burn, except for Kyoto (the old capital) and four other cities—Hiroshima, Nagasaki, Niigata, and Kokura—that were barred for routine B-29 missions. These four were, of course, on the target list for the "special bomb."

The Emperor Takes a Hand

By the summer of 1945, the Japanese government had split into a peace faction (including Prime Minister Kantaro Suzuki) and a war faction (General Anami and the military). The war faction was powerful, but the peace faction was gaining an extraordinary ally: the Emperor, Hirohito. Regarded as divine and the embodiment of the Japanese state, the Emporer supposedly "lived beyond the clouds," above politics and government. In fact, he was interested and well informed. While he did not interfere, he was often present at important meetings.

The B-29 missions strengthened

Hirohito's growing belief that Japan should not be devastated further in a losing cause. On March 18, he toured areas of Tokyo that had been firebombed March 9–10. The experience persuaded him that the war must end as quickly as possible.

Hirohito shattered precedent at a meeting of the Supreme War Council June 22, openly stating his criticism of the military: "We have heard enough of this determination of yours to fight to the last soldiers. We wish that you, leaders of Japan, will now strive to study the ways and means to conclude the war. In so doing, try not to be bound by the decisions you have made in the past."

Anami and his faction managed to sidestep the Emperor's rebuke. All concerned—including the Emperor—hoped that the Soviet Union could be persuaded to act as an intermediary and help end the war on a more acceptable basis than unconditional surrender. The rationale for this, as the Japanese saw it, was that Japan's neutrality had allowed the Russians to concentrate on their real enemy, the Germans, and that in the postwar world, the Soviet Union would find a strong Japan useful as a buffer between its Asian holdings and the United States.

Through July and into August, Japan continued to hope it could negotiate terms, including concessions for control of the armed forces and the future of its military leaders. The passage of time and the repeated publication of pictures from Hiroshima and Nagasaki have transformed Japan's image to that of victim in World War II. In the 1940s, Japan's image was different.

The Allies had imposed unconditional surrender on Germany. The United States was not inclined to make deals with the Japanese regime responsible for Pearl Harbor, the Bataan death march, the forced labor camps, habitual mistreatment of prisoners of war, and a fifteen-year chain of atrocities stretching from Manchuria to the East Indies.

Options

Basically, President Truman and the armed forces had three strategic options for inducing the Japanese surrender:

Continue the firebombing and blockade. After the war, the Strategic Bombing Survey would conclude that without the atomic bomb or invasion, Japan would have accepted unconditional surrender, probably by November and definitely by the end of the year. In 1945, however, the AAF was not able to persuade General Marshall that this strategy would work.

Invasion. Neither Marshall nor Truman was convinced that LeMay's B-29 bombing campaign could bring a prompt end to the war. In their view, the only conventional alternative was invasion.

Use the atomic bomb. Within a few years after World War II, the specter of global nuclear war (combined with visions of Hiroshima) would imbue the bomb with special horror. In 1945, the perspective was different. Doubts about use of the atomic bomb were mostly of a strategic nature, reflecting the belief that an invasion might not be necessary or that bombing and blockade would be sufficient. (Use of the bomb to end the war eventually saved Japanese casualties, too. The incendiary bombs from B-29s were taking a terrible toll. The attack on Tokyo in March killed more people than either the Hiroshima or Nagasaki bombs.)

Truman was acutely aware that hesitation would be paid for in blood. The Japanese refusal to surrender led to 48,000 American casualties in the battle for Okinawa between April and June. *Kamikaze* attacks in that battle sank twenty-eight US ships and did severe damage to hundreds more. The Japanese force on Okinawa was only a fraction the size of the one waiting in the home islands.

Advice About the Bomb

As discussions continued, US authorities made preparations for the decision that seemed most likely. In May, a special committee in Washington nominated four urban industrial centers—Kokura, Hiroshima, Niigata, and Kyoto—as targets. Secretary of War Stimson struck Kyoto (Japan's capital for more than 1,000 years) from the list. The military picked Nagasaki as the fourth potential target.

The Interim Committee on S-1 (a code term for the Manhattan Project) told the President that the bomb should be used against Japan and that a demonstration explosion would not be sufficient. Reasons included the possibility that the bomb might not work, that the Japanese might think the demonstration was faked, and that there was no way to make the demonstration convincing enough to end the war.

Military leaders accompanied the President to the Big Three meeting at Potsdam in July, and discussions continued there. In his memoirs, Truman said that Secretary of State James F. Byrnes, Mr. Stimson, Admiral Leahy, General Marshall, and General Arnold reached a consensus at Potsdam that the bomb should be used. In fact, the advice was not so clear-cut. Although Arnold supported the decision, he repeated his view that use of the bomb was not a military necessity.

Casualties were increasing with every day that Japan refused to surrender. Truman's biographer, David McCullough, writes, "Had the bomb been ready in March and deployed by Roosevelt, had it shocked Japan into surrender then, it would have already saved nearly fifty thousand American lives lost in the Pacific in the time since, not to say a vastly larger number of Japanese lives."

During the Potsdam conference, Truman received word that the "Fat Man" bomb had been tested successfully at Alamogordo, N. M., on July 16. On July 25, the War Department relayed Truman's order that the 509th Composite Group should deliver the first "special bomb" as soon after August 3 as weather permitted on one of the four target cities.

Among those at Potsdam staunchly supporting the decision to use the bomb was British Prime Minister Winston Churchill. Years later, Churchill still believed that Truman's decision had been right.

The Potsdam Proclamation, issued July 26 by the heads of government of the US, UK, and China, warned of "utter devastation of the Japanese homeland" unless Japan surrendered unconditionally. "We shall brook no delay," it said. The same day, the cruiser *Indianapolis* delivered the U-235 core of the "Little Boy" bomb to Tinian.

On July 28, Prime Minister Suzuki declared the Potsdam Proclamation a "thing of no great value" and said "We will simply *mokusatsu* it." Literally, *mokusatsu* means "kill with silence." Suzuki said later the

meaning he intended was "no comment." The Allies took the statement as rejection of the Potsdam Proclamation.

Hiroshima and Nagasaki

The unit that would deliver the atomic bombs, the 509th Composite Group, had been organized in 1944. Crews were hand-picked by the commander, Col. Paul W. Tibbets, Jr. In the early morning hours of August 6, the *Enola Gay*, flown by Tibbets, took off from Tinian. The primary target was Hiroshima, the seventh largest city in Japan, an industrial and military shipping center on the Inland seacoast of Honshu. At precisely 8:16 a.m., the atomic bomb fell on Hiroshima. More than half of the city was destroyed in a flash, and about 80,000 people were killed.

Reaction by the Japanese Cabinet was split between the war faction and the peace faction. With the cabinet at an impasse, Hirohito took a more assertive position. On August 8, the Emperor instructed Foreign Minister Shigenori Togo to tell Prime Minister Suzuki that Japan must accept the inevitable and terminate the war with the least possible delay and that the tragedy of Hiroshima must not be repeated.

Anami could not bring himself to flatly defy the Emperor, but he continued to argue his position passionately. Hard-liners in the military were plotting to kill Suzuki and others of the peace faction. Anami was not part of the plot—although his brother-in-law, Masahiko Takeshita, was a ringleader.

The Soviet Union, seeing an opportunity for easy pickings with limited risk, declared war on Japan August 8. Despite the desperation of a war suddenly active on two fronts, the Japanese were not quite ready to capitulate.

The primary target for the second atomic bomb mission on August 9 was Kokura, but the aimpoint was obscured by smoke drifting from a nearby city that had been bombed two days earlier. *Bockscar* diverted to Nagasaki on the western coast of Kyushu. Nagasaki was heavily industrialized. The Mitsubishi conglomerate operated a shipyard, electric equipment production facilities, steel factories, and an arms plant there. The aimpoint for *Bockscar* was the Mitsubishi Steel and Arms Works. The bomb exploded on Nagasaki at 11:02 a.m., killing 40,000.

In his radio address August 9, President Truman said the United States had used the atomic bomb "against those who attacked us without warning at Pearl Harbor, against those who have starved and beaten and executed American prisoners of war, against those who have abandoned all pretense of obeying international laws of warfare. We have used it to shorten the agony of war, in order to save the lives of thousands and thousands of young Americans. We shall continue to use it until we completely destroy Japan's power to make war. Only a Japanese surrender will stop us."

"Bear the Unbearable"

Japanese deliberation on August 9 lasted all day and into the night. At a cabinet meeting that began at 2:30 p.m.—hours after the second atomic bomb had fallen—Anami said, "We cannot pretend to claim that victory is certain, but it is far too early to say the war is lost. That we will inflict severe losses on the enemy when he invades Japan is certain, and it is by no means impossible that we may be able to reverse the situation in our favor, pulling victory out of defeat." Finally, at 2:00 a.m. on August 10, the Emperor told the Big Six meeting (the Supreme War Council) that "the time has come to bear the unbearable" and that "I give my sanction to the proposal to accept the Allied Proclamation on the basis outlined by the Foreign Minister."

At 4:00 a.m., the cabinet adopted a message for radio transmission to Allied powers, saying in part: "The Japanese Government [is] ready to accept the terms enumerated in the joint declaration which was issued at Potsdam on July 26th, 1945, by the heads of the Governments of the United States, Great Britain, and China, and later subscribed to by the Soviet Government, with the understanding that the said declaration does not comprise any demand which prejudices the prerogatives of His Majesty as a Sovereign Ruler."

The Allied response August 11 said that the "authority of the Emperor and the Japanese Government to rule the state shall be subject to the Supreme Commander of the Allied Powers" and that "the Emperor shall authorize and ensure the signature by the Government of Japan and the Japanese General Headquarters of the surrender terms."

V-J Day

The Anami faction continued to haggle, but at noon on August 14, the Emperor asked the cabinet to prepare an Imperial Rescript of Surrender. He said that "a peaceful end to the war is preferable to seeing Japan annihilated." The plotters engaged in various disruptive actions in the hours that followed, but it was over. At 11:30 p.m. the Emperor recorded his radio message for broadcast the following day. General Anami, preferring to die rather than see Japan surrender, committed *seppuku* at 5:00 a.m., August 15.

In the Imperial Rescript of Surrender, broadcast at noon on August 15, Emperor Hirohito said, "Despite the best that has been done by everyone—the gallant fighting of the military and naval forces, the diligence and assiduity of Our servants of the State, and the devoted service of Our one hundred million people—the war situation has developed not necessarily to Japan's advantage, while the general trends of the world have all turned against her interest.

"Moreover, *the enemy has begun to employ a new and most cruel bomb, the power of which to do damage is, indeed, incalculable,* taking the toll of many innocent lives. Should We continue to fight, not only would it result in an ultimate collapse and obliteration of the Japanese nation, but also it would lead to the total extinction of human civilization. [Emphasis added.]

"Such being the case, how are We to save the millions of Our subjects, or to atone Ourselves before the hallowed spirits of Our Imperial Ancestors? This is the reason why We have ordered the acceptance of the provisions of the Joint Declaration of the Powers."

V-J Day was celebrated August 15. General MacArthur accepted Japan's formal surrender September 2 on the battleship *Missouri* in Tokyo Bay. The atomic bomb did not win the war. Japan had been defeated already by the land, sea, and air campaign that went before. It is reasonable to conclude, however, that the bomb did force the Japanese surrender—and considerably sooner than it would have occurred otherwise. ■

Stay active on weekends.

Leaving active duty doesn't have to mean losing all the benefits of being in the service. You can serve part-time in your hometown Air National Guard.

Spend as little as two days a month and 15 days a year in the Air National Guard and you can keep both your skills and your benefits.

If you're approaching the end of your active duty tour, the Palace Front Program can give you a direct duty assignment to your local Air Guard unit without a break in service.

Our Palace Chase Program may help you fulfill your military obligations if you're considering leaving before the end of your term.

Or consider our Try-One Program. It lets you serve in your local Air Guard unit for one year, before obligating yourself to an entire term.

For details on the Air Guard Program created with you in mind, talk to your Personnel Separations Section, send this coupon or call **1-800-638-0936.**
(Stateside only.)

Mail to: Air National Guard, PO Box 554, Hanover, MD 21076-9967

Name_____ ☐M☐F

Address_____

City_____ State_____ Zip_____

Phone ( ) _____ U.S.Citizen ☐Yes ☐No

Date of Birth_____

Prior Military Service ☐Yes ☐No

Current Military Service ETS __/__/__

Branch_____

Rank_____

AFSC/MOS_____

A2AISA**044PS

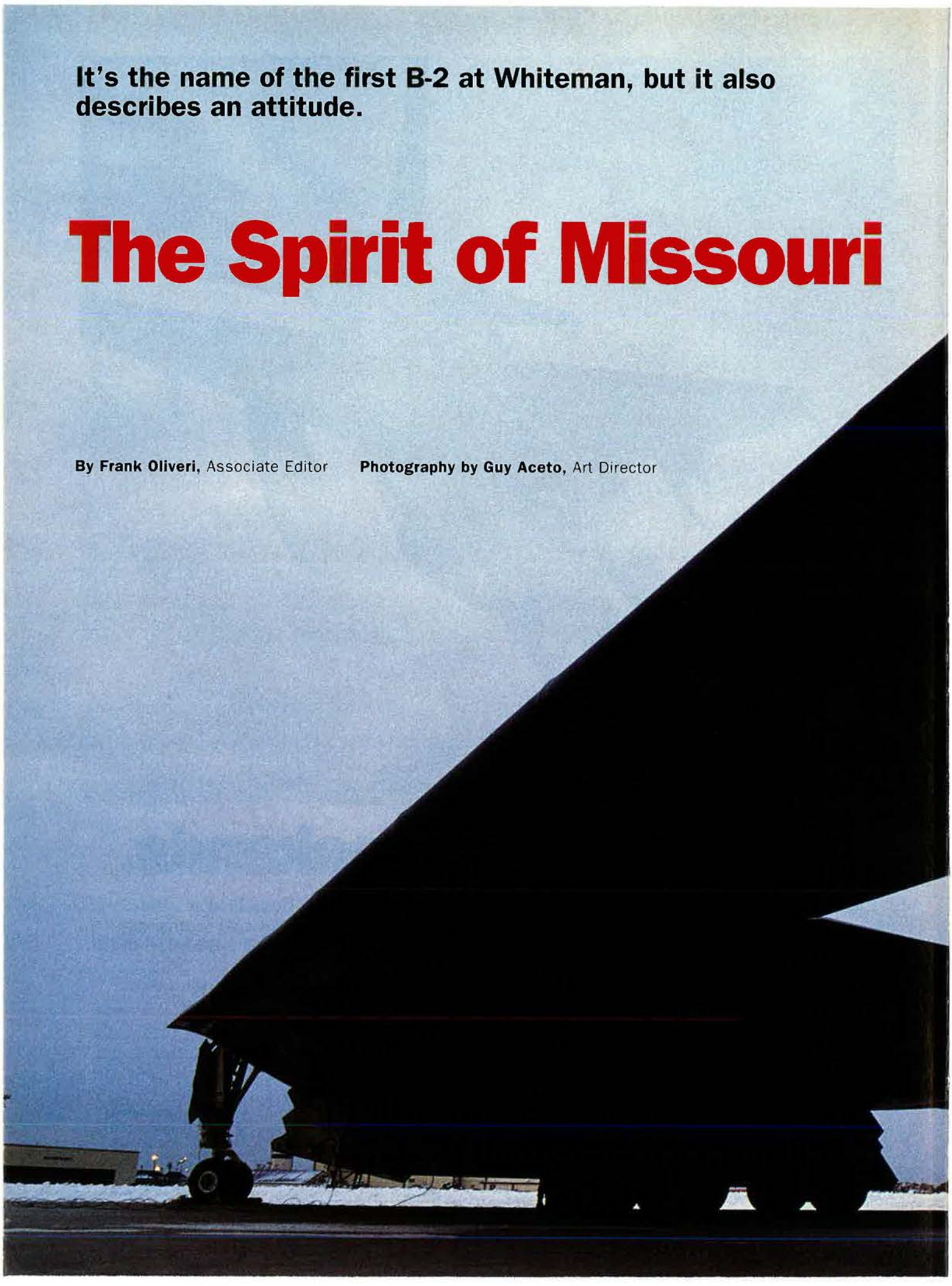
AIR NATIONAL GUARD

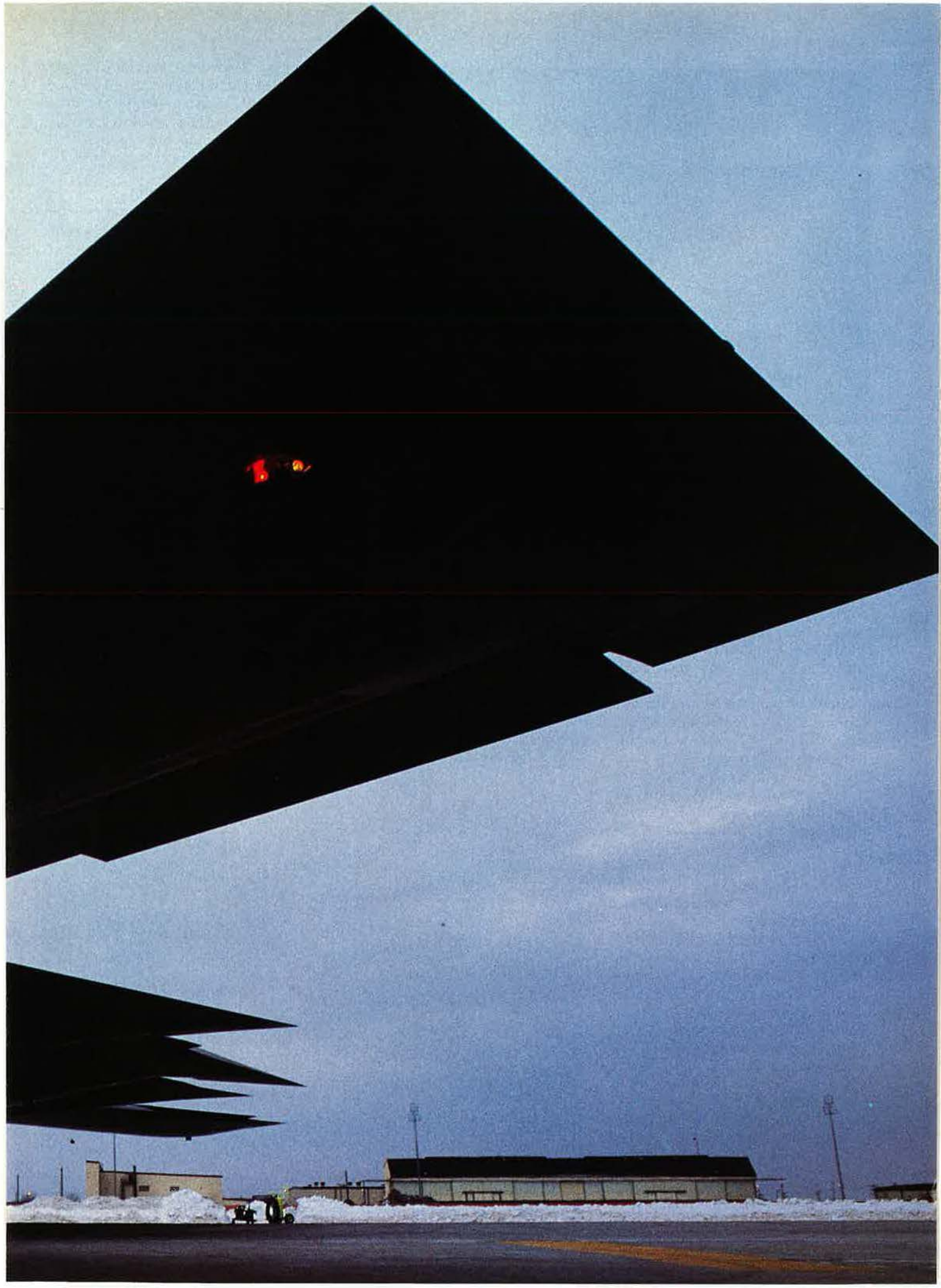
Americans At Their Best.

It's the name of the first B-2 at Whiteman, but it also describes an attitude.

The Spirit of Missouri

By Frank Oliveri, Associate Editor **Photography by Guy Aceto,** Art Director





B-2 preflight briefings emphasize mission safety and training. Crews don't need to fly daily missions, so commanders try not to lean on their experienced instructor pilots and exercise the new pilots and specialists instead.

WITH THE arrival of the first B-2 bomber at Whiteman AFB, Mo., on December 17, 1993, the Air Force and its major combat component, Air Combat Command, entered a strikingly new era. The B-2 not only added a unique precision weapon to USAF's arsenal but also broke down some barriers dividing fighter pilots and bomber crews.

At Whiteman, the best of the two groups are now embarked on the validation of B-2 aircrew training programs, which began in early January. Their work gives Northrop, the prime contractor, and CAE-Link, the simulator house, a chance to make improvements at an early stage. The blending of these distinctive "cultures" in the B-2 program mirrors initiatives that ACC has undertaken on a smaller scale in other units.

What makes the B-2 special, of course, is its combat power—specifically its ability to penetrate an enemy air defense with what officials say will be near-impunity. The B-2 is the ultimate "silver bullet" weapon. Plans call for only twenty B-2s, with about sixteen operational at any one time, but just two B-2s can deliver thirty-two precision guided 2,000-pound bombs. Such a mission would require sixteen F-117 fighters, four tankers, and many more crew members.

In the early validation and verification period at Whiteman, leaders of the 509th Bomb Wing, the operational home of the B-2, have been striving to instill in pilots and maintenance personnel what they call the "stealth mindset."

It's working. Spend time with some of the 2,886 pilots and enlisted personnel who work with *The Spirit of Missouri* (the official name of the first B-2) at its rural western Missouri base, and you pick up a sense of awe regarding the new airplane. The attitude stems partly from the B-2's immense complexity and technological prowess but also from its simple beauty and unconventional lines. Observing the sleek aircraft one bright and bitterly cold day last January, assistant dedicated crew chief TSgt. Henry A. Price paused and summed up his feelings with these words: "We're not worthy."

Wafer-Thin and Quiet

Those watching the barely visible B-2 during a takeoff on that January day gasped when the wafer-thin bomber lifted off and then rolled into a sharp bank, suddenly revealing the vast sweep and size of the black wing. Even more shocking was the quietness of its four F118 19,000-pound-thrust engines as they propelled the aircraft into the sky. Normally, the roar of the jet engines would have been ear-shattering, easily heard miles away. The sound of the B-2, however, could almost be called unobtrusive.

The stealth mindset recognizes that the bomber is part of a whole. Until the 1991 Persian Gulf War, "I don't think people really appreciated . . . what stealth could do for us," observed Lt. Col. Tony Imondi, one of the B-2's two qualified instructor pilots. "You don't have [just] a stealthy plane; you have a stealthy weapon system and everything that goes with it, from ground planning to training to maintenance. You don't go out and turn a wrench on a stealth airplane without thinking, 'What's the impact if I scratch this thing?' because there is an impact."

Aircraft maintainers assisted B-2 designers. Easy access to compartments was a happy result. B-2 compartment doors fit so snugly that they are constantly sharpened like scissors. Ground crews put safety guards over the door edges.

From the maintenance of its composite materials and specialized skin to the proper use of its stable of simulators that allows pilots to train for and even rehearse complex missions before they log one minute in the actual bomber, the B-2 was built from the ground up with all potential tasks in mind. Every aspect of aircraft support and training was included in the design of the B-2 system.

In pursuit of the best training system possible, former fighter pilots and bomber pilots debate the best way to go about each task. Whether the subject is tactics, training, or basic procedures, "It gets pretty spirited," said Operations Group Commander Col. William Fraser III of the B-2 team. "They [pilots] sit around the table and say, 'Fighter guys do it this way. . . . Bomber guys do it this way.' We have good open discussions about it and come up with the best ideas. . . . We don't censor anything."

Note the auxiliary intake door atop the B-2's engine nacelle. Two doors in each nacelle provide optimum mass airflow to the engines at idle. Below, a crew chief communicates with pilots during preflight.

It seems appropriate that the B-2 would go to the 509th BW, one of the most famous air units of all time. Activated by Army Air Forces on December 17, 1944, the 509th was created with one mission in mind—to drop the new, supersecret atomic bomb on a Japanese target. The first leader of the unit was Col. Paul W. Tibbets, Jr., who hand-picked and trained his personnel for the August 1945 mission. Leaders of the present-day 509th were chosen by Gen. John Michael Loh, the commander of ACC, and Brig. Gen. Ronald C. Marcotte, the wing commander.

The goal is to form a cadre of highly experienced pilots who will prepare other aviators to use the massive combat capabilities of the B-2. Great care has also gone into the selection of key ground crew members. "We're talking about cream of the crop," General Marcotte said. "These are very highly qualified aviators and professional officers. They're not just test community. These are card-carrying Air Force leaders, and they have the records to prove it."

Sprinkled throughout the B-2 unit are individuals who have been with the B-2 program virtually since its inception. Some are officers who were whisked away to California years ago to work on a project about which they knew little or nothing. Sergeant Price, the assistant dedicated crew chief of *The Spirit of Missouri,* has been with the program since 1986. He was sent to California to work with Northrop on the top-secret program but could not tell anyone what he was doing. Two years later, when the Pentagon took the wraps off the program, Sergeant Price surprised his co-workers when he showed up for work in his uniform. They had had no idea he was in the Air Force.

Not Just for the Cold War

The B-2's transition from developmental to operational status has been a rocky one. Initially developed during the Cold War to be a penetrating bomber with a primary focus on strategic nuclear operations, the B-2 hit turbulent times when the Soviet Union collapsed. Critics portrayed the bomber as a weapon without a mission.

Decisions made by the Air Force early in the program, however, had given the B-2 the flexibility to employ not only nuclear weapons but also conventional munitions ranging from Mk. 84 500-pound dumb bombs to sea mines to 2,000-pound

Crew members work in the B-2 Weapons Load Trainer. Such training systems help prepare crews for work on the actual aircraft. The B-2 uses rotary launchers for both conventional and nuclear weapons delivery.

precision guided weapons. Design changes made early in the course of the program gave the B-2 a low-level bombing capability.

The B-2 can carry a payload of more than 40,000 pounds. It has an unrefueled range of 7,255 nautical miles; with refueling, its range is unlimited. That means the B-2 can hit any target in the world within hours and, because of its low observable (LO) characteristics, officials can be confident that it will not be engaged over hostile territory.

Said General Marcotte, "It could strike high-value, time-critical targets in the initial phases of an operation [to] slow down a force, to put out eyes and ears, to drop smart weapons through those air-conditioning ducts, to slow the force so we can get our deployment operation ginned up to add more mass. Then . . . the decision could be made to forward deploy the B-2. They would then be able to fly more sorties closer together and add a lot of mass to the attack. Or the decision may be to reconstitute the B-2 in a different unit and hold them in reserve for a second major regional contingency or swing them. We're training that way. . . . We'll train to deploy."

While the B-2 can carry eighty Mk. 84 500-pound bombs, it's unlikely that it would be used in such a fashion. "We won't use it as a bomb truck," General Marcotte said. "The real operational capability will come when we can get smart weapons on it. It can drop sixteen smart weapons in a single pass, within ten-meter accuracy. You can take out an airfield. You know how many bombing sorties that takes other aircraft?"

A duplicate of the B-2 cockpit, the Weapon Systems Trainer is used to rehearse training (and, if necessary, combat) missions before pilots fly the real aircraft. Since the full-motion WST runs the same software as the aircraft, maintainers can fix problems on the ground rather than in the air.

Just Like the Real Thing

The heart of the B-2 system is its simulators. It uses three such trainers—the Cockpit Procedures Trainer (CPT), Mission Trainer (MT), and Weapon System Trainer (WST).

The CPT provides a basic feel for where switches are in the aircraft and what they do. This training is supplemented by classroom instruction. If a student throws a switch incorrectly, the system freezes. This prevents inadvertent learning of any improper procedure. Pilots learn procedures for both normal and emergency situations.

Beyond the CPT is the MT and WST. The MT is really a miniature WST, dealing only with the mission commander's right seat. It complements the WST.

Colonel Imondi said the B-2 is easy to fly. Maj. Richard Vanderburgh, currently undergoing instructor pilot (IP) qualification training and simulator training, agreed. "It's very well engineered. . . . It's a pilot's dream," he said, adding that "your intense work load comes from the avionics, and the WST has virtually the same software as the airplane, so the crew gets extremely high fidelity on the avionics." Major Vanderburgh has logged thousands of hours on the B-52.

The WST's combination of hydraulically activated motion and high-fidelity images gives pilots something approaching the actual feeling of flight. Air pumps jolt each seat to simulate turbulence or even a rough landing. The WST compartment exactly duplicates the B-2 cockpit.

The pilot in the left seat is responsible for the actual flight of the aircraft, and he monitors all the parameters of the aircraft. The right-seater is responsible for carrying out the military mission. He handles navigation and bombing duties, as well as some piloting.

That division of labor is key. Early in the program, the Air Force considered the merits of a crew consisting of one pilot and one Weapon System Officer. After some internal debate, it was decided that two pilots would be needed. Either mission can be performed from either seat.

Each station has four multifunctional color displays. "Bezzle buttons" surround each screen. By pushing these buttons, pilots are able to call up "pages" of information on almost any system in the aircraft.

"There are not a lot of little sensor heads and knobs associated with turning on systems," Major Vanderburgh said. "Everything is done electronically through the computers. We do a lot of actuating with the bezzle buttons and the multipurpose display units. We also have . . . a data entry panel."

To the right of the mission commander is the mission recorder, where a tape with the mission data is loaded into the aircraft's computers. The B-2 may be retasked while in flight. New mission data can be loaded into the system through the data entry panel.

Blended surfaces characterize the huge flying wing. Nearly as great in wingspan as the B-52, the B-2 is slightly longer than the F-15. With its lack of tail and widely spaced landing gear, the B-2 represents a new era in aircraft design.

Elation and Fatigue

Maj. Steve Tippets, another officer in the B-2 IP course, said, "You come out of a simulator mission, after three or four hours, and you really feel as if you've flown the aircraft. You feel the same elation and fatigue, depending on how difficult the flying is." Major Tippets has logged more than 1,000 hours in F-16s.

This view of the B-2 accelerating down the runway illustrates some of its design complexity. Its trailing-edge control surfaces make up about fifteen percent of total wing surface. Note the huge nose gear and main landing gear door.

As the pilots fly simulator missions, they are thoroughly monitored by instructors in another room, who see everything the pilots see. Every action, every button pushed is electronically recorded and stored, so that pilots can study their missions line by line. The information is kept in each pilot's training file so that his progress can be monitored.

These data are important for validating the trainer system. The training syllabus and software are constantly being revised and upgraded, prompting the Air Force to seek experienced pilots for the course at this stage of the program. If problems occur and pilots fail to grasp certain information, chances are the fault lies with the training system, which can quickly be corrected.

Having the same software in the WST as in the B-2 allows pilots to rehearse missions before actually flying the aircraft. Lt. Col. Walter Denne, operations and training director of the B-2 Site Activation Task Force, said, "We can take mission data and we can put it through a mission generation system and actually plug the mission into the simulator. So when a crew comes in to fly the simulator, they'll actually be flying the real mission as planned for the next day. And mission rehearsal is where we pick up an awful lot of invaluable training because we can simulate hostile territory. . . . We can simulate threats with the best

The B-2 takes off, showing the variation in camber of the leading edges. After extensive and realistic simulator and classroom work, pilots are expected to "know everything about the aircraft," says B-2 IP Lt. Col. Tony Imondi.

Colonel Fraser said that tactics are still being developed and defined. "We have an aircraft that is very capable, that has a lot of features built into it. Now it is incumbent upon us to train and develop the best employment tactics for the aircraft."

The B-2 can sense active threats and avoid them. According to the Air Force, the B-2 is not necessarily invisible to radar. However, air defense radars must do more than merely detect a B-2 if anyone seeks to destroy the airplane. The enemy must make enough consecutive detections to establish a track, then track the B-2 for some distance, and finally guide a missile to it.

An air-to-air missile would have similar problems because it must acquire, track, and fuze properly as it closes on the B-2. No known system can make it through all those gates.

Experts say that some very-high-powered, landbased, long-range early warning radars, with the right power and wavelengths, can in fact detect the B-2—but without any degree of precision. This imprecision disrupts the defense process. Air defense fighters must search an area so vast that their fire-control radars are unlikely to detect a B-2. Big, fixed, and stationary radars are vulnerable to such defensive tactics as flying under or circumventing their coverage.

B-2 pilots know which parts of the aircraft are most "detectable,"

available data. The reason you have two pilots in here is because things rarely go as planned."

If the bomber itself displays system problems, technicians can use the simulator to check it out. "We've already had maintenance guys go to the simulator and do what we did in the airplane to try and find what the problem was because the simulator flies our airplane's software," Colonel Imondi said. "We put the same data into there. I've told them what happened in the airplane, and, I'll be darned, right there in [the simulator] session it happened."

The training program lasts about six months, with the first three months spent in the classroom and simulators. During the last three months, pilots focus on flying. However, once the six months have passed, the pilots start all over again. This cycle will be repeated indefinitely.

"Just Be Quiet"

Much has been written about B-2 tactics. B-2 operators contend that they are still trying to get a handle on how the bomber will be used, but some things are obvious.

"Our main tactic is to be quiet," Colonel Imondi said. "Just be quiet [and] manage our LO, which covers every spectrum—acoustic, [infrared], and radar. All those things are tied together. Everything we do is low-power. If we have to, we can go in and go out without doing anything external to the airplane, depending on how the systems are operating. . . . We can go out and pinpoint things with our radar and other equipment without being detected, so the whole airplane is balanced."

The B-2 is most detectable when the bomb bay doors are open, but that time is negligible, Colonel Imondi said. "The doors are open three to five seconds. There is no way they're going to lock us up and shoot us down in three to five seconds. The endgame takes a whole lot longer than that. That's the whole paradigm of stealth. It's not that they can't see you. . . . They can't get you."

which radars are most effective, where the emitters are, and which position most greatly reduces the radar's effectiveness. Countermeasures are expected to improve. Thus, the Air Force argues, the B-2 will be a potent, survivable platform for many decades.

Sometimes Simpler

Maintaining such a revolutionary air vehicle requires unique methods of care on the ground.

The B-2 may be complex, but its maintenance in some ways is easier and more efficient than that of older systems. For example, Sergeant Price said that in the old days he spent long hours diagnosing B-52 problems. "Now this airplane spits out a reference designated indicator and it tell us what's wrong with it," he said.

"Each component on the airplane that is electrical or mechanical has an RDI assigned to it. Once the part fails, it's hot-wired and sent right to the flight-control computer on the airplane, which gives us a readout on the maintenance printer, and that tells us what's wrong. The flight-control computer diagnoses its own problems. The airplane senses every little glitch, and it goes through all its memory banks, and it talks to itself. Sometimes it will correct itself in flight. It may just reset itself."

Diagnosing a problem quickly means that the bomber can be turned around in less time and with fewer man-hours. If a problem occurs in flight, the aircraft "tells" the pilot about it.

From the front, the B-2 has an otherworldly appearance. Here, the crew disembarks from the aircraft for an extensive debrief while the ground crew prepares to tow the aircraft to its custom-built hangar.

One of the more challenging aspects of maintaining the B-2 is its composite materials. Unique methods have been developed to patch damage. Areas are specially prepared to accept a patch. Materials must be cured for certain periods of time at extremely high temperatures while hundreds of pounds of suction are applied to remove air bubbles that would ruin a patch. Some things can be patched on the aircraft; other repairs must be done at the shop.

Sometimes maintainers are thankful for little advances. For example, the B-2 has antilock brakes. Sensors detect when a brake is about to lock and automatically release pressure, which shifts the burden to other tires. This keeps tires from skidding and wearing out at a fast clip. Sergeant Price said that, so far, he has only had to replace two worn tires.

Under current plans, the first B-2 unit will not be fully operational until 1996 or 1997, though General Marcotte says that it could happen sooner. He noted that when the first B-2 arrived at Whiteman it was in "code one" status, meaning it could have been refueled and flown again right away. It flew a few days later and, again, it was code one. It had two minor write-ups on its third flight but still could have flown again.

"We're meeting and exceeding our expectations," General Marcotte said. "What we did different in the B-2 than in the B-1, for example, was we did more of the work up front, training our people, putting training systems on the base, putting Weapon Systems Trainers on the base. We were ready to maintain this airplane and ready to fly. If we continue to be successful and do our job like the first one, there is a potential that things would be operationally ready sooner." ■

Bomber pilots flying in fighters are just another indication of ACC's blending of bomber and fighter cultures. B-2 pilots fly T-38s as chase planes for B-2 training flights, thus keeping current as they wait for nineteen more B-2s.

Some intelligence comes from space, but the CIA also works the world's back alleys with agents who would be out of place at your local PTA meeting.

Mr. Woolsey's Neighborhood

By James W. Canan, Senior Editor

THE END of the Cold War and the breakup of the Soviet Union made life more difficult for the Central Intelligence Agency in many ways. The intelligence mission became more complex and, in some respects, more demanding. The price of failure did not go down.

The USSR was an enigma—but an old, familiar one. Moscow and its minions tended to behave by the numbers, and the CIA generally knew what to look for and how and where.

The world scene is murkier and maybe even nastier now, marked by ethnic, national, religious, and regional strife and by rogue nations and terrorist groups bent on big trouble for the US and its allies. The restive nations of the former Soviet Union, some with nukes, still bear close watching. Former Soviet client states in the Middle East and elsewhere are on the loose and lethal.

R. James Woolsey, Director of Central Intelligence, notes that the intelligence community operates today "in a jungle full of poisonous and camouflaged snakes" and that "the snakes are harder to keep track of, in a lot of ways, than the [Soviet] dragon was."

"The Soviet Union did a lot of things in relatively regular ways," the DCI told a congressional committee. "It deployed new ICBMs the same way. It tested new systems the same way. It even infiltrated groups in the Third World the same way. There is nowhere near that degree of predictability with respect to countries such as North Korea, Iran, Iraq, Libya, and so on."

Mr. Woolsey emphasized that the potential threat to the US posed by Russia cannot be dismissed. He called it "the inheritor" of the Soviet Union's nuclear strength and said that it presents, "in many respects, a more demanding problem for intelligence than existed before."

CIA stations around the world reflect the changing nature of the agency's tasks. Throughout the Cold War, those stations concentrated their resources on monitoring local political developments, with an eye for signs of Soviet infiltration and influence. They no longer bother much with that. Instead, they are on the lookout for signs of national and transnational trafficking in terrorism, narcotics, and weapons of mass destruction.

The CIA is responsible for tracking such traffic and for keeping the National Security Council and the President informed on the state of play in the terrorism and weapons-proliferation arenas. The whole idea is to make sure that renegade nations and organizations never get into position to use the chemical, biological, and nuclear weapons that could change the world at the drop of a bomb.

High Stakes

The stakes could not be higher. One lapse of intelligence could lead to disaster at home. Terrorism has already come to the US, probably to stay.

"I am very concerned about the potential lash-up between terrorism and weapons of mass destruction," Mr. Woolsey asserted in an interview with AIR FORCE Magazine recently. He referred to the World Trade Center bombing in February 1993 as "a wake-up call for everybody—a very troubling event," one that would have been much worse if "some nasty chemicals had been wrapped around [the bomb]."

The CIA is responsible for staking out and, if possible, interdicting terrorists overseas. The Federal Bureau of Investigation is responsible for doing the same in the US. The CIA and the FBI have "a very close relationship" in counterterrorism, Mr. Woolsey said.

They can ill afford to get their signals crossed. The CIA must be careful to defer to the FBI as soon as terrorists set foot in the US. The CIA is forbidden by law from operating in the US. The agency came under heavy fire from Congress in the mid-1970s for having done so. CIA officers would also risk being summoned to testify in court and perhaps be forced to compromise the agency's jealous protection of "sources and methods."

As 1994 began, the CIA had no evidence of any terrorist organization's having acquired nuclear, biological, or chemical weapons. This is always possible. The most worrisome terrorist organizations are the ones affiliated with or based in nations intent on possessing such weapons.

At the moment, terrorists are considered more likely to use chemical and biological weapons than to use nuclear weapons. It will be some time before nuclear weapons can be sized as satchel charges but probably not forever, intelligence sources say.

Two to Watch

North Korea and Iran stand out on the CIA's list of nations that are up to no good. The agency keeps close watch on North Korea's nuclear weapons development program and on its efforts to export ballistic missiles around the world. Iran is a prime North Korea customer. It appears that the Iranian nuclear program is meant to produce nuclear weapons as well as atomic energy for industrial power.

The CIA has China pegged as Iran's chief supplier of nuclear technology. Iran has purchased from China an electromagnetic isotope separation unit for uranium enrichment and a research-model nuclear reactor.

These days, the CIA also assigns high priority to gathering intelligence on the traffic in illegal narcotics and to stanching its flow.

It is more difficult for the CIA to develop sources inside terrorist organizations and narcotics cartels than inside totalitarian states. "If you're in one of those groups, it's because you want to be, not because you're trapped in a totalitarian system," Mr. Woolsey told AIR FORCE Magazine. "So penetrating organizations of that sort is a difficult and dangerous business."

The DCI expanded on this in congressional testimony, asserting, "We're in the business of stealing secrets from people who can harm American interests. Some of our agents—our informants—would thus be a bit out of place at, say, your local PTA meeting.

"From time to time we will find that an individual we have recruited will betray us, for example, during operations to interdict the flow of drugs into this country or to infiltrate a terrorist network.

"That is regrettable, but [betrayal] and physical dangers are the prices our officers pay for frequenting the world's back alleys in order to recruit people who can help us learn about serious threats to American interests."

The CIA's approach is comparable to that of "the FBI recruiting informants in the Mafia," he said.

The CIA's spy satellites, sources of imagery intelligence (imint), may be of little use in tracking terrorists but are a big help in keeping track of weapons proliferation around the world.

Mr. Woolsey explained, "Gathering intelligence on closed societies involved in proliferation is a form of combined puzzle solving, using imagery, sigint [signals intelligence], and humint [human intelligence]. You never know which one will tip another one off. Spies tip off satellites, and satellites tip off spies."

Much of the action at CIA headquarters in Langley, Va., a Washington suburb, takes place in three so-called "community centers": the counterterrorism center, the counternarcotics center, and the nonproliferation center. At their disposal are the combined human and technical resources of the entire US intelligence community, including the FBI, the National Security Agency, the Defense Intelligence Agency, and the State Department.

In a speech before the Chicago Executive Club not long ago, Mr. Woolsey declared that "the intelligence task [in counterproliferation] is daunting. We must decipher an intricate web of suppliers and end users. We must distinguish between legitimate and illicit purposes, particularly for technology that can be used in several different ways, and we must help to interdict the flow of material, technology, and know-how."

The nonproliferation center is now being expanded.

Early this year, Mr. Woolsey testified on Capitol Hill to a string of CIA successes, both in detecting the flow of technology for mass destruction weapons and in arranging for foreign authorities to interdict it, in many parts of the world.

A Changing Relationship

The centers at CIA headquarters symbolize the restructuring of US intelligence in the post–Cold War era. So do changes in the CIA's relationship with the military.

"With smaller military forces, it's very important that the intelligence be not only good but excellent," Mr. Woolsey declared in a recent television interview. "Intelligence is a substantial multiplier of military force, and it so proved during the Persian Gulf War."

That war also exposed some intelligence shortcomings. It demonstrated the need for closer cooperation between the CIA and the military in combat.

As a result, said Mr. Woolsey, the CIA forged "a formal agreement with the Pentagon, spelling out for all players the precise roles of CIA officers and other intelligence specialists who are assigned to support the two-star or three-star [military] officers in charge of military operations in combat theaters."

The CIA station chief in a combat theater is in charge of all humint operations there. Military humint organizations and operatives report to the CIA chief, who reports to the military commander. CIA headquarters keeps posted on the station chief's activities but tries to stay out of his hair. This arrangement takes effect wherever and whenever US forces assemble for combat.

In sharp departure from CIA custom, a uniformed general officer now holds a high-ranking leadership post in the agency. Army Maj. Gen. Roland Lajoie is associate deputy director of Operations in the CIA Directorate of Operations (DO), at the right hand of Ted Price, the CIA's deputy director for Operations (DDO).

Other CIA directorates are those for administration, science and technology, and intelligence, which is the analysis side of the house. DO, once an exclusively civilian domain, deals in human and technical intelligence and is the espionage side.

General Lajoie is responsible for all CIA activities relating to, or involving, military humint. He is supposed to see to it that CIA station chiefs serve the needs of military commanders and that CIA and military humint activities harmonize at the scenes of action.

The DO military slot was created in 1992 by Robert Gates, who preceded Mr. Woolsey as DCI. Its occupant, appointed by the Chairman of the Joint Chiefs of Staff in consultation with the DCI and the DDO, can be drawn from any of the armed services.

Ragged Work in Somalia?

The CIA has been criticized for its allegedly ragged performance on the ground in Somalia. Some critics hold the agency partly responsible for the inability of US forces to locate and capture Somali warlord Mohamed Farah Aideed and for incurring heavy losses under fire while seeking him out.

Mr. Woolsey makes no apology for CIA operations in Somalia, indicating that they may have been more successful than the agency can acknowledge. In a TV interview, he noted that "the United States was not officially in Somalia for some years" and that US intelligence operatives, on arrival, were short of time to "understand the clan relationships and a whole range of things."

"I think any police chief will tell you that, even if you are the authority in a city, trying to trail an individual is a major and very difficult undertaking," said the DCI. "It's considerably more difficult when one is an outsider. . . . That's not normally the kind of thing that intelligence desires to do."

Mr. Woolsey let it go at that, but other sources claim that the CIA did better than is generally known in locating Mr. Aideed and that the agency's pathfinder teams did a fine job in the Somali countryside, reconnoitering towns and villages ahead of advancing US forces.

The CIA and the Pentagon have also joined forces to speed the flow of imagery intelligence from satellites to foxholes and cockpits. In the Gulf War, images of terrestrial surroundings as seen from space often reached combat units on land, at sea, and in the air too late to be useful. The war showed that "we need to do a much better job of imagery dissemination to the tactical commanders," Mr. Woolsey told Air Force Magazine.

At the urging of Congress, the Defense Department established the Central Imagery Office in 1992 at the Pentagon. The CIO's overarching task, under CIA guidance, is to do for imint what the NSA long ago did for sigint: design and build a standard architecture—methods and equipment—for distributing images from military command headquarters to combat forces in the air, on the ground, and at sea.

Satellite images reached US Central Command headquarters in Riyadh, Saudi Arabia, quickly enough during the Gulf War. Relaying them to the troops was the problem. In many instances, commanders had to resort to delivery by hand. In some instances, couriers stowed copies of satellite imagery in briefcases and ferried them to the scenes of action in light propeller-driven airplanes.

This was not the case with signals intelligence collected in space. Sigint reached the troops on time because the National Security Agency, steward of sigint, had long since set up an architecture for its dissemination throughout the services. All use the same sigint receivers and other equipment, as specified in NSA's "combined cryptologic program" for its military customers.

Still Deliberating

The jury is out on the CIO. It lacks NSA's clout in the intelligence community and in military circles. The betting is that the CIO will prevail only if the CIA and the Defense Department are steadfast in supporting it at the top. The key players in this are the DCI, who runs the National Foreign Intelligence Program (NFIP), and the deputy secretary of Defense, who directs Tactical Intelligence and Related Activities (TIARA).

NFIP and TIARA, encompassing all human and technical intelligence, come together in the CIO. They overlap much more than they did during the Cold War, when so-called "national assets" served global, strategic purposes and were seldom related to tactical operations, let alone counterterrorism.

The CIA and DoD are also partners in the National Reconnaissance Office. The NRO, ordinarily under the direction of an Air Force civilian official, controls the acquisition and operation of all spaceborne intelligence systems and some airborne systems.

In the past, the NRO was divided into a CIA directorate, an Air Force directorate, and a Navy directorate. They have been renamed, reorganized, and reoriented. The NRO now consists of directorates for imagery, signals intelligence, and ocean-monitoring.

The existence of the NRO was an official secret for many years. Its name and overall mission were made public in 1992, but nothing more. Mr. Woolsey's connection with it goes back a long way.

He first set foot in the NRO twenty-seven years ago as an Army lieutenant, analyzing imagery captured by the cameras of satellites

and drone airplanes. Two years ago, DCI Gates appointed Mr. Woolsey, then practicing law in Washington, to chair a panel to study the NRO with an eye to its reorganization. The panel's recommendations are now in effect.

Mr. Woolsey has been involved with military and intelligence issues throughout his career in various government posts and, in private life, on numerous governmental advisory panels. A graduate of Yale Law School and a Rhodes scholar, he was an aide to Ambassador Paul Nitze, head of the US delegation to the Strategic Arms Limitation Treaty (SALT I) talks, in the late 1960s, and then served as general counsel of the Senate Armed Services Committee in the early 1970s.

In the Carter Administration, Mr. Woolsey was under secretary of the Navy and, as such, the overseer of naval intelligence. In the 1980s, while practicing law, Mr. Woolsey served on several blue-ribbon defense advisory commissions for the Reagan and Bush Administrations. He was US ambassador to the Conventional Forces in Europe talks in 1989–91.

"Really First-Rate"

Mr. Woolsey testified on Capitol Hill that he had been "a very satisfied consumer of [US] intelligence" through the years and that the CIA's "analysis of and understanding of the military hardware and military developments of the Soviet Union were really first-rate, . . . both in strategic weapons and in conventional weapons." The CIA was less proficient at divining economic trends in the Soviet Union, but this, all things considered, was understandable, he said.

Mr. Woolsey is the sixteenth DCI in forty-six years. Under law, the DCI serves as the principal advisor to the President and the NSC on all matters of foreign intelligence.

The National Security Act of 1947 created the CIA and assigned it responsibility for coordinating the nation's intelligence activities and for correlating, evaluating, and disseminating intelligence affecting national security. The law made the CIA director and the DCI one and the same.

Two years later, Congress gave the CIA statutory authority for budget secrecy. The Central Intelligence Agency Act of 1949 authorized the CIA to keep fiscal and administrative procedures confidential and to disperse and disguise its funds in the budgets of other government departments and agencies.

The 1949 law also exempted the CIA from disclosing its "organization, functions, names, officials, titles, salaries, or numbers of personnel employed."

Mr. Woolsey, like every previous DCI, vigorously opposes moves in Congress and elsewhere to unmask the intelligence budget and, thus, to make the CIA more accountable to Congress and the public. He argues that budget numbers, even the bottom-line number alone, are clues to intelligence priorities and operations.

The word gets around, though. Unofficial sources peg the total US intelligence budget at roughly $29 billion a year. Like the defense budget, the intelligence budget is a tempting target for budget cutters because it falls into the category of "discretionary"—as opposed to "mandatory"—spending.

Rep. Dan Glickman (D-Kan.), chairman of the House Select Committee on Intelligence, noted in a January meeting with reporters that the Administration's intelligence budget suffered "very significant cuts" in Congress last year. The House intelligence appropriations bill was "over a billion dollars below the Woolsey request," he said.

Mr. Glickman acknowledged that the intelligence mission is no less difficult than it was during the Cold War but that intelligence budgets are caught in a fiscal vise.

"We did what we had to do—fund intelligence within budget realities," the intelligence committee chairman said. He predicted that the intelligence budget "is going to fall some" again this year. "We can't spend more money. We just don't have it," he declared.

Mr. Glickman said that the DCI hopes to be spared big cuts in the intelligence budget for Fiscal 1995, now before Congress, because he "took a lot of big cuts" in the current budget.

President Clinton promised during his campaign for the White House that he would cut the Bush Administration's intelligence budget projections by $7 billion over five years. Congress seems intent on outdoing him.

Insiders say Mr. Woolsey will fight to hold the line against cuts deeper than those now in the works for the intelligence budget and for intelligence personnel, said to number about 20,000.

The intelligence community has been downsizing right along. As planned, it will have lost by the end of this decade one-fourth the number of civilians and one-third the number of military personnel that it had in 1991.

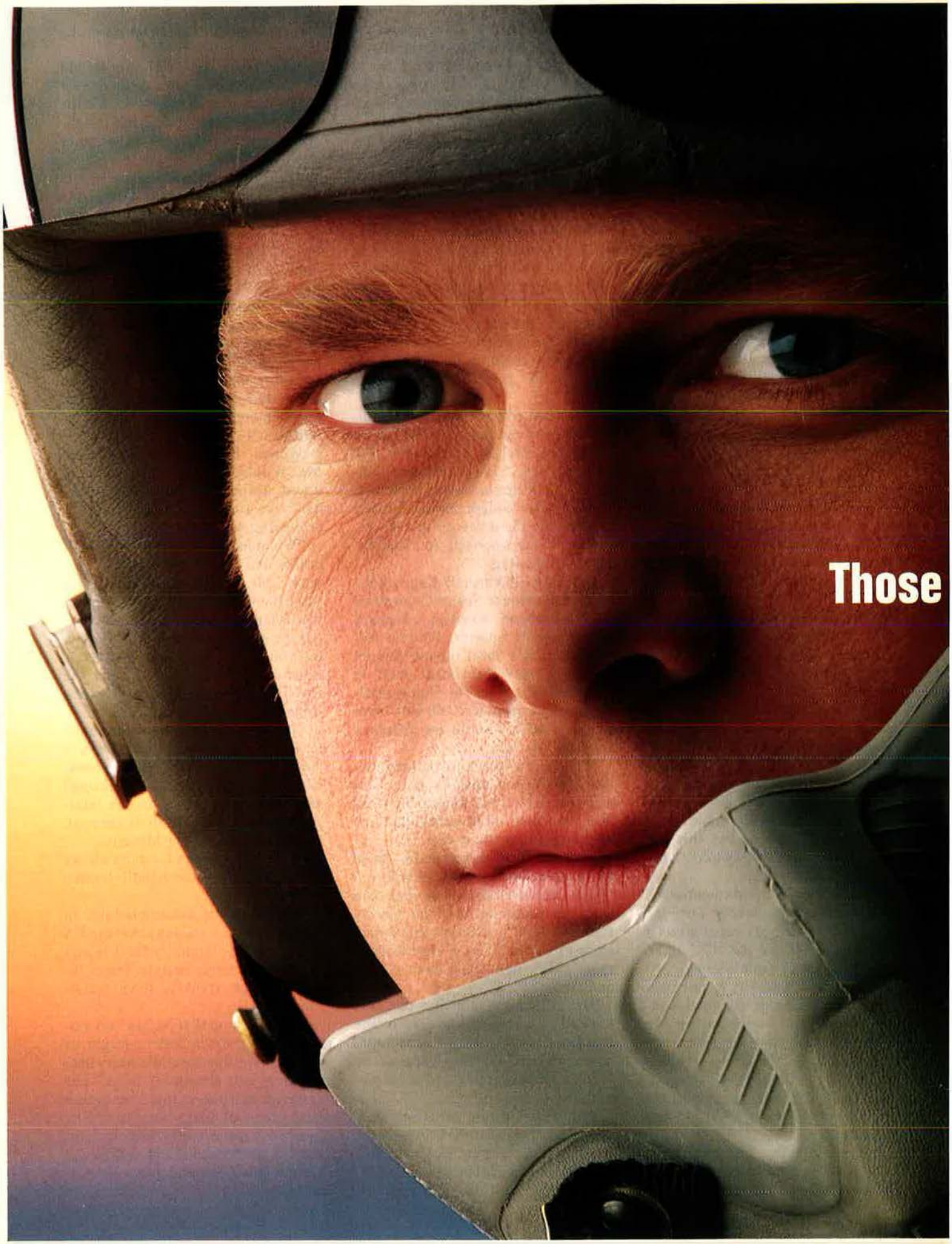
Mr. Glickman served notice early this year that the House Intelligence Committee will take a hard look at, among other things, "how much we're spending and what we're doing on counterterrorism, on counternarcotics, on counterproliferation." The committee will also scrutinize satellite programs. Its chairman noted that Mr. Woolsey "has talked publicly about doing some consolidation" of "very expensive" intelligence-collecting satellites.

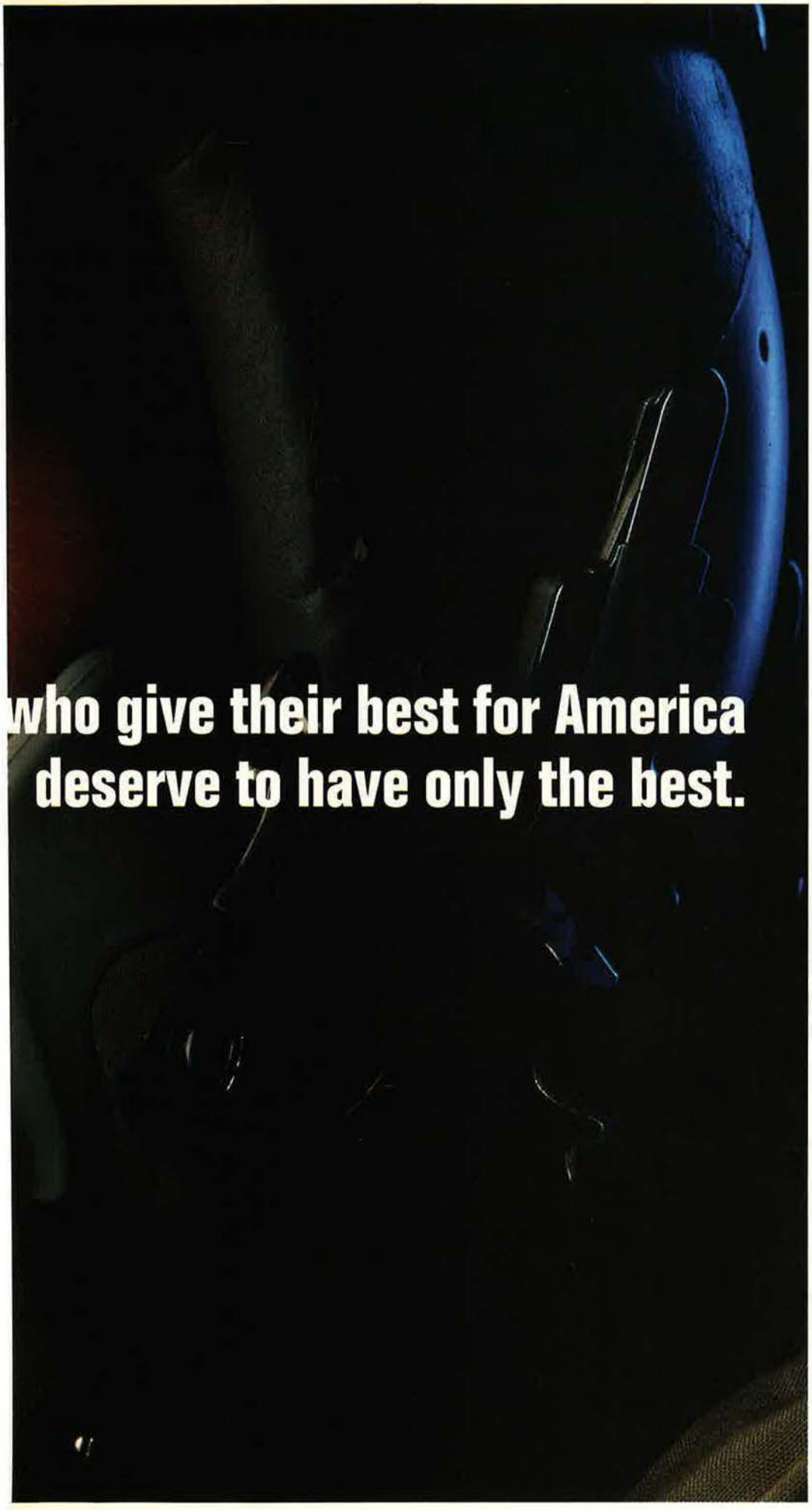
"We must make sure that we modernize and update our satellite systems," Mr. Glickman declared. "But you cannot monitor the intentions of a world leader through a satellite. . . . All the sensors in the world will not tell you what's in Saddam Hussein's mind or how likely it is that the Russian people will move toward a right-wing kind of operation."

The intelligence committee chairman also said there has been a "tendency" in the intelligence community to "underfocus on [having] well-trained, capable, human intelligence around the world. In the past, it was all focused on Moscow. . . . Now we have to be a lot more clever in terms of how we handle human intelligence."

Mr. Woolsey acknowledged in congressional testimony that the US intelligence community faces leaner years with "fewer people, fewer facilities, and, frankly, fewer satellites."

The DCI said that he has "no ambitions to preside over a larger or grander intelligence community than the taxpayers absolutely need." His concern, he said, is that "we do not miss some of these very troubling trends [in the world] for lack of resources and because the [intelligence] budget has been cut more than is reasonable." ■


Those



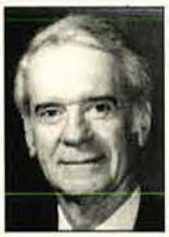
PRATT & WHITNEY
FOR JPATS

UNITED
TECHNOLOGIES
PRATT & WHITNEY

The Congressional Defense Establishment

Democrats

Ronald V. Dellums
Chairman
California



G.V. "Sonny" Montgomery
Mississippi

Patricia Schroeder
Colorado

Earl Hutto
Florida

Ike Skelton
Missouri

Dave McCurdy
Oklahoma

Marilyn Lloyd
Tennessee

Norman Sisisky
Virginia

John M. Spratt, Jr.
South Carolina

Frank McCloskey
Indiana

Solomon P. Ortiz
Texas

George J. Hochbrueckner
New York

Owen B. Pickett
Virginia

H. Martin Lancaster
North Carolina

Lane Evans
Illinois

James H. Bilbray
Nevada

John Tanner
Tennessee

Glen Browder
Alabama

Gene Taylor
Mississippi

Neil Abercrombie
Hawaii

Thomas H. Andrews
Maine

Chet Edwards
Texas

Don Johnson
Georgia

Frank Tejeda
Texas

David Mann
Ohio

Bart Stupak
Michigan

Martin T. Meehan
Massachusetts

Robert A. Underwood
Guam

Jane Harman
California

Paul McHale
Pennsylvania

Tim Holden
Pennsylvania

Pete Geren
Texas

Elizabeth Furse
Oregon

Sam Farr
California

house

Armed Services Committee

Republicans

Floyd D. Spence
Ranking Minority Member
South Carolina

Bob Stump
Arizona

Duncan Hunter
California

John R. Kasich
Ohio

Herbert H. Bateman
Virginia

James V. Hansen
Utah

Curt Weldon
Pennsylvania

Jon Kyl
Arizona

Arthur Ravenel, Jr.
South Carolina

Robert K. Dornan
California

Joel Hefley
Colorado

Ronald K. Machtley
Rhode Island

Jim Saxton
New Jersey

Randy "Duke" Cunningham
California

James M. Inhofe
Oklahoma

Stephen E. Buyer
Indiana

Peter G. Torkildsen
Massachusetts

Tillie K. Fowler
Florida

John M. McHugh
New York

James M. Talent
Missouri

Terry Everett
Alabama

Roscoe G. Bartlett
Maryland

senate

Armed Services Committee

Democrats

Sam Nunn
Chairman
Georgia

J. James Exon
Nebraska

Carl Levin
Michigan

Edward M. Kennedy
Massachusetts

Jeff Bingaman
New Mexico

John Glenn
Ohio

Richard C. Shelby
Alabama

Robert C. Byrd
West Virginia

Bob Graham
Florida

Charles S. Robb
Virginia

Joseph I. Lieberman
Connecticut

Richard H. Bryan
Nevada

Republicans

Strom Thurmond
Ranking Minority Member
South Carolina

John Warner
Virginia

William S. Cohen
Maine

John McCain
Arizona

Trent Lott
Mississippi

Daniel R. Coats
Indiana

Bob Smith
New Hampshire

Dirk Kempthorne
Idaho

Lauch Faircloth
North Carolina

Kay Bailey Hutchison
Texas

house

Defense Appropriations Subcommittee

Democrats

John P. Murtha
Chairman
Pennsylvania

Norman D. Dicks
Vice Chairman
Washington

Charles N. Wilson
Texas

W. G. "Bill" Hefner
North Carolina

Martin O. Sabo
Minnesota

Julian C. Dixon
California

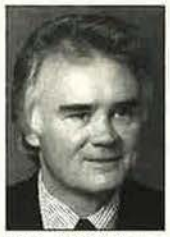
Peter J. Visclosky
Indiana

George "Buddy" Darden
Georgia

William H. Natcher
ex officio, Kentucky

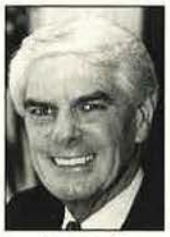
Republicans

Joseph M. McDade
Ranking Minority Member
Pennsylvania



C. W. "Bill" Young
Florida

Bob Livingston
Louisiana



Jerry Lewis
California

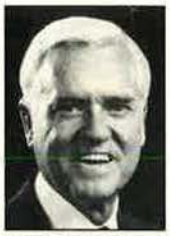
Joe Skeen
New Mexico

senate

Defense Appropriations Subcommittee

Democrats

Daniel K. Inouye
Chairman
Hawaii



Ernest F. "Fritz" Hollings
South Carolina

J. Bennett Johnston
Louisiana

Robert C. Byrd
West Virginia

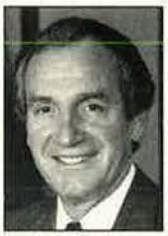
Patrick J. Leahy
Vermont

James R. Sasser
Tennessee

Dennis DeConcini
Arizona

Dale Bumpers
Arkansas

Frank R. Lautenberg
New Jersey



Tom Harkin
Iowa

Republicans

Ted Stevens
Ranking Minority Member
Alaska

Alfonse M. D'Amato
New York

Thad Cochran
Mississippi

Arlen Specter
Pennsylvania

Pete V. Domenici
New Mexico

Don Nickles
Oklahoma

Phil Gramm
Texas

Christopher "Kit" Bond
Missouri

Mark O. Hatfield
ex officio, Oregon

Verbatim

All in the Family

"Because of his work during the Carter Administration, Dr. Perry is known as the 'Father of Stealth.' If that's true, it's my job to make sure he keeps up his child-support payments."

Gen. Merrill A. McPeak, Air Force Chief of Staff, referring to Defense Secretary William J. Perry at an AFA symposium in Florida, February 18, 1994. Perry, DoD's top weapons official in 1977–81, initiated the F-117 fighter, the B-2 bomber, and other stealth projects.

More Peace in Our Time

"I have seen us adopt a policy of accommodation that borders on appeasement, which has had predictable results. In return for asking the North Koreans to comply with a treaty, which they signed, . . . we have offered them economic aid, we have offered to cancel the military exercises [that] have been an annual event for the last forty years, and we have also dangled other carrots. . . . The result has been . . . more and more intransigence on the part of the North Korean government . . . leading us closer and closer to a confrontation."

Sen. John McCain (R-Ariz.), in a February 2, 1994, Senate Armed Services Committee hearing on the nomination of William J. Perry to be Secretary of Defense.

Under the UN Flag?

"For operations under the United Nations, there ought to be some very strict conditions. [At issue are] the robustness of the chain of command under the UN, the specific rules of engagement, and whether they not only allow for the self-protection of the force but also are robust enough to allow you to get the job done. . . .

"I think we ought to make sure that we judge those things on a case-by-case basis. . . . I can well imagine that there will be United Nations operations . . . where we can all, with a great deal of confidence, say that the command and control arrangement is robust enough, the rules of engagement are proper. . . . There are other cases where I would obviously have to say no."

Gen. John Shalikashvili, Chairman of the Joint Chiefs of Staff, at a December 14, 1993, press conference explaining how to decide when US forces should participate in UN operations.

No Further Cuts

"Last year, I proposed a defense plan that maintains our post–Cold War security at a lower cost. This year, many people urged me to cut our defense spending further to pay for other government programs. I said no. The budget I send to Congress draws the line against further defense cuts. It protects the readiness and quality of our forces. Ultimately, the best strategy is to do that. We must not cut defense further."

President Bill Clinton, in a January 25, 1994, speech to Congress on the State of the Union.

Look Over Here

"We normally think of Russia as being a European power. However, in the Far East Military District, they have over 300,000 personnel and almost four times the number of airplanes that I do. And all of those are third and fourth generation. You wondered what happened to all those Soviet airplanes that came out of the eastern European countries. Most of them showed up in the Far East Military District."

Gen. Robert L. Rutherford, commander in chief, Pacific Air Forces, in February 17, 1994, remarks at an AFA symposium in Florida.

Wish I Had Been There

"It is very difficult to understand the [Persian] Gulf War unless you have some perspective on air and space operations, . . . which is not available to us. . . .

"I don't always find that [the Gulf War] receives the historical, honest perspective that it should. In fact, it tends to be a gold mine that people go to to extract particular points they want to make and then justify, based on that war. In fact, I go to briefing after briefing from my own space people who tell me how they won the Gulf War. . . . I sit there and smile and say, 'Thank you very much. I appreciate that.' "

Gen. Charles A. Horner, commander in chief, US Space Command, and commander of coalition air forces during Operation Desert Storm, in an October 1, 1993, presentation to the Royal United Services Institute for Defence Studies in Britain.

State's Top Priority

"Top priority for everybody are our commitments on population. . . . The world population is currently 5.5 billion. If we do nothing, [it] will double again some time in the next thirty-five to forty years. . . . [This] is unfathomable and clearly does not allow us . . . to maintain the quality of life or respect for the individuals that are fundamental to what we believe in the United States, nor would it allow us to maintain an environment with any integrity whatsoever or to conserve what many would call God's creation."

Tim Wirth, counselor for the Department of State, in January 11, 1994, remarks on the Administration's highest priority "global issues."

The World as Minefield

"[An] estimated 85 million land mines [are] scattered around the world as a result of [regional or civil] conflicts. Land mines now cause 150 casualties each week, or 7,800 yearly, almost exclusively among civilians. . . . Many of these conflicts have deliberately targeted civilian populations. . . .In Cambodia, for example, there have been 30,000 to 60,000 land mine casualties. . . . In Mozambique . . . more than 520 people are killed or maimed each year."

Department of Defense statement, December 21, 1993, outlining new international efforts to establish a moratorium on the export of land mines and to deal with those already in place. ■

The heavily laden B-52s took off in a hard rain for the world's longest combat mission. They carried a surprise weapon—the supersecret AGM-86C.

The Secret Squirrels

By John Tirpak

A HARD rain was falling as seven B-52Gs of the 596th Bomb Squadron, 2d Bomb Wing, their last bad fuses replaced and their radios coaxed into operation, lumbered out onto the runway of Barksdale AFB, La. With each plane groaning at a gross weight of 244 tons—the heaviest that most of the pilots had ever flown—they needed more than 9,000 feet of runway to get airborne.

Once aloft, the big twenty-eight-year-old bombers, loaded with weapons never before tested in combat, turned toward the gray dawn and began their task. Time to launch point: 14.5 hours. It was the early morning of January 16, 1991, local time, and Operation Desert Storm had begun.

The fifty-seven aviators aboard the seven planes were on a historic though highly secret mission. When it was over, they would have flown more than 14,000 miles and for more than thirty-five hours without landing—the longest combat sortie ever. It would mark the premiere of a new weapon in USAF's arsenal and redefine the practical reach of US airpower.

The BUFFs were carrying a "black" weapon, developed under strict secrecy four years before. The crews called it "Secret Squirrel," after a cartoon character, but it was officially designated the AGM-86C conventional air-launched cruise missile (CALCM).

Created in the wake of Operation Eldorado Canyon—the April 1986 raid on Libyan military facilities and terrorist training camps—the CALCM was intended to solve problems experienced in that action. The Libya raid had succeeded in retaliating for terrorist attacks on Americans in Europe and deterring further terrorist action for several years. However, it had taken time to mount, involving dozens of planes, aircraft carriers, and air refueling tankers. When it was over, an F-111 and its crew had been lost, and some errant bombs had injured or killed civilians.

Top Pentagon leaders wanted to do better. They directed the Air Force to find a way to hit targets surgically, without endangering the "shooters" and with enough precision to ensure that innocent bystanders wouldn't be hurt.

As a start, the Air Force chose its only standoff weapon—the AGM-86B nuclear-armed cruise missile—and, within three months of the Libya raid, development of a conventional version was under way.

Unprecedented Accuracy

Boeing, which originally built the air-launched cruise missile (ALCM), was rehired to alter a number of the missiles for $380,000 apiece. Technicians removed the ALCMs' W80 nuclear warheads along with the terrain contour matching guidance sys-

tems. They were replaced, respectively, with 1,000-pound conventional blast fragmentation warheads—with the effect of a 2,000-pound bomb—and Global Positioning System (GPS) satellite receivers, which promised unprecedented accuracy.

Secrecy was vital for several reasons. The Air Force wanted the CALCMs to be a complete surprise if they were ever employed. Also, externally, the AGM-86Cs were almost indistinguishable from their nuclear counterparts and might, if revealed, derail or at least complicate pending arms control agreements with the USSR. Lastly, only a few GPS satellites were in operation in the late 1980s, and an enemy, knowing when the satellites would be in position, might also know when to expect the missiles and thus when to prepare for them.

Flight testing began in August 1987, and a year later the CALCM was declared operational. More than three dozen were put into storage igloos at Barksdale, where they waited for three years.

When Iraqi forces rolled into Kuwait on August 2, 1990, US forces in the region were few and certainly not up to the task of repelling an invasion of Saudi Arabia.

The CALCMs were unsheathed. "We stood them up on alert because we were trying to give the national command authorities some options," recalled Lt. Gen. Buster C. Glosson, one of the Persian Gulf air war's chief architects and targeters.

Air Force leaders advised the National Security Council that CALCMs were available to send against Iraq's command, control, and communications nodes, its electrical grid, and other high-value targets, all within a day's flying time.

"We wanted to give them a capability, even though admittedly it was limited," General Glosson said, "because at that point in time there weren't that many other options available for any action the President might have wanted to take."

Because of the limited number of CALCMs, and the inability to follow through immediately with a wider air campaign, the weapon chiefly offered a chance to make "a political statement" rather than deal a crippling blow, General Glosson said.

Lt. Col. Jay Beard, commander of the 596th Bomb Squadron, was ordered to get ready. Access to the CALCM had been kept "to an absolute minimum," Colonel Beard said. Only one crew—which had flight-tested the weapon—was available to operate it. More would be needed to carry out the kind of strike Strategic Air Command had offered the White House.

In just a few weeks, fifteen crews were introduced to the "Secret Squirrel," a moniker picked because "we couldn't say the real code name ["Senior Surprise"] out loud, and it had the same initials," noted Maj. Steve Hess, chief weapon system officer for the unit.

On a Short String

The B-52Gs were loaded with CALCMs and fully fueled, and their crews were kept "on a very short string," Colonel Beard said. New mission planning "tapes" with updated targets arrived from SAC headquarters at Offutt AFB, Neb., sometimes as often as three times a week.

Colonel Beard began to get calls about oddly loaded bombers on the alert pad. B-52s configured for the SIOP (Single Integrated Operational

Plan, or nuclear war) usually carried a full load of ALCMs—six under each wing—but the CALCMs were loaded asymmetrically: three under one wing, four under the other. "I told them we were practicing [sortie] generation," he said, but the curious kept calling.

His crews were being taxed to their limits. For months, they continued to stand "Alpha," or SIOP alert, in addition to being ready for a strike on Iraq, which Colonel Beard dubbed "Sierra" alert. "They were pulling double duty," he said, and it was wearing them down.

Time passed, and Iraq did not press on into Saudi Arabia. Plans changed, and theater aircraft became available.

"Very quickly after the beginning of Desert Shield, we had force in place" that could stop "any further Iraqi move down the road toward Riyadh," said Gen. Merrill A. McPeak, the Air Force Chief of Staff. "In fact, by about the middle of September, in six weeks or so," the Air Force was ready to take the offensive, he asserted. President Bush had decided to "more or less double the size of the ground component . . . so we had to wait until January" for an orchestrated ground, naval, and air attack.

Since a broad spectrum of airpower was now in the theater, the need to use the CALCMs for a first strike had subsided.

"There was some early exposure," General McPeak admitted. "If Saddam Hussein had continued immediately in the direction of Riyadh, we could have had a problem on our hands. But . . . after about the first week, our vulnerability was closed." Any further advance on Saudi Arabia would have been stopped, and "we wouldn't have needed the long-range kind of strike" the CALCMs offered.

The 596th remained on alert. It was getting tougher, because many of the B-52 crews were moving to forward bases in Spain and Diego Garcia, whence they would mount a heavy bombing campaign.

"We were stretched very, very thin," Colonel Beard observed.

Filling the Gap

As General Glosson planned the air campaign, he was determined to "keep the intensity level of attacks fairly high" in the opening hours, to keep the pressure on Iraqi defenses, but a gap began to emerge in that part of the plan following the initial strikes, during which Iraq might gain a respite while coalition aircraft recovered at their bases. It was a gap that the CALCM could fill "quite nicely," General McPeak said.

Launched at precisely the right moment, the CALCMs could avoid aircraft leaving Iraq and arrive over their targets at midmorning, destroying or damaging infrastructure targets and further degrading air defenses.

Eight targets, including powerplants at Mosul and a telephone exchange in Basra, were picked for CALCM attack. Iraq's electrical grid and communications nodes were "soft targets," General Glosson explained—ones not needing special penetrating bombs—and so CALCMs were ideal to use against them.

Colonel Beard had received the "go" order at midnight on January 16. By 3:00 a.m. he had called all members of his hand-picked crews. For many arriving in the "vault" for their final brief, it hit home for the first time that they were really going to war, "that those planes out there were cocked and loaded with real live bombs," Colonel Beard said.

Colonel Beard was asked for a last-minute favor: help with making out wills, which a few of the men had, for some reason, neglected to prepare.

"I had to get the base JAG [Judge Advocate General] out of bed," he recalled. "I had a lieutenant colonel in the alert facility . . . doing wills at 3:00 in the morning."

Colonel Beard didn't mind, though; there were few other favors he could do for his men. To maintain a "low operational signature . . . I couldn't bring them into the chow hall and give them a warm meal" or even extra box lunches because it would tip off the kitchen.

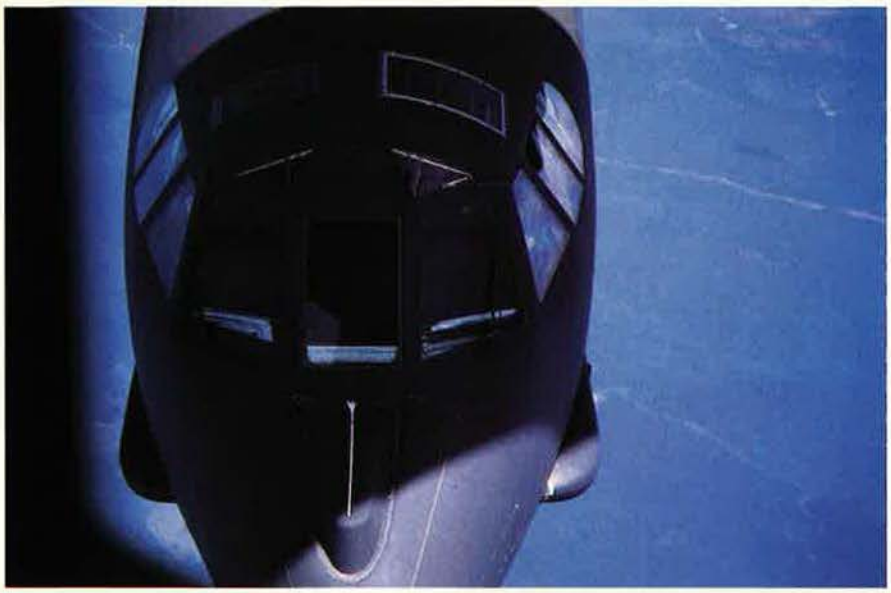
He had prepositioned some "meals, fit-for-flight"—low-residue, low-gas cousins of the infamous meal, ready-to-eat—aboard the aircraft, as well as five-gallon jugs of water and some "jugs of tepid coffee." In addition, he had instructor seats removed and put in air mattresses and sleeping bags—one "upstairs" and one "downstairs."

The normal crew of six men was augmented with one extra pilot and one extra radar navigator so some could rest en route.

After the flight briefing, Lt. Gen. Ellie G. "Buck" Shuler, Jr., 8th Air Force commander, addressed the crews, likening their mission to that of the Doolittle Raiders nearly fifty years before. "After that, we were really pumped up," Colonel Beard said.

Over the Atlantic, the seven bombers headed toward their first aerial refueling rendezvous, somewhere near the Azores. Colonel Beard, in the lead plane, "Doom 31," called the aircraft commanders on secure frequencies to check in. He quickly

Virtually indistinguishable from its nuclear-armed counterpart, the AGM-86C instead carried a 1,000-pound conventional blast fragmentation warhead, which struck with the effectiveness of a 2,000-pound bomb.



Foul weather and hung missiles impeded the mission, forcing unscheduled refueling sorties to enable the B-52s to complete the 14,000-mile, thirty-five-hour trip from Barksdale AFB, La., to Saudi Arabia and back.

got an audio thumbs-up from five of the six other planes but not from "Doom 34."

Silence From Doom 34

"We're working something right now, and we'll get back to you," Capt. Bernie Morgan and copilot Lt. Mike Branch radioed. Patiently, Colonel Beard waited as an hour passed; still nothing. Finally, past the point where any planes could turn back, Doom 34 called to say they had shut down an engine on takeoff due to fluctuating oil pressure. Normally, this would have been an air abort, but the crew refused to be left behind.

"That's OK," Colonel Beard said. "They did exactly what I would have done. . . . I expected nothing less. I wanted them to be gung ho." It had been determined beforehand that a B-52 could manage the job with just six of its eight engines.

They made their first aerial refueling with KC-135s out of Lajes Field, Azores. The next gas-up was over the Mediterranean, with KC-10s out of Morón AB, Spain.

Timing was crucial. The CALCM mission had been set back a couple of hours because General Glosson didn't want Libya to spot the B-52s and warn Iraq. They were not to pass Libya until F-117s had hit their first targets in Baghdad.

Flying lights-out and in radio silence, the raiders crossed the Mediterranean, the Red Sea, and the featureless Arabian desert. Then they began to arm the missiles and started their run to the launch point.

"We thought somebody might have come up to look us over," Major Hess said, since there were some "inconclusive" radar contacts. Though they had on-board jamming, "the opportunity to use it was very limited," Colonel Beard reported, because it would have announced the presence of the bombers.

Efforts had been made to "deconflict" the B-52s with other allied combat and commercial air traffic. They were on the Air Tasking Order, the single plan that described what each aircraft in the theater was to do, though their ordnance was listed as "XLRBs" (extra-long-range bombs) to obscure the nature of their errand.

As they reached the area of the launch coordinates—"in the far western part of Saudi Arabia, about 100 miles south of the border," General Glosson said—it was apparent that four missiles were having software problems and could not be used. Strict orders had been given not to launch missiles unless they were completely "healthy," so there wouldn't be any avoidable collateral damage.

In a sequenced launch over ten minutes, spread out so the missiles wouldn't hit each other or their launching craft, the CALCMs dropped off their rails, extended their wings, lit their engines, and headed north. The thirty-five "good" missiles of the thirty-nine they carried fanned out and headed toward targets "across Iraq," General Glosson said, though the main objectives were in the central and southern areas. Some took a direct course to their targets, others more meandering routes, so they would all arrive simultaneously.

When the last missile was away, the bombers turned west. Nearly fifteen hours had passed since takeoff, but the mission was far from over.

Weather Snarls Everything

Heading back toward the Mediterranean, the seven bombers hit severe weather. Visibility dipped below two miles, the minimum required for a desperately needed aerial refueling. With only thirty minutes of fuel left, conditions improved enough to carry out the refueling with KC-10s out of Spain. Had the weather stayed bad, the bombers would have had to go to a divert field.

Fuel consumption kept Colonel Beard nervous. Two aircraft were flying with a pair of seized engines, sharply increasing drag, and two other planes were seeing fluctuating oil pressure readings. In addition, four of the aircraft were carrying 2,500-pound hung missiles.

As they headed for the Atlantic, some of the men tried to sleep; most had been up long before the mission even started. "It wasn't really sleeping," Major Hess observed. "It was more like lying down and dehydrating for two hours." On the lower deck, cramped quarters forced an unfortunate choice: One could lie down with either one's head or boots in the urinal.

The weather turned ugly again, this time slamming them with 130- to 140-knot headwinds, when they had planned on a worst-case headwind of ninety knots.

"I kept searching for a way to get out of the wind," Colonel Beard said. "First, we went high, . . . then we tried low," but there was no relief. More bad news: The wind at Lajes was so harsh that the KC-135s, which were to give them their last fill-up, were grounded.

With gas running low, they radioed Morón AB for help. A flight of KC-10s dashed out and found them, and Colonel Beard asked them to "give us everything you can." The tankers stayed with the bombers as long as they could but finally had to

Photo by Nathan Leong

Most of the B-52s that took part in the mission have been retired, but the conventional air-launched cruise missiles remain in the inventory, having proved their worth by hitting about ninety percent of their targets.

pull away "or they wouldn't have made it back to Spain," Colonel Beard said.

The heavy drag and wind continued to eat up gas. The planes with hung missiles and seized engines would need another fill-up to get back to Barksdale. Colonel Beard was determined that they would not resort to a divert field. B-52s showing up unannounced at an East Coast base, carrying what looked for all the world like unexpended nuclear missiles, would mean big trouble.

Finally, he raised the 8th Air Force command post on a secure frequency, and two "strip tankers"—kept ready for just such emergencies—were launched from Robins AFB, Ga. The BUFFs met the tankers just over the coast.

Murphy's Law kicked in again, however, as one of the bombers developed a faulty radio, unable to communicate with the tanker. Colonel Beard, through a special plane-to-plane communication system, could talk to the other pilot and relayed messages to the tanker. At last, the two limping bombers had enough fuel to complete the trip.

It was nearly dark when they arrived. They wasted no time getting down and, once on the ground, taxied directly into their shelters, exposing their hung missiles to as few unauthorized eyes as possible. After a perfunctory debrief, they headed home for a much-needed rest.

One Year of Silence

The crews were under strict orders not to discuss the mission, which would not be officially acknowledged until exactly a year later. Only then could they discuss the mission and show off the Air Medals awarded for their historic and "unprecedented demonstration of Global Reach, Global Power."

The raid had consumed "not all, but most" of the CALCMs on hand at the beginning of Desert Storm, Colonel Beard said. A second strike was deemed unnecessary because air superiority had been nearly achieved in Iraq and theater aircraft could attack targets with far less risk and cost.

Bomb-damage assessment was a problem throughout the war, and at first it was hard to tell if the CALCMs, scheduled to hit around 11:00 a.m., struck their targets. But "the next night, when the sun set," the lights didn't come on in Iraq, General Glosson said. "Either [the B-52s] were very successful" at destroying powerplants, "or [the Iraqis] turned off a lot of power. . . . As we found out later, it was a combination of both."

Later reconnaissance showed that CALCMs had hit a number of targets dead-on. One CALCM had snapped its aimpoint, a telephone pole, in half.

The raid was ultimately pegged as having achieved between eighty-five and ninety-one percent of its objectives, well above an expected eighty percent, since CALCMs had never before been volley-launched or operated under real-world conditions with GPS. One missile fell unexploded in the launch area, later to be found and destroyed. Another was never accounted for and might have been shot down.

Nearly all of the seven B-52Gs in the operation have been retired to the boneyard at Davis-Monthan AFB, Ariz., but the CALCMs used during the war were replaced under war stock replenishment legislation. Congress has since directed the Air Force to look at upgrades to the weapon, which is expected to remain in service even beyond full phaseout of the B-52H.

General Glosson bristles at the idea, advanced by some critics, that the CALCM raid was a stunt mounted to advertise the notion of a long-range strike from the American heartland. "It's incredible what people say in hindsight," General Glosson said. "Had my interest been to just demonstrate a new capability, I would have done it two or three times" and not kept the program secret afterward.

"We used those weapons because . . . it seemed the logical thing to do. Plain and simple, . . . it saved lives. If we had lost a half dozen A-6 [Intruders] attacking those targets, it would have been unforgivable."

But the raid did demonstrate that US airpower is in "a period of historic change," General McPeak observed. The Air Force is shifting from " 'forward presence' of our combat forces, deployed and stationed overseas, to an era characterized by Stateside basing of our combat forces, configured for expeditionary action."

Reflecting on the mission, he noted, "The 2d Bomb Wing is 'present' at Barksdale . . . and it is also 'present,' twenty hours later, at any spot on the globe. And everybody now knows that." In the future, enemies will have to consider that USAF is "present everywhere at all times. . . . People will have to think about presence in an entirely different way." ■

John Tirpak is the senior military editor of Aerospace Daily, *a Washington, D. C., defense and commercial aviation periodical. This is his first article for* Air Force *Magazine.*

Outstanding Squadron Dinner

Saturday, May 28
Outstanding Squadron Dinner

AFA's 35th Annual Outstanding Squadron Dinner will be held at The Broadmoor Hotel, Colorado Springs, Colo., on Saturday, May 28. The dinner honors cadets of the United States Air Force Academy for the 1993–94 school year. Our featured speaker is an Academy graduate from the Class of 1959, Gen. Robert C. Oaks, CINCUSAFE.

Thursday, May 26
Golf Tournament and Reception

The golf tournament will be held at 10 a.m. on the Broadmoor West Course. The price is $115 per person. This includes golf, greens fees, golf cart, and reception. The fee is $35 for the reception only. For more information on both the dinner and the golf tournament, call Dottie Flanagan at (703) 247-5805.

Friday, May 27
Air Force Acquisition Symposium

The fourth annual Air Force Acquisition Update, sponsored by the Colorado Springs/Lance Sijan Chapter of AFA, will focus on "Air Force Acquisition: Mandate for Change." The program is aimed at industry executives and government leaders.

Speakers who have been invited:

Gen. Bernard P. Randolph, USAF (Ret.)
Colleen A. Preston, Dep. USD for Acquisition Reform
Lt. Gen. Richard E. Hawley, Principal Deputy to the Assistant Secretary of the Air Force (Acquisition)
Lt. Gen. Thomas S. Moorman, Jr., Vice Commander, AFSPACECOM
Maj. Gen. Kenneth R. Israel, Director DARO, Asst. Dep. USD for Advanced Technology
Maj. Gen. Larry L. Henry, Director Operational Requirements, AF/XOR
Brig. Gen. Robert W. Drewes, Deputy Assistant Secretary (Contracting), Assistant Secretary of the Air Force (Acquisition)
Brig. Gen. Sebastian F. Cogliore, Director Space Programs, Assistant Secretary of the Air Force (Acquisition)

The "Federal Acquisition Streamlining Act of 1993" will be discussed, along with the benefits and challenges of the Act to the Air Force acquisition process. Included in the agenda will be acquisition information concerning logistical (O&M) support as well as new system acquisition policy.

The 1994 USAF Acquisition Update will be held at Peterson AFB, Colo., and will require a Department of Defense secret clearance. The local AFA chapter has made arrangements to certify the need-to-know requirements in accordance with DoD 5220.22-M. The cost for the symposium is $225 for AFA individual or Industrial Associate members and $50 for US military or government employees. The registration fee includes coffee and doughnuts, lunch, and a reception in honor of the speakers following the symposium. Additional individual reception tickets are $30 (spouses and individuals not registered for the Acquisition Update).
For more information, contact Rayetta Lantzy at (719) 570-4844. Fax: (719) 570-4829.

"On reviewing the Air Force Association proposal, the Department of Defense finds this event meets the standards for participation by DoD personnel under DoD Instruction 5410.20 and DoD Standards of Conduct Directive 5500.7. This finding does not constitute DoD endorsement of attendance, which must be determined by each DoD component."

Registration Form

AFA's 35th Annual Outstanding Squadron Dinner • Saturday, May 28, 1994

Please mail this form to:

ATTN: D. Flanagan
Air Force Association
1501 Lee Highway
Arlington VA 22209-1198
or call: (703) 247-5805
Fax: (703) 247-5853

Advance registration closes Friday, May 20.

Refunds must be requested in writing and postmarked no later than Wednesday, May 18.

___ My check for $100, payable to the Air Force Association, covering the Outstanding Squadron Dinner, is enclosed.

___ Enclosed is $35 for a guest Golf Reception ticket.

___ Send information on the Acquisition Update and Reception.

Name (please type or print) | Title | Affiliation

Address | City

State | Zip | Area code and telephone

Three years after Desert Storm, the Army is losing divisions and is short of money.

The Glow Is Gone From the Army

By Richard Lardner

Staff photo by Guy Aceto

M1A1 tanks (opposite, one from the 4th Infantry Division, Fort Carson, Colo.) contributed to the US Army's success in the Persian Gulf War. Today's Army faces such challenges as combining force packages that have Bradley Fighting Vehicles (shown above at the National Training Center, Fort Irwin, Calif.) of various vintages.

IN EARLY 1991, the US Army basked in the glow of success in Operation Desert Storm. A three-day ground campaign against Iraq, witnessed almost instantaneously on television by millions, capped one of modern history's overwhelming victories and filled the Army with renewed confidence about the future.

Three years later, the glow is pretty much gone, and the most serious challenge facing the Army's senior leaders doesn't come from a Third World aggressor. The service's rapidly declining budget and a growing list of tasks have put the squeeze on its ability to build new combat equipment and to stay ready for future conflicts.

The Army endorsed the strategic conclusion of the Defense Department's 1993 Bottom-Up Review—that the US should be able to win two major, nearly simultaneous regional wars. That dictum, now a cornerstone of US military strategy, seems far too ambitious for the future Army, which would play its part with ten active divisions—far fewer than it had several years ago.

All services are getting hammered in the budget wars, but the manpower-intensive Army is in a uniquely difficult spot. Each year, it costs billions of dollars to keep Army people properly trained and equipped. Unwilling to cut too deeply into personnel or operations and maintenance accounts to pay for cuts mandated by President Clinton, the Army has had to cut back or kill scores of weapon programs. In preparing its Fiscal Year 1995–99 program, made public February 7, the Army killed fifty-seven programs and made cuts

Photo © Hans Halberstadt / Arms Communications

in another seventy-seven, according to service budget documents.

Senior officers say the Army faces the prospect of becoming hollow, a predicament that they vowed never to allow again. In the 1970s, the term "hollow" was used to describe an Army that simply wasn't ready to fight. Now, years later, the Army finds itself confronting the same situation. With the money that will be available over the next several years, the service will have a hard time maintaining the ten active divisions it will have or its planned force of National Guard and Reserve units.

Force in Four Packages

The Army breaks its active-duty and reserve forces into four basic groups. Force Package One includes US-based units that make up the Army's contingency corps, the "first to fight" troops. Force Package Two is made up in large part of the service's forward deployed divisions. Force Package Three includes CONUS-based units that are not part of the contingency corps. Force Package Four is the Army National Guard and Reserve.

According to an internal study prepared last year by the Army's Training and Doctrine Command (TRADOC) at Fort Monroe, Va., there is a worrisome and growing disparity in the warfighting capabilities of the force packages.

The TRADOC study, dubbed "Warfighting Lens Analysis," took a hard look at the long-term plan from a warfighter's perspective. It found that the contingency corps will be adequately outfitted through the end of the century. The assessment of Force Packages Two, Three, and Four is not so positive. The Army's overseas forces are losing their "close combat edge" and are fast becoming incompatible with the contingency corps, the study said. TRADOC's analysis found that, further down the scale, such units as the 1st Infantry Division at Fort Riley, Kan., are "difficult to deploy and support" and are "not maintaining land force dominance in close battle." National Guard and Reserve units, meanwhile, "are not maintaining the edge in any area," TRADOC concluded.

The impact of this disparity is serious. Service officials said that, should the Army have to deploy more than its five-division contingency corps for a particular operation—as it did in the Persian Gulf War—the force packages may find it difficult to fight together. For example, although Force Package One would be equipped with the most modern Bradley Fighting Vehicles, Force Package Three would still have a hodgepodge of older Bradleys and Vietnam-era M113 personnel carriers.

"It would be nearly as complicated as working [in battle] with our allies who have different equipment," comments a TRADOC official familiar with the study.

More modernization money would help, but the Army probably won't get it. The Clinton Administration has put the military on a downward track in terms of spending, and that's not likely to change. For Fiscal Year 1995, the Army has requested roughly $11.4 billion to spend on equipment modernization. Just five years ago, the service had close to $20 billion for modernization. For Fiscal 1995–99, the five-year research, development, and acquisition program falls from $62.5 billion, planned under President Bush, to $51.8 billion—a seventeen percent reduction.

Some analysts note that the "Big Five" weapons systems—Patriot missile, Apache and Black Hawk helicopters, M1 Abrams tank, and Bradley Fighting Vehicle—have all been developed and deployed. Now the Army has no major, eye-catching new programs that will be fielded soon. It follows that Army modernization should decline, these analysts maintain.

The Fall of the Army Budget

(Billions of current dollars)

Budget Category	Fiscal Year 1990	1991	1992	1993	1994	1995	Change, 1990–95
Military personnel	30.1	29.7	29.8	28.5	26.8	26.1	–13.3%
Operations & maintenance	24.5	22.9	21.2	22.5	19.7	21.5	–12.2%
Procurement	13.8	8.9	7.6	7.4	6.9	6.1	–55.8%
Research & development	5.3	5.5	6.4	6.1	5.4	5.3	0.0%
Military construction	1.1	1.2	1.2	0.7	0.9	0.8	–27.3%
Family housing	1.5	1.5	1.6	1.5	1.3	1.3	–13.3%
Total	**76.3**	**69.7**	**67.8**	**66.7**	**61.0**	**61.1**	**–19.9%**

All figures represent Total Obligational Authority. Amounts for Fiscal 1990–94 are final congressional appropriations; Fiscal 1995 figures are those contained in the President's request.

No Sex Appeal

"About one-half of the things in the Army's budget are below the noise level; they don't have a lot of sex appeal," says Lt. Gen. Richard L. West, USA (Ret.), the director of the Association of the United States Army's (AUSA's) Institute for Land Warfare. "Aside from the Comanche helicopter, there are no big programs that are important to a broad base of congressional supporters."

Other observers said the Gulf War increased the Army's interest in standoff weapons, such as the Navy's Tomahawk missile or the Air Force's precision guided munitions, rather than large platforms.

Some of the money the Army does receive for purchasing goods and services is soaked up by tangential factors. Examples include higher-than-expected inflation and fuel rates, unbudgeted pay raises, and special congressional items.

Another culprit is the Army itself. In 1990, it decided to make large cuts in procurement funding so it could invest in the development of "leap-ahead" systems, ultrahigh-tech equipment that could be fielded early in the next century. However, the rapid decline of the Soviet threat reduced the perceived need for these programs, such as the Armored Systems Modernization (ASM) effort. They were cut back or canceled. Along with the program cuts went large chunks of the Army's budget authority.

Stephen Conver, the Army's assistant secretary for Research, Development, and Acquisition from 1990 through 1992, says the Army has made preserving force structure and maintaining readiness its top priorities. To make sure those priorities are funded properly, the service has dipped into the modernization accounts.

That approach hasn't worked as planned. The Office of the Secretary of Defense and Congress eventually cut the Army's O&M and personnel spending anyway, so the Army loses money three ways. "What's really happened is that the Army has persistently, and futilely, tried to preserve force structure," says Mr. Conver, now a vice president at Martin Marietta. "In the process, the Army has gutted its procurement and research and development funds. So, to this extent, the modernization woes are somewhat self-inflicted."

The possibility of a significant increase in modernization accounts is slim. The only major weapon systems now under development are the Comanche, the Brilliant Anti-armor Technology submunition, and the two survivors of the once-massive ASM program—the Advanced Field Artillery System and a companion resupply vehicle.

For the near term, the Army will rely on upgrading today's systems, such as the Abrams, Bradley, and Apache. A concept known as Horizontal Technology Integration will play a major role in this process. HTI calls for infusing key technologies, such as improved digital communications, across a series of warfighting platforms. The expected upshot is a battlefield on which US armor, artillery, and aviation can all see the same targets and work at a highly integrated level.

Private Bitterness

Privately, the Army's senior leaders express bitterness about the cuts. Internal budget documents reveal their concerns. Says one, "The outcome of these reductions may be a future force [that] does not possess the technological superiority required to prevail over all potential conflicts arising from the changing world order, as the Army's ability to execute its mission becomes substantially weakened."

The bottom line, say these officers, is that it is unlikely the Army can meet the two-war requirement (known as "win-win") outlined by the report of the Bottom-Up Review, which cuts the Army to ten active-duty divisions and allots the service roughly 500,000 full-time troops. AUSA says the cuts made to the Army since the end of Desert Storm have brought the service to a position where it probably could not fight a similar campaign today.

Rep. Ike Skelton (D-Mo.), chairman of the House Armed Services Committee's Military Forces and Personnel Subcommittee, said the Clinton Administration's plans assume that all ten Army divisions would be immediately deployable. If some divisions are already engaged in peacekeeping or are forward deployed, he said, the number of troops for a given contingency is greatly reduced.

Mr. Skelton believes the Army needs twelve active divisions and 550,000 active troops. "We may have a win-win strategy," he says, "but we're drawing the Army down to a win-zero capability."

Since the end of Desert Storm, the Army has inactivated one corps and four divisions. Currently the Army has thirteen active divisions. With the 6th Infantry Division, Fort Wainwright, Alaska, due to inactivate this year, the Army then will be at the Base Force level planned by President Bush. To meet President Clinton's goals, two more active divi-

sions will be cut by 1997. Most "at risk" are the 4th Infantry Division, Fort Carson, Colo., the 10th Mountain Division, Fort Drum, N. Y., and the 1st Infantry Division.

The Army is also working to downsize its reserve component. Late last year, it announced a sweeping plan that by 1999 would trim the Army Reserve by 71,600, down to 208,000 troops, and the National Guard by 55,700, to 367,000 soldiers. Under the terms of the plan—known as the Off-Site Agreement because it was crafted at a location outside the Pentagon—the Guard will take a direct combat support function while the Reserve will handle combat service support duties.

The Off-Site Agreement calls for 4,400 Reserve aviation slots and 1,400 special operations posts to be transferred to the Guard. The Army Reserve's Maj. Gen. James H. Mukoyama, Jr., head of the Army Reserve Association, says this "migration" will result in deactivation of the Reserve's 244th Theater Aviation Group and the 12th Special Forces Group because there is no room for them in the Guard.

Deactivating these two units "will cause immediate readiness degradation," says General Mukoyama, who adds that the 244th and 12th are well trained and ready. "If we go to war, we run the risk of scores of casualties because we're not ready."

New Roles

Once poised for a major land war in Europe against the Soviet Union, the Army has seen its world role change dramatically. Regional contingencies, as well as peacekeeping, humanitarian, and disaster-relief missions, are what the service expects in the future. In keeping with these new prospects for action, the Army issued a revised edition of Field Manual 100-5, *Operations,* last year. The Army's keystone warfighting manual, FM 100-5 was reworked for the first time since 1986.

One of the most significant additions to FM 100-5 is a chapter outlining the principles for "Operations Other Than War." This, in turn, led to the publication of a follow-on field manual, 100-19, *Domestic Support Operations*, which spells out how Army commanders can use the service's physical and human resources to support civilian operations like flood control and hazardous-waste cleanup. Despite new emphasis on the home front, the Army is quick to assert that its primary focus is to fight and win land wars.

The Army has sought to protect its current list of wartime functions. In an effort to eliminate service redundancies, Chairman of the Joint Chiefs of Staff Gen. Colin L. Powell released in 1993 his study on roles and missions, which recommended some changes. That same year, however, Congress mandated establishment of a Commission on Roles and Missions of the Armed Forces, which would take a wide-ranging look at what the military does and make recommendations as to how certain tasks can be done better. The commission's final report is due next year.

One area addressed in General Powell's report, but likely to be the subject of further debate, is theater air defense (TAD). In internal deliberations in 1992, the Air Force proposed that it be responsible for the entire TAD function. The Army, which operates the Patriot missile and is developing other medium- and high-altitude air defense systems, opposed the suggestion. General Powell agreed with the Army.

Some USAF officials continue to believe their service should become the single manager for TAD. A white paper circulated in the Pentagon last year said the US air defense system was the "least integrated" in the world. Giving the Air Force the land-based air defense function could save $1 billion and eliminate overlap that threatens Air Force pilots when they fly over friendly territory, the white paper said.

The Army, however, states that theater air defense is a shared mission and should remain so. "We don't agree with the Air Force allegation that it's their mission," says Maj. Gen. Jay M. Garner, the Army's assistant deputy chief of staff for Operations and Plans (Force Development). General Garner says it could cost up to $4 billion to move the Army's air defense assets. General Garner also says the fratricide argument is bunk.

Don't Tell It to the Marines

The Pentagon's new roles and missions commission is also expected to examine the capabilities of the Army and Marine Corps and determine if there is overlap. Under Title 10 and DoD Directive 5100.1, the Marines are to perform land operations "essential to the prosecution of a naval campaign." Historically, the Corps has not been limited to such a narrow role and has sought to expand its inland warfighting capability. In doing so, it is acquiring some of the characteristics of the Army.

For example, the Marines are pushing to build up their inventory of M1A1 tanks. The Corps has more than 200; it would like to have closer

Staff photo by Guy Aceto

Military personnel and training remain the largest expense items in the Army's budget. Cuts in its O&M account have left the Army on the "razor's edge" of preparedness, Chief of Staff Gen. Gordon R. Sullivan told Congress last year.

Though critics say that cutting the Army to ten active divisions and 500,000 troops would leave it unable to meet the two-war requirement of the Bottom-Up Review, General Sullivan is determined that the Army be trained and ready.

to 500. Army officials wonder why a service tasked with performing amphibious assaults needs nearly 500 main battle tanks. "The Marines are not doing what they are supposed to do," says one Army officer. "They're out of their box."

Gen. John W. Foss, who headed TRADOC until his retirement in 1992, expects the new commission to scrutinize the crisis response mission. Currently, the Marines and the Army both have the ability to respond to crises involving land combat, and the mission is essentially shared by the two services. The Marines would like a larger role in the crisis response arena, if not the outright lead—a prospect that concerns the Army.

An area where the Marines and the Army have found common ground is artillery support. General Powell's report recommended that the Army provide artillery support for the Marines with the Multiple-Launch Rocket System, but the General wanted further study before a final decision was made. Late last year, Marine Corps Commandant Gen. Carl E. Mundy, Jr., told senior Army officials that a Navy–Joint Staff review concluded what General Powell initially had believed. "I concur that MLRS support for the Marine Corps is more appropriately provided by the Army," General Mundy told Army Chief of Staff Gen. Gordon R. Sullivan in a December 8, 1993, letter.

Precious O&M

To make sure its troops are trained and ready to meet future missions, the Army has fought to protect its operations and maintenance money. But, as Mr. Conver notes, this account has been cut despite the Army's efforts. Between Fiscal 1990 and 1994, O&M funding dropped by a cumulative $4.8 billion. The Army's FY 1995 budget request included $21.5 billion for O&M—less than the service actually needs.

The drop in O&M funding is a serious concern. Without enough of it, the Army can't properly train its troops, repair its bases and equipment, or recruit new personnel. At a Senate Armed Services Committee hearing last year, General Sullivan told lawmakers the Army was on the "razor's edge" in terms of being prepared. The roughly $20 billion in O&M money the Army received in Fiscal 1994 "adequately supported" operating tempo and training requirements but underfunded base support operations, real property maintenance, and depot maintenance activities—all of which are keys to readiness. *[See table on p. 64.]*

Army depot maintenance is funded at fifty-eight percent of its requirement in 1994. This allows the Army to support only "minimum" sustainment for the early deploying units in Force Package One, the five-division contingency corps. It does not allow the service to repair equipment quickly.

The drop in O&M funding also affects training. General Sullivan told Sen. John McCain (R-Ariz.) of the Armed Services Committee that between Fiscal 1985 and 1990 the Army spent $83 million each year for the service's participation in joint exercises. In 1994, that figure dropped to $61 million. While the Army can still participate in scheduled joint exercises, these are smaller and shorter and rely more heavily on simulation.

Moreover, an increase in peacekeeping and disaster-relief missions has taxed Army O&M accounts. In Fiscal 1993, the Army spent $511.5 million in O&M funds on various contingencies, but only $371.5 was reimbursed. For 1994, contingency operations are expected to cost $615.4 million, according to the Army. If it is not reimbursed completely for these operations, it must cut training or readiness in some other way.

Planned manpower cuts have also hurt readiness, General Sullivan said. As troop reductions are made, readiness rates fluctuate and fall below standards in some units. "This will be characterized by a number of unmanned and less than fully manned weapon systems and crews/squads in some noncontingency force units," he said. The Army has accelerated inactivation of some divisions to beef up readiness in others.

The Army's greatest strength—manpower—is also its greatest weakness. Five years ago, the Army had more than 760,000 troops on active duty. By the end of this year, there will be 540,000 and by 1999, about 500,000.

However, military personnel and training remain the largest expense items in the Army's budget. General Sullivan is determined that his troops be trained and ready for combat. He preaches that there will be "no more Task Force Smiths," a grim reference to the ill-trained and poorly supplied Army unit wiped out in the early days of the Korean War. ■

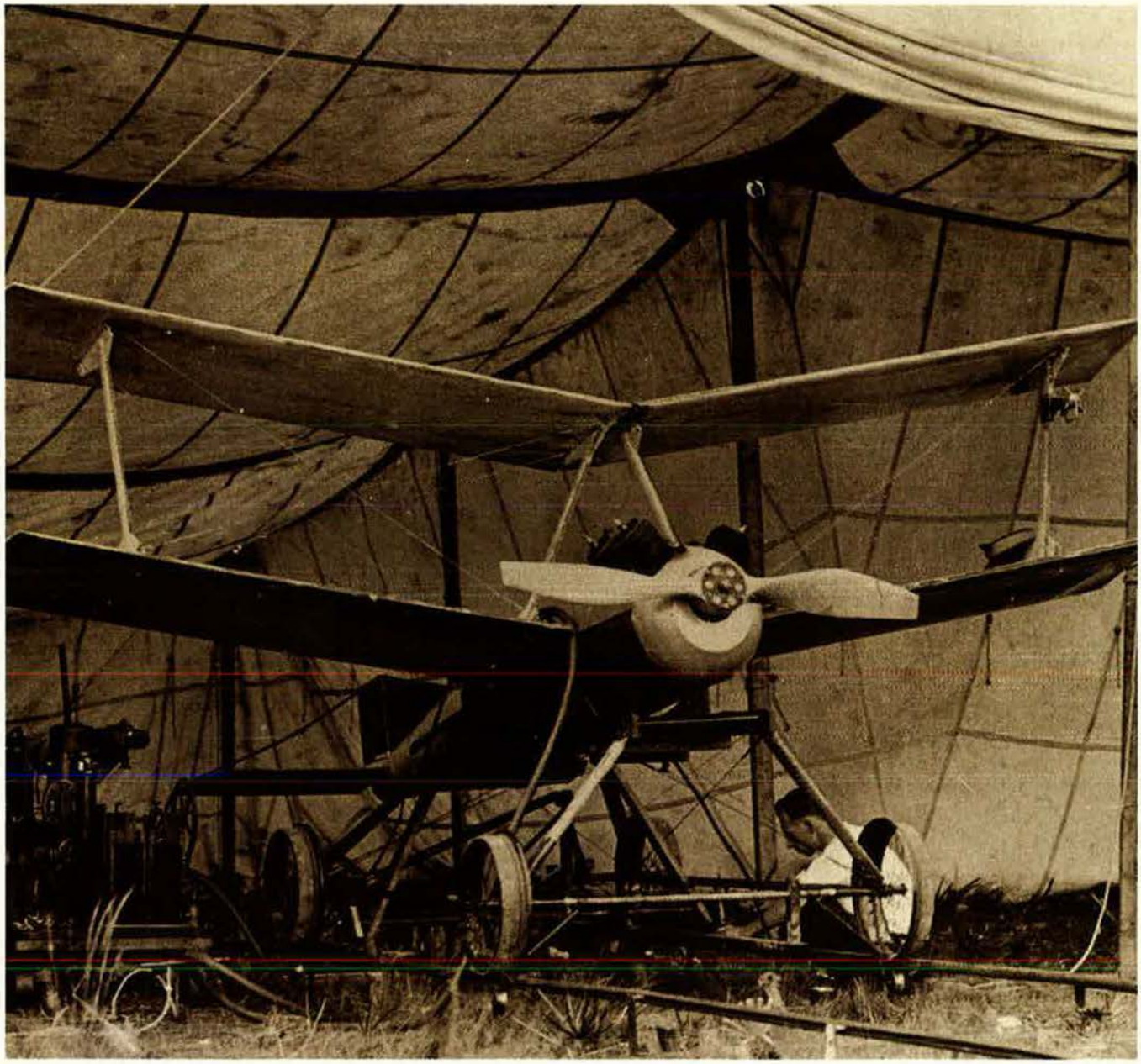
Richard Lardner, based in Washington, D. C., is chief editor of Inside the Army. *This is his first article for* Air Force *Magazine.*

Industrial Associates

Listed below are the Industrial Associates of the Air Force Association. Through this affiliation, these companies support the objectives of AFA as they relate to the responsible use of aerospace technology for the betterment of society and the maintenance of adequate aerospace power as a requisite of national security and international amity.

AAI Corp.
AEL Defense Corp.
Aermacchi S.p.A.
Aerojet
Aerojet Electronic Systems Div.
Aerojet Propulsion Div.
Aerospace Corp.
Aerospatiale, Inc.
AIL Systems Inc., a subsidiary of Eaton Corp.
Alliant Techsystems Inc.
Allied-Signal Aerospace Co.
American-Amicable Life Insurance Co. of Texas
Analytic Services Inc. (ANSER)
Anheuser-Busch, Inc.
ARINC Research Corp.
Army Times Publishing Co.
Arrowsmith Shelburne
ASTECH/MCI Manufacturing Inc.
Astra Holdings Corp.
Astronautics Corp. of America/ Kearfott Guidance & Navigation
AT&T Federal Systems
Atlantic Research Corp.
Atlantic Research Corp., Professional Services Group
Atlantis Aerospace Corp.
Autometric, Inc.
Battelle Memorial Institute
BDM International, Inc.
Beech Aircraft Corp.
Bell Helicopter Textron
Boeing Defense & Space Group
Bose Corp.
British Aerospace, Inc.
Brunswick Corp., Defense Div.
Burdeshaw Associates, Ltd.
CAE-Link Corp.
Canadian Marconi Co.
Carter Chevrolet Agency, Inc.
Cessna Aircraft Co.
Charles Stark Draper Laboratory, Inc., The
Coltec Industries, Inc.
Computer Sciences Corp.
Computing Devices International
COMSAT Aeronautical Services
Cubic Corp.
Cypress International, Inc.
Datatape Inc.
Deutsche Aerospace Washington, Inc.
Dowty Aerospace Marketing
DynCorp
Eastman Kodak Co., FSD
ECC International Corp.
EDO Corp., Government Systems Div.
EDS
EG&G Defense Systems Group
E. I. du Pont de Nemours & Co.
ESCO Electronics Corp.
E-Systems, Inc.
Evans & Sutherland
Fairchild Space & Defense Corp.
FCD Corp., Mark IV Industries, Inc.
Firearms Training Systems, Inc.
Garber International Associates, Inc.
GDE Systems, Inc.
GE Aircraft Engines
GEC Avionics, Inc.
GEC-Marconi Electronic Systems Corp.
General Atomics
General Dynamics, Space Systems Div.
General Motors Corp.
Gentry & Associates, Inc.
Geodynamics Corp.
Government Employees Insurance Co. (GEICO)
Grumman Corp.
Grumman Data Systems Corp.
Grumman Melbourne Systems Div.
GTE Government Systems Corp.
GTE Government Systems Corp., C^3 Systems Sector
GTE Government Systems Corp., Electronic Defense Systems Div.
Gulfstream Aerospace Corp.
Harley-Davidson Inc.
Harris Electronic Systems Sector
Harris Government Communications Systems Div.
Harris Government Support Systems Div.
Hercules Missiles, Ordnance and Space Group
Honeywell Inc.
Howell Instruments, Inc.
Hughes Aircraft Co.
Hughes Danbury Optical Systems, Inc.
IBM Federal Systems Co.
IMO Industries Inc.
Ingersoll-Rand Co.
Innovative Technologies Corp.
Iowa Concepts Inc.–American Matrix Technologies
Israel Aircraft Industries Int'l, Inc.
Itek Optical Systems, a Division of Litton Industries
ITT Aerospace Communications Div.
ITT Defense
ITT Gilfillan
Jane's Information Group
Johnson Controls World Services Inc.
Judd's, Inc.
Kaiser Electronics
Kollsman
Lear Astronics Corp.
Learjet Inc.
Litton-Amecom
Litton Applied Technology
Litton Data Systems
Litton Guidance & Control Systems
Litton Industries
Lockheed Advanced Development Co.
Lockheed Aeronautical Systems Co.
Lockheed Aircraft Service Co.
Lockheed Corp.
Lockheed Engineering & Sciences Co.
Lockheed Fort Worth Co.
Lockheed Missiles & Space Systems Group
Lockheed Sanders Inc.
Lockheed Space Operations Co.
Logicon, Inc.
Logistics Management Institute
Loral Corp.
Loral Vought Systems
Lucas Aerospace Inc.
Magnavox Electronic Systems Co.
Martin Marietta Astronautics Group
Martin Marietta Corp.
Martin Marietta Electronics, Information & Missiles Group
Matra Aerospace Inc.
McDonnell Douglas Aerospace–East
McDonnell Douglas Aerospace–West
McDonnell Douglas Corp.
MITRE Corp., The
Motorola Inc., GSTG
NavCom Defense Electronics, Inc.
Northrop Corp.
Northrop Corp., Aircraft Div.
Northrop Corp., B-2 Div.
Northrop Corp., Electronics Systems Div.
OEA, Inc.
Olin Ordnance
Orbital Sciences Corp.
Oshkosh Truck Corp.
Pilatus Aircraft, Ltd.
PRC
Racal Communications, Inc.
RAND
Raytheon Co.
RBI, Inc.
RECON/OPTICAL, Inc.
Reflectone, Inc.
Rockwell Int'l Aerospace Operations
Rockwell Int'l Collins Avionics & Communications Div.
Rockwell Int'l Corp.
Rockwell Int'l Electronics Operations
Rolls-Royce Inc.
Rosemount Inc.
Sabreliner Corp.
Scheduled Airlines Traffic Offices, Inc. (SatoTravel)
Science Applications Int'l Corp.
SIMCO Electronics
Smiths Industries, Aerospace & Defence Systems Co.
Snap-On Tools Corp.
SNECMA, Inc.
SofTech, Inc.
Software Productivity Consortium
Southwest Mobile Systems Corp.
Space Applications Corp.
SPARTA, Inc.
Steward-Davis International, Inc.
Sundstrand Aerospace
Sun Microsystems Federal, Inc.
Sverdrup Aerospace
Systems Control Technology, Inc.
Systems Research Laboratories/ Defense Electronic Systems
Systron Donner, Safety Systems Div.
Talley Defense Systems
TASC
Teledyne Brown Engineering
Teledyne Power Systems Group
Teledyne Ryan Aeronautical
Telephonics Corp.
Texas Instruments, Defense Systems & Electronics Group
Texstar, Inc.
Textron
Textron Defense Systems
Thiokol Corp.
Thomson-CSF, Inc.
Tracor, Inc.
Trident Data Systems
TRW Inc., Avionics and Surveillance Group
TRW Space & Electronics Group
TRW Systems Integration Group
UNC Aviation Services
Unisys Corp.
United Technologies Corp.
Universal Propulsion Co., Inc.
UTC, Hamilton Standard
UTC, Norden Systems, Inc.
UTC, Pratt & Whitney
UTC, Research Center
UTC, Sikorsky Aircraft
Vitro Corp.
Vought Aircraft Co.
Walter Kidde Aerospace Inc.
Watkins-Johnson Co.
Westinghouse Electric Corp.
Williams International

The Bug



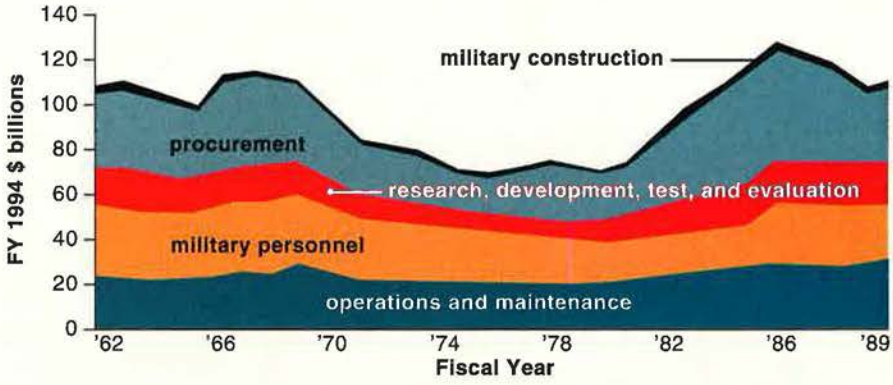
The Kettering Aerial Torpedo, nicknamed the "Bug," was the first guided missile—an ancestor of such weapons as the ground-launched cruise missile and the AGM-130. It was invented by Charles F. Kettering of Dayton, Ohio, and built by the Dayton-Wright Airplane Co. in 1918 for the Aviation Section of the US Army Signal Corps. Launched from a track, it was guided to its target by preset vacuum-pneumatic and electrical controls. At predetermined times, the engine shut off, the wings released, and the Bug crashed, detonating 180 pounds of explosives. World War I ended before the Bug could enter combat. Lack of funds halted further development.

Trend indicators from 1974 through 1989 track the decline and the recovery.

The Hollow Force That Was

By Lt. Col. Daniel L. Cuda, USAF

Figure 1 **Air Force Budgets**



HEADING off a recurrence of the "hollow force" has become an overriding concern of post–Cold War defense planners. The phrase first came to prominence in the late 1970s, when US armed forces were judged insufficient, lacking a robust ability to fight or deter a war. In the US Air Force, the clearest symptoms were poor morale, inadequate flying hours, lack of spare parts, an exodus of highly trained personnel, and the inability to attract high-quality recruits.

Many see worrisome parallels between the 1970s and the 1990s, with the US military on the verge of another hollow force. What follows is a quantitative portrait of the Air Force, providing a context for assessment. It examines a fifteen-year period—Fiscal Years 1974–89—that sweeps from the bitter end of the Vietnam War through the Reagan rearmament program to the triumphant denouement of the Cold War.

The year 1974 was the first without a draft and the first since 1965 without armed conflict in Vietnam; 1989 saw the last big Reagan budget and the symbolic finale of the

Cold War, the fall of the Berlin Wall.

The accompanying charts lay out what the hollow force (and the rearmed "Reagan force") really looked like. They also display the basic direction of critical trend lines.

Figure 1 puts the Air Force budget in a broader historical context. It shows that expenditures peaked initially in 1967 at $110 billion (in 1994 dollars). With the wind-down of the Vietnam War, Air Force spending dropped in the 1970s and began to grow steadily again in 1980.

Although the largest budget and force structure cuts were made in the beginning and middle of the 1970s, the worst problems—which engendered the term hollow force—did not emerge until the late 1970s, a time of low but stable budgets.

Expressions of concern about the hollow force generally centered around personnel, training, and logistics.

Figure 2 **Military Pay Gaps**

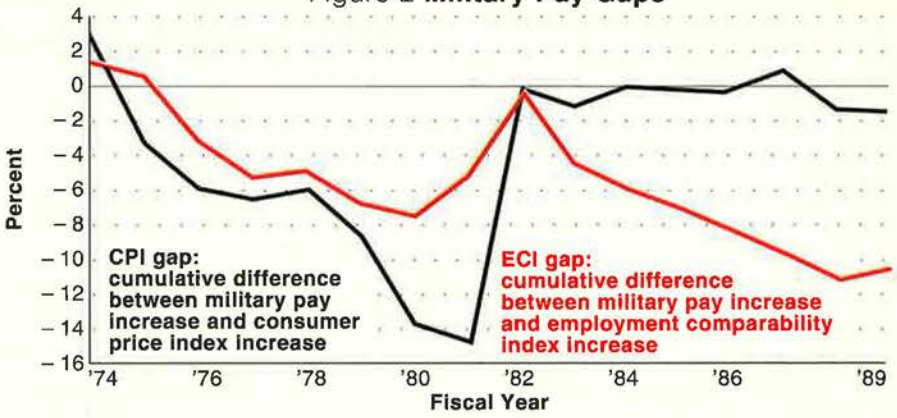


Figure 3 **Reenlistment Trends**

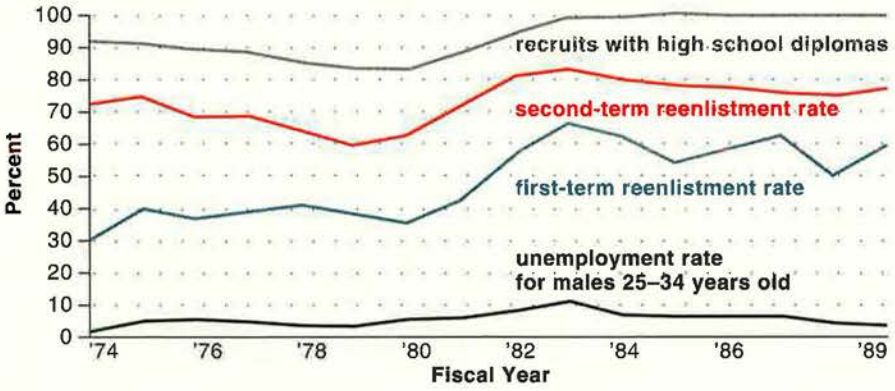
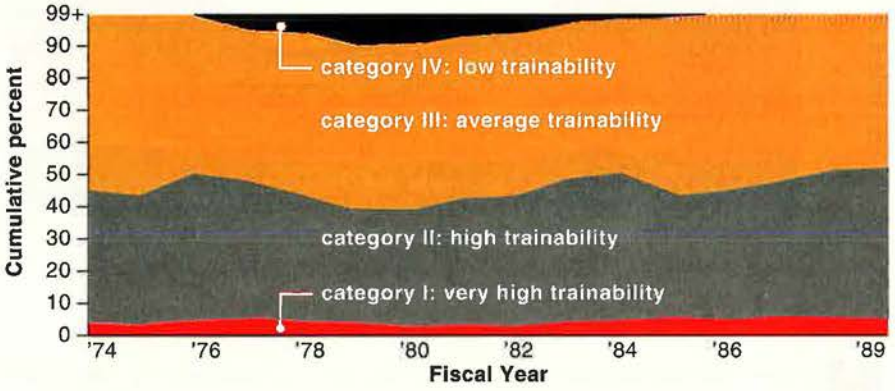


Figure 4 **Recruit Quality**
(By Armed Forces Qualification Test category)



Personnel Issues

The All-Volunteer Force began in Fiscal 1974 with major pay increases and a commitment to quality. However, as the 1970s progressed, recruitment and retention of a high-quality force became difficult. Civilian unemployment decreased, and military pay failed to match inflation and private-sector pay. Figure 2 shows cumulative losses in military pay due to inflation ("CPI gap") and differences between military and private-sector pay ("ECI gap"). Major military pay increases in 1981–82 restored military-civilian comparability, and pay increases generally matched inflation in the 1980s.

The late 1970s saw big drops in reenlistment rates. A significant factor, particularly among second-term personnel, was an erosion of benefits. In addition to pay caps, there were also real and threatened cuts in basic benefit areas.

Concern about this led many to lose faith and leave the service. Figure 3 compares reenlistment rates to the civil unemployment rate for men aged twenty-five to thirty-

Figure 5 **Disciplinary Problems**

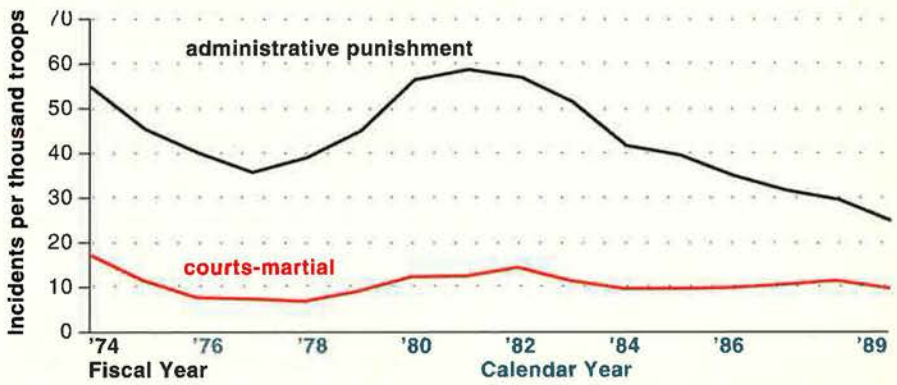
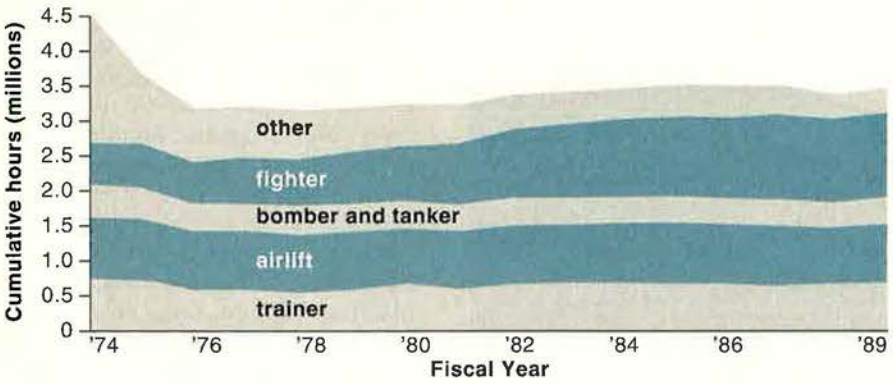


Figure 6 **Total Flying Hours**



four. As unemployment rose, reenlistments rose. As the job market improved, reenlistments fell. However, reenlistments in the 1980s were not as sensitive to the job market.

Losing trained and experienced personnel was bad enough, but the late 1970s also saw a drop in the quality of new recruits. Figure 3 shows a general decline in the number of recruits with high school diplomas. Quality also declined in terms of Armed Forces Qualification Test (AFQT) scores. The AFQT classifies recruits on a scale of trainability—Category I being the highest, Category IV the lowest. Figure 4 shows the percentage distribution over the period. The numbers of Category IV trainees peaked at nine percent in 1979 and 1980.

Almost certainly because of recruiting woes, disciplinary problems rose during the hollow force period and in its immediate aftermath. Figure 5 shows overall USAF rates for administrative punishments and courts-martial. After decreasing until 1977, both rates rose rapidly, peaking in the early 1980s.

Figure 7 **Crew Flying Hours**

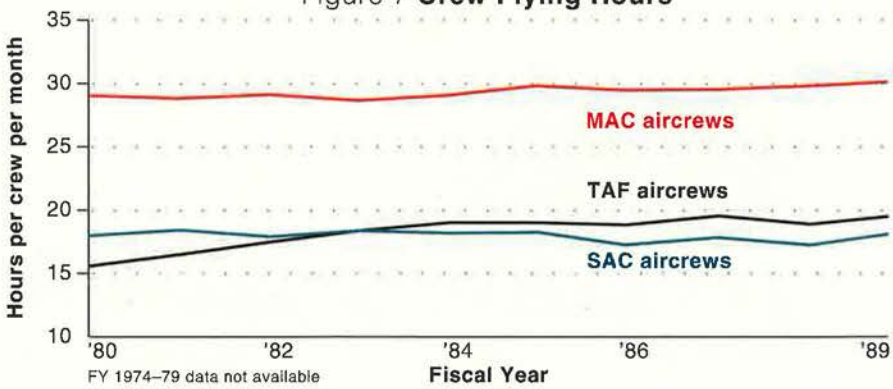
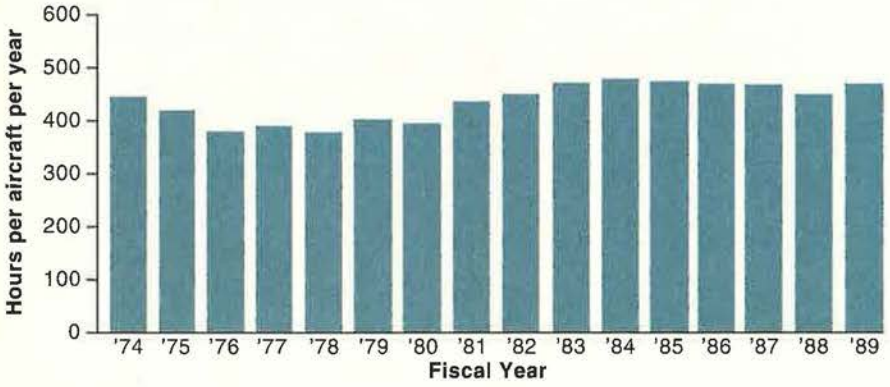


Figure 8 **Aircraft Flying Hours**



Flying Training Issues

Insufficient flying hours have been cited as another characteristic of the hollow force. The flying hour program is the Air Force's most prominent training indicator. Flying hours are no guarantee of readiness in and of themselves, but they are the quantitative prerequisite for high-quality training. The flying hour program allows aircrews to maintain basic proficiency and hone specific combat skills. It not only helps to train aircrews but also provides a *de facto* readiness program for maintenance and logistics personnel who prepare aircraft for flight.

The overall flying hour program for Fiscal 1974–89 is shown in Figure 6. The totals include not only training flights but also operational flying, such as airlift channel missions. The flying hour program stabilized in Fiscal 1976 after a steep drawdown and decreased further to a low of 3.1 million hours in Fiscal 1978. The program grew modestly over the 1980s to a peak of 3.5 million hours in Fiscal 1985.

Figure 7 provides more data. The average number of flying hours per crew per month (HCM) for airlift and bomber/tanker crews are shown to be stable throughout 1980–89. From the beginning of the Reagan buildup to 1989, aircrews in the tactical air forces (TAF) show a marked gain of twenty-five percent. Rates for Military Airlift Command, Strategic Air Command, and the TAF are shown for 1980–89. Though data are unavailable for years prior to 1980, anecdotal evidence is that the HCM rates were lower. This claim is bolstered by tracking the annual flying hours per TAF aircraft in the 1970s, displayed in Figure 8. Flying hours per aircraft increase at a rate similar to that of HCM in the 1980s.

Figure 9 **Fighter Flying Hours**

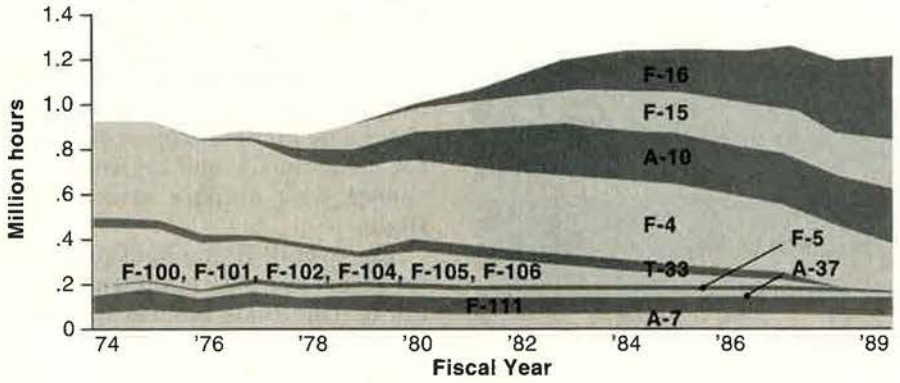


Figure 10 **Class A Mishaps, Fighter/Attack Aircraft**

(Rate per 100,000 flying hours)

Detailed flying hour data for the TAF are depicted in Figure 9.

Another important measure of readiness is the aircraft accident rate. The accident rate for fighter and attack aircraft from 1974 to 1989 is shown in Figure 10. The rate rose sharply in 1978 and 1979, then declined throughout the 1980s.

Logistics Issues

Stories of aircraft grounded for lack of spare parts are a standard feature in descriptions of the hollow force. Aircraft are judged Not Mission Capable (NMC) on the basis of maintenance (NMCM) or lack of supplies (NMCS). A third category, Not Mission Capable–Both, includes aircraft grounded for maintenance and parts. This category was first tracked in Fiscal 1978.

Data for the period are shown in Figure 11. In the late 1970s, overall mission capable rates decreased, went nearly flat, then slowly improved during the 1980s. Although both areas improved, most improvement came in the area of maintenance. High NMCM rates can come from many sources: lack of test equipment, need to cannibalize aircraft for spare parts, lack of maintenance manpower for repair tasks, or inadequate training and experience.

General personnel problems addressed earlier, such as a lack of good-quality recruits, low reenlistment rates, and disciplinary problems, affect the quality of aircraft maintenance and should be seen as a backdrop to high NMCM rates. Lack of experience can also make a

Figure 11 **Mission Capable Rates**

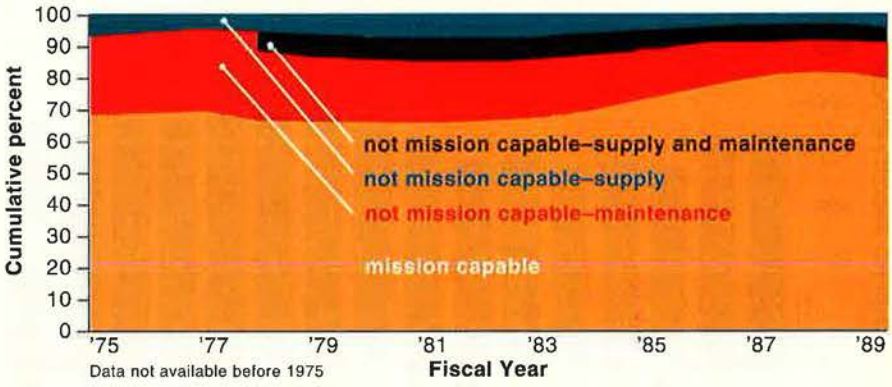
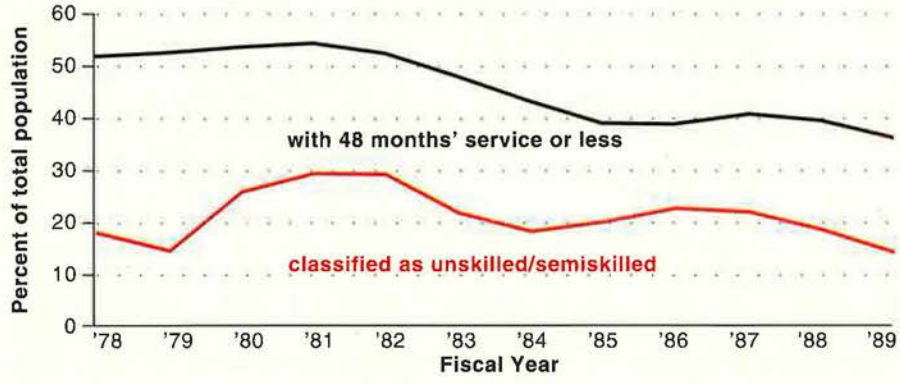


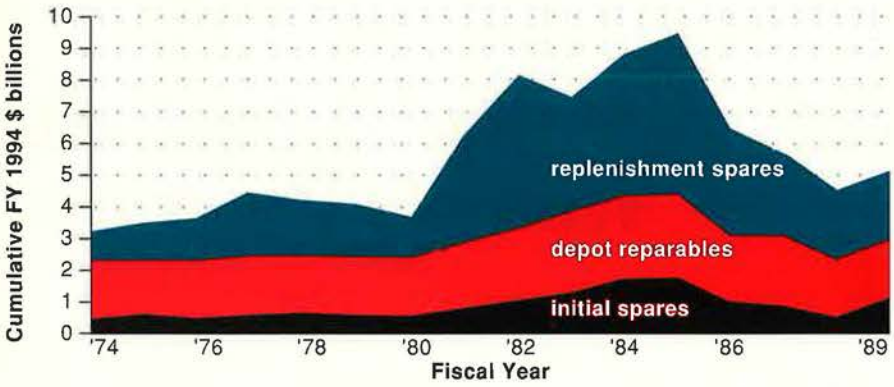
Figure 12 **Aircraft Maintenance Experience**



difference. Data from the late 1970s and early 1980s show a drop in the experience of enlisted maintenance Air Force Specialty Codes (AFSCs).

Figure 12 measures experience and competence. The top curve shows percent of enlisted maintenance AFSCs with four or fewer years in service. The bottom curve traces the proportion of the maintenance work force with ratings of unskilled or semiskilled. Taken together, these curves show an overall improvement in the level of

Figure 13 **Spares Funding**



comparisons. A two- to three-year lead time is generally assumed between the time parts are funded and the time they reach the warehouse.

Readiness can not be created overnight. Nor does it decline overnight. Readiness seems to decay gradually and ambiguously in a way sometimes difficult to manage in light of other priorities. The pressure to reduce costs creates a temptation to cut budgets for recruiting, or for aircrew training, or for the procurement of spares. It is difficult to show the precise damage caused by each

maintenance skills from the late 1970s to the late 1980s. It seems that there is a two- to four-year lag between improvements in experience levels and improvements in mission capable rates.

In the 1970s, the Air Force introduced a new generation of fighter aircraft—F-15s, F-16s, and A-10s. Introduction of new aircraft partly diminishes the value of experience and requires the force to buy spare parts against a forecasted requirement, rather than a historical requirement. Poor forecasting can lead to inadequate funding and cause gaps in provisioning.

Figure 13 shows overall funding for initial spares and replenishment spares. It also shows funding for depot repairs. Funding for these three key logistics categories hit a low point in Fiscal 1974 after peaking in Fiscal 1967 at approximately $6 billion (measured in Fiscal 1994 dollars). Spare parts funding grew again, declined after Fiscal 1977, and then grew dramatically to a peak in Fiscal 1985, the height of the Reagan buildup.

The F-15 and its new F100 engine were frequently cited as textbook examples of a hollow force. The F100 was a significant technological leap over older engines. However, its problems included compressor stalls and cracked turbine blades. In 1978 and 1979, the production of turbine blades was a major issue. In addition, the F-15 was experiencing a cannibalization rate eight times greater than the average.

Increased spending on critical spare parts (shown in Figure 14) seemed to help fuel a rise in F-15

Figure 14 **F-15 Initial and Replenishment Spares Funding**

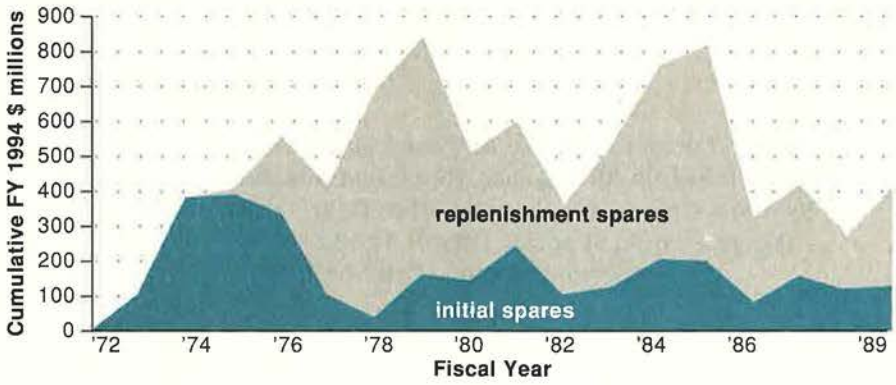
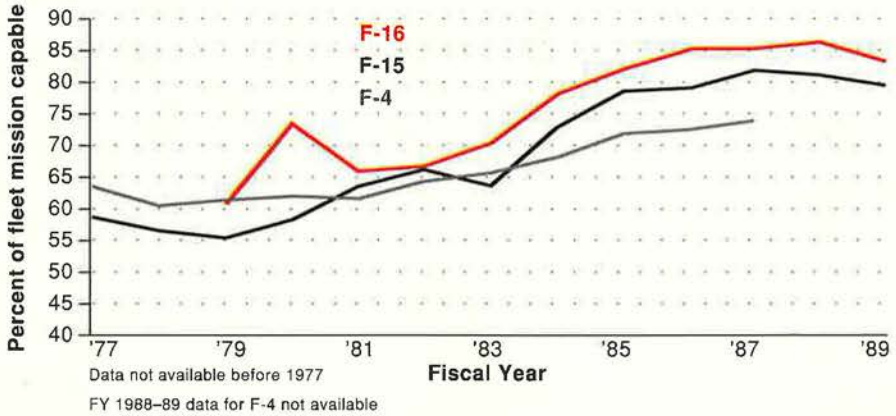


Figure 15 **F-15, F-16, and F-4 Mission Capable Rates**



mission capable rates, as shown in Figure 15 for Fiscal 1977 through Fiscal 1989. (Data are not available for earlier years.) Data for the F-4 and F-16 are included to permit decision. However, the history of this period is a testament to the fact that many small, often unmeasurable decisions can eventually lead to a "hollow force." ■

Lt. Col. Daniel L. Cuda is an analyst in the Directorate of Programs and Evaluation at Air Force headquarters in Washington, D. C. *The author wishes to acknowledge the significant contributions of Lt. Col. Philip A. Richard and Maj. Bruce W. Colletti to this article. This article was excerpted from a larger paper.*

A Checklist of Air Force Test and Training Programs

Edited by Tamar A. Mehuron, Associate Editor

Work in progress at the Air Force Flight Test Center, Edwards AFB, Calif.; Space and Missile Systems Center, Los Angeles AFB, Calif.; and Range System Program Office, Aeronautical Systems Center, Eglin AFB, Fla.

Air Force Flight Test Center, Edwards AFB, Calif.

AC-130U Gunship
Program to modify C-130H aircraft into the AC-130 gunship for US special operations forces (SOFs). Efforts include the addition of 25-mm, 40-mm, and 105-mm guns, infrared sensor, all-light-level television, dual-mode attack radar, armament, battle management center, and defensive system suite. **Contractor:** Rockwell International. **Status:** Qualification test and evaluation (QT&E), qualification operational test and evaluation (QOT&E).

Advanced Cruise Missile Variant
Program to formulate development, test, and evaluation of the ACMV. This version of the Advanced Cruise Missile will be incorporated into the 1995 revision of the Single Integrated Operational Plan. **Contractors:** General Dynamics (GD), Convair, Boeing. **Status:** Engineering and manufacturing development (EMD).

Advanced Fighter Technology Integration/F-16
Test program for use in the development and integration of advanced avionic and flight-control systems. The AFTI/F-16 is a highly modified, full-scale development aircraft designed to develop, integrate, flight test demonstrate, and implement promising new technologies applicable to present and future fighter aircraft. Currently evaluating technologies for sensor fusion in support of the close air support mission. **Contractors:** In-house, NASA Ames Dryden Flight Test Facility, Lockheed. **Status:** Ongoing.

Advanced Range Instrumentation Aircraft Scoring Systems
Program to provide state-of-the-art, broad-ocean-area coverage of reentry vehicles for weapon system testing. Functions previously requiring both EC-135 and P-3 aircraft are combined in the EC-18 ARIA. The Sonobuoy Missile Impact Location System acquires and processes missile impact data. Impact times and locations of multiple reentry bodies are determined using deep-ocean transponders as geodetic references. Associated programs will collect optical data on reentry vehicles during the terminal phases of flight and sample meteorological parameters from the surface to 80,000 feet. **Contractors:** Applied Physics Laboratory (Johns Hopkins U.), E-Systems. **Status:** One aircraft operationally capable.

Argus Optical Phenomenology Aircraft
Program using a high-altitude C-135 optics test-bed and USAF's Phillips Lab at Kirtland AFB, N. M., to gather and analyze signature data in the ultraviolet through infrared wave bands, including both radiometric imagery and spectroscopic data. **Contractor:** Metrolaser. **Status:** Ongoing.

B-1B Block B Upgrade Program
Program to evaluate Block B software upgrades, including improvements to offensive, defensive, Electrical Multiplexer (EMUX) unit, and Central Integrated Test System (CITS) avionics. Also includes development, test, and evaluation (DT&E) AN/APQ-164 radar software designed to significantly increase the resolution of the Real Bean Ground Map mode. **Contractors:** Boeing, AIL, Westinghouse, Rockwell International. **Status:** Evaluation/reporting.

B-1B Block C/Cluster Bomb Unit Program
Phase 1 of the B-1B Conventional Munitions Upgrade Program. Block C will incorporate additional improvements to offensive, defensive, EMUX, and CITS avionics software. CBU program includes developmental testing of the hardware and software required for employment of CBU-87 CEM, CBU-89 Gator, and CBU-97 SFM cluster bomb munitions. **Contractors:** Rockwell International, Boeing, AIL, Westinghouse. **Status:** Test Planning.

B-2A Advanced Technology Bomber
Developmental and initial operational testing, including evaluations of performance, weapon compatability, offensive and defensive avionics, operational envelope definition, human factors, and reliability and maintainability. **Contractor:** Northrop B-2 Division. **Status:** Ongoing.

Big Crow Airborne Electronic Warfare Laboratory
Program using an extensively modified NKC-135 test-bed to support operational and developmental testing for the Air Force, Army, Navy, NORAD, and NATO. Test-bed houses electronic countermeasures (ECM) equipment and can emulate all known ECM threats and transmit, receive, and analyze a wide range of electronic signals. **Contractor:** Los Alamos Technical Associates. **Status:** Ongoing.

C-135C Project Speckled Trout
Advanced avionics and communications R&D program implementing avionics developments based on advanced digital bus architectures. Integrates various communications and navigation satellite technologies to enhance versatility in tanker/transport worldwide applications. **Contractor:** Many. **Status:** Ongoing.

Cruise Missile Mission Control Aircraft
The CMMCA (designated EC-18D) will provide a stand-alone asset for OT&E (off-range) and a range support asset for DT&E (on-range) cruise missile testing. By combining the aspects of telemetry reception and real-time display, remote command and control, and radar surveillance into one airframe, cruise missile testing will not require the large airborne support group currently used. Initial operational capability is planned for FY 1995. **Contractors:** Chrysler Technological Airborne Systems, Hughes. **Status:** Second aircraft in systems ground testing.

Electronic Counter-Countermeasures/Advanced Radar Test-Bed
The ECCM/ARTB is an airborne platform for DT&E of advanced radar systems and ECCM techniques, to include multisensor integration. This unique Air Force resource is designed to support development of current airborne radar systems and advanced technology programs into the next century. The NC-141A test-bed has been specifically designed to both instrument and physically accommodate five radars currently in use in the F-15, F-16, and B-1. **Contractor:** Lockheed-Georgia. **Status:** Upgrade to increase the bandwidth of the data collection system in support of Wright Laboratory Program.

F-15/APG-70 Radar Air-to-Air Missile Integration
Flight test and evaluation of the F-15/APG-70 radar operational flight program (OFP) and avionics suite support for the AIM-120 Advanced Medium-Range Air-to-Air Missile, AIM-7 Sparrow, and AIM-9 Sidewinder. Capability is assessed for each radar OFP following the completion of OFP DT&E. **Contractors:** McDonnell Douglas Aircraft (MDA), Hughes. **Status:** DT&E.

F-15/APG-70 Radar OFP
Flight test and evaluation of F-15/APG-70 radar OFP updates, which incorporate changes and ECCM features requested by using commands. Test programs are conducted in formal phases. The radar OFPs are released to operational units every 18 months as part of two avionics suites—the Multistage Improvement Program (MSIP) APG-70 and the F-15E. **Contractors:** MDA, Hughes. **Status:** DT&E.

F-15/F100-PW-229 Component Improvement Program
Flight test and evaluation of Pratt & Whitney F100-PW-229 engine performance and operability as installed in the F-15 with improved components, developed as required to improve engine reliability and maintainability. Test programs are conducted in formal phases. Improved components are released for incorporation into operational aircraft after the successful conclusion of CIP DT&E. **Contractors:** MDA, Pratt & Whitney (P&W). **Status:** DT&E.

F-15E Avionics OFP
Flight test and evaluation of F-15E avionics OFP updates, incorporating changes requested by using commands. Test programs are conducted in formal phases. The avionics OFPs are released to operational units every 18 months. **Contractor:** MDA. **Status:** DT&E.

F-15E High Angle of Attack Flight Test Program
Program to test the high angle of attack flying qualities of the F-15E with conformal fuel tanks and various external loadings as requested by using commands. **Contractor:** MDA. **Status:** DT&E.

F-15E/Low-Altitude Navigation and Targeting Infrared for Night (LANTIRN) DT&E
Flight test and evaluation of the LANTIRN system OFPs as installed on the F-15E. Both the AAQ-13 navigation pod and the AAQ-14 targeting pod OFPs are tested. OFP updates incorporate changes requested by using commands. Test programs are conducted in formal phases. The LANTIRN OFPs are released to operational units every 18 months. **Contractors:** MDA, Martin Marietta Electronic Systems. **Status:** DT&E.

F-16 Combined Test Force/Block 30 Close Air Support
An MSIP retrofit of avionics systems for the F-16C/D dedicated to the close air support mission. Implements new avionics architecture based on the modular mission computer and several sensor and display modes to enhance close air support operations. **Contractors:** GD, Westinghouse. **Status:** Development, test planning.

F-16 Combined Test Force/Block 30 System Capability Upgrade
An MSIP production upgrade of avionics systems for Block 30 F-16C/Ds. Integrates several sensor and display modes to enhance versatility in both air-to-ground and air-to-air operations. **Contractors:** GD, Westinghouse. **Status:** Ongoing.

F-16 Combined Test Force/Block 40 Avionics Integration
Testing program to help upgrade the avionics systems as part of the MSIP for F-16C/D production. Includes avionics architecture based on a general avionics computer, LANTIRN compatibility, Global Postitioning System (GPS), digital flight-control system, and wide-field-of-view holographic head-up display. **Contractors:** GD, Westinghouse, Martin Marietta (MM). **Status:** Flight test, reporting.

F-16 Combined Test Force/Block 50 Avionics Integration
An MSIP production upgrade of avionics systems for F-16C/D. Integrates modes to enhance air-to-ground operations, including AGM-65G Maverick and AGM-88 High-Speed Antiradiation Missile. **Contractors:** GD, Westinghouse. **Status:** Development, test planning, risk reduction, flight test.

F-16 Combined Test Force/F100-PW-229
Testing of the Increased Performance Engine (IPE) version of the existing F100 engine being developed for the Block 50 F-16C/D. **Contractors:** GD, P&W. **Status:** Flight test, reporting.

F-16 Combined Test Force/F110-GE-129
Testing of the IPE version of the existing F110 engine being developed for the Block 50 F-16C/D of the 1990s. Will compete with P&W IPE. **Contractors:** GD, General Electric. **Status:** Flight test, reporting.

F-16 LANTIRN
Program to conduct follow-on DT&E of system enhancements to the two-pod navigation and targeting system for nighttime, under-the-weather ground attack. **Contractors:** GD, MM. **Status:** Flight test, reporting.

F-16A/B Air Defense Fighter
MSIP retrofit of avionics systems for the F-16A/B aircraft dedicated to the air defense fighter mission. Integrates beyond-visual-range missile capabilities; advanced identification, friend or foe; and several sensor and display modes to enhance air defense operations. **Contractors:** GD, Westinghouse. **Status:** Flight test, reporting.

F-16A/B Midlife Update
A retrofit of avionics systems to extend viability of Block 15 (USAF) and Block 10 (European Participating Air Forces) F-16A/Bs past 2000. Includes implementation of the modular mission computer–based avionics architecture. **Contractors:** GD, Westinghouse. **Status:** Development, test planning.

F-22
Program in which combined test force conducts combined DT&E/initial OT&E of the F-22 aircraft and F119 engine in preparation for a production decision on the F-22 air-superiority fighter, which will replace the F-15. **Contractors:** Lockheed, Boeing, P&W. **Status:** EMD, test planning.

MC-130H Combat Talon II
Program to evaluate the modification of C-130H aircraft into MC-130H configuration for US SOFs. Modifications include terrain-following/terrain-avoidance radar, integrated avionics systems, and a defensive avionics suite. **Contractor:** IBM. **Status:** QT&E, QOT&E, development improvements testing.

NC-141/A General Test-Bed
Program providing three aircraft used for pallet-mounted test equipment or any testing which requires large cargo space. **Contractors:** Many. **Status:** Ongoing.

Project Condor Twin
Program conducted for US Coast Guard to modify its RG-8A aircraft from single-engine to twin-engine configuration, including extensive modification of the airframe and powerplant and full airworthiness and performance flight testing. **Contractor:** Schweizer. **Status:** Planning.

T-39 Photo Safety Chase Test-Bed
The 418TS has several capabilities of the T-39 and limited support requirements, suiting it for diverse test programs and remote or isolated testing locations. **Contractors:** Many. **Status:** Ongoing.

Testing Off-the-Shelf Aircraft
Commercial aircraft purchased for military applications are evaluated against applicable military requirements both during source selection and after contract award. Areas of evaluation include ground handling, maintenance, flying quality, performance, human factors, and technical orders. Two programs are ongoing: JPATS and T-3A. **Contractor:** None. **Status:** Ongoing.

Variable Stability In-Flight Simulator Test Aircraft/F-16
VISTA/F-16 is modified to function as a general-purpose fighter simulator to replace the NT-33. **Contractors:** GD, Calspan Corp. **Status:** Ongoing.

X-29 Vortex Flow Control
Program designed to investigate the ability to control asymmetric nose vortices at high angles of attack, using forebody blowing to enhance control and stability. **Contractor:** Grumman. **Status:** Continuing evaluation of data.

X-30 National Aerospace Plane
Program to investigate possible simulation, ground support system design, and instrumentation in support of the joint Air Force, NASA, and Navy NASP effort, whose goal is to develop and verify the technologies needed to build military and civilian single-stage-to-orbit and hypersonic cruise vehicles. **Contractors:** Rockwell, MD, GD, Rocketdyne, P&W. **Status:** Planning.

X-31 Enhanced Fighter Maneuverability
Testing of the EFM, a program to verify and validate the tactical utility of maneuvering at very high angles of attack. Includes use of two X-31A vehicles with post-stall techniques enabled by thrust vectoring and specialized control systems. Participants include the International Test Organization, composed of US government, German government, and industry participants. **Contractors:** Rockwell International, Deutsche Aerospace. **Status:** Flight test and documentation.

Space and Missile Systems Center, Los Angeles AFB, Calif.

Space Test and Evaluation Directorate
USAF test center for space R&D program mission control and technology demonstrations. Current programs include Transportable Space and Evaluation Resource, Transportable Vehicle Checkout System, and Consolidated Space Test Ground System. **Contractor:** Loral. **Status:** Test Support.

Range System Program Office, Aeronautical Systems Center, Eglin AFB, Fla.

Air Combat Manuevering Instrumentation (ACMI) Advanced DDS
Joint USAF-Navy project to provide a majority of the debriefing information currently available on the ACMI Display and Debriefing System to users at their home bases at greatly reduced cost. The program will use state-of-the-art mini- and microcomputer equipment to reduce the cost of ACMI debriefing facilities. **Contractor:** ADTI Corp. **Status:** EMD.

ACMI Airborne Instrumentation Subsystem Pods
Production of the airborne portion of the ACMI system. Pods can be carried on any AIM-9 missile rail; some can be carried on AIM-120 rails. Pods are interoperable on all eight- and 36-aircraft ACMI systems, as well as on all US Navy Tactical Aircrew Combat Training System (TACTS) ranges. Program includes fully automated/computerized pod test sets, which are deployed at each AIS pod maintenance facility. **Contractor:** Metric. **Status:** Production.

ACMI Joint Interoperability
Ongoing effort to incorporate a series of completed Air Force/Navy projects into operational ACMI/TACTS ranges. This program will allow fighters from both services to train in a simulated combat environment at any range. **Contractor:** In-house. **Status:** Ongoing.

AN/MST-T1V Mini–Multiple Threat Emitter System
Production of a variant of the AN/MST-T1A that allows dispersion of emitter signals to simulate an Integrated Air Defense System. The remote emitters will be unmanned and will radiate multiple threat signals. **Contractors:** GD, Harris. **Status:** Production.

Foreign Military Sales Measurement Debriefing System
Program to upgrade the FMS ACMI systems with the next-generation MDS capability. This involves the replacement of the eight-aircraft system with more modern systems, such as the 36/45 high-activity-aircraft system, 70 ground threats, and GPS/computer-generated threat system capability. **Contractor:** To be determined (TBD). **Status:** Program definition.

Goldwater Mission Debriefing System
Program to provide real-time monitoring and control of aircraft during training by recording events for postmission debrief and analysis. **Contractor:** TBD. **Status:** RFP May 1994.

GPS Production
Development of the High-Dynamics Instrumentation Set, a full mil-spec GPS five-channel CA/P-code receiver for use in high-speed aircraft and in pods mounted on the aircraft. Data-link subsystem is used for data communication between the participants and the RR/P and host range. Ancillary equipment includes a control display unit to communicate with GPS instrumentation sets and a data retrieval unit to download recorded data for transfer to a host range computer. **Contractor:** Interstate Electronics. **Status:** Low-rate initial production.

GPS Translator Range Applications
Program developed and tested translators for test and training ranges. Translator is used for low-volume requirements and can receive L-band signals from all satellites in view, shift signals to another frequency (commonly S-band), and transmit this broadband information to the ground station for reduction. **Contractor:** Interstate Electronics. **Status:** Production, product improvement, sustainment.

GPS Upgrade
Projects to upgrade the GPS data link to include the latest encryption technology and over-the-air rekeying. Prototype and low-rate production equipment will be retrofitted. **Contractor:** Interstate Electronics. **Status:** Product improvement.

GRDCUS Upgrade
Program to replace all computer hardware of the older Gulf Range Drone Control Upgrade System with a more powerful computer system to control both full-scale and subscale drones. It will include a mobile control system. The mobile system is part of the test equipment being acquired for the QF-4 full-scale aerial target (FSAT) and is designed to land damaged drones. This upgrade will also include a capability to accept GPS data for time and space positioning information (TSPI). **Contractors:** IBM, MM. **Status:** Production.

Ground Jammer Follow-On
Production of I/J-band radar jammer that includes functional duplication of known threat jammers. Modular construction and software changes will permit low-cost updates. **Contractor:** American Electronic Lab, Inc. **Status:** Production.

Gulfport North Range ACMI
Program to expand existing Gulfport overwater ACMI to instrument airspace surrounding Camp Shelby, Miss. The north range consists of an additional Tracking Instrumentation Subsystem master and 13 remotes. The south range will be used primarily for air-to-air training and the north range for air-to-ground training of Guard, Air Force, and Navy pilots. **Contractor:** Industrial Data Link. **Status:** Production.

Joint Air Combat Training System
Program to provide next-generation ACMI. Features will include GPS-based TSPI; secure data link; and expanded capability in terms of participants, threat environment, and airspace. Threats will be computer-generated, requiring a two-way interface. USAF priority aircraft are F-15, F-16, and F-22. Navy priority aircraft are F/A-18, F-14, and A-6. Nellis AFB, Nev., will be the first user. **Contractor:** TBD. **Status:** EMD.

Low-Cost GPS C/A Receiver GPS Range Applications
Program to provide DoD with more than 400 C/A receiver units. This competitive acquisition has an option for an additional 700 units. **Contractor:** Navstar, Ltd. **Status:** Production.

Missile Endgame Scoring System
Program will provide development, test, and production options for QF-106 and BQM-34A aerial targets. **Contractor:** Motorola. **Status:** EMD.

National Training Center/Air Warrior Integration System
Program to place an ACMI range over the existing Army National Training Center Range at Fort Irwin, Calif. Data from the Army tracking system will be shared and integrated with the ACMI data stream so that weapon events can be conducted among both Army and Air Force players. Specially modified AIS pods will form part of the system to allow the Army system to designate airborne targets. **Contractor:** Cubic Corp. **Status:** Production.

Next-Generation Target Control System
Program to provide a triservice, next-generation target control system for use in test and evaluation and operational training. Features will include GPS-based TSPI; secure data link; and expanded capability in terms of controlled targets, participants, threat environment, and airspace. **Contractor:** TBD. **Status:** Program definition.

On-Board Electronic Warfare Simulator
Program to provide F-16 and F-15E aircrews with realistic electronic combat threat indications. This ground-independent, computerized threat simulator will cause aircraft radar warning receivers to react visually and aurally as though threats existed. **Contractor:** Lockheed Sanders. **Status:** EMD, production.

QF-4 FSAT
Program to replace the QF-106 full-scale aerial target in mid-1996. USAF is the lead service in this triservice program. Some 330 F-4s are being converted to FSATs. **Contractor:** Tracor Systems Division. **Status:** Ongoing.

QF-106 FSAT
Conversion of retired F-106 aircraft to full-scale aerial targets for use in support of aircrew training, tactical air forces weapon systems evaluation, and development/test programs. 175 F-106s have been converted to FSATs. **Contractor:** Honeywell, Inc. **Status:** Production.

Range Control System
The RCS will support safety, overall management, and ground-control intercept training at the range control facility at Tyndall AFB, Fla. The RCS will receive and display sensor input and provide the capability to receive and display other future sensor system inputs. **Contractor:** DigiComp. **Status:** Production.

Strategic Training Route Complex/Route Integration/ Instrumentation System
Program to provide RIIS for a bomber training complex in the northwestern US. Encompasses communication, control, information processing, and debriefing display capability for the STRC. The RIIS aircrew-debriefing function will provide capability to review missions, analyze associated events, and evaluate aircrew performance. **Contractor:** GTE. **Status:** Production.

Translator Processing System GPS Range Applications
Program to develop and test the TPS for test and training ranges. TPS will receive telemetry signals from the translator and process the position of the translator to the ground controller. The TPS provides tracking for the Army's SDI interceptor missile and reentry vehicle. **Contractor:** Interstate Electronics. **Status:** Production.

Tyndall ACMI Upgrade
Project to improve the training of Air Force and Navy fighter pilots, including Reserve and Guard, in tactics and techniques. System provides for real-time monitoring and control of aircraft during training. It records events for postmission debriefing and analysis. This system directly supports deployed units at Tyndall and Eglin AFBs, Fla. **Contractor:** ADTI Corp. **Status:** Production.

Yukon Mission Debriefing System
Project to improve the training of Air Force and Navy fighter pilots, including Reserve and Guard, in tactics and techniques. This system directly supports deployed units at Eielson AFB, Alaska. The tracking instrumentation subsystem to be installed on the Yukon range will consist of three master stations and approximately 17 remotes. The communication subsystem will also interface with the recently installed Cope Thunder Radar Microwave Link and range UHF and VHF radio systems. **Contractor:** ADTI Corp. **Status:** Production. ■

A World War II bombardier recalls the campaign to disrupt Germany's oil supply.

Ploesti, Through Fire and Flak

By Leroy W. Newby

PLOESTI has long been the heart of Romania's petroleum industry, with many massive refineries, storage facilities, and oil field equipment plants. During World War II, it was vital to the German war effort. The Allies bombed it intensely for years, especially in the spring of 1944, fifty years ago. The author, a bombardier on many missions, gathered these nine stories from his crew and other crews who flew in 1944 against the guns at Ploesti. They are representative of the high drama and many acts of courage that occurred over Ploesti throughout the war.

The War Stood Still

Lt. Ped Magness, a bomber pilot in the 97th Bomb Group, reported how time seemed to stand still in one air battle.

In this particular action, he said, a B-17 in the middle of an American formation was mortally hit and caught on fire. The crew bailed out, but one man's parachute caught on the bomb bay. He was left hanging and whipping in the wind, doomed to a horrible death. None of his comrades in nearby aircraft could help him. They were scrambling to avoid the inevitable explosion that sometimes would take another plane down with it.

Then the war "kind of hesitated," as Magness put it, when a German Me-109 (officially, a Bf-109) flew right into maximum peril—within the perimeter of the formation of bombers. The American crew members were amazed that he had the guts to fly into the center of all those guns pointing at him. Everyone quit shooting. The German eased up behind the helpless, dangling airman and shot him. No one fired when the German pulled out and away. The US airmen let him go, and the war started up again.

Into the Fire

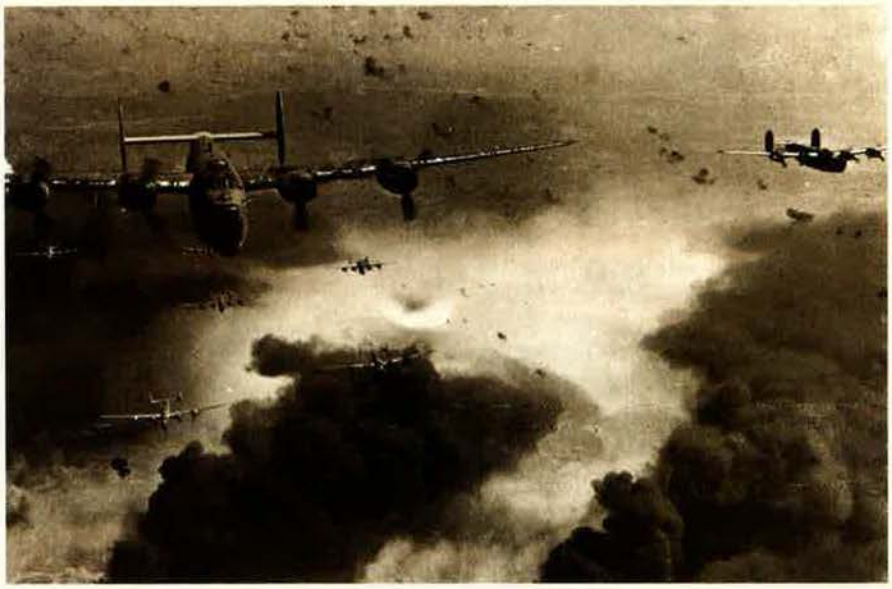
Navigator Lt. Dick Fowler saw the six German Me-109s attack his plane, causing the fuel tanks to explode. Both of the pilots in his aircraft died instantly, and the entire nose section was in flames. The nose gunner's parachute harness snagged on his turret, and he screamed for help.

Fowler fought his way through flames to his trapped comrade, who succumbed to flame inhalation just as Fowler reached him. By then, Fowler's clothing was on fire. In the middle of a furnace, he faced a serious dilemma. Just a foot away from him was the open nose wheel door—an escape hatch and instant relief from the inferno—but his chest pack was two feet beyond the opening, up on the crawl-tunnel entrance.

The heat was so intense that he wanted only to escape the searing fire. So badly did he want relief that his irrational, emotional desire to dive out the opening into the cool air, without his parachute, was at first stronger than his rational need to move toward the lifesaving chest pack. It would take all his willpower to move past the beckoning open hatch, through more flames, to his parachute.

Reason and the will to live finally won out. Fowler lunged for his chute pack, which was also on fire, grabbed it, and leaped through the hole without snapping the pack to his harness. The –60° air jolted him back to reality. He snapped the two chute-hooks onto the harness rings, counted to ten, and pulled the rip cord.

Fowler was so cold that he was unaware that his face had been badly burned. As he floated down to about 12,000 feet, a fighter fired on him. The bullets ripped through his parachute canopy. He slumped in his har-



The first oil refinery opened at Ploesti, Romania, in 1856. At its peak, the refining complex there was processing more than twenty million barrels of oil for the Axis each year, ensuring its status as a high-value target.

ness, pretending to be dead, and the plane flew away. Fowler survived that jump and walked for nine weeks through the mountains of Yugoslavia to reach Italy. There he resumed his quest for fifty missions and his ticket home.

Hundreds of Guns

Running into enemy fighters was scary, but at least you could shoot back. With flak, you knew it was lurking out there, yet a bomber had no defense against it except to throw out radar-defeating chaff. When there was no undercast, chaff was worthless; gunners could track you visually more accurately than by radar.

If enemy defenders had few guns, they tracked you with predicted fire. When you looked out ahead of the airplane and saw four flak bursts, spaced in a row a few seconds apart, you knew where the fifth would explode. You could only hope and pray your plane wouldn't be near that predicted spot in the sky.

At Ploesti, where they had hundreds of guns, the defenders developed the "box barrage." This was a large box of bursting flak in the sky, spread out along the bomb run and at the bomb release point. This box was larger than the mass of bombers, making sure the formation was enveloped in the streaking steel. Hundreds of flak gunners, each firing a round every three or four seconds, kept it filled with bursting flak, daring the bombers to enter.

They knew the bombers could not be stopped. Their hope was to hit a plane or two and cause the formation to split open, thereby reducing bombing accuracy. Our instructions, however, were clear: Accept the dare. Fly into and through the box of deadly flak. No evasive action. Get in and get out, and go on a straight line.

Dangerous Euphoria in the Clouds

My job as deputy lead bombardier on my first mission to Ploesti was to identify the assigned refinery from among ten in the city, then locate a tank farm through the Norden bombsight, close in, and help lead the formation to destroy it. When well along the course, I saw something that made my heart sink: Instead of a long two-abreast storage-tank farm running east-west, this one was square. The target photo confirmed my worst fears.

I shouted to the navigator, Lt. Sherman Wood, "Did we turn early?"

"Yeah, about a minute early," he replied. "Why?"

"This is the wrong target!"

Then came the voice of the squadron operations officer, Maj. W. Heberd James. "Right or wrong, this is the one we're bombing."

The flak intensity increased, along with my anxiety. I vaguely realized I was breathing very deeply, and the air in my nostrils seemed dusty. I was unaware that I had pulled my oxygen hose from the auto-mix. The hose dangled to the floor, and I was breathing air without enough oxygen to keep a man alive, mixed with dust from the floor.

I was in danger of slipping into a dangerous euphoria caused by oxygen deprivation. Wood saw my plight, gave me a kick, and motioned to hook up as he turned the auto-mix selector to "pure oxygen."

Head back in the sight and now fully alert, I could see that we were about eight seconds away from bomb release. A low cloud covered the aiming point, and I had to rely on offset aiming—predicting where the target would be. I came out of the sight and sat back to watch the scale tick off the final seconds.

A "click" from within the sight told me the system was sending a message to the bomb-shackles to release the bombs. An upsurge of the aircraft, suddenly lighter by two tons, confirmed it had been done. "Bombs away" and "bomb bay doors closed" marked my exit from brief participation in the mission, and I looked forward to my homeward nap.

The clouds made it impossible to know whether the target had been hit.

Inches From the Edge

The US bombers' tail-end Charlie staggered homeward from the punishment at Ploesti, which had left it with number three propeller windmilling and three blown superchargers. It ducked in and out of clouds to evade fighters. All items not nailed down—machine guns, ammo, flak suits and helmets, oxygen tanks, and the Norden bombsight—had long since been jettisoned to try to keep the plane aloft. Gas streamed from number three as the crew headed for the emergency landing strip at Vis, off Yugoslavia's coast.

While the B-24 was still over water and on the landing approach, its prop burned off and ripped through the fuselage. As the bomber neared land, a biplane taxied down the short runway, its pilot oblivious to the stricken B-24 descending on him.

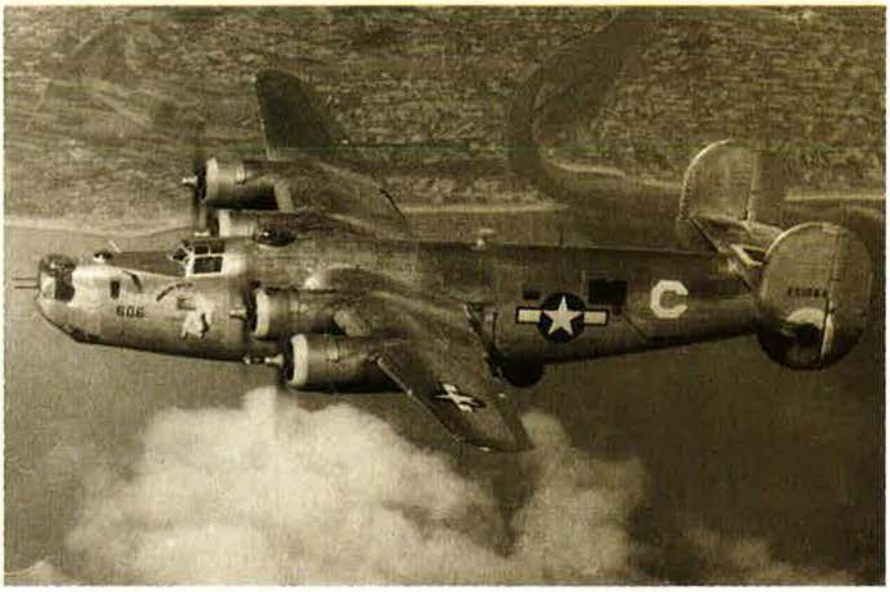
The bomber skimmed over the errant plane, and Lt. Charles M. Hammett dropped it in front, leaving just 1,500 feet of landing space—with a cliff and the Adriatic Sea at the other end. A B-24 needs 3,500 feet to land.

At the signal of 2d Lt. Edward R. "Dusty" Rhodes, the rear brakemen pulled the rip cords on parachutes secured by parachute harness to each waist gun-mount and held out in the slipstream.

The shock of sudden braking was like being hit by a baseball bat. The two pilots stood on the brakes, bug-eyed as they watched the cliff's edge approach at diminishing speed. Which would win, drag or momentum?

The other crew members, braced in crash-landing positions, grinned, shook hands, and exchanged OK signs, unaware of what was going on. The plane rolled to a halt. The bombardier, reaching out to congratulate Hammett and Rhodes, wondered why their faces were drained of color. Neither offered his hand or spoke.

When he crawled out from under the bomb bay, he saw why: The nose wheel had stopped only inches from the cliff's edge.



Hangar Queen ***was one of hundreds of B-24s to make repeated sorties against Ploesti. Despite the Liberator's ten .50-caliber guns, losses from German fighters were high, and the guns offered no protection against the massive flak barrages.***

Post-Target Shakes

Not long after bombing a target, I experienced a new thrill. Visually scouring the ground from my 20,000-foot perch, I saw what appeared to be a five-gun flak battery and was startled to see a red flash, followed by four more from the compound.

I thought, "Could they be flak guns firing at me?"

What followed was terrifying. Five black dots in a growing circle appeared below and seemed to be coming straight for the plane. Hypnotized, I watched antiaircraft shells coming up to get the plane. The spell was broken when they exploded about a hundred yards away in a straight line. It was predicted fire.

Departing the flak zone, I sat down and had my usual post-target shakes, caused partly by sweat-soaked underwear reducing my body temperature as I sat in the unheated nose section. As part of my ritual, I removed my oxygen mask and poured out the pool of sweat, fascinated as it froze on the way down and bounced off the floor.

The site of much tragedy, Ploesti also saw acts of heroism that earned USAAF flyers six Medals of Honor among countless other decorations. This photo was taken August 10, 1944, less than a month before Ploesti fell to Soviet troops.

Cat and Mouse

On one particularly dispiriting day, the crews of the 460th Bomb Group lost four aircraft to German fighters and to flak. Soon after leaving the target, one bomber emerged from a cloud to encounter a sickening sight: A German Me-110 fighter was poised for the kill, flying directly behind a badly mangled B-24 that was barely able to stay aloft. The helpless flak-riddled bomber, with one engine shot out, half a rudder gone, and no guns operating, was trapped 600 miles from home base. The cat appeared to be toying with the mouse.

The bomber pilot emerging from the clouds felt a sudden surge of anger at the sight. He peeled over and sent the four-engine bomber diving on the unsuspecting Me-110 pilot, who didn't have a chance. The heavy Liberator roared out of the sun, fighter-attack style, with six of its guns firing. The fighter spun downward in flames.

On the crippled bomber, an appreciative audience cheered and applauded.

Brown Sugar Souvenirs

Though the crewmen of *Hangar Queen* were on their forty-seventh mission, they were as petrified as newcomers. Their B-24 was ordered

After its engines quit at 1,500 feet,* Hangar Queen *was lucky to make it back at all. Amazingly, thanks to the timely appearance of a convenient valley, most of the crew survived the crash-landing that left their aircraft in this condition.

down the runway, despite its overweight load and the lack of headwind. At the end of the runway, a column of fire and black smoke rose from a crashed aircraft, testimony to the folly of trying the impossible.

Second in line for takeoff, the crew had watched as the first plane made its attempt. It had run out of runway before it reached takeoff speed, plowed into the field beyond, nosed over, and exploded.

Now it was *Hangar Queen*'s turn.

The towering column of smoke did not deter the starter, who waved his flag to signal takeoff. The pilot, Lieutenant Hammett, shook his head no. The starter nodded back yes.

This head-signaling went on for a few more seconds, until someone in authority took over. Ground crewmen put long-roped wooden chocks in front of each wheel. The tower instructed both pilots to apply the brakes and rev all four engines to full throttle. This violated normal takeoff procedure of easing throttles forward while rolling down the runway, using them to steer the plane until enough speed was attained for rudder control.

At a signal, the chocks were pulled and the brakes released. The plane shot forward.

The tower had told the pilots that they should jettison their bombs through the bomb bay doors if the bomber had not attained a speed of 140 mph at a certain marker. They knew, or at least believed, that unarmed bombs would not explode. They also knew or believed that the instant loss of two tons would help the plane leap into the air.

Hangar Queen raced down the runway. The full-throttle start enabled the pilot to gain rudder control earlier than usual. The copilot called out ground speed. The flight engineer kept his eye out for the marker.

At eighty mph the nose wheel was still load-bearing, but it lifted at eighty-five mph. The race was to reach the 140 mph takeoff speed by the time the marker arrived—or jettison the bombs.

"Marker!" called out SSgt. Danny Smith.

"One-thirty-five," called out Dusty Rhodes.

Hammett, aware they were behind schedule, but knowing they were picking up speed at an increasing rate, said, "We're going!"

The flaming, smoking aircraft lay dead ahead.

At runway's end, *Hangar Queen* eased off the ground, flew through the smoke and flames, and went off to war.

Shortly after, two planes did have to jettison their bombs. None of the weapons exploded, but some broke apart. On display that evening in several tents around the airstrip were what looked like large chunks of hardened brown sugar. The penchant of Americans to collect souvenirs apparently extends even to TNT.

Landing a Liberator

Hangar Queen, home at last from a grueling mission and in the landing pattern at 1,500 feet with gear down, saw its four engines suddenly quit. *Hangar Queen* had served its crew faithfully for months; now, on the crew's fiftieth combat mission, she faltered. Charlie Hammett instinctively shoved the control column forward and said, "Feather all props."

From an altitude of only 1,500 feet above ground, you don't really have enough time and space to lose power in a B-24 and land it successfully. The plane should have crashed, but the crew had some luck: A little valley conveniently appeared near the landing strip. Hammett sent the dead-engine bomber into a dive, dropping it into the valley using the only available power—gravity. The aircraft hugged the steep hillside and followed it downward to recapture the airspeed that the wing of a B-24 needs in order to sustain flight. Then, the plane soared up to a low plateau for a dead-stick landing on a field.

One member of the crew, a replacement bombardier who had asked to fly with our crew on his fiftieth mission, bailed out when the engines quit. His body was found with a partially opened chute fluttering in the wind. Another crew member, Cpl. Clyde Gilbert, also bailed out, but he was lucky: He fell into the valley and landed unscathed.

Sgt. Bob Kaiser had crawled up to the nose to get his chute and was crawling back to make his jump when the plane landed. The landing was smooth, but the stop was not. The fast-moving aircraft slammed into an earthen mound. The impact crushed the underbody of the fuselage, killing Kaiser in the collision. ■

Leroy W. Newby flew fifty bomber missions during World War II, many of them against targets in and around Ploesti. He has written two books about the air operation, Target Ploesti—View From a Bombsight *(Presidio Press) and* Into the Guns of Ploesti *(Motorbooks), and is co-author of a screenplay, "The Guns of Ploesti," based on the latter book.*

Valor

By John L. Frisbee, Contributing Editor

Going for Broke

The odds were heavily against Mustang ace Bob Goebel, but the game wasn't over yet.

IT HAS been said that, among those who fly fighters in combat, there are the hunters and the hunted. The former are true fighter pilots. In the early summer of 1944, the Italy-based 31st Fighter Group was seeing fewer Luftwaffe fighters, and those few avoided engagement whenever possible in order to concentrate on Fifteenth Air Force bombers. Lt. Robert J. Goebel, one of the 308th Fighter Squadron aces, and his squadron commander, Capt. Leland "Tommy" Molland, a double ace, came up with a plan to change that situation. They would put up an extra flight of four P-51s not tied to the bombers but ranging the area, hunting for enemy fighters.

Bob Goebel, the junior partner in the plan, had joined the group's 308th Fighter Squadron in Italy after having flown P-40s and P-39s in Panama and Spitfire Mark Vs in North Africa following the Allied victory there. With fifteen hours in the P-51B at San Severo on Italy's east coast, he crossed the threshold to the shooting war on April 16, imbued with the fighter pilot spirit but with much yet to learn about air combat. His rapid climb up the learning curve to a first victory six weeks later is described in his book *Mustang Ace.*

The first opportunity that Goebel and Molland had to test their plan came on August 18 when the bombers hit Ploesti for the eighteenth and next-to-last time before Soviet troops overran eastern Romania. Several miles east of Ploesti, Goebel, the element leader in Border Black Flight, looked up and back. There was a gaggle of Bf-109s. Half of them continued on course; the other half dove on flight leader Molland and his wingman. Goebel went to max power, pulled up in a wingover, and screamed down into the -109s. He picked one out, holding fire until he couldn't miss, then cut loose with his six .50s. (The squadron's P-51Bs had been replaced by more heavily armed Ds.) The -109 pilot bailed out immediately, leaving Goebel alone. The other three P-51s had disappeared during the violent maneuvering.

Lieutenant Goebel spotted another -109 below and ahead of him. Still at full throttle and almost on the deck, he got strikes all over his adversary. The enemy pilot bailed out, but his chute did not open, and he plunged to the ground. Goebel suspected that the German pilot had been hit and killed as he bailed out. Seeing the death of an opponent who might have lived had he released the trigger a split second earlier has haunted Bob Goebel ever since.

With only a couple of seconds of firing time left and with minimum fuel, Goebel was alone and in a tight spot 600 miles from home base. As he began his climb to altitude, there was a loud bang. The P-51 shuddered. Thinking he had been hit, Goebel broke to the right, went to max power, and looked over his shoulder. Two Bf-109s were closing rapidly. After some wild maneuvering, the -109s, probably low on fuel, broke off and headed north. Common sense told Bob Goebel that in his precarious situation he, too, should break off and head for home, but the fighter pilot spirit took over. He followed the -109s, which were flying line-abreast on the deck, some 300 yards apart.

Closing on the enemy fighters, Goebel decided to take the one on his left. As he was approaching firing position, the second -109 turned to get on his tail. Breaking off, he again fell in behind the Germans, once more singling out the one on the left. This time, the second -109 turned into him too quickly and was, at least momentarily, out of the fight. With his few remaining rounds and only two guns still firing, Goebel opened up on his quarry. The Luftwaffe pilot, who must have looked back at that moment, crashed into the ground.

After Bob Goebel landed at San Severo with his engine running on fumes, he and his crew chief could find no bullet holes in the P-51. Two exhaust stacks were missing, probably from running too long at high power settings. They theorized that the bang, which saved the young pilot's life, was an engine detonating—a sort of backfire. In any event, Goebel's gun camera film confirmed the three victories that earned him the Silver Star. He was promoted to captain a few days later and was named group leader on several later missions.

At the end of World War II, Bob Goebel was a twenty-one-year-old ace with eleven confirmed aerial victories.

Before ending his combat tour, Bob Goebel scored two more victories. At war's end, with eleven confirmed, he was tied for eighth place among Fifteenth Air Force aces. He was twenty-one years old.

Following the war, Bob Goebel earned a degree in physics under the GI Bill, then worked on the manned space program and several other advanced Air Force projects. He retired as a lieutenant colonel in 1966 to join the aerospace industry. Now fully retired, he lives in Torrance, Calif., with his wife of fifty-three years, surrounded at times by nine children and twenty-two grandchildren. ■

Books

Compiled by Frank Oliveri, Associate Editor

Ballard, Robert D., and Archbold, Rick. *The Lost Ships of Guadalcanal.* Warner Books, Inc., 1271 Avenue of the Americas, New York, NY 10020. 1993. Including photos and index, 227 pages. $39.95.

Band, William F. X. *Warriors Who Ride the Wind.* Castle Books, P. O. Box 17262, Memphis, TN 38187. 1993. Including photos, 267 pages. $19.95.

Bergerud, Eric M. *Red Thunder, Tropic Lightning: The World of a Combat Division in Vietnam.* Penguin Books, 375 Hudson St., New York, NY, 10014. 1994. Including photos, 328 pages. $11.95.

Budahn, P. J. *Drawdown Survival Guide.* Naval Institute Press, Annapolis, MD 21402-5035. 1993. Including appendix and index, 193 pages. $12.95.

Bundy, McGeorge, Crowe, William J., Jr., and Drell, Sidney D. *Reducing Nuclear Danger: The Road Away from the Brink.* Council on Foreign Relations Press, 58 E. 68th St., New York, NY 10021. 1993. Including index, 107 pages. $14.95.

Burrows, William E., and Windrem, Robert. *Critical Mass: The Dangerous Race for Superweapons in a Fragmenting World.* Simon & Schuster, 1230 Avenue of the Americas, New York, NY 10020. 1994. Including photos, notes, and index, 573 pages. $25.00.

Burton, James G. *The Pentagon Wars: Reformers Challenge the Old Guard.* Naval Institute Press, Annapolis, MD 21402. 1993. Including photos, notes, and index, 306 pages. $23.95.

Carlaw, Alan, ed. *Eagles in the Sky: The RAF at 75—A Celebration.* Trafalgar Square, North Pomfret, VT 05053. 1994. Including photos, 160 pages. $29.95.

Cross, Air Chief Marshal Sir Kenneth, with Orange, Vincent. *Straight and Level.* Grub Street, The Basement, 10 Chivalry Rd., London SW11 1HT, England. 1993. Including photos and index, 306 pages. $29.95.

Davis, Richard G. *Carl A. Spaatz and the Air War in Europe.* Smithsonian Institution Press, 470 L'Enfant Plaza, Suite 7100, Washington, DC 20560. 1994. Including photos, appendix, notes, glossary, and index, 808 pages. $49.95.

Deniston, Col. Dale R., USAF (Ret.). *Memories of a Combat Fighter Pilot: World War II and Korea.* Dale Deniston, 5020 Lake Pierce Dr., Lake Wales, FL 33853. 1993. Including photos 160 pages. $7.95.

Dunnigan, James F., and Macedonia, Raymond M. *Getting It Right: American Military Reforms After Vietnam to the Persian Gulf and Beyond.* William Morrow and Co., Inc., 1350 Avenue of the Americas, New York, NY 10019. 1993. Including appendix and index, 320 pages. $23.00.

Franks, Norman L. R., Bailey, Frank W., and Guest, Russell. *Above the Lines: The Aces and Fighter Units of the German Air Service, Naval Air Service and Flanders Marine Corps 1914–1918.* Grub Street, The Basement, 10 Chivalry Rd., London SW11 1HT, England. 1993. Including photos and bibliography, 259 pages. $49.95.

Fry, Eric. *An Airman Far Away.* Kangaroo Press Ltd., 3 Whitehall Rd., P. O. Box 75, Kenthurst NSW 2156, Australia. Including photos and index, 242 pages. $29.95.

Glennan, T. Keith. *The Birth of NASA: The Diary of T. Keith Glennan.* National Aeronautics and Space Administration History Office, Headquarters, Washington, DC 20546-0001. 1993. Including photos, appendix, and index, 389 pages. $24.00.

Graham, Michael B. *Mantle of Heroism: Tarawa and the Struggle for the Gilberts, November 1943.* Presidio Press, 505 B San Marin Dr., Suite 300, Novato, CA 94945-1340. 1993. Including photos, notes, index, and bibliography, 360 pages. $24.95.

Gruner, Elliott. *Prisoners of Culture: Representing the Vietnam POW.* Rutgers University Press, 109 Church St., New Brunswick, NJ 08901. 1993. Including photos, notes, bibliography, and index, 245 pages. $14.95.

Herlik, Ed. *Separated by War: An Oral History by Desert Storm Fliers and Their Families.* TAB Books, Blue Ridge Summit, PA 17294-0850. 1994. Including photos and glossary, 292 pages. $24.95.

Herman, Marguerita Z. *Ramparts: Fortification From the Renaissance to West Point.* Avery Publishing Group, Inc., 120 Old Broadway, Garden City Park, NY 11040. 1992. Including photos and index, 201 pages. $50.00.

Hyland, L. A. *Call Me Pat: The Autobiography of the Man Howard Hughes Chose to Lead Hughes Aircraft.* The Donning Company Publishers, 184 Business Park Dr., Suite 106, Virginia Beach, VA 23462. 1993. Including photos and index, 415 pages. $19.95.

Johnson, J. E., and Lucas, P. B. *Courage in the Skies: Great Air Battles From the Somme to Desert Storm.* Trafalgar Square, North Pomfret, VT 05053. 1993. Including photos and index, 208 pages. $39.95.

Kilduff, Peter. *Richthofen: Beyond the Legend of the Red Baron.* John Wiley and Sons, Inc., 605 Third Ave., New York, NY 10158. 1994. Including photos, bibliography, and index, 256 pages. $27.95.

Kurzman, Dan. *Left To Die: The Tragedy of the USS* Juneau. Pocket Books, 1230 Avenue of the Americas, New York, NY 10020. 1994. Including photos, notes, appendix, and index, 335 pages. $23.00.

Maslowski, Peter. *Armed With Cameras: The American Military Photographers of World War II.* The Free Press, 866 Third Ave., New York, NY 10022. 1993. Including photos, bibliography, and index, 412 pages. $29.95.

Morris, Eric. *Circles of Hell: The War in Italy, 1943–1945.* Crown Publishing Inc., 201 E. 50th St., New York, NY 10022. 1993. Including photos, appendix, bibliography, and index, 498 pages. $25.00.

Murphy, Edward F. *Dak To: The 173d Airborne Brigade in South Vietnam's Central Highlands, June–November 1967.* Presidio Press, 505 B San Marin Dr., Suite 300, Novato, CA 94945. 1993. Including photos, appendix, glossary, and index, 355 pages. $24.95.

North, Oliver L., with Roth, David. *One More Mission: Oliver North Returns to Vietnam.* HarperCollins Publishers, 10 E. 53d St., New York, NY 10022-5299. 1993. Including photos and index, 280 pages. $22.00.

O'Neill, William L. *A Democracy at War: America's Fight at Home and Abroad in World War II.* The Free Press, 866 Third Ave., New York, NY 10022. 1993. Including photos, notes, and index, 480 pages. $24.95.

Shores, Christopher, and Cull, Brian, with Malizia, Nicola. *Air War for Yugoslavia, Greece, and Crete, 1940–41.* Grub Street, The Basement, 10 Chivalry Rd., London SW11 1HT, England. 1987; available in US 1993. Including photos and index, 445 pages. $29.95.

Showalter, Dennis E., and Albert, John G., eds. *An American Dilemma: Vietnam, 1964–1973.* Imprint Publications, Inc., 100 E. Ohio St., Suite 610, Chicago, IL 60611. 1993. Including index, 203 pages. $22.95.

Thompson, Scott A. *B-17 in Blue: The Flying Fortress in US Navy and US Coast Guard Service.* Aero Vintage Books, P. O. Box 1508, Elk Grove, CA 95759-1508. 1993. Including photos, appendix, and index, 120 pages. $16.95.

Volkman, Ernest. *Spies: The Secret Agents Who Changed the Course of History.* John Wiley and Sons, Inc., 605 Third Ave., New York, NY 10158. 1994. Including photos and index, 288 pages. $24.95.

Waller, Douglas C. *The Commandos: The Inside Story of America's Secret Soldiers.* Simon & Schuster, 1230 Avenue of the Americas, New York, NY, 10020. 1994. Including photos and index, 399 pages. $23.00.

Wood, W. Raymond. *Or Go Down in Flame: A Navigator's Death Over Schweinfurt.* Sarpedon, 166 Fifth Ave., New York, NY 10010. 1993. Including photos, notes, and index, 230 pages. $24.95.

AFA State Contacts

Following each state name are the names of the communities in which AFA chapters are located. Information regarding these chapters or any of AFA's activities within the state may be obtained from the appropriate contact.

ALABAMA (Birmingham, Gadsden, Huntsville, Mobile, Montgomery): **William B. Divin,** 6404 Pinehurst Run, Mobile, AL 36608 (phone 205-433-4848, ext. 278).

ALASKA (Anchorage, Fairbanks): **Steven R. Lundgren,** P. O. Box 83658, Fairbanks, AK 99708-3658 (phone 907-459-3291).

ARIZONA (Green Valley, Phoenix, Prescott, Sedona, Sierra Vista, Sun City, Tucson): **William A. Lafferty,** 1342 W. Placita Salubre, Green Valley, AZ 85614 (phone 602-625-9449).

ARKANSAS (Blytheville, Fayetteville, Fort Smith, Hot Springs, Little Rock): **William A. Kehler,** 2718 Gray Fox Ln., Jacksonville, AR 72076-2629 (phone 501-843-3562).

CALIFORNIA (Apple Valley, Bakersfield, Camarillo, Edwards, Fairfield, Fresno, Los Angeles, Merced, Monterey, Novato, Orange County, Pasadena, Riverside, Sacramento, San Bernardino, San Diego, San Francisco, Sunnyvale, Vandenberg AFB, Yuba City): **Cheryl L. Waller,** 10449 Shore Crest Terr., Moreno Valley, CA 92557 (phone 909-382-3689).

COLORADO (Boulder, Colorado Springs, Denver, Fort Collins, Grand Junction, Pueblo): **Don Dandurand,** 4450 E. Fountain Blvd., Suite 204, Colorado Springs, CO 80916 (phone 719-591-1011).

CONNECTICUT (Brookfield, East Hartford, Middletown, Storrs, Stratford, Torrington, Waterbury, Westport, Windsor Locks): **John F. McCormack,** 218 Tryon St., Middletown, CT 06457 (phone 203-346-0036).

DELAWARE (Dover, New Castle County, Rehoboth Beach): **Robert M. Berglund,** 128 W. Loockerman St., Dover, DE 19901 (phone 302-674-0200).

DISTRICT OF COLUMBIA (Washington): **Paul McManus,** 1501 Lee Highway, Arlington, VA 22209-1198 (phone 703-247-5820).

FLORIDA (Avon Park, Broward County, Cape Coral, Daytona Beach, Fort Walton Beach, Gainesville, Homestead, Hurlburt Field, Jacksonville, Leesburg, Miami, New Port Richey, Ocala, Orlando, Palm Harbor, Panama City, Patrick AFB, Port Charlotte, Saint Augustine, Sarasota, Spring Hill, Tallahassee, Tampa, Titusville, Vero Beach, West Palm Beach, Winter Haven): **Bernard R. Hanlon,** 1179 Talbot St., Port Charlotte, FL 33952-2872 (phone 813-624-0234).

GEORGIA (Athens, Atlanta, Columbus, Dobbins AFB, Rome, Saint Simons Island, Savannah, Valdosta, Warner Robins): **Jack Steed,** P. O. Box 2087, Warner Robins, GA 31099 (phone 912-929-4111).

GUAM (Agana): **William Dippel,** P. O. Box 12861, Tamuning, GU 96931 (phone 671-646-4445).

HAWAII (Honolulu, Maui): **Jeffrey H. Okazaki,** 2029 Lee Pl., Honolulu, HI 96817-2442 (phone 808-438-1132).

IDAHO (Boise, Mountain Home, Twin Falls): **Ralph D. Townsend,** P. O. Box 45, Boise, ID 83707-0045 (phone 208-389-5226).

ILLINOIS (Belleville, Champaign, Chicago, Elmhurst, Moline, Peoria, Rockford, Springfield-Decatur): **Richard W. Asbury,** 502 Slavens Manor, Bettendorf, IA 52722-4114 (phone 319-355-8409).

INDIANA (Bloomington, Evansville, Fort Wayne, Grissom AFB, Indianapolis, Lafayette, Marion, Mentone, New Albany, South Bend, Terre Haute): **Don McKellar,** 2324 Pinehurst, Kokomo, IN 46902 (phone 317-455-0933).

IOWA (Des Moines, Marion, Sioux City, Waterloo): **Carl B. Zimmerman,** 208 Waterloo Bldg., Waterloo, IA 50701-5495 (phone 319-234-0339).

KANSAS (Garden City, Topeka, Wichita): **E. D. Brown,** 4209 Westport, Wichita, KS 67217 (phone 316-942-8045).

KENTUCKY (Lexington, Louisville, Paducah): **Vaiden Q. Cox,** 3249 Cross Bill Rd., Louisville, KY 40213-1284 (phone 502-636-2316).

LOUISIANA (Alexandria, Baton Rouge, New Orleans, Shreveport): **Ivan L. McKinney,** 331 Greenacres Blvd., Bossier City, LA 71111 (phone 318-425-8877).

MAINE (Bangor, Loring AFB, North Berwick): **Philip B. Turner,** P. O. Box 202, Caribou, ME 04736 (phone 207-496-6461).

MARYLAND (Andrews AFB, Baltimore, College Park, Rockville): **Robert B. Roit,** P. O. Box 263, Poolesville, MD 20837-0263 (phone 301-349-2262).

MASSACHUSETTS (Bedford, Boston, East Longmeadow, Falmouth, Hanscom AFB, Taunton, Westfield, Worcester): **Carol A. Chrest,** 134 Ember Ln., Carlisle, MA 01741 (phone 617-275-6100).

MICHIGAN (Alpena, Battle Creek, Detroit, East Lansing, Kalamazoo, Marquette, Mount Clemens, Oscoda, Traverse City, Southfield): **George E. Copher,** 1015 S. County Rd. 557, Gwinn, MI 49841 (phone 906-346-2400).

MINNESOTA (Duluth, Minneapolis–Saint Paul): **Vic Seavers,** 8259 131st St. W., Apple Valley, MN 55124 (phone 612-726-6558).

MISSISSIPPI (Biloxi, Columbus, Jackson): **Leonard R. Vernamonti,** 718 Country Place Dr., Pearl, MS 39208 (phone 601-960-3600).

MISSOURI (Richards-Gebaur AFB, Saint Louis, Springfield, Whiteman AFB): **John J. Politi,** 2308 Jason Ct., Jefferson City, MO 65109-5825 (phone 314-634-2246).

MONTANA (Bozeman, Great Falls): **Charles F. Curtis,** 119 W. College, Bozeman, MT 59715 (phone 406-586-0291).

NEBRASKA (Lincoln, Omaha): **C. Howard Vest,** 301 S. 70th St., Suite 140, Lincoln, NE 68510-2452 (phone 402-489-9255).

NEVADA (Las Vegas, Reno): **P. K. Robinson,** 3440 Moberly Ave., Las Vegas, NV 89118 (phone 702-385-8600).

NEW HAMPSHIRE (Manchester, Pease AFB): **Baldwin M. Domingo,** 5 Birch Dr., Dover, NH 03820 (phone 603-742-0422).

NEW JERSEY (Andover, Atlantic City, Belleville, Camden, Chatham, Cherry Hill, Forked River, Fort Monmouth, Gladstone, Jersey City, McGuire AFB, Newark, Old Bridge, Trenton, Wallington, West Orange): **Joseph M. Capriglione,** 179 Newbrook Ln., Springfield, NJ 07081-3022 (phone 201-344-6753).

NEW MEXICO (Alamogordo, Albuquerque, Clovis): **Charles Vesely,** 808 Piedra Vista N. E., Albuquerque, NM 87123-1954 (phone 505-881-3552).

NEW YORK (Albany, Bethpage, Binghamton, Brooklyn, Buffalo, Chautauqua, Griffiss AFB, Nassau County, New York City, Queens, Rochester, Staten Island, Suffolk County, Syracuse, Westhampton Beach, White Plains): **Allen G. Harris,** 202 Riverside Dr., 6C, New York, NY 10025-7298 (phone 212-222-0446).

NORTH CAROLINA (Asheville, Charlotte, Fayetteville, Goldsboro, Greensboro, Greenville, Havelock, Kitty Hawk, Littleton, Raleigh, Wilmington): **William W. Michael,** P. O. Box 36, Fayetteville, NC 28302-0036 (phone 910-323-4400).

NORTH DAKOTA (Fargo, Grand Forks, Minot): **John O. Syverson,** 6450 N. 13th St., Fargo, ND 58102-6011 (phone 701-232-2897).

OHIO (Cleveland, Columbus, Dayton, Mansfield, Newark, Youngstown): **William J. Schaff,** 429 Oakmead Pl., Dayton, OH 45419 (phone 513-429-0100).

OKLAHOMA (Altus, Enid, Oklahoma City, Tulsa): **Larry M. Williams,** 11819 S. Douglas Ave., Oklahoma City, OK 73170-5635 (phone 405-736-5512 or 736-4317).

OREGON (Eugene, Klamath Falls, Portland): **Robert S. Furrer,** 19 S. W. Greenridge Ct., Lake Oswego, OR 97035-1428 (phone 503-697-7585).

PENNSYLVANIA (Allentown, Altoona, Beaver Falls, Bensalem, Coraopolis, Drexel Hill, Erie, Harrisburg, Homestead, Johnstown, Lewistown, Philadelphia, Pittsburgh, Scranton, Shiremanstown, State College, Washington, Willow Grove, York): **Robert C. Rutledge,** 129 Arlington St., Johnstown, PA 15905 (phone 412-235-2711).

PUERTO RICO (San Juan): **Vincent Aponte,** P. O. Box 8204, Santurce, PR 00910 (phone 809-764-8900).

RHODE ISLAND (Warwick): **John A. Powell,** 700 Saint Paul's St., North Smithfield, RI 02895 (phone 401-766-3797).

SOUTH CAROLINA (Charleston, Clemson, Columbia, Myrtle Beach, Sumter): **David V. Massey,** 101 Kerryton Rd., Columbia, SC 29223 (phone 803-695-6202).

SOUTH DAKOTA (Rapid City, Sioux Falls): **Robert J. Johnson,** 1120 E. 57th St., Sioux Falls, SD 57106 (phone 605-338-4532).

TENNESSEE (Chattanooga, Knoxville, Memphis, Nashville, Tullahoma): **Jack K. Westbrook,** P. O. Box 1801, Knoxville, TN 37901-1801 (phone 615-523-6000).

TEXAS (Abilene, Amarillo, Austin, Big Spring, College Station, Commerce, Corpus Christi, Dallas, Del Rio, Denton, El Paso, Fort Worth, Harlingen, Houston, Kerrville, Lubbock, San Angelo, San Antonio, Waco, Wichita Falls): **Larry L. Miller,** 8322 Van Pelt Dr., Dallas, TX 75228-5950 (phone 214-653-3537).

UTAH (Clearfield, Ogden, Salt Lake City): **Richard E. Schankel,** 370 S. 500 E., #120, Clearfield, UT 84015-4046 (phone 801-776-2101).

VERMONT (Burlington): **William C. Austin,** 10 Southwind Dr., Burlington, VT 05401 (phone 802-863-5909).

VIRGINIA (Alexandria, Charlottesville, Danville, Harrisonburg, Langley AFB, Lynchburg, McLean, Norfolk, Petersburg, Richmond, Roanoke, Winchester): **James E. Cvik,** 1919 Commerce Dr., Suite 445, Hampton, VA 23666-4269 (phone 804-838-2424).

WASHINGTON (Seattle, Spokane, Tacoma): **Philip Giambri,** 131 S. W. 194th St., Seattle, WA 98166-4040 (phone 206-773-1226).

WEST VIRGINIA (Charleston): **Samuel Rich,** P. O. Box 444, White Sulphur Springs, WV 24986 (phone 304-536-4131).

WISCONSIN (Madison, Milwaukee, Mitchell Field): **Gilbert M. Kwiatkowski,** 8260 W. Sheridan Ave., Milwaukee, WI 53218-3548 (phone 414-463-1849).

WYOMING (Cheyenne): **Robert S. Rowland,** 9001 Red Fox Rd., Cheyenne, WY 82009 (phone 307-632-8746).

AFA NATIONAL REPORT

(From left) AFA Executive Director Monroe Hatch Jr. and AFA National President Jim McCoy discuss AFA priorities with House Armed Services Committee member Rep. H. Martin Lancaster (D-NC).

Military-Civilian Pay Gap

The battle for comparable pay for AFA military members goes on. Since 1982, military pay has fallen 11.7% behind private sector pay. As military pay erodes, it is more and more difficult to attract and keep top quality people in military service.

The Air Force Association supports equitable and timely pay increases for all military members, as well as other initiatives aimed at countering the erosion of benefits.

Fighting for adequate compensation is a top AFA priority. It directly affects the quality and readiness of the force, and it is even more important as the U.S. military becomes smaller.

AFA Board taps health care expertise

Health care reform continues to be on the top of the Association's 1994 agenda. Like other concerned Americans, AFA members have much at stake in the current health care debate.

AFA members have varied interests, which range from active duty care to access of dependents and retired members. One thing seems certain for all: military health care as we know it will never be the same again.

Given the complexity of the issue, AFA Chairman of the Board O.R. Crawford recently appointed Air Force Lt. Col. Jerome Luby, a health care expert, to keep the Board up to date on this crucial issue. Luby serves on the staff of the Air Force Surgeon General and is a key member of the Air Force team evaluating the many proposals now being discussed.

Luby briefed the AFA Board on four current proposals:

- The Health Security Act: The Clinton Plan
- Managed Competition Act: The Cooper Plan
- Health Equity and Access Reform Today Act: The Chafee Plan
- American Health Security Act: The Wellstone/McDermott Plan

AFA will continue to represent its members' interests in the health care debate, working individually and as part of the Military Coalition.

How are we doing?

"The Air Force Association is a strong voice on Capitol Hill for a strong national defense. In my dealings with the Association's leaders, I have found them to be a source of credible information, and I always appreciate the support they offer in my efforts to improve the quality of life for the men and women of the Air Force."

—Rep. Ike Skelton (D-MO)
Chairman, Military Forces and Personnel Subcommittee

AFA/AEF Report

By Daniel M. Sheehan, Assistant Managing Editor

Florida Fund-Raising

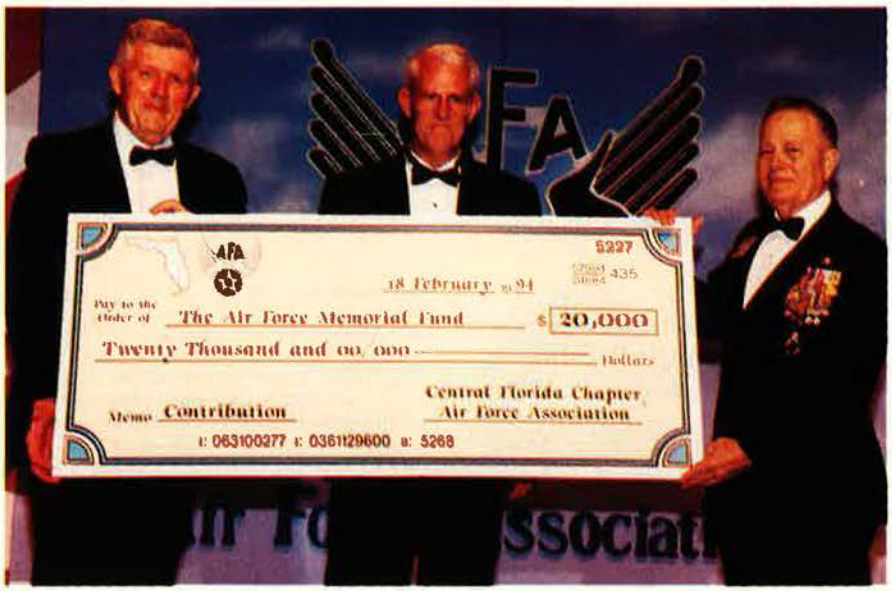
Many AFA chapters have discovered the link between the game of golf and successful fund-raising. The **Jerry Waterman (Fla.) Chapter,** near Tampa, has tapped into the area's obsession with golf as a surefire method of raising funds for its projects—most notably the JW Education Foundation, which distributes scholarships to local students.

The third annual Jerry Waterman Golf Classic drew sixty-three participants and netted $3,800 for the foundation. The chapter offered several donated prizes, including round-trip airline tickets and cellular telephones, to golfers and staged an auction to reap further proceeds for the foundation. Local businesses were offered the opportunity to become sponsors of the tournament in return for $1,000, $500, or $250 donations.

Northwest Airlines, Ron Slivka Buick, Jones Intercable, Paragon Cable, One Up Golf Center, and Bill Currie Ford contributed the $1,000 required to become Gold Sponsors of the tournament.

The chapter has lined up an important speaker to kick off its 1994 program of luncheon meetings. Maj. Gen. Earl Peck, USAF (Ret.), was scheduled to give chapter members the perspective from his position as executive director of the Florida De-

AFA National Director James M. McCoy (left) and Executive Director Monroe W. Hatch, Jr. (right), met with Veterans Affairs Secretary Jesse Brown in a session devoted to addressing the concerns of AFA's many veterans. Mr. McCoy discussed the impact of various health-care plans on veterans.



Both AEF and AFA were busy during recent Florida meetings. The new AEF officers (at left), Walter E. Scott (left) and Thomas J. McKee, will lead the foundation as chairman of the board and president, respectively. At right, Central Florida Chapter President Richard Ortega (right) and Gala Chairman Harry Ledford (left) present the proceeds of the tenth annual Air Force Gala to Air Force Memorial Foundation Chairman Joe Coors, Jr.

partment of Veterans Affairs. Hosted by Chapter President Joe Lamparielo, General Peck could be counted on to impart information of interest to the state's more than one million veterans.

The chapter is also scheduled to deliver a strong presence at the MacDill AFB Open House, complete with booths to exhibit examples of aerospace technology, in an effort to raise funds, attract new members, and increase the public's awareness of AFA's mission.

Far West Workshop

The Far West Regional Workshop in Las Vegas, Nev., last January had the benefit of two outstanding speakers to ensure its success. Lt. Gen. Robert D. Beckel, USAF (Ret.), spoke at the luncheon meeting, recalling his experiences as commander of Strategic Air Command's 15th Air Force at March AFB, Calif. Maj. Gen. Billy G. McCoy, USAF (Ret.), the dinner speaker, was no stranger to the Las Vegas area or the mission of nearby Nellis AFB, having served there as commander of the USAF Tactical Fighter Weapons Center. Both generals are Vietnam veterans, with 313 and 223 combat missions, respectively.

National Vice President (Far West Region) John W. Lynch, Jr., applauded the speakers, as did California State President Cheryl L. Waller, Nevada President P. K. Robinson, and Arizona President William A. Lafferty. **Phoenix Sky Harbor (Ariz.) Chapter** President Glenn O. Plaumann was among several chapter presidents in attendance.

Chapter News

The **David D. Terry, Jr. (Ark.), Chapter** has teamed with the Jacksonville, Ark., Chamber of Commerce to honor one of its own. Longtime Chapter Secretary Jerry Reichenbach was named the chapter's Citizen of the Year. Chapter President Marleen Eddlemon gave Mr. Reichenbach his plaque at an annual banquet sponsored by the Chamber of Commerce.

Gordon Blackwell, project and research officer for the city of Mobile, Ala., has been honored for his staunch support of the **Mobile Chapter** with an AFA Citation. The citation was presented by Alabama State President William B. Divin on the occasion of Mr. Blackwell's retirement.

AFA member Glen L. Bower has been singled out for recognition by his peers by being named a Life Fellow of the American Bar Foundation, an honor limited to one-half of one percent of all attorneys in the US. Mr. Bower, who serves on the US Railroad Retirement Board, has been an officer in the Air Force Reserve since 1974 and an AFA member since 1983.

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. ■

Coming Events

May 6–7, **Mississippi State Convention,** Biloxi, Miss.; May 6–7, **North Carolina State Convention,** Fayetteville, N. C.; May 7, **Massachusetts State Convention,** Boston, Mass.; May 13–14, **South Carolina State Convention,** Sumter, S. C.; May 13–14, **Tennessee State Convention,** Knoxville, Tenn.; May 20, **Maryland State Convention,** Andrews AFB, Md.; June 10–12, **Arizona/Nevada State Convention,** Las Vegas, Nev.; June 10–12, **New York State Convention,** Cheektowaga, N. Y.; June 17–18, **Missouri State Convention,** Whiteman AFB, Mo.; June 24–26, **Alabama State Convention,** Huntsville, Ala.; June 24–26, **Ohio State Convention,** Newark, Ohio; July 8–9, **Virginia State Convention,** McLean, Va.; July 15–17, **Oregon State Convention,** Portland Ore.; July 15–18, **Pennsylvania State Convention,** Pittsburgh, Pa.; July 22–24, **Texas State Convention,** Fort Worth, Tex.; August 5–6, **New Mexico State Convention,** Albuquerque, N. M.; August 6, **Montana State Convention,** Three Forks, Mont.; August 6–7, **Iowa State Convention,** Des Moines, Iowa; August 12–13, **Arkansas State Convention,** Hot Springs, Ark.; August 12–14, **California State Convention,** Vandenberg AFB, Calif.; August 19–21, **Kansas State Convention,** Wichita, Kan.; August 20, **Indiana State Convention,** Indianapolis, Ind.; September 12–14, **AFA National Convention and Aerospace Technology Exhibition,** Washington, D. C.

Unit Reunions

Fiftieth Anniversary of the United States Air Force

Seeking veterans/unit reunion groups and individuals interested in participating in USAF fiftieth-anniversary activities in Las Vegas, Nev., April 22–26, 1997. **Contact:** Jim McDonnell, Air Force Association, 1501 Lee Hwy., Arlington, VA 22209. Phone: (800) 727-3337.

Air Commando Ass'n
World War II air commandos (1st, 2d and 3d Groups) and other current/past air commando and special operations personnel will hold a fiftieth-anniversary reunion October 6–9, 1994, at Hurlburt Field, Fla. **Contacts:** Kenneth Heller, 3716 Smoke Rise Hill Dr., Charlotte, NC 28226. Phone: (704) 543-7166. SSgt. Daniel A. d'Errico, USAF (Ret.), P. O. Box 7, Mary Esther, FL 32569.

Air Forces Escape and Evasion Society
The Air Forces Escape and Evasion Society will hold a reunion April 15–19, 1994, at the Worthington Hotel in Fort Worth, Tex. **Contact:** James J. Goebel, Jr., 9 Georgia Park, Conroe, TX 77302. Phone: (409) 273-2828.

Burtonwood Ass'n
Personnel who were stationed in Burtonwood, England, will hold a reunion October 12–16, 1994, in Dayton, Ohio. **Contact:** James M. Ruel, 302 E. Peach Orchard Ave., Dayton, OH 45419. Phone: (513) 293-2634.

CAP
The Civil Air Patrol will hold a reunion for Spaatz Award recipients in conjunction with its national meeting August 11–13, 1994, at the Sheraton Hotel in New Orleans, La. **Contact:** Lt. Col. Leonard Blascovich, CAP, 100-30 Elgar Pl., Apt. 30-H, Bronx, NY 10475-5048. Phone: (718) 379-8666.

Dyersburg AAB Memorial Ass'n
Personnel who were stationed at Dyersburg AAB, Tenn., between 1942 and 1946, including members of the 346th Bomb Group and 223d/330th Combat Training units, will hold a reunion June

11–12, 1994, at the Holiday Inn in Dyersburg. **Contact:** Patricia A. Higdon, 719 W. Main, Halls, TN 38040. Phone: (901) 836-7400.

Johnston Island AFB Personnel
Personnel who served at Johnston Island AFB between 1952 and 1957 will hold a reunion April 8–9, 1994. **Contact:** Norm Cox, 5100 John D. Ryan Blvd., #2210, San Antonio, TX 78245.

N. C. ANG Pilots and Navigators
Former North Carolina ANG pilots and navigators will hold a reunion June 10–11, 1994, at the Ramada Inn in Charlotte, N. C. **Contact:** Blaine Nash, 918 Hartford Ave., Charlotte, NC 28209. Phone: (704) 523-3054.

P-38 National Ass'n
Members of the P-38 National Association will hold a reunion May 12–15, 1994, at the Doubletree Hotel in Houston, Tex. **Contact:** Jack Mullan, 3400 Irvine Ave., Suite 101, Newport Beach, CA 92660. Phone: (714) 852-9111.

P-47 Thunderbolt Pilots Ass'n
The P-47 Thunderbolt Pilots Association will hold a reunion May 26–June 2, 1994, in France. **Contacts:** Bob Forrest, 9728 Argyll Cir., L. V. E., Lakewood, NJ 08701. Phone: (908) 920-0146. Bob Richards, P. O. Box 3299, Topsail Beach, NC 28445. Phone: (910) 328-8781.

RAF Station Manston
Personnel from all units who served at RAF Station Manston, UK, will hold a reunion and seven-day cruise starting May 24, 1994. **Contact:** Milton J. Torres, 11200 S. W. 99th Ct., Miami, FL 33176. Phone: (305) 238-3342.

Red River Valley Fighter Pilots Ass'n
The Red River Valley Fighter Pilots "River Rats" will hold a reunion April 27–30, 1994, at the Holiday Inn Palo Verde in Tucson, Ariz. **Contact:** Russ Violett, 4401 N. Placita Gacela, Tucson, AZ 85718. Phone: (602) 577-6348 or fax: (602) 577-3634.

Scouting Force Ass'n
Veterans of the 1st, 2d, and 3d Scouting Force, 8th Air Force, will hold a reunion April 7–10, 1994, at the Hilton Hotel in Arlington, Tex., **Contact:** Lt. Col. E. Richard Atkins, USAF (Ret.), 1304 Cochise Dr., Arlington, TX 76012.

Tan Son Nhut Ass'n
Veterans who served at Tan Son Nhut AB, Vietnam, will hold a reunion July 15–17, 1994, in Evansville, Ind. **Contact:** Don Parker, 524 S. Gibson St., Princeton, IN 47670. Phone: (812) 385-4422.

6th Bomb Group
Veterans of the 6th Bomb Group, which included the 24th, 39th, and 40th Bomb Squadrons, who served on Tinian (World War II) will hold a reunion May 11–15, 1994, at the Grosvenor Hotel in Orlando, Fla. **Contact:** Newell Penniman, Jr., 6 Porter Ln., South Hamilton, MA 01982.

9th Air Force Ass'n
The 9th Air Force Association will hold a "D-Day Remembered" reunion convention May 12–17, 1994, in New Orleans, La., and a reunion cruise aboard the *Queen Elizabeth II* May 29–June 8, 1994. **Contacts:** Marvin Rosvold (reunion), 600 S. 13th St., Norfolk, NE 68701. Phone: (402) 371-6633. Kathi Jones (D-Day event), University of New Orleans, Lakefront, New Orleans, LA 70148. Phone: (504) 286-7126. Vito S. Pedone (cruise), P. O. Box 2733, Arlington, VA 22202. Phone: (703) 979-1992.

12th Tactical Recon Squadron
Veterans of the 12th Tactical Reconnaissance Squadron will hold a reunion September 29–October 1, 1994, at the Sheraton Hotel in Colorado Springs, Colo. **Contacts:** William M. Winberry, 294 Moline St., Aurora, CO 80010. Phone: (303) 366-6329. Jerry Purcell, 1516 W. Mountain Ave., Fort Collins, CO. 80521. Phone: (303) 484-2345.

13th Bomb Squadron Ass'n
Veterans of the 13th Bomb Squadron who served in Korea will hold a reunion July 27–31, 1994, at the Sheraton Burlington Hotel and Conference Center in Burlington, Vt. **Contact:** John Goodrich, 60 E. Terrace, South Burlington, VT 05403. Phone: (802) 864-6563.

14th Air Force Ass'n
Veterans of the 14th Air Force Association "Flying Tigers," which includes the American Volunteer Group (1941–42), China Task Force (1942–43), and 14th Air Force (1943–45), are planning to hold a reunion May 26–29, 1994, at the Crystal Gateway Marriott in Arlington, Va. **Contact:** Robert M. Lee, 717 19th St., S., Arlington, VA 22202-2704. Phone: (703) 920-8384.

22d Bomb Squadron Ass'n
Veterans of the 22d Bomb Squadron, 341st Bomb Group (World War II), will hold a reunion October 20–22, 1994, in San Antonio, Tex. Members of the 10th, 11th, 12th, 490th, and 491st Bomb Squadrons are invited. **Contact:** David K. Hayward, 6552 Crista Palma Dr., Huntington Beach, CA 92647. Phone: (714) 842-8478.

38th Bomb Group Ass'n
Veterans of the 38th Bomb Group, 5th Air Force (World War II), will hold a reunion September 22–25, 1994, at the Holiday Inn Hampton Coliseum in Hampton, Va. **Contact:** Lt. Col. James B. Thoren, USAF (Ret.), 8110 S. Possession Rd., Clinton, WA 98236-8913. Phone: (206) 579-1080.

Class 42-J
Members of Class 42-J (Brooks/Randolph AFBs, Tex.) will hold a reunion May 19–22, 1994, at the Crockett Hotel in San Antonio, Tex. **Contact:** Col. Thomas E. Yarbrough, USAF (Ret.), 1764 Acorn Ln., Hurst, TX 76054-3702. Phone: (817) 282-0069.

Class 43-D Ass'n
Members of Pilot Class 43-D will hold a reunion April 13–16, 1994, at the Holiday Inn Palo Verde in Tucson, Ariz. **Contact:** Jack Carlson, 3045 Silverview Dr., Cuyahoga Falls, OH 44224. Phone: (216) 688-4848.

51st Fighter Squadron
Veterans of the 51st Fighter Squadron, 6th Air Force (World War II), will hold a reunion October 6–9, 1994, in Fort Walton Beach, Fla. **Contact:** Joseph S. Benham, 1405 Langley Dr., Sun City Center, FL 33573. Phone: (813) 634-3094.

Class 52-A
Members of Pilot Training Class 52-A will hold a reunion and memorial dedication ceremony September 8–10, 1994, at Wright-Patterson AFB, Ohio. **Contact:** Charles Costantino, Rte. 2, Box 281-A1, Raeford, NC 28376. Phone: (910) 875-4750.

Class 54-I
Members of Pilot Training Class 54-I are planning to hold a reunion this summer in Dayton, Ohio. **Contact:** Maj. Gen. Clyde F. Autio, USAF (Ret.), 1468 Hilltop Rd., Xenia, OH 45385. Phone: (513) 372-5760.

55th Strategic Recon Wing Ass'n
The 55th Strategic Reconnaissance Wing will hold a reunion April 20–23, 1994, in Hampton, Va. **Contact:** Bruce Bailey, 1611 S. Aida Ave., Tucson, Ariz. 85710. Phone: (602) 886-7825.

63d Fighter Squadron
Veterans of the 63d Fighter Squadron will hold a reunion/dedication April 29–May 1, 1994, at Luke AFB, Ariz. **Contact:** 2d Lt. Teri J. Weaver, USAF, 63d Fighter Squadron (AETC), Luke AFB, AZ 85309-1839. Phone: (602) 856-3670 or DSN: 853-3670.

63d Station Complement Squadron
Veterans of the 63d Station Complement Squadron, 9th Air Force (World War II), will hold a reunion June 10–12, 1994, at the La Quinta Inn in Odessa, Tex. **Contact:** Joe E. Johnston, 3105 Byron, Odessa, TX 79762. Phone: (915) 366-5671.

69th Fighter-Bomber Squadron
Veterans of the 69th Fighter-Bomber Squadron who served in Korea will hold a reunion June 9–12, 1994. **Contact:** Roger Warren, 7550 Palmer Rd., Reynoldsburg, OH 43068. Phone: (614) 866-7756.

79th Fighter Squadron
Veterans of the 79th Fighter Squadron (NATO Tigers '69) who served 1967–69 will hold a twenty-fifth-anniversary reunion September 2–4, 1994, at the Hilton Hotel in Colorado Springs, Colo. **Contact:** Col. Robert E. Darlington, USAF (Ret.), 5006 Chapel Hill Dr., Midland, TX 79705. Phone: (915) 682-8727.

84th ATS/MAS
Veterans of the 84th Air Transport Squadron/Military Airlift Squadron will hold a reunion May 14–15, 1994, at the Holiday Inn in Fairfield, Calif. **Contact:** William D. Oakes, 201 Peachtree St., Vacaville, CA 95688. Phone: (707) 448-3924 or fax: (707) 447-8762.

86th/72d Air Service Squadron
Veterans of the 86th/72d Air Service Squadron, 52d Air Service Group, who served between 1943 and 1946 will hold a reunion October 13–15, 1994, at the Howard Johnson Governors House Hotel in Montgomery, Ala. **Contact:** Robert Harrell, 742 Hillman Ct., Montgomery, AL 36109. Phone: (205) 272-8187.

87th/512th Fighter-Interceptor Squadron
Veterans of the 87th/512th Fighter-Interceptor Squadron who served between 1954 and 1958 will hold a reunion June 3–5, 1994, at the Ramada Hotel in Old Town, San Diego, Calif. **Contact:** Sal Zamora, 222 Sisterdale Rd., Boerne, TX 78006. Phone: (210) 537-4025.

90th Bomb Group
Veterans of the 90th Bomb Group "Jolly Rogers," 5th Air Force, will hold a reunion September 1–5, 1994, at the Little America Hotel in Salt Lake City, Utah. **Contact:** Dan Kravet, P. O. Box 336, Riverton, UT 84065. Phone: (801) 561-7187.

95th Squadron
Veterans of the 95th Pursuit/Interceptor/Fighter Squadron (World War II/Grenier Field), 95th Fighter-Interceptor Squadron (Andrews AFB/Dover AFB), and 95th Fighter-Interceptor Training/Tactical Fighter Training Squadron (Tyndall AFB) will hold a fifty-second-anniversary reunion April 15–17, 1994, in Panama City, Fla. **Contacts:**

Capt. Arthur Crain, USAF, or Capt. Karl Johnson, USAF, Air Education and Training Command, Tyndall AFB, FL 32403-5000. Phone: (904) 283-3113, (904) 283-2121, or (904) 747-9395.

111th Tactical Recon Squadron
Veterans of the 111th Tactical Reconnaissance Squadron (World War II) will hold a reunion October 6–9, 1994, at the Hampton Inn in San Antonio, Tex. **Contact:** Lt. Col. Roy D. Simmons, Jr., USAF (Ret.), 3730 Edgewater Dr., Nashville, TN 37217. Phone: (615) 366-1191.

311th Fighter Squadron
Veterans of the 311th Fighter/Fighter-Bomber Squadron (World War II and Korea) will hold a reunion June 9–12, 1994, in Phoenix, Ariz. **Contact:** E. R. James, 13083 Ferntrails Ln., St. Louis, MO 63141. Phone: (314) 878-5953.

315th Fighter Squadron
Veterans of the 315th Fighter Squadron, 324th Fighter Group (World War II), will hold a reunion April 21–May 1, 1994, at the Marriott Hotel in Albuquerque, N. M. **Contact:** Eugene J. Orlandi, 311 North St., East Northport, NY 11731. Phone: (516) 368-9193.

345th Bomb Group Ass'n
Veterans of the 345th Bomb Group, 5th Air Force (World War II), will hold a reunion September 8–10, 1994, at the Sheraton Hotel in Colorado Springs, Colo. **Contact:** Brenna Terrill, 104 Granville St., Gahanna, OH 43230. Phone: (800) 219-7235.

352d Fighter Group Ass'n
Veterans of the 352d Fighter Group and the 1st Service Group will hold a reunion August 4–7, 1994, in San Jose, Calif. **Contact:** Richard J. DeBruin, 234 N. 74th St., Milwaukee, WI 53213-3629. Phone: (414) 771-0744.

384th Bomb Group
DATE CHANGE: Veterans of the 384th Bomb Group/Wing will hold a reunion **June 4–6, 1994,** at Hill Aerospace Museum in Ogden, Utah. **Contact:** Nathan H. Mazer, 5483 S. 2375 W., Roy, UT 84067. Phone: (801) 825-2796.

386th Bomb Group
Veterans of the 386th Bomb Group who served in 8th and 9th Air Forces (World War II) will hold reunions August 31–September 3, 1994, at the Marriott Hotel in Albuquerque, N. M., and September 28–October 6, 1994, in France. **Contacts:** Marvin Colton (US reunion), 1500 Dartmouth Dr., N. E., Albuquerque, NM 87106. Phone: (505) 255-7031. Earl Slanker, 847 Hereford Way, Schenectady, NY 12307. Phone: (518) 370-4421.

394th Bomb Group
Veterans of the 394th Bomb Group and the 585th Bomb Squadron will hold a reunion October 20–23, 1994, at the Safari Resort in Scottsdale, Ariz. **Contact:** Elden G. Shook, 311 Green Vista Dr., Enon, OH 45323. Phone: (513) 864-2983.

443d Fighter Squadron
The 443d Fighter Squadron, 327th Fighter Group (World War II), will hold a reunion September 21–25, 1994, at the Holiday Inn North in Colorado Springs, Colo. **Contact:** R. B. Mullaney, 49 Tampa Ave., Warwick, RI 02886-5720. Phone: (401) 737-3188.

446th Bomb Group
Veterans of the 446th Bomb Group who were assigned to Bungay, England, will hold a reunion May 12–15, 1994, at the Viscount Suite Hotel in Tucson, Ariz. Assigned groups and support units are invited. **Contact:** Marvin J. Anderson, 8411 E. Albion Pl., Tucson, AZ 85715. Phone: (602) 296-4829.

447th Bomb Group
Veterans of the 447th Bomb Group, 8th Air Force (World War II), will hold a reunion June 29–July 3, 1994, at the Marc Plaza Hotel in Milwaukee, Wis. **Contact:** Pete Petrillo, 955 N. Pasadena Ave., Elyria, OH 44035. Phone: (216) 365-2561.

449th Bomb Group Ass'n
Veterans of the 449th Bomb Group "Flying Horsemen," 15th Air Force (World War II), will hold a reunion May 24–27, 1994, at the Sheraton-Spokane Hotel in Spokane, Wash. **Contact:** Jack Cunningham, 13521 16th Ave. E., Spokane, WA 99216. Phone: (509) 926-2532.

507th Air Materiel Squadron
The 507th Air Materiel Squadron will hold a reunion in September 1994. **Contact:** Joseph Faust, 101 Rainbow Dr., Apt. 1784, Livingston, TX 77351-9300.

580th/581st/582d Air Resupply and Communication
Members of the 580th, 581st, and 582d Air Resupply and Communication Service will hold a reunion September 8–11, 1994, in the Philadelphia, Pa., area. **Contact:** Col. Norman H. Runge, USAF (Ret.), 155 S. Kings Croft Dr., Bear, DE 19701. Phone: (302) 836-4625.

587th Bomb Squadron Ass'n
Veterans of the 587th Bomb Squadron, 394th Bomb Group, 9th Air Force, will hold a reunion May 19–21, 1994, at the Holiday Inn Dayton Mall in Miamisburg, Ohio. **Contact:** Lonnie Osborne, 4251 Glendale Rd., House Springs, MO 63051-1326. Phone: (314) 375-3712.

780th Bomb Squadron
Veterans of the 780th Bomb Squadron (World War II) will hold a reunion July 27–31, 1994, in Wisconsin Dells, Wis. **Contact:** F. Sommers, 8671 N. Harry Rd., Wisconsin Dells, WI 53965. Phone: (608) 742-3941.

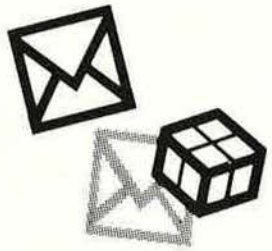
3225th Drone Squadron
Members of the 3225th Drone Squadron will hold a reunion June 5–8, 1994, at the Riviera Hotel in Las Vegas, Nev. **Contact:** James E. Knight, 9915 Columbus Cir., N. W., Albuquerque, NM 87114-4301. Phone: (505) 898-2479.

3912th Air Base Squadron
3912th Air Base Squadron and permanent base personnel who served 1950–53 at RAF Station Wyton, England, will hold a reunion July 22–25, 1994, in San Francisco, Calif. **Contact:** Bill G. Parkhurst, P. O. Box 2881, Tulsa, OK 74101. Phone: (918) 446-6400.

AAF Air Intelligence School Personnel
For the purpose of planning a reunion, I am seeking contact with World War II veterans (1942–44) who attended or were on the staff of the Army Air Forces Air Intelligence School in Harrisburg, Pa. **Contact:** Sid Taylor, 5053 S. 22d St., Arlington, VA 22206. Phone: (703) 820-7537.

Class 43-B
Seeking contact with members of Aviation Cadet Class 43-B (Maxwell AFB, Ala.) who are interested in holding a reunion in Montgomery, Ala. **Contact:** Hoyt M. Warren, 884 Terrace Acres, Auburn, AL 36830. Phone: (205) 887-7558. ■

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.



Mailing Lists

AFA occasionally makes its list of member names and addresses available to carefully screened companies and organizations whose products, activities, or services might be of interest to you. If you prefer **not** to receive such mailings, please copy your mailing label **exactly** and send it to:

Air Force Association
Mail Preference Service
1501 Lee Highway
Arlington, Va. 22209-1198

Bulletin Board

Seeking the whereabouts of **TSgt. Bud Kurreimeyer** of Green Bay, Wis., who was an instructor on B-36s at Ellsworth AFB, S. D., in 1950–51. He had a wife, Bonnie, and a son. Also wish to locate **1st Lt. Raymond Schoolcraft** of Quanah, Tex., who was an RB-36 engineer at Ellsworth in 1950–51. He had a wife, Mary, and two children, and he may have worked for the Postal Service after retirement. **Contact:** MSgt. Malcolm C. Harper, USAF (Ret.), 214B Lochcarren Ct., Kalamazoo, MI 49006.

Artist seeks information on the following **aircraft:** B-24 #942 *Wonder Gal;* B-25s *Cielito Lindo* and *Old Ironsides* of the 310th Bomb Group; B-29 #4461083 *Journey for Margret;* and P-51D #472412 *Miss Mary K* coded 9I-K. Also interested in P-61s, P-70s, Beaufighters, and Mosquitos. **Contact:** Mark J. Adamic, 627 W. Jefferson St., Joliet, IL 60435.

Collector seeks **Military Payment Certificates** used in Vietnam from 1946 to 1975. Willing to buy or trade for notes. Will provide MPC information on request. **Contact:** Nick Schrier, Box 60104, Sacramento, CA 95860.

Collector seeks a copy of the air war story **"The Flying Dutchman"** by George Bruce, which can be found in *Aces,* July 1929, or George Bruce's *Aces,* March 1931. **Contact:** Jack Holt, 1503 Wavecrest Ln., Houston, TX 77062-5427.

Collector and historian seeks **Air Corps** and **AAF memorabilia** from World War I through World War II: flight jackets, uniforms, flight equipment, and photo albums. **Contact:** Jon Cerar, 425 John St., Carlinville, IL 62626.

Seeking contact with **George W. Satterfield, Jr.,** of the 794th Bomb Squadron, 468th Bomb Group. **Contact:** Mrs. Robert P. Evans, 6331 Querbes Dr., Shreveport, LA 71106.

Seeking contact with **C-46** and **C-47 pilots** who were based in Accra, Khartoum, and Aden from November 1942 to September 1944. **Contact:** Ernie Bickers, 7657 Long Pine Dr., Springfield, VA 22151-2826.

Seeking the whereabouts of **J. V. Colson,** a POW in Stalag Luft 1 from late 1944 to May 1945. His last known address was Waycross, Ga. **Contact:** Lt. Col. James R. Groblewski, AFRES, P. O. Box 55, Webster, MA 01570.

Seeking contact, to share memorabilia, with students or staff of the **USAAF Air Intelligence School** at Harrisburg, Pa., during 1942–44. A reunion is being considered. **Contact:** Capt. Sid Taylor, USAF (Ret.), 5053 S. 22d St., Arlington, VA 22206.

Seeking contact with veterans of the **Headquarters Detachment, 317th Troop Carrier Group,** Tachikawa AB, Japan, from July 1946 to April 1947. **Contact:** Herbert L. Wagener, 524 Bridge St., Waynesburg, PA 15370.

Collector seeks **patches** from any USAF units. **Contact:** SSgt. Franklin M. Newman III, USAF, 230 N. Broad St., Apt. D, Fairborn, OH 45324.

Seeking **1/72d-scale model kits** for USAF, Royal Air Force, and Italian Air Force fighters and bombers, 1933–93. **Contact:** Dariusz Zgoda, Ochendzyn 109 , 98-420 Sokolniki, Poland.

Seeking **pen pal** in USAF. **Contact:** Jane Green, 5 Balmoral, East Grinstead, West Sussex RH19 4RJ, England.

Seeking blue-and-white and desert cloth **defective chevrons,** recently recalled by the manufacturers, that are 3.5 inches wide but not tall enough. Can exchange for rare 1956 three-inch-wide rectangular USAF chevrons. **Contact:** Ben Weed, P. O. Box 4643, Stockton, CA 95204.

Seeking any AFROTC graduates from the **University of Illinois** at Urbana-Champaign. **Contact:** Lon J. Taff, AFROTC Det. 190, 223 Armory Bldg., 505 E. Armory Bldg., Champaign, IL 61820.

Seeking information on ***Lady Stardust II,*** a B-17 with the 728th Bomb Squadron, 452d Bomb Group, 8th Air Force, shot down on May 12, 1944. Her pilot was Lt. Boris "Nick" Slanin. Photos appreciated. **Contact:** David C. Williams, 2237 Brookhollow Dr., Abilene, TX 79605.

Seeking the whereabouts of **Lt. Delia Greer** from St. Louis, Mo., who was stationed at Rhein-Main AB, West Germany, 1961–63. She was attached to the MAC Aeromedical Evacuation Squadron. **Contact:** Col. W. Thomas Fuller, USAF (Ret.), 10 Rolling Dr., Framingham, MA 01701.

Seeking whereabouts of or information on **Capt. Gordon McNabb, Lt. Burt Hook,** or any member of the **406th Bomb Squadron,** 11th Air Force, Kiska, Alaska, 1942–44, for a reunion. **Contact:** Eric E. Harris, P. O. Box 81, Victor, CO 80860.

Seeking contact with pilots, WSOs, or maintainers from the **14th Photographic Reconnaissance Squadron,** 7th Photographic Reconnaissance and Mapping Group (1942–45), and the **14th Tactical Reconnaissance Squadron,** 432d Tactical Reconnaissance Wing (later Tactical Fighter Wing, 1966–75) for a history for the 14th Fighter Squadron, Misawa AB, Japan. **Contact:** Capt. David Thole, PSC 76, Box 8331, APO AP 96319-8331.

Seeking contact with anyone who served with the **500th Bomb Squadron** (B-25s), 345th Bomb Group, from November 1942 to November 1945. **Contact:** Bill Cavoli, 2147 Encino Loop, San Antonio, TX 78259-1902.

Seeking information on the **379th Bomb Squadron,** 310th Bomb Group, in Corsica, France, from May 1944 to August 1944, and photos of B-25s *Silver Chief, Uninvited,* or *Shang-Hi-Lil.* **Contact:** MSgt. Roger Francis Harrison, USA (Ret.), 35 Wint Ave., Fort Leavenworth, KS 66027-1346.

Researcher seeks information on **YB-40** aircraft and information or photos of the **B-17 Bomber escort** flown between May and August 1943 by the 327th Bomb Squadron, 92d Bomb Group. This group was reassigned to the 91st Bomb Group, 303d Bomb Group, and Burtonwood later that year. **Contact:** William V. Miller, 800 Quacco Rd., #432, Savannah, GA 31419.

Seeking contact with former USAF pilot **John Yingling.** He was at the All Weather School, Moody AFB, Ga., in May 1953. **Contact:** Erroll L. Williams, 1716 Greenbriar Rd., Glendale, CA 91207.

Seeking to buy or trade patches for museum display from the **962d, 964th, and 966th Airborne Early Warning and Control Squadrons** and the **4759th Combat Crew Training Squadron.** **Contact:** Steve Marques, 15 Grandview Ave., Peabody, MA 01960.

Seeking information, anecdotes, and photos of early Air Force aerobatic teams, particularly the **Thunderbirds/Skyblazers,** for a book on their history. All material will be returned. **Contact:** Terry Durham, 1031 Browns Ln., Gallatin, TN 37066.

Seeking a copy of ***Lingering Contrails of the Big Square A*** *(A History of the 94th Bomb Group)* by Harry E. Slater. **Contact:** Rob Raun, Rte. 2, Box 61, Minden, NE 68959.

Seeking information, photos, and anecdotes of **F-86s, F-84s,** and **B-29s** in Korea for book on UDAF operations in Korea, 1950–53. **Contact:** John Horne, 8/4 Chalmers St., Belmore, N. S. W. 2192, Australia.

Seeking the whereabouts of AAF flight nurses **Lillian J. Tachina** and **Eugenie H. Rutkowski,** or any crew or passengers aboard the 12th Air Force C-47 that was forced to land in Albania on November 8, 1944. **Contact:** A. E. Turner, P. O. Box 623, Point Comfort, TX 77978.

For a scale-model project, seeking information on markings carried by F-4 Phantom IIs of the **3d Tactical Fighter Wing,** based at Incirlik AB, Turkey, during Operation Desert Storm and information on black-bellied F-4D Phantom IIs of the **497th TFS/8th TFW "Night Owls,"** based at Ubon RTAFB, Thailand, in the late 1960s. **Contact:** Michael F. McCullough, 7201 Armat Dr., Bethesda, MD 20817.

Seeking any information on **Norman MacDonald,** a USAF member stationed in Calgary, Alberta, around October 1944. He was born in Detroit, Mich. **Contact:** George Millar, #45 Greenoch Cresc., Edmonton, Alberta, Canada T6L 1W6.

Seeking the whereabouts of **Marshall Dunn, Walter E. George, John C. Haynie, Elba G. Hunt, Henry Iverson,** and **Richard W. Jones,** who graduated from Moody Field, Ga., Class 44-C. **Contact:** Alvin Goodman, 2804 Wall Ave., Waukegan, IL 60087.

Seeking information about **Capt. Foy Draper,** missing in action in 1943; **Capt. Chuck Edwards,** killed in a P-39 at Kaneohe, Hawaii, in 1946; and **Capt. Jack Costen** of the 442d Regimental Combat Team. **Contact:** Herculean Takeru Eno, 13300 Roselle, Hawthorne, CA 90250.

For a family history, seeking information about **Maj. Dewey Chapman,** killed in Korea May 7, 1951. He flew a B-29, and one of his planes was *Shady Lady.* **Contact:** John S. Chapman, 4026 Buena Vista, Dallas, TX 75204.

Seeking veterans of **Broken Arrow** at Palomares, Spain, from January to April, 1966, to call the Department of Energy Hotline (800-493-2998) and the DVA (800-827-0365). Veterans who received USAF-directed follow-up urinalyses are encouraged to contact a fellow "Warner's Warrior" and one of the "High 26." **Contact:** Vic Skaar, 6130 Eisner Dr., Las Vegas, NV 89131.

Seeking the whereabouts of **SSgt. Clinton E. Stanford.** He was stationed at RAF Bentwaters, England, 1954–56, with the 512th FIS. **Contact:** MSgt. P. Hutting, PSC 43, Box 915, APO AE 09466.

Seeking information on **MSgt. Fred Layman,** a B-17 tailgunner assigned to the 532d Bomb Squadron, 381st Bomb Group, at Ridgewell, England, during World War II. **Contact:** Wayne Layman, 14 Belle Crest Dr., Belleville, IL 62221-5513.

Seeking information on the squadron or wing affiliation, base of assignment, and details of the mission and shoot-down of F-105 pilot **Clifton E. Cushman**. He was shot down September 25, 1966. **Contact:** James D. Mahoney, 1702 La Cruz Dr., Henderson, NV 89014-3505.

Seeking information on **54th Troop Carrier Squadron's** flight to the Berlin Airlift. **Contact:** Harry Yonkman, Box 907, Leland, MI 49654.

Seeking contact with friends of **Lt. Col. Richard H. Morgan,** USAF (Ret.), who was recently released from University Medical Center in Tucson, Ariz. **Contact:** Mark Morgan, 59 E. Tioga St., Tunkhannock, PA 18657.

Seeking recognition (spotter or ID) **aircraft models,** World War II to postwar era, all countries of issue and scales, plastic, metal, wood, or cardboard; AFVs; teacher-scale ship ID models; Wings or Players Cigarette cards and albums; Kix cereal 1/432d-scale aircraft models; and the later issues of the COX/AHM showcase miniature aircraft models. **Contact:** James A. Dorst, 113 Beach Rd., Hampton, VA 23664-2054.

Collector of uniforms seeks USAF **colonel's visored service cap,** with clouds and lightning on visor, shade 1549, size 7 and 7½, in good condition, to complete a 1960s and 1970s USAF uniform. **Contact:** Peter J. Burnett, 25 Brora Close, Lakes Est., Bletchley, MK2 3HD, Milton Keynes, Buckinghamshire, England.

For a history of the **100th Bomb Wing,** 1956–66, seeking **squadron and wing insignia,** or color copies, from the 350th, 351st, 418th, and 100th BWs. Also seeking personal information about tours with the 100th BW, Pease AFB, N. H., and the B-47. Photos will be copied and returned. **Contact:** Col. Sigmund Alexander, USAF (Ret.), 12110 Los Cerdos, San Antonio, TX 78233.

Seeking USAF **patches,** especially from the Vietnam era and from former F-102, F-106, and F-4 units. **Contact:** Hans den Uyl, Chr. Huygenslaan 111, 3769 XT Soesterberg, the Netherlands.

Seeking technical information, unit history, and personal stories from former **O-2** pilots, air crew, crew chiefs, and maintenance personnel for a historic journal on the O-2A aircraft. **Contact:** Dave Linker, 2641 South Hoyt Ct., Lakewood, CO 80227.

Seeking contact with **Lieutenant Edwards,** or anyone of the **359th Bomb Squadron,** 303d Bomb Group, who can furnish information on the target and specific date in 1944 of the mission over the North Sea in which Edwards's crew lost an engine. **Contact:** Pete Kowalk, 202 Brushy Creek, Taylors, SC 29687.

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 information, photos, or narratives on **F-4D #65-0626** and its crews' combat operations. The aircraft operated from Ubon RTAFB, Thailand, during the Vietnam War. Information will be copied and returned. **Contact:** John J. Panoski, Empire State Aerosciences Museum, 130 Saratoga Rd., Scotia, NY 12302.

Model-builder seeks to verify markings on an **F-16C Block 30 Falcon** of the 35th Tactical Fighter Squadron, 8th Tactical Fighter Wing, as it appeared in 1993. **Contact:** Cameron Lynch, 2217 S. Flower Ct., Lakewood, CO 80227.

Seeking information on **2d Lt. Clarence Edward Boatright, Jr.,** a B-29 pilot. He may have been a member of the 73d Bomb Wing, or the 498th, 499th, or 500th Bomb Group, on Saipan. He was declared missing in action in December 1944 and may have died in Japan. **Contact:** Chris E. Boatright, 1007 Hickory Trail, San Antonio, TX 78245-1608.

Seeking contact with **Richard Greer,** who retired as a USAF major or lieutenant colonel, and **MSgt. Alvin Chambers,** USAF (Ret.), for the fortieth-anniversary La Jolla High School reunion. **Contact:** Maj. Daniel Rigoli, USAF (Ret.), 5612 Ladybird Ln., La Jolla, CA 92037.

Seeking information about **Dominique (Tony) Costello,** who was stationed at Wright-Patterson AFB, Ohio, in 1953. He sometimes played the saxophone at the NCO club. **Contact:** Dundee Simmons, E. 6506 Highway 106, Union, WA, 98592. ■

Don't wait until what CHAMPUS

Your federally funded CHAMPUS benefits are designed to help you pay for medical care in civilian medical facilities. It's a good plan — as far as it goes. Unfortunately, you can end up paying up to 25% or more of medical expenses!

That's why the Air Force Association is pleased to offer CHAMPLUS®, one of the best CHAMPUS supplements available. As an AFA member, you automatically qualify for special members-only coverage.

New Expense Protector Limits Your Out-of-Pocket Expenses

Here's how it works: You are hospitalized for 35 days and the hospital charges you $330 per day — $59 per day more than allowed by CHAMPUS. Your out-of-pocket expense would be $2,065. With the Expense Protector Benefit your cost would be limited to $1,000, and all reasonable and customary costs over this amount — for the entire calendar year — would be paid.

LOOK AT WHAT AFA CHAMPLUS® PAYS

Care	Retired	Active Duty
Inpatient civilian hospital care	The 25% of allowable charges not paid by CHAMPUS, after the deductible has been satisfied, plus 100% of covered charges after out-of-pocket expenses exceed $1,000 per person (or $2,000 per family) during any single calendar year.	The greater of the total daily subsistence fees, or the $25 hospital charge not paid by CHAMPUS.
Inpatient military hospital care	The daily subsistence fee.	The daily subsistence fee.
Outpatient care (Covers emergency room treatment, doctor bills, pharmaceuticals, and other professional services; see exclusions for limitations)	The 25% of allowable charges not paid by CHAMPUS, after the deductible has been satisfied, plus 100% of covered charges after out- of-pocket expenses exceed $1,000 per person (or $2,000 per family) during any single calendar year.	The 20% of allowable charges not paid by CHAMPUS after the deductible has been satisfied, plus 100% of covered charges after out-of-pocket expenses exceed $1,000 per person (or $2,000 per family) during any single calendar year.

If you live in California, Hawaii, Texas or Louisiana... you'll be pleased to hear that AFA now offers a supplement to CHAMPUS Prime for Prime beneficiaries! (Call 1-800-727-3337)

you're sick to find out *doesn't* cover.

ELIGIBLE APPLICANTS

All AFA members under age 65 who are receiving retirement pay based on their military service, spouses (under 65) of active duty or retired members and their unmarried dependent children under age 21, or 23 if in college, are eligible. Upon reaching age 65, your coverage may automatically be converted to AFA's Medicare Supplement Program.

RENEWAL PROVISION

Your coverage will continue as long as you remain eligible for CHAMPUS benefits, the Master Policy with AFA remains in force, your membership continues, and you pay your premiums.

EXCEPTIONS AND LIMITATIONS

Coverage will not be provided under this plan for pre-existing conditions (conditions which were treated during the 6 months prior to the effective date), until the expiration of 6 consecutive months of coverage during which time no further treatment is received for the condition. After the coverage has been in effect for 12 consecutive months, ALL pre-existing conditions will be covered. There is no waiting period for active duty members who enroll within 30 days of retirement if their dependents have been insured for 12 months previously.

Children of active duty members over age 21 (age 23 if in college) will continue to be eligible if they have been declared incapacitated and if they are insured under CHAMPLUS® on the date so declared. Contact AFA for details.

EXCLUSIONS

This plan does not cover and no payment shall be made for: routine physical examinations or immunizations; domiciliary or custodial care; dental care (except as required as a necessary adjunct to medical or surgical treatment); well-baby care after the age of 2 years; injuries or sickness resulting from declared or undeclared war or any act thereof or due to acts of intentional self-destruction or attempted suicide, while sane or insane; treatment for prevention or cure of alcoholism or drug addiction; eye refraction examinations; prosthetic devices (other than artificial limbs and artificial eyes), hearing aids, orthopedic footwear, eyeglasses and contact lenses; expenses for which benefits are or may be payable under Public Law 89-614 (CHAMPUS).

CHAMPLUS® offers many attractive benefits. A detailed description of the Plan, including exceptions and limitations is contained in the Certificate of Insurance —call AFA's Insurance Division toll-free at 1-800-727-3337. To enroll in the program, complete the application.

RATES

Plan I: For Military Retirees
QUARTERLY PREMIUM SCHEDULE
In-Patient Benefits Only

Member's Attained Age	Member	Spouse	Each Child
Under 45	$24.64	$37.87	$22.71
45-49	$34.11	$65.04	$22.71
50-54	$43.79	$79.69	$22.71
55-59	$59.31	$85.29	$22.71
60-64	$81.16	$107.54	$22.71

Plan I: For Military Retirees and Dependents
QUARTERLY PREMIUM SCHEDULE
In-Patient and Out-Patient Benefits

Member's Attained Age	Member	Spouse	Each Child
Under 45	$49.85	$74.37	$49.04
45-49	$60.14	$94.20	$49.04
50-54	$89.06	$134.54	$49.04
55-59	$115.31	$171.28	$49.04
60-64	$143.77	$194.22	$49.04

Plan II: For Dependents of Active Duty Personnel
ANNUAL PREMIUM SCHEDULE
In-Patient Benefits Only

	Member	Spouse	Each Child
All Ages	N/A	$24.73	$16.08

In-Patient and Out-Patient benefits

All Ages	N/A	$105.21	$55.58

APPLICATION FOR AFA CHAMPLUS®

Group Policy 4609-G1 • Metropolitan Life Insurance Co. • Home Office: New York

Full Name of Member _____
Rank Last First Middle

Address _____
Number and Street City State Zip Code

Date of Birth _____ Current Age _____
Month/Day/Year

Height _____ Weight _____ S.S.N. _____

This Insurance coverage may only be issued to AFA members. Please check the appropriate box below:

❑ I am currently an AFA member

❑ I enclose $25 for annual AFA membership dues,
(includes subscription ($18) to AIR FORCE magazine)

PLAN & TYPE OF COVERAGE REQUESTED

Plan Requested (check one)
❑ AFA CHAMPLUS® PLAN I (for military retirees and dependents)
❑ AFA CHAMPLUS® PLAN II (for dependents of active-duty personnel)

Coverage Requested (check one)
❑ Inpatient Benefits Only
❑ Inpatient and Outpatient Benefits

Person(s) to be insured (check one)
❑ Member Only
❑ Spouse Only
❑ Children Only
❑ Member & Spouse
❑ Member & Children
❑ Spouse & Children
❑ Member, Spouse & Children

PREMIUM CALCULATION

All premiums are based on the attained age of the AFA member applying for this coverage. Plan I premium payments are normally paid on a quarterly basis, but, if desired, they may be made on an annual (multiplied by 4) basis. Plan II premiums are payable annually ONLY.

Quarterly (annual) premium for member (age_____) $ _____
Quarterly (annual) premium for spouse
(calculate based on member's age, not age of spouse.) $ _____
Quarterly (annual) premium for _____ children @ $_____ $ _____
Total premium enclosed $ _____

If this application requests coverage for your spouse and/or eligible children, please complete the following information for each person for whom you are requesting coverage.

Names of Insured Dependents **Relationship to Member** **Date of Birth (Month/Day/Year)**

_____

_____

_____

(To list additional dependents, please use a separate sheet.)

In applying for this coverage, I understand and agree that (a) coverage shall become effective on the last day of the calendar month during which my application together with the proper amount is mailed to AFA, (b) only hospital confinements (both inpatient and outpatient) or other CHAMPUS-approved services commencing after the effective date of insurance are covered and (c) any conditions for which I or my eligible dependents received medical treatment or advice or have taken prescribed drugs or medicine within 6 months prior to the effective date of this coverage without medical treatment or advice or having taken prescribed drugs or medicine for such conditions. I also understand and agree that all such pre-existing conditions will be covered after this insurance has been in effect for 12 consecutive months.

Date _____, 19_____ _____
(Member's Signature)

Application must be accompanied by a check or money order. Send remittance to: Air Force Association, Insurance Division, 1501 Lee Highway, Arlington, VA 22209-1198.

GET CHAMPLUS® PROTECTION NOW

Pieces of History

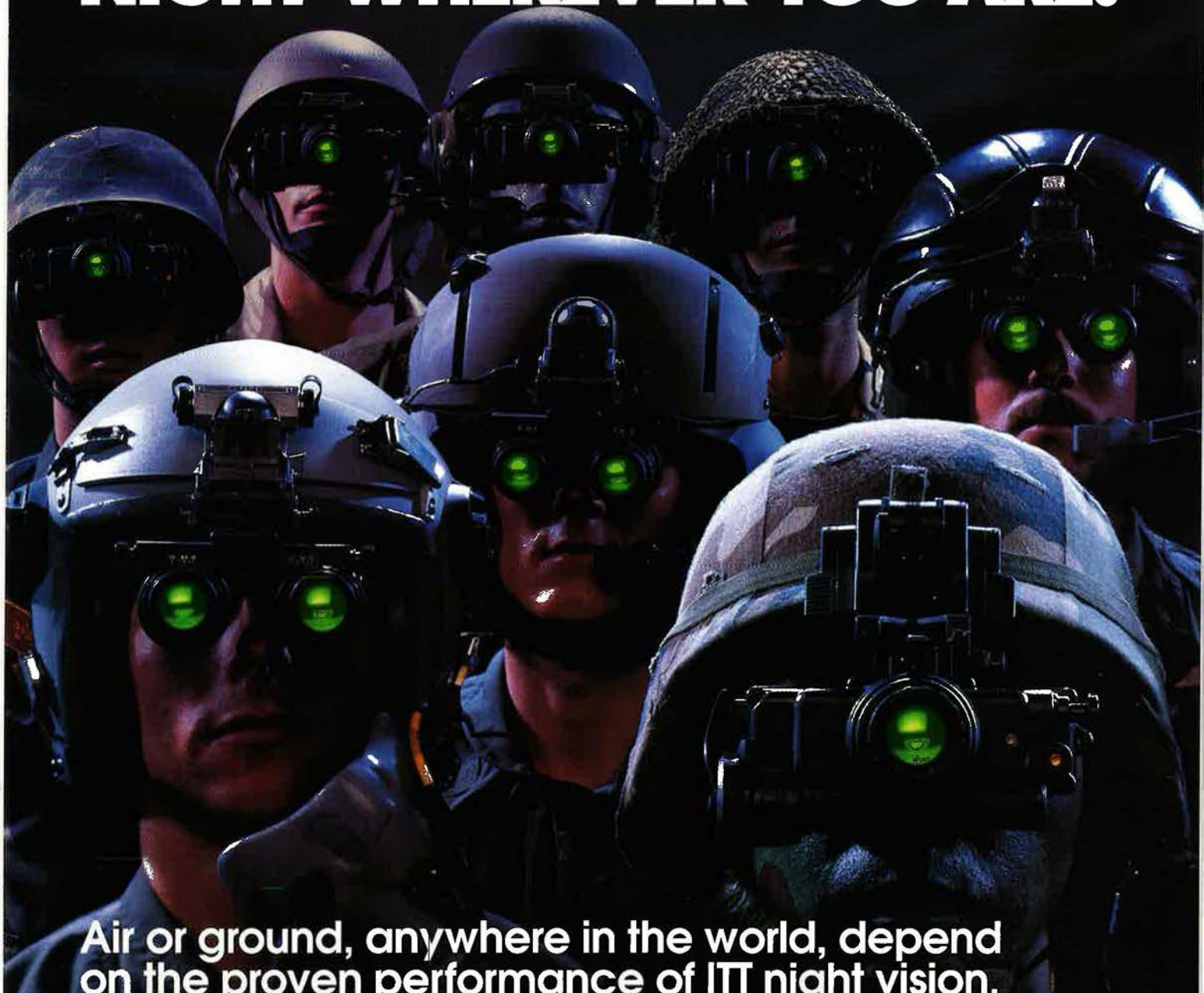
Photography by Paul Kennedy

Just Fix It

Memorabilia courtesy Robert Borrell, Sr. Lt. Col. Charles Hillman, USAF (Ret.), Bill Reese, and Wil Lee. Toolbox courtesy 459th Aircraft Generation Branch (AFRES).

Aircraft maintenance has been part of flying ever since a gusting North Carolina wind ended the first day's flying for the Wright brothers on a December afternoon in 1903. The art of the maintainer has been pivotal ever since. Whether repairing a damaged prop blade or checking pressure levels in a modern jet engine, maintenance personnel are essential in any flying organization. Some tools have changed little in the past fifty years; others are on the cutting edge of technology. The goal however, remains the same: to keep them flying.

NOW YOU CAN OWN THE NIGHT WHEREVER YOU ARE.



Air or ground, anywhere in the world, depend on the proven performance of ITT night vision.

Owning the night gives you the war-fighting edge essential to victory. That's why we're working to expand your night vision capabilities.

For the first time, fixed-wing aviators can trust the night to ITT. U.S. Air National Guard, Air Force and Navy as well as military pilots worldwide can benefit from our improved Aviator's Night Vision Imaging System (ANVIS).

And for ground forces, our GEN III 25mm image intensifier is available as a direct retrofit to upgrade existing weapon sights and drivers' viewers.

This dedication to advancements, combined with our proven performance, has made us the world leader in GEN III image intensification. A full-service organization, ITT is committed to continuous improvement, supporting night operations of U.S. and allied military forces around the globe.

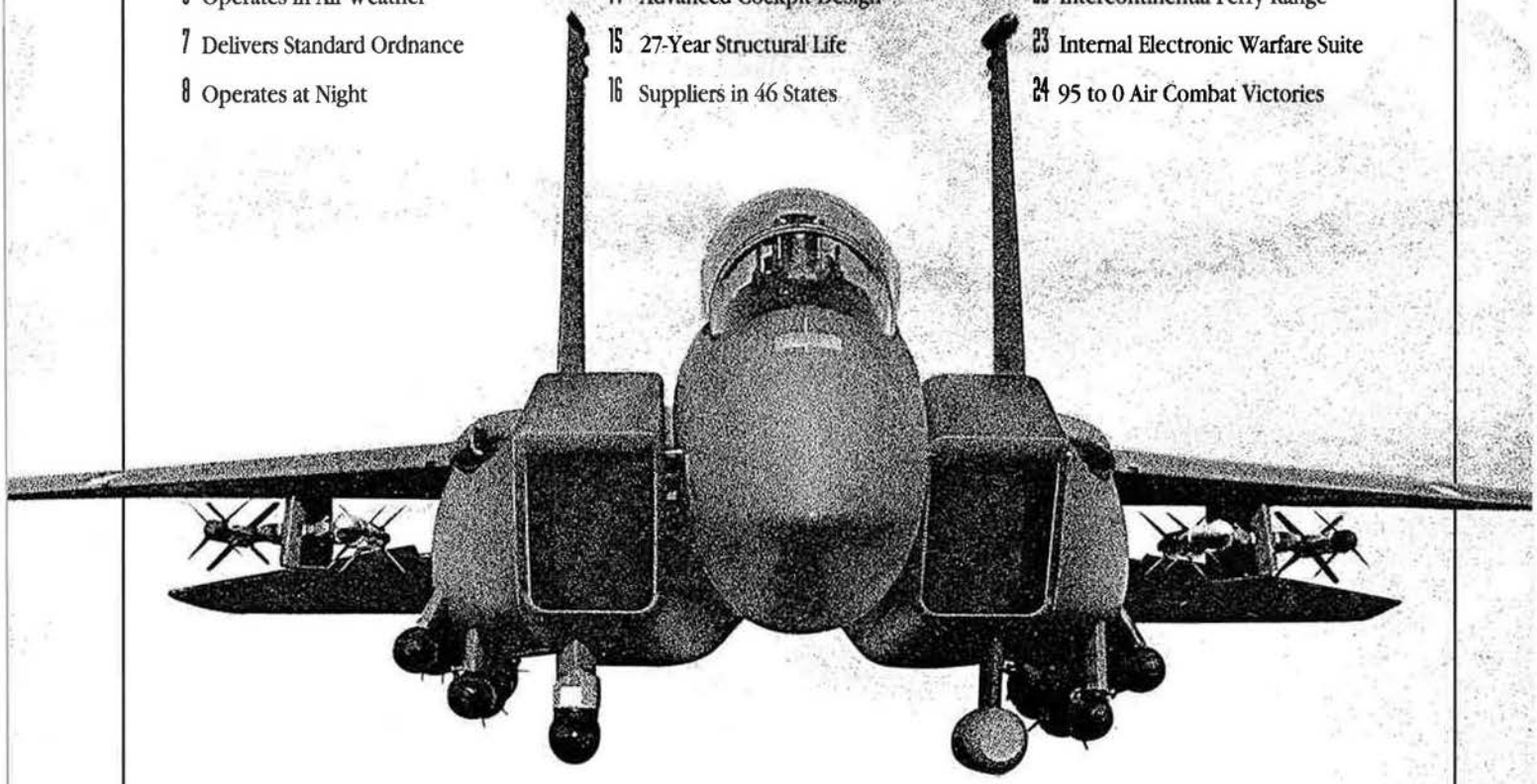
And we're ready now to respond to your future requirements … anywhere.

ITT Electro-Optical Products Division
7635 Plantation Road
Roanoke, VA 24019 • (703) 563-0371

ITT DEFENSE & ELECTRONICS

F-15E

1 Backbone of the Interdiction Force
2 Carries up to 23,000 lb of Payload
3 Delivers Precision-Guided Munitions
4 Long Range - 800 mi. Radius of Action
5 Round-the-Clock Operations With High Fly Rates
6 Operates in All Weather
7 Delivers Standard Ordnance
8 Operates at Night
9 Deep Strike of High-Value Targets
10 95.5% Mission-Capable Rates in Operation Desert Storm
11 Infrared Accurate Targeting Sensor
12 High Resolution Radar Ground Maps
13 99% Made in the U.S.A.
14 Advanced Cockpit Design
15 27-Year Structural Life
16 Suppliers in 46 States
17 Safest Fighter in USAF History
18 USAF's Most Modern Fighter
19 Capability to Grow to More Missions
20 Unequalled Air Superiority
21 Carries 4 Medium-Range and 4 Short-Range Air-to-Air Missiles
22 Intercontinental Ferry Range
23 Internal Electronic Warfare Suite
24 95 to 0 Air Combat Victories



In An Era When Every Plane Must Count, Nothing Counts More Than The F-15E Eagle.

These days every defense dollar has to count. So go ahead, count.

Here are twenty-four good reasons to fund the F-15E. Start with the fact that this is America's only fighter capable of performing long-range, air-to-ground missions while providing its own air defense. That fact alone not only makes this aircraft a smart strategic choice, it makes it the most prudent choice for the Air Force.

And that's something you can count on.

MCDONNELL DOUGLAS