APRIL 1996/$3

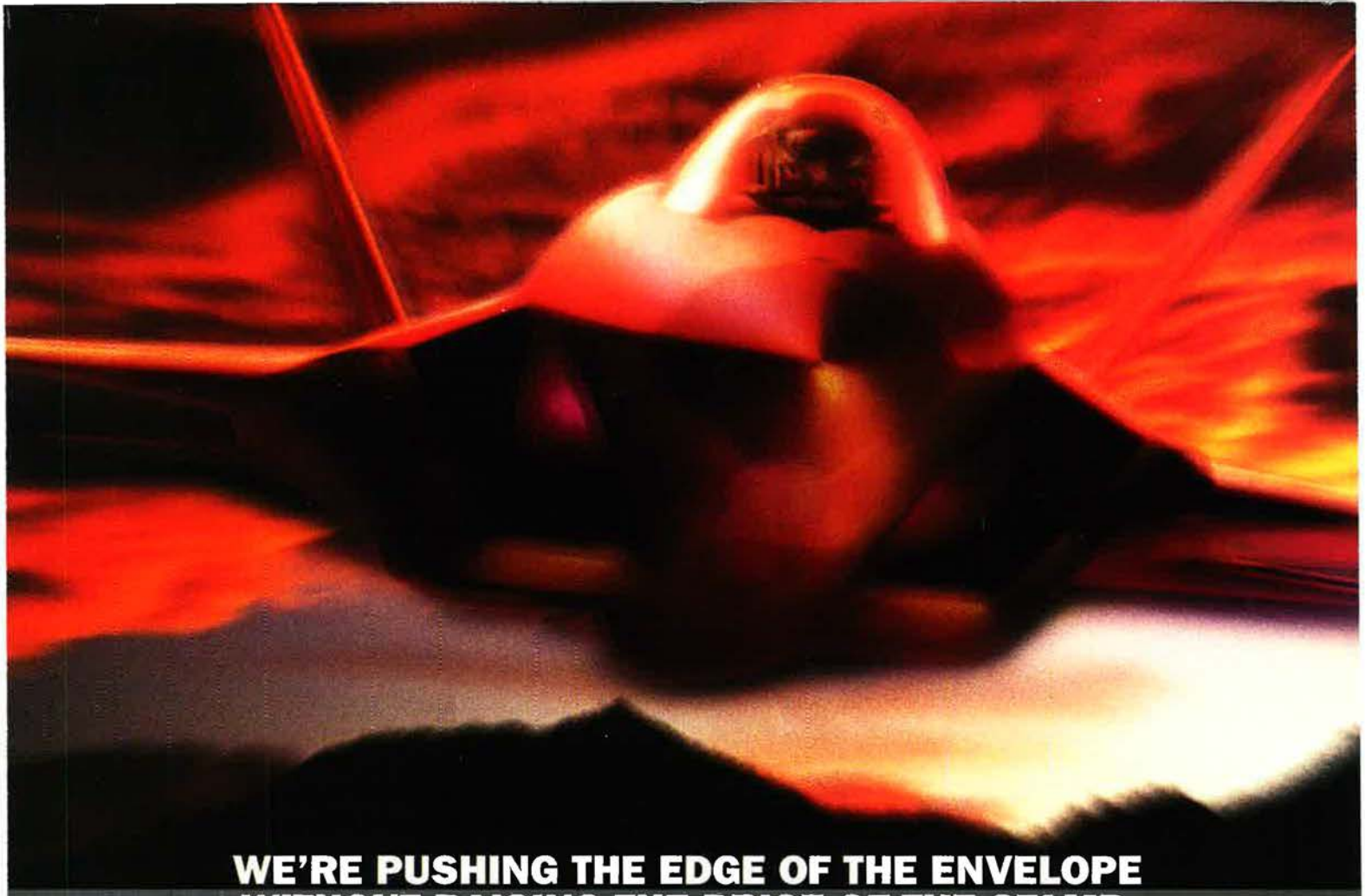
AIR FORCE MAGAZINE

PUBLISHED BY THE AIR FORCE ASSOCIATION

Wings Over Oshkosh

The museum that flies

Also:
The New American Way of War



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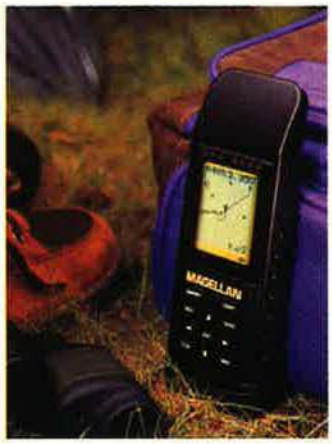
LOCKHEED MARTIN

April 1996, Vol. 79, No. 4

AIR FORCE MAGAZINE

PUBLISHED BY THE AIR FORCE ASSOCIATION

About the cover: This B-17 is just one of the many historic aircraft on display—and in operation—at the Experimental Aircraft Association's Air Adventure Museum in Oshkosh, Wis. See "Wings Over Oshkosh," p. 48. EAA photo by Jim Koepnick.



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Editorial

By John T. Correll, Editor in Chief

Deep Strike

In February, seeking to break free of a politically sticky question about future production of B-2 bombers, the White House announced that the Pentagon would expand an ongoing study of deep attack capabilities to include the trade-offs between long-range bombers, landbased and seabased tactical aircraft, and missiles. A spokesman for the Department of Defense said that completion of the expanded study is expected in early 1997.

This analysis is to be conducted by Dr. Paul G. Kaminski, the under secretary of Defense for Acquisition and Technology. He and his team do not begin from scratch. The question has been studied before, and the findings are substantial.

The dominant requirement for deep attack in a major regional conflict is to strike the enemy's centers of gravity and to do it rapidly, accurately, and with intensity. (Centers of gravity, in the parlance of modern strategy, are those critical points in the opponent's order of battle and infrastructure against which the use of force has greater effect than if the same force were applied elsewhere. These targets tend to lie deep in enemy territory.)

The objective is to attack these centers of gravity "in parallel"—all of them at once—rather than serially. The capability to do that is new and growing. During World War II, Eighth Air Force struck about fifty target sets in all of 1943. In the Persian Gulf War, the coalition hit 150 targets in the first twenty-four hours. Gen. Ronald R. Fogleman, USAF Chief of Staff, predicts that "very early in the next century, we may be able to engage 1,500 targets within the first hour, if not the first minutes of a conflict."

If the fight is short, the probability of military success is high. The enemy will have no chance to adjust, adapt, or mount a counteroffensive. As an Air Staff briefing officer put it, "With parallel warfare, it all goes down at once. Every step in the recovery tree is obstructed. Even if the decision-maker survives, he can't know the extent of the damage, can't coordinate a response, can't move repair teams. The enemy is paralyzed."

Obviously, airpower will be paramount. As always, range, payload, and responsiveness are important, but the deep attack mission puts a special premium on penetration of hostile airspace and thus on stealth. The less susceptible an aircraft is to detection by radar, the better it can penetrate and the fewer accompanying aircraft it will need to suppress enemy air defenses. A report done last year for the Commission on Roles and Missions said that in the early days of the Gulf War, "one stealth sortie was 'worth' approximately sixteen nonstealth sorties in attack planning."

The dominant requirement is to attack the enemy's centers of gravity and to do it rapidly, accurately, and with intensity.

Precision is likewise crucial because that is what makes the new efficiency of the attack—and hence parallel warfare—possible. Deep strike further requires the capability to generate and sustain sorties and to maintain a high rate of attack, both to cover the target sets and to keep the enemy from bouncing back.

Almost any weapon that reaches beyond the local battlefield has some value against the enemy's rear echelons, but certain forms of military power contribute more than others to the deep strike mission. Land-attack cruise missiles have the range and accuracy to hit distant targets. They can be sent into lethal airspace without risking the lives of aircrews. While cruise missiles will be the weapons of choice in some instances, they come with drawbacks that include high cost, relatively small payload, and less accuracy than cheaper missiles fired from aircraft.

As for carrier-based airpower, it is at its best when the targets are within air reach of safe waters and when a limited amount of force is sufficient. It can work effectively along with forward-based and long-range airpower to establish a US military presence or to respond to the initial phases of a regional crisis.

A huge problem for the Navy in the deep strike mission, however, is that it has no stealth aircraft and does not figure to have any until it gets the Joint Strike Fighter in about fifteen years. Pumping out sorties for sustained conflict is not the long suit of naval airpower, either. A report by the Center for Naval Analyses and Rand Corp., for example, found that carrier aviation produced seventeen percent fewer sorties per aircraft than landbased aircraft in the Gulf War.

For sheer payload brought to bear with precision against enemy centers of gravity, nothing beats the long-range bomber in the deep attack role. The B-2, cued by a signal from space, for example, will be able to target sixteen aimpoints independently on a single pass. The only operational stealth aircraft in the world are the Air Force's F-117s and B-2s.

USAF's commitment to precision attack capabilities has grown since the Gulf War. The number of its aircraft outfitted to deliver precision guided weapons has tripled in the past five years, and the weapons are getting better. Many of the targets in the enemy's heartland would fall to Air Force ground-attack aircraft operating from forward locations.

What Dr. Kaminski and his colleagues are likely to find is that bombers, various forms of tactical airpower, and missiles all contribute to the task at hand—but that all in all, the deep attack mission is a remarkable match with the strengths of landbased airpower and of the US Air Force. ■

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Letters

Integrity's Importance

Not since the 1950s have we seen the case for integrity put as plainly and succinctly as did USAF Chief of Staff Gen. Ronald R. Fogleman *["Integrity," February 1996, p. 90]*. His words were like a clarion call of something bypassed in the race for technological supremacy. Too seldom is the virtue of integrity emphasized these days—or even mentioned, for that matter.

For too long we have been concerned in our rating process largely with what an officer did and how well he did it and not with what sort of fellow he was. I have had countless officer effectiveness reports (OERs) returned by reviewing officers for too little of the former and too much of the latter. We assumed if he got the job done, it mattered little what sort of person he was. We made a big thing of the "whole man" concept but looked away from character flaws that could be decisive in battle.

In the 1950s, while assigned to a branch of Air University concerned with officer development, I had the good fortune to sit on a panel that considered revising the OER. When I proposed "character" as a trait that should be considered, I received a polite horselaugh from the civilian and military panel members, who promptly nixed the idea not only as "unworkable" but also apparently as irrelevant. I later concluded the problem lay in the fuzzy notion of what "character" meant to these "air-age citizens" who had forgotten its importance or who, because of some personal failing, preferred that the matter not be considered.

On yet another occasion, I proposed integrating into one of our publications a chapter on "Officership as a Profession," which dealt with matters of character and integrity, and had obtained permission from the author and publisher to do so. A cadre of civilian Ph.D.s got it censored as "tautology."

I and others who believe as I do applaud General Fogleman and the Air Force for saying so well what we were unable to years ago and hope that those who come after us will take his words to heart.

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

Gen. Ronald R. Fogleman's splendid remarks on the need for integrity in the officer corps of the Air Force should be mandatory reading for every young officer serving in the armed forces of the United States.

In addition, every officer serving in a command slot at every level in every service branch should make General Fogleman's remarks part of his or her required reading.

If some of those senior commanders who constantly saw "the light at the end of the tunnel" as they juggled their aspirations for another star by playing the political game had insisted—even at the risk of their careers—on doing what they knew to be right, we'd have buried fewer troops in Korea and Vietnam.

Where are the Billy Mitchells when we need them?

Brig. Gen. Neal M. Gertz,
USAF (Ret.)
Palatine, Ill.

I want to thank you for "Integrity." I have shared it with my peers, managers, and people I am privileged to lead. . . . I am working on development of commercial airplanes, and if I compromise integrity, people could die. I am proud to say my co-workers feel the same way about integrity as I do.

Some of the concepts in the article (Avoid Careerism: Here and Now; When No One Is Looking; Good, Bad, and Ugly; Don't Lie) are presented differently from ours (Don't Shoot Messengers; Open Communication; Facts and Data Will Set Us Free), but the mandates behind these concepts are the same. I believe that common corporate techniques, such as public relations processes and technical mandates, won't make it. General Fogleman's premise—personal integrity—is right on!

James G. Hutton
Boeing Commercial Airplane Group
Seattle, Wash.

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

Happy Anniversary

It is not every day that an organization or an individual celebrates a Golden Anniversary *["Fifty Years of AFA," February 1996, p. 34]*.

Congratulations to the Air Force Association on this important milestone, from a supporter who joined AFA in 1946 and likewise celebrates a Golden Anniversary.

"Fifty Years of AFA" contains well-chosen memorabilia.

Col. G. Vinton Hallock,
USAF (Ret.)
Worcester, Mass.

Farewell to Colonel Suter

His many friends were saddened to learn that Moody Suter, American patriot, retired fighter pilot, and tireless supporter of the US Air Force, died January 11, 1996, after a short illness *["Obituaries," March 1996 "Aerospace World," p. 18]*.

Moody's impact over many years has been great, both as an active-duty blue-suiter and as a consultant. His charged-up imagination was always in gear, thinking of ways to make the warfighting capabilities of his US Air Force more formidable and more efficient—the best it could be. He passionately believed that an American armed force that was strong and ready to win was the best way to keep the peace.

The contributions of "the man with the old face" (and young heart) were many. They include, but certainly are not limited to, Red Flag, NATO War-

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Letters

rior Prep Center, USAF Aggressors, and Pentagon Theater Battle Arena. Like so many of the men with whom he served, Moody was convinced by his 230 missions in the Southeast Asian war that the Air Force needed constant effort to maintain and improve its warrior capabilities. . . .

The Air Force lost a great member, but he leaves behind a community that is involved and in whom he instilled so many of his colorful credos—including, "If you don't really want to get it done, don't ask me to do it."

Condon McDonough
Vineyard Haven, Mass.

Look to the Future

Recent letters to *Air Force* Magazine reflect readers' concerns about the gradual phasing out of the F-4G, F-111, and EF-111 *["Economical EW," January 1996, p. 4; "False Economy," February 1996, p. 5; and "Dialing Long Distance," February 1996, p. 9].* I assume most readers would agree that fiscal and international political realities have had a significant impact on the force structure of the US Air Force, resulting in the gradual phaseout of these aircraft and reassignment of their aircrews.

The letters criticize the EA-6B and F-16 by implying (and often stating outright) that these aircraft will never effectively replace the EF-111 (in the case of the EA-6B) or F-4G/F-111 (in the case of the F-16). These criticisms ignore today's realities, only to argue which is the "best Suppression of Enemy Air Defenses" or "best long-range" aircraft.

This phaseout should not be interpreted as an attack on their unquestioned and unchallenged combat record. I owe my life to an F-4G aircrew who fired a well-targeted High-Speed Antiradiation Missile (HARM) shot while I was egressing a heavy surface-to-air missile ring over Kuwait. Difficult as it may be to accept USAF's decision, it is time to look to the future rather than lament what is past.

Future warfighting will demand effective joint employment of airpower. The future will also continue to be shaped by budget constraints and highly scrutinized defense appropriations bills. Today's Joint Force Commander (JFC) stands to gain much from aircraft that offer efficiency through multirole capabilities.

With few exceptions, most fighters currently available to a JFC (such as the F/A-18, F-16, and F-15E) are multirole. In addition, the US Navy is converting the F-14 to a multirole capability in order to maintain viable options for the JFC. The mission trade-off from "best suited" single-role fighters to "effectively suited" multirole fighters is cost-effective because multirole capabilities significantly enhance the JFC's flexibility with fewer airframes.

Although not a classic multirole aircraft, the "multi-capable" EA-6B offers jamming and HARM capability. It has the advantage of rapid response via worldwide carrier deployment and jointly trained USN, USMC, and USAF aircrews.

The multirole F-16 couples a world-class air-to-air capability (backed up by a "sixty-nine to zero" air combat score, including the first three Advanced Medium-Range Air-to-Air Missile kills) with an impressive air-to-ground capability. In addition to its Low-Altitude Navigation and Targeting Infrared for Night system, precision guided munitions, and HARM Targeting System, the F-16 gives the JFC a combat-proven aircraft with the highest mission capable and sortie rates of any aircraft during Operation Desert Storm.

EA-6Bs will never fully replace EF-111s, nor will F-16s fully replace F-4Gs or F-111s. However, they offer significant capabilities beyond those available in a single-role aircraft. The classic "jack-of-all-trades, master of none" argument against multirole fighters has long since been refuted by their outstanding combat performance. Rather than continue this "my plane is better than your plane" food fight, we should focus on employing joint airpower with the tools on hand.

As with the F-106, F-105, and other veteran fighters, we will greatly miss the F-4G, F-111, and EF-111. But after we honor them at the retirement ceremonies, and as we anticipate future follow-on fighter technology, we will continue to fight with the multi-capable/multirole aircraft of today.

Maj. Phil Ruhlman,
USAF
Yorktown, Va.

U-2 Shootdowns

It is important to note what John Frisbee has written about the death of SAC U-2 pilot Maj. Rudolf Anderson, Jr., on an operational mission over Cuba on October 27, 1962. He further noted that Major Anderson was the first recipient of the Air Force Cross *["The First Air Force Cross," December 1995 "Valor," p. 73].*

I was chief of Special Operations with the Joint Staff from 1962 to 1963 and well recall those tense days of

the Cuban Missile Crisis. The Air Force U-2 pilots of SAC's 4080th Strategic Reconnaissance Wing played a major role in providing the President and other government leaders with information about hostile activities of the Soviets.

Two related and relevant subjects mentioned by Mr. Frisbee require clarification.

First, he states "more than forty missiles were now in Cuba," meaning in late October 1962. This is true, but one must distinguish between "missiles" and "missiles fitted with hydrogen bomb nosecones." A report prepared by the Guided Missiles and Astronautics Intelligence Committee, the Joint Atomic Energy Intelligence Committee, and the National Photographic Interpretation Center, dated October 28, 1962, states, "No [intermediate-range ballistic missiles], missile transports, or erectors have been identified," and on October 29, 1962, "No nuclear weapons or missiles nosecones have been identified in Cuba."

Those of us on the Joint Staff, who saw the stacks of U-2 photos grow day by day as they were collated to go to the President, can confirm that report. Thus, although the October 1962 missile crisis was dangerous, it never became a nuclear crisis.

Second, Mr. Frisbee writes, "MiG-21s and SA-2 surface-to-air missiles—similar to those that had shot down Francis Gary Powers's U-2 over the USSR two years earlier—were in place."

I thought by now that everyone in the Air Force knew that Powers's U-2, on an operational mission for the CIA on May 1, 1960, had not been shot down. . . .

With regard to Powers's U-2, the following three citations are taken from the Report of Proceedings of the Committee on Foreign Relations of the US Senate of May 1960, from the prepared testimony of Allen Dulles, Director of Central Intelligence:

"Their [Soviet] vaunted fighters were useless against [U-2] flights, [and] their ground-to-air missile capacity was inadequate. Khrushchev has never dared expose this to his own people. It was only after he boasted, and we believe falsely, that he had been able to bring down [Powers's] U-2 on May 1 by ground-to-air missile, while the plane was flying at altitude, that he has allowed his people to have even an inkling of the capability we have possessed. . . .

"Our best judgment is that it did not happen as claimed by the Soviets, that is we believe that it was not shot down at its operating altitude of around 70,000 feet . . . We believe that it was initially forced down to a much lower altitude by some as-yet-undetermined mechanical malfunction. At this lower altitude, it was a sitting duck for Soviet defense. The pilot may have bailed out at any time, or he may have crash-landed. . . .

"We are quite clear that the plane was not hit by a missile, because if it had been hit by a missile, it would have disintegrated in the air and they wouldn't have had the pieces they now have."

What I have quoted ought to clarify that Powers's U-2 was not shot down. Those of us there at the time and familiar with the U-2 operations knew this almost immediately for additional reasons.

I was responsible for operating a major overflight program into China and Tibet. However, on orders from the White House, all of those operations were grounded during the spring of 1960 because the President was going to meet with Khrushchev and other world leaders in Paris during mid-May. We understood that the U-2 program had received the same orders. Why this U-2 was sent out on May 1, 1960, for a first-time flight across the Soviet Union from Pakistan to Norway, we could never understand. It was definitely against Presidential orders.

This comment is provided so Air Force personnel and other readers will know the facts and will not be misled by the fictions of that day.

Col. L. Fletcher Prouty,
USAF (Ret.)
Alexandria, Va.

Spending the Dividend

"Percentages of Reality" *[December 1995 "Editorial," p. 2]* made me recall the countless times I was asked by reporters, "Where is the peace dividend?" As a former public affairs officer for the Ballistic Missile Organization at a time when major defense contracts were being canceled, I was amazed when that question was posed to me by reporters who otherwise seemed informed and intelligent.

Three years later, the mission has changed and active-duty members every day are asked to do more with less, while the defense budget takes hits from reporters who have never been to the Persian Gulf, Bosnia-Hercegovina, Somalia, or Haiti. Simply put, there is no peace dividend because there is no peace.

We're good at being warriors, and in the absence of war, we create missions into which we inject ourselves to solve the world's problems. Doing this costs money, time, and sometimes the lives of our young people. The next time someone asks you, "Where's the peace dividend?" look him straight in the eye and say, "We spent it."

Rebecca Feaster
Jufair, Bahrain

The Solid C-5

"Airlift Moves Up and Out" *[February 1996, p. 26]* suggests potential replacement of early models of the C-5 Galaxy as they "run out of useful service life in the next decade." The estimated minimum useful service life is 60,000 hours for the C-5A and 97,000 hours for the C-5B, based on current use and continuation of an effective corrosion control and maintenance plan. On this basis, the C-5 airframe is solid for the foreseeable future, considering the average time is 15,000 hours on the C-5A and 7,600 hours on the C-5B.

The article further suggests that, should the C-5 be used extensively for low-level airdrop, "structural fatigue would tend to accelerate and move up the date of its necessary retirement." On the contrary, analysis shows that even if ten percent (an exaggerated estimate) of the missions were low-level airdrop, such use would have negligible effect on the service life of the airframe.

There is no structural reason to consider retiring the C-5 fleet in the foreseeable future. Modernization of the existing airframe systems should prove to be much more cost-effective than new procurement.

W. E. Arndt
Director, C-5 Programs, Lockheed Martin
Marietta, Ga.

Training for All

Surely the purpose of "The New Gunsmoke" *[January 1996, p. 32]* was not to "save about $500,000" but to provide the most complete training for the largest number of airmen possible. Does "eliminating much of the traditional weapons-load maintenance segments" from the competition mean that in future wars these skills will not be needed? The entire team must be trained, not just the personnel learning the integration of various types of aircraft into a single mission.

As one who experienced the lack of both equipment and training as a

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The first of a new generation, integrated processor that will serve as the "brains" of the avionics for the U.S. Air Force F-22 Air Superiority Fighter, was recently delivered. This Common Integrated Processor, developed by Hughes Electronics, is an advanced, high-speed computer that provides the computer processing for all the F-22's avionics, sensors, and displays. The new, compact computer will help the F-22 process much more information than its previous system, in which each of the aircraft's avionics suites had its own processor, and a separate computer distributed the workload and output. Coupled with its stealth qualities, the F-22's new processing capability will help the U.S. maintain control of air space into the 21st century.

The AXQ-14 Weapon Data Link System continued its perfect record during recent U.S. Air Force launches of the AGM-130 standoff weapon system. The Hughes-built AXQ-14 includes a data link pod mounted underneath the aircraft and a control panel with a display that fits into the cockpit. The system operates over a wide range of speeds and altitudes, and can be launched in either direct or indirect attack. Hughes has delivered more than 3,000 Weapon Data Links for the AGM-130/GBU-15 family of standoff weapons, many to international customers.

U.S. Navy forces will soon be equipped with "the sonar for the 21st century," an advanced helicopter-borne AQS-22 Airborne Low Frequency Sonar (ALFS), developed by Hughes. With delivery of the first engineering development model to the Navy, Hughes has successfully completed a 39-month development schedule. The sonar will play a vital role in the future of Navy helicopters, enhancing the warfighting capabilities of SH-60R Light Airborne Multi-Purpose helicopters with active and passive sonar and sonobuoys, bathymetry intelligence gathering, underwater communications, and embedded training capabilities.

Astronomers and astrophysicists will soon be able to obtain data that would be impossible to obtain from the ground. This is the result of NASA's AXAF (Advanced X-ray Astrophysics Facility) telescope, an orbital X-ray telescope scheduled to be launched into high-Earth orbit in 1998. The heart of AXAF's telescope, a nest of concentric cylindrical mirror pairs, was built by Hughes. These mirrors are the largest and most precise set of grazing incidence optics ever built. With its superior capability for detecting very faint, remote sources, AXAF will provide insights into the age, distance, composition and history of celestial bodies.

A high-powered motion detection system adds a new dimension to surveillance, making it possible to detect someone through concrete and brick walls, wooden doors and other non-metal materials. The Motion Detection Radar (MDR), developed by Hughes, was recently used by U.S. law enforcement officials to apprehend a convicted felon who had escaped from his holding cell and was hiding in the building's duct system. Depending on a building's construction, the MDR system's transmitter can detect motion from 10 to 50 feet away and can be monitored up to 2,000 feet away with a standard hand-held radio. MDR units are also in use in Canada, Germany, Holland, Japan, New Zealand, Russia and Sweden.

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HUGHES
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member of the Army Air Corps during the Louisiana Maneuvers of 1941, I am especially sensitive to the issue. The disastrous results of this kind of economy are painfully depicted in *They Fought with What They Had,* by Walter D. Edmonds. This painful and deadly history should not be forgotten, or it will be repeated.

Francis Person
Lusby, Md.

Creative Options

Maj. Donald W. Thompson *["Your Grandfather's BUFF," January 1996 "Letters," p. 8]* reiterates several accomplishments of the legendary B-52 and its brave crew members—accomplishments this doddering, old, uninformed retiree is well aware of. The Boeing engineers did an excellent job designing a conservative, robust aircraft and have beefed up portions of it as needed over the years. However, basic aircraft design teaches that high-aspect-ratio wings have a severe gust response. Because of this, aircraft designed for low-altitude penetration have variable swept wings to provide low-aspect-ratio, highly swept wings (*e.g.,* the F-111, the B-1, and the Russian Tu-22 "Backfire" and Tu-160 "Blackjack" bombers, which have much more moderate gust loadings). . . .

In all the hype about how the B-52 will last another thirty-five years, no details are given about Boeing's program. Instead, I hear apples-to-oranges comparisons of B-52 flight hours to those of 747s. Both planes were designed for high-altitude cruise, but the B-52 has flown a lot of low-altitude missions and will continue to do so.

If Boeing is doing such a good job of monitoring corrosion and fatigue, why did an engine pod fall off a B-52 in August? That seems to be a non-event. Having worked for twenty-five years in research and development, I know that even the best-designed time-compression tests in the laboratory do not always duplicate real-world situations.

With lead times of ten years or more for the development of a B-52 replacement, finding a severe corrosion/fatigue problem after the B-2 line is shut down would jeopardize our heavy bomber capability. The unknowns are unacceptable when you consider that we base a significant portion of the next thirty-five years of heavy bomber capability on a thirty-five-year-old aircraft operated outside of its optimum design conditions.

I have never questioned the lethality of the B-52—only its ability to penetrate to the target and survive. With all the defense suppression we could muster in bombing Hanoi and Haiphong, reported losses due to obsolete SA-2 missiles ranged from twelve to fifteen B-52s and their fine aircrews, with possibly six or more other B-52s damaged beyond repair. This would represent a significant portion of the planned fleet of B-52s and an unacceptable casualty level for today's public expectation of zero losses. . . .

Although B-52 tactics and electronic countermeasures can improve, in the next thirty-five years we will surely have to face overlapping, mobile, all-altitude surface-to-air missiles. Standoff weapons can destroy a lot of targets, but used in mass they become very expensive. Hardened, critical targets are increasing in rogue nations, and, unless we revert to nuclear weapons to neutralize them, we will probably have to rely on kinetic energy weapons, which at this point can be delivered only by overflying aircraft.

As to more B-2s being unaffordable, former Secretary of the Air Force Donald B. Rice makes a strong case that additional B-2s promise more capability than several comparable or more expensive weapon systems. Capt. James H. Patton, Jr., USN (Ret.), makes the point that stealth is empowered by size. Have we fully explored the capability that the large, stealthy B-2 could provide with large kinetic energy precision guided munitions or other creative options? . . .

Lt. Col. Morris R. Betry,
USAF (Ret.)
Midlothian Va.

The Overlooked KB-50

I wish to correct an oversight in "Tribute to the Tankers" *[January 1996 "Valor," p. 49].*

Some of the first air refueling missions flown in support of Southeast Asia combat operations were flown in the KB-50J—an aircraft conspicuously absent from your summary of "other" tankers used in Southeast Asia.

In August 1964, several KB-50Js departed Yokota AB, Japan, for Kadena AB, Okinawa, landing there about three-and-one-half hours later. After minimum ground times, KB-50 tankers refueled flights of F-105s en route from Yokota AB to Korat AB, Thailand. As I recall, three separate flights of F-105s were each being refueled by a flight of three KB-50s. . . .

The overland refueling orbits were flown at 12,000 feet and primarily supported RF-101 and F-100 sorties in northern Laos and North Vietnam. The overwater orbits north of Da Nang were flown at 16,000 to 20,000 feet and supported all aircraft entering and exiting North Vietnam over the Gulf of Tonkin.

KB-50J aircraft and aircrews were assigned to the 421st Air Refueling Squadron at Yokota. As the only permanently assigned tanker unit in PACAF, the 421st fulfilled three primary missions—a wartime alert at Yokota, temporary duty at Wake Island to support transpacific fighter deployments, and local refueling orbits at Misawa, Itazuke, and Kadena to support proficiency training for PACAF fighters. . . .

Although the combat refueling history of the 421st ARS and the KB-50J was short—from August 1964 until October 1964—it was significant because it included the first in-flight refueling for a combat deployment and the first in-flight refueling in a combat zone.

Lt. Col. Melvin M. Marvel,
USAF (Ret.)
Sacramento, Calif.

Investigating Haney

As an Air Force Association member and a US Postal Inspector, I read with interest your news item concerning the mail bomb investigation of Maj. Lester K. Haney *["News Notes," December 1995 "Aerospace World," p. 20].* I was surprised and disappointed that you failed to mention the obvious participation of one of this nation's oldest law enforcement agencies, the US Postal Inspection Service, in bringing charges against Major Haney. He was arrested on a federal warrant by Postal Inspectors on October 6, 1995, in Montgomery, Ala.

Major Haney was subsequently indicted by a federal grand jury on November 7, 1995, and charged with violation of Title 18, US Code, Section 1716: Mailing of an Injurious Article. Evidence is being examined by the US Postal Inspection Service Crime Laboratory in Chantilly, Va., one of five US Postal Inspection Service crime labs in the US.

Terry Cullivan
Dawson, Ill.

Turkey, Not Pakistan

"Gallery of South Asian Airpower" *[February 1996, p. 76]* identified some F-16s on p. 80 as "F-16As, Pakistan Air Force" when in fact they are Turkish F-16Cs.

Bob Anders
San Antonio, Tex.

Capitol Hill

By Brian Green, Congressional Editor

McCain's Rising Star

His independent views command increasing attention on the Senate Armed Services Committee.

In Sen. John McCain's vision of the US military, the Air Force takes center stage in meeting the most important security threat facing the nation: the proliferation of weapons of mass destruction and the missiles to deliver them. In a recent interview with *Air Force* Magazine, the Senator commented, "I view the Air Force as playing the lead role in any [ballistic missile defense] systems that we may try to acquire."

The Arizona Republican's star continues to rise on the Senate Armed Services Committee, and therefore his view commands increasing attention. Senator McCain currently ranks fourth among Republicans on the SASC. Committee Chairman Sen. Strom Thurmond (R–S. C.), however, is ninety-three years old and up for reelection this year. Of the other two ranking members, Sen. John Warner (R-Va.) is also facing a tough reelection battle, and Sen. William S. Cohen (R-Me.) is retiring.

Senator McCain often displays a strong independent streak. He was one of just three Republicans to oppose the final defense authorization bill in January. Part of that opposition was based on the elimination of ballistic missile defense policy language from the measure. However, he also opposed it because of what he termed its "wasteful, pork-barrel spending practices." For such practices, the GOP cannot escape some blame, he said. "I thought that the Republicans in Congress would do a far better job than they are doing in controlling it."

His efforts to weed out waste and low-priority, nondefense spending in the defense budget have had only partial success.

These efforts have not only antagonized his fellow members of Congress but also have occasionally snared popular Air Force programs, such as the Civil Air Patrol. Senator McCain sought last year to shift CAP funding from the Air Force to the Department of Transportation. The idea is still a good one, he argued; while CAP performs important functions, most of its activities have little to do with defense.

"But," he said, "in all candor, I'm not interested in spilling a lot more blood over it."

Achieving these savings is particularly important, the Senator argued, because defense budgets will be inadequate to meet requirements. Until recently, he argued, the Clinton Administration paid scant attention to readiness. "Now that pendulum has swung," he noted, "and I hope it's not swinging too far in the other direction. . . . [Parts] of the force need to be modernized more quickly than is now realistic or contemplated."

Furthermore, the military-civilian pay gap won't be closed because "the best we can do is keep up with the cost of living."

Nor does Senator McCain believe that the budgets will sustain the force structure needed to support the current national military strategy. That strategy calls for being prepared to fight two major regional conflicts (MRCs) at nearly the same time.

"It's obvious we're not going to maintain the force structure that was anticipated when the two-MRC scenario was designed," he said, adding that a reexamination of the strategy is inevitable.

Whatever the strategy, it will have to focus on emerging threats, he continued. These include rising Chinese military power, tribal and ethnic conflict, and the rise of Islamic fundamentalism, as well as proliferation. "We have not made the transition from the Cold War era to the post–Cold War era in establishing a framework to determine what is best for our national security," he said.

Alcng with ballistic missile defense, technologically superior forces, including airlift, tactical combat aircraft, and rapidly deployable ground and amphibious forces, deserve priority, the Senator said. This, he maintained, is because they support requirements ranging from the need to establish presence up to the need to fight a Persian Gulf War–style conflict.

Senator McCain expressed particular concern about shortfalls in modern tactical airpower and airlift. He strongly supports USAF's new F-22 fighter. "There is no doubt in my mind that we need a follow-on fighter for the Air Force," he said. But, he noted, cost is key. The Senator, a former Navy aviator, warned, "If you get dramatic cost escalation with the F-22, . . . it could meet the same fate that the Navy follow-on to the A-6 met." That program was canceled.

The Senator has no patience with arguments on behalf of procuring additional B-2 stealth bombers for the Air Force and *Seawolf*-class attack submarines for the Navy. He describes both as vestiges of the Cold War. He believes the future of the heavy bomber resides in the B-52, which "can play an important role for many, many years to come," and the newer B-1B.

Senator McCain is cautious when it comes to deploying troops overseas. Yet he rejects the notion that the criteria set out by former Secretary of Defense Caspar W. Weinberger—clear and achievable objectives, public support, the use of overwhelming force, and a clear exit strategy—can serve as an ironclad guide to such decisions. He argues for flexibility, particularly when use of US forces with minimal risk can help resolve a conflict.

The Republican said that when troops are sent in harm's way, they deserve fair treatment.

He also emphasized the need for equitable treatment of nondeployable servicemen and -women. The Fiscal 1996 authorization measure mandates discharge of service members diagnosed as HIV-positive. The Senator contended, "If we're going to throw out HIV-positive [service members], the same should be true for any [member] with a disabling or crippling disease, cancer, diabetes, pregnancy. . . . There should be a uniform policy." ■

Aerospace World

By Suzann Chapman, Associate Editor

DoD Enjoys Banner Safety Year

The Department of Defense announced on February 5 that, despite continuing high operations tempo of US armed forces, 1995 proved remarkably free of accidents and casualties.

The American military has completed one of its safest years on record, said Secretary of Defense William J. Perry.

In 1995, the aircraft accident rate, based on the number of Class A mishaps per 100,000 flying hours, dropped from 1.62 to 1.51. The number of aircraft destroyed in accidents also dropped, from eighty-five in 1994 to sixty-seven in 1995. The 1995 results fit in with a long-term trend in military flying safety. *[See box at right.]*

Secretary Perry said that this change saved the taxpayer millions of dollars.

He noted specifically that the Army's aircraft accident rate dropped from 1.61 to .81, marking a one-year reduction of almost fifty percent.

DoD also reported that off-duty accidental deaths in the military fell from 385 in 1994 to 374 in 1995.

GAO Sees Long-Term Trend Toward Safety

The number of Class A military aircraft accidents has been dropping steadily for twenty years, according to a General Accounting Office report released February 5. Class A mishaps are those causing death, permanent total disability, destruction of aircraft, or damage of $1 million or more.

GAO found that such accidents declined in number from 309 in 1975 to seventy-six in Fiscal 1995. Fatalities decreased from 285 to eighty-five. The mishap rate, or number of Class A mishaps per 100,000 flying hours, dropped from 4.3 to 1.5 in the same period. The Air Force's rate dropped from about 2.8 to 1.44, according to USAF safety officials.

GAO acknowledged that its findings would surprise many, given a widespread public perception that military flying accidents were dramatically increasing in number. One of those surprised was Rep. Ike Skelton (D-Mo.), who commissioned the report.

"The increased media coverage of these accidents left an impression we were seeing higher numbers of crashes and deaths," he said. "While this report offers little consolation to those who have lost loved ones, it shows that military aviation safety has improved."

Representative Skelton also said the report "raises questions about the independence of invest gators." He emphasized that most members of mishap investigation boards come from within the mishap unit's chain of command. "This creates, at a minimum, the appearance that investigations are not completely independent," he said.

Joint STARS Sets Record

The mission count for two E-8 Joint Surveillance and Target Attack Radar System aircraft supporting the NATO peacekeeping operation in Bosnia-Hercegovina reached fifty on February 14, setting a record for the still-developmental system.

In its only other deployment—during Operation Desert Storm in 1991—the Joint STARS flew a total of forty-nine missions.

Both E-8s being flown in the Balkan operation are preproduction models of the Joint STARS. One of the two aircraft, an E-8A, was one that saw action in the Persian Gulf War. It has been joined by an E-8C.

Air Force Col. Robert DeBusk, 4500th Joint STARS Squadron (Provisional) commander, said, "This is quite a distinction for a squadron with two developmental aircraft placed into an operational environment." The squadron, which set up operations at Rhein-Main AB, Germany, on December 15, includes more than 400 Army, Air Force, and civilian members.

The unit has flown daily missions to support Operation Joint Endeavor. The system includes not only the aircraft but also more than ten Army ground-station modules throughout the Balkan theater. In a January visit, Army Gen. George A. Joulwan, Supreme Allied Commander Europe, told squadron members, "I'm Joint STARS's biggest fan."

Plan Set for E-8 Wing

A formal ceremony on January 29 heralded the activation at Robins AFB, Ga., of a one-of-a-kind wing—the 93d Air Control Wing—which will operate Joint STARS aircraft, the flying element of the Air Force and Army battlefield management system.

The new wing, commanded by Col. Ben T. Robinson, will operate under Air Combat Command. By 2004, the wing will comprise twenty Joint STARS aircraft and about 2,700 people. The new wing was to receive its first E-8C production aircraft last month. Colonel Robinson said that he expects to have 300 people and three aircraft on duty by January 1997.

Top NRO Chiefs Resign

Secretary of Defense Perry and Director of Central Intelligence John M. Deutch announced on February 26 that they had asked the two most senior officials of the National Reconnaissance Office to "step down."

Agreeing to leave in the shake-up were the NRO's director, Jeffrey K. Harris, and the long-time deputy director, Jimmie D. Hill, who had been in that position since April 1982.

In a joint statement, Secretary Perry and Mr. Deutch expressed "the greatest respect" for the two NRO officials but nonetheless cited a need to improve NRO management and credibility. Mr. Harris and Mr. Hill are to be reassigned within the intelligence field.

Both men were caught up in a dispute over an NRO stash of more than $1 billion—some reports claim the amount is closer to $3 billion—in unspent Congressional appropriations.

No one has raised charges of misspending; rather, critics claimed that the NRO amassed the money from various programs that did not require full appropriations. House and Senate oversight committees were alarmed at the size of the holdings.

Two years ago, Congress also took issue with NRO's construction of a new $300 million facility in suburban Virginia, built with money accumulated in NRO's operating budget. The facility reportedly far exceeded both NRO's requirements and government building standards.

Named to serve as the new NRO deputy director was Keith R. Hall, Mr. Deutch's executive director of Intelligence Community Affairs. He will serve as the NRO's acting director until the Clinton Administration names a replacement for Mr. Harris.

As acting director, Mr. Hall also holds the position of assistant secretary of the Air Force for Space and must be confirmed in that position by the Senate. Senate Intelligence Committee members endorsed the decision to remove Mr. Harris and Mr. Hill. Further, the panel recently suggested that the top NRO job and the top Air Force space position be held by two different persons.

A large-scale powered model of Lockheed Martin's candidate for the future Joint Strike Fighter program undergoes wind tunnel testing at NASA's Ames Research Center. The JSF will be fielded by USAF, the US Navy and Marine Corps, and Britain's Royal Navy.

ANG Captures Space Mission

In its first foray into space, the Air National Guard on January 20 added the 137th Space Warning Squadron to its force in Colorado. The unit, based in Greeley, Colo., will maintain the Air Force's only mobile satellite communications ground system.

Slated to be fully operational in mid-1997, the new squadron is taking over the role of Air Force Space Command's 4th SWS, which is deactivating at Holloman AFB, N. M. The squadron provides backup to worldwide ground stations that monitor Defense Support Program missile-tracking satellites.

"Should something happen to our fixed ground sites, we have these mobile units ready to take over," said Brig. Gen. Gerald F. Perryman, Jr., commander of the 21st Space Wing, Peterson AFB, Colo. The Air Force can load the mobile units onto aircraft and haul them wherever needed.

General Perryman estimated that the mission transfer will save the Air Force about $6 million annually, the result of lower personnel costs. With its relatively stable personnel base, he said, "the Guard can do it cheaper than the active forces."

The new unit will have 168 full-time personnel and 123 weekend positions. It will inherit much of its equipment from the 4th SWS.

These luminescent strips will be visible only from above and beside Block 40 F-16s specially modified for night missions. The cockpit lighting was also extensively modified to make the F-16s compatible with the use of night vision goggles.

New Lighting for CAS F-16s

The last of four Block 40 F-16s equipped with special interior and exterior lighting entered testing in late January at Nellis AFB, Nev. The special lighting will enable pilots to use night vision goggles (NVGs) to carry out nighttime close air support missions.

Because standard F-16 cockpit lighting would temporarily "blind" flyers wearing NVGs, Lockheed Martin either installed systems to filter the light sources in the cockpit or fitted the cockpit with a different type of lighting. It also had to balance the lighting needed for nighttime NVG

Skunk Works photo by Denny Lombard

NASA, industry, and the Air Force are working together to develop a reusable launch vehicle to replace the space shuttle fleet. Above, a scale model of an RLV powerplant is fitted to an SR-71 "Blackbird" for testing at Lockheed Martin's "Skunk Works" in California.

operation against daytime requirements—when sunlight floods the fighter's interior.

The four aircraft received exterior lighting—dual-mode, electroluminescent strips—to increase their visibility to friendly forces. In a covert mode, according to Lockheed Martin officials, the strips can be seen only with night vision devices from above or beside the aircraft.

USAF plans to equip 250 Block 40 F-16s with these new features, with the program to start in 1998.

USAF Changes Probe Procedures

The Air Force announced in February that it had revised its aircraft mishap investigation procedures and streamlined its safety operations.

Brig. Gen. Orin L. Godsey, USAF's chief of safety, told reporters that the service had elevated the Safety Investigation Board (SIB) convening authority from three-star, numbered Air Force commanders to four-star major command commanders.

Additionally, said the General, each SIB for a Class A mishap now includes a voting member from the Air Force Safety Center, Kirtland AFB, N. M.

USAF took the steps to answer criticisms stemming from a two-month review by the Blue Ribbon Panel on Aviation Safety, commissioned by the USAF Chief of Staff last year. The panel, in a report released in September 1995, found that some USAF personnel doubted the objectivity and credibility of the SIB process.

Though the panel acknowledged that it could not substantiate such concerns, the Air Force acted anyway.

Under the new procedures, once the SIB completes its work, the major command commander has only three options: approve the report as written, approve the report with comments, or direct the entire board to reinvestigate all or part of the mishap.

General Godsey said that the service had followed another Blue Ribbon recommendation in combining his Pentagon office with the Safety Center at Kirtland. This move, said the report, should preclude duplication and "ensure that safety speaks with one voice."

USAF Focuses on Human Factors

In his briefing, General Godsey said that the Air Force continually analyzes its extensive accident database, which runs from the first US military aircraft accident in 1908 to the present, and "one of the [categories] we highlighted was 'human factors.' "

In a February report, GAO found that in seventy-three percent of 1994–95 Class A mishaps, human error was a contributing factor.

This category, he said, comprises "the human element that's involved with the mission"—and not just pilot error. Besides the actions of pilots, it includes air traffic control, maintenance, and supervision.

Paying more attention to the human factors issue was one of the recommendations made by the Blue Ribbon Panel on Aviation Safety.

The Air Force is formulating a risk-management program to weigh cost and benefit in conducting any activity, not just flying, to help minimize the impact of human factors in accidents, said General Godsey. He said the USAF program will include successful aspects of the other services' safety programs.

USAF's Director of Maintenance Maj. Gen. Marcelite Harris is joined by Col. (Brig. Gen. selectee) Paul Bielowicz, Air Education and Training Command's director of Logistics, and Army Brig. Gen. Charles Mahan, director of Supply and Maintenance, at an Air Force Institute of Technology seminar.

General Godsey said he plans to bring together acquisition, medical, operations, and safety representatives "to get further into human factors."

He explained that minimizing the impact of human factors "is very important, because I really believe that is the mechanism that is going to help us to reduce mishap rates."

Safety officials also are working to provide general guidance "to standardize the basics" of crew resource management, as well as operational risk management.

The General emphasized that the guidance would not lay out a specific program. "We can't take a program that will work in the fighter arena and mandate it on transport people," he said.

More "Accountability" Sought

The Air Force announced in February that it had developed strengthened measures to hold USAF officers accountable for their actions. This was done, USAF said, by changing personnel policy in four general areas: documentation, assignments, awards and decorations, and transfer of adverse information.

Late last summer, the Air Force began a review of personnel policy following criticism by Gen. Ronald R. Fogleman, Air Force Chief of Staff, that some supervisors and commanders appeared "to condemn inappropriate conduct one moment, condone it the next, or, even worse, reward it." General Fogleman referred to the aftermath of the 1994 accidental shootdown of two Army UH-60 Black Hawk helicopters by F-15s patrolling airspace over northern Iraq.

The Chief of Staff found that, although the military justice system worked, the personnel evaluation process had broken down. *[See "Seven Careers Damaged in Black Hawk Review Action," October 1995 "Aerospace World," p. 16.]*

In a message outlining the new procedures, General Fogleman said, "Changes in personnel policy provide specific guidelines to commanders that link disciplinary and personnel actions, while protecting command prerogative."

Changes range from required provisions to some that are not required but are strongly recommended. For instance, it is now mandatory to document court-martial convictions permanently in an officer's promotion selection record. For lesser actions, commanders must carefully consider including comments on a promotion recommendation form (PRF) for officers who have received an Article 15 (a formal administrative admonishment) or letter of reprimand (LOR), admonishment, or counseling.

The new policy requires commanders and supervisors to review an officer's unfavorable information file (UIF) and personnel information file prior to completing an evaluation report or PRF, nominating an officer for a decoration, or recommending an assignment. Documents covering courts-martial, Article 15s, and LORs also now must be filed in an officer's UIF for at least four years.

AFRES Crew Misused Aircraft, Van

A two-month Air Force Reserve investigation substantiated allegations that Reservists from McChord AFB, Wash., used a C-141 airlifter and a government passenger van in November 1995 to help them attend professional basketball games in Charlotte, N. C., and Indianapolis, Ind.

The 446th Airlift Wing crew, according to a February 2 statement by Maj. Gen. Robert A. McIntosh, AFRES chief, conducted appropriate training during flights November 17–19 to North Carolina and Indiana, but the investigation "uncovered a number of irregularities and unacceptable standards

USAF photo by A1C Heather Logan

Fifteen members of the Dallas Cowboys visited Luke AFB, Ariz., before winning the 1996 Super Bowl in nearby Tempe. Here, Chad Hennings, an Air Force Academy graduate who flew A-10s during the Persian Gulf War, tries on an F-16. Mr. Hennings plays defensive tackle for the Cowboys. Hundreds of Luke AFB personnel volunteered to help with Super Bowl activities.

of performance" by some crew members and the chain of command.

Besides incurring "additional unjustified expense to the Air Force" to "accommodate personal preference," General McIntosh said the investigation revealed that crew planning and senior leadership oversight were inadequate. He reported the crew flew a low-level route, although the navigator was not qualified to fly low level at that time.

The crew chose to fly into Charlotte/Douglas IAP, N. C., despite the fact that the Air National Guard unit there could not provide parking or refueling for the C-141. As a result, fuel costing $5,832 was purchased from a commercial firm with no government contract. It would have cost $2,248 from the ANG unit.

In Indianapolis, some crew members used a military van transported aboard the C-141 to drive sixty miles to attend a basketball game. The General said that travelers may use government transportation to obtain meals and lodging, but "they must do so in a reasonable manner."

Crew members have received letters of reprimand, admonishment, and counseling—the specific type being dependent on the part that each played in the incident. AFRES officials also recommended that two crew members receive Article 15 nonjudicial punishment.

General McIntosh further stated that AFRES had "initiated corrective actions to prevent recurrence of such an incident." As part of those changes, Reserve numbered air forces must approve all training outside a unit's local area and AFRES headquarters must approve missions that require overnight stays on a civilian airport ramp.

Unified Commands' Boundaries Shift

A year-long Joint Chiefs of Staff review of the Unified Command Plan resulted in several changes for the nine combatant commands, according to a February 7 DoD statement.

Under DoD's revised plan, the Pentagon will shift the boundary that separates US Pacific Command and US Central Command. In the new arrangement, CENTCOM gains responsibility for the Arabian Sea and part of the Indian Ocean. This step is expected to help eliminate "choke points" and provide CENTCOM with "the air, land, and sea battlespace it needs to conduct joint operations and training."

The area of US Southern Command will expand to include the Gulf of Mexico and waters adjacent to Central and South America—all formerly the responsibility of US Atlantic Command. This change is expected to enhance SOUTHCOM's ability to interact with the navies of Central and South American nations and place one commander in control of all US military activities in the Caribbean basin and Central and South America, stated the Pentagon release.

The final change expands the re-

USAF photo by StA. Molly Freng

Capt. Alan Beaty (right) of PACAF's 13th Air Force Geopolitical Division reviews air doctrine with members of the Cambodian Air Force: Lt. Col. Lim Peng Sieng (standing) and Gen. Ul Navy. The meeting took place at Andersen AFB, Guam, as part of an Asia/Pacific regional symposium.

connaissance responsibility of US Strategic Command, which will now conduct "worldwide airborne reconnaissance [for] strategic operations, the Single Integrated Operational Plan, or other strategic missions."

Preserve Strategic Industrial Base

Sustaining US strategic systems is "essential to ensure a continued, viable deterrent," stated Lt. Gen. (Gen. selectee) Eugene E. Habiger in response to questions from the Senate Armed Services Committee during his February 1 nomination hearing as the new head of US Strategic Command.

General Habiger told members of the Senate committee that STRATCOM, DoD, and the services together are pursuing industrial capability initiatives to support "spacebased communication and sensor systems, strategic missile guidance technology, propellant technology, and reentry vehicle design capability."

He called support for these key strategic components and systems crucial because "there are no follow-ons in progress and existing systems must be maintained for an unforeseeable length of time."

General Habiger, whose nomination to the top strategic position was confirmed last month, also stated that elimination of the intercontinental ballistic missile leg of the nuclear triad would be "risky and destabilizing." He said such a move would simplify an adversary's targeting problem and remove an important capability that cannot readily be replaced.

Reserve Boosts EOD Role

The Air Force Reserve recently hired CMSgt. John Glover, USAF (Ret.), to fill a newly created full-time civilian position to oversee the Explosive Ordnance Disposal program. Since the Gulf War, when downsizing of active-duty EOD forces became a problem, Reservists have slowly expanded their EOD role.

Following the war, Air Mobility Command created 122 Reserve EOD positions at its associate units. AFRES activated its first two associate EOD flights in 1994 and four more in 1995 but still needs about seventy Reservists, according to Mr. Glover.

The twenty-five-year EOD veteran also said that Air Combat Command and Air Force Special Operations Command have expressed interest in Reserve EOD programs.

F-22 Pilots To Wear New Helmet

To meet performance safety requirements for the F-22, USAF's next-generation stealth fighter, the Air Force developed a helmet that is lighter, stronger, more stable, and has greater resistance to impact. The HGU-86/P is "a next-generation helmet."

"We needed a helmet that would provide pilots a level of safety above the helmets being [worn] in today's fighter aircraft," said Dawn McGarvey-Buchwalder, life-support integrated product team leader with Aeronautical Systems Center's F-22 System Program Office, Wright-Patterson AFB, Ohio.

One of the chief advantages of the new helmet, with its improved fit, is that it will remain on a pilot at 600 knots equivalent airspeed. Wind forces during ejections from aircraft traveling at 450 knots EAS cause the current helmet, the HGU-55/P, to fly off the pilot's head. The HGU-86/P fits ninety-nine percent of USAF's male pilots and is under evaluation for fe-

The new HGU-86/P helmet, modeled here by Armstrong Laboratory's Patrick Files, is designed to protect the pilot at higher speeds, yet cause less fatigue than its heavier cousin.

male pilots, according to Ms. McGarvey-Buchwalder.

Another feature is that flyers wearing the lighter helmet are less susceptible to fatigue when it is worn for long periods. It also has an ear cup tensioning system to draw the ear cup closer to the head, thus blocking out excessive background noise and increasing the pilot's ability to concentrate and process information.

The HGU-86/P has to pass additional tests, such as compatibility with the current oxygen mask, before the Air Force makes a procurement decision in the fall of 1996. Service officials are also considering the new helmet for use with current aircraft.

F-22 Slims Down

Under a $13.1 million contract awarded by Lockheed Martin Corp. in January, Alliant Techsystems Inc. will develop and produce a composite pivot shaft for the F-22 fighter. The component will replace a forged titanium shaft and will reduce the weight of the fighter's tail section by about 100 pounds.

Weight became an issue with some critics of the fighter program when the aircraft gained about 1,346 pounds between its Preliminary and Critical Design Reviews.

The weight stemmed from improvements in the engine, changes in the wing design, and incorporation of stealth characteristics—all of which were designed to enhance performance. USAF officials emphasized that other fighter aircraft had similar weight gains in development.

Alliant Techsystems will produce twenty of the composite shafts for nine aircraft through 1998.

In another stage of F-22 development, Pratt & Whitney completed fabrication of the first set of hollow fan blades for the fighter's F119 turbofan powerplant. The F119 is the first military engine to incorporate these lower-weight blades.

A company release said that parts manufacturing is on schedule for initial flight test engines, with the first pair set for delivery to the Lockheed Martin–Boeing airframe team by the end of September.

Expel Troops Infected With HIV?

The Fiscal 1996 defense authorization bill contained a controversial provision requiring expulsion from active duty of any serviceman or -woman carrying the human immunodeficiency virus (HIV). The Clinton Administration vowed to fight the provision, which senior military officials have stated is not "militarily necessary."

At present, the armed forces include an estimated 1,000 persons who are HIV-positive. Of these, eighty-five are Air Force members who have tested positive for HIV but whom the service deemed fit to perform their duties. Sponsors of the provision said that these individuals are nondeployable and therefore should not be carried on the rolls.

Secretary of Defense Perry and Chairman of the Joint Chiefs of Staff Army Gen. John M. Shalikashvili issued a joint statement February 9 that called the move "unwarranted and unwise." They said, "Discharging service members deemed fit for duty would waste the government's investment in the training of these individuals and be disruptive to the military programs in which they play an integral role."

They further argued that the services should continue to evaluate each member individually to determine fitness to serve. They pointed out that other diseases render some members nondeployable, but these individuals are permitted to stay.

JPATS Selection Final

GAO on February 5 denied the final outstanding contractor protest stemming from the Pentagon's 1995 selection of Raytheon's Beech Aircraft to supply a new Joint Primary Aircraft Training System. GAO's action cleared the way for the Air Force to proceed with its $4 billion contract award for JPATS. *[See "Raytheon Wins JPATS Contract," August 1995 "Aerospace World," p. 18.]*

Rockwell and Cessna both protested the selection of the Beech Mk. II, a single-engine turboprop aircraft.

The GAO decision affirmed what Aeronautical Systems Center officials called one of the "longest and most closely scrutinized source-selection competitions ever." The selection process took fourteen months and entailed evaluation of seven aircraft, seven cockpit mockups, and thousands of pages of contractor proposals.

Production of the new USAF-Navy trainer will begin within a few months and extend through 2017. First flight is planned for summer 1998.

Program officials stated in February that the size of the purchase—originally pegged at 711 aircraft—may increase to some 860 JPATS aircraft. They base the projection on a review of the number of aviators both services need and the number of joint squadrons they must develop.

Medals for Strafing Victims

Five crew members of a USAF C-130 attacked by Peruvian jets over international waters during a 1992 counternarcotics mission received Purple Hearts February 12 in a Pentagon ceremony.

Accepting the medals from Air Force Secretary Sheila E. Widnall and Chief of Staff Gen. Ronald R. Fogleman were Sherry Beard, widow of MSgt. Joseph H. Beard, who died during the incident; TSgt. (MSgt. se-

lectee) Darren R. Trexler; TSgt. Peter J. Paquette; and SSgt. Ronald P. Hetzel, Jr.

Daniel G. Sobel, a former Air Force captain, also earned a Purple Heart but did not attend the ceremony.

General Fogleman said the crew members epitomized "the unlimited liability clause that goes along with what we do."

In April 1992, a fourteen-person crew from the 310th Airlift Squadron at Howard AFB, Panama, was flying a C-130 about seventy miles from the Peruvian coast at an altitude of 18,500 feet when two Peruvian Su-22 fighters suddenly and unexpectedly began strafing the C-130 with 30-mm cannon fire.

The transport suffered rapid decompression, numerous fuel leaks, and damage to the number three engine. A direct hit on the auxiliary hydraulic reservoir caused it to explode and start a fire in the cargo bay. The C-130 lost use of its electric and hydraulic systems. The aircraft commander, Capt. Pete Eunice, landed the plane at an airfield in Peru. The crew won the 1992 Mackay Trophy.

News Notes

■ Gen. Richard E. Hawley will replace Gen. Joseph W. Ralston as commander of Air Combat Command, headquartered at Langley AFB, Va. General Hawley was commander of Allied Air Forces Central Europe and US Air Forces in Europe, headquartered at Ramstein AB, Germany.

■ Replacing General Hawley at his previous commands will be Lt. Gen. (Gen. selectee) Michael E. Ryan, former commander of Allied Air Forces Southern Europe and of 16th Air Force, Aviano AB, Italy.

■ Lt. Col. Joseph A. Abbott ejected safely from a 62d Fighter Squadron F-16 that crashed December 21 about twelve miles southwest of Winslow, Ariz. Colonel Abbott was on temporary duty at Luke AFB, Ariz., from Cannon AFB, N. M., at the time of the crash.

■ US Army aviators from the Joint Rescue Coordination Center at Howard AFB, Panama, rescued four USAF personnel February 7. The airmen from Howard's 24th Supply Squadron had been adrift almost two days, without power or means of communication, in a sixteen-foot boat they had rented for a fishing trip. They were treated for exposure by Army doctors.

■ To provide an additional 800 officers the opportunity to select early retirement, USAF extended the latest Temporary Early Retirement Act

Senior Staff Changes

RETIREMENTS: L/G Stephen B. **Croker,** L/G Arlen D. **Jameson,** L/G Thad A. **Wolfe.**

PROMOTIONS: To be **Lieutenant General:** Kenneth E. **Eickmann,** Phillip J. **Ford,** Michael D. **McGinty.**

To be **Major General:** Andrew M. **Egeland,** Jr., Bryan G. **Hawley.**

To be **AFRES Major General:** Boyd L. **Ashcraft,** Jim L. **Folsom,** James E. **Haight,** Joseph A. **McNeil,** Robert E. **Pfister,** Donald B. **Stokes.**

To be **AFRES Brigadier General:** John L. **Baldwin,** James D. **Bankers,** Ralph S. **Clem,** Larry L. **Enyart,** Jon S. **Gingerich,** Charles H. **King,** Ralph J. **Luciani,** Richard M. **McGill,** David R. **Myers,** James **Sanders,** Sanford **Schlitt,** David E. **Tanzi,** John L. **Wilkinson.**

CHANGES: B/G Brian A. Arnold, from Comdt., Squadron Officer School, AU, AETC, Maxwell AFB, Ala., to Comdt., AFROTC, AU, AETC, Maxwell AFB, Ala., replacing B/G Susan L. Pamerleau . . . **B/G Scott C. Bergren,** from Exec. Officer to CINC, USCENTCOM, MacDill AFB, Fla., to Vice Cmdr., San Antonio ALC, AFMC, Kelly AFB, Tex. . . . **B/G Claude M. Bolton, Jr.,** from Comdt., Defense Sys. Mgmt. College, Fort Belvoir, Va., to Dir., Requirements, Hq. AFMC, Wright-Patterson AFB, Ohio, replacing retiring M/G Roy D. Bridges, Jr. . . . **M/G William B. Davitte,** from Cmdr., AFPC, Randolph AFB, Tex., to Dep. IG, Hq. USAF, Washington D. C., replacing L/G Brett M. Dula.

L/G Brett M. Dula, from Dep. IG, Hq. USAF, Washington D. C., to Vice Cmdr., Hq. ACC, Langley AFB, Va., replacing retired L/G Thad A. Wolfe . . . **M/G (L/G selectee) Kenneth E. Eickmann,** from Cmdr., Oklahoma City ALC, AFMC, Tinker AFB, Okla., to Cmdr., ASC, AFMC, Wright-Patterson AFB, Ohio . . . **M/G (L/G selectee) Phillip J. Ford,** from Dir., Ops. and Log., Hq. USSTRATCOM, Offutt AFB, Neb., to Cmdr., 8th Air Force, ACC, Barksdale AFB, La., replacing retired L/G Stephen B. Croker . . . **B/G Dennis G. Haines,** from Dir., Supply, DCS/Log., Hq. USAF, Washington, D. C., to Dir., Log., Hq. AFMC, Wright-Patterson AFB, Ohio, replacing B/G (M/G selectee) Charles H. Perez.

B/G (M/G selectee) Bryan G. Hawley, from Staff Judge Advocate, Hq. ACC, Langley AFB, Va., to The Judge Advocate General, Hq. USAF, Washington, D. C., replacing retired M/G Nolan Sklute . . . **M/G (L/G selectee) Michael D. McGinty,** from Dir., Personnel Prgms., Education, and Training, DCS/Personnel, Hq. USAF, Washington, D. C., to DCS/Personnel, Hq. USAF, Washington, D. C., replacing L/G (Gen. selectee) Eugene E. Habiger . . . **M/G David W. McIlvoy,** from Dir., Mil. Personnel Policy, DCS/Personnel, Hq. USAF, Washington, D. C., to Dir. Personnel Prgms., Education, and Training, DCS/Personnel, Hq. USAF, Washington, D. C., replacing M/G (L/G selectee) Michael D. McGinty . . . **L/G Kenneth A. Minihan,** from Dir., DIA, Washington, D. C., to Dir., NSA, and Chief, Central Security Service, Fort Meade, Md.

Col. (B/G selectee) William A. Moorman, from Cmdr., AFLSA, Office of the JAG, Hq. USAF, Bolling AFB, D. C., to Staff Judge Advocate, Hq. ACC, Langley AFB, Va., replacing B/G (M/G selectee) Bryan G. Hawley . . . **B/G Susan L. Pamerleau,** from Comdt., AFROTC, AU, AETC, Maxwell AFB, Ala., to Cmdr., AFPC, Randolph AFB, Tex., replacing M/G William B. Davitte . . . **Col. (B/G selectee) Wilbert D. Pearson, Jr.,** from Dep. for Aeronautical Systems, Office of the Under Sec'y of Defense for Acquisition and Technology, OSD, Washington, D. C., to Vice Cmdr., ESC, AFMC, Hanscom AFB, Mass. . . . **B/G (M/G selectee) Charles H. Perez,** from Dir., Log., Hq. AFMC, Wright-Patterson AFB, Ohio, to Cmdr., Oklahoma City ALC, AFMC, Tinker AFB, Okla., replacing M/G (L/G selectee) Kenneth E. Eickmann.

Col. (B/G selectee) John F. Regni, from Dir., Personnel, Hq. AMC, Scott AFB, Ill., to Dir., Mil. Personnel Policy, DCS/Personnel, Hq. USAF, Washington, D. C., replacing M/G David W. McIlvoy . . . **Col. (B/G selectee) Billy K. Stewart,** from Exec. Officer to C/S, Hq. USAF, Washington, D. C., to Vice Cmdr., Warner Robins ALC, AFMC, Robins AFB, Ga. . . . **B/G Leon A. Wilson, Jr.,** from Cmdr., Defense Fuel Supply Ctr., DLA, Fort Belvoir, Va., to Dir., Supply, DCS/Log., Hq. USAF, Washington, D. C., replacing B/G Dennis G. Haines.

SENIOR EXECUTIVE SERVICE CHANGES: Gary M. Erickson, to Dir., Center for Environmental Excellence, Brooks AFB, Tex. . . . **Helmut W. Hellwig,** to Dep. Ass't Sec'y, Research, Engineering, and Industrial Policy, Ass't Sec'y of the Air Force for Acquisition and Technology, Hq. USAF, Washington, D. C. . . . **Steve N Smith,** to Dir., Personnel, Hq. AFMC, Wright-Patterson AFB, Ohio. ■

date from July 1 to September 1, 1996. The date change also will permit another fifty once-deferred officers to apply. Congress has authorized TERA through Fiscal 1999, but money for the program may be limited after this year, according to personnel officials. The service is still 300 officers short of its goal of 1,200 losses for Fiscal 1996.

■ The Air Force needs fifty navigators and electronic warfare officers to enter active duty from the Guard and Reserve for Fiscal 1996. Personnel officials said the officers must have flown within the last five years, among other requirements.

■ The last of twelve C-17 airlifters based at Rhein-Main AB, Germany, to support Operation Joint Endeavor returned to its home base at Charleston AFB, S. C., February 10, according to McDonnell Douglas officials. One C-17 remains at Ramstein AB, but USAF officials said future C-17 missions to Bosnia may deploy directly from Charleston.

■ As of February 20, C-17s had flown 493 of the 2,132 Joint Endeavor airlift missions. The newest transport had hauled forty-five percent of the cargo, some 12,229 of the total 27,221 tons, and 4,079 of the 12,032 passengers.

■ The airfield at MacDill AFB, Fla., is back in business under the Air Force, which reclaimed operations when the 1995 Defense Base Closure and Realignment Commission reversed a 1993 decision to transfer the airfield to the Department of Commerce. MacDill's 6th Air Base Wing is playing host to "snowbirds," who come to Florida to train when winter weather hampers flying at their northern home bases.

The Swiss Air Force received the first of its thirty-four F/A-18 Hornets from McDonnell Douglas in January. Most of them will be assembled in Switzerland, which chose the Hornet after also evaluating the US F-16, Sweden's JAS 39 Gripen, and France's Mirage 2000-5.

■ Madeline McCormick, widow of Maj. Gen. Clarence L. Tinker, MacDill's first commander, celebrated her 100th birthday at the base January 4. Mrs. McCormick has survived her first husband, General Tinker, who disappeared in the Pacific in 1942 and for whom Tinker AFB, Okla., is named, and her second husband, Col. Charles McCormick. She started MacDill's first women's club after her arrival in 1940 and participated on the Air Corps' Ladies Song Committee, charged with selecting the Corps' official song.

■ Civil Air Patrol volunteers in Pennsylvania and New York helped local officials with everything from sandbagging to aerial surveillance during heavy flooding in the northeast in January. Through January 26, they had worked more than 3,600 manhours and 110 flying hours.

■ Sixty cadets from CAP's Arizona Wing marched for the first time in the thirtieth annual Parada del Sol celebration January 27 in Scottsdale, Ariz.

■ For the fourth consecutive year, Air Intelligence Agency's 488th Intelligence Squadron, RAF Mildenhall, UK, is USAF's nominee for the National Security Agency Director's Trophy, given to DoD's best mobile tactical support cryptologic unit.

■ DoD is compiling a "by name" list of service members who supported NATO operations in the former Yugoslavia or on the Adriatic Sea since July 1, 1992, and who may be eligible to wear the NATO medal, which was approved by the Secretary of Defense in December. Members who think they qualify will need official travel orders to verify their participation.

■ Electronic Systems Center's Peace Shield and Atmospheric Early Warning System program offices at Hanscom AFB, Mass., have won the 1995 Gen. Bernard A. Schriever Award.

■ The last of 113 T-3A Firefly training aircraft landed at Hondo, Tex., in January, completing the aircraft-procuct on portion of a $54.8 million contract awarded by Aeronautical Systems Center at Wright-Patterson AFB, Ohio, in 1992. The Air Force has already used the T-3A, which—unlike its predecessor the T-41 Mes-

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calaro—can handle aerobatic flight, to screen 491 candidates and sent 428 of them on to undergraduate pilot training.

■ The Air Force selected twenty-nine officers out of 170 applicants for the test pilot program. Twenty-five will attend the USAF Test Pilot School at Edwards AFB, Calif., and two the US Navy's Test Pilot School at NAS Patuxent River, Md. Two others will attend the test pilot education program, which includes master's degree work at the Air Force Institute of Technology prior to Test Pilot School.

■ AFIT conferred eleven doctoral degrees and 153 master of science degrees during its winter 1995 commencement. The school educates nearly 34,000 students annually and administers 3,000 more students at civilian institutions.

■ The Intermediate and Senior Service School Board selected 221 out of 520 officers for senior service schools, a forty-three percent selection rate, and 485 out of 1,183 officers for intermediate service schools, a forty-one percent rate. It also selected four chaplains for intermediate service schools.

■ The Defense Finance and Accounting Service has created a World Wide Web home page called "DFAS Lane." Reached at http://www.dfas.mil, the page includes current pay charts, discussions of agency priorities, and an interactive forum.

■ Next month, Nebraska will honor the fiftieth anniversary of the founding of Strategic Air Command by dedicating Highway 370 between Bellevue and Gretna, Neb., the SAC Memorial Highway. The event is part of a six-month celebration called "America's Shield," in the greater Omaha area, which began in March.

■ DoD announced February 13 that the Office of the Assistant to the Secretary of Defense for Atomic Energy has changed its name to the Office of the Assistant to the Secretary of Defense for Nuclear and Chemical and Biological Defense Programs. The office has added or expanded its responsibilities to include chemical matters—including destruction of chemical weapons in the US and Russia—biological matters, arms-control treaties and agreements implementation, and the cooperative threat-reduction program.

■ USAF awarded more than $5.3 billion in Fiscal 1995 to small-business contractors, including more than $1.75 billion to disadvantaged businesses and almost $500 million to businesses owned by women. Secretary Widnall said the service "significantly exceeded previous dollar obligation amounts."

■ The Global Aeronautical Foundation, Inc., of Moorpark, Calif., has restored to flying condition an EC-121T Warning Star Constellation, used by both USAF and the Navy as an airborne early warning system from the late 1950s to late 1970s. The foundation plans to fly the aircraft at air shows this summer.

Obituary

Dr. Anthony J. Cacioppo, former chief scientist with the Foreign Technology Division (now National Air Intelligence Center) at Wright-Patterson AFB, Ohio, died January 13 at age seventy-two. His early Air Force work in electronic warfare provided countermeasures data to Southeast Asia aircrews, helping reduce the aircraft loss rate. He also created the intelligence community's first systematic Soviet technological threat assessment and made advances in the transfer of foreign science and technology to US research and development. After his retirement from government service in 1986, he became chairman of the biomedical engineering department at Wright State University, Dayton, Ohio. ■

USAF's top leaders see airpower as the instrument and the product of strategic change.

The New American Way of War

By John T. Correll, Editor in Chief

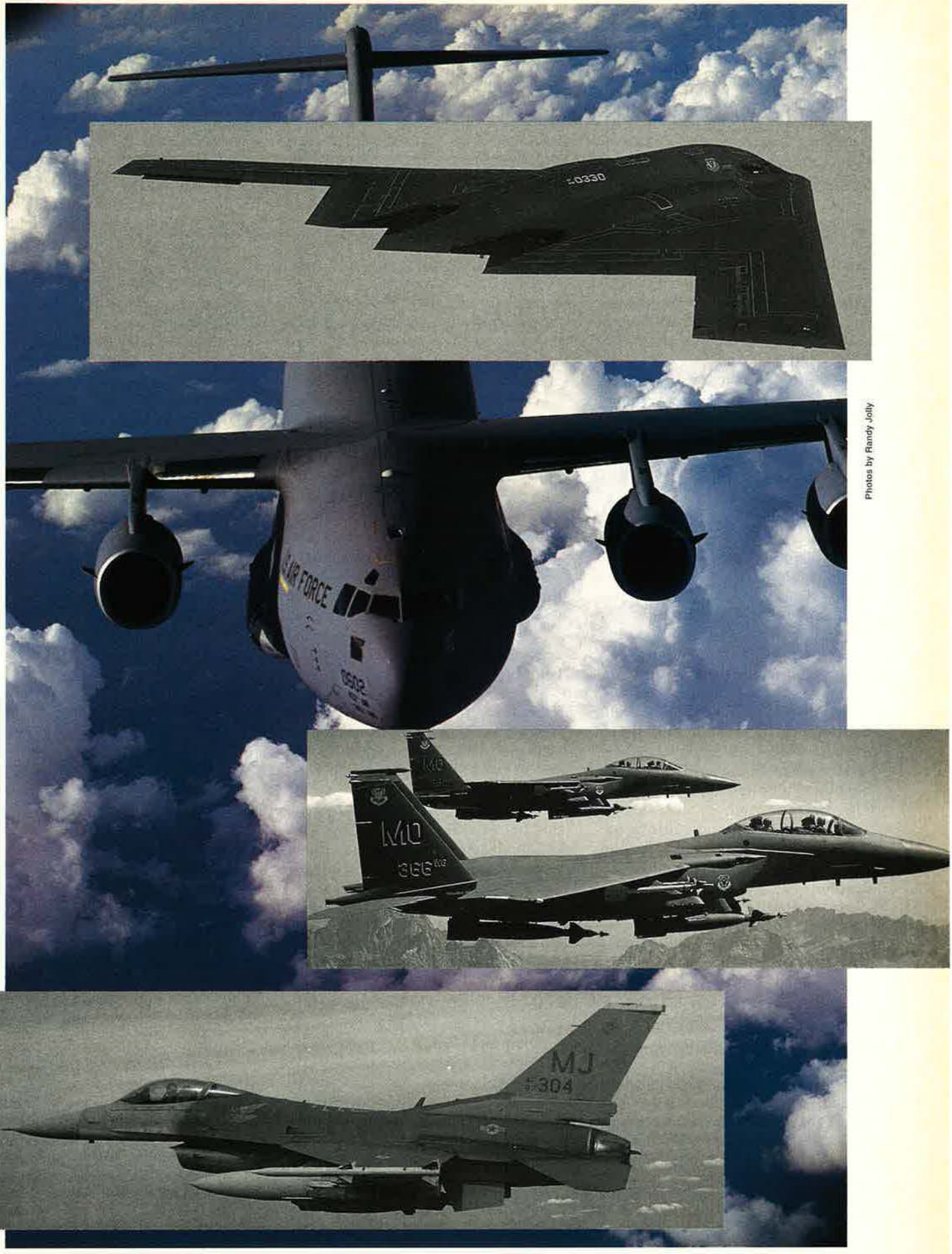
Gen. Ronald R. Fogleman, USAF Chief of Staff, believes that a "new American way of war" is emerging. Traditionally, the US has "relied on large forces employing mass, concentration, and firepower to attrit enemy forces and defeat them in what many times became costly but successful battles," he said at the Air Force Association's Air Warfare symposium in Orlando, Fla., in February. Now, however, technology and circumstances are leading to unique military advantages, particularly in airpower, that can be employed "to compel an adversary to do our will at the least cost to the United States in lives and resources."

We have an obligation as well as an opportunity, General Fogleman said, to make the transition from "brute force" attrition strategy to "a concept that leverages our sophisticated military capabilities to achieve US objectives by applying what I'd like to refer to as an asymmetric force strategy."

Secretary of the Air Force Sheila E. Widnall pointed to USAF's contributions to the national security strategy of engagement abroad and "enlargement" of democracy around the world and said that "those contributions themselves shape the Air Force of the future." Looking back from the vantage of years hence, she said, we will see the "profound impact" of the Air Force's humanitarian and training missions and in the other international contacts that occur daily. "I never cease to be amazed at the ability of our twenty-year-olds to represent the US effectively in Bosnia[-Hercegovina], work closely with their Russian counterparts on a peacekeeping operation, or help build schools in El Salvador."

International contacts also have direct military utility. For example, Secretary Widnall said, in the successful air campaign against the Bosnian Serbs last fall, the cooperation of coalition air forces functioned as "a glue for the political consensus needed to see that operation through to completion."

More and more, General Fogleman said, "whether it is a hot crisis or a crisis in development," the national command authorities "turn to our military establishment because it is one of the few elements in our government that has consistently



Photos by Randy Jolly

demonstrated the ability to respond and make things happen."

Among the factors making the new American way of war possible, he said, are "the extended range, the precision, and the lethality of modern weapon systems that are increasingly leveraging and leveraged by an agile C^4I [command, control, communications, computers, and intelligence] capability that enables warfighters to analyze, to act, and to assess before an adversary has the capability to act."

In the Gulf and in the Balkans

The Air Force's most recent combat experiences—the Persian Gulf War of 1991 and Operation Deliberate Force last year in Bosnia—were previews of the asymmetric force model. In the Gulf War, General Fogleman said, the US and its partners in the allied coalition initially "looked at attacking the frontal strength of Iraq's army, which was then occupying Kuwait" but wisely passed up that approach and "chose to capitalize on the coalition's asymmetrical advantage in airpower to attack [Iraqi leader Saddam Hussein's] strategic and tactical centers of gravity.

"The coalition conducted a concentrated forty-three-day air campaign [that] took away Hussein's eyes, attritted his forces in the field, rendered his command and control relatively ineffective, destroyed his war production capability, and denied vital supplies to his troops. . . . This operation prevented a bloody slugfest on the ground while allowing coalition forces to safely prepare for an offensive that engaged a badly degraded enemy force with the asymmetric strength of *our* ground forces. The result was a 100-hour ground offensive that concluded the Gulf War."

Another example of asymmetric force immediately followed the Gulf War with the use of airpower to enforce UN sanctions against Iraq. "For over four-and-a-half years, the United States and its allies have leveraged our advantage in airpower, both carrier-based and landbased, in southwest Asia to achieve political objectives without placing large numbers of young Americans in harm's way," General Fogleman said. "This has been an air occupation of Iraq."

Prior to Operation Deliberate Force in 1995, command authorities in the Balkans had constrained the use of airpower rather than using the asymmetric advantage of it. "We could only conduct limited area attack operations, and so the airpower that was being applied in the air-to-ground role had very little political linkage," General Fogleman said. "In fact, for many of us airmen, it was very reminiscent of what we had seen in Vietnam."

That changed with Operation Deliberate Force in August and September. It was conducted with a coherent strategy that "gave airpower the freedom of maneuver to attack the full range of targets that were carefully selected to reduce the Bosnian Serb military advantage," General Fogleman said. "Allied air forces took down the Bosnian Serb air defenses, and they launched extraordinarily precise air strikes that deprived the Serbs of vital warfighting resources while minimizing collateral damage."

Late last year, Secretary of Defense William J. Perry recognized what airpower had achieved in the Balkans and said, "Deliberate Force was the absolute, critical step in bringing the warring parties to the negotiating table at Dayton, [Ohio,] leading to the peace agreement."

Precision, Information, and Airlift

Several characteristics of modern airpower stood out starkly in the Deliberate Force campaign. The first of these was precision.

"Deliberate Force extended a trend that began with the Vietnam War—in which about 0.2 percent of our weapons expended were precision—and continued in Desert Storm where, contrary to the general perception of its having been a 'video war,' only about nine percent of our bombs were precision guided," Secretary Widnall said. "In Deliberate Force, more than sixty percent of the bombs dropped by the NATO force were precision guided."

The significance of precision weaponry went beyond the straightforward military value. In what Secretary Widnall described as a "media-intensive environment," limiting collateral damage was crucial. "The NATO air operation was operationally robust, but it was politically fragile. With the first report of civilian casualties, the entire operation would have been put at risk, but that report never came."

The campaign also demonstrated "information dominance," she said. "We have employed the E-8 Joint Surveillance and Target Attack Radar System, a modified Boeing 707 with its moving-target indicator and synthetic aperture radar, to take incredibly detailed real-time pictures of Serbian movements and encampments. The NATO commander enforcing the separation there has taken to slapping those pictures down in front of the Serbs during their meetings to say, 'See, you can't do *anything* we don't know about!' This is powerful. It's like playing poker and being able to see all the cards against an opponent who knows that you can do just that."

Despite terrible local weather conditions, forces and equipment were inserted rapidly into Bosnia by US Air Force strategic airlift, which Secretary Widnall termed a "unique national treasure." As the airlift drew to a close, she was struck by "the ease with which we had just executed a mission that no other nation on Earth could even attempt."

In Deliberate Force, she said, "we affirmed the utility of air forces in providing options for our national policymakers. Over the years of our growing involvement in the war in the former Yugoslavia, this nation had used political tools—economic tools, diplomatic tools—all to no avail. The nation's air forces provided a military option at relatively low risk with a real prospect of success. And that option paid off."

Working With the Constraints

General Fogleman noted three major constraints that make it difficult to continue with old-style force-on-force attrition strategies.

- **Fewer forces.** The nation no longer has the large military force structure it once did. What the armed forces do, they must do with smaller numbers.
- **Casualties and collateral damage.** "Americans have come to expect military operations to be quick and decisive so that our troops can return home quickly," General Fogleman said. The public is not tolerant of casualties or of firepower that hits in the wrong place.
- **The "CNN effect."** Horrors of war are transmitted in real time into

homes by television. Operations that are not precise, efficient, and focused could lose public support in a hurry.

It is the Air Force's intention to "provide advanced capabilities that will give us responsive, precise, and survivable capability to implement a new American way of war," General Fogleman said. "These same capabilities will help minimize casualties on both sides. They'll reduce the CNN effect. And they'll allow us to wage war in a way that corresponds to what appears to be the values of American society vis-à-vis what they are willing to accept on the battlefield."

Airpower, he said, "will also provide a tremendous leverage to resolve future crises rapidly at low cost. All of these developments point to a significant increase in the role of airpower in achieving our nation's security objectives using asymmetric strategy."

Time-Phased Modernization

The Air Force, General Fogleman said, is pursuing a "balanced, time-phased modernization program" to "field air and space systems that will bolster our ability to execute a new American way of war well into the next century."

In the near term, he said, the Air Force is buying the C-17 "to address the nation's most pressing military shortfall—strategic lift." The investment in the C-17 has already paid off in Bosnia, where the C-17 delivered large loads like those carried by C-5s and C-141s to airfields that, up to now, could not be used by an airlifter larger than the C-130 intratheater transport. Eventually, the Air Force will replace a fleet of 250 C-141 airlifters with 120 C-17s.

"In the midterm of our modernization plan, we are upgrading the capability of the long-range bomber force and procuring a family of autonomous precision weapons to leverage the range and payload of that bomber force," said General Fogleman. This summer, he noted, the B-2 bomber will be equipped with the GPS-Aided Targeting System/GPS-Aided Munition that will enable the stealth bomber to target sixteen aimpoints independently on a single pass. "We're beginning to change our thinking from how many aircraft does it take to destroy one target to how many targets can we destroy with one aircraft," General Fogleman said.

Also working for the midterm are an expendable launch vehicle "that will provide assured, affordable access to space," the Spacebased Infrared system to support theater missile defense, and the CV-22 tiltrotor aircraft for special operations forces.

The long term will bring two systems that General Fogleman declared to be "truly revolutionary"—the F-22 fighter and the Airborne Laser (ABL), which will strike from hundreds of kilometers away to intercept ballistic missiles in the boost phase. "The Secretary and I were recently briefed by an independent review team that foresaw no showstoppers in developing the Airborne Laser, to include fielding a demonstrator by 2002," General Fogleman said. At a press conference in Orlando, Secretary Widnall pronounced progress on the ABL to be "a genuine ten on a scientific Richter scale."

Asked whether USAF's plans for the asymmetrical power strategy include nonlethal systems, General Fogleman said it definitely includes such nonlethal systems as air mobility forces, but "if we're talking about gooey gunk being dropped in bombs or something like that—I'm not too dewy-eyed about gooey gunk."

Models and Metrics Fall Behind

"Too many people, to include professional airmen, still conceive of airpower in terms of functional stovepipes—fighters, bombers, space, intel, and so on," General Fogleman said. "We've got to come to appreciate airpower for what it is: a collection of unique capabilities that exploit the control of the air and space medium to gain a powerful advantage in time and mass and position and awareness in pursuit of national security interests."

Analytical models and metrics have not yet caught up with operational practice. "The current attrition models that assess the results of force-on-force engagements, based on force ratios and territory lost or gained, aren't really very relevant with forces that are employed in accordance with asymmetric strategies," he said.

General Fogleman said there is no longer any question of "individual services attempting to develop the resources to win the war on their own or the individual services trying to get in on the action for the sake of being in on the action." At the same time, he added, all indications "point to a significant increase in the role of airpower in achieving our nation's security objectives, using asymmetric strategy."

In theater conflict, the unified commander in chief (CINC) develops a war plan to strike at the enemy's strategic and tactical centers of gravity. "While these may vary as a function of the enemy, these centers generally include things like the leadership elite, command and control, internal security mechanisms, war production capability, and one, some, or all branches of the armed forces—in short, it's the enemy ability to effectively wage war," General Fogleman said.

The Air Force's role is twofold. "Theater commanders count on us to support them with ready air and space capabilities, often on very short notice," General Fogleman said. The other task is to think and plan ahead. "By their very nature," said the General, "CINCs tend to focus on dealing with near-term developments." By statute, the services are responsible for organizing, training, and equipping forces, and it is up to them to take the longer view.

"They've got to anticipate the capabilities that the CINCs of the future will require," General Fogleman said. "The services have got to articulate and advocate those capabilities. The Air Force has got to stay in front of this effort because we offer so much to the nation in this respect."

It is difficult to imagine an asymmetric strategy, pitting US strengths against the weaknesses of the adversary, in which airpower would not be paramount.

As General Fogleman said, "Once the United States decides to engage, and our naval forces are steaming to the theater of operations, and our ground forces are being transported to the affected theater, the Air Force can be employing airpower to achieve theater situation awareness, to stop aggression in its tracks, to attack vital strategic targets, and to seize control of the air to make sure that the later arriving forces arrive in a benign air environment." ■

Senior officers survey programs and prospects at an AFA symposium.

Perspectives on Air Warfare

By John A. Tirpak, Senior Editor

All photos by Randy Jolly

THE Air Force Association held its annual Air Warfare symposium February 15–16 in Orlando, Fla. The speakers included not only the Air Force Secretary and Chief of Staff *[see "The New American Way of War," p. 20]* but also heads of four USAF operational commands—Air Combat Command, Air Mobility Command, Air Force Space Command, US Air Forces in Europe—and a senior Air Force acquisition official. The Army's senior general for doctrine also made a presentation.

Gen. Joseph W. Ralston, then ACC commander and now vice chairman of the Joint Chiefs of Staff, praised the symposium as the AFA event "that does the best job of bringing the senior leadership of the Air Force and industry partners together."

Air Combat Command: General Ralston

The Air Force cannot afford all the programs already in its pipeline and can scarcely look at new projects unless they promise tremendous new capabilities, General Ralston told the Orlando attendees.

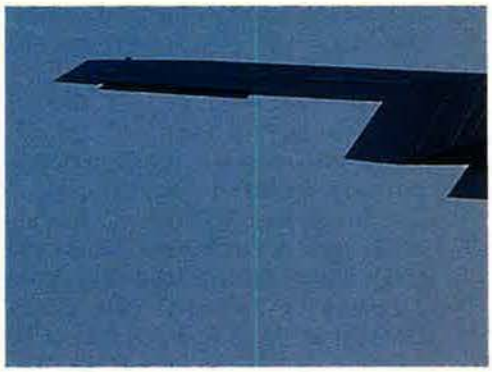
"At best, we are in a zero-sum game," he cautioned.

In the Air Force's 1998–03 Program Objective Memorandum—the upcoming six-year defense spending plan—the Air Force is already facing a $4.5 billion shortfall "just for the programs that we've got on the books," the General pointed out. "So, anyone who comes forward with a new, grand idea, we're going to have to kill something to proceed with that grand idea, no matter how good it is."

He added that the Air Force has an obligation to be honest with industry about the money situation, so contractors don't waste effort on projects that won't make the cut.

"When you are about to spend your discretionary dollars on a program," he said, addressing industry attendees, "it certainly needs to be one that has some prayer of success, in terms of the overall funding."

The F-22 advanced fighter is "absolutely fundamental" and remains the top Air Force modernization program, General Ralston said, adding that it is "not an overstatement" that the airplane will provide air superiority for US forces "for the first half of the twenty-first century," given its expense and predicted service life.



The F-15 will need improvements to keep it viable until the F-22 enters service, "but we can't do much," General Ralston acknowledged. Priorities include an upgrade to the APG-63 radar and the Link 16 digital data-sharing system.

Air Combat Command considers the Airborne Laser for theater missile defense a "revolutionary system" and has fully funded a concept demonstrator that should fly in 2001, the General noted.

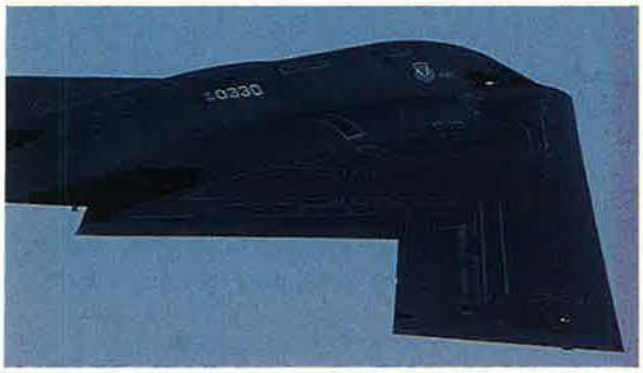
The thirty-year-old computers that power the Region and Sector Operations Control Center system "just can't do the job" and will be modernized.

General Ralston put to rest the idea that the days are numbered for the A-10 Thunderbolt II attack aircraft, saying it has "served us well and will continue to do so as far into the future as I can see." It has been funded for embedded Global Positioning System (GPS) capability and the Enhanced Position Location Reporting System (EPLRS) radio, so it can communicate with the Army ground troops it supports.

The F-16 pilot force is getting night vision goggles, and the aircraft is receiving a capability for carrying the Joint Direct Attack Munition (JDAM), Joint Standoff Weapon, Wind-Corrected Munition Dispenser (WCMD), and EPLRS radio.

"I would also like to see a way to do Link 16," as well as the EPLRS on the F-16, General Ralston said, and "perhaps there is a way you could do both" in the same box.

The B-1 heavy bomber is funded for a conventional-weapons upgrade and defensive-systems improvement, "so it can face the threat of the twenty-first century," said the General. Congress added funding to the Fiscal 1996 budget for a "virtual umbilical" that will allow the B-1 to drop a "JDAM-like" weapon within the next two years, and General Ralston said ACC considers this a "smart hedge" to provide some near-term, near-precision capability for the B-1.



Though he says he is a "strong supporter" of the B-2 stealth bomber, General Ralston noted "we still have over $1.5 billion worth of development . . . to do" on it.

"As you know, Congress has appropriated $493 million for the B-2, and those decisions will be made in Washington on how to spend that," but "certainly we need at least that much" money to fund necessary testing and spare parts for the stealth bomber.

The General said he expects that the Defense Department's ongoing—and newly expanded—"deep strike" study will "build very heavily on [DoD's] heavy bomber study last year," which concluded that a force of twenty B-2s was sufficient for the Air Force. He noted that ACC was involved in developing last year's conclusions, but he expressed his belief that the issue will get "a fresh look."

He also said he expects the B-52 will remain a combat asset for a long time to come.

"I find it an interesting statistic that the average B-52H has fewer flying hours and fewer landings than the average 767 in the commercial fleet," the General remarked, "so it has got a lot of life left on it." The airplane could serve "for well beyond the lives of just about anybody in this room."

The Joint Air-to-Surface Standoff Missile, Sensor-Fuzed Weapon, and AIM-9X short-range dogfight missile are all "fully funded," he said.

Two E-8 Joint Surveillance and Target Attack Radar System aircraft are meeting expectations in their deployment to Bosnia-Hercegovina. However, the number of E-3 Airborne Warning and Control System airplanes worldwide is not sufficient to meet CINC desires, General Ralston said. "We're doing all that we can to generate more sorties," and the Radar System Improvement Program for AWACS is considered a priority, he added.

The case is much the same when it comes to the RC-135 Rivet Joint electronic surveillance aircraft. "We need some additional Rivet Joint" craft, the General emphasized. Congress added money to reengine the existing aircraft, he added, but "that's an expensive program, and we've got some work to do to sort out how we approach that."

General Ralston is also very supportive of unmanned aerial vehicles and the C-130J theater transport aircraft, which will be "very important to us, as we have a good-size fleet of C-130s aging out" of the inventory.

General Ralston was pleased to report that Air Force "combat readiness is at an all-time high," with ninety-four percent of active squadrons and ninety-six percent of Guard and Reserve squadrons at readiness condition C-1 or C-2. This, he claimed, indicates that decisions made to cut force structure in order to preserve readiness were "the right ones."

Air Mobility Command: General Rutherford

In spite of inadequate warning, "screwed-up planning," and "stinko" weather, the Air Force's movement of US troops to Bosnia for Operation Joint Endeavor was a huge success and vindicated the C-17 and the requirements that led to it, according to Gen. Robert L. Rutherford, head of USAF's Air Mobility Command and the joint-service US Transportation Command.

The Bosnian lift "was a relatively small effort," General Rutherford explained, but the poor conditions and activation of long-dormant facilities taught important lessons, he said.

"We need to pay more attention to our infrastructure, especially that infrastructure in Europe [that] we've moved out of"—such places as Torrejon and Moron ABs, Spain, and Rhein-Main AB, Germany, the General said. This is true, he continued, "because we may well have to go back in there and use it again, and we'd better . . . keep it in pretty good condition [and] exercise it, which we have not been doing enough."

When the operation began, AMC planned to do the job with only twenty-six C-130s. However, "as the elements started to take their toll," said the General, "and we wanted to stay on the time line, it became obvious that we needed additional lift. Consequently, we ended up moving twelve of our nineteen C-17s into the theater."

The fields from which AMC operated were austere at best, with "holes in the runway, . . . minimum lighting, and no precision approach capability." Crews had to rely on the C-130's radar altimeter and the C-17's GPS "to get down to 400 feet" in visibility that was typically only one mile.

At Tuzla, Bosnia—the main operating field—available ramp space was only 200 by 600 feet, and operations were conducted off taxiways a mere fifty feet wide.

"No way you were going to get a C-5 in there unless you parked it on the runway," General Rutherford asserted. "And if you parked it there, and you broke it, you were out of luck."

Because there was "an airplane landing every fifteen minutes [at Tuzla] at the height of operations, space was at an absolute premium." Given the tight ramp space, the need to maneuver on the ground, and the pace of operations, the General concluded, the situation was a textbook illustration of "the reasons we bought the C-17, and I can't think of a better example of why we needed it."

The dozen C-17s moved "17,000 short tons in a thirty-day period" and carried a third of the whole airlift operation, General Rutherford said. Also participating were ten C-141 Starlifters and two C-5 Galaxys, but they had to operate at sites more distant from the action, he added.

"What did we learn?" he asked rhetorically. "We learned that we would have liked to have had some more planning time. We learned that there are some seams in an operation like this where you start using strategic lift in a tactical role, and we need to go back and think about that."

General Ralston also highlighted the fact that "we still don't have a good feel for in-transit visibility"—for knowing where certain cargo is and how it's getting to its destination. AMC also discovered that "even a small operation like this can be very manpower-intensive." He noted that AMC deployed 1,700 troops into the Balkan theater.

Asked if the currently planned buy of C-17s is adequate to AMC's needs, General Rutherford said the question is being reviewed.

"We've said all along, somewhere between 120 and 140 is probably the right number for strategic lift," he noted. More C-17s might fill the unmet brigade-airlift requirement and modernize the aeromedical evacuation fleet.

Soon, it will be time to "look at replacing that C-5A," the General added. It took fourteen years from concept to production on the C-17, and "we cannot wait another fourteen years to . . . replace the C-5A," he said.

Air Force Space Command: General Ashy

The North American Air Defense system, run jointly by Canada and the US, has not gone out of business with the end of the Cold War, reported Gen. Joseph W. Ashy, head of North American Aerospace Defense Command (NORAD), US Space Command, and Air Force Space Command.

At the time of the symposium, the Canada-US agreement keeping NORAD going was on the verge of being renewed "for the eighth time," General Ashy said, "so we'll be around at least another five years."

The organization has "downsized, . . . resized, and . . . reconfigured," he continued, to be more relevant "and more cost-effective."

NORAD still provides nuclear attack warning and assessment and performs the air sovereignty mission, though in a much-reduced, "readjusted" manner to be less expensive, General Ashy said. If deterrence ever fails, NORAD will, in fact, be in charge of continental air defense.

The organization continues to keep an eye on the movements of Russian submarines, as well as on the operations tempo and training of Russian bomber crews. Russia has 101 "fairly modernized" bombers that bear watching, the General noted. Also of keen interest is the Russian intercontinental ballistic missile force, particularly "road- and rail-mobile SS-24s and SS-25s," General Ashy said.

Increasingly, though, NORAD and US Space Command are being more integrated with the civilian space program, particularly when it comes to communications, navigation, and weather satellites.

Asked to comment on the increasing civilian dependence on GPS *[see "GPS in Peace and War," p. 76]*, General Ashy said GPS was fielded "as a military system for a very good reason"—because of the navigational accuracy it can provide to combat systems. It required a military investment of nearly $8 billion.

Still, the system has generated civilian business worth as much as $30 billion, and "what we have to do is balance this whole thing," the General said. "President Clinton will soon sign a new policy on Selective Availability, which . . . will probably be a compromise." Technologies are germinating that "I can't comment on," he said, but these technologies may make it easier to ensure that GPS is available only to US military users at one level of accuracy and to commercial users on another, "to the benefit of all."

General Ashy asked his listeners to spread the word that Cheyenne Mountain AS, Colo., remains the hub of NORAD and US Space Command activities and is not a Cold War relic.

"Some question why we need Cheyenne Mountain in the mountain," he said. "It is our command-and-control node. . . . It is critical to the defense of North America. It was built there for a very good reason," and it would make no sense to relocate it. Besides the increased vulnerability of another site, "it costs resources to move it out," he said.

"We are modernizing it," he said. "We've spent over a billion dollars on it, and we are well into the second phase. . . . I want to make sure we keep our modernization program on track."

General Ashy said NORAD and US Space Command are in the process of evaluating a new estimate of the threat from ballistic missiles and that threat's implications on field-

ing a ballistic missile defense of the continent.

Missile proliferation "is something we watch very closely," the General said. "We're posturing ourselves to be prepared to deal with this threat when the time is appropriate."

At the CINC NORAD level, "we have postured ourselves to think this through as a concept of operations, so [the Ballistic Missile Defense Organization] can model and simulate capabilities that would be produced by the Air Force and Army in an operationally pertinent way."

Ballistic missile defense will have to be undertaken in cooperation with Canada, under the terms of the NORAD agreement, the General noted.

US Air Forces in Europe: General Hawley

Gen. Richard E. Hawley, then USAFE commander, noted that the United States possesses a "zeal to exploit the potential" of new technologies, which can rapidly project power anywhere in the world within hours. The General worries, however, that in its zeal, the US "might lose sight of some of the more subtle benefits" of keeping forces based overseas, he told the Orlando conference.

The alliances formed by the US around the globe have safeguarded the world "through half a century of unparalleled danger to mankind," he said. The track record—which shows that the presence of US forces has a calming influence on simmering conflicts—suggests that there should not be a wholesale retreat to US shores, projecting power from afar, but rather a continued policy of "active engagement," he asserted.

General Hawley observed that forward presence is often "the best and least expensive way" to effectively head off a problem.

"Let's not lose sight of the critical role of forward-deployed forces in areas of instability," he said.

He explained that such forces "give us a seat at the table—usually the most influential seat—when issues of interest to the US are being debated. They sustain our system of alliances, which in turn allows us to leverage the military capabilities of allies in pursuit of common interests. They preserve our access to bases, ports, and airfields, without which we might not even have the option to engage. They give us a pool of regional experts both in and out of uniform, frequently very senior experts, who have served as leaders in the region of interest."

It is "often overlooked" that US allies provided a quarter of the forces in the Persian Gulf War, half the aircraft in Operation Deny Flight, and seventy percent of the ground force in Joint Endeavor, he noted.

There is a "multiplier effect," in that allies use similar tactics and procedures and "often equip their forces with weapons of US manufacture," providing interoperability advantages.

Having access to overseas bases is the "most critical" benefit of being forward deployed, General Hawley said. "If we didn't have access to Rhein-Main and Ramstein, [Germany,] you couldn't 'do' Bosnia," he pointed out. "If you want to put a fire out while it's still small, you better have a firehouse close to the action."

While he does not advocate abandoning the pursuit of new capabilities that can give the US the advantage of long reach, the General instead argued for maintaining "a balanced approach" that recognizes and capitalizes on the advantages of both

The Force XXI Tool Kit

The Army got a late start shifting gears for the post–Cold War world but is following the Air Force's lead in preparing itself for a new strategy and a new range of threats, reported Army Gen. William W. Hartzog, commanding general of the Army's Training and Doctrine Command.

General Hartzog told attendees that, after events in eastern Europe "signaled a change in where our world was and where it was going, . . . [USAF] had a strategy and you had it articulated very rapidly. We took longer to do that." For two years, the Army has been developing a hardware and doctrine plan that will convert it into "Force XXI," which will be more of a "tool kit" for world crises than "a threat-based Army," he explained.

Only recently has the Army progressed from "grease pencils on acetate" to "light pens on video screens" in an effort to collect and make sense of battlefield information, the General said.

"Technology had come upon the Army in a way we had not anticipated," he explained. "We decided . . . we can't afford to take this cautious, casual way of making changes; we have to make a major step."

After a long internal debate about what the Army should do and be, General Hartzog said the mission has boiled down to several key concepts: deterring war, compelling an adversary to submit, reassuring allies, and supporting other services and national strategy.

"We have to be more doctrinally flexible and operationally agile," he said.

The new Army will focus on being "more tailorable" to the situation and "more modular," to be able to assemble the right ingredients for a given mission. This has required "redesigning the tactical Army" in such a way that the result will be relevant for the next twenty years. It will involve unprecedented sensor data, from such eye-in-the-sky systems as the Joint Surveillance and Target Attack Radar System down to "a flip-down monocle on a soldier's helmet." This, in turn, will require sensor fusion systems that will collate information so that everyone on the "blue force" knows who is where.

Special attention will have to be given to not overloading people with extraneous information, General Hartzog said. But information will be the key because most of the equipment will be "legacy systems" that cannot be easily replaced, and the only way to make them more powerful will be to use them more effectively, "in the right place at the right time, . . . linking the sensors to the shooters."

What "it all boils down to is real-time situational awareness," he said.

"We have to redesign the institutional Army," which has had "the same staff organization since 1911." It could use some "deep thought" about what aspects of it are still really necessary, the General said.

The new doctrine will emphasize force projection and protection, information dominance, shaping the battlespace—setting the conditions under which the Army will fight—decisive operations, then sustaining operations and making the transition to future operations.

Many experiments have been run, and a prototype unit is being organized that will put the new thinking and technology to the test at the National Training Center, Fort Irwin, Calif., next year. With regard to new hardware, General Hartzog said, "We will only buy those things that are critical" to the Army's future success.

long-range weapons and forward deployment.

He also disputed the claim that overseas-based forces are "somehow more expensive" than US-based ones. Because host nations pay some support costs for US forces on their soil, "the only way we can save money by withdrawing forces from overseas is if we decommission them and put them in the boneyard."

General Hawley made a plea on behalf of 73,000 Air Force troops and dependents in USAFE "who are living and working in some of the worst facilities found anywhere in our Air Force." The US, he said, stopped investing in facilities in Europe when the Berlin Wall came down because of the uncertainties about what would happen next.

"But that period of uncertainty is now over. We know with some confidence what our posture in Europe will be for the next decade or so. It is time to fulfill our obligation to give our people facilities that meet Air Force standards and are able to support the missions that we call on them to do." Because his troops don't "live in anyone's district, their needs sometimes get pushed to the bottom of the stack. . . . I'd appreciate your help in keeping that from happening."

USAF Acquisition: General Muellner

Only a few years ago, the C-17 airlifter "was in great, great trouble, . . . but [it] has become a model program," in large part because the acquisition process has been streamlined, Lt. Gen. George K. Muellner, principal deputy assistant secretary of the Air Force for Acquisition, said in his Orlando address.

At the depth of the aircraft's problem period, the C-17 was costing USAF $330 million a copy, but "the government and industry got their act together," and now the C-17 may come in for as low as $173 million a copy, saving $4 billion over the life of the program. "That's what streamlining can do for you," General Muellner said.

Across the Air Force, cost has become a paramount consideration in any program. General Muellner assured his listeners that "there's still a focus on meeting the warfighter's needs but doing so in a much more effective manner." The C-17 is an example of success in doing so, he said.

It is a myth that streamlining will work only on major projects, the General continued. Experience on numerous smaller efforts has shown that "it works at all levels."

The F-22 fighter program has become the flagship of acquisition reform because it has pioneered the use of integrated product teams "of government and industry people working hand in hand" to make the program perform technically as well as financially, said General Muellner.

"It has now become a model not only for our other programs and our sister services but also [for] the way the Defense Department now functions in the acquisition process," the General asserted.

He cited numerous cases of programs in which the act of relaxing military standards or shifting to commercial practices sped up the acquisition process and saved money while not harming—or while actually improving—the performance of the system. These model programs included JDAM, WCMD, Milstar satellite program, and GPS.

General Muellner also said the Air Force won't hesitate to cancel a system that can't meet target cost. He argued that the AGM-137 Triservice Standoff Attack Missile, while technically sophisticated, was "a failure."

TSSAM "would have cost us in excess of $2 million a round," said General Muellner. "Clearly that would not fit in" with Air Force spending limits. Its replacement program, the Joint Standoff Air-to-Surface Missile, has "cost as one of its key performance parameters. If we fail to meet the cost, the program is at risk of cancelation, just as if you failed to meet the survivability requirement."

The Joint Strike Fighter, a prospective aircraft that is to emerge from the Joint Advanced Strike Technology program, was set up "as a pilot program to capture all the benefits of acquisition reform and streamlining," said General Muellner, who previously headed the JAST effort. The program does all its business in a paperless format over the Internet and involves industry "in every aspect," such as writing requirements and choosing models to verify performance and trade-offs.

Commonality savings will be realized by getting all the services to use the airplane. Britain's participation will increase efficiency, spread development costs further, and expand the production run.

"We've had a lot of successes, but we've got a long way to go," the General said. He cautioned that warfighters are now "very, very serious about trading off cost over performance. That is an ongoing part of every acquisition program from the front end and throughout its life."

The Air Force Scientific Advisory Board's "New World Vistas" report *[see "New World Vistas," March 1996, p. 20]* has given the acquisition department "a very good roadmap of where we need to go in the future," the General said.

"We . . . are responding to that by reorganizing our [science and technology] program right now in line with that, identifying when and where we divest activities . . . more readily available on the commercial market, . . . and making sure we're putting the right amount of money into these technologies of the future." ■

Valor

By John L. Frisbee, Contributing Editor

A CAP for the Sub Threat

In the early months of World War II, the US was not prepared to deal with the German submarine threat. A civilian organization, CAP, volunteered to help fill the gap.

On December 7, 1941, Japan, Germany, and Italy declared war on the US. Germany immediately began submarine attacks on US shipping, concentrating on the sea-lanes along our East Coast. The results were catastrophic for the movement of oil from Gulf of Mexico ports to the northeast and for shipment of supplies to our European Allies. In January 1942, twelve vessels were sunk along the coast. In March forty-two went down, and by May the toll was so high that no figures were released to the public. The US military did not have enough ships and planes to combat the German menace.

Fortunately, one organization could take significant action to help limit the attacks—the Civil Air Patrol. Organized a week before Japan's attack on Pearl Harbor and placed under the Office of Civilian Defense, CAP was composed of private pilots and support personnel who believed that war lay just over the horizon and knew they could perform many services to help the military. Its members, who ranged from millionaires to mechanics, served in units throughout the country, personally providing many of the aircraft and spare parts. Before the war ended, CAP numbered 100,000 men and women from eighteen years of age to more than fifty.

In February 1942, CAP requested—and finally was granted—permission to conduct submarine patrols in aircraft of at least ninety horsepower. Their function was to find enemy submarines, then call in military aircraft and ships to sink them. Funds were provided for two bases, at Atlantic City, N. J., and Rehoboth, Del. Eventually twenty-one CAP bases would dot the coast. CAP volunteers were paid from five to eight dollars per day to cover their expenses.

Submarine patrol was hazardous duty. Few of the pilots had any overwater flying experience, but their patrol areas lay from twenty to 100 miles offshore. They flew at 300 feet, too low to use parachutes. Patrols often were carried out in weather below Army and Navy minimums. Their light planes were not designed to survive ditching, which could be fatal, especially in winter. Because of these perils, female CAP pilots were not allowed to volunteer for submarine duty, but they flew in other capacities.

CAP located more than 150 submarines, many of which were given the *coup de grâce* by the Army or Navy. Eventually the light planes capable of carrying two 100-pound bombs or a depth charge were armed and single-handedly sank at least one submarine, damaging several more. German captains soon learned that the appearance of a light plane meant that heavy help was on the way and that a crash dive was in order. As time passed, the combination of CAP and military might drove the submarines further and further from shore with a drastic reduction in US and Allied shipping losses.

There were many acts of heroism by CAP sea-patrol crews. One in particular deserves telling, not only because of the valor displayed by the crew but also because it earned the first two of more than 800 Air Medals awarded to CAP members.

On the afternoon of July 21, 1942, a CAP Fairchild aircraft went down about twenty miles at sea from the CAP base at Rehoboth. A radio call from the crashed plane's sister ship gave the location. CAP Maj. Hugh R. Sharp, Jr., commander of the base, and CAP Lt. Edmond I. Edwards immediately took off in an old Sikorsky amphibian, bucking a strong northeast wind. When they reached the crash scene, the left wing float of the amphibian was damaged while landing on the rough sea and was taking on water. Edwards climbed out on the hull and located Henry Cross, the pilot of the downed plane, who at first was hidden by ten-foot swells. His observer had disappeared and never was found.

From his precarious perch on the hull, Edwards threw a rope to Cross, who appeared to be paralyzed. With great difficulty, the Sikorsky was maneuvered close enough for Edwards to reach Cross and pull him aboard, where it was apparent that his back had been broken. Now, as the sun set, the challenge was to get the injured man ashore and to a hospital, but the listing amphibian could not take off in its damaged condition, let alone withstand the rough sea. It would have to be taxied to shore. To keep the plane on an even keel, Edwards crawled out on the right wing and clung there until a Coast Guard ship arrived and towed them to shore. A chilled and soaking Edwards had been on the wing for more than seven hours when the rescue was completed. Henry Cross recovered and returned to duty with CAP but was not able to return to flying.

For this feat of skill and courage, the first Air Medals awarded to CAP members were presented to Major Sharp and Lieutenant Edwards by President Franklin D. Roosevelt in a ceremony at the White House. These were the only Air Medals awarded to CAP members for specific actions. The other 800 were for sustained operations in hazardous conditions.

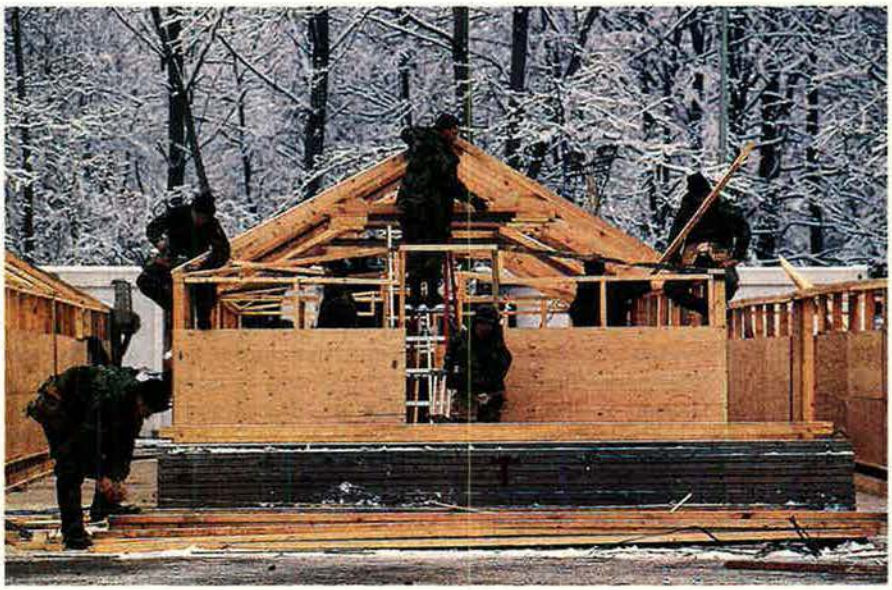
When CAP ended its patrol missions, its antisubmarine units had flown nearly 87,000 missions totaling some twenty-four million miles over water, helped defeat the submarine menace, and rescued many survivors at sea. Other units continued to assist the military in many ways. According to Gen. H. H. "Hap" Arnold, fifty CAP members lost their lives serving the country during World War II.

CAP became an auxiliary of the Air Force in 1948. Its members serve the US today as they have for more than half a century, flying ninety percent of landbased search-and-rescue missions for civilian aircraft, conducting counterdrug surveillance, training cadets, and participating in aviation education. CAP is a resource that far outweighs its modest cost. ■

Air Force engineers build operating facilities for US peacekeeping forces deploying to Bosnia.

RED HORSE of the Balkans

By Bill Gertz



USAF photo by MSgt. Rose A. Reynolds

Even in an Air Force better known for airborne lasers, advanced fighters, and satellites, there is still a place for hammers, nails, and elbow grease. RED HORSE personnel arrived early in Bosnia-Hercegovina and worked around the clock to make sure that arriving troops would have a dry, warm place to sleep.

WITHOUT fanfare, the Air Force carried out a sizable ground operation in the Balkans this winter, helping the Army set up a base of operations at the American sector headquarters in Tuzla, Bosnia-Hercegovina. The biggest mission entailed rapid construction of huge tent cities at Tuzla airfield—once a MiG fighter base—and other areas in order to house thousands of soldiers pouring in from staging areas in Hungary and Croatia.

These enormous compounds of wood-frame tents began springing up in December at Tuzla airfield and two adjacent areas known as Tuzla East and Tuzla West. Construction was the work of USAF's 823d Civil Engineering Squadron, better known by the acronym RED HORSE (Rapid Engineer Deployable, Heavy Operational Repair Squadron, Engineer).

"It's different from what we're used to," reported Col. Susanne M. Waylett, RED HORSE commander and the first woman to hold that position. "We've operated primarily in southwest Asia. We're very accustomed to operating in the heat but not in the cold."

In the initial phase of NATO's Operation Joint Endeavor, the brutal Balkan winter featured not only breathtaking cold but also alternating periods of rain, snow, and ice. At times, an ocean of mud encased Tuzla, which has served as the logistic hub for Task Force Eagle, the name used by the US-led multinational force comprising the US Army's 1st Armored Division and units made up of Turkish, Scandinavian, Baltic, and Russian troops.

Photo by Tracy A. Woodward

Colonel Waylett, wearing a Kevlar helmet tightly cinched under her chin and a standard-issue 9-mm Beretta pistol strapped around her flak vest, took time out from the job one day to talk about the mission, while outside, on the grounds of Tent City One, members of RED HORSE sawed and hammered away.

"Almost Miraculous"

"I feel the troops have adapted very, very well," said the Colonel. "The productivity that we've demonstrated, considering the weather conditions, is almost miraculous." One reason for this, Colonel Waylett explained, was motivation to complete the job—something not felt to the same degree by the ground troops stationed in the country. "They're here for a year," she said of the soldiers. "When we're finished building their base camps, we go home. We know the faster we get finished, the faster they get into good billets, and the faster we can go do other things for other customers."

The 823d RED HORSE Squadron, whose home station is Hurlburt Field, Fla., deployed about 250 troops to the Balkans. In their first two months in the country, they built several tent cities at Tuzla airfield and moved on to three other locations, where tents were going up as quickly as Air Force transport aircraft could deliver construction materials. By February, the Air Force had stationed about 550 troops in Bosnia, about half of them RED HORSE members. The rest served as air traffic controllers, airlift ground personnel, communications specialists, engineers, and the like.

Getting Tuzla's operating surfaces into shape proved easier than many had expected. Capt. Anthony Davit, civil engineer with the 4100th Air Base Group (Provisional), said the runways and taxiways were in good shape, with only a few shallow potholes, which were easily repaired with cold-patch asphalt. However, the lights presented a greater problem. The Captain said that they had to replace fixtures and bulbs for the runway lights and contract with the Tuzla Electric Co. to repair extensive breaks in the taxiway lighting cables.

By December 20, the day NATO officially took over the Balkan peacekeeping operation, USAF had deposited at the Tuzla base seventy-three airmen and all of the communications gear needed for flight operations. Flight operations were being directed from an old tower whose windows were crisscrossed with tape. The tower's prior occupants, Bosnian government forces, believed the tape would protect controllers from a shell blast.

After the Army determined it needed help setting up tent cities, RED HORSE was called in and went to work building the tents. Col. Neal Patton, 4100th Air Base Group (Provisional) commander, is in charge of Air Force operations at Tuzla and arrived with combat air controllers December 6 and began working with the departing United Nations troops to prepare for the airlift.

It was common to see ground crews running out of tents by the airstrip to greet the arriving cargo aircraft. Transports kept their engines running while unloading and took off as soon as their cargo was moved off with the help of front loaders and other heavy cargo-handling equipment.

By February 1, USAF had landed more than 700 transport aircraft into

Tuzla, mostly C-130s, C-141s, and C-17s.

Blanketing the Marshes

Pitching tents in Bosnia was not easy. CMSgt. Ricardo D. Garcia, enlisted manager of the RED HORSE advance team, explained that before the tent cities could be built on the marshy airfield areas the ground had to be covered with special "geotextile" fabric blankets, which were then covered with eight to ten inches of gravel. The blankets separated the gravel from the mud but allowed drainage. Otherwise, the gravel would have just sunk into the mud, said Sergeant Garcia.

RED HORSE units were first established during the Vietnam War. They built their first facilities at Bien Hoa AB, South Vietnam. During the Persian Gulf War, the 823d RED HORSE built an entire air base in Saudi Arabia. The unit also built 2.4 miles of revetments in Mogadishu, Somalia, to protect US aircraft during the humanitarian mission there. And many of the "Horsemen" of the 823d finished military construction projects in Haiti around the end of November, just in time to begin preparing for deployment to Bosnia.

RED HORSE members are trained for heavy engineering operations and boast of their ability to launch twelve-person teams to remote or hostile locations within twelve hours of a "go" order. Teams with ninety-four persons and 500 tons of equipment can be on the ground within forty-eight hours. Within six days, the full squadron of nearly 300 men and women and 1,100 tons of equipment can be deployed.

Their missions include base-camp construction (as in Tuzla), rapid runway repair, airfield lighting and installation, barrier and revetment construction, well drilling, and concrete and asphalt construction.

Photos by Tracy A. Woodward

The deploying RED HORSE personnel and their equipment arrived mostly in C-130s, C-141s, and C-17s (above, refueling from a KC-135). An in-demand asset, RED HORSE engineers have recently spent up to 280 days per year traveling.

Col. Susanne M. Waylett commands the 823d Civil Engineering Squadron, Hurlburt Field, Fla. Before battling the cold and mud of the Balkans, the 823d faced vastly different challenges in Saudi Arabia, Somalia, and Haiti.

The first RED HORSE personnel arrived in Tuzla on Christmas Eve. "It was the first year I missed Christmas at home," said Capt. George Forbes, of Warrenton, Va. "It pretty much sucked."

But overall, the Captain, a civil engineering graduate of Virginia Tech, views the operation as "a good mission."

"We're helping thousands of troops in a short time, and the pace doesn't give you any time to think about home."

Captain Forbes, who has spent as many as 280 days a year traveling on construction projects, is part of a twelve-member RED HORSE survey team that conducted soil and water tests at Tuzla East and Tuzla West before the tent cities were built.

Captain Forbes noted that the military operation will leave the Bosnians with better roads, power-generation facilities, and water systems. Like many of the squad members, the Captain has a gung-ho attitude. "That's reflected in our motto," he said. " 'Can do. Will do. Have done.' "

Another key project for the squad is the construction of six facilities known as "Force Providers," the Army equivalent of the Air Force's Harvest Eagle rest and recreation centers.

Army plans called for the deployment, by mid-February, of 18,000 US troops to eastern Bosnia, spread out among about two dozen base

camps and the Tuzla complex. Several thousand more international troops also faced deployment in the US sectors.

For security reasons, soldiers and airmen have been forbidden to leave their bases. To improve morale in the many months of duty ahead, the Army asked the 823d to set up Force Provider centers at three forward operating bases in the Tuzla Valley.

Photos by Tracy A. Woodward

Thanks to a donation from a grocery chain back in the States, more than 100 of the troops in the Balkans were able to enjoy a steak dinner—a real boost to morale for Army and Air Force personnel serving thousands of miles from home.

In Good TEMPER

Two Force Provider centers will be set up at Tuzla East, two more at Tuzla West, and the last two at Lukavac. Each location will provide between 1,650 and 2,200 soldiers with morale, welfare, and recreation centers, medical facilities, chapels, laundry centers, and an exchange store in sixty-four-foot-square metal-frame tents. The TEMPER (Tent, Extendable Modular Personnel) tents come with central heating ducts.

The 823d is building the Force Providers at Tuzla East and West, while US Army engineers, along with the defense contracting firm Brown & Root, headquartered in Houston, Tex., are building the facilities at Lukavac.

The idea is to rotate soldiers through the facilities for rest and recreation. These tents are heated better than those in the field, and recreation facilities include basketball courts, large-screen televisions, weight rooms, and dining rooms. Also on hand is what many troops long for: a hot shower.

"If there is one thing that everybody in this installation would like to have, it's a hot shower," said Colonel Waylett. "And we're trying really hard to get as much . . . available as we can."

RED HORSE's first priority is to get the soldiers under cover in heated tents, and the next is to provide latrine and bathing facilities. RED HORSE is also helping at the dining facility, where, at breakfast and dinner, one encounters the unusual sight of Russian paratroopers eating T-rations alongside American GIs.

Normally, RED HORSE is a self-sustaining outfit that provides its own food, medical technicians, and maintenance personnel. This time, however, the nearly 300 RED HORSE troops are eating with others at the main base facility. "Because we're being supported out of the joint dining facility, I've brought in my services personnel, and we're going to give them a hand in feeding the masses," Colonel Waylett said.

The objective, she explained, is "supporting everybody who's deployed in whatever way we can, whether it's doing standard base-camp construction or providing [other types of] service that we have the capability to provide."

Colonel Waylett is proud of the RED HORSE crew, who, despite the lack of the customary lead time to plan for the deployment, have "stepped forward and met every challenge."

No Privacy

Privacy for male and female troops in Bosnia often does not exist. Asked about segregating the sexes, Colonel Waylett replied, "Nope. Don't believe in it." She added, "Some units do, and some units are uncomfortable about integrating [men and women]. In RED HORSE, at least, no matter where we deploy, we do not segregate. It's important because we operate as a team."

In tents shared by men and women, changing clothes can be awkward.

USAF photos by MSgt. Rose A. Reynolds

Whether in Tuzla, Bosnia (above), or Taszar, Hungary (below), USAF engineering personnel have performed with a productivity that Colonel Waylett termed "almost miraculous," considering the austere conditions they faced.

the largest airlift in Europe since World War II.

The heavy aircraft operations—C-5s, C-17s, C-141s, and C-130s that fly in and out around the clock—are under the command of the 615th Tanker Airlift Control Element. For the Hungarians, who view their support of Joint Endeavor as a foot in the door to joining the NATO Alliance, the huge airlift operation is impressive.

"In this airfield, we have never seen such a mass quantity of technology and equipment," said Hungarian Air Force Col. Zoltan Pinter, deputy commander of the active MiG-21 base at Taszar. "And we never thought there was enough room for all that."

About fifty of the MiG-21s based in Hungary had to be moved to another airfield during the deployment.

Male troops usually wait for females to leave the tent before changing clothes—but some don't.

SrA. Tony Carrender, of Destin, Fla., is a RED HORSE heating technician. He worries about millions of mines that have been planted or scattered throughout Bosnia, including areas around the airfield where he is working. "If it's not concrete, I don't walk on it," he said.

Casualties among the RED HORSE crew in the first six weeks of the deployment were limited to work-related injuries. One airman accidentally shot his foot with a pneumatic nail gun and had to have surgery at an Army medical facility before the Air Force evacuated him to the United States. A second airman suffered a painful shoulder separation when a load of materials shifted and pinned him to the inside of a metal shipping container.

The deployment is not a problem for SrA. Jason Arrowood, of Mount Airy, Md. "I don't mind being here, as long as we're doing some good," said the Airman, who orders materials for RED HORSE.

Colonel Waylett is proud of the RED HORSE crew. "They have stepped forward and met every challenge that has been presented. This has been far different from most of our deployments to do base-camp support because normally we have a lot of lead time to do planning, material ordering. This has not been that way, and we still have to be able to produce the support that's necessary."

Another major Air Force logistics hub is located at the former Warsaw Pact MiG base in Taszar, Hungary, about 100 miles southwest of Budapest. The base, which is being rented by the US military for $37,000 a month, has a sign at the entrance to the airstrip that says it is the site of Several MiG-21s, covered in canvas, were lined up nearby, apparently used for spare parts. At the airfield one day, a MiG-29 arrived overhead and began flying aerobatic maneuvers over the American operation, prompting one Army lieutenant colonel to quip, "I guess they're trying to tell us it's time to leave." ■

Bill Gertz covers national security affairs for the Washington Times. *In January, he spent more than three weeks with US forces in Bosnia. His most recent* Air Force *Magazine article, "The Air Force and Missile Defense," appeared in the February 1996 issue.*

Verbatim

Shadow on the Subcontinent

"The relationship between India and Pakistan continues to be unsatisfactory, and the potential for conflict is high. Each of these nations possesses nuclear capability, so every effort must be made to avoid military confrontation. India is making preparations for a nuclear test, and we assume that, if one nation conducts a test, the other will follow."

John M. Deutch, Director of Central Intelligence, in the CIA's annual "Worldwide Threat Assessment Brief," presented February 22, 1996, to the Senate Select Committee on Intelligence.

Pilotless Aircraft?

"We're doing it now [using pilotless, uninhabited aircraft]. Certainly in the Predator for surveillance aircraft, we are doing that. . . . We [also] basically made the decision that the surveillance-warning-navigation missions that we had in space could best be accomplished unmanned. That decision was made a long time ago. It has to do with the nature of the medium and [the fact that] the times in which we can have a satellite operate in that environment are measured in the tens of years. We make those decisions all the time. There's a lot of excitement about what the Predator has been able to accomplish, but at the same time we also are getting great utility from the U-2 [manned reconnaissance aircraft]. It's very, very important to understand that there's a balance here."

Air Force Secretary Sheila E. Widnall, in a February 16, 1996, press conference at AFA's Air Warfare symposium in Orlando, Fla.

Compared to $40 Billion Today

"What we must now do is ensure that we put more money into recapitalizing the force and into modernizing the force. . . . In my judgment, you're talking about $60 billion a year . . . somewhere in . . . the 1998 time frame. . . . It's a good benchmark to discipline the system so we don't each year take money out of acquisition accounts to pay for other things."

Army Gen. John M. Shalikashvili, Chairman of the Joint Chiefs of Staff, in February 15, 1996, remarks to the Defense Writers Group in Washington, D. C.

Double . . .

"I want to stress that it's not the job of the military to run a police state, and it's not their job to go out aggressively to search for war criminals, and they don't intend to do that."

Pentagon spokesman Kenneth H. Bacon, in a February 13, 1996, press briefing on US military missions in Bosnia-Hercegovina.

. . . Vision

"I think we served clear notice on Karadzic, Mladic, and other indicted war criminals that they will be brought to justice and that, sooner or later, they will be arrested if they do not voluntarily surrender."

John H. F. Shattuck, assistant secretary of state, in a briefing the next day on a US diplomatic mission to Bosnia. He referred to Radovan Karadzic, the Bosnian Serb political leader, and Gen. Ratko Mladic, the Bosnian Serb military leader.

Ralston and the Revolution

"In my view, [the term] 'revolution in military affairs' refers to the recognition that future war will be fought in the context of an information-rich battlefield. . . . This recognition calls for a different way of thinking about battle, as well as the training and equipping to prepare for it. In an environment of ever-increasing information, the commander will have staggering situational awareness. . . . The real challenge of our future is to understand more precisely what we recognize intuitively—that the information-age battlefield will be very different, and the force that masters the means and methods will have a decisive advantage."

Gen. Joseph W. Ralston, USAF, former commander of Air Combat Command and now vice chairman of the Joint Chiefs of Staff, in a January 22, 1996, letter to the Senate Armed Services Committee.

The Iran Nightmare

"Iran is undertaking a major program to develop a nuclear weapon. . . . Iran is also pursuing a biological warfare program that could give them a weapon near the turn of the century. We expect Iran to become essentially self-sufficient in chemical weapon precursor production in the next three to five years. Iran has negotiated with North Korea to purchase the No Dong 1 [long-range missile], which is especially worrisome, given the threat that it would pose to Israel."

USAF Lt. Gen. James R. Clapper, Jr., then director of the Defense Intelligence Agency, in secret testimony to the Senate Armed Services Committee. A partial transcript of the testimony, delivered January 17, 1995, was recently declassified.

Thinking the Unthinkable

"War between China and Taiwan is unthinkable today. It makes no sense. It is as unthinkable as an Iraqi invasion of Kuwait was in July 1990, as unthinkable as China entering the Korean War against the United States was in November 1950, as unthinkable as Britain having to expel the Argentines from the Falklands seemed in 1982."

***Foreign affairs analyst Jim Hoagland, writing in the February 11, 1996, Washington* Post.**

Deutch's Reassurances

"The June presidential election will be an important juncture in the brief history of democratic Russia. Should the Russian people choose a Communist or hard-line nationalist, further progress toward democracy and economic reform would be in question. Even if a hard-line government takes power, however, Russia is not likely to be transformed back into the Soviet Union. Moreover, the Russian military, struggling to cope with numerous problems, is not likely to regain its former strength."

CIA Director Deutch in the "Worldwide Threat Assessment Brief." ■

The B-2A Spirit of Kansas *of the 393d Bomb Squadron slips through the skies over Whiteman AFB and Knob Noster, Mo.*

Operational progress for the new bat-winged bomber is running ahead of schedule at Whiteman AFB, Mo.

With the First B-2 Squadron

By John A. Tirpak, Senior Editor

Photo by Randy Jolly

Photo by Randy Jolly

Despite its experimental look, the B-2 is well on its way to operational status, accumulating up to thirty sorties per week. The bomber's flyers and maintainers are impressed by its reliability and maneuverability.

THREE or four times a day, the sleek, sinister-looking B-2s roar out of their hangars, glide along a taxiway to the airstrip, push forward, and then seemingly levitate into the Missouri sky. They hook up with tankers, practice aerial refueling, cross a few states, carry out a practice bomb run, do some low-level hill dodging, and return.

It's almost routine, but no one expected it to be that way—not at this point.

The hundreds of Air Force people who fly, maintain, and support the B-2s at Whiteman AFB, Mo., are "writing the book" on the new bomber, and it is now clear that they have raced a few chapters ahead of schedule. They are quickly filling in the gaps of knowledge about the true capabilities of this aircraft, a huge wing with windows and wheels, crammed with dozens of new technologies.

"We're taking some pretty big steps right now," reported Brig. Gen. (Maj. Gen. selectee) Ronald C. Marcotte, commander of the 509th Bomb Wing and the man who has shepherded the B-2 program at Whiteman since before the first stealth bomber arrived in December 1993. The "steps" mark the location of the B-2 on a continuum of crawl, walk, run—a strategy the people of the 509th scrupulously follow.

When General Marcotte was organizing the unit for the B-2's arrival, he asked those experienced with bringing new airplanes on-line what he could expect.

The experts, noting that the B-2 is still considered to be in development, cautioned him not to try to do too much too fast, the General said. Though the B-2 had been wrung out in flight test, its novel technologies might still provide some unpleasant surprises in initial service. Extreme caution was called for.

National Treasure

"You don't have to think very hard to realize this is a lot of national treasure we're talking about," General Marcotte said. The unit flyaway cost of each bomber is a breath-catching $600 million, and in addition "there are all the people and the facilities put into it."

Air Force officials knew that critics of the B-2 would be watching keenly for any error that would suggest the new bomber was unreliable, a technological failure, or unsafe. The months before the B-2 arrived were spent trying to figure out how to bring it to operational status "in a fashion that you don't make mistakes that could, basically, end it all," General Marcotte said.

The General was told that the B-2s would likely fly "maybe once or twice a quarter" in the initial phase of deployment, given USAF's experience with other large, complex flying machines and considering the many unproven technologies rolled up in the new bomber. He likened the first operational sortie, carried out less than a week after the first B-2 arrived at Whiteman, to "a shuttle launch . . . with cameras rolling and hundreds of personnel" attending to every detail.

Now, the launch of an airplane takes place "with one supervisor out there," and the sorties amass at up to thirty a week. Two years ago, such a rate would have been wishful thinking, but the B-2 is "exceeding any expectations," said General Marcotte. He added, "I expected more 'unknown unknowns,' " and he was prepared for "one step forward, one step back, . . . but we haven't had that."

The B-2 went to its first Red Flag exercise last summer, "a year ahead of schedule," General Marcotte noted. It made an appearance at the Paris Air Show last June and at the Singapore Air Show in February by way of Guam. A second, more challenging Red Flag role was planned for early this year. In early summer, the 509th will receive a new, improved model of the B-2—the first Block 20 airplane.

General Marcotte said that the Air Force is "on track" in its plans for the B-2 squadron to become an operational unit of US Strategic Command in March 1997. In that month, it will take its place alongside the B-52 in the bomber leg of the strategic nuclear triad, the General said.

"We're doing very well," he asserted. "We're pushing forward in a safe and productive fashion."

General Marcotte said he has hammered on the message of caution to his people because most of them have "succeeded their entire career by . . . being aggressive." Now, the same individuals must blend this attribute with caution.

To be part of the initial cadre assigned to the B-2, pilots went through a rigorous selection process. An individual's record had to be spotless, without the slightest safety infraction. Each candidate needed the recommendation of his wing commander, other endorsements, and thousands of hours of flight time. Many of the first pilots have combat experience, and all have demonstrated an ability to learn and progress quickly. Maturity was an important factor, and they had to pass muster in personal interviews not only with

General Marcotte but also with Gen. John Michael Loh, former commander of Air Combat Command.

Mature Pilot Force

"We have a very mature pilot force," said Col. Gregory H. Power, 509th Operations Group commander. "My youngest pilot is a midlevel captain," he noted. The pilots' experience comes mostly from flying in bomber units, but there are veterans of various fighter aircraft as well. B-2 pilot training, once administered by flight-test and contractor pilots, now is carried out by USAF instructor pilots at Whiteman.

"The training program is about six months [long], which is typical of bombers," reported Col. James F. Whitney, Jr., chief of the 509th Formal Training Unit.

Besides flying the airplane and establishing the rules by which it flies—covering everything from takeoff weather minimums to weapons release procedures—pilots are also heavily involved in developing tactics for the airplane, exploring what it can do operationally in order to derive the maximum effect from its unprecedented range, payload, and stealth.

"It's a free-for-all," said Capt. John S. Paganoni, a B-2 pilot. "With all this combined expertise from all over, there's no predisposed thought and no inertia" requiring that things be done in a traditional way. "We have a lot of guys here who were in the war" in the Persian Gulf in 1991, and their combat experience is proving highly valuable in developing "the best way to employ the airplane," he said.

Captain Paganoni added that the B-2 pilots are considered the experts on their still-new airplane and are invited to think tanks and conferences where tactics and strategy for the entire Air Force are developed. "We have a direct impact," he said.

Photos by John A. Tirpak

Each bomber has its own "dock," a purpose-built hangar with floor umbilicals that mate perfectly with the airplane. The glossy floors are spotless because the B-2's tight tolerances make fuel leaks and hydraulic leaks a thing of the past.

The B-2's smooth contours play a large role in its stealthiness, and its wide expanses of exotic surfacing must be carefully protected. Note the special footwear on SSgt. David Maxwell as he inspects two of the F118 engines.

There is a mix of ranks in the B-2 pilot cadre, and it is intentional, the result of a lesson learned in the B-1 program. The pilots bringing that system into service all had about the same experience level and about the same number of years of service. It was a situation that led to staffing bottlenecks and difficulty turning officers loose for professional military education.

Every B-2 pilot can count on flying about one sortie per week. Each flight is preceded by a day of mission planning and a full dress rehearsal in the Weapon System Trainer. This full-motion simulator is "ninety-five to ninety-eight percent like the real aircraft," said Col. Jonathan George, commander of the 393d Bomb Squadron. "It really is outstanding fidelity."

Colonel George asserted that the simulator gives a "very accurate" feel for the way the B-2 handles. Another instructor, Maj. Steven M. Tippets, said its state-of-the-art graphics system accurately depicts the countryside surrounding Whiteman for "almost 200 miles in every direction, just about down to every tree."

Because the 509th has a small number of operational aircraft, the wing "relies more heavily on simulators than other flying units," said Colonel Whitney. However, he does not believe that the 509th will use more and more simulator time as a substitute for real flying time.

up for the B-2 generally goes like this: The Air Force would send the B-2 as a single ship against a "high-value target set" well within an enemy's air defense net. The bomber would be equipped and flown in a way that would permit it to hit multiple aimpoints in a single pass with great accuracy.

Soon the B-2 will have capability for employing a near-precision weapon guided by signals from the Global Positioning System satellite constellation, the GPS-Aided Targeting System/GPS-Aided Munition (GATS/GAM). Later, it will have the Joint Direct Attack Munition. Both weapons will be able to hit a target through bad weather, relying on cues from GPS satellites and aimpoints designated by the mission commander on the photographic-quality synthetic aperture radar. Unlike precision weapons of the Gulf War, it will not be necessary for the mission commander to manually hold an aimpoint for the bomb.

Lots of Stress

"To make a good pilot," said Colonel Whitney, "you have to handle inordinate amounts of stress. A pilot knows he's not going to get hurt in a simulator."

Mission planning entails plotting radar threats the B-2 would face on a given run and determining how best to avoid or defeat them with the B-2's stealth capabilities. It's a process that can take "one day, plus" to complete, said B-2 pilot Capt. Scott Hughes.

B-2 crews fly to bomb ranges in Utah, Wisconsin, and Kansas in order to perform practice runs within the US; they go to other sites when required to do so by the particular exercise or the specific mission to be rehearsed. About one in every five sorties entails the release of a live bomb, inert bomb, or smoke bomb. During the flight, a weapon release can be fully simulated, with nothing actually being dropped.

All flights involve practice in aerial refueling. The B-2 has a considerable bow wave that can make tanker rendezvous "kind of tricky," Major Tippets said.

Low-level flying is usually part of a four-hour training sortie. Though the B-2 is designed to be stealthy at medium and high altitudes, and may not need to make ground-hugging flights, the pilots practice the skill because under some circumstances it might be required.

"There are some advantages to going low," Captain Hughes said, "and, if you don't train to do it, you lose the ability to do it."

Photos by John A. Tirpak

Above, Whiteman weapons loaders practice their trade on a specially built replica of the B-2's undersurface, bomb bays, and cockpit. This trainer makes it unnecessary to occupy an actual aircraft for loading practice. At right is the huge bomb bay containing two of the up to sixteen Mk. 84 2,000-pound bombs that the B-2 can carry.

General Marcotte noted that the B-2's flight profiles will be "totally target-dependent" and crews "have to be able to do it all."

To get the most out of what is an exhaustive preflight inspection, two training sorties are flown back-to-back to save time. When one crew lands, the engines are kept turning while a second crew climbs aboard.

The operational concept forming

Triple Threat

One B-2 pilot, Maj. Gregory A. Biscone, asserted that the B-2 en-

joys "all the advantages of an F-15E in terms of precision, with all the advantages of the B-52 in load, coupled with the advantages of the F-117 in stealth."

The B-2 can land at "twice as many fields" as the B-1 can, General Marcotte said, meaning the aircraft can be deployed just about anywhere, worldwide. Deployment kits are being developed now, and within a year the Air Force should have enough to permit three to eight aircraft to fly a mission to an expeditionary airfield.

In a major regional conflict, the B-2s may well fly and fight directly from Whiteman, requiring missions lasting more than twenty-four hours. The airplane's part in last year's Red Flag exercise was "planned and run all from Whiteman," said Colonel Power.

The pilots are unconcerned about sustaining such a seemingly exhausting flying schedule. Unlike the B-52, which can carry additional crew, the B-2 can carry only two pilots. The B-2 bomber is highly automated, and the pilots believe it is safe for one of the crew members to take a nap while the other flies the airplane.

"For the initial round [of combat], adrenaline alone will keep you going," Major Biscone said, and for continuing missions, "we may do go/no-go pills" relied on by some combat crews during the Gulf War.

However, he added, "crew ratio is the only thing that will sustain long sortie durations." So far, USAF has no plan to put a third crew member on the B-2, although there is room and an escape hatch exists for a third ejection seat. General Marcotte said that "for training purposes only, it would be nice to have a third seat in the B-2," but he would not put this near the top of a wish list for improvements to the airplane.

The General said he is pleased that, with videoconferencing, he has the ability to get the System Program Office, the test center, the contractor, and the operations room all talking to each other at a moment's notice, such as for an in-flight emergency.

Captain Paganoni noted that the B-2 does offer two amenities helpful in reducing crew fatigue on a long mission—the means to prepare a hot meal and a flush toilet.

Staying Sharp

To supplement their B-2 time, the pilots also fly the T-38 Talon, which helps build their flight experience and keep their airmanship edge, said Maj. William R. "Buzz" Barrett. "The B-2 and the T-38 fly very differently," he said, with the B-2 being "much easier to fly."

Photo by Randy Jolly

B-2 pilots routinely take a break from the highly automated bomber to get refreshers in the fast-moving T-38 Talon. The twin-jet trainer requires quick thinking and vigorous cross-check, helping stealth pilots maintain their edge.

While the B-2 is highly automated and will cruise with minimal effort, the T-38 "does 300 knots in the pattern. There's a lot of cross-check, . . . a lot of airmanship decisions. The B-2 requires more systems knowledge, but the T-38 keeps your pilot skills sharp," he said.

In a time of budget stringency, only B-2, U-2, and F-117 units have access to T-38s as companion trainers.

After a B-2 mission, an extensive debrief takes place. In the room are the flight crew, contractor representatives, maintenance specialists, and people from the B-2 Combined Test Force at Edwards AFB, Calif. Gripes are detailed, and lessons learned are submitted on Air Force Form 847. These, in turn, build the B-2 Dash One manual, which describes better-flying tips as well as a host of "do nots" that could lead to damage or destruction of the aircraft.

The initial cadre of maintenance personnel on the B-2 was handpicked, but shortly after the B-2 came to Whiteman it became a specialty available for any enlisted person with good enough marks. There are one- and two-stripe airmen working on the airplane. They get four to eight weeks of specialized training for it, and the aircraft has proven docile in their hands.

"You can do ninety percent of the maintenance on the B-2 without removing any panels," according to 2d Lt. Jeffrey M. Burnside, of the 393d Bomb Squadron. "There was a great deal of thought put into maintenance when they were designing this aircraft."

As to its reliability, Lieutenant Burnside said the B-2 is a champ. "You don't have people sitting around with nothing to do," he said, "but they aren't here all night fixing things, either."

Propulsion Specialist SrA. Michael P. Sullivan observed that the B-2's F118 turbofans are similar to others he has worked on, though "a little harder to get to" because they are buried in the fuselage to hide their fan blades from radar. He has "no big gripes" with the engines.

Flight controls are critical to the highly unstable B-2, which operates by a quad-redundant, fly-by-wire system, but they "work great," said SrA. Robert G. Rayburn, who specializes in them. "I haven't seen any problem areas."

Each B-2 has its own "dock," a term the crews prefer over "hangar" because the airplane is positioned carefully to hook up with umbilicals in the floor. Each dock is immaculate, with none of the hydraulic fluid

Photo by Randy Jolly

Engines keep turning as a Spirit changes pilots for another training sortie—a practice that eliminates the need for a lengthy preflight. The B-2's reliability has allowed crews to gain experience far faster than originally predicted.

or fuel puddles or stains one would find under any other large airplane.

"Used to be, if an airplane didn't leak, it meant there wasn't any fuel in it," Lieutenant Burnside said, but the B-2 is a departure from most large aircraft.

"The tolerances are very tight" between panels on the aircraft, Airman Sullivan said. "They have to be; leaks can damage the LO," or low-observable—stealth—characteristics of the surface.

Tolerances are so tight that the B-2, even with a wingspan comparable to that of the B-52 (the wings of which can flex up to eighteen feet in flight), remains highly rigid. Its wings flex less than three feet, and as a result nothing drips.

"We don't have hydraulic problems or electrical problems, only one fuel [incident], and no leaks," Colonel Power noted. He also said that, to date, no B-2 crew has had to shut down an engine in flight.

"You just don't lose sorties on this airplane," said Major Biscone, a veteran of many aborts with his previous ship, the B-52. "If you're scheduled to go, you go."

The Blackout

Only one really serious in-flight emergency has occurred; on that occasion, all the displays in one B-2's glass cockpit went blank. The airplane landed without further incident.

The specialized work pertaining to the B-2's stealth characteristics is conducted in a windowless, keypad-entry hangar across from the flight line. There, experts maintain the advanced materials and gear that reduce the B-2's radar cross section—special tape that shields panel joints, heat-absorbent tiles in the exhaust area, and structures made of epoxy resins and other exotic materials.

"Tape is tape," observed Capt. Casey W. Hughson, who supervises LO maintenance in the 509th Maintenance Squadron. "Fly it around long enough at high speed and it will start to peel back." The tape must be carefully reapplied using special adhesives, and it must rest on the airplane just so, lest it disturb the surface contours. A barely noticeable disruption of the surface contour can increase the airplane's radar cross section considerably.

"What these guys do isn't a science; it's an art," Captain Hughson said. "For example, getting the paint on exactly one mil thick—that's an art."

The LO shop is also the first line of repair for the B-2. There have been no catastrophic problems, but there have been some challenges. A birdstrike several months ago hit a bull's-eye on a B-2 control surface. Though the Whiteman team initially thought the part would have to go back to the factory, it was diagnosed and repaired at the base.

The B-2 is not problem-free, however. The LO shop spends most of its time maintaining the aft deck, part of the exhaust covered with heat-absorbent tiles similar to those on the space shuttle. The aft deck also experiences lots of dynamic stress in flight. Cracks occur regularly.

"The aft deck is a known challenge," General Marcotte said, "but we are repairing it mostly ourselves."

Northrop Grumman has developed new procedures that "speed up the process" to repair cracks, General Marcotte noted. "What used to be months now is down to a week or two weeks."

Weapons loaders have a rare advantage in the B-2 program. They are able to practice on a weapons loading trainer that is a close replica of the B-2's bomb bay and cockpit. They practice the extremely precise process—down to millimeter accuracy—of loading Mk. 84 bombs and nuclear "shapes" but can also simulate malfunctions and emergencies that might be hazardous if practiced with a real aircraft.

"It was purpose-built" for weapons loading and "allows us to train loaders without sacrificing an airplane from the flying lineup," Colonel Power said. With only eight aircraft available, "that's a tremendous help."

Different Kind of Stealth

The B-2's stealthiness is what sets it apart from the other bombers in Air Combat Command, and it is one of the big unknowns still being explored in the program. Though the Air Force has operated a stealthy airplane under combat conditions—the F-117 in Operation Desert Storm—General Marcotte said that the B-2 "is stealthy in a different way from the F-117" because of the techniques and materials used.

Early this year, the first of a planned series of tests was run to see how well the B-2's stealthiness holds up in the field. The test is called the Periodic RCS (Radar Cross Section) Surveillance Mission (PRSM), and it determines whether field maintenance can keep the B-2 at the specified, factory-installed levels of radar observability.

The test findings are classified, but "we were pleasantly surprised . . . and very happy with the results," said Colonel Power. Technical or-

ders have been upgraded—"we need to do some fine-tuning." However, said the Colonel, "we are applying the lessons learned, and next time we'll see even better results."

The B-2 is being phased into service gradually. The 509th has been operating with the initial batch of airplanes—Block 10 models—but has already returned one to the factory, where it will be reconfigured into a Block 30 version. As Whiteman gets Block 20s from the assembly line, its Block 10s will be traded back for refitting. When fully equipped with Block 20s, the 509th will start trading them back for Block 30s, which will have the full complement of capability planned for the B-2, in both weaponry and stealth.

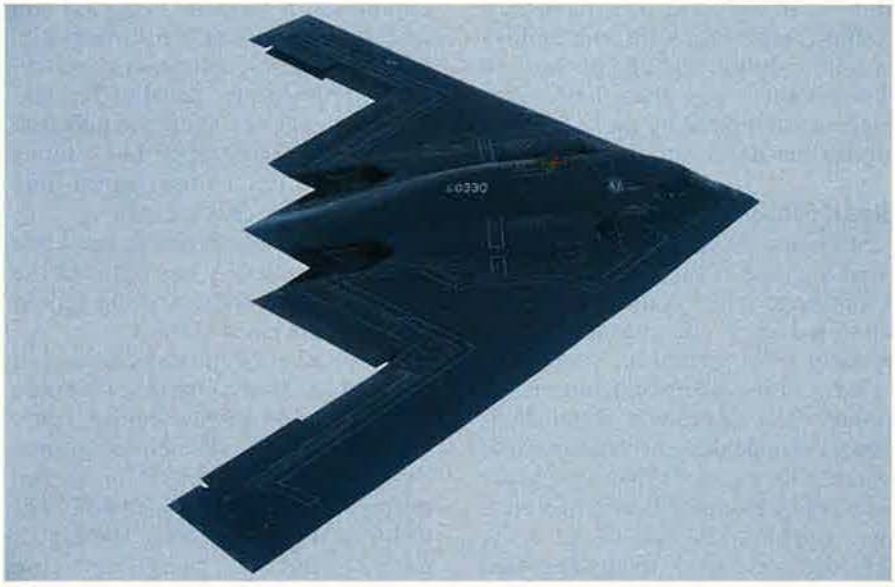
During this rolling conversion period—expected to last another four years or so—the 509th will have a stable complement of eight to nine B-2s at any given time, so today's operating pace is likely to remain "fairly stable" until the last eleven Block 30 airplanes start arriving, Colonel Power said.

The 509th is now undergoing nuclear surety inspections, involving tests of security, procedures, and facilities. Colonel Power said the unit expects to receive certification for nuclear weapons by January 1, 1997. Initial operational capability will focus on the nuclear mission, but it is clear that the Air Force would prefer to measure the B-2 against full requirement and full capability, which will come only with the arrival of the Block 30 airplane.

"Initial LO signature tests have confirmed the stealthiness of the B-2 and provided confidence that the final configuration will meet the user's needs," an Air Staff spokeswoman said. "Initial tests on the radar, navigation, and weapon-delivery systems are complete, and we are working to deliver full functionality and capability in our Block 30 configuration."

Photos by Randy Jolly

The B-2 seems to levitate into the sky, and pilots must avoid flaring a landing or risk a long "float" because of massive ground effect. Also, the Spirit's considerable bow wave makes aerial refueling "kind of tricky," according to B-2 pilots.



The B-2 is one of the "cleanest" aerodynamic designs ever to go into production, and the payoff is reduced radar cross section and increased range. Split ailerons, visible here, function as rudders on the tailless flying wing.

Flight testing of the B-2 airframe and of the weapons in the Block 10 and Block 20 is complete, the Air Staff reported. Block 30 testing is already under way and should be finished next summer.

The Whiteman facilities built to support the B-2 were designed and constructed bearing in mind that the B-2 has a very long life expectancy. "These buildings will last a hundred years," Colonel Power said. Each of the twenty currently planned B-2s will have its own dock at Whiteman, but "the acreage is here" to accommodate more if they are built, he added.

General Marcotte was wrapping up his stewardship of the B-2 early this year and counted it as the plum job of his career. Looking ahead to emerging technologies that may compete with the B-2, he said he cannot foresee "the bomber losing its place in the near future."

The B-2 brings "a tremendous advantage" to war planners because it "ensures the capability to slow down an enemy," buying time for follow-on forces, he continued. So far, incremental improvements in engine and weapons technology for smaller aircraft haven't come close to matching the B-2's ability to "get a warning order and twenty hours later be dropping bombs" precisely on target.

"We have to make our own people understand what it brings to the fight." ■

Claims for compensation wait 213 days for a decision. If there's an appeal, add two years. Ten percent of the caseload is cleared when claimants die while awaiting a decision.

Fixing the Mess in Veterans Benefits

By David Masci

Compensation and Pensions

Average number of days to process a claim

Case type	FY 1994	FY 1996	FY 1998
Veteran's compensation	213	140	106
Veteran's pension	123	88	77
Survivor's pension	65	51	44
DIC	111	76	68

In 1994, Congress ordered the VA to streamline its claims process on the appellate level and to significantly reduce the time required to process a claim. Figures for 1994 are actual. Figures for 1996 and 1998 are goals set by the government. "DIC" stands for Dependency and Indemnity Compensation.

CIRCUMSTANCE has forced James Badini to take a long look at the nation's veterans benefits claims system, and he doesn't like what he sees.

Mr. Badini developed severe allergies and bronchitis while serving in the Air Force from 1967 to 1971. His health condition worsened, and in 1974 he filed two disability claims with the Department of Veterans Affairs (VA).

Two years later, the VA ruled that Mr. Badini was not entitled to receive benefits for his allergy. He appealed the decision and in 1978, four years after he filed the claim, the VA awarded disability compensation for his allergy condition.

As for his bronchitis case, Mr. Badini is still fighting the VA—more than twenty years after he filed the claim. "Part of it is my fault," he said, noting that at times he simply stopped pursuing the claim. Still, he puts most of the blame on the VA, which, he said, simply botched his case.

"People who wouldn't normally make mistakes [do] make mistakes because they are under pressure to put out so many cases," he said.

Complaints like Mr. Badini's are common in the veterans community. Many have waited years to have their claims resolved, with the delays caused mainly by a huge backlog of cases. Others say that their cases have been bungled by the VA, causing further delay and hardship.

Bleak Picture

Statistics from the past paint a bleak picture of the benefit system. According to the VA itself, a veteran who filed a new compensation claim in early 1994 waited an average of 213 days for a decision from the regional office. Moreover, if that decision were appealed, the veteran could expect to wait more than two years for a ruling from the Board of Veterans' Appeals (BVA). If the BVA sent that case back to the regional office for reprocessing, another year or two would elapse before a final decision was rendered.

For years, descriptions of the VA's adjudication system ranged from merely "inefficient" to "in crisis." Finally, in 1994, Congress started to address the issue, passing legislation that gave the agency a mandate to streamline the appellate claims process and reduce the overall time required to process a claim.

Many veterans advocates agree that since then, the VA has reduced the overall case backlog and the time it takes to process a claim.

The number of claims pending fell from 531,000 in September 1993 to some 450,000 in September 1995. The number of days needed to process a new compensation claim dropped from 170 at the end of 1994 to 146 at the end of 1995. The time it takes for the BVA to rule on a case has also dropped, from 781 days in 1994 to 687 days in October 1995.

Opinions differ, however, as to

the degree of progress one should ascribe to these changes.

According to VA officials, the system is now working much more efficiently than it did just two years ago. "We've been able to implement a more simplified and targeted process," reported Stephen L. Lemons, central area director for the Veterans Benefits Administration (VBA), referring to efforts to cut red tape and put more people to work resolving claims.

Mr. Lemons and his colleagues at the VA said that the process will continue to improve and that, over the next few years, the backlog will reach manageable levels.

Veterans service organizations are far less optimistic.

Kenneth A. Goss, the Air Force Association's director of National Defense Issues, said: "While the VA says it is working to fix the claims-processing system, far too many vets die or are left destitute before their request for aid is answered. Claim files get lost, misrouted, or stuck in one place for far too long. Statistics quoted by the VA are averages; far too many vets wait years to get their claims resolved."

"The backlog is coming down, and so is the timeliness of the processing claims, but not dramatically enough," said Robert J. Collins, a field representative for the National Veterans Service of the Veterans of Foreign Wars (VFW).

Others have different concerns. "The problem is quality," said Rick Surratt, assistant national legislative director at the Disabled American Veterans (DAV). Mr. Surratt and others accused the VA of being sloppy in its claims processing. This, they said, forces the VA to devote precious time and resources to cleaning up its mistakes and imposes unnecessary burdens on some veterans.

The benefit claims system has three distinct levels: the VBA, which processes all claims for benefits through its regional offices; the BVA, which hears all cases in dispute between veterans and the VBA; and the Court of Veterans Appeals, which hears a handful of cases each year that are still in dispute after the BVA has rendered a decision.

Long, Complex Process

This process, like many within the federal government, can be long and complex. It begins when a veteran files a claim for benefits with one of the VA's fifty-eight regional offices around the country. Most claims fall into one of three categories: disability compensation, pension benefits, or educational benefits.

Each claim is examined by a rating board at the regional office. According to the VBA, more than fifty percent of all such claims are routinely granted at this first stage.

If the rating board does not grant all or part of a claim, the veteran is entitled to file a notice of disagreement disputing the decision. In Fiscal 1994, only 1.3 percent—61,813 out of the nearly 4.7 million claims filed—were disputed.

Veterans who dispute a claim first receive a VBA hearing, conducted in Washington by VBA staff. If the decision of the rating board is not altered, or if the veteran is still not satisfied, the case can be appealed to the Board of Veterans Appeals.

The BVA is not part of the Veterans Benefits Administration. It is a separate body within the VA charged with ruling on claims cases appealed from the regional offices. Only 45,000 cases, or roughly one percent of the total number filed in 1994, were appealed to the BVA.

The BVA has broader authority than a traditional appellate tribunal. Usually, appellate bodies only decide whether the law was properly applied in the case at hand—they do not reexamine the factual evidence. This board, however, is empowered to decide questions of fact as well as law.

For instance, if a veteran claims that the VBA denied benefits because it misread his medical records, the BVA could reexamine the records and decide to reverse the original ruling.

According to the federal government's most recent statistics (from 1994), outright reversals of VBA decisions occur in twenty percent of claims appealed. In these cases, the BVA orders the VBA to award the benefit or benefits previously denied.

In another 46.7 percent of the claims that come up for a review, the BVA does not reverse the judgment but remands them to the regional offices for further work. Cases are remanded for a variety of reasons, but chief among them is that the regional office did not have adequate service or medical records to make an informed decision on the claim. The BVA will order the regional office to search for additional records or, in the case of medical questions, may ask for a new physical examination.

In 22.7 percent of the cases, the regional office decision is affirmed by the BVA and the veteran's claim is once again denied.

The remaining cases, which constitute just over ten percent of the total, are dismissed because the veteran dies during the appeals process or the BVA decides that the claim was entirely groundless.

If the BVA rejects a veteran's claim, he is entitled to another appeal, this time to the Court of Veterans Appeals. The court is the VA's final level of adjudication and only decides questions of law. If no legal issue is at stake, the court will not accept a veteran's case for review.

At all levels in the process, the law requires that, in close cases, the benefit of the doubt be given to the veteran.

Paved With Good Intentions

Still, despite good intentions, the system has not worked for many veterans in the past. Problems stemmed from a number of causes, including mismanagement and personnel cuts. VA officials have acknowledged that too many agency employees were engaged in administrative tasks when they should have been directly involved in processing claims. Also, the number of full-time employees working for the VBA has shrunk in recent years.

"They're trying to do more and more with less and less," said Mr. Collins of the VFW.

Military downsizing has put extra strain on the system, as greater numbers of service personnel have become veterans. This, in conjunction with the upsurge of ailments and disabilities attributed to service in the Persian Gulf War, has led to more claims being filed with the VA.

Another problem was that the Court of Veterans Appeals, created in 1988, began handing down decisions that foisted more work on the regional offices and the BVA. Court rulings struck down or altered rules and procedures used by the VA to adjudicate claims. This, in turn, forced the offices and the BVA to reopen a substantial number of cases, adding to the backlog.

Pending Work Load

Compensation and pension cases

Work load category	FY 1994	FY 1995	FY 1996	FY 1998
New claims received	2,782,000	2,362,000	2,174,000	N/A
Total claims processed	2,818,000	2,428,000	2,263,000	N/A
Pending at end of year	452,000	386,000	297,000	250,000

Taken together, faster processing and a downturn in new claims have enabled the VA to begin working off the claims backlog. Figures for 1994 are actual. Figures for 1995 and 1996 are estimates. The 1998 figure is a goal.

In addition, the advent of the court brought new responsibilities to the regional offices and the BVA. Notably, written decisions regarding a case had to be much more detailed. This, of course, required decision-makers to spend more time on each case.

By 1994, the consensus in the VA, veterans' organizations, and Congress was that something needed to be done to make the claims system faster and more efficient. In that year, Congress passed the Veterans Benefits Act, making procedural and other changes designed to allow the BVA to handle more cases more quickly.

Before enactment of this legislation, three board members were required to render a decision in each veteran's appeal. The new law authorized the BVA to allow one board member to decide an appeal. This, according to Charles L. Cragin, BVA chairman, has allowed each board member to handle twenty-five percent more cases than before.

In addition, the act eliminated the BVA's long-standing sixty-five-member cap, giving the BVA the authority to hire more members to reduce the backlog.

Saving Time and Money

The law also authorized and encouraged the BVA to develop new ways to save time and resources. For instance, hearings have been conducted via videoconferencing. According to Mr. Cragin, innovations like this have reduced delays and freed board members to handle even more cases. "When a board member doesn't have to travel, that saves time and resources," he said.

Finally, the act established the Veterans' Claims Adjudication Commission, a nine-member panel created to look at the problems facing regional offices and the BVA and to recommend additional ways to reduce the backlog and processing time.

The commission plans to issue a final report on its findings and recommendations this spring.

Though the act focused primarily on overhauling the BVA, change was also taking place at the regional offices.

"We found that we needed more decision-makers," said J. Gary Hickman, director of the VA's Compensation and Pension Service.

The number of people actually deciding claims has been increased from 500 to almost 900 over the last few years, Mr. Hickman said. During this period, the VBA also authorized $20 million to pay overtime for workers in the regional offices, allowing them to work more hours in order to further alleviate the backlog.

The VBA has established a medical records center in St. Louis, Mo. Before the center opened, employees at regional offices often wasted much time trying to track down a veteran's records. Now, all medical records are available at one location and are easier to access.

Finally, the VBA, like the BVA, has also turned to technology to maximize efficiency. All regional office employees now have personal computers, for example. "As we've been able to modernize our equipment, we've obviated the need for clerical personnel," said the VBA's Mr. Lemons. By cutting back the number of administrative workers, regional offices have been able to divert more employees into claims processing.

Even so, veterans' organizations said that the VA has a long way to go before it declares victory in the war to reduce the claims backlog and processing time.

Average Appeals Response Time

Board of Veterans' Appeals

	FY 1994	FY 1995	FY 1996	Percent Change
BVA cases decided	22,045	28,000	33,600	+52
Average response time in days	781	745	687	−12

Figures for 1994 are actual. Figures for 1995 and 1996 are estimates.

One recurring complaint concerns the quality of the decisions rendered. "The problem is that [regional offices] don't get it right the first time," said DAV's Mr. Surratt, who added that roughly two-thirds of the cases appealed from the regional offices are either reversed or remanded. He recommends that the VBA examine old remanded cases to find the errors that occurred most frequently and develop a strategy to avoid them in the future.

According to Mr. Surratt and others, poor quality at the regional offices overloads the BVA. It also makes more work for the regional offices because almost half the cases heard by the BVA are sent back for reconsideration.

Mistakes also take their toll on the claimants. Some veterans' cases bounce between the regional office and the BVA several times. Many of these have also been held up at the VBA as they move back and forth between the rating board members at the regional office and the hearing officers in Washington.

Veterans' organizations have said that improving quality is the only way the VA can ever reduce the claims backlog to a manageable level. Said Ronald W. Scholz, national service director at the Paralyzed Veterans of America, "If you do it right the first time at the regional office, you will, over time, be able to eliminate the backlog." ■

David Masci, a reporter in Washingon, D. C., covers veterans affairs for Congressional Quarterly. *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.

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General Atomics
Gentry & Associates, Inc.
Geodynamics Corp.
Government Employees Insurance Co. (GEICO)
GTE Government Systems Corp.
GTE Government Systems Corp., Electronic Defense Systems Div.
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More than the site for an annual air show, Oshkosh, Wis., is home to a special museum.

Wings Over Oshkosh

In the aviation world, Oshkosh is best known for its annual Fly-In Convention. The event is sponsored by the Experimental Aircraft Association, whose headquarters complex includes the more than 100,000-square-foot Air Adventure Museum, housing one of the world's largest private airplane collections. Shown here is one of EAA's two Spirit of St. Louis *replicas. Both aircraft have flown in air shows, although only one still takes part in them.*

EAA photo by Jim Koepnick

In what could pass for a 1930s-vintage photo, a rare Ford Trimotor 4AT-E "Tin Goose" sits outside the museum's Pioneer Airport, adjacent to EAA headquarters. The aircraft, serial number 69, was built in 1929 and restored in 1986. Museum visitors are permitted to ride in it, taking off from the old-time airfield. Founded in Milwaukee, Wis., in the 1960s, the museum moved to its present location in 1983. It not only restores and exhibits aircraft but often maintains and flies rare and noteworthy ones, such as this Trimotor.

EAA photo

EAA photo by Carl Schuppel

The museum's display includes more than ninety historic aircraft, including replicas of the Wright Flyer and Voyager, *used in 1986 by Jeana Yeager and Dick Rutan for their nonstop, round-the-world flight. Among the most interesting examples of aircraft at the museum is the restored Aerocar (left), one of a handful originally built in the 1940s as designer Molt Taylor's answer to combining flying and driving with a minimum of fuss.*

Along with five theaters, a library, and photo and art galleries, the museum offers the Eagle Hangar, a tribute to the aircraft and people who served in World War II. Aircraft on display in this hall include a North American XP-51 Mustang and a P-64 and a Boeing B-17G Flying Fortress, as well as a Japanese fighter airplane and a Bf-109E from Germany. One of the most important aircraft on display is this beautifully restored Lockheed P-38 Lightning painted in the colors of America's all-time leading ace, Maj. Richard I. Bong, a Wisconsin native.

EAA photo by Dick Matt

EAA photo by Jim Koepnick

The aerial shot above shows the sprawling EAA headquarters complex, including the museum, Eagle Hangar, and Pioneer Airport in the background. In the far background is Wittman Regional Airport, site of the association's annual fly-in. The facility is named for award-winning airplane racer and Wisconsin native, S. J. "Steve" Wittman, whose racing airplanes are on display at the museum. Other types of specialized aircraft, such as the Pitts S-2 "Big Stinker" used for air show aerobatics, and such homebuilts as the Lancair 200 and the Bede BD-5 "Micro" have their own sections in the museum.

Paul H. Poberezny, an Army Air Forces and Air National Guard pilot who retired as a lieutenant colonel in 1970, founded EAA with his friends in 1953 to encourage amateur aircraft builders and restorers. What began as a neighborhood gathering to exchange ideas is now an organization with more than 160,000 members.

EAA photo by Mike Steineke

Many of the museum's restored aircraft are regulars on the air show circuit. Above, even the founder keeps a hand in, as Mr. Poberezny flies a P-51 Mustang.

EAA photo by Jim Koepnick

Constructed with "nonstrategic" building skills and crafted from molded plywood, the de Havilland Mosquito was very maneuverable and successful in many roles, from night fighting to photo-reconnaissance. The British-built light bomber is one of a dozen World War II–era airplanes on display at any given time in the Eagle Hangar, the museum's most popular wing. In describing this hall, EAA Executive Vice President Gregory J. Anderson says, "The Eagle Hangar collection presents the factual and inspirational context of ordinary individuals who did extraordinary things, from the home front to the front lines around the world."

This rare Japanese Nakajima Ki-43 "Oscar" is among the aircraft used by America's World War II adversaries on display in the Eagle Hangar. The fighter represented a level of sophistication in aircraft design that the Allies were not prepared for in the war's early days.

EAA photo by Jim Koepnick

EAA photo by Carl Schuppel

Many of the museum's 150,000 annual visitors fly in for a visit, so it's not uncommon to see a lineup of several types of aircraft at nearby Wittman Regional Airport. Activity at the airfield peaks when more than 800,000 visitors gather at Oshkosh for the annual Fly-In Convention. The aircraft, displays, pavilions, workshops, and "fly" market that make up this show spread out over 1,400 acres

EAA photo

When not on national tours, the B-17G Aluminum Overcast *is one of the highlights of the Eagle Hangar. Restoration of such classics is the museum's backbone and requires a great effort from more than a dozen aircraft technicians, aviation students, and volunteers. EAA's Aviation Foundation has two restoration areas, one within the museum and another for larger airplanes at Wittman Airport. The aircraft arrive in all kinds of condition—from pristine to parts shipped in crates. Some are restored to flying status, others for permanent museum display. Those that fly give today's aviation devotees a chance to hear history in the drone of four 1,000-horsepower radial engines.*

EAA photo by Steve Buss

In displaying the many facets of the flying machine's development, EAA's Air Adventure Museum offers insight into an invention of monumental importance that continues to inspire and challenge. ■

The Congressional Defense Establishment

(Members arranged by seniority in committee)

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National Security Committee

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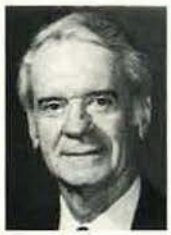

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John S. Tanner
Tennessee

Glen Browder
Alabama

Gene Taylor
Mississippi

Neil Abercrombie
Hawaii

Chet Edwards
Texas

Frank Tejeda
Texas

Martin T. Meehan
Massachusetts

Robert A. Underwood
Guam

Jane Harman
California

Paul McHale
Pennsylvania

Pete Geren
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Florida

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Rosa L. DeLauro
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Senate

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Mississippi

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New Hampshire

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Ranking Minority Member
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West Virginia

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Richard H. Bryan
Nevada

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Chairman
Florida

Joseph M. McDade
Pennsylvania

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Louisiana

Jerry Lewis
California

Joe Skeen
New Mexico

David L. Hobson
Ohio

Henry Bonilla
Texas

George Nethercutt
Washington

Ernest J. Istook, Jr.
Oklahoma

National Security Appropriations Subcommittee

(formerly House Defense Appropriations Subcommittee)

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Ranking Minority Member
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Washington

Charles N. Wilson
Texas

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North Carolina

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Minnesota

David R. Obey
Wisconsin

senate

Defense Appropriations Subcommittee

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Chairman
Alaska

Thad Cochran
Mississippi

Arlen Specter
Pennsylvania

Pete V. Domenici
New Mexico

Christopher "Kit" Bond
Missouri

Mitch McConnell
Kentucky

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Florida

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Judd Gregg
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Louisiana

Robert C. Byrd
West Virginia

Patrick J. Leahy
Vermont

Dale Bumpers
Arkansas

Frank R. Lautenberg
New Jersey

Tom Harkin
Iowa

Books

Compiled by Wendy Alexis Peddrick, Editorial Associate

Bering, Henrik. *Outpost Berlin: The History of the American Military Forces in Berlin, 1945–1994.* edition q, Inc., 551 N. Kimberly Dr., Carol Stream, IL 60188-1881. 1995. Including photos, maps, notes, and bibliography, 266 pages. $16.95.

Boyne, Walter, Paul Coggan, Peter Jacobs, Colin Dodds, Philip Handleman, William Jesse, Tim Laming, Bob Ogden, Don Storer, and Nicholas Veronico. *Fly Past, Fly Present: A Celebration of Preserved Aviation.* Sterling Publishing Co., Inc., 387 Park Ave. S., New York, NY 10016-8810. 1995. Including photos, 224 pages. $29.95.

Cardozier, V. R. *The Mobilization of the United States in World War II: How the Government, Military, and Industry Prepared for War.* McFarland & Co., Inc., Box 611, Jefferson, NC 28640. 1995. Including bibliography and index, 277 pages. $38.50.

Churchill, Winston S. *Great Battles and Leaders of the Second World War: An Illustrated History.* Houghton Mifflin Co., 215 Park Ave. S., New York, NY 10003. 1995. Including photos and maps, 328 pages. $40.00.

Collins, Raymond L., George Lang, and Gerard White. *Medal of Honor Recipients 1863–1994, Vols. I and II.* Facts on File, Inc., 460 Park Ave. S., New York, NY 10016-7382. 1995. Including index, 894 pages. $99.00.

Gardner, Lloyd C. *Pay Any Price: Lyndon Johnson and the Wars for Vietnam.* Ivan R. Dee, Inc., 1332 N. Halsted St., Chicago, IL 60622-2637. 1995. Including photos, notes, and index, 610 pages. $35.00.

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Goldstein, Donald M., Katherine V. Dillon, and J. Michael Wenger. *Rain of Ruin: A Photographic History of Hiroshima and Nagasaki.* Brassey's, Inc., 1313 Dolley Madison Blvd., Suite 401, McLean, VA 22101. 1995. Including photos, maps, selected bibliography, and index, 175 pages. $31.95.

Harvie, John D. *Missing in Action: An RCAF Navigator's Story.* University of Toronto Press, 340 Nagel Dr., Buffalo, NY 14225-4731. 1995. Including photos, illustrations, and appendix, 243 pages. $26.95.

Heaton, Dean R. *Four Stars: The Super Stars of United States Military History.* Order from: Val Vista Book Co., 640 N. Bermuda Circle, Mesa, AZ 85205. 1995. Including photos, references, and index, 531 pages. $48.50.

Hughes, Thomas Alexander. *Over Lord: General Pete Quesada and the Triumph of Tactical Air Power in World War II.* The Free Press, 866 Third Ave., New York, NY 10022. 1995. Including photos, notes, bibliography, and index, 380 pages. $28.00.

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Logan, Don. *The 388th Tactical Fighter Wing at Korat Royal Thai Air Force Base, 1972.* Schiffer Publishing Ltd., 77 Lower Valley Rd., Atglen, PA 19310. 1995. Including photos and maps, 128 pages. $29.95.

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Lopez, Donald S. *Fighter Pilot's Heaven: Flight Testing the Early Jets.* Smithsonian Institution Press, 470 L'Enfant Plaza, Suite 7100, Washington, DC 20560. 1995. Including photos and index, 223 pages. $24.95.

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Maeda, Tetsuo. *The Hidden Army: The Untold Story of Japan's Military Forces.* edition q, Inc., 551 N. Kimberly Dr., Carol Stream, IL 60188-1881. 1995. Including photos, notes and index, 330 pages. $24.95.

Marshall, Chester W., with Warren Thompson. *Final Assault on the Rising Sun: Combat Diaries of B-29 Air Crews Over Japan.* Specialty Press Publishers and Wholesalers, Inc., 11481 Kost Dam Rd., North Branch, MN 55056. 1995. Including photos, 224 pages. $29.95.

McPeak, Gen. Merrill A. *Selected Works, 1990–1994.* Air University Press, CADRE/EDPPB, 170 W. Selfridge St., Maxwell AFB, AL 36112-6110. 1995. Including illustrations, glossary, and index, 399 pages. No charge.

Miller, Nathan. *War at Sea: A Naval History of World War II.* Scribner, 1230 Avenue of the Americas, New York, NY 10020. 1995. Including photos, appendices, maps, notes, bibliography, and index, 592 pages. $32.50.

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Peebles, Curtis. *Dark Eagles: A History of Top Secret US Aircraft Programs.* Presidio Press, 505 B San Marin Dr., Suite 300, Novato, CA 94945-1340. 1995. Including photos, notes, and index, 344 pages. $24.95.

Phillips, Col. Charles L., Jr., USAF (Ret.). *Rain of Fire: B-29s over Japan, 1945.* Order from: B-Nijuku Publishing, 11875 Pigeon Pass Rd., B-14-357, Moreno Valley, CA 92557. 1995. Including photos, appendices, and bibliography, 188 pages. $19.95.

Pilot's Handbook: Navy Models F4U-5, -5N, -5NL, -5P Aircraft. Schiffer Publishing Ltd., 77 Lower Valley Rd., Atglen, PA 19310. 1995. Including photos and maps, 102 pages. $19.95.

Ponting, Clive. *Armageddon: The Reality Behind the Distortions, Myths, Lies, and Illusions of World War II.* Random House, 201 E. 50th St., New York, NY 10022. 1995. Including maps, selected guide for further reading, and index, 376 pages. $27.50.

Powell, Colin L., with Joseph E. Persico. *My American Journey.* Random House, 201 E. 50th St., New York, NY 10022. 1995. Including photos and index, 643 pages. $25.95.

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Timberg, Robert. *The Nightingale's Song.* Simon & Schuster, 1230 Avenue of the Americas, New York, NY 10020. 1995. Including notes, bibliography, and index, 544 pages. $27.50.

Vaughn, Kirby Lee. *The Enlistment Planning Guide: How to Make the Most of Your Military Service.* Order from: Essayons Publishing, P. O. Box 758, Santa Barbara, CA 93102-0758. 1995. Including bibliography and index, 174 pages. $12.95.

Warner, Roger. *Back Fire: The CIA's Secret War in Laos and Its Link to the War in Vietnam.* Simon & Schuster, 1230 Avenue of the Americas, New York, NY 10020. 1995. Including notes and index, 416 pages. $25.00.

Wells, Mark K. *Courage and Air Warfare: The Allied Aircrew Experience in the Second World War.* Frank Cass, c/o ISBS, 5804 N. E. Hassalo St., Portland, OR 97213-3644. 1995. Including photos, bibliography, and index, 240 pages. $40.00.

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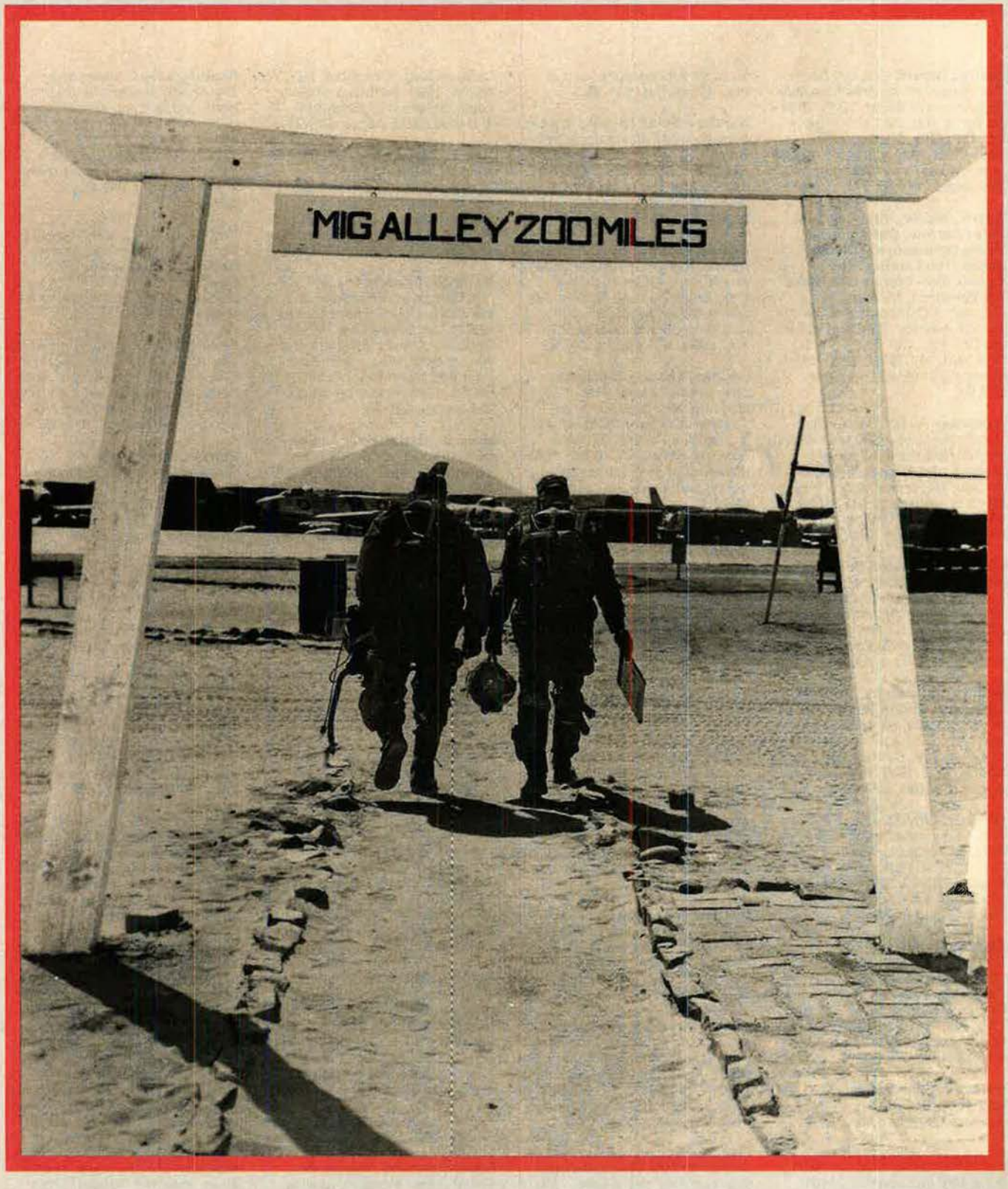
The Air War in Korea



A statistical portrait of USAF in the first hot conflict of the Cold War.

Within minutes of taking off, US airmen could have their RF-80s (right) over MiG Alley (opposite), as the skies over the area between the Yalu and Chongchon Rivers in northwest Korea were known. There the air was thick with MiG-15s piloted by North Korean, Chinese, and (it is now known) Russian pilots.

Below is a C-119 Flying Boxcar at Chinhae AB, South Korea

Photos from the collection of Warren Thompson

NEARLY half a century ago, from June 25, 1950, through July 27, 1953, the newly independent Air Force, in conjunction with other US services and various allies operating under the United Nations banner, halted aggression by North Korea and its Chinese allies.

Data charted in this section are drawn from the comprehensive *US Air Force Statistical Digest, Fiscal Year 1953: Summary of USAF Combat Operations in Korea, June 1950–July 1953,* published in 1954, and the authorized USAF history, *The United States Air Force in Korea, 1950–1953,* published in 1983 by the Office of Air Force History.

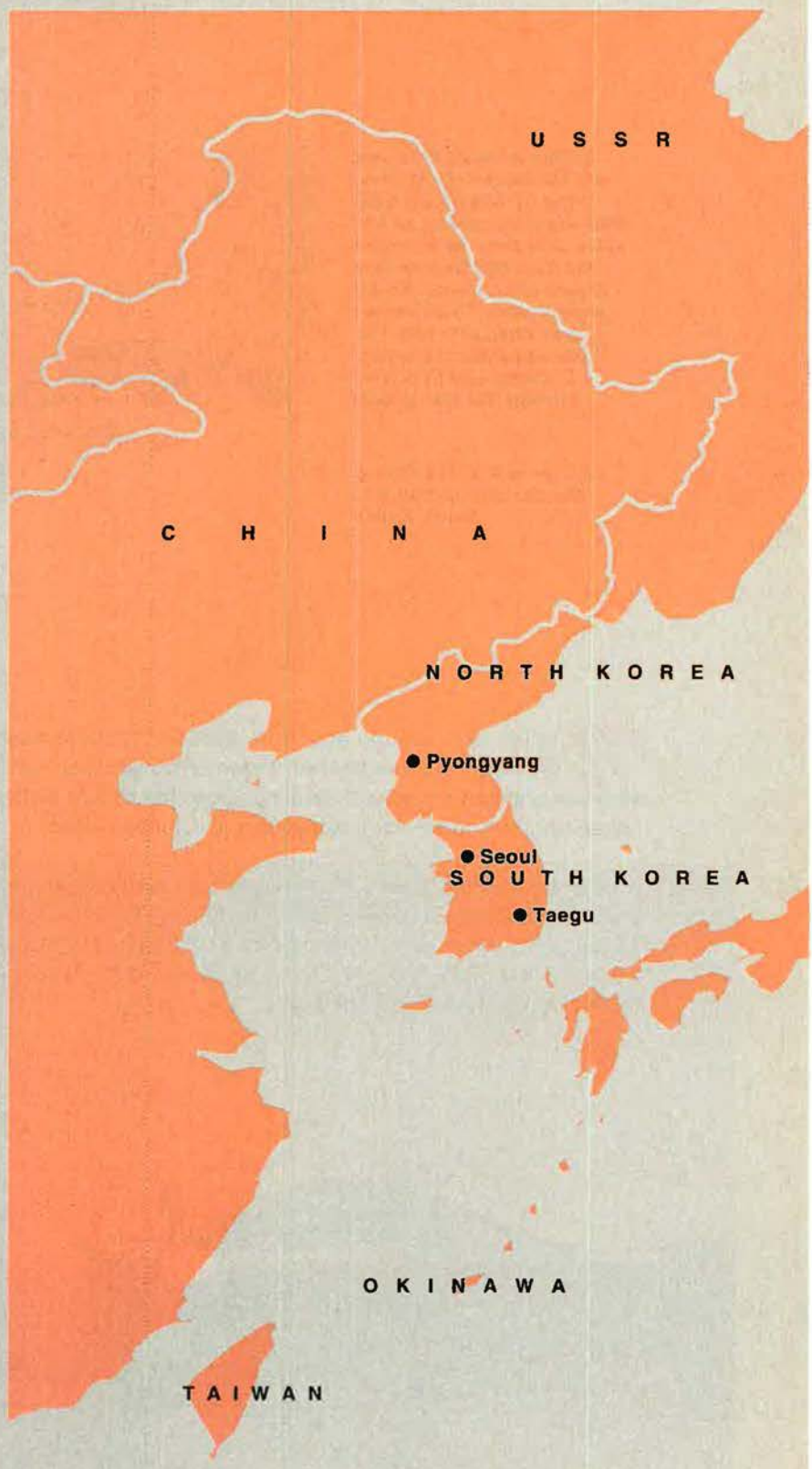
Far East Air Forces on the First Day, June 25, 1950

Fifth Air Force
3d Air Rescue Squadron
6th Troop Carrier (Heavy) Squadron
7th Fighter-Bomber Squadron
8th Bombardment (Light) Squadron
8th Fighter-Bomber Squadron
8th Tactical Reconnaissance Squadron
9th Fighter-Bomber Squadron
13th Bombardment (Light) Squadron
22d Troop Carrier (Heavy) Squadron
35th Fighter-Bomber Squadron
36th Fighter-Bomber Squadron
39th Fighter-Interceptor Squadron
40th Fighter-Interceptor Squadron
41st Fighter-Interceptor Squadron
68th Fighter Squadron
80th Fighter-Bomber Squadron
339th Fighter Squadron
512th Weather Reconnaissance Squadron

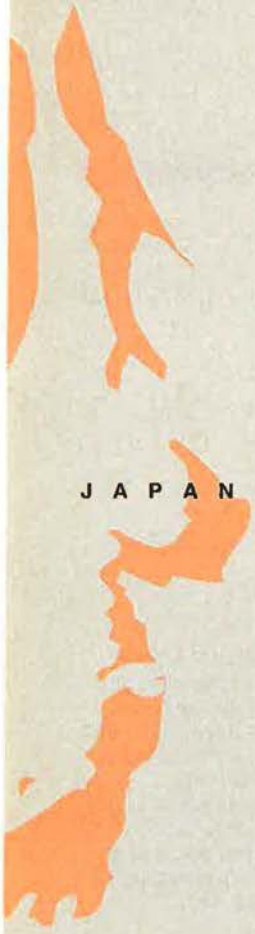
Thirteenth Air Force
2d Air Rescue Squadron
12th Fighter-Bomber Squadron
21st Troop Carrier Squadron
24th Maintenance Group
24th Supply Group
44th Fighter-Bomber Squadron
67th Fighter-Bomber Squadron

Twentieth Air Force
2d Air Rescue Squadron
4th Fighter Squadron
16th Fighter-Interceptor Squadron
25th Fighter-Interceptor Squadron
26th Fighter-Interceptor Squadron
28th Bombardment (Medium) Squadron
30th Bombardment (Medium) Squadron
31st Strategic Reconnaissance Squadron
93d Bombardment (Medium) Squadron
514th Weather Reconnaissance Squadron

Far East Air Materiel Command
13th Maintenance Group
13th Supply Group
13th Medical Group
13th Air Base Group



Far East Air Forces on the Last Day, July 27, 1953



Fifth Air Force
7th Fighter-Bomber Squadron
8th Bombardment (Light) Squadron
8th Fighter-Bomber Squadron
12th Fighter-Bomber Squadron
12th Tactical Reconnaissance Squadron
13th Bombardment (Light) Squadron
15th Tactical Reconnaissance Squadron
16th Fighter-Interceptor Squadron
25th Fighter-Interceptor Squadron
34th Bombardment (Light) Squadron
35th Fighter-Bomber Squadron
36th Fighter-Bomber Squadron
37th Bombardment (Light) Squadron
39th Fighter-Interceptor Squadron
45th Tactical Reconnaissance Squadron
67th Fighter-Bomber Squadron
69th Fighter-Bomber Squadron
80th Fighter-Bomber Squadron
90th Bombardment (Light) Squadron
95th Bombardment (Light) Squadron
310th Fighter-Bomber Squadron
311th Fighter-Bomber Squadron
319th Fighter-Interceptor Squadron
334th Fighter-Interceptor Squadron
335th Fighter-Interceptor Squadron
336th Fighter-Interceptor Squadron
417th Engineering Aviation Brigade
428th Fighter-Bomber Squadron
429th Fighter-Bomber Squadron
430th Fighter-Bomber Squadron
605th Tactical Control Squadron
606th Aircraft Control and Warning Squadron
607th Aircraft Control and Warning Squadron
608th Aircraft Control and Warning Squadron
2157th Air Rescue Squadron
6148th Tactical Control Squadron
6149th Tactical Control Squadron

Thirteenth Air Force
31st Air Rescue Squadron
32d Air Rescue Squadron
44th Fighter-Bomber Squadron
581st Air Resupply and Communications Wing

Twentieth Air Force
4th Fighter-Interceptor Squadron
26th Fighter-Interceptor Squadron
28th Bombardment (Medium) Squadron
30th Bombardment (Medium) Squadron
33d Air Rescue Squadron
34th Air Rescue Squadron
54th Strategic Reconnaissance Squadron
79th Air Rescue Squadron
93d Bombardment (Medium) Squadron
623d Aircraft Control and Warning Squadron
624th Aircraft Control and Warning Squadron
851st Aircraft Control and Warning Squadron
852d Aircraft Control and Warning Squadron
6319th Air Base Wing

Far East Air Forces Logistics Forces
24th Air Depot Wing
75th Air Depot Wing
6400th Air Depot Wing
6418th Air Depot Wing

Japan Air Defense Force
3d Air Rescue Group
9th Fighter-Bomber Squadron
12th Strategic Fighter Wing
40th Fighter-Interceptor Squadron
41st Fighter-Interceptor Squadron
56th Strategic Reconnaissance Squadron
68th Fighter-Interceptor Squadron
339th Fighter-Interceptor Squadron
610th Aircraft Control and Warning Squadron
611th Aircraft Control and Warning Squadron
613th Aircraft Control and Warning Squadron
618th Aircraft Control and Warning Squadron
620th Aircraft Control and Warning Squadron
621st Aircraft Control and Warning Squadron
847th Aircraft Control and Warning Squadron
848th Aircraft Control and Warning Squadron
849th Aircraft Control and Warning Squadron
850th Aircraft Control and Warning Squadron
6101st Air Base Wing

315th Air Division
6th Troop Carrier (Heavy) Squadron
19th Troop Carrier (Medium) Squadron
21st Troop Carrier (Heavy) Squadron
22d Troop Carrier (Heavy) Squadron
34th Troop Carrier (Medium) Squadron
43d Troop Carrier (Medium) Squadron
50th Troop Carrier (Medium) Squadron
61st Troop Carrier (Medium) Squadron
62d Troop Carrier (Medium) Squadron
344th Troop Carrier (Medium) Squadron
815th Troop Carrier (Medium) Squadron
816th Troop Carrier (Medium) Squadron
817th Troop Carrier (Medium) Squadron
6127th Air Terminal Group
6461st Troop Carrier (Medium) Squadron

Far East Air Forces Bomber Command (Provisional)
28th Bombardment (Medium) Squadron
30th Bombardment (Medium) Squadron
91st Strategic Reconnaissance Squadron
93d Bombardment (Medium) Squadron
343d Bombardment (Medium) Squadron
344th Bombardment (Medium) Squadron
345th Bombardment (Medium) Squadron
370th Bombardment (Medium) Squadron
371st Bombardment (Medium) Squadron
372d Bombardment (Medium) Squadron

USAF Battle Casualties in the Korean Theater

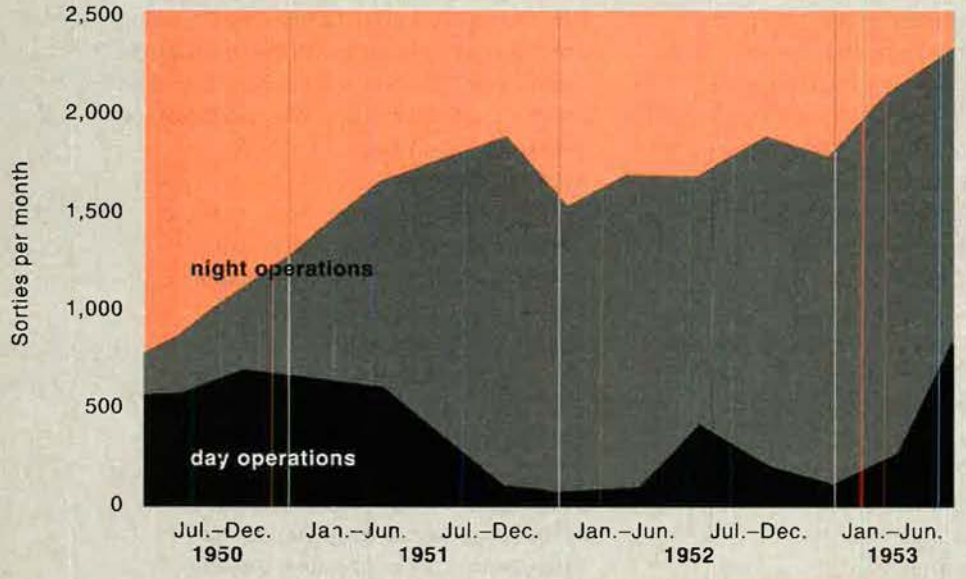
Fiscal Year (July–June)	Killed, Died of Wounds	Wounded, Evacuated	Missing, Captured	Total Casualties
1950–51	423	224	27	674
1951–52	218	102	10	330
1952–53	90	42	23	155
1953–54*	449	—	233	682
Total period	**1,180**	**368**	**293**	**1,841**

*Casualties resolved after the war were included in this year-category.

Combatant Commands and Their Korean War Casualties

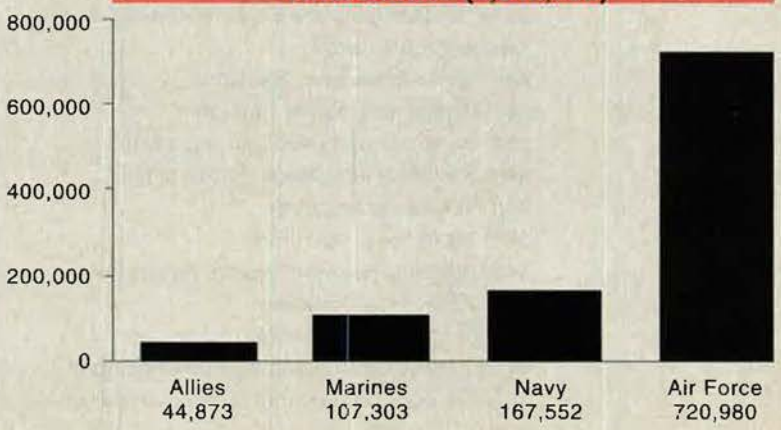
Combatant Command	Killed, Died of Wounds	Wounded, Evacuated	Missing, Captured	Total Casualties
Far East Air Forces	892	289	201	1,382
Strategic Air Command	183	51	64	298
Military Air Transport Service	21	16	1	38
Tactical Air Command	59	4	14	77
Air Defense Command	25	8	13	46
Total period	**1,180**	**368**	**293**	**1,841**

Distribution of B-26 Effort



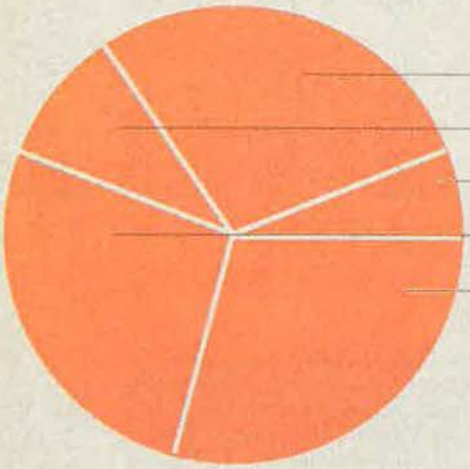
Two B-26 units, USAF's 3d Bombardment Wing and 452d Bombardment Wing, specialized in nighttime intrusion. With the start in mid-1951 of a new railway-interdiction effort (code-named "Strangle"), night interdiction assumed added importance, but the pace of B-26 day operations picked up in the last half of the war.

Total Sorties (1,040,708)



In the UN air effort, USAF conducted the lion's share of total sorties—720,980, or about seventy percent. Significant numbers also were flown by aviators of the US Navy (167,552 sorties) and the US Marine Corps (107,303 sorties). Another contribution (a total of 44,873 sorties) came from the air forces of friendly or allied nations—South Korea, Australia, South Africa, Thailand, Greece, and Britain.

Breakdown of USAF Sorties



Ordnance Tonnages

Bombs, rockets, ammo, napalm released

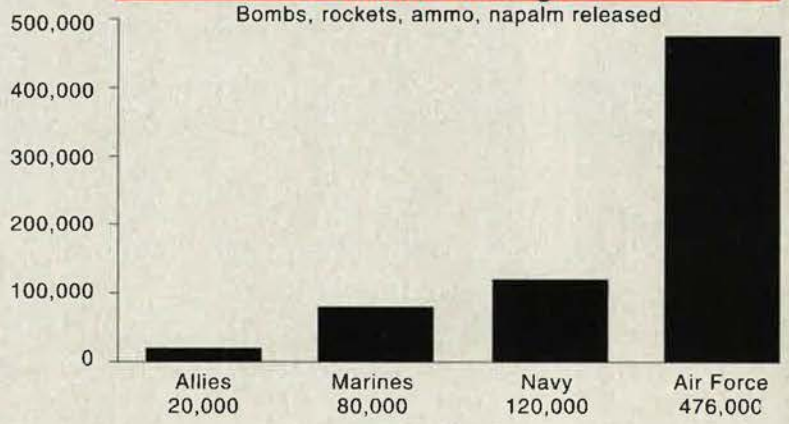


Photo from the collection of Warren Thompson

At the height of its participation in the war, the fledgling US Air Force had more than 46,000 uniformed personnel on the peninsula. USAF airmen suffered almost 2,000 casualties, so returning from a mission in one piece was cause for congratulations, even for Capt. Joseph McConnell, USAF's leading ace of the war.

315th Air Division Combat Cargo Operations, 1950–53

Parameter	Into Korea	Intra Korea	Out of Korea	Intra Japan
Total sorties	65,334	58,573	45,572	40,864
Tons of cargo	296,316	133,755	149,039	100,526
Passengers	906,262	416,686	868,753	413,890
Ton-miles	75,609,000	12,553,000	32,828,000	37,374,000
Personnel-miles	481,338,000	96,911,000	516,352,000	188,766,000

USAF Aircraft Losses on Operational Missions

Cause	1950	1951	1952	1953	Total
Enemy, air-to-air	9	56	60	14	139
Enemy, ground fire	103	229	154	64	550
Enemy, unknown	6	20	31	11	68
Not enemy action	104	186	112	70	472
Unknown, missing	47	102	60	28	237
Total	**269**	**593**	**417**	**187**	**1,466**

Enemy Aircraft Destroyed or Damaged

Category	1950	1951	1952	1953	Total
Destroyed, claimed	97	180	383	293	**953**
Air-to-air	49	175	383	293	**900**
Air-to-ground	48	5	0	0	**53**
Destroyed, probable	43	39	60	51	**193**
Air-to-air	20	37	60	51	**168**
Air-to-ground	23	2	0	0	**25**
Damaged	48	313	400	248	**1,009**
Air-to-air	22	303	400	248	**973**
Air-to-ground	26	10	0	0	**36**
Total enemy losses	**188**	**532**	**843**	**592**	**2,155**

Airpower put at risk not only Communist aircraft. USAF, Marine aviation, and friendly foreign air forces also claimed to have destroyed 1,327 tanks, 82,920 vehicles, 963 locomotives, 10,407 railway cars, 1,153 bridges, 118,231 buildings, 8,663 gun positions, 8,839 bunkers, 593 barges and boats, sixty-five tunnels, and sixteen oil-storage tanks. The aircrews claimed to have made 28,621 cuts on enemy railroads.

Demoralizing the Enemy

What Did It?

A survey of 825 prisoner-of-war interrogations having specific references to morale revealed that tactical airpower contributed materially to the demoralization of Communist troops. The survey found that the demoralizing effect of tactical air attack ranked second only to discontent about lack of food.

Cause of Low Morale	Percent
Shortage of food	21.4
Tactical aircraft threat	17.9
Lack of training	11.3
Lack of arms and equipment	9.8
Insufficient rest	8.2
Forced induction	6.3
Casualties	6.2
No cause for fighting	4.9
Artillery attack threat	4.7
Desertion	3.3
Harsh treatment by officers	1.6
Lack of replacements	1.5
Inadequate clothing	1.2
All other causes	1.7

Who Destroyed What?

A Comparison of Air and Ground Forces

Communist Force Targets	Killed/Destroyed by Aircraft	Killed/Destroyed by Ground Arms
Troops	47%	53%
Tanks	75%	25%
Trucks	81%	19%
Artillery	72%	28%

Airpower made a great contribution by interdicting hostile troops, weapons, and supplies. Under vulnerable conditions imposed by a lack of air cover and of training in antiaircraft measures, Communist forces found themselves exposed to the fullest shock effect of airpower.

USAF Combat Aircraft on Hand in the Korean Theater, 1950–53

Aircraft Type	July 1950	July 1951	July 1952	July 1953	Average, 37 months
B-26 bomber	79	157	190	194	161
B-29 bomber	87	104	118	117	109
F-51 fighter	190	227	150	65	167
F-80 fighter	528	254	224	152	270
F-82 fighter	37	24	0	0	16
F-84 fighter	0	175	353	410	247
F-86 fighter	0	93	177	439	184
F-94 fighter	0	14	100	82	56
Total	**921**	**1,048**	**1,312**	**1,459**	**1,210**

Photo from the collection of Warren Thompson

In Korea, up-to-the-minute fighters like the F-94 fought side by side with World War II holdovers, such as the B-29 (left). On the support side, aircraft as old as the C-47 (which dates from 1935) saw plenty of service.

USAF Support Aircraft on Hand in the Korean Theater, 1950–53

Aircraft Type	July 1950	July 1951	July 1952	July 1953	Average, 37 months
R/WB-26	0	24	30	30	27
R/WB-29	4	38	40	37	36
RF-51	0	7	22	0	18
RF-80	35	36	40	57	39
C-46	41	72	76	73	70
C/VC-47	84	129	134	133	123
C-54	31	64	64	21	47
C-119	0	86	95	104	87
C-124	0	0	13	25	9
Other	273	289	384	375	334
Total	**468**	**745**	**898**	**855**	**790**

USAF Personnel in Far East Air Forces

Personnel Category	July 1950	July 1951	July 1952	July 1953
Officer	5,067	11,117	14,178	15,429
Enlisted	39,618	70,232	101,914	114,039
Civilian	9,792	11,200	12,045	11,032
Total	**54,477**	**92,549**	**128,137**	**140,500**

USAF Uniformed Personnel in Major Forward Operating Locations

Operating Location	June 1950	December 1950	June 1951	December 1951	June 1952	December 1952	June 1953	Final July 1953
Guam	5,698	4,073	4,186	3,972	4,849	6,585	5,416	5,399
Korea	1	10,063	20,908	34,895	42,376	46,388	44,650	43,791
Japan	21,324	34,923	35,059	43,468	46,543	54,418	60,297	60,299
Okinawa	9,339	10,389	8,383	8,913	10,550	9,736	10,520	10,532
Philippines	5,293	5,659	5,097	5,635	5,120	7,369	7,807	8,036
Total	**41,655**	**65,107**	**73,633**	**96,883**	**109,438**	**124,496**	**128,690**	**128,057**

Photo from the collection of Warren Thompson

This F-51 is from the 18th Fighter-Bomber Wing, which remains in the region today as the 18th Wing, although it is now stationed at Kadena AB, Japan. Today, Pacific Air Forces has about 35,000 military personnel in the region, compared to Far East Air Forces' 129,000 in five countries in July 1953.

USAF Combat Crew Inventories in the Korean Theater, 1950–53

Aircraft Type	July 1950	July 1951	July 1952	July 1953	Average, 37 months
B-26 bomber	40	105	174	191	144
B-29 bomber	81	86	112	109	101
F-51 fighter	70	122	118	—	121
F-80 fighter	368	349	222	158	268
F-82 fighter	25	29	—	—	18
F-84 fighter	—	217	303	554	263
F-86 fighter	—	121	216	489	203
F-94 fighter	—	16	103	165	66
Total	**584**	**1,045**	**1,248**	**1,666**	**1,184**

Total USAF Flying Hours in the Korean War, 1950–53

Aircraft type	1950–51	1951–52	1952–53	Total
Bombers	180,581	185,151	195,444	561,176
Fighters	293,766	300,185	385,120	979,071
Transports	290,360	390,897	318,124	999,381
Other	164,301	185,505	278,678	628,484
All types	**929,008**	**1,061,738**	**1,177,366**	**3,168,112**

Photo from the collection of Warren Thompson

This 452d Bomb Group B-26 suffered major damage to its nose and engines. Though USAF lost more than 1,400 aircraft during the war, only 139 of the losses were caused by enemy air-to-air action.

Wartime Airfields

Country/Location	Fields	Active Runways
Guam	3	5
Iwo Jima	1	1
Japan	41	49
Korea	34	36
Okinawa	8	9
Philippines	1	1
Ryukyus	2	4
Total	**90**	**105**

USAF Fuel Consumption, 1950–53

(gallons)

Aircraft type	1950–51	1951–52	1952–53	Total
Bombers	55,273,000	48,277,000	55,757,000	159,307,000
Fighters	79,357,000	99,273,000	148,111,000	326,741,000
Transports	47,805,000	61,875,000	41,893,000	151,573,000
Other	27,552,000	33,198,000	66,025,000	126,775,000
All types	**209,987,000**	**242,623,000**	**311,786,000**	**764,396,000**

Just as predicted, the Air Force is about to run short of pilots.

And Now, the Pilot Shortage

By Bruce D. Callander

In 1943, US Army Air Forces produced 97,792 rated officers—65,797 pilots, 15,938 navigators, and 16,057 bombardiers. Now the task would take 158 years. The Air Force, if it started today and worked at prevailing rates, would not turn out its 97,792d new flyer until 2154.

The record year for training came, of course, at the height of World War II. Since then, the Air Force never has approached anything like the 1943 pace and is not likely ever to do so again. Even for peacetime, however, the training rate is worrisome, languishing at a record and perhaps dangerous low, warn some service officials.

The problem became acute in 1994 and 1995. In each of the two years, USAF graduated just more than 600 new rated officers—500 pilots and 118 navigators. This was a big drop; through the 1980s, the Air Force annually produced 1,500 to 2,000 pilots and 500 to 1,000 navigators. This year, the Air Force will pick up the pace only marginally.

The decline began during the ten-year, post–Cold War drawdown of the force. As total strength dropped by about one-third, USAF jealously guarded its rated inventory, but with units closing and aircraft numbers declining, there were fewer cockpit slots for those already in flying status and none for those in the training pipeline.

The Air Force's solution was to cut back on rated production. Hun-

A Changing Pilot Mix

Numbers of Rated Officers, 1986–95

Grade	1986	1995	Percent Change
2d Lieutenant	1,183	80	–93.2
1st Lieutenant	3,583	997	–72.2
Captain	9,184	8,949	–2.6
Major	5,990	2,717	–54.6
Lieutenant Colonel	4,208	2,597	–38.3
Total	**24,148**	**15,340**	**–36.5**

Competition from the airlines has long been a worry for the military. The concern has lessened in recent years because most airlines have been hiring only modest numbers and some have gone out of business.

However, the airlines periodically lose experienced captains and look to service pilots to replace them. That could be a problem again, Major Olinto concedes, but he thinks the Air Force is in better shape to compete than in past years.

dreds of flight school applicants had to wait for training slots. More than 1,000 pilots who already had graduated were "banked" in nonflying jobs. Even some seasoned pilots were sent to staff positions until the rated force thinned out.

Now, with the drawdown tapering off, the Air Force has started to turn things around. It will take a long time to return to something close to normal production rates. This year, USAF will graduate 525 new pilots and gradually increase the annual rate to more than 1,000 by the turn of the century. It will produce 188 new navigators in 1996 and 300 per year in most of the ensuing years.

Pilot requirements are designed to support the Pentagon's wartime mission requirements, currently geared to fighting two nearly simultaneous major regional conflicts, as well as supporting contingency operations when not actually engaged in war. Officials say they foresee no change in this approach in the near future or any major easing of the budget constraints that help to keep training rates modest.

Coming Shortages

The Air Force will continue to be slightly overstrength in both categories for a while longer. However, as older flyers retire, USAF will increasingly have to contend with rated shortages, particularly among pilots.

The shortfall will be especially acute in some year groups because of the earlier cutbacks in training. As a result, the Air Force will have to use experienced field-grade pilots in cockpit slots calling for less rank and experience. Then, as they retire, it will have to replace them with new company-grade pilots having far less experience—in many cases moving them into jobs for which they normally would not qualify for some years.

The trade-offs are certainly less than ideal. Even if it makes them, however, the Air Force still will face overall pilot shortages in 1998 and, at projected training rates, will continue to suffer from them into the next century. At that point, pilot retention could become critical.

A few years ago, Lt. Gen. Billy J. Boles, then deputy chief of staff for Personnel, predicted difficulties. He said that if the Air Force continued to graduate only 500 pilots a year for too long, it could retain 100 percent of them and still not meet its future requirements. It now appears that, even though training rates are beginning to rise, the prediction was correct.

At the moment, rated retention is not a major problem, said Maj. Lou Olinto, formerly of the deputy chief of staff for Personnel's Rated Force Policy Division.

"I think we are doing well," said Major Olinto, "but a lot will depend on the economy, and that's hard to predict. And airline recruiting probably is going to pick up."

Shifts in the Navigator Force

Numbers of Rated Officers, 1986–95

Grade	1986	1995	Percent Change
2d Lieutenant	741	10	–98.7
1st Lieutenant	1,588	129	–91.9
Captain	4,029	2,605	–35.3
Major	2,968	1,774	–40.2
Lieutenant Colonel	1,139	1,335	+17.2
Total	**10,465**	**5,853**	**–44.1**

"The difference this time," he said, "is that over the last few years, we have been restructuring and improving policies so that when airline hiring does come, we won't see retention rates drop as much as they did in the mid- to late 1980s. Right now, retention is at the highest point it has ever been in the Air Force."

Major Olinto gives significant credit to one relatively recent incentive, Aviator Continuation Pay. That bonus plan pays flyers up to $12,000 per year for every year they agree to remain beyond eight years of active commissioned service (to a total of fourteen years). They can earn up to $72,000 over and above their normal flight pay, which now can reach $650 per month for officers with six or more years of aviation service.

Thinking Twice

Even with flight pay and bonuses, Air Force pilots may not make as much as senior airline captains do. However, such incentives should be enough to make them think twice about jumping quickly into entry-level jobs with the commercial carriers, particularly when they have begun to build up USAF retirement equity.

Still, said Major Olinto, the service would like to increase training rates a bit more to be on the safe side. The problem stems more from tight military budgets than from a lack of candidates. There are more pilot applicants from students in the major commissioning sources—the Air Force Reserve Officers Training Corps, Air Force Academy, and Officer Training School—than USAF can accept into training.

Nor does the Air Force suffer from a shortage of navigator candidates, but here the situation is somewhat different. The Air Force long has trained fewer navigators than pilots, and now the difference is becoming greater. This is because changes in USAF equipment have sparked a decline in navigator requirements, said Maj. Greg Hayman, who works in the Rated Management Section of the Operations Directorate.

Enlisted Crew Numbers Stable

The Air Force expects little near-term change in the number of enlisted airmen serving in aircrew positions.

At present, about 6,850 enlisted troops serve in what the Air Force deems flying positions, including flight engineers, boom operators, loadmasters, and E-3 Airborne Warning and Control System command-and-control specialists.

Equipment changes have had little effect on these totals, USAF officials said. When 345 enlisted tailgunners were removed from the B-52, for example, the airmen were shifted to other crew positions. Now, some units are receiving large aircraft, such as the E-8 Joint Surveillance and Target Attack Radar System aircraft, that require large numbers of enlisted crew members.

Enlisted members also are moving into some flying slots previously filled only by officers. The air weapons director specialty recently was opened to airmen, and officials say that some battalion air liaison officer positions may be opened in future. Airmen also have been allowed to apply for astronaut training. More than 250 have done so, and six have been reviewed for consideration, but so far none has been accepted.

An additional 1,200 crew members—both officer and enlisted—continue to fly in "command-unique" positions, such as nurses, medical technicians, and linguists.

Percentages in the Pilot Force . . .

Rated Officers, 1986–95

Grade	1986 Share	1995 Share	Change
2d Lieutenant	5	0.5	–4.5
1st Lieutenant	15	6.5	–8.5
Captain	38	58.3	+20.3
Major	25	17.7	–7.3
Lieutenant Colonel	17	16.9	–0.1
Other	0	0.1	+0.1

For pilots, such changes are expected to have little impact. "The C-17 replaces the C-141," Major Hayman said. "That's an airlifter for an airlifter. As far as we know, our force structure will remain based on twenty fighter wing equivalents to fight two wars, so it is going to take X number of fighters whether they are one type or another. The F-22 is coming on and they may retire something else, but it's still one pilot going into one cockpit in terms of fighters."

For navigators, though, it is another story.

"Modifications will take all of the nav requirements out of the KC-135 aircraft," Major Hayman reported. "Also, the C-141s have navs, and the new C-17s do not, so we're looking at the force structure out a ways, and it's pretty clear that the requirements are going to dwindle."

Fewer Navigators

Major Hayman, himself a navigator, added, "We're down to about 5,000 now, and we continue to draw down. The problem we face in production is that you can absorb just so many navs each year. We're poking up to about 300 per year for 1997 and beyond, and that will support a force of about 4,200 total. The force requirements will continue to come down. The combat crew members will stay pretty steady, but you'll see a lot fewer navigators in the staffs."

USAF's projections for coming years bear out that prediction. They show the pilot inventory lagging requirements but the stock of navigators exceeding requirements until about 2001.

In both rated categories, however, the problem again is less one of numbers than of experience levels.

"We've had all these charts showing that we should be bringing in all these people to support the rated force," claimed Major Hayman, "and we've been way below it the past several years. That's because the only flexibility we had was to shut off the training pipeline.

"It's going to result in our having some year groups . . . without nearly the number of people you normally would bring in year after year. Over a twenty-year career, you would have enough folks in every year group, but we now have some older year groups that are large, so we're going to have to use them to fill in where normally you would have captains."

Another effect of returning rated officers to the cockpit will be that fewer will be available for staff assignments.

"During the drawdown," said Major Hayman, "we had to have places to put a lot of flyers for whom there weren't any cockpit slots, so we had a lot of them go to nonrated jobs just to spread the rated expertise around. Now, units are finding how painful it is not to have such people. We're only producing to support the rated requirements and bringing all these rated folks back into flying jobs, and those nonrated positions are going begging."

Even as it struggled to juggle its

rated resources and requirements, the Air Force has made drastic changes in the way it produces flyers. Traditionally, pilots and navigators were trained broadly and the Air Force considered any flyer at least potentially qualified to fly in any type of aircraft.

That tradition began to change in the 1980s when USAF adopted specialized undergraduate navigator training (SUNT). In the years since, it has moved into a similar program for pilots. In both programs, Air Force students do some training jointly with the other services.

Under specialized undergraduate pilot training (SUPT), all students receive flight screening in the T-3A Firefly and then primary training in either the T-37B Tweet or the Navy equivalent, the T-34 Mentor. After that, however, they are divided into different tracks to train for bombers and fighters or airlifters and tankers.

The SUPT program still is being phased in. The program for navigators has been in business for some time but shifted from Mather AFB, Calif., to other locations. Under SUNT, all students begin training in Navy T-34s at NAS Pensacola, Fla. Then, those picked to become panel navigators in airlifters—about fifty-five percent of the total—receive advanced training in T-43s at Randolph AFB, Tex. The rest stay at Pensacola for training as weapon system officers; WSOs picked to become electronic warfare officers (EWOs) receive added training at Corry Naval Technical Training Station, Fla.

About thirteen percent of the navigator students follow the WSO track, with some three-quarters going to bombers and the rest to fighters. Another thirty-two percent take the EWO track, most going to bombers or fighters and the rest to heavy aircraft.

Tracked for Life

Once specialized on types of aircraft, pilots and navigators are likely to remain with those types throughout their careers. When the new track system was proposed, some officials feared it would reduce the Air Force's ability to shift flyers between fighters and bombers if requirements demanded. Those who supported specialization insisted that, despite USAF's "universal assignability" philosophy, few flyers actually shifted among aircraft types anyway and the change would have little impact.

Major Olinto said that it still would be theoretically possible to cross-train flyers to fly in different aircraft, but as a practical matter USAF foresees little need to do so.

"If there ever is a cross-flow program," said Major Olinto, "it will never be in large numbers. Even when we had an exchange program between the old [Strategic Air Command and Tactical Air Command], the numbers were small."

The Air Force is considering some cross-flow at the moment, the Major said, but only for a specific group of pilots. Those affected would be officers who graduated as fighter pilots during the drawdown and were sent to other types of aircraft. The proposal, still to be approved, would give such officers another crack at fighter aircraft.

Overall, officials said, the feedback from gaining commands on the specialized training approach is positive.

Now being considered are changes designed to beef up other tracks. For example, the officials said, when the planned T-38 Talon avionics modifi-

Pilots: The Fifteen-Year Record

Actual Results, 1981–95

Year	Requirement	Inventory	Net +/–	New Pilots
1981	23,219	22,297	–922	1,693
1982	23,819	22,814	–1,005	1,875
1983	23,719	23,458	–261	1,783
1984	23,645	23,901	+256	1,937
1985	23,978	24,198	+220	1,872
1986	24,137	24,210	+73	1,700
1987	23,499	23,663	+164	1,453
1988	22,699	22,819	+120	1,510
1989	22,537	21,750	–787	1,581
1990	21,474	20,917	–557	1,581
1991	19,672	19,222	–450	1,460
1992	17,157	17,887	+730	870
1993	15,939	16,723	+784	746
1994	15,209	15,963	+754	500
1995	14,792	15,453	+661	500

. . . and in the Navigator Force

Rated Officers, 1986–95

Grade	1986 Share	1995 Share	Change
2d Lieutenant	7	0.2	–6.8
1st Lieutenant	15	2.2	–2.8
Captain	38	44.5	+6.5
Major	28	30.3	+2.3
Lieutenant Colonel	11	22.8	+11.8
Other	1	0	–1

cation is completed, the Air Force may be able to integrate the current graduate-level Introduction to Fighter Fundamentals course into the bomber/fighter track. Then, fighter maneuvers and procedures could be introduced earlier and give students more experience and confidence when they graduate and make the transition to their follow-on weapon systems.

This presumably would be a refinement of an earlier approach the Air Force adopted during the drawdown. To relieve using commands of the need to do so much combat training, Air Education and Training Command took charge of the Follow-On Training Units. The idea was to ensure that graduates were mission-ready when they reported to their operational units.

So far, USAF officials said, the feedback from the gaining commands has been favorable, but AETC has found it expensive to provide the training and the combat aircraft required to support the new mission. Being able to offer similar training in appropriately equipped trainers should help.

Empty Bank

Some problems caused by the drawdown already have been corrected. Of the 1,094 officers "banked" in nonrated jobs, all but ninety-nine were returned to the cockpit. Most of those ninety-nine have separated from service. Another 1,065 officers, most of them ROTC graduates, were delayed an average of three years in starting flight school. Of these, all but 265 have entered training.

Other changes in the rated force are also under way. The number of female rated officers dropped during the drawdown, for example, but in a smaller force the proportion of female flyers actually has risen. Last year, the Air Force had ninety-nine female navigators and 315 female pilots. Women now make up about two percent of the pilot inventory and a slightly smaller percentage of the navigator force.

The percentages of reservists in the rated force also have grown steadily in recent years. This year, the Air Force said, about thirty-one percent of total pilot requirements are being filled by members of the Air National Guard and the Air Force Reserve. Totals are split about evenly between the two components, and officials say they do not expect this mix to change appreciably in coming years.

Concern still focuses on what officials term the "bathtub" effect, the dip in the rated officer inventory caused by the training cuts taken during the drawdown.

Major Hayman summed up the difficulty this way: "People always see training as the point where you can be flexible, and when you do that you pay the price years down the road when you don't have the correct types when you need them. The biggest pain will be with the field-graders who have to come back and fill line cockpits. But it will work out. As production increases, there will be a few tough years, but we will get back up to where we want to be." ■

The Coming Drought

Projected Shortages of Pilots

Year	Requirement	Inventory	Net +/–	New Pilots
1996	14,558	15,024	+466	525
1997	14,211	14,464	+253	650
1998	13,859	13,733	–126	850
1999	13,714	13,219	–495	950
2000	13,683	12,961	–722	1,025
2001	13,737	12,932	–805	1,050

Pilot Commissioning Sources

Organization	1986	1995	Percent Change
Air Force ROTC	10,370	6,807	–34.4
Officer Training School	7,023	2,362	–66.4
Air Force Academy	6,509	6,121	–6.0
Other	246	73	–70.3
Total	**24,148**	**15,363**	**–36.4**

Navigator Commissioning Sources

Organization	1986	1995	Percent Change
Air Force ROTC	4,549	2,950	–35.2
Officer Training School	4,743	2,076	–56.2
Air Force Academy	977	774	–20.8
Other	196	26	–86.7
Total	**10,465**	**5,826**	**–44.3**

Bruce D. Callander, a regular contributor to Air Force *Magazine, served tours of active duty during World War II and the Korean War. In 1952, he joined* Air Force Times, *becoming editor in 1972. His most recent article, "The Transition After the Transition," appeared in the February 1996 issue.*

In the Catbird Seat

Photo courtesy Jeffery Ethell via Ole C. Griffith

The Navy F-14 was not the first Tomcat to fly. Superstition spurred many aircrews to take a mascot with them as they headed overseas during World War II. Unfazed by the roar of the North American B-25 Mitchell's engines—or the Army regulation strictly prohibiting animal mascots on military aircraft—this cat was caught napping by pilot Ole C. Griffith on a 90th Photo Mapping Squadron flight over Peru in 1944.

Global Positioning System technology was too phenomenal for the Air Force to keep a monopoly on it. In wartime, that will make an enormous difference.

GPS in Peace and War

By Peter Grier

Staff photo by Guy Aceto

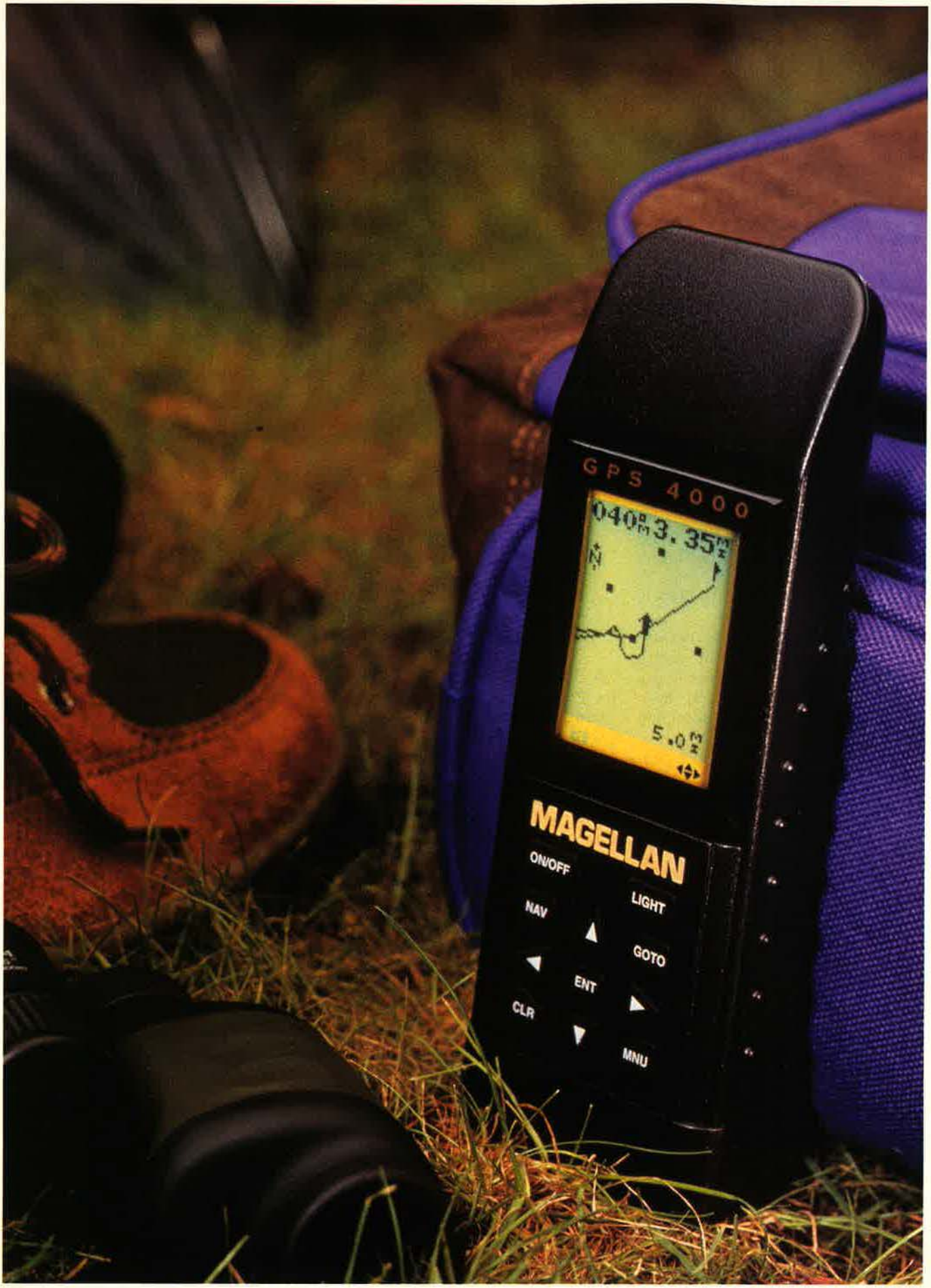
Both soldiers on maneuvers in the trackless desert and weekend hikers in the Adirondacks depend on GPS technology to tell them exactly where they are. The US must now find a way to ensure that its troops have the most accurate, secure, positioning information while denying such data to potential enemies.

THE USAF Global Positioning System is one of the most successful high-technology projects ever produced by the Defense Department. Signals from the twenty-four orbiting satellites that make up the GPS constellation now provide precise time and location data for all manner of US military forces—from troops creeping through unknown landscapes to precision guided munitions speeding toward their targets. Reliance on GPS will only increase in the years ahead. Congress has promised that after 2000 it will cancel production of any aircraft, ship, or armored vehicle not equipped with a GPS receiver.

To some extent, however, GPS now risks becoming a victim of its own success. The commercial market for its services has exploded faster than anyone had predicted—complicating national decisions about the system's control and use. Potential adversaries may be plotting to take advantage of global positioning data, having seen the power of GPS demonstrated by US forces during the Persian Gulf War.

Thus, it is no longer enough for the Pentagon simply to deny other users the most accurate signals produced by GPS satellites, according to a new RAND Corp. study. The Air Force and other services need to start thinking—now—about how they will handle the inevitable proliferation of global positioning information.

"The United States must begin preparing to operate in a world where access to GPS-type and augmented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GPS services are the norm," says a new RAND study of GPS produced for the White House Office of Science and Technology Policy.

For one thing, that means planning defenses-in-depth against attacks by GPS-guided missiles. It also means devising ways to protect US global positioning assets. Attacks on such vital data providers could well be a facet of a coming age of information warfare.

"The overall magnitude of [the] threat appears manageable, provided that the United States proceeds prudently in preparing an array of defensive measures," concludes the RAND report.

Three Systems

Operated by the US Air Force, the Global Positioning System was developed over two decades at a cost of around $10 billion. It reached its formal initial operational capability on December 8, 1993, though its fledgling satellites had already been providing useful positioning information for years.

Technically speaking, the GPS is not one system but three.

The first is a constellation of twenty-four Navstar satellites orbiting Earth in six different planes, spaced so a user on the ground will typically have access to the signal from a minimum of five different "birds."

The second is ground control, consisting of a master control center at Falcon AFB, Colo., and unmanned monitoring stations in Colorado Springs, Hawaii, Ascension Island, Diego Garcia, and Kwajalein.

The third system consists of users, whose GPS receivers convert raw signals from the satellites into position information.

The GPS satellites are in essence extremely accurate clocks in the sky. They broadcast precise time information toward the ground via coded radio transmissions, which are picked up by equipment ranging from handheld receivers to units mounted in aircraft or on guided weapons. The receivers calculate how long it has taken them to receive the radio pulses from different GPS satellites—and use the barely perceptible differences in time to figure out their position on the face of the Earth.

In fact, GPS satellites broadcast two different kinds of time signals. The first is the Coarse Acquisition signal, or C/A-code. Designed for nonmilitary users, it provides position information accurate to about 100 meters. The second signal is the encrypted Precision signal, or P-code. Intended for US military or other authorized recipients, it is accurate to within twenty meters.

The Pentagon has long worried that the easily obtainable C/A-code might someday be picked up by adversaries and used against the US. Thus, GPS satellites already intentionally degrade the commercial signal, using a dithering technique called Selective Availability (S/A). Without S/A dilution, the C/A-code would be much more accurate than it is; during the Gulf War, however, the Pentagon turned S/A off so troops would be able to take full advantage of commercially bought receivers many brought with them or received from their families.

Tens of thousands of commercial receivers are undoubtedly still in use throughout the US military. They are small, readily available, and cheap. Given continued budget cuts, officials will undoubtedly be tempted to rely more heavily on off-the-shelf GPS equipment in the future.

A Bad Idea

RAND experts judge this to be a bad idea—for security reasons as well as accuracy. The more commercial equipment used by US military forces, the greater the internal pressure to turn S/A off permanently will be. More important, the less accurate and less sophisticated C/A-code could become a victim of future electronic warfare. "US forces relying on the C/A-code will be much more vulnerable to jamming than those using the P-code," says the RAND report.

Commercial considerations, however, will inevitably figure in GPS's future. Since its beginning as a solely military system, it has grown into perhaps the most successful dual-use technology program of its age, with GPS signals serving a wide array of civil and scientific purposes. GPS guides airliners and helps control the Internet; it keeps rental-car users from getting lost and helps farmers navigate their own fields. The market for civilian GPS use is about three times bigger than its military counterpart, and growing fast. An industry council predicts that by 2000, sales of commercial GPS equipment will generate $8.5 billion a year.

Striking a balance between national security and the needs of industry has thus become a prime problem for Air Force GPS officials. In the past, much of this debate has centered on S/A accuracy degradation. Civil aviation users, among others, have called for S/A to be scrapped, in the face of opposition from the military services. But the civil-military GPS debate may soon include another, equally contentious subject: commercial augmentation of the standard GPS signal.

Augmentation services can provide commercial users with greater accuracy than they can receive from GPS alone—in some cases, as precise as within five meters. A technique called local-area differential GPS (DGPS) is the most common such booster. It works by using a base station whose location is precisely known to beam an additional signal to GPS users.

Current DGPS services are limited to relatively small areas and are used for such purposes as marine navigation. Their augmentation signals are broadcast on the FM-subcarrier portion of the radio spectrum, or over phone lines, and are typically usable only by fee-paying subscribers.

Commercial access to DGPS is likely to expand greatly in the years ahead, raising real security issues for the Pentagon. The FAA, for instance, is planning a wide-area augmentation service that would include broadcasts from geostationary satellites. Eventually, these add-on systems may enable adversaries to have position information as accurate as that available to US forces using military-specification equipment.

The availability of local- and wide-area DGPS is beginning to erode the protections provided by S/A degradation, according to RAND. The US and its allies need to plan for the emergence of DGPS-guided weapons. The Pentagon might also work to discourage other US agencies or friendly nations from providing wide-area GPS augmentations beamed from space—at least for now.

"Time is needed both to develop electronic countermeasures and negotiate international agreements" on DGPS control, concludes RAND.

Hostile Exploitation

Hostile forces could exploit GPS signals in a number of ways. They could use location data for guidance of ground forces, as the US does. They could use the data to aid in warship location or aircraft navigation. The most threatening use of intercepted GPS signals, however, would probably be to increase the accuracy of air-delivered ordnance or ballistic and cruise missiles. "While such [uses] are currently out of reach for most Third World nations, their basic building blocks will be in the hands of several countries fairly soon," says the RAND study.

The notoriously inaccurate Scud missile, for instance, is one weapon system that could be made more deadly by an infusion of GPS technology. According to RAND calculations, adding basic GPS guidance to a Scud derivative or a version of North Korea's No Dong 1 could improve overall missile accuracy by twenty to twenty-five percent.

This figure would be little changed if the Pentagon turned off S/A and allowed easy access to the unaltered C/A-code, say RAND scientists. That is because so many other factors are involved in missile guidance that a more accurate GPS reading would make little difference.

The situation is the same for cruise missiles. A GPS-aided cruise missile could be a significant threat to US forces—particularly if outfitted with a warhead containing biological or chemical weapons. But it is the basic GPS signal itself, not its most accurate manifestation, that would provide aggressors with the greatest benefit.

Thus RAND judges GPS to be a facilitator, but not a driver, of missile proliferation. The military threat posed by the US GPS system must be seen in context, says RAND. Few nations have the potential to make real use of GPS in the near- to mid-term, and most of these are US allies. GPS-guided missiles are a real tactical threat, but not necessarily a strategic one, particularly if the US proceeds with upgrades to the Patriot missile defense system and other planned defensive moves.

Overall, the use of GPS guidance could help an adversary place US lives and property at risk. "However, these forces' ability to destroy critical national assets is marginal, and the likelihood that they will either prevent the United States from winning a [regional conflict] or threaten the survival of the United States itself is quite low," judges the RAND report.

One implication of the RAND findings is that S/A is becoming an increasingly questionable defense technique. Much of the benefit of GPS is realized simply through access to the basic signal. Meanwhile, more accurate augmentation services are spreading around the globe.

RAND does not go so far as to recommend that S/A be abandoned. A decision on whether to turn S/A off in the future should be made by US officials only after development of GPS countermeasures, says the think tank's report.

Electronic Defense

Offense is not the only way adversaries could wage GPS war. They could also play electronic defense by jamming GPS signals and preventing the system's use against them. Current GPS transmissions can be easily disrupted by both intentional and unintentional interference.

The vulnerability stems from the relative weakness of the GPS signal and the susceptibility of many receivers to electronic attack. Tests show that a one-watt jammer can drive a commercial GPS receiver haywire at a distance of twenty-two kilometers—and large numbers of small jammers can be hard to find and destroy. Even a 1,000-watt jammer can be miniature enough to be man-portable.

The first step in fighting GPS jamming may be to purge the military, as much as possible, of commercial receivers. The second is to increase the sophistication of milspec GPS equipment. Currently, military receivers work by first acquiring the C/A-code, then jumping over to the encrypted P-code. RAND recommends that they be designed to acquire the P-code directly, as it is much more difficult to block than its C/A counterpart.

Antenna improvements could provide an additional antijam margin. RAND also suggests equipping each advanced GPS receiver with its own inertial navigation system (INS), to provide some location data in case of loss of signal.

"It is clear that the use of GPS for military applications is extremely vulnerable to jamming without a design that includes additional antijam enhancements and an adequate INS to ensure graceful degradation after loss of GPS," says the RAND report.

Adding INS capability could be expensive, however. An aircraft-navigation-quality INS unit can cost upward of $100,000.

US forces also may need GPS jammers of their own. A future adversary could depend on commercial GPS receivers; therefore the Pentagon "should ensure it has adequate electronic countermeasures to selectively deny GPS, GPS augmentations, and [similar] signals to an adversary," recommends RAND.

In the end, Pentagon planners might wish that GPS had remained entirely under their control, without interference from commercial users or allies, but the time when GPS could be thought of as a purely military system is long past, concludes RAND. The commercial benefits are obvious, and the commercial market is too big. In addition, GPS is a strong example of US technical and scientific leadership at a time when the global economy is increasingly competitive.

The threats from relatively open access to GPS signals can be managed through cooperation with allies and appropriate international bodies, conclude RAND experts. The US government also needs to do a better job coordinating the views of the various bureaucratic stakeholders in the system, from the Department of Defense, to the FAA, to members of Congress. "The United States should issue a statement of national policy, perhaps a Presidential Decision Directive, on the Global Positioning System to provide a more stable framework for public- and private-sector decision-making," concludes the RAND report. ■

Peter Grier, Washington bureau chief of the Christian Science Monitor, *is a longtime defense correspondent and regular contributor to* Air Force *Magazine. His most recent article, "New World Vistas," appeared in the March 1996 issue.*

Air Force Association - Working for its National Membership. April 1996

National Report

Photo by Susan Kennedy

AFA Month in the Old Dominion. *In observance of the fiftieth anniversary of the Air Force Association, Governor George Allen (center) proclaimed February "AFA month" in the commonwealth of Virginia. On hand for the signing of the proclamation were (left to right) Virginia AFA State President John Craig II, National Secretary Mary Anne Thompson, William L. Anderson, secretary of the William A. Jones III (Va.) Chapter, and Allen M. Van Wickler, William A. Jones III Chapter president.*

Members Can Participate in Long-Range Plan

As the Air Force Association (and the US Air Force) look ahead to their second fifty years, AFA's Long-Range Planning Committee has been asked by National President Gene Smith to conduct a top-to-bottom examination of how the Association can best prepare itself for the future. Every member of AFA is invited to contribute thoughts and ideas.

The main subjects on the agenda so far are the Association's mission and organization, roles and responsibilities of elected officers, leadership development, and institutional and individual accountability. Other issues can be considered as well, according to Bill Croom, chairman of the committee.

Those wishing to make their comments in writing should address them to the AFA Long-Range Planning Committee, 1501 Lee Highway, Arlington, VA 22209.

One Year to Las Vegas

Preparations are well along for the celebration of the fiftieth anniversary of the Air Force, which AFA in cooperation with the US Air Force, will hold in Las Vegas, Nev., April 22–26, 1997. "This is the kind of event that occurs once in a lifetime," says Gene Smith, AFA National President. "Anyone with an interest in airpower or the Air Force will definitely want to be there."

The celebration will bring together veterans, Air Force members, aerospace industry representatives, reunion groups, the USAF Thunderbirds, foreign and civilian aerial demonstration teams, foreign air forces, and airpower enthusiasts.

Nine aerial demonstration teams are tentatively scheduled to take part in the two days of air shows. There will be a two-day international airpower symposium. Huge halls at the Las Vegas Convention Center will be filled with exhibits, and about thirty veterans groups and other organizations plan to hold reunions in conjunction with the event. Among the dignitaries scheduled to attend are eighty-two chiefs of foreign air forces. Evening events will include a spectacular multimedia historical retrospective of the first fifty years of the US Air Force.

Because of the large crowds expected, planners of the celebration advise those planning to attend to make their arrangements early.

Reunion groups needing help with meeting facilities should call Shirley Bledsoe at (800) 727-3337, ext. 4875.

Industry representatives seeking information about the exhibition, call J. Spargo & Associates (800) 564-4220.

Watch for information about registration and hotel reservations in an upcoming issue of *Air Force* Magazine.

"Precise and accurate information are essential when weighing the pros and cons of any issue facing a member of Congress. When it comes to issues relating to the Air Force and the aerospace industry, I find that I get the most reliable information from members of the Air Force Association, their newsletters, and the Air Force Magazine."

—US Rep. William J. Jefferson (D-La.), member of the House National Security Committee.

AFA/AEF Report

By Frances McKenney, Assistant Managing Editor

In SHAPE

"SHAPE," said Lt. Col. John F. Crandley, Jr., "is like nowhere else in the Air Force."

President of the **General Lauris G. Norstad (Belgium) Chapter,** Colonel Crandley said the USAF contingent at the Supreme Headquarters Allied Powers Europe in Mons, Belgium, makes up "a very small part" of the SHAPE community. (Sixty-eight officers and 104 enlisted were assigned to SHAPE as of February [illegible]

al Director Julian B. Rosenthal Ronald Fogleman the Exceptional norary award to a civilian. Here, ral Florida Chapter President Robert n Ira C. Eaker Fellowship.

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or Mater has been stationed at Yokota or four years. He calls it "the end of 5,000-mile-long supply chain."

ightning Strikes Twice

When Darleen A. Druyur, then cting assistant secretary of the Air orce for Acquisition, unleashed her Lightning Bolt" initiatives last summer to streamline acquisition, her staff urned to AFA's Central East Region or help.

AFA National Director Charles G. Durazo and the Central East Region ave organized an annual acquisition conference since 1987, so they vere able to provide USAF the know-ow for quickly disseminating new nformation and gathering feedback n the reforms.

Mr. Durazo, a former director of Research and Development and Acquisition at Air Force Systems Command, and Patrick A. Briggs, of the **Nation's Capital (D. C.) Chapter,** helped Ms. Druyun's staff develop a road show" aimed at USAF acquisition officials and industry leaders nationwide. It began with a roundtable at

Photo by Susan Kennedy

A generous gift from National Director Jack Gross makes possible Employee of the Quarter awards for headquarters staff. The latest winners are (l–r) Laura Ingle, David Huynh, and Patricia Brownelie. The third-quarter winner was Jack Giese. Mr. Huynh was also chosen as Employee of the Year for 1995.

Fort Belvoir, Va., last August. The **General B. A. Schriever Los Angeles (Calif.) Chapter** sponsored the next roundtable in September. The road show traveled to Dallas in October, where the **Dallas (Tex.) Chapter** served as its local sponsor. That same month, the **Wright Memorial (Ohio) Chapter** hosted the final roundtable.

During these conferences, industry CEOs recommended training sessions for implementing the acquisition reforms. So AFA joined USAF in organizing another series of conferences. The first was held at the Defense Systems Management College at Fort Belvoir in December 1995, and the last two were at Los Angeles AFB, Calif., in January, hosted again by the Schriever Chapter and by Lt. Gen. Lester L. Lyles, Space and Missile Systems Center commander. In all, the seven sessions trained more than 1,200 industry and Air Force program management, contracting, and engineering officials from USAF's highest-priority acquisition programs, Mr. Durazo said.

Grass-Roots Recruiting

His goal is "top-flight second lieutenants."

To help the military produce them, Carl B. Zimmerman of the **Northeast Iowa Chapter** organizes a "Grass-Roots Seminar," sponsored by the chapter, the Air Force Academy, the Air Force Recruiting Service, Air Force ROTC, and other organizations in the Waterloo, Iowa, area.

At last December's twenty-fourth annual seminar, open to seventh graders through high school seniors and their parents, the audience learned about options for combining a college education with earning a commission. They heard from cadets, an Air Force Academy representative, a former Academy instructor, ROTC and Academy graduates, a Naval Reservist, and a Coast Guard representative. AFROTC was represented by 2d Lt. Chad H. Scholes, an ROTC assistant regional director of Admissions, based at the University of Iowa's AFROTC Det. 255 at Iowa City. Army Capt. Patrick T. O'Regan, an assistant professor of military science at the University of Northern Iowa, Cedar Falls, represented Army ROTC. After an hour and a half of presentations, students and parents broke into two groups to meet separately with the various military representatives.

When the students and parents were together, their questions centered on scholarship opportunities, said Lieutenant Scholes. By themselves, however, students asked questions about a cadet's social and academic life and dormitory living. He said the most common misperceptions were that ROTC cadets must wear their uniforms every day and live in the same dorm, as Academy cadets do.

Mr. Zimmerman, a University of Iowa graduate who served one year on active duty and has thirty years of commissioned Reserve time, first organized the Grass-Roots Seminar in 1972, when he became an Air Force Academy admissions liaison officer. He held the first meetings in the basement of his home with one cadet and two or three prospective students. This year, more than ninety students and parents attended the gathering, held at the local Elks Club. His biggest turnout—150 people—came in the mid-1980s. During that same period, four local students were accepted

Gen. B. A. Schriever Chapter President Col. Charles Whited, Lt. Gen. Richard Scofield, Acting Assistant Secretary of the Air Force for Acquisition Darleen Druyun, Lt. Gen. Lester Lyles, AFA National Director Charles Durazo, and Brig. Gen. Timothy Malishenko (l–r) met at a recent acquisition symposium.

Coming Events

April 19–21, **New Mexico State Convention,** Windrock, N. M.; April 26–27, **Louisiana State Convention,** Baton Rouge, La.; May 3–4, **Tennessee State Convention,** Memphis, Tenn.; May 10–11, **South Carolina State Convention,** Charleston, S. C.; May 11–12, **Montana State Convention,** Great Falls, Mont.; May 17, **Maryland State Convention,** Andrews AFB, Md.; May 17–19, **New Jersey State Convention,** Absecon, N. J.; May 29, **Massachusetts State Convention,** Boston, Mass.; June 7–9, **Texas State Convention,** San Antonio, Tex.; June 14–15, **Arkansas State Convention,** Jacksonville, Ark.; June 14–16, **Arizona/Nevada State Convention,** Las Vegas, Nev.; June 21–22, **Alabama State Convention,** Mobile, Ala.; June 21–22, **Ohio State Convention,** Youngstown, Ohio; July 13, **Georgia State Convention,** Robins AFB, Ga.; July 18–21, **California State Convention,** Fresno, Calif.; July 19–21, **Kansas State Convention,** McConnell AFB, Kan.; July 20, **Virginia State Convention,** Charlottesville, Va.; July 26–27, **Florida State Convention,** Daytona Beach, Fla.; July 26–28, **Pennsylvania State Convention,** Trevose, Pa.; August 2–3, **Missouri State Convention,** Kansas City, Mo.; August 9–10, **North Carolina State Convention,** Seymour Johnson AFB, N. C.; August 9–11, **Iowa State Convention,** Cedar Rapids, Iowa; August 16–17, **Colorado State Convention,** Colorado Springs, Colo.; September 7, **Indiana State Convention,** Indianapolis, Ind.; September 16–18, **AFA National Convention and Aerospace Technology Exhibition,** Washington, D. C.

Before attending the dedication of the B-2* Spirit of Georgia*, Georgia President Jack Steed, AFA National President Gene Smith, Carl Vinson Memorial Chapter member Robert Scott, and North Carolina President Alton Jones (l–r) visited the newly expanded Museum of Aviation near Robins AFB, Ga.

by the Air Force Academy, a Grass-Roots record. Last year, two area students gained admission.

Although his first priority is to help students enter the Air Force Academy, Mr. Zimmerman recalled that one year, three of his "top-notch" female seminar "graduates" all entered West Point.

Dedicating a B-2

Carl Vinson Memorial (Ga.) Chapter members and other AFA representatives attended the dedication of the B-2 *Spirit of Georgia* at Robins AFB, Ga., in December 1995.

Special guests at the ceremony included Under Secretary of the Air Force Rudy de Leon, Sen. Sam Nunn (D-Ga.), Rep. Saxby Chambliss (R-Ga.), Northrop Grumman Corp. Chairman, President, and CEO Kent Kresa, Vice President and General Manager of the company's B-2 Division Ralph D. Crosby, Jr., Georgia Governor Zell Miller (D), and Gen. Joseph W. Ralston, then Air Combat Command commander.

AFA National President Gene Smith joined Vice President (Southeast Region) J. E. "Red" Smith, Georgia President Jack H. Steed, North Carolina President Alton V. Jones, immediate past National Vice President (Southeast Region) Dr. Dan Callahan, and chapter member Robert L. Scott, Jr., at the aircraft's dedication, held in front of base operations on the Robins AFB flight line.

Spirit of Georgia is among eight B-2s built by Northrop Grumman that bear the names of various states, starting with *Spirit of Missouri* in 1993. Others have been named for California, Texas, Washington, South Carolina, Kansas, and Nebraska. The ninth bomber, now at Whiteman AFB, Mo., has not been named yet.

Dr. Callahan reported that Senator Nunn, ranking Democrat on the Senate Armed Services Committee, told the crowd that he wanted to see a B-2 named after every state.

Southern Hospitality

The **Leigh Wade (Va.) Chapter** hosted the state's AFA quarterly meeting in February at Petersburg, Va.

Virginia President John Craig III headed the list of guests that included the presidents or representatives of the Old Dominion's dozen chapters. The keynote speaker at the gathering's Saturday night dinner was John F. Salafia, manager of Advanced Technology Requirements in the Military Aircraft Systems Division of Northrop Grumman.

Chapter President Glen E. Thompson read a proclamation from the mayor of Colonial Heights, Va., James McNeer, recognizing 1996 as AFA's runup to the Air Force's golden anniversary.

Mr. Thompson also presented the chapter's own Force Behind the Force certificates to recognize twenty-five people, including charter President Arlie Andrews and executive committee members, who have made important contributions. The awards also honored the chapter's original community partner, Conner Small Engine of Colonial Heights.

Mr. Thompson also proudly presented a certificate to Tussing Elementary School, Colonial Heights, Va., where he was once an assistant principal. It is the first school the chapter has signed up for the *USA Today*/AEF "Visions of Exploration" program that encourages youngsters interested in math and science. The Visions program at Tussing involves ten fourth- and fifth-grade classrooms. The chapter plans to expand the program to include middle school classes this fall. Tussing Principal Leslie P. Fryar received the chapter's first Teacher of the Year award at this meeting.

The 130-member chapter is named after Maj. Gen Leigh Wade, USAF

(Ret.), who piloted the *Boston,* one of four Army Air Service planes that set out to make the first round-the-world flight in 1924.

Reaping Rewards

In December 1995, the **Thomas W. Anthony (Md.) Chapter** honored two members with Commissioned Officer of the Year awards: Vice President Charles X. Suraci and Vice President for Communications William H. Thomas. The chapter's president, MSgt. Robert D. Gatewood, Jr., Treasurer Thomas "Sam" Bass, and Maryland President Sam O'Dennis received awards for outstanding service.

Mr. Suraci reaped a bonanza of awards during November and December. He also received the George Washington Honor Medal from the Valley Forge Freedom Foundation and the Patrick Henry Medallion from a local chapter of the Military Order of the World Wars, in addition to his AFA honor.

The Anthony Chapter selected Mr. Suraci for recognition because of his work in fund-raising for a POW/MIA memorial to be built at Andrews AFB, his efforts in organizing the chapter's annual Harvest Moon Ball, and his Civil Air Patrol activities. He is also the chapter's aerospace education officer and has been acting chapter president since Sergeant Gatewood was deployed to Saudi Arabia in late 1995.

Scrapbook for Vietnam War Veterans

First came *Air Force* Magazine's popular "World War II Scrapbook" in September 1995. Next comes the "Korean War Scrapbook," scheduled for publication in July. On the horizon for October: the "Vietnam War Scrapbook."

As with the previous scrapbooks, the magazine seeks personal snapshots (rather than official photos) from current Air Force Association members who are veterans of the conflict in Southeast Asia. The photos will be copied and the originals returned promptly.

Please mail photos and their descriptions, before June 15, to *Air Force* Magazine, 1501 Lee Highway, Arlington, VA 22209-1198.

More Chapter News

Fred D. Womack and Chapter President George E. Caraway represented the **General Bruce K. Holloway (Tenn.) Chapter** at the thirteenth annual Veterans' Day Luncheon in Knoxville, Tenn., last November. Adm. Jeremy M. Boorda, Chief of Naval Operations, delivered the keynote address at the gathering, sponsored by several local chambers of commerce and military organizations, in addition to the Holloway Chapter. Chapter member Jack K. Westbrook has served as luncheon chairman every year since the event began.

Have AFA/AEF News?

Contributions to "AFA/AEF Report" should be sent to *Air Force* Magazine, 1501 Lee Highway, Arlington, VA 22209-1198. Phone: (703) 247-5828. Fax: (703) 247-5855. ■

Unit Reunions

Air Transport Command Hump Pilots, CBI. June 5–9, 1996, in San Diego, Calif. **Contact:** Lt. Col. Arthur W. Sutton, Jr., USAF (Ret.), 2154 Tudor Castle Way, Decatur, GA 30035-2164. Phone: (770) 981-4640.

Ass'n of Air Force Missileers. October 9–13, 1996, at the Santa Maria Inn in Santa Maria, Calif. **Contact:** Col. Charles G. Simpson, USAF (Ret.), P. O. Box 5693, Breckenridge, CO 80424. Phone: (970) 453-0500.

Aviano Reunion Ass'n (Aviano AB, Italy). October 3–6, 1996, in Shreveport, La. **Contact:** Tama Tillman, 3214 Fox Lake Dr., Tampa, FL 33618. Phone: (813) 963-3083.

BAD 2 Ass'n (Base Air Depot, Warton, UK, World War II). October 3–5, 1996, in Myrtle Beach, S. C. **Contact:** Richard McClune, 527 Quarterfield Rd., Newport News, VA 23602-6140.

CBI Veterans Ass'n (World War II). August 29–September 3, 1996, in Irvine, Calif. **Contact:** Homer C. Cooper, 145 Pendleton Dr., Athens, GA 30606. Phone: (706) 548-3618.

Glasgow AFB Ass'n (Glasgow AFB, Mont.), assigned units (1961–68), including the 91st/4141st Bomb Wing, 322d Bomb Squadron, 907th Air Refueling Squadron, 91st Combat Support Group (SAC), 861st Medical Group, and 13th Fighter Squadron (ADC). September 26–28, 1996, at the Hampton Inn in Reno, Nev. **Contacts:** Lt. Col. James E. Bradley, USAF (Ret.), 13840 Hwy. 99, Westmoreland, KS 66549-9707. Phone: (913) 457-3579. Col. Al E. Hodkinson, USAF (Ret.), 410 Willamette Dr., Vacaville, CA 95688. Phone: (707) 446-0878.

Hahn AB, Germany. June 28–29, 1996. Personnel stationed at Hahn AB are invited. **Contact:** Charles Edward, c/o Kimley-Horn and Associates, Inc., Raleigh, NC 27636-3068.

SAC Airborne Command Control Ass'n, Air Command and Control System and Post-Attack Command and Control System operations. October 2–6, 1996, at the Marriott Hotel in Omaha, Neb. **Contacts:** Col. Jack W. Suggs, USAF (Ret.), 855 Crenshaw Loop N., Keizer, OR 97303. Phone: (503) 390-2435. Jack Gatewood, 358 Sharon Dr., Niceville, FL 32578. Phone: (904) 678-6464.

US Air Force Helicopter Pilots Ass'n. October 2–6, 1996, at the Holiday Inn On the Bay in San Diego, Calif. **Contact:** Lt. Col. Howard D. Armstrong, USAF (Ret.), P. O. Box 4118, San Marcos, CA 92069-4713. Phone: (303) 979-3790.

1st Tactical Depot Squadron, including 1st TSS and 9th AFDS. September 3–6, 1996, at the Sheraton Inn in Albuquerque, N. M. **Contacts:** Col. Fred I. Chanatry, USAF (Ret.), 3709 Big Sky N. E., Albuquerque, NM 87111. Phone: (505) 292-7475. Charlie Malitz, 13516 Cedarbrook N. E., Albuquerque, NM 87111. Phone: (505) 296-3668.

3d Photoreconnaissance Squadron. May 5–8, 1996, at the Holiday Inn River Walk in San Antonio, Tex. **Contact:** Claude "Cowboy" Erving, 30760 Bartels Rd., Bullverde, TX 78163-1916. Phone: (210) 438-2859.

4th Emergency Rescue Squadron Ass'n. September 29–October 2, 1996, in Dayton, Ohio. **Contact:** Chet Gunn, 237 Franklin St., Reading, MA 01867-1030. Phone: (617) 944-6616.

8th Fighter-Bomber Wing, 475th Fighter Wing, and assigned units (1947–53), Itazuke AB, Japan, and Korea. September 4–7, 1996, in Colorado Springs, Colo. **Contact:** Marshall J. Loftus, 2318 Lockhaven Dr., Colorado Springs, CO 80909-2042. Phone: (719) 473-3667.

8th Fighter Group Ass'n, 5th Air Force (World War II, Korea, and Vietnam). September 18–22, 1996, in St. Louis, Mo. **Contact:** Charles Sisler, 762 Oak Valley Dr., St. Louis, MO 63131-3933. Phone: (314) 821-0930.

8th Photoreconnaissance Squadron Ass'n, 5th Air Force (World War II). September 18–22, 1996, in Albuquerque, N. M. **Contact:** Andrew J. Kappel, 6406 Walnut St., Kansas City, MO 64113-2316. Phone: (816) 363-0261.

8th Tactical Fighter Wing, 8th Fighter-Bomber Wing, 8th Fighter Group. September 12–15, 1996, at the Radisson Hotel on Town Lake in Austin, Tex. **Contact:** Brig. Gen. D. O. Williams, Jr., USAF (Ret.), 9207 Clearock Dr., Austin, TX 78750. Phone: (512) 258-9448.

12th Tactical Fighter Wing Ass'n. August 9–11, 1996, at the St. Anthony Hotel in San Antonio, Tex. **Contact:** Gregory T. Scott, 643 McKinstry Ave., Chicopee, MA 01020-1122.

18th Fighter-Bomber Wing Ass'n (World War II, Korea, and Vietnam), including the 12th, 39th, 44th, 67th, and 70th Fighter Squadrons. October 7–10, 1996, in Las Vegas, Nev. **Contact:** Duane E. "Bud" Biteman, 1000 S. Idaho Rd., Apt. #670, Apache Junction, AZ 85219. Phone: (602) 983-3015.

23d Aeromedical Patient Staging Squadron (AFRES). May 4, 1996, in Old Forge, N. Y. **Contacts:** CMSgt. George Milroy, AFRES (Ret.), Box 708, Old Forge, NY 13420. Phone: (315) 369-3150. CMSgt. Raymond J. Gosnell, AFRES (Ret.), 5 Bridgewood Lane, Watervliet, NY 12189-3450. Phone: (518) 785-4012.

27th Air Transport Group, 310th, 311th, 312th, and 325th Ferrying Squadrons; 86th, 87th, 320th, and 321st Transport Squadrons; and 519th and 520th Service Squadrons. September 26–28, 1996, in Columbia, S. C. **Contact:** Fred T. Garcia, 11903 N. 77th Dr., Peoria, AZ 85345-8251. Phone: (602) 878-7007.

30th Ordnance Company, 991st Ordnance Heavy Maintenance Company. May 15–18, 1996, in Louisville, Ky. **Contact:** Norbert H. Sonnie, 1268 Cushmore Rd., Southampton, PA 18966. Phone: (215) 355-1605.

34th Bomb Group, 8th Air Force (World War II). September 19–22, 1996, at the Marriott Crabtree Valley in Raleigh, N. C. **Contact:** Lt. Col. Robert H. Wright, USAF (Ret.), 411 Parkovash Ave., South Bend, IN 46617-1029. Phone: (219) 232-4287.

35th Air Police Squadron, Johnson AB, Japan (Korean War). October 1996 at Tyndall AFB, Fla. **Contact:** Ken MacDermid, 3490 N. Key Dr., Apt. #203C, North Fort Myers, FL 33903. Phone: (941) 997-0309.

40th Bomb Wing personnel assigned to Smoky Hill, Schilling, or Forbes AFBs, Kan. (1952–64). October 6–8, 1996, in Colorado Springs, Colo. **Contact:** Lt. Col. Charles F. Emmons, USAF (Ret.), 19730 Capella Dr., Monument, CO 80132-9708. Phone: (719) 481-3385.

USAAF Pilot Classes 42-D through 45-B (Sequoia Field, Calif.). September 27–29, 1996, in Visalia, Calif. **Contact:** Bruce Baird, 9322 Melba Dr., Garden Grove, CA 92641. Phone: (714) 539-9747.

43d Bomb Group Ass'n. September 8–15, 1996, at the Hyatt Orlando in Kissimmee, Fla. **Contacts:** James Diefenderfer, 2042 Gatlin Ave., Orlando, FL 32806. Phone: (407) 859-1356. Lloyd Boren, P. O. Box 15036, San Antonio, TX 78212. Phone: (210) 229-1484.

Pilot Class 44-D, Luke Field, Ariz. June 1996 in Dayton, Ohio. **Contact:** Harry D. Gandrup, 759 17th St., Nevada, IA 50201. Phone: (515) 382-4365.

Pilot Classes 44-G-H-I-J. October 10–14, 1996, in Tampa, Fla. **Contact:** Stan Yost, 13671 Ovenbird Dr., Fort Myers, FL 33908. Phone: (941) 466-1473.

50th Fighter-Bomber Wing officers (1952–58). October 17–20, 1996, in Fort Walton Beach, Fla. **Contact:** Lt. Col. James S. Yealy, USAF (Ret.), 331 Yacht Club Dr., Fort Walton Beach, FL 32548-6437. Phone: (904) 244-3954.

USAF Pilot Class 52-G. October 25, 1996, at the Hyatt Regency on the Riverwalk in San Antonio, Tex. **Contact:** Randy Presley, P. O. Box 1238, Mt. Pleasant, TX 75456-1238. Phone: (903) 572-2195. Fax: (903) 572-4393.

54th Troop Carrier Wing and assigned groups and squadrons. September 26–29, 1996, at the Sheraton Inn in Buffalo, N. Y. **Contact:** Glenn McMurry, 8944 Krueger St., Culver City, CA 90232-2437. Phone: (310) 559-8331.

Class 56-H. October 4–6, 1996, in San Antonio, Tex. **Contacts:** Bill Schwoeble, 2714 Grennock Dr., Austin, TX 78745. Phone: (512) 444-6471. Dick Holland, 2561 Guntley Rd., Philo, CA 95466. (707) 895-2136.

57th Bomb Wing Ass'n (World War II), including the 310th, 319th, 321st, and 340th Bomb Groups, plus the 308th Signal Wing and attached squadrons. October 8–13, 1996, at the Hilton Pavilion in Mesa, Ariz. **Contact:** Robert E. Evans, 1950 Cunningham Rd., Indianapolis, IN 46224-5341. Phone: (317) 247-7507.

Pilot Class 58-D and 58-E (Hondo and Bryan AFBs, Tex.). October 11–13, 1996, in San Antonio, Tex. **Contact:** Dick Westerberg, 105 Hillcrest Dr., Wayne, NJ 07470. Phone: (201) 696-1471.

58th/60th Fighter-Interceptor Squadrons, 33d Fighter Group (Otis AFB, Mass.). October 16–20, 1996, in Fort Walton Beach, Fla. **Contact:** Dick Dorrity, 15598 E. S. R. 37, Sunbury, OH 43074. Phone: (614) 965-2455.

Mail unit reunion 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.

Aviation Cadet Class 59-C. October 18–19, 1996, in San Antonio, Tex. **Contacts:** Brig. Gen. Thomas R. Webb, USAF (Ret.), 6404 Lakeside Dr., Flower Mound, TX 75028. Phone: (817) 430-1049. Don Gray, 1345 Solar Heights Dr., Prescott, AZ 86303. Phone: (520) 776-7889.

69th Depot Repair Squadron, 301st Air Depot Group, Kunming, China (World War II). April 13–16, 1996, in San Antonio, Tex. **Contact:** Marty Oxenburg, 1109 Valley Glen Rd., Elkins Park, PA 19027-1750. Phone: (215) 663-1488.

75th Fighter-Interceptor Squadron (Presque Isle AFB or Dow AFB, Me.). October 10–12, 1996, in Hampton, Va. **Contact:** Maj. Tom D. Johnson, Jr., USAF (Ret.), 124 Brinkman Dr., Hampton, VA 23666. Phone: (804) 766-0731.

90th Strategic Reconnaissance Wing Ass'n. October 17–20, 1996, in Topeka, Kan. **Contact:** Glen Montgomery, 735 N. E. Poplar St., Topeka, KS 66616. Phone: (913) 357-1537.

97th Bomb Wing, Smoky Hill AFB, Kan., and Biggs AFB, Tex. September 12–15, 1996, in Williamsburg, Va. **Contact:** Col. John H. Allison, USAF (Ret.), 11751 Bollingbrook Dr., Richmond, VA 23236-3216. Phone: (804) 794-7988. Fax: (804) 794-7550.

98th Bomb Group/Bomb Wing Veterans Ass'n. September 13–17, 1996, Chattanooga, Tenn. **Contact:** Lt. Col. Robert T. Schrawger, USAF (Ret.), 701 S. College St. Georgetown, TX 78626-6015. Phone: (512) 863-7358.

100th Bomb Wing (Pease AFB, N. H., B-47–KC-97 era). September 5–8, 1996, in San Antonio, Tex. **Contacts:** Lt. Col. Arthur W. Saylor, USAF (Ret.), W. 104 22d Ave., Spokane, WA 99203-1952. Phone: (509) 747-5307. Sigmund Alexander, 12110 Los Cerdos Dr., San Antonio, TX 78233-5953. Phone: (210) 653-5361.

315th Troop Carrier Group Ass'n and support units (World War II). September 4–8, 1996, at the Hyatt Regency Hotel in Milwaukee, Wis. **Contact:** Robert L. Cloer, 1417 Valley View Dr., Yuba City, CA 95993. Phone: (916) 674-3681.

316th Troop Carrier Group (World War II). October 10–12, 1996, in Fort Lauderdale, Fla. **Contact:** Col. Allen A. Beaumont, USAF (Ret.), 1010 American Eagle Blvd., #441, Sun City Center, FL 33573. Phone: (813) 634-3388.

320th Bomb Group, Mediterranean (World War II). October 6–8, 1996, at the Radisson Airport Hotel in Buffalo, N. Y. **Contact:** Stu Rowan, 108 Aspen, Hereford, TX 79045. Phone: (806) 364-3015.

339th Fighter Squadron Ass'n (1942–86). October 9–12, 1996, at the Drawbridge Estates in Covington, Ky. **Contact:** Vernon C. Allison, 10732 Shaffer Rd., Versailles, OH 45380. Phone: (513) 526-4344.

340th Fighter Squadron Ass'n (World War II). September 26–29, 1996, in Dayton, Ohio. **Contact:** Duane Kuhlman, 4 Sweetgum Crossing, Savannah, GA 31411.

364th Fighter Group Ass'n, 8th Air Force, Honington, UK (World War II). September 15–19, 1996, at the Silver Legacy Hotel in Reno, Nev. **Contact:** Dan Leftwich, 6630 Caldero Ct., Dayton, OH 45415. Phone: (513) 890-3641.

375th Troop Carrier Group Ass'n, including the 55th, 56th, 57th, and 58th Troop Carrier Squadrons (World War II). October 10–13, 1996, at the Holiday Inn Palo Verde in Tucson, Ariz. **Contact:** Lt. Col. Eugene A. Diemand, USAF (Ret.), 625 S. Wheaton Ave., Wheaton, IL 60187. Phone: (708) 668-9575.

380th Bomb Group Ass'n, "The Flying Circus." October 16–21, 1996, in Savannah, Ga. **Contact:** Helen H. Thompson, 208 Roland Ave., Jackson, TN 38301-4353. Phone: (901) 427-6502.

384th Air Refueling Squadron, Westover AFB, Mass. (1955–66). July 25–28, 1996, at the Ramada Hotel in West Springfield, Mass. **Contact:** Charlie Morris, 5366 Knollwood Cove, Memphis, TN 38119. Phone: (901) 767-1321.

384th Organizational Maintenance Squadron. May 17–19, 1996, at McConnell AFB, Kan. **Contact:** Jay S. Stark, 725 Carette Dr., Fort Worth, TX 76108. Phone: (817) 246-3664.

440th/472d Signal Battalions. October 1–3, 1996, in Reno, Nev. **Contact:** Joe Terrien, 909 Colonial Ave., Williamsburg, VA 23185. Phone: (804) 220-1277.

446th Bomb Group, 8th Air Force, UK (World War II). September 19–22, 1996, at the Pines Resort Hotel in South Fallsburg, N. Y. **Contact:** Marv Speidel, 708 Dianne Ct., Rahway, NJ 07065. Phone: (908) 388-2843.

454th Bomb Group Ass'n, Italy (World War II). October 15–20, 1996, in Arlington, Va. **Contact:** Ralph Branstetter, P. O. Box 678, Wheat Ridge, CO 80034-0678. (303) 422-6740.

456th Bomb Squadron, 323d Bomb Group (World War II). October 1–6, 1996, at the Red Lion Inn in Bellevue, Wash. **Contact:** Tom Curtin, 1874 Southwood Dr., Surfside Beach, SC 29575. Phone: (805) 650-0405.

459th Bomb Group Ass'n, 15th Air Force (World War II). October 24–27, 1996, at the Hilton Hotel in Cocoa Beach, Fla. **Contacts:** Anthony DeGaetano, 2835 S. E. Pace Dr., Port St. Lucie, FL 34984. Phone: (407) 336-4055. John Devney, 90 Kimbark Rd., Rochester, NY 14610. Phone: (716) 381-6174.

483d Bomb Group Ass'n, 566th Air Engineers (World War II). September 15–21, 1996, in Seattle, Wash. **Contact:** George F. Stovall, 38970 Kings Valley Hwy., Monmouth, OR 97361. Phone: (514) 929-2295.

509th Bomb Wing. September 18–22, 1996, in Tucson, Ariz. **Contact:** Don Dalton, 6721 N.

Quartzite Canyon Pl., Tucson, AZ 85718. Phone: (520) 299-7758.

530th Fighter Squadron, 311th Fighter Group, CBI (World War II). September 29–October 2, 1996, at the Ramada in Panama City Beach, Fla. **Contact:** F. H. "Tiny" Wilbourne, 4118 Keagy Rd., Salem, VA 24153. Phone: (703) 387-0562.

692d Radar Squadron (ADC). July 5–7, 1996, in Baudette, Minn. **Contacts:** 692d Reunion, Box P-560, Baudette, MN 56623. Loni Rickert, 224 Tyler St., Athens, PA 18810.

839th/840th Engineer Aviation Battalions, Korea (SCARWAF). July 24–28, 1996, in Des Moines, Iowa. **Contact:** Don K. Tomajan III, P. O. Box 90457, Los Angeles, CA 90009. Phone: (310) 459-4034.

905th Air Refueling Squadron. June 14–16, 1996, in Grand Forks, N. D. **Contact:** Bill Sykes, 22591 N. W. Bishop-Scott Rd., Yamhill, OR 97148. Phone: (503) 662-4526.

3910th Bomb Group, 7th Air Division (SCARWAF). June 14–18, 1996, in Louisville, Ky. **Contact:** Bill G. Parkhurst, P. O. Box 2881, Tulsa, OK 74101. Phone: (918) 446-6400.

3917th Air Base Group, 3931st Air Base Squadron (RAFs Manston and East Kirkby, UK). May 31–June 2, 1996, in Natchez, Miss. **Contact:** MSgt. George J. McNally, 123 School Rd., Bethel, PA 19507. Phone: (717) 933-4849.

6147th Tactical Group "Mosquito" Ass'n, 5th Air Force (Korea). July 2–7, 1996, at the Crowne Plaza in Natick, Mass. **Contact:** Bob Gibbons, 49 H St., Hull, MA 02045. Phone: (617) 925-2093. ■

Bulletin Board

Seeking contact with military or civilian personnel assigned to **Rushmore AFS,** S. D., 1952–62. **Contact:** Lt. Col. George A. Larson, USAF (Ret.), 3947 Fairway Hills Dr., Rapid City, SD 57702.

Seeking information on and photographs of the Hughes/Norden/Grumman **Pave Mover** Target Acquisition Weapon Delivery System installed on F-111E #67-0115, tested at Holloman AFB, N. M., July 1983. **Contact:** Robert E. Styger, 15 Genesee Lane, Willingboro, NJ 08046-3319.

Seeking the whereabouts of **SSgt. Clarence N. Nelson,** 16th Bomb Group, 315th Bomb Wing, whose last known address was McKeesport, Pa. Also seeking contact with **Lt. Col. Frank A. Crockwell,** whose last known address was Seattle, Wash. **Contact:** Col. Rex E. Werring, Jr., USAF (Ret.), 5701 Sunrise Dr., Prescott, AZ 86301-7354.

Seeking an AAF **technician badge** with an AP Electrical Specialist SP bar, an AP Instrument Specialist SP bar, and a Radio V-I bar. **Contact:** Peter F. Ardizzi, 835 St. Davids Ave., Warminster, PA 18974-2548.

Seeking USAF unit and wing and civilian law enforcement **patches. Contact:** SSgt. Matthew S. Kernen, USAF, 7021 Firethorn Dr., Riverbank, CA 95367.

Seeking the whereabouts of **1st Lt. Jack Phillips,** from Memphis, Tenn., assigned to Hq. PASC, the Philippines, 1946, and Hq. FEAMCOM, Japan, 1947–48. **Contact:** CMSgt. Robert D. Brown, USAF (Ret.), 8491 850th Ave. W., Oak Harbor, WA 98277-2142.

Seeking a **Norden bombsight. Contact:** Capt. Russell A. Doyland, USAF (Ret.), 4859 N. Bengston Ave., Fresno, CA 93705.

Seeking World War II 1st Combat Cargo Squadron officers **Capts. Frank Buckley and Jack Miller and Lts. Edward Sampson and Bruce MacCarter. Contact:** Gerald A. White, Jr., 1818 Barbee St., McLean, VA 22101.

Seeking information on **Maj. Felix Asia, Jr.,** commander of the 336th Fighter-Interceptor Squadron, 4th Fighter-Interceptor Group, shot down in Korea August 1, 1952. **Contact:** William F. Villani, 4501 Franklin Blvd., Apt. #10, Eugene, OR 97403.

Seeking information on and contact with **Master Sergeants Blank and Duval,** who flew a modified B-17 from Brazil to Morrison Field, Fla., 1946–49. **Contact:** Lt. Col. John A. Banasick, USAF (Ret.), PSC 02, Box 1602, APO AA 34002.

Seeking information on the **4116th AAF Base Unit,** Dover AFB, Del., World War II. **Contact:** William J. Cecka, Jr., 15 Sumerfield Lane, Saratoga Springs, NY 12866-5496.

Seeking information on World War II bombardier **Ernest Anderson** and pilot **Clarence Howard. Contact:** Herb Steward, P. O. Box 29760, Los Angeles, CA 90029-0760.

Seeking information on the nose art and other markings of the **C-47 *Hezekai*** piloted by **1st Lt. Joe May** in World War II. **Contact:** Michael A. Spero, 117 Kings Mt. Rd., Freehold, NJ 07728.

Seeking contact with personnel from the **347th Bomb Squadron,** 99th Bomb Group, 15th Air Force, World War II, 1943–45. **Contact:** Frank Puppa, P. O. Box 560009, College Point, NY 11356.

Seeking contact with graduates of **USAF OCS Class 54-B. Contact:** Lt. Col. Robert E. King, USAF (Ret.), 420W Island View Dr., Camano Island, WA 98292.

Seeking information on units stationed at **Brookley AFB, Ala., McCoy AFB, Fla., and Ramey AFB, Puerto Rico.** Also seeking pre-1980 copies of ***Airman*** magazine. **Contact:** SSgt. David J. Marti, USAF, 316-C Sweeney Dr., Biloxi, MS 39531-3158.

Seeking information about construction workers captured on **Wake Island** and shipped to a

Shanghai prison camp in 1942. Particularly seeking information on **Leo Driscoll. Contact:** Rusty Smith, 110 Woodbury Dr., Winnsboro, SC 29180.

Seeking **patches** from, photographs of, and information on the 180th Bomb Squadron, Missouri ANG, 1947–51, and the 112th Tactical Fighter Squadron, Ohio ANG. Also seeking information on **SSgt. Emelio A. Ragucci,** who served with the 112th TFS, 1961–62. **Contact:** Joe Detrick, 6916 Winchester Pl., Fort Worth, TX 76133.

Seeking information on and photographs of USAF mechanic **Clyde Stover,** stationed at RAF Sculthorpe, UK, 1957–59. **Contact:** Wayne A. Bell, 114 Speedwell Rd., Colchester, Essex CO2 8DT, UK.

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 the whereabouts of **MSgt. William H. Osborne,** from Pennsylvania, stationed during 1946 to 1950 on Tinian and at Chanute and Scott AFBs, Ill. **Contact:** Dr. William H. Griffith, 1725 Winding Way, Richmond, VA 23235.

Seeking information on P-38 pilot **Rex Pitzer,** killed in action in World War II. **Contact:** Maj. Sheril D. Huff, USAF (Ret.), 3200 Chetwood Dr., Del City, OK 73115-1933.

Seeking information on **B-17G #338560,** 94th Bomb Group, which made an emergency landing at Cambrai, France, 1944. **Contact:** J. R. "Bill" Bailey, 1541 Eastwood Dr., Slidell, LA 70458.

Seeking recollections and photographs from and contact with former members of Air Force units that served at **Decimomannu AB, Italy,** 1956–96. **Contact:** Alessandro Ragatzu, via Sulcitana 134, 09030 Elmas Ca, Sardegna, Italy.

Seeking the whereabouts of **Neil Ford,** stationed at RAF Barford St. John, UK, 1960–62, possibly with the 2130th Communications Squadron, Det. 1. **Contact:** Deborah Jean Palmer Tyler, 46 Winters Way, Bloxham, Banbury, Oxfordshire OX15 4QS, UK.

Seeking contact with **David Coleman,** stationed at Weatherfield, UK, 1961. **Contact:** T. C. Moore, 110 Rising Grove, Laindon, Basildon, Essex SS15 5NW, UK.

Seeking contact with anyone who served with **Col. William Tudor Gardiner** in 8th Air Force Intelligence, 1942–45. **Contact:** Claude G. Berube, 1754 Dogwood Dr., Alexandria, VA 22302.

Seeking contact with anyone who served at or passed through the former **US Gunnery School** on The Wash, Norfolk, UK, 1942–44. **Contact:** Brian Clipston, 3 Chase Farm, Wood St., Geddington, Nr. Kettering, Northampshire NN14 1RA, UK.

Seeking information on any **Reservist or Guardsman** who suffered an amputation because of an off-duty accident and was allowed to remain in military service. **Contact:** SMSgt. Steven J. Wesolowski, 2611-A S. Third St., Milwaukee, WI 53207.

Seeking the whereabouts of **A2C William T. Dixon,** whose last duty station was Bangkok, Thailand, 1966. **Contact:** Tin Kay, 18422 Vanowen St., Reseda, CA 91335.

Seeking contact with anyone who knew **Ellis B. Stringfellow** of 59th Base Headquarters, Philadelphia, Pa., October 1942 to August 1943. **Contact:** Anna Stringfellow Kauffman, 3201 Woodhaven Rd., Apt. #F-4, Philadelphia, PA 19154.

Seeking information on **Lt. Darwin M. Kelter,** 95th Fighter Squadron, killed in a C-45 crash near Romulus Field, Mich., August 4, 1945. Also seeking contact with **Capt. Lloyd Fleishman. Contact:** R. M. Clarke, R. R. 1, Box 2102-1C, Blue Hill, ME 04614.

Seeking information on the **558th Bomb Squadron,** 2d Bomb Division, France, 1942–45. **Contact:** CMSgt. Guy A. Chauvin, USAF (Ret.), 1681 N. E. 56th St., Apt. #2, Fort Lauderdale, FL 33334.

Seeking information on a UC-64A **Norseman** that crashed in Somerset, UK, after hitting a turret on King Alfred's Tower, July 10, 1944. **Contact:** Gordon Pickard, 12 Jarvis Way, Stalbridge, Dorset DT10 2NP, UK.

Seeking contact with aircrews hit by fighters or ground fire over Germany who made it to Polish territory. Also seeking information on the **Krzesinki/Kreising raid,** March 29, 1944. **Contact:** M. H. Abbott, 2007 Mound Rd., Jacksonville, FL 62650. ■

Pieces of History

Photography by Paul Kennedy

Four Decades of Falcons

Of the more than 28,600 cadets who have graduated from the US Air Force Academy in Colorado since 1959, about fifty-three percent are still on active duty. Authorized by President Dwight D. Eisenhower in April 1954, the Academy imparts the knowledge, skills, and values that help make a good Air Force officer. It also provides a choice of twenty-six academic majors, plus military training and athletic conditioning. Part of the Academy's intense athletic program is its Western Athletic Conference football team, which has earned the Commander in Chief's Trophy more times than either the US Military Academy or US Naval Academy.

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C-17 unloading, Tuzla, Bosnia, 1/13/96