

March 2004/\$4

AIR FORCE

JOURNAL OF THE AIR FORCE ASSOCIATION

MAGAZINE



The Nation's Hangar
Classic airplanes at NASM's Udvar-Hazy Center

The F-35 Gets Real
Pentagon Leadership Photochart
Airpower in Europe

IF THE MISSIONS WERE ANY MORE REAL,
WE'D HAVE TO ACTUALLY BRING IN THE BAD GUYS.



*"Launching the first HARM
of Operation Iraqi Freedom,
my flight location and
the tactics we used were
exactly like we had
practiced in the MTC."
—F-16 Pilot*

Lockheed Martin's F-16 Mission Training Center provides training missions that look and feel like the real deal for both the Air National Guard and the Air Force Reserve Command. In fact, we are the world leader in simulation and training. And with our advanced technology simulation and training hardware and software, we're able to meet both the current and projected F-16 training needs of the USAF Air Combat Command. We offer a foundation and flexibility to tailor a best-value, ground-based pilot training solution. One that meets any F-16 aircraft configuration, training philosophy and interoperability requirement. With our F-16 MTC, when the bad guys are real, our warfighters are ready for them.

LOCKHEED MARTIN
We never forget who we're working for™



AIR FORCE

JOURNAL OF THE AIR FORCE ASSOCIATION MAGAZINE

March 2004, Vol. 87, No. 3

www.afa.org

- 4 Letters
- 12 Aerospace World
- 18 Index to Advertisers
- 18 Senior Staff Changes
- 19 Action in Congress
- 38 Verbatim
- 63 This Is AFA
- 74 AFA/AEF National Report
- 78 Unit Reunions
- 79 Field Contacts
- 80 Pieces of History



About the cover: The B-29 *Enola Gay* on display at the Steven F. Udvar-Hazy Center. See "The Nation's Hangar," p. 22, and "Airplanes Under Glass," p. 30. Photo by Paul Kennedy.

2 Editorial: The Three-Week War

By Robert S. Dudney
Knowledge, speed, precision, and lethality are intensified in—and by—air and space power.

8 Washington Watch

By John A. Tirpak
Retooling in the Pacific; Elderly F-15s; Budget Basics; Seeking a Bomber Replacement

22 The Nation's Hangar

By John T. Correll
At Udvar-Hazy, there are classic airplanes every way you look, including up.

30 Airplanes Under Glass

Photography by Guy Aceto and Paul Kennedy
Acres of aircraft, spacecraft, and artifacts of flight are on display at the Smithsonian's new Udvar-Hazy Center.

39 Springboard for Airpower

Remarks by Gen. Robert H. Foglesong
Gen. Robert Foglesong, commander of US Air Forces in Europe, says his forces



44

44 The F-35 Gets Real

By Adam J. Hebert
The new triple-purpose fighter experiences growth—and growing pains.

50 The New Drawdown

By Peter Grier
The Air Force must cut another 16,000 airmen at a time when the service is still stretched thin.

54 DOD Senior Leadership

By Chequita Wood
Who's who in the Bush Administration's Pentagon.

58 The Compensation Issue

The Congressional Budget Office says the average service member "makes" \$99,000 a year. Less than half shows up in a paycheck, however.

64 Dixon

By Rebecca Grant
At Tactical Air Command, Gen. Robert Dixon helped the Air Force kick the post-Vietnam blues.

68 Flights From the Deep

By Norman Polmar and Kenneth J. Moore
War produces many strange results. The submersible aircraft carrier was one.

AIR FORCE Magazine (ISSN 0730-6784) March 2004 (Vol. 87, No. 3) is published monthly by the Air Force Association, 1501 Lee Highway, Arlington, VA 22209-1198. Phone (703) 247-5800. Second-class postage paid at Arlington, Va., and additional mailing offices. **Membership Rate:** \$36 per year; \$90 for three-year membership. **Life Membership (nonrefundable):** \$500 single payment, \$525 extended payments. **Subscription Rate:** \$36 per year; \$29 per year additional for postage to foreign addresses (except Canada and Mexico, which are \$10 per year additional). Regular issues \$4 each. USAF Almanac issue \$6 each. **Change of address** requires four weeks' notice. Please include mailing label. **POSTMASTER:** Send changes of address to Air Force Association, 1501 Lee Highway, Arlington, VA 22209-1198. Publisher assumes no responsibility for unsolicited material. Trademark registered by Air Force Association. Copyright 2004 by Air Force Association.

By Robert S. Dudney, Editor in Chief

The Three-Week War

THE conventional combat portion of Gulf War II, which began a year ago this month, lasted three weeks. Though brief, it ushered in what should be—but has not yet been—recognized as a new advance in the role of military air and space power.

Main combat began March 20 and ended with the fall of Baghdad on April 9. That phase was preceded by mistakes regarding weapons of mass destruction in Iraq and followed by a bloody occupation, problems which have diverted much attention from the victory on the battlefield.

The public has focused on the revelation that Iraq did not possess WMD, as advertised, and on the effort of die-hard Iraqi Baathists to kill and injure US troops.

Such matters deserve the most careful attention, but there has emerged a kind of vacuum about the war itself. Into this vacuum have rushed various commentators with various claims, some of which have clouded the role of airpower.

For that reason, it is worth recalling basic facts about Operation Iraqi Freedom. They include the fact that US-led ground forces were able to race the 300 miles from Kuwait to Baghdad largely because their path had been opened by devastating air and space power operations. Another is that airmen kept the skies clear of any threat; not a single Iraqi pilot even tried to take off.

On the main axes of advance, USAF, Navy, Marine, and allied airpower attacked enemy formations on the flanks, permitting land units to maneuver past them and thereby keep up a rapid advance.

Coalition aircraft using precision weapons—aided by space-generated intelligence, communications, and satellite signals—virtually destroyed three Republican Guard divisions south of Baghdad, eliminating a potentially large threat.

In Iraq's western desert, airpower forces, working with small numbers of Special Operations Forces, became maneuver elements, destroying enemy units and helping to control the countryside.

In a support role, USAF tankers refueled not only Air Force aircraft but also those of the Navy, Marine Corps, and allied air forces. Theater transports delivered supplies and expendables for critical operations. In the north, C-17 airlifters helped to create an entirely new front.

This is not to say that air and space power, by itself, won the war. It did

Knowledge, speed, precision, and lethality are intensified in—and by—air and space power.

not. The Joint Force prevailed. The important point is that modern airpower, as exemplified in Gulf War II, seems to be moving to the center of how the US will fight future wars.

A "new way of war" can be discerned in the words of Pentagon officials and officers at US Joint Forces Command, which has been charged with divining the war's key lessons. In the view of its commander, Adm. Edmund P. Giambastiani Jr., the US will no longer rely for victory on "overwhelming force," as in the past. Instead, he said, the new gold standard will be "overmatching power."

Force traditionally has been measured in terms of mass—numbers of troops, aircraft, warships, and so forth. Today, mass no longer is the best metric. Iraqi forces weren't defeated by overwhelming numbers, Giambastiani said; they were crushed by superior capabilities used in innovative ways.

As Giambastiani notes, this kind of "overmatch" stemmed from four key qualities, noted below. All of these are inherent in airpower.

■ **Knowledge.** Coalition forces acquired more data, more quickly, and with fewer systems than ever before. Satellites, UAVs, and specialized surveillance aircraft were vital. The Air Force E-8 Joint STARS ground surveillance aircraft used increased satellite capabilities and communications links. This, Giambastiani said,

"vastly improved" US knowledge of enemy dispositions.

■ **Speed.** Deployment of aircraft and smaller ground forces took just three months. With superior information and mobility, coalition forces ranged rapidly over the whole of Iraq. Though the JFCOM commander didn't mention it, USAF has also drastically curtailed the time needed to attack a specific target. Orbiting bombers provided on-call firepower.

■ **Precision.** Two-thirds of the ordnance dropped by aircraft were guided by satellite signal or laser beam. SOF teams on the ground provided "precision decisions" to help direct US smart weapons. According to Giambastiani, coalition forces achieved their objectives using one-seventh the air ordnance expended in Desert Storm.

■ **Lethality.** In OIF, 90 percent of air-ground operations were fully integrated, compared to 10 percent in Desert Storm. This and the increased capability of US aircraft produced startling results: While in Desert Storm it took an average of four aircraft to destroy one target, in Operation Iraqi Freedom it took one aircraft to kill about four targets.

Even before the latest Gulf War postmortems, the importance of these four factors was obvious. These qualities are intensified in and by air and space power.

The implications for defense planning are large. The shift could reduce the need for heavy surface forces optimized for close combat in theater war and increase the emphasis on swift, precision attack.

Already, according to a *Washington Post* report, US commanders have begun revising war plans for Korea, the Mideast, and other areas, on the assumption that theater conflicts can be fought more quickly and with fewer forces. This, said the *Post*, reflected advances in precision munitions, SOF capabilities, and jointness as seen in the Iraq war.

Clearly, defense officials liked what they saw in Gulf War II and want more of it. That makes it highly likely that the prominence of air and space power forces will increase, too. ■



*DIFFERENT BRANCHES.
DIFFERENT MISSIONS.
DIFFERENT PLATFORMS.
DIFFERENT ENVIRONMENTS.
ONE DOMINANT FORCE.*

In today's battlespace, interoperability and situational awareness require a seamless network solution. Focus and technical leadership place us at the forefront. With an array of key, enabling building blocks to keep forces in the loop. From navigation, communications and avionics systems to advanced display technology. All delivered on time. As promised.

319.295.5100 www.rockwellcollins.com/gs

**Rockwell
Collins**

The Tanker Issue

Robert Dudney's editorial [*"Tanker Turmoil," p. 2*] in the January 2004 issue of *Air Force Magazine* hit the nail on the head when he admonished that tanker replacement must be accomplished relatively soon while containing costs in the process.

The quickest, cost-effective fix would have the US Air Force purchase, at rock bottom prices, the 100 or so new or near new MD-11s and 747-400s sitting on runways in the Mojave and convert them into tankers with three refueling probes like the KC-10.

These tankers have greater range and fuel capacity than the 767's one refueling probe, similar to the old 707 (KC-135) tankers. In the conflicts facing us, we need the capacity to refuel three planes at a time.

David Chigos
San Diego

Finally, they have come up with an acceptable program to present the Air Force with a much needed new tanker. Mr. Dudney made several very interesting points in his article.

The most interesting point he made [is in] the last two sentences of the article. "Congressional critics didn't like the plan, however, and forced USAF to accept a different one. In so doing, they also inherited an obligation to help make it work." These sentences should have been in big bold print so all the Congressional powers could see it. Let us all hope that no present or future USAF programs will suffer because of the new tanker program.

CMSgt. Donald W. Grannan,
USAF (Ret.)
Benbrook, Tex.

Your January editorial is on target but misses some critical points.

Updating the tanker fleet is essential to our continued ability to project airpower where and when it's needed. However, you can't justify a bad procurement and ignore potentially criminal acts by a contractor and a senior defense procurement official simply because of an overwhelming need.

First, before any large equipment acquisitions are made, the government must perform a lease vs. buy analysis to determine the most cost-effective way of filling the requirement. It was widely reported (and, I believe verified) that Boeing prepared the original analysis that justified the decision to lease 100 tankers. That ranks right down there with the farmer asking the fox to verify the number of hens in the hen house.

Second, a senior defense procurement official, Darleen Druyun, reportedly gave Boeing officials access to confidential offer documents submitted by Airbus for the tanker lease contract. That severely taints the procurement process and would, under normal circumstances, disqualify Boeing from further competition. If you doubt that, remember that the Air Force stripped Boeing of seven contract awards when Boeing was found to be in possession of critical documents belonging to Lockheed.

The other issue is whether or not the lease is the best use of government funds. While it is likely the lease costs are far more than purchase costs, it may well be that some trade-off between cost and time is necessary to get our warfighters the equipment needed to maintain mission integrity.

Don't blame this one on Congress. They have enough to be ashamed of as it is. Instead, put the blame where it belongs—squarely on Boeing, Ms. Druyun, and anyone else dumb enough to get caught up in this fiasco. Right thinking Air Force offi-

cialists need to go back to square one and clean up the mess or risk losing the entire program.

MSgt. Boyd A. Hemphill Jr.,
USAF (Ret.)
Montgomery, Ala.

■ See *"Tanker Twilight Zone," February, p. 46*, for more information on the tanker investigation.—THE EDITORS

A Nagging Question

Richard J. Newman's well-written and comprehensive article [*"Upheaval at the Academy," January, p. 56*] on the major sexual assault problem at the Air Force Academy still left me with a nagging question. Nowhere in his article does he make any reference to the other academies having this problem. Likewise in all of the articles I have read in major newspapers, there is no mention of a problem of this magnitude at other institutions. Is it possible that only the Air Force Academy recruits students of such low character?

Friends continually mention this point to me, and, as a parent of an academy graduate, I am truly disturbed that all of this sexual assault problem is focused on the Air Force.

Alfred E. Mueller
Hampshire, Ill.

In Richard Newman's article, he reports: "Early in 2003, a Colorado Springs rape crisis center reported that 22 cadets sought confidential help over the prior 15 years." This averages to be one-and-a-half reports a year. If USAFA's enrollment mix was consistent over this time, with about 800 female cadets enrolled in any year, the annual complaint ratio is one complaint per 500 female students.

As the rape crisis center is able to trace student complaints to the educational institution, I wonder how USAFA's complaint ratio compares to those at Colorado College, Colorado Tech, and University of Colorado—Colorado Springs—educational facilities in the same area, with students roughly of the same age?

Mark Marshall
Mercer Island, Wash.

Do you have a comment about a current article in the magazine? Write to "Letters," *Air Force Magazine*, 1501 Lee Highway, Arlington, VA 22209-1198. (E-mail: letters@afa.org.) Letters should be concise and timely. We cannot acknowledge receipt of letters. We reserve the right to condense letters. Letters without name and city/base and state are not acceptable. Photographs cannot be used or returned.—THE EDITORS

Take your IR missile
and jam it.



Northrop Grumman Electronic Systems, the leader in infrared countermeasures, has been bringing aviators home safely for more than 35 years. Today, we are the only company producing a Directional Infrared Countermeasure (DIRCM) system that uses laser energy to disrupt missile guidance. Even the most advanced heat-seeking missiles are no match for our countermeasures, which provide autonomous, 360° protection for both rotary- and fixed-wing aircraft. Fast, accurate and proven effective, our DIRCM system can defeat IR threats. So if you don't point those missiles somewhere else, we'll do it for you.

www.northropgrumman.com
www.dsd.es.northropgrumman.com

© 2004 Northrop Grumman Corporation

NORTHROP GRUMMAN DEFINING THE FUTURE™

Electronic Systems

Not in Richard J. Newman's article, nor in any coverage I've seen, was there any indication that the Air Force and Department of Defense are seeking the identities of and removal of those felons who slipped through the commissioning system and are currently active in our service. Not only do we need to eliminate sexual assault problems in the academy, we also must identify, remove, and prosecute those criminals, who are a cancerous sore in the body of the officer corps.

Lt. Col. Robert V. Dean,
USAF (Ret.)
Bradenton, Fla.

The last paragraph [quoting from the Fowler Commission] sums up the problem: "The reputation of the institution and, by extension, the Air Force it serves, depends on finding a lasting solution to the problem."

Exactly—and the solution is to deep six the current liberal political correctness nonsense that has caused nothing but havoc in all of our military academies since Day 1.

Tearing these great academies apart to accommodate women is an exercise in futility, and probably (you will never see the number on this)



USED CAR LOAN

Another Superior Rate

3.49%
APR*
up to 60 months

A used car can still be cool, especially when you can finance it with one of the lowest rates in the nation. That means more car for your dollar. What can be cooler than that?



**Pentagon Federal
Credit Union**

Superior Rates. Proven Service.™

1-800-247-5626 • PENFED.ORG

NCUA Please mention Code 600. You must be a member to receive services. All Army, Air Force, and Coast Guard personnel (including National Guard and Reserve), Dept. of Homeland Security personnel, many Dept. of Defense personnel, and your families are eligible to join. Others are also eligible. You must be a member to receive services. Rate is current as of February 1, 2004, based upon loan amount, and subject to change without notice. Other conditions apply. Used car loan example: \$10,000 loan at 3.49% apr, 60 monthly payments of approx monthly \$182 each. *2002 model year or newer.



Air Force Association

1501 Lee Highway • Arlington, VA 22209-1198

Telephone: (703) 247-5800

Toll-free: (800) 727-3337

Press 1 if you know your party's extension.

Press 3 for Member Services.

(For questions about membership, insurance, change of address or other data changes, magazine delivery problems, or member benefit programs, select the "Member Services" option.)

Or stay on the line for an operator to direct your call.

Fax: (703) 247-5853

Internet: <http://www.afa.org/>

E-Mail Addresses

Field Services fldsvcs@afa.org
Government Relations grl@afa.org
Industry Relations irl@afa.org
Information information@afa.org
Member Services service@afa.org
Policy & Communications (news media)
..... polcom@afa.org

Magazine

Advertising adv@afa.org
AFA/AEF Report afa-aef@afa.org
Editorial Offices afmag@afa.org
Letters to Editor Column letters@afa.org

Aerospace Education
Foundation aefstaff@aef.org
Eaker Institute eaker@aef.org
Air Force Memorial Foundation ... afmf@afa.org

For individual staff members
first initial, last name, @afa.org
(example: jdoe@afa.org)

AFA's Mission

To advocate aerospace power and a strong national defense.

To support the United States Air Force and the Air Force family.

To promote aerospace education to the American people.

Publisher
Donald L. Peterson

Editorial afmag@afa.org

Editor in Chief
Robert S. Dudley

Editor
Suzann Chapman

Executive Editor
John A. Tirpak

Senior Editor
Adam J. Hebert

Associate Editor
Tamar A. Mehuron

Managing Editor
Juliette Kelsey Chagnon

Assistant Managing Editor
Frances McKenney

Editorial Associate
Chequita Wood

Art Director
Guy Aceto

Assistant Art Director
Heather Lewis

Production Director
Robert T. Shaughness

Research Librarian
Pearlie M. Draughn

Contributing Editors
John T. Correll
Bruce D. Callander
Rebecca Grant
Peter Grier
Tom Philpott

Advertising adv@afa.org

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

Industry Relations Manager
Jennifer R. Anderson • 703/247-5800

US and European Sales Manager
William Farrell • 847/295-2305
Lake Forest, Ill.
e-mail: BFarr80708@aol.com

BPA Circulation audited by
Business Publication Audit

Handcrafted Ready-Made Museum Quality Mahogany Aircraft/Ship Models
LET US CUSTOM MAKE YOUR AIRCRAFT/SHIP
www.motionmodels.com **1-800-866-3172**

The largest catalog selection & website of custom & ready-made ships & aircraft anywhere. Catalog has over 1200 models in COLOR. Specializing in CUSTOM MADE & cataloged models. Vets & active, let us make you what you served on or flew. GIANT 120-page, full-color catalog \$8.00 (refundable). Layaway plans available. Flyers, Sailors, Collectors, we talk your language. Email: Joel@motionmodels.com



Motion Models
1-800-866-3172 • (OVERSEAS CALLERS) 1-954-344-8512 (8870 FAX)
2141 N. University Dr. #359, Coral Springs, FL 33071-6134

from a taxpayer perspective, 75 per cent fiscally unproductive.

However, if we must go this route, then the answer is to build or convert an academy strictly for women who are interested in making a long-term commitment to one of the services. The program can be designed to accommodate and complement their talents and strengths, toward a well-rounded education, tilted toward the need of the military and steeped in traditions of all the services, the last one or two years slanted toward the service of their choice.

A solution to all problems? Probably not, but certainly better than what we have now.

Maj. Maynard H. Kolb,
USAF (Ret.)
San Antonio

Label Those Airplanes

Although originally opposed to adding a "politically correct" label about Japanese casualties to the label of the B-29 *Enola Gay* at the National Air and Space Museum, I am beginning to rethink my view. Indeed, perhaps all aircraft should have such politically correct labels affixed. [See "Editorial: *Enola Gay II*," December, p. 3.]

For example, the A6M Zero fighter in the collection should have a comment along the lines of: "There were 78 Zero fighters among the Japanese carrier planes that made the sneak attack on Pearl Harbor without a declaration of war; 2,340 American servicemen were killed and thousands more wounded—some of the dead Navymen suffocated in overturned warships."

Perhaps for other Japanese aircraft: "These planes supported the Japanese aggression in China in the

1930s, including the occupation of Nanking in 1937. That occupation—now known in the West as the 'Rape of Nanking'—saw more than 50,000 civilians slaughtered, and 20,000 cases of rape were later documented."

And for the appropriate German aircraft: "These planes participated in the bombing of Rotterdam on May 13, 1940, after it was declared an open city by the Dutch government. The German planes dropped 97 tons of bombs, killing 814 persons, and 78,000 people lost their homes."

Or for the appropriate Italian aircraft: "These planes dispensed poison gas on Ethiopians during Italy's savage aggression against virtually unarmed natives in 1935-36."

As for the *Enola Gay*'s politically correct label, it should state: "Hiroshima—target of the first atomic bomb attack—contained a large number of military installations, including the largest army base in western Japan. Many of the casualties were Japanese troops."

Norman Polmar
Alexandria, Va.

I am appalled by the action of the antinuclear lobby protesting about the exhibition of the *Enola Gay* in the NASM's Udvar-Hazy Center. Anybody who is so far removed from reality as to believe that imperial Japan would have capitulated without the dropping of the atom bomb must be soft in the head. The military dictatorship, which started the Pacific war, would no doubt have fought to "the last men standing" with a far greater loss of life on both sides of the conflict.

Squadron Leader T.T. Pietzsch,
RAAF (Ret.)
Townsville, Australia

Washington Watch

By John A. Tirpak, Executive Editor

Retooling in the Pacific; Elderly F-15s; Budget Basics; Seeking a Bomber Replacement

Boosting Pacific Force Structure

The portion of USAF forces deployed to bases in the Pacific region may increase under proposals being spearheaded by Gen. William J. Begert, commander of Pacific Air Forces.

Begert, who spoke in January with defense reporters in Washington, D.C., said he believes that continuing tensions between North and South Korea and between China and Taiwan, as well as the ongoing war on terrorism, require a major reassessment of the allocation of forces. In his view, the Air Force—along with other branches of the US military—should shift more forces to the Pacific.

Begert said component commanders in the region have briefed Defense Secretary Donald H. Rumsfeld on “a way ahead in the Pacific that gives us the basing and access ... and lash-ups with our allies and friends that we need.”

Begert said the briefings took place “over a period of months” and had been conducted “very close hold in terms of specifics.” That gave the US an opportunity to consult US allies and friends in the region before carrying out any major changes.

He emphasized that no final decisions had been made yet.

He also noted that talks were under way with South Korea and Japan to prevent any “unpleasant surprises” and to make certain the force shifts are practical.

Begert is pushing for a permanent or rotational complement of bombers and other aircraft at Andersen AB, Guam. Currently, the base has no permanently assigned aircraft; instead, it serves as a staging facility for transit aircraft and forces. Begert maintains that the island’s proximity to regional hot spots—1,500 miles both from the Taiwan Strait and from Korea—and the fact that the air base, over the last decade, has been maintained and upgraded, make it ideal as a center of airpower projection.

“It’s a huge base structure, very capable,” he said. “We’ve invested very heavily in Guam over the past 10 years or so. ... The capacity of the base to either absorb airplanes stationed there or airplanes that pass through is really very, very good.”

During Operation Enduring Freedom in Afghanistan, Begert said, the base went from “having no airplanes on the ground to literally 75 airplanes on the ground ... within 48 hours and never missed a beat.” Moreover, he added, “it’s US territory.”

One approach might be to rotate a mix of bombers at the base, Begert said, noting that B-1Bs and B-52s were stationed there during Gulf War II and “the deployment ... went very, very smoothly.” In addition, he said, the island offers a good training range.

That’s particularly important for the future, Begert said, for aircraft such as the F/A-22. At Guam, “you can go supersonic and do supersonic cruise and the other things you need,” he explained, adding that there is



USAF photo by MSgt. Bill Kimble

An F-16 flies over Guam. Is it time to send more?

also both air-to-air and air-to-ground training capability available.

Begert acknowledged that any move to the Pacific would be somewhat remedial, in that US forces in Asia “downsized dramatically” 10 years ago. On top of that, PACAF had some “pretty painful reductions” over the past year or so, he said. And there could be additional cuts coming. “It’s something I worry about,” he said.

“We need to keep what we have and see what we can do to enhance what we have in terms of capabilities,” emphasized Begert. He said that any increase need not be permanent, pointing out that the US has asked for—and been granted with little prompting of the host nations—temporary basing rights throughout the region. A common caveat has been to refrain from publicizing the endeavors.

“We’re able to go in and move force structure in there for a particular operation, then we move out,” said Begert. “We’ve had very good success in Asia on getting access to the bases that we need.”

Hurry Up With Those F/A-22s

Begert expressed concern about the age of PACAF’s F-15 Eagles based at Kadena AB, Japan. These 1970s-vintage aircraft, he said, are beginning to suffer serious age-related deterioration, and maintenance crews are losing the battle to keep them up to par.

“We set a standard of 79 percent in-commission rate, and they haven’t met that, come September, [in] four years,” said Begert. “They were down to 70 percent last year.”

He said there is no single cause of these aircraft problems, making predictions next to impossible.

“It’s a variety of issues that you find with aging airplanes,” said Begert. He cited “wiring bundles that corrode or turn to dust” and “structural issues.” Kadena has 48 airplanes, and, out of those, he said, structural failure caused five to require new wings last year. In some of

the F-15s, the vertical tail assembly had to be replaced. In others, canopy seals failed, leading to pressurization problems.

Begert said, "It's just one thing after another."

Budget Request Tops \$400 Billion

President Bush on Feb. 2 presented to Congress a \$401.7 billion defense budget for Fiscal 2005. If enacted, it would raise defense budget authority in real terms for the seventh year in a row. A companion future-years plan calls for an increase of about \$20 billion annually through 2009. The Bush Administration projects that year's defense budget would be \$487.7 billion.

Air Force budget authority came to \$120.5 billion, an increase of nearly \$10 billion over 2004. However, a senior defense official told reporters that most of that increase is "pass through" money, meaning it will go to space and other accounts that provide defense-wide capabilities. The Navy/Marine Corps budget received a \$4.2 billion boost to \$119.3 billion, while the Army budget increased only \$1.8 billion to \$97.2 billion.

The new budget raises by about \$13 billion the funding for operation and maintenance accounts, which finance flying hours, steaming days, tank miles, and the like. Procurement, however, would be virtually flat, at about \$75 billion, although some buying accounts would get a substantial increase to replace equipment and munitions expended during operations over the last 30 months.

Investment in science and technology would go to about \$69 billion, but its share of the defense budget would be unchanged.

Bomber Work Coming Together

The Air Force on Dec. 12 held a long-range strike summit to begin work on a "flight plan" that will guide the service as it searches for ways to supplement or replace the existing bomber fleet. The solution may be a manned or unmanned aircraft or something that's not an aircraft at all.

Officials have scrupulously avoided using the term "bomber," primarily because the service has shifted toward capabilities—or effects-based—planning and away from platform-oriented planning. They do not want to presuppose that the best solution to the problem of long-range strike is necessarily a traditional aircraft.

Service officials had planned to wait another decade before starting research and development for a bomber replacement. However, lawmakers did not feel that was moving quickly enough, so last fall Congress authorized \$100 million specifically to get the plan going.

USAF directed the summit attendees to put into like



USAF photo by SSgt. Bennie J. Davis

After the B-2, what will come next?

categories and time frames all the programs, initiatives, technologies, threats, and ideas pertaining to a new bomber-like capability, said Brig. Gen. Stephen M. Goldfein, USAF's director of operational capability requirements.

USAF has been pursuing a host of projects that bear on long-range strike, Goldfein told reporters at the Pentagon in January. The summit's goal was to discover "what are the common threads," he said, adding that no decisions were made.

The summit was held too late to influence the Fiscal 2005 budget, but the new flight plan will help determine direction for long-range strike in the 2006 budget. The plan is expected to succeed the current Bomber Roadmap, released in 2001.

According to the old Bomber Roadmap, the Air Force should have a replacement for current bombers by 2037, but, Goldfein said, the service is reconsidering that date.

"We know the age of the three bombers we have," he said. "At some point, we have to start thinking about replacing them."

There have been a multitude of initiatives—studies driven by the Pentagon, Congress, and the Air Force—that have attempted to answer a host of "fairly specific questions," said Goldfein, about threats and capabilities that will emerge in various windows from now through 2050. Various options presented in those studies ranged from aircraft and hypersonics to direct energy, stealth, munitions and network-centric operations.

The summit made some apples to apples comparisons about needs, capabilities, and timing. For instance, one of the driving factors for any long-range strike capability, said Goldfein, is the ability "to penetrate to survive." He was talking about potential adversary air defenses that likely will feature new surface-to-air missiles. Although new SAMs may proliferate more slowly than previously expected, he noted, they will become more widespread and numerous in the coming years.

Goldfein expects the summit to trigger a new analysis of alternatives, one that will be focused on near-term operational utility.

The Air Force leadership wants very much to say, "Here's a path" to the next long-range strike capability, Goldfein said. "We've studied this to death."

Plans called for an announcement soon.

Not Hypersonic—Yet

In the near future, the Air Force is not likely to pursue hypersonics for a long-range strike platform, said Gen. T. Michael Moseley, Air Force vice chief of staff.

Speaking at a defense conference in January, Moseley



Hypersonic vehicles are still a ways off.

Washington Watch

said the Air Force should not fixate on an exoatmospheric hypersonic craft today because the technology is not yet mature and won't be anytime soon. He specifically noted that much more work needs to be done on finding vehicle "skin" materials that can withstand the high-altitude, high-temperature rigors of the mission.

Moseley believes that research should continue into hypersonic technology and that it will eventually be useful. However, he told attendees at the precision strike conference hosted by the National Defense Industrial Association, he is skeptical about following the course posed by some industry officials, who urge betting big on near-term use of the technology. Moseley doubts that a huge infusion of money will suddenly advance the state of the art.

Instead, Moseley said, he would like to see incremental upgrades of existing fighters and bombers, along with improvements in stealth and electronic warfare. He'd also like to see development of a complementary portfolio of assets, such as unmanned combat aerial vehicles and new standoff weapons.

The biggest payoff in strike systems in the last few years, he said, has been in giving attack assets "persistence over the target," rather than additional speed.

New Multisensor Aircraft in Danger

The Air Force has been fighting hard since early December to keep intact its E-10 Multisensor Com-

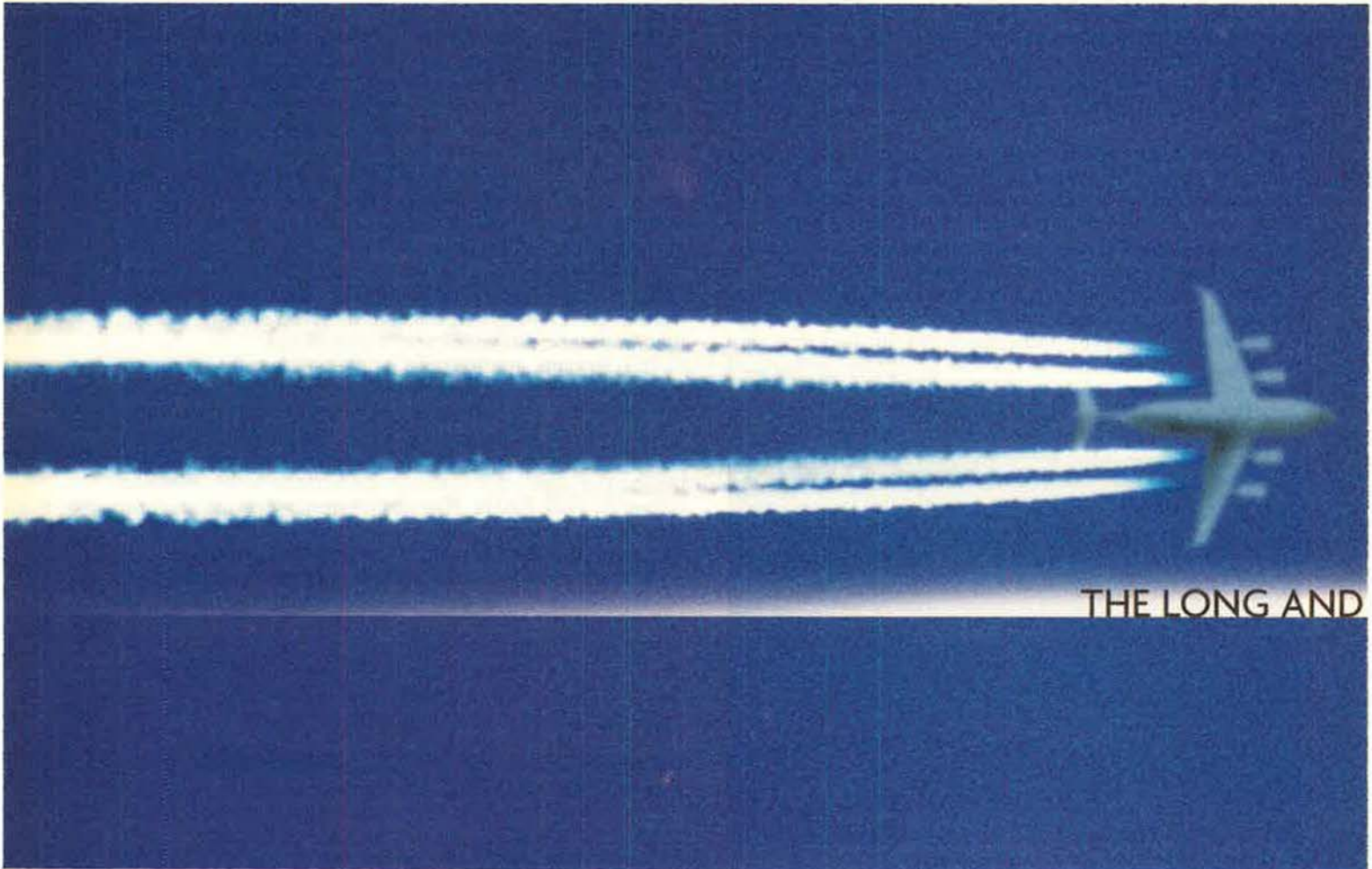
mand and Control Aircraft project, despite budgetary pressures and outright opposition from key Pentagon officials.

In the budget wars, the E-10 is squaring off against the Space Based Radar. The E-10, which is to be based on the Boeing 767 airframe, is intended to eventually replace the E-8 Joint STARS ground radar airplane, E-3 AWACS air battle control aircraft, and the RC-135 Rivet Joint signals intelligence airplane.

The chief E-10 opponent seems to be Stephen A. Cambone, undersecretary of defense for intelligence. Cambone has questioned the pace of the project and whether USAF has proper authority to pursue it.

Cambone also thinks it might duplicate the capability to be provided by the Space Based Radar. The primary function of both systems will be to perform the ground moving target mission now carried out by Joint STARS.

The Air Force has argued that the \$5.3 billion E-10 will have ground resolution 12 times better than what will be seen in early versions of the \$7 billion SBR and that it will be available sooner. Moreover, the E-10 will be able to stay in the battle area indefinitely, while the SBR—expected to be a low Earth orbit system—initially will have only a brief capability over any one area. It will take a large constellation of SBR satellites before the system can provide nonstop coverage.



The trump card for the Air Force, however, is the E-10's power to spot and track low-flying cruise missiles, which some defense analysts consider an emerging threat soon to be on a par with weapons of mass destruction. The SBR will lack the resolution to play much of a role in cruise missile detection or tracking.

Cambone wants the SBR as a cornerstone of what he has called "universal situational awareness" and prefers the satellite because it requires no forward-based "footprint" overseas. He has also complained to acting Pentagon acquisition chief Michael W. Wynne that the Air Force has exceeded its authority to develop the airplane. The project started out as simply a radar upgrade for the Joint STARS.

Cambone's case was recently bolstered by Dov S. Zakheim, the Pentagon's comptroller and top budget official, who told reporters in December that he doesn't expect cruise missile defense to become a big-ticket program or concern for some time.

Cruise missiles in the hands of terrorists, said Zakheim, would assume the ability to "seize a ship, configure it with a cruise missile, ... target the missile, ... [and] put in the right mapping information to hit the US," a scenario which he says strains credibility just now.

The E-10 project's chief proponent is Gen. John P. Jumper, USAF Chief of Staff. Jumper has championed the effort since announcing it in February 2001. He sees it as a way to build greater battlefield awareness



DOD photo by R.D. Ward

Cambone: Space Based Radar is the key.

and better information networks, as well as a mobile air operations center that could go anywhere in the world.

Most of the E-10 work has been divided up between Boeing, Lockheed Martin, Northrop Grumman, and Raytheon. A contract to develop the last piece of the project—the battle management system—is expected to be awarded this spring. ■



By Adam J. Hebert, Senior Editor

Critical Few To Stay Longer

The Air Force expects to resume its standard 90-day Air and Space Expeditionary Force deployment cycles in March, but there will still be some airmen who serve on longer rotations. Officials predict that extended tours will affect less than 10 percent of the airmen in an AEF rotation cycle.

"Those folks who are on extended tours are in critical career fields," said Brig. Gen. Anthony F. Przybylski, commander of the AEF Center at Langley AFB, Va. In that group, he said, are security forces, air traffic control specialists, and civil engineers.

Despite being over its authorized end strength by some 16,000 personnel, the Air Force has had a shortage of airmen in these and other critical career fields since the war on terrorism began in September 2001.

The Air Force must cut 16,600 airmen by the end of 2005, but service leaders have started what they term "force reshaping" efforts to address the shortages in critical career fields. (See "The New Drawdown," p. 50.)

Anthrax Shots Halted, Restarted

The Defense Department temporarily halted its anthrax vaccination program on Dec. 23, 2003, but resumed the shots Jan. 7 when a federal judge in Washington, D.C., stayed his preliminary injunction against mandatory shots.

Judge Emmett Sullivan on Dec. 22 said that the Food and Drug Administration had approved the vaccine only for use against skin exposure, not airborne exposure to anthrax, thereby labeling it an "investigational drug."

For years, the FDA has maintained that the anthrax vaccine was effective "regardless of the route of exposure." On Dec. 30, the FDA formalized that finding by issuing a "final rule and order" that was published in the *Federal Register* Jan. 5.

The injunction originally had been granted in response to a lawsuit filed by six unidentified individuals opposed to the vaccination program. The lawsuit, which did not dispute

Hornburg and the B-1Bs

The Air Force may need to ask the Office of the Secretary of Defense "to forge a compromise" on the Congressional order to return to service 23 of the 31 B-1B bombers USAF just retired, said Gen. Hal M. Hornburg, the head of Air Combat Command.

Congress directed the reactivation of the B-1Bs in the Fiscal 2004 defense authorization bill, but, said Hornburg, lawmakers did not provide the funding necessary to modernize or operate the aircraft. (See "Aerospace World: Three Committees Favor B-1B Reconstitution," September 2003, p. 23.)

By ordering the airplanes back into service without providing for future expenses, Congress has essentially left the Air Force with an unfunded \$2 billion bill over the future years defense program, Hornburg told *Air Force Magazine*.

The available funding will probably only "get eight back into flying status," he said, because of the modifications and upgrades needed for the retired bombers.

The ACC boss said he does not want to end up with a split fleet, with some airplanes essentially better than others. "My desire would not be to have airplanes that we can't operate or that we can't afford to modernize," Hornburg said.

Asked if USAF should raid other accounts to fund a fully restored fleet of 83 B-1Bs, Hornburg responded: "I'm not looking at that. I believe in managing the [given] budget." He said robbing other programs would damage combat capability in other areas.

There's another problem—manpower. Hornburg said that restoring all 23 bombers to operational use would mean the command must add more than 700 airmen. ACC would need another 710 maintainers, and, if it returns more than eight aircraft to service, it would also need more aircrew members.

These positions are "not in our program and, right now, not affordable," Hornburg said.

The Air Force's 2001 plan to shrink to a fleet of 60 modernized and upgraded B-1Bs, consolidated at two locations, was "a raging success," Hornburg asserted.

The B-1B was a key weapons system in Operation Iraqi Freedom, because of its large payload, improved reliability, and ability to be dynamically retasked in flight to attack emerging targets.

the safety of the vaccine but said the use of an investigational drug required consent, is still pending.

Pentagon officials halted the program temporarily but maintained that the anthrax vaccine has been around for 40 years and is safe and effective, as noted by the FDA and independent experts. Since 1998, about one million service members have been given the six-shot anthrax vaccination series.

Handy Sets Record Straight

Contrary to what some may believe, there are significant differences between USAF's two strategic airlifters, said Gen. John W. Handy. After reading an article in a national news magazine, Handy felt compelled to declare: "The C-5 and C-17 aircraft are not interchangeable."

The report discussed the contro-

versial tanker deal between USAF and Boeing, asserting that USAF proposed to sacrifice upgrades on the Lockheed Martin C-5 to pay for the Boeing tankers. The article concluded that such a move would doubly favor Boeing because the service would have to "bulk up its cargo fleet with some other aircraft. ... There's only one choice: Boeing's C-17." The Air Force, according to the article, "clearly has a favorite"—the C-17 over the C-5.

Handy, the commander of US Transportation Command and Air Mobility Command, said the news report had "ignored the detailed airlift roadmap," which includes a plan to modernize C-5 avionics and engines. He explained that the Air Force is "retiring the 14 worst-performing C-5s but only because they have been very difficult and costly to maintain."

The Need for "Battle Effects Assessment"

The Pentagon is clinging to an antiquated mode of assessing battle results, according to Gen. Hal M. Hornburg, Air Combat Command chief. He said the current linear battle damage assessment process should be more dynamic.

The Air Force needs to "get away from the arcane [BDA] we are doing now [and] start looking at what might be best described as 'battle effectiveness assessment,'" said Hornburg. Faster assessment can be a force multiplier, he added.

Damage assessment, explained Hornburg in an *Air Force Magazine* interview, has "become a hindrance to the extent that, unless targets can be seen and counted as dead, they may have to be restruck time and time again." The Air Force has to "look at this differently, because I think we are wasting resources and wasting time," he said.

"Right now, the bean-counters in the BDA world think a tank is not dead unless the turret is laying beside it on the ground—or it's a smoking hulk," Hornburg said. "We know that if that tank is not opposing our advancing armor, it may be ineffective. If our tank platoon leader says, 'I face no resistance and I'm pressing forward,' that's battle effects assessment," Hornburg said.

Progress on this front could involve new ways of thinking about existing assets. For instance, Hornburg said fighters can play a major role.

He said he could "envision a day" when, after a target has been struck, coordinates are sent to an F-15E returning from a mission. That Strike Eagle, equipped with a targeting pod, could snap a "collection" picture of the targeting area. Through data links, the Air Force would have near-instantaneous BDA from the fighter. That would eliminate the need to wait for a specialized intelligence-collection system to assess the damage.

C-17 Pilots Get Combat Training

The first class of pilots in USAF's new C-17 weapons instructor course capped off their training by inaugurating C-17 participation in a two-week mission employment exercise at Nellis AFB, Nev. Next, they train other C-17 pilots in their newly gained tactical expertise.

The new C-17 course lasts 5.5 months and includes 300 hours of classroom study and 25 flights—covering advanced tactical maneuvering, direct delivery, joint operations, and mission employment.

For the exercise, the C-17 pilots faced "enemy" aircraft and sophisticated air defense systems as they flew troop insertions, cargo airdrops, and aeromedical evacuations. The C-17 pilots had to use newly learned defensive tactics and coordinate with friendly combat aircraft to avoid being shot down. Some of the scenarios were based on real-world C-17 operations in Afghanistan and Iraq.

Carrying out "full envelope maneuvers" at 500 feet above the ground is not normal for most C-17 aircrews,

What it gets down to, said Handy, is "operational trade-offs."

DOD Releases BRAC Criteria

The Pentagon on Jan. 6 instructed base commanders in the US and its territories to begin collecting data on their installations to prepare for the 2005 round of base realignments and closures.

That was the formal call for information, but, ever since Congress approved a new round of closures in the Fiscal 2002 defense authorization bill, communities near military facilities have been girding for action.

The public had one month to respond to the draft selection criteria that DOD posted in the *Federal Register* on Dec. 23. The final criteria were to be published in February. Congress must approve or disapprove the criteria this month. Plans call for the Pentagon to submit its facility recommendations by May 2005.

In the selection criteria, prime consideration is given to "military value." That includes: mission capabilities; availability of land and airspace; ability to accommodate future force structure; and cost of operations.

Secondary BRAC considerations may include "extent and timing of potential costs and savings" of closing a facility; economic impact on local communities; ability for communities to support future DOD requirements; and environmental impact.

Moseley Wants USAF "Overhead," With "Persistence, Precision"

The Air Force has made great strides in shortening the kill chain—the sequence of steps for finding and destroying a target—through use of precision weapons and data links to permit dynamic tasking of aircraft waiting to strike. The limiting factor now is the time required to get authority to kill a target, said Gen. T. Michael Moseley, Air Force vice chief of staff.

"The difficulty in this is getting approval through all the wickets," Moseley said at a January conference sponsored by the Precision Strike Association. "That's not because they're bad decision-makers; that's because there are [targeting] questions that should be answered up front," he said.

Moseley said it is not practical to "stand off and think" about hitting a time critical target. Nor is it always practical to lob a cruise missile at that target. "You have an extended time of flight with those missiles, and the time critical target may no longer be critical by the time the missile gets there," he noted.

Tightening the timeline, therefore, requires airpower to be "overhead with persistence and precision," he said, though getting the process down to seconds "is a more complex problem than just parking the B-2 over the target." The order to attack needs to be made quickly.

In Operation Iraqi Freedom, Army Gen. Tommy R. Franks, commander of US Central Command, delegated to Moseley targeting authority for most air strikes. Moseley served as the combined force air component commander. Moseley, in turn, delegated authority whenever possible to the officials working in the combined air operations center.

However, much of the approval process still was being done after a target was identified. Planners had to "look at battle damage mitigation" for noncombatants and for the desired effects, Moseley said. "I don't have a problem with penetrating a high threat area—that's what we do for a living," he said. "To get that timeline down, though, you have to deal with the process of approvals."

The Iraq Story Continues

"Iron Grip" Tightens Around Iraqi Resistance

The Air Force increased its presence over Baghdad in late December while supporting Operation Iron Grip, a major campaign to capture Iraqi insurgents and seize weapons and explosives.

Stars and Stripes reported that Air Force units provided constant cover for Iron Grip ground units. Aircraft supporting the operation included A-10s, F-15Es, and F-16Cs, according to Capt. Bryan Bellamy, an air liaison officer.

Attacks Wax and Wane

Attacks on coalition forces in Iraq dropped by about 70 percent from the middle of September to the end of December.

Brig. Gen. Mark Kimmitt told reporters that attacks numbered around 50 per day in September. That number dropped to an average of 15 per day as of Dec. 27, said Kimmitt, who is deputy director of operations for the Combined Joint Task Force 7 in Iraq.

Kimmitt cautioned that the drop might not be "a good prediction of what will happen tomorrow."

Indeed, the number of daily attacks began to rise slightly, ranging between an average of 16 daily during the week prior to Jan. 27 up to 24 per day during the week before Feb. 5.

"We should not be surprised if there is continued violence," Dan Senor, senior advisor to the Coalition Provisional Authority, told reporters Jan. 27. "We think that the trend will ultimately go down, but the violence will continue as ... we are getting closer and closer to handing over a sovereign, democratic Iraq to the Iraqi people."

More Wanted Iraqis Captured

Coalition forces in Iraq continued to make progress in rounding up wanted Iraqi insurgents after the December capture of Saddam Hussein. Captured on Jan. 11 was Khamis S. al Muhammad, who was No. 54 on the coalition's list of the 55 most-wanted Iraqis, and, on Feb. 15, Muhammad Zimam abd al Razzaq al Sadun, No. 41.

Captured on Jan. 14 were two nephews of former Iraqi vice president Izzat I. al Douri—No. 6 on the coalition's most wanted list.

Also in mid-January, coalition forces captured two former Iraqi generals who were believed to be actively participating in anti-coalition attacks. According to a DOD release, the generals were captured Jan. 14 and 15.

As of Feb. 15, 19 out of the 55 individuals on the most-wanted list remained at large.

Casualties

By Jan. 23, a total of 505 US troops had died supporting Operation Iraqi Freedom—349 of them due to enemy action and 156 killed in nonhostile events, such as accidents.

Out of the 349 deaths attributed to enemy action, 234 have occurred since May 1, 2002—the date that marked the end of major combat operations in Iraq.

said Capt. Brian Wald, who has flown the C-17 for six years.

The need to be able to operate in that type of environment spurred Air Mobility Command to push for rapid development of the C-17 WIC. It would normally take almost two years to set up such a program; in this case, AMC had it operating in less than a year.

Wald credited the course with providing him with "tons and tons of detailed information" about C-17 tactical operations that he can pass on to other C-17 pilots in his unit.

Memorial Honors Controller

Air Force Secretary James G. Roche in January unveiled a memorial to TSgt. John A. Chapman, a combat controller who was killed March 4, 2002, while trying to res-

Aerospace World

cue a Navy SEAL during Operation Anaconda in Afghanistan. The memorial was unveiled at Arlington National Cemetery.

Chapman posthumously received the Air Force Cross for voluntarily putting himself in harm's way to rescue the separated commando. (See "Aerospace World: Combat Controller Receives Posthumous Honor," February 2003, p. 11.)

At the Jan. 8 ceremony, Roche said Chapman's "personal bravery in the face of the enemy was emblematic of the warrior ethos. ... He died fighting terrorism, and we continue to live free today because of his sacrifice."

The memorial, a life-size model of a controller in full combat gear with photos of Chapman in Afghanistan, will remain at the Arlington visitor's center until March 15. Then it will be on display for two weeks at Air Force Special Operations Command, Hurlburt Field, Fla., after which it will be moved to its permanent location at the Air Force Enlisted Heritage Museum, Maxwell AFB, Ala.

USAF Wins Range Dispute

A group of Southwestern ranchers have been rebuffed in an attempt to reverse an Air Force expansion of low-level training flights out of Holloman AFB, N.M. Military aircraft from the base fly over southern New Mexico and western Texas.

The 10th Circuit Court of Appeals in Denver upheld a lower court's decision that the expanded low-level flying was not "arbitrary, capricious, [or] without reasonable foundation."

Another 2,000 Airmen To Beef Up AEF Silver

Air Force officials said in January that nearly 2,000 airmen not originally deployed as part of Air and Space Expeditionary Force Silver would in fact be going overseas to meet personnel demands.

The airmen come primarily from the combat support fields, said Col. Michael Scott, USAF chief of war plans organization. Affected fields include air traffic control, communications, engineering, firefighting, medical, security, and transportation.

Air Force officials said some airmen could be deployed up to 179 days. Plans remain on track, however, for most career fields to resume regular 90-day AEF rotations, beginning in March.

AEF Silver is the second of two 120-day AEFs the Air Force used to help its airmen recover from the demands of Operation Iraqi Freedom. AEFs Silver and Blue deployed forces that, for the most part, had not already been sent overseas in support of OIF.

Pentagon Panel Calls for Cruise Missile Plan

The Defense Science Board believes that DOD should put together a roadmap for defense against cruise missiles. Ships, low-flying aircraft, and cruise missiles are "credible delivery systems available to adversaries," the DSB warned.

The report said DOD must "take steps to counter these threats as a complement to ongoing initiatives to defend against ballistic missiles."

Lack of a counter-cruise missile plan had drawn the attention of several top military officials, including Air Force Gen. Ralph E. Eberhart, head of NORAD and US Northern Command.

In comments to the Defense Writers Group last fall, Eberhart said, "Cruise missiles concern me," and DOD "needs to come to grips with what we are going to do" to counter the threat. (See "Homeland Air Force," January 2004, p. 36.)

The board noted that NORAD began work on a cruise missile defense master plan just as a DSB report, "DOD Roles and Missions in Homeland Security," was being completed last year.

According to the board, DOD also should consider expanding NORAD's mandate and transform the binational command into one tasked with defending North America against land and sea threats in addition to the current air defense mission.

Noting the general lack of protection against inconspicuous ships, the report said that military assets could help "provide the nation with a robust capability to identify, track, and ... intercept suspicious cargo and vessels as far from US shores as possible."

The ranchers initially filed their lawsuit in 1998, saying the training flights would threaten their livelihoods and property values. After losing the case, they appealed, claiming the Air Force failed to consider reasonable alternatives to the area selected.

USAF argued that no other base was reasonable. The 10th Circuit Court agreed.

Another group of ranchers has attempted to halt an expansion of low-level bomber training flights out of Dyess AFB, Tex. The Air Force also won that court case, but the ranchers have appealed.

B-2 Program Adds Navy Pilot

In a first, a Navy pilot has become an Air Force B-2 stealth bomber pilot. Navy Lt. Michael Orr, an EA-6B Prowler pilot, took his first flight as a certified B-2 pilot in January, according to a spokeswoman at Whiteman AFB, Mo., the home of USAF's B-2 operations.

After completing his B-2 pilot training, Orr became the electronic warfare officer for the 509th Operational Support Squadron at Whiteman. The Air Force is not losing any of its small cadre of B-2 pilots through this arrangement, said the spokeswoman, Capt. Kat Ohlmeyer.

USAF first brought EA-6B crews to Whiteman in 2000 to familiarize them with the B-2's mission. The Prowlers provide jamming support for the B-2 and all other Defense Department aircraft.

On one of the subsequent familiarization tours, Orr inquired about how to become a B-2 pilot. The Air

Casualties and Confusion and Afghanistan

Over the winter, a series of high-profile air strikes against terrorist targets in Afghanistan generated considerable confusion. There were questions about whether American aircraft had killed Afghan children on several occasions.

The events in question began last Dec. 5, when six children died after a wall fell on them following a US attack against a terrorist complex. US Central Command officials confirmed that US ground forces and warplanes attacked the compound but said it was unclear what caused the wall to collapse.

"There were secondary and tertiary explosions," noted CENTCOM spokesman Army Lt. Col. Bryan Hilferty. An Afghan spokesman for the local provincial governor said the US forces were not to blame for the children's deaths. "This house [where the wall collapsed] was not bombed by US planes," he said, adding, "I think there were many other weapons in that house."

A second incident occurred the next day, Dec. 6, when an A-10 attack aircraft targeted an al Qaeda terrorist. The attack evidently killed nine Afghan children, who were found dead in the field at the site of the attack.

"We accept blame" for the Dec. 6 incident, Hilferty said. However, he noted, "I will tell you the surveillance video shows no children there."

Finally, US officials said claims that 11 civilians were killed in an AC-130 strike on Jan. 18 were incorrect.

Another provincial governor had said the Jan. 18 US attack killed four men, four women, and three children. Hilferty contradicted this account. He described the incident as an attack against five armed men leaving a "known terrorist compound."

Hilferty said there were "no indications that civilians were killed in that incident."

Force, to his surprise, took him up on his request, and the Navy deferred his assignment to become a Prowler instructor.

Ohlmeyer said Orr will serve a standard tour of duty at Whiteman before returning to Navy assignments.

ACC Reconstitution Slow in Spots

Gen. Hal M. Hornburg, the commander of Air Combat Command, said ACC's post-Iraq war reconstitution plans have largely gone according to schedule. However, he said, ACC did not vacate as many of the

worldwide contingency bases as fast as it wanted, complicating some efforts.

"In the main, reconstitution has gone the way we thought," said the ACC commander, but "we had to leave some folks over there in larger numbers" than expected. That led to some equipment strains.

He said ACC was "right up against the ropes" in being able to provide enough tents for operations at contingency bases. And, while most aircraft recovery efforts went well, the A-10 community remained a notable exception. The Warthog was still deployed "in larger numbers than we anticipated," Hornburg said in December.

Most weapons were reconstituted effectively, but, he said, inventories of Joint Direct Attack Munitions and GBU-12 Paveway laser guided bombs remained below desired levels.

US, EU Set for NavSat Deal

The end probably is near for a three-year disagreement between the US and the European Union over competing navigation satellite systems. After positive negotiations in January, officials expected a deal to emerge quickly.

In January, a senior State Department official said the United States is willing to share space technology with Europe in exchange for a guarantee that the European Galileo navigation system would not interfere with Global Positioning System satellite sig-

nals. Galileo is slated to enter service in 2008.

Officials had determined that the proposed frequency for Galileo would impact the frequency DOD planned to use for the military-only M-code portion of GPS. To alleviate that problem, the US proposed an international standard for the US and European navigation systems.

Preserving the M-code capability is vital to US and allied security," said Charles Ries, deputy assistant secretary of state for Europe, at a January press briefing.

At the briefing, USAF's deputy director of space acquisition, Richard McKinney, said the US would be willing to provide help to harden the EU's Galileo satellites and to resolve atomic clock problems, as well as to provide information on ground control operations and software updates. McKinney said that was based on Europe's willingness to work with the US on the signal structure of the two systems.

Ries said the US would continue the negotiations until reaching a deal.

An EU statement issued Feb. 6 indicated that the common approach was received "positively," but it said

Schwarzenegger to Rumsfeld: Don't Terminate Bases

In one of his first acts as California governor, Republican Arnold Schwarzenegger fired off a letter to Defense Secretary Donald H. Rumsfeld about the upcoming round of base closures. He asked the Defense Secretary not to forget the "unparalleled opportunities which exist in California."

The department's 2005 base closure round is expected to be the largest ever—leading to a roughly 25 percent reduction in infrastructure.

Schwarzenegger, star of the "Terminator" action movie series, informed Rumsfeld Jan. 12 that he will "ensure that California's current military sites and the resulting resident intellectual capital and logistic infrastructure around each base, remain and prosper in California."

no agreement had been reached on the specific modulation.

AFRL Assists Mars Rovers

Radiation-hardened computers developed by the Air Force Research Laboratories helped guide NASA's Mars rovers to safe landings on the Red Planet in January.

Creigh Gordon, AFRL engineer, said that BAE Systems/Air Force Rad6000 32-bit microprocessors controlled the Mars vehicles on their flight from Earth. The processors also directed the two rovers, *Spirit* and *Opportunity*, as they went about their

exploration of Mars. The first rover touched down on Mars Jan. 4, the second on Jan. 25.

"NASA chose AFRL microprocessors because they are proven reliable, rugged, and fully compatible" with NASA systems, said Gordon.

More Navs May Go to Pensacola

The Air Force may send more of its navigator trainees to NAS Pensacola, Fla., if an effort to combine the services' navigator training programs is approved. The *Pensacola News Journal* reported in January that the idea has been well received so far.

News Notes

By Tamar A. Mehuron, Associate Editor

■ A new GPS satellite launched into orbit aboard a Delta II rocket from Cape Canaveral, Fla., in December became operational in mid-January. USAF expects the GPS IIR-10 to provide greater positioning and timing accuracy during its 10-year lifetime than the older satellite it replaced. The older GPS had been running low on power.

■ The Missile Defense Agency launched a Lockheed Martin three-stage booster for a verification test Jan. 9 at Vandenberg AFB, Calif., as part of the Ground-based Midcourse Defense System. The booster is one of two to be used for the program. MDA tested the Orbital Sciences booster in August at Vandenberg.

■ In January, MDA awarded an eight-year, \$768 million contract to Lockheed Martin to develop and demonstrate a miniature kill vehicle system. Early work will concentrate on the design and demonstration of the kill vehicle. The MKV system is to deploy multiple small kill vehicles from a single carrier vehicle. Attached to

existing and planned interceptor boosters, the system would be able to engage several midcourse targets from a single launcher.

■ Two private contractors are supplying eight personnel for one year to replace stressed Air Force airfield radar maintainers at Baghdad Airport in Iraq, a USAF news release said in December. The service also contracted with SYTEX, Inc., and ITT Industries to provide radar maintenance at Tallil and Kirkuk Air Bases in Iraq.

■ To offset a shortage of 1,100 noncommissioned officers, the Air Force conducted a voluntary sign up period in January and February for staff, technical, and master sergeants in surplus career fields to retrain into undermanned specialties. If necessary, said officials, USAF will conduct an involuntary selection process during March and April.

■ USAF in January awarded Lockheed Martin a \$48.7 million contract to install avionics modernization kits on 112 C-5Bs. The upgrades will re-

place old analog instruments with digital cockpit displays and equipment. New communications and navigation avionics will meet the standards of the Global Air Traffic Management system. Contract work will begin in June 2004 and conclude in 2007.

■ Air Force investigators found that pilot lack of situational awareness caused an F-16 to crash Sept. 9 into the Yellow Sea. While on a two-ship training mission, neither Capt. Kevin Dydyk, the flight lead, nor Capt. Todd Houchins, instructor pilot, realized early enough that their altitude was too low for the planned training maneuvers. Dydyk called to terminate the training and attempted to recover, but he was forced to eject from his aircraft. He was rescued 90 minutes later. Investigators said Houchins failed to recognize the low altitude but managed to recover his F-16 about 450 feet above the sea. Both pilots are assigned to Kunsan AB, South Korea.

■ USAF recognized four airmen in 2003 with the Lance P. Sijan Air Force Leadership Award. They are: Lt. Col. Robert E. Moriarty, 314th Civil Engineer Squadron, Little Rock AFB, Ark.; Capt. Christopher P. Larkin, 321st Special Tactics Squadron, RAF Mil-

The air station currently trains about 350 navigators each year. Last year, 78 of those were from the Air Force.

Most USAF navigator trainees (349 in 2003) go through the service's primary navigator school at Randolph AFB, Tex.

If approved, the consolidation plan could, in 10 years, double the number of navigators trained at Pensacola, said Navy Capt. Chaunce Mitchell, commodore of Training Air Wing 6. Mitchell added that such a consolidation should make navigator training more efficient and, ultimately, reduce the Air Force costs.

Obituary

Retired Col. Travis Hoover, one of the Doolittle Raider pilots of World War II, died Jan. 17 in Webb City, Mo. He was 86.

Hoover was one of the pilots who dropped bombs on Japan in the first US strike after Japan's Dec. 7, 1941, attack on Hawaii. The Doolittle Raiders—named after their leader, then-Lt. Col. Jimmy Doolittle—attacked Japan on April 18, 1942, inflicting modest damage but showing Japan that it was vulnerable to US bombers. Hoover flew the second B-25, just behind Doolittle.

Born in 1917, he joined the Na-

denhall, UK; MSgt. Michael V. Lamonica, 24th Special Tactics Squadron, Pope AFB, N.C.; and MSgt. Christopher R. May, 305th Civil Engineer Squadron, McGuire AFB, N.J. The award is named for the first Air Force Academy graduate to receive the Medal of Honor.

- DOD plans to establish 11 more civil support teams trained to help local authorities deal with weapons of mass destruction attacks. Congress approved \$88 million to fund the increase. There are 32 teams, comprised of 22 Army and Air National Guard members. Eventually DOD will have 55 teams.

- An F-16C turbine engine blade failed due to fatigue during a training flight and caused the aircraft to crash Sept. 22 in woods near Rosepine, La., according to an Air Combat Command accident report released in January. The pilot ejected, suffering minor cuts. Both pilot and aircraft were assigned to the Air National Guard's 147th Fighter Wing, Ellington Field, Tex. Loss of the aircraft is estimated at \$23.3 million. There were no other injuries or property damage.

- The remains of two B-52 crew members formerly missing in action from the Vietnam War have been iden-

tified and sent to their families for burial. Maj. Richard W. Cooper Jr., of Salisbury, Md., and CMSgt. Charlie S. Poole of Gibsland, La., were returning from a bombing mission Dec. 19, 1972, for Operation Linebacker II when their B-52D was hit by an enemy surface-to-air missile. The aircraft crashed southwest of Hanoi. Four crew members who survived the crash were among POWs released in 1973.

- Iran's defense minister announced plans to launch an Iranian-made satellite within 18 months, reported the official Islamic Republic News Agency. That would mark the debut of an Islamic nation in space.

- USAF's 2003 Athletes of the Year are race walker Capt. Kevin Eastler, F.E. Warren AFB, Wyo., and rugby player 1st Lt. Laura McDonald, Randolph AFB, Tex. Eastler is the first American to be accepted for the Olympic "A" standard time. McDonald was chosen for the US Women's National Sevens Rugby Team and the USA Eagle Women's National Team.

- USAF awarded a sole-source contract to Lockheed Martin International Launch Services in December for an Atlas V Evolved Expendable Launch Vehicle to carry a National

Reconnaissance Office payload into orbit in 2006.

- Gen. T. Michael Moseley, Air Force vice chief of staff, was honored with the United Arab Emirates Military Order First Class during the Dubai Air Show in December. Moseley served as combined force air component commander for Operation Enduring Freedom in Afghanistan and Operations Iraqi Freedom and, earlier, Southern Watch over Iraq.

- The Airborne Laser Test Force team at Edwards AFB, Calif., took delivery Dec. 4 of thousands of gallons of the chemical needed to create the laser beam. The hydrogen peroxide was to be mixed this winter with sodium hydroxide, potassium hydroxide, and lithium hydroxide to make the laser fuel. When mixed with chlorine gas, the energy from the combination creates the laser beam.

- Afghanistan's provincial reconstruction team at Konduz on Jan. 6 became the first to come under NATO control in a transfer of authority from the coalition. Coalition forces run six other teams in Afghanistan. The teams are a key part of the strategy to speed development and reconstruction and thus bolster prospects for permanent stability in Afghanistan.



WE STILL NEED YOU.

Calling All Former Lowry Air Force Base Personnel

The Air Force Real Property Agency (formerly known as the Air Force Base Conversion Agency) believes you can play an essential role in its investigation to help see that all possible sources of contamination on the former Lowry AFB in Denver, Colorado, are identified and addressed. We're asking former base personnel to consider volunteering for a brief interview to share their unique historical perspective, experience, and knowledge, while supporting the environmental cleanup program at Lowry.

The Air Force and the community need you. Make another valuable contribution to the Air Force mission at Lowry.

Volunteer Today!

For more information or to schedule an interview, please call:

Doug Karas
Lowry Public Affairs Officer
toll free 1-866-725-7617
doug.karas@afrrpa.pentagon.af.mil



Kay's Conclusions and the Question of WMD

Did They Exist?

"What happened to the stockpiles of biological and chemical weapons that everyone expected to be there?"—*Question from Reuters to David Kay after his resignation as chief US weapons inspector in Iraq, Jan. 23.*

"I don't think they existed."—*Kay.*

Basis of Decision

"You have to make decisions based on the intelligence you have, not on the intelligence you can discover later."—*Paul D. Wolfowitz, deputy secretary of defense, visiting troops in Germany, New York Times, Feb. 1.*

Almost All Wrong

"We were almost all wrong, and I certainly include myself here."—*Kay to Senate Armed Services Committee, Jan. 28.*

Rumsfeld: Zero WMD Unlikely

"There are several alternative views that are currently being postulated. First is the theory that WMD [weapons of mass destruction] may not have existed at the start of a war. I suppose that's possible, but not likely. ... It took us 10 months to find Saddam Hussein. The reality is that the hole he was hiding in was large enough to hold enough biological weapons to kill thousands of human beings. ... The [Iraq Survey Group's] work is some distance from completion. There are some 1,300 people in the ISG in Iraq working hard to find ground truth. When that work is complete, we will know more."—*Secretary of Defense Donald H. Rumsfeld, Senate Armed Services Committee, Feb. 4.*

Bottom Lines

"Analysts differed on several important aspects of these programs, and those debates were spelled out in the estimate. They never said there was an 'imminent threat.' ... My provisional bottom line today [on chemical weapons]: Saddam had the intent and the capability to quickly convert civilian industry to chemical weapons production. However, we have not yet found the weapons we expected."—*CIA Director George J. Tenet, speech at Georgetown University, Feb. 5.*

Saddam Had a Record

"We know that Saddam Hussein had the intent to arm his

regime with weapons of mass destruction. And Saddam Hussein had something else—he had a record of using weapons of mass destruction against his enemies and against his own people."—*Vice President Dick Cheney, Washington Post, Feb. 8.*

War President's Decision

"This is a dangerous world. I wish it wasn't. I'm a war President. I make decisions here in the Oval Office in foreign policy matters with war on my mind. ... I expected to find the weapons. I'm sitting behind this desk, making a very difficult decision of war and peace, and I based my decision on the best intelligence possible. ... David Kay has found [in Iraq] the capacity to produce weapons. [Such weapons] could have been destroyed during the war. Saddam and his henchmen could have destroyed them as we entered into Iraq. They could be hidden. They could have been transported to another country. ... But what I want to share with you is my sentiment at the time. There was no doubt in my mind that Saddam Hussein was a danger to America. No doubt."—*President Bush, NBC's "Meet the Press," Feb. 8.*

Selling a Product

"The intention was to dramatize it [the intelligence], just as the vendors of some merchandise are trying to exaggerate the importance of what they have."—*Hans Blix, former UN chief weapons inspector, BBC television, quoted by Reuters, Feb. 9.*

The Pre-9/11 Theory

"He betrayed this country! He played on our fears. He took America on an ill-conceived foreign adventure dangerous to our troops, an adventure preordained and planned before 9/11 ever took place."—*Former Vice President Albert Gore, New York Times, Feb. 9.*

International Problem

"It wasn't just an American intelligence failure. It was German, it was French, it was British, it was Israeli. It was all intelligence failures, and we need to find out what happened. It's clear to me that the weapons of mass destruction were not there."—*Sen. John McCain (R-Ariz.), member of panel investigating intelligence on Iraq, New York Daily News, Feb. 8.*

tional Guard in 1938, transferring to the Army as a flying cadet the next year. After completing pilot training, he flew B-24s, B-25s, and P-38s in England, Italy, and North Africa. He retired from the Air Force in 1969 as commander of Keesler AFB, Miss. ■

Index to Advertisers

Agusta Westland	Cover IV
Air Force Real Property Agency	17
Boeing	10-11
Lockheed Martin	Cover II
Motion Models	7
Northrop Grumman	5, Cover III
Pentagon Federal Credit Union	6
Raytheon	21
Rockwell Collins	3
AEF Planned Giving	78
AEF Fellows	67
AFA Membership	43
New at AFA	77

Senior Staff Changes

PROMOTIONS: To Lieutenant General: Thomas L. Baptiste.

To ANG Major General: Roger P. Lempke, Albert P. Richards Jr., Albert H. Wilkening.

To ANG Brigadier General: Terry L. Butler, John A. Caputo, Richard H. Clevenger, Michael D. Dubie, Jerald L. Engelman, William H. Etter, Edward R. Flora, Rufus L. Forrest Jr., Richard M. Green, James E. Hearon, Terry P. Heggemeier, Vergel L. Lattimore, Duane J. Lodrige, Maria A. Morgan, James K. Robinson, Michael J. Shira, James P. Toscano.

CHANGES: Brig. Gen. Chris T. Anzalone, from Vice Cmdr., Air Armament Center, AFMC, Eglin AFB, Fla., to Vice Cmdr., Warner Robins ALC, AFMC, Robins AFB, Ga. ... Brig. Gen. Charles C. Baldwin, from Dep. Chief, Chaplain Service, Vice C/S, USAF, Pentagon, to Chief, Chaplain Service, Vice C/S, USAF, Pentagon ... Brig. Gen. (sel.) Robert H. Holmes, from Cmdr., 37th TW, AETC, Lackland AFB, Tex., to Dir., Security Forces, DCS, Air & Space Ops., USAF, Pentagon ... Brig. Gen. David L. Stringer, from Dir., Log., AETC, Randolph AFB, Tex., to Cmdr., Arnold Engineering Dev. Center, AFMC, Arnold AFB, Tenn. ... Lt. Gen. (sel.) Donald J. Wetekam, from Cmdr., Warner Robins ALC, AFMC, Robins AFB, Ga., to Dep. C/S, Instl. & Log., USAF, Pentagon.

SENIOR EXECUTIVE SERVICE CHANGE: Steven D. Shirley, to Exec. Dir., Defense Cyber Crime Center, AFOSI, IG, Linthicum, Md. ■

Action in Congress

By Tom Philpott, Contributing Editor

Commissary Intrigue; Drug Price Hike Deferred; Disability Commission Angst

Variable Grocery Pricing?

Key lawmakers took note of the fact that Pentagon officials in January ordered a team of consultants to study the use of "variable pricing" in the military's grocery stores.

Rep. John McHugh (R-N.Y.), chairman of the subcommittee that oversees military stores, said he was worried that DOD officials might raise store prices and use resulting income to cut the Pentagon's \$1.2 billion subsidy to commissary operations.

Commissary items are sold at cost plus a five percent surcharge. The surcharge dollars are used to renovate and replace aging stores. Under variable pricing, items could be sold either above or below cost.

"The clear danger of variable pricing is that, [if] you charge less [in some areas], you're inclined in other areas to charge more," said McHugh. "If what you're trying to do is find justification to cut appropriations to commissaries, you use it as a means to increase revenues."

Dove Consulting Group, Inc., of Boston, and Willard Bishop Consulting, Ltd., of Barrington, Ill., received a contract to conduct the Variable Pricing Feasibility Study in just seven weeks. A final report was due to the Defense Commissary Agency by Feb. 27. McHugh said the study could cost more than \$500,000.

Defense officials acknowledge trying to lower the \$1.2 billion subsidy. But they also contend that variable pricing could create a better commissary benefit by giving managers greater flexibility.

The goal, they said in a statement, is "to provide average savings to commissary customers of 30 percent over similar items sold by commercial grocers, regardless of the location of the commissary where they shop."

The Bush Administration is the first to adopt a 30 percent savings goal for commissary shoppers. Skeptics note the current average savings is 32 percent. So, using variable pricing, DOD could convert savings in excess of 30 percent into store prof-

its, which would reduce the taxpayer spending on stores.

Latest on Retiree Drug Costs

President Bush's 2005 defense budget request on Feb. 2 arrived on Capitol Hill minus an Office of Management and Budget proposal to end free prescriptions for retirees on base and to raise retiree co-payments for drugs purchased off base.

The OMB proposal would have raised prescription fees for military retirees, their spouses, and their survivors on Oct. 1, 2004. It included a first-ever requirement for co-payments on retiree prescriptions filled on base.

Sent to the Pentagon Dec. 16 as a "draft Program Budget Decision" for Fiscal 2005, the OMB plan called for raising co-payments under the Tricare mail order and Tricare retail pharmacy benefit from \$9 up to \$20 for name-brand drugs and from \$3 up to \$10 for generic drugs. The \$20 or \$10 fees also would have been charged to retirees using military pharmacies.

Defense officials got OMB to pull the plan from the 2005 budget, but DOD agreed to consider the ideas. At least part of the plan could appear again in the 2006 budget request.

OMB documents said higher co-pays "could generate significant revenues," ranging from \$728.3 million in Fiscal 2005 up to \$954.7 million in Fiscal 2009, with a five-year defense budget reduction of \$4.2 billion.

Service associations roundly criticized the proposal.

"This was one of those ideas that got a little bit ahead of rational-thinking people and is back in the box," said a senior Pentagon official.

Defense officials still plan to adopt a "uniform formulary" for all DOD pharmacy programs. It will broaden the list of drugs stocked at base pharmacies and available by mail, but also will impose a new three-tier co-payment scheme to curb growth in the Tricare retail benefit.

Eye on the New Commission

Key members of Congress are watching carefully to see who Presi-

dent Bush appoints to the new Veterans' Disability Benefits Commission.

The 13-member commission is being set up to make a broad review of DOD and VA disability benefits. The appointment of such a panel was part of the deal reached between Congress and the White House last year. The Bush Administration got the panel in exchange for agreeing to a partial lifting of the legal ban on "concurrent receipt" of disability compensation and military retirement pay for seriously disabled retirees.

Rep. Ted Strickland (D-Ohio), a key member of the House Veterans' Affairs Committee, says he is worried that the President will name "lapdogs" who will recommend cuts in benefits.

The commission must hold its first meeting within 30 days of the naming of all commissioners. The speaker of the House, House minority leader, Senate majority leader, and Senate minority leader each control two appointments. President Bush will make the remaining five appointments.

The law requires that a majority of commissioners must have received either the Medal of Honor, Distinguished Service Cross, Navy Cross, Air Force Cross, or Silver Star. Fifteen months after its first meeting, the commission must send to the President and Congress a comprehensive study on revising disability and death benefits for veterans and their survivors.

Senate Minority Leader Tom Daschle (D-S.D.) has named the first two commissioners—former Nevada Gov. Mike O'Callaghan and Rick Surratt, deputy legislative director of the Disabled American Veterans. A veteran of the Korean War, O'Callaghan received the Purple Heart, Bronze Star, and Silver Star. Surratt was wounded in combat in Vietnam.

Keep the Promise Bill

As the 108th Congress reconvened, the "Keep Our Promises to America's Military Retirees Act" (H.R. 3474) had nearly 150 co-sponsors.

The bill would allow older military

retirees to waive Medicare Part B premiums, enroll (if they can afford it) in the Federal Employees Health Benefits Program (FEHBP), and benefit from Tricare network pharmacy rates, even if they don't have access to participating commercial pharmacies.

Retired Air Force Col. George "Bud" Day, a Medal of Honor recipient and practicing lawyer, said he intended to lobby Congress hard through the spring to pass H.R. 3474 and won't accept hand-wringing by lawmakers over rising budget deficits.

"When it comes to spending, none of them pay attention to that," Day said.

Day said he expected his friend and fellow former Vietnam prisoner of war, Sen. John McCain (R-Ariz.), along with Sen. Tim Johnson (D-S.D.), to introduce a companion bill in the Senate. Day promised to travel from his Florida home to Capitol Hill at least one week every month this spring "to make sure guys who vocalize support put their pencil on the paper, too."

The bill's key feature would be the waiver of Medicare Part B premiums, now set at \$66 a month, for retirees who first entered service before Dec. 7, 1956. That is the effective date of a law that, for the first time and despite recruiter promises, limited retiree health care access to military hospitals based on the availability of space and staff.

Last year, retirees from the World War II and Korean War eras lost their seven-year-long lawsuit against the government to reimburse them for broken promises of free lifetime health care. Day led the legal action and along with others formed a class act group to wage the battle.

The Other "Concurrent Receipt"

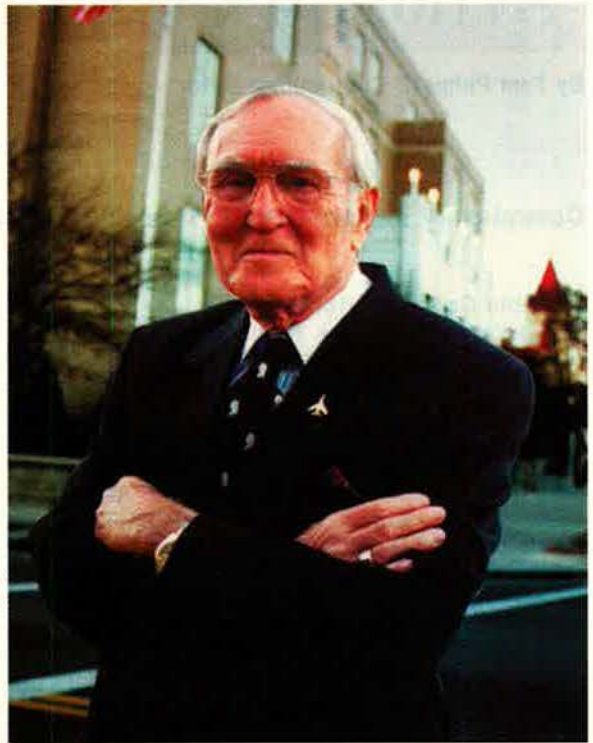
Did Congress last December vote to allow "concurrent receipt" for certain surviving spouses of military retirees? If so, the move would make them eligible to draw dependency and indemnity compensation (DIC) from the VA and military Survivor Benefit Plan (SBP) compensation from DOD.

As of late January, the spouses couldn't be sure.

Members and staff of the House Veterans' Affairs Committee said they inserted a provision in the Veterans Benefits Act of 2003 that would open both benefits to a retiree's surviving spouse who remarried at age 57 or later.

However, DOD lawyers read the

Retired Air Force Col. George "Bud" Day vows to keep pressure on lawmakers.



AP photo by Bill Kuczer

provision differently, said a Pentagon source. The Pentagon concluded that the provision only restores DIC payments to surviving spouses who remarried at 57 or older, but it doesn't allow them to draw that pay without a dollar-for-dollar offset in SBP.

At stake in how the law is interpreted is an average of \$9,204 in annual survivor benefits for these "DIC 57" spouses, the committee said.

Rep. Henry Brown Jr. (R-S.C.) said the committee intended to take a symbolic first step toward ending the DIC-triggered offset in SBP that impacts about 48,000 dual-eligible surviving spouses.

Military retirees buy SBP coverage so their surviving spouses will continue to draw a portion of their retired pay when they're gone. The spouse of any veteran also can be eligible for DIC if the veteran or retiree died from a service-related injury or illness. Minimum DIC is \$967 a month. But spouses of military retirees see their SBP reduced dollar for dollar by DIC.

Surviving spouses who remarry lose their DIC entitlement. But Section 101 of the new benefit package (Public Law 108-183) now allows surviving spouses who remarry at 57 or older to retain DIC. Those remarried at 57 or older before the law took effect Dec. 16, 2003, have a year to reapply for DIC. (They should do so using VA Form 21-

686c). More than 12,000 surviving spouses fall into that category, but officials estimate that fewer than 15 percent will know to apply.

The controversy is with paragraph B of Section 101, which says individuals made eligible for DIC under the provision, by reason of their "status as the surviving spouse of a veteran," should see no reduction in other federal benefits as a result of this provision. As of late January, however, the committee and DOD officials had not discussed their difference of opinion.

SBP Reforms

Responding to President Bush's State of the Union Address Jan. 20, House Minority Leader Nancy Pelosi (D-Calif.) said the Democratic Party supports reform of the military Survivor Benefit Plan, a priority for service associations in 2004.

The goal of SBP reform is to end a sharp drop in benefits that surviving spouses see at age 62, when most become eligible for Social Security. SBP annuities set at 55 percent of the covered retired pay amount suddenly fall to as low as 35 percent.

Retirees are rallying behind bills S. 1916 and H.R. 3763, introduced by Sen. Mary Landrieu (D-La.) and Rep. Jeff Miller (R-Fla.), to phase out the lower tier of the SBP formula, so 55 percent annuities are sustained through old age. ■

Approved for full
rate production for
U.S. Navy and
Marine Corps
F/A-18 squadrons

ASQ-228
3rd Generation ATFLIR



ATFLIR at sea

Raytheon's 3rd generation ASQ-228 Advanced Targeting FLIR is now on cruise. Delivering targeting performance, EO and IR imagery, and maintainability 3 to 5 times better than any other targeting pod in production. Proving that we meet our commitments, time after time, as expected from a global leader in electro-optics and infrared technology. ATFLIR – integrated on the F/A-18 and fully compatible with the F-15 and F-16.

www.raytheon.com

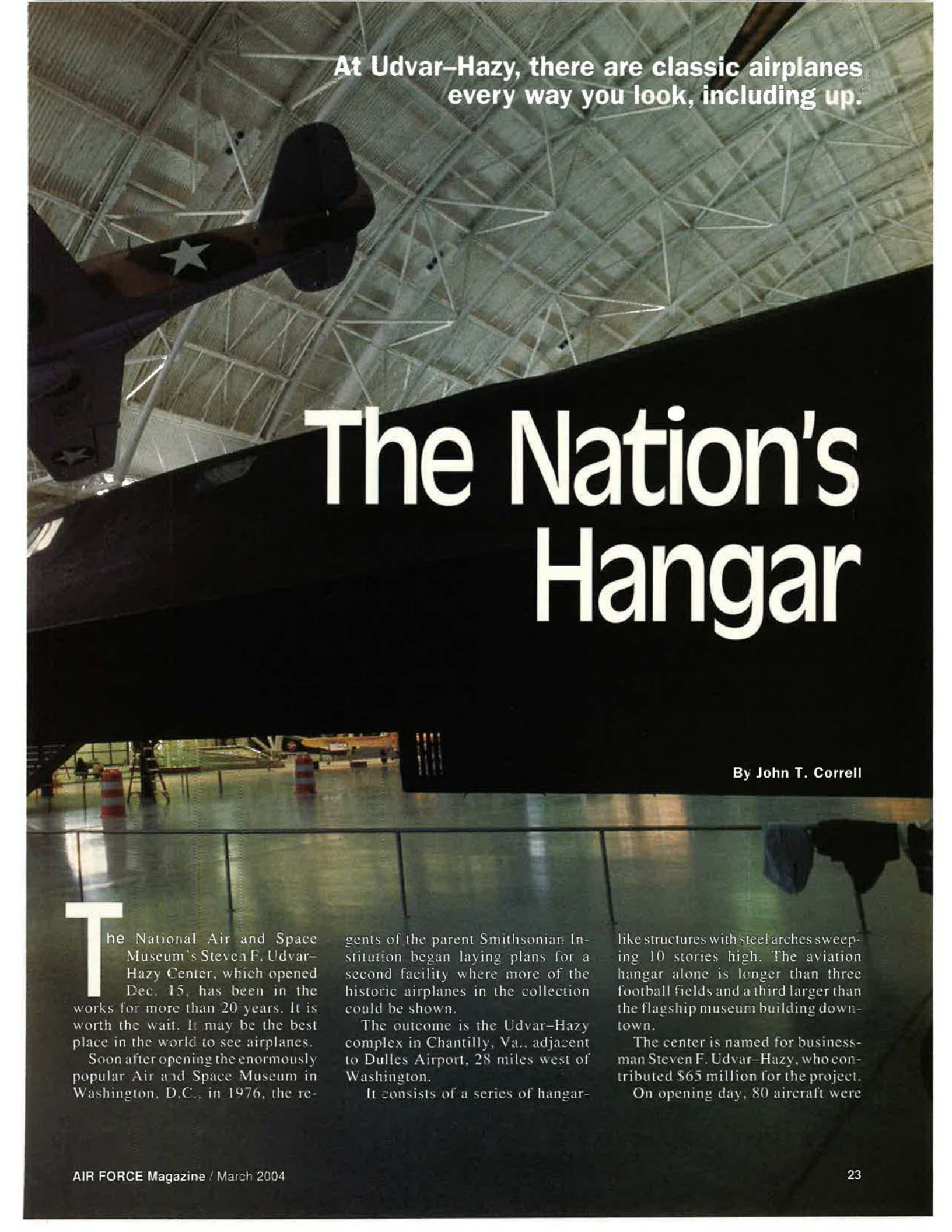
Raytheon

Customer Success Is Our Mission

© 2004 Raytheon Company. All rights reserved.



From an overlook, visitors can gaze down on a sleek SR-71 Blackbird. Also shown are an F4U Corsair (upper left corner), a Pitts Special (hanging upside down), and a P-40E Warhawk (with shark mouth insignia).



At Udvar-Hazy, there are classic airplanes every way you look, including up.

The Nation's Hangar

By John T. Correll

The National Air and Space Museum's Steven F. Udvar-Hazy Center, which opened Dec. 15, has been in the works for more than 20 years. It is worth the wait. It may be the best place in the world to see airplanes.

Soon after opening the enormously popular Air and Space Museum in Washington, D.C., in 1976, the re-

gents of the parent Smithsonian Institution began laying plans for a second facility where more of the historic airplanes in the collection could be shown.

The outcome is the Udvar-Hazy complex in Chantilly, Va., adjacent to Dulles Airport, 28 miles west of Washington.

It consists of a series of hangar-

like structures with steel arches sweeping 10 stories high. The aviation hangar alone is longer than three football fields and a third larger than the flagship museum building downtown.

The center is named for businessman Steven F. Udvar-Hazy, who contributed \$65 million for the project.

On opening day, 80 aircraft were



Warhawk. Opening day finds Don Lopez, deputy director of NASM, talking to the press as a P-40 Warhawk bearing his name "flies" through the gallery. Lopez, a World War II ace, flew a P-40 in combat.

on display, with more to come. Eventually, Udvar-Hazy will have 200 aircraft and 135 spacecraft in two main exhibition hangars.

Smaller aircraft hang from the arched trusses. Elevated walkways rise to four stories above the floor, allowing visitors to see the suspended aircraft nose to nose.

The museum entrance is on the second level of the hangar, so the first glimpse visitors get of the airplanes is from an elevated walkway, looking down on the vast exhibition floor.

The view from the walkway is framed by two fabled World War II fighters, a P-40 and an F4U Corsair, hanging at eye level to visitors and situated just out of reach.

Twenty-five feet below, nose forward, is the SR-71 Blackbird, the fastest airplane ever built. It is also, just possibly, the best-looking airplane ever built.

Beyond the SR-71 is the arched opening of the unfinished space hangar, from within which the space shuttle *Enterprise* faces out toward the observation platform.

(The *Enterprise* arrived at Dulles in 1983. Refurbishing could not begin until it was moved out of a building on airport property last year. As work proceeds, visitors peer across construction barriers to see the shuttle and other artifacts, such as a Mercury capsule. Until the space hangar opens, some 60 space artifacts are on display in the aviation hangar.)

The view is spectacular in all directions. The aviation hangar stretches almost 1,000 feet from end to end, with no partitions to block the view. Modern military airplanes are on the north end of the hangar, airliners are on the south end, and aircraft from World War II and earlier are in the center.

Display cases on the ground floor have smaller artifacts: Eddie Rickenbacker's uniform; Charles Lindbergh's flight suit; Amelia Earhart's flight suit and scissors used to cut her hair before her last mission; hats worn by Hap Arnold and Curtis E. LeMay.

For those who can tear their eyes away from the airplanes, there is a large collection of aircraft engines and propellers.

Visitors can take an elevator to the top of the Donald D. Engen Observation Tower (named for the former museum director who died in a glider accident in 1999), 164 feet high, for a "pilot's eye" view of airplanes landing and taking off from the Dulles runway and a scenic sweep of Virginia.

Opening day drew more than 7,000 people, even though it was a Monday with snow on the ground. Museum officials believe yearly attendance will reach three million, once word of its attractions gets around.

The museum director, retired Marine Corps Gen. John R. Dailey, likes to call Udvar-Hazy "the nation's hangar," a variation on the Smithsonian's familiar nickname as "the nation's attic."

The *Enola Gay*

At the center of the aviation hangar is the most famous of the airplanes at Udvar-Hazy, the B-29 bomber *Enola Gay*, which dropped the atomic bomb on Hiroshima in 1945.

The *Enola Gay* is raised up on an eight-foot platform with a P-38 Lightning under one wing and a P-47 Thunderbolt under the other. Other World War II airplanes are all around: a British Hawker Hurricane, a Ger-



Artifacts. Display cases contain smaller artifacts such as Eddie Rickenbacker's uniform (shown here), Charles Lindbergh's flight suit, and hats worn by Gen. Hap Arnold and Gen. Curtis LeMay.

man Focke-Wulf FW-190A-8, a Japanese Kawanishi N1K1 naval fighter, and numerous others.

Controversy about the Hiroshima mission continues elsewhere, but the aircraft is displayed as nonpolitically as possible. Director Dailey said that the basic descriptive label in front of the airplane “delivers the facts” and “allows people to understand these facts within the context of their own beliefs.”

That did not satisfy antinuclear protesters who staged a demonstration in the museum on opening day. One of the protesters hurled a bottle of red paint at the *Enola Gay*. It bounced off, denting the airplane and shattering on the floor below. (See “The Activists and the *Enola Gay*,” p. 29.)

The Smithsonian acquired the *Enola Gay* in 1949, but it was kept outdoors in various locations for years and was in bad condition when it was taken apart and put into storage at the Smithsonian’s Garber facility in Suitland, Md., in 1960.

Putting it back together was not easy.

“The *Enola Gay* was disassembled into 52 pieces for storage at the Garber facility, and none of the team that did the disassembly is still with us today,” Dailey said.

“Unfortunately, the way it was disassembled was not in accordance with the Boeing directives that describe the procedures, so they were of little value when it came time to

reassemble the aircraft. Some of the joints that had to be reconnected were intended to be done only on factory assembly jigs. This required some expert crane handling and ingenuity to accomplish the reconstruction.”

Dailey said it was “the largest reassembly job we have ever attempted and is a source of great pride for us.”

In all, the restoration, which began in 1984, took 300,000 staff hours to complete. The aluminum skin has been polished to its original shine. The parts and systems are of World War II vintage, and many of them are original.

The Norden bombsight is the same one that flew on the Hiroshima mission. The tires are the ones that were on the aircraft when the Smithsonian got it in 1949. The tires have been treated with materials that help preserve the old rubber.

The aircraft has had a special visitor at Udvar-Hazy.

Retired Brig. Gen. Paul W. Tibbets Jr., 88, who flew the *Enola Gay* on its mission to Hiroshima, was there for a special Salute to Military Aviation Veterans, Dec. 9, and at the dedication of the new museum on Dec. 11. As crowds of well-wishers



Showstopper. The museum’s most famous airplane, the B-29 bomber *Enola Gay*, dwarfs smaller contemporaries, the twin-engine P-38 Lightning (foreground) and a Japanese N1K2 Shiden Kai.

Photos by Paul Kennedy



Special Visitor. At the museum dedication, retired Brig. Gen. Paul Tibbets Jr., who flew the *Enola Gay* on its Hiroshima mission, posed for pictures and talked to well-wishers streaming by.

streamed by, Tibbets stood by the airplane, talking and shaking hands.

The Langley Aerodrome

The oldest aircraft at Udvar-Hazy is the Langley Aerodrome A, which hangs at the level of the second walkway, looking more like a huge butterfly than an airplane.

It was fished out of the water and restored after it crashed (twice) into the Potomac River in 1903. Museum staffers joke that the Aerodrome achieved a new altitude record when it was hoisted to its present position, 25 feet above the hangar floor.

The Langley Aerodrome was the basis for an epic feud between the Wright brothers and the Smithsonian and almost kept the museum from ever getting its hands on the Wright Flyer, which today is a centerpiece of



Ancient. The museum's oldest aircraft, the Langley Aerodrome A, predates the Wright Flyer but never actually flew until 1914. In 1903, the airplane, built by Samuel P. Langley, twice crashed into the Potomac River.

the collection at the Air and Space Museum.

In 1903, Samuel Pierpont Langley was secretary of the Smithsonian. He was also a competitor of the Wrights in the development of powered flight. His entry in the race was the Aerodrome. The wings of this improbable-looking contraption consisted of four linen-covered panels, two on each side of a tubular frame. It was launched from a catapult on top of a houseboat.

The Langley Aerodrome was all engine (52 hp vs. a dinky 12 hp engine on the Wrights' Kitty Hawk Flyer) and no aeronautics. It went directly from the catapult into the river.

Langley died in 1906, but his successors at the Smithsonian billed the Aerodrome as the world's first airplane "capable of sustained flight." Glenn Curtiss did get the Aerodrome to fly a bit in 1914, but that was after numerous modifications and improvements.

Orville Wright was outraged. (Wilbur died in 1912.) Not until the Smithsonian said in writing in 1942 that the Wright brothers were the first to fly was Orville satisfied and the way cleared for the Smithsonian to obtain the Wright Flyer in 1948.

Lopez's Hope

The Curtiss P-40E Warhawk near the main entrance to the museum is painted with the shark's mouth in-

signia of the legendary Flying Tigers.

The name on the nose is *Lopez's Hope*. As all good aviation buffs know, "Lopez" is Donald S. Lopez, longtime deputy director of the National Air and Space Museum and an ace with five victories in China in World War II.

On Dec. 12, 1943, Lopez took on a Nakajima Ki-43 Oscar that was attacking another P-40. The Japanese pilot turned toward Lopez, head-on, and kept coming. The left wings of the two aircraft collided, and the Oscar got the worst of it. As the Oscar

tumbled downward, out of control, Lopez—minus three feet of wing—kept flying and finished the mission.

The museum has a Ki-43 Oscar like the one Lopez engaged that day, and it is on the list for exhibition at Udvar-Hazy.

The P-40 now on display has the same markings as the airplane assigned to Lopez in China, but those were not the markings of the P-40 he was flying when he hit the Oscar. That day, Lopez had been in China for less than a month and was on his eighth combat mission. He was still too junior to have his own airplane with his name on the nose.

Other museum officials also have personal connections with vintage airplanes at Udvar-Hazy.

Three of the airplanes on display, for example, are types that director Dailey flew when he was on active duty with the Marine Corps: the XV-15 tilt-rotor research aircraft, the Vietnam-era F-4S Phantom fighter, and the SR-71.

Tom Alison, the museum's chief of collections management, not only flew the SR-71, he flew the particular SR-71 that is on the floor at Udvar-Hazy.

Airplanes Everywhere

Among the other highlights in the aviation hangar are these:

- The Concorde supersonic airliner. British Airways and Air France retired their fleets last year. The one at Udvar-Hazy was the oldest in the



Rivals. Displayed side by side on the hangar floor are a Soviet-built MiG-15 (background) and an American F-86 Sabre. In Korean War combat, the Sabre bested the MiG by a 10-to-one margin.

The National Air and Space Museum's Steven F. Udvar-Hazy Center

- A** Business Aviation
- B** Cold War Aviation
- C** Commercial Aviation
- D** General Aviation
- E** Korea and Vietnam
- F** Pre-1920 Aviation
- G** Modern Military Aviation
- H** Reaching Into Space
- I** Sport Aviation
- J** World War II Aviation



- 1** B-29 *Enola Gay*
- 2** Boeing 367-80
- 3** Concorde
- 4** Space Shuttle *Enterprise*
- 5** SR-71
- 6** Boeing 307 Stratoliner
- 7** F-86 and MiG-15
- 8** P-40
- 9** X-35
- 10** Langley Aerodrome

Air France fleet and arrived at Dulles in June 2003. The Concorde, which cruised at twice the speed of sound, is the longest and heaviest airplane at Udvar-Hazy (202 feet, 174,000 pounds empty).

■ The Boeing 307 Stratoliner, the last one in existence and one of only 10 ever built. It was the first airliner with a pressurized cabin. It cruised above the weather at 20,000 feet (unprecedented for airliners of that era) for a faster and smoother ride and carried 33 passengers with the comfort of sleeping berths and reclining seats.

This particular aircraft was flown by Pan American Airways, entering service in 1940 as the *Clipper Flying Cloud*. In 1954, it was bought by the Haitian Air Force and became the personal airplane of dictator "Papa Doc" Duvalier. In the 1960s, it was used as a water bomber to fight forest fires in Arizona. It was obtained by the Smithsonian in 1972.

■ A Kugisho Okha 22 Kamikaze aircraft, essentially a flying bomb, flown by a pilot on a one-way mission. An Okha was brought within striking distance and air launched by a Mitsubishi G4M Betty bomber. The pilot, who had received rudimentary training, crashed himself at high speed into an Allied warship. The Okha had a range of about 80 miles. It was powered by a crude jet engine, similar to the modern afterburner.

■ The Aichi Seiran, a Japanese World War II bomber built to operate from a submarine to strike at the United States or other distant targets, such as the Panama Canal. The wings folded up so the airplane would fit inside a submarine. (Japan had developed a special fleet of submarine aircraft carriers). An I-400 class submarine could carry three Seirans in waterproof compartments. Assembled, the Seiran had a 40-foot wingspan and came with two large jettisonable pontoons for operation as a seaplane.

The Seiran never saw combat. This is the last surviving example, found by Allied forces in the remains of the Aichi factory after the war. (See "Flights From the Deep," p. 68.)

■ Located side by side on the hangar floor are a MiG-15 and an F-86 Sabre. In the Korean War, the MiG-15 was flown by Russians, Chinese, and North Koreans and was bested,



From the Great War. This Nieuport 28C.1 exhibits markings of the famous US 94th "Hat in the Ring" Aero Squadron. This was the first fighter type to be flown by US airmen in World War I.

by a ratio of 10 to one, by the American F-86.

- The Boeing 367-80 "Dash 80," the prototype for America's first commercial jet airliner, the Boeing 707.

- A Nieuport 28C.1 fighter, assembled from components of five different Nieuports, exhibited in the markings of the famous 94th "Hat in the Ring" Aero Squadron. This type of aircraft was the first fighter US airmen flew in World War I. Nieuports later starred in the 1938 movie, *The Dawn Patrol*.

- The X-35 demonstrator for the Joint Strike Fighter, the newest airplane at Udvar-Hazy.

One Museum, Two Sites

For all of its scope and grandeur, Udvar-Hazy is not an independent operation. It is an expansion of the National Air and Space Museum and a companion facility to the building downtown.

"Of the 265 employees of the National Air and Space Museum, only 15 are assigned to the Udvar-Hazy Center," the museum's fact sheet says. "Most administrative and curatorial operations will be based at the museum's flagship building on the National Mall. Other Smithsonian staff not directly employed by the museum, such as store employees, also work at the Udvar-Hazy Center."

The major presence at Udvar-Hazy is some 300 education docents and

other volunteers. They wear big "Ask Me" buttons and answer visitors' questions with knowledge and enthusiasm.

The downtown museum had room for only 10 percent of the collection. (Another 10 percent is on loan to other institutions.) Udvar-Hazy gives the museum space to display the 80 percent of its airplanes that had been in storage. Many of them were too large to fit into the museum downtown.

There is no intention to move the museum's best known holdings, now exhibited in the downtown facility,

to Udvar-Hazy. "Crown jewels" shown at the flagship facility include the Wright brothers' 1903 Kitty Hawk Flyer, Lindbergh's *Spirit of St. Louis*, Chuck Yeager's X-1 *Glamorous Glennis*, which broke the sound barrier in 1947, and the Apollo 11 command module *Columbia*, in which astronauts flew to the Moon and back.

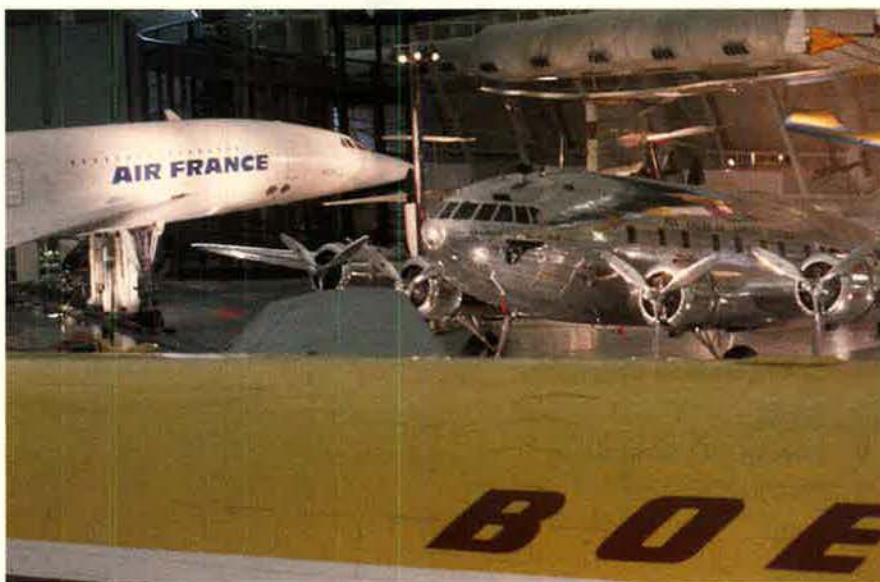
Since October, the downtown museum has been the site of a spectacular exhibition, "The Wright Brothers and the Invention of the Aerial Age," commemorating the 100th anniversary of powered flight. The program is built around the Wright Flyer and features 170 artifacts.

Dailey said that, "whereas the flagship building combines large exhibit halls, such as Milestones of Flight, with the more traditional exhibitions, such as the new Wright Brothers and the Invention of the Aerial Age, in the various galleries, the Udvar-Hazy Center will feature a single, coordinated display approach—exhibits of artifacts with brief identification labels, grouped in major thematic areas featuring historical background to provide context."

By Air and by Road

Getting the airplanes to Udvar-Hazy has been a job in itself. Some of them, including the *Enola Gay*, were trucked to Chantilly in pieces aboard a tractor-trailer called "Big Blue" and then reassembled.

Others, such as the Concorde, flew to Dulles and came to the museum



Civilian side. Among the other highlights in the aviation hangar are a Boeing 707 (foreground), a supersonic Concorde (left), and a gleaming Boeing 307 Stratoliner, one of only 10 ever built.



In its 1995-98 *Enola Gay* exhibit (above), NASM displayed only the B-29's forward fuselage, a propeller, tail fin, and a few other parts.

The Activists and the *Enola Gay*

This is the National Air and Space Museum's third shot at exhibition of the *Enola Gay*.

The first time was in 1993, when the museum, under different management, planned to display the *Enola Gay* in a political horror show that emphasized Japanese suffering and depicted Japan more as a victim than an aggressor in World War II. An article in *Air Force Magazine* brought the plan to light, and, after a raging controversy, the exhibit was canceled in early 1995.

The museum's second shot came later in 1995, a replacement for the canceled version. It took a straightforward, factual approach, built around display of the forward fuselage, a propeller, the tail fin, and other parts of the *Enola Gay*. The rest of the aircraft had not been restored yet, and, even if it had been, the 141-foot wingspan would have made it too large to show in the downtown museum. That exhibition ran for three years and drew almost four million visitors, becoming the most popular special exhibition in the museum's history.

The exhibition that opened Dec. 15 at the Udvar-Hazy Center leaves the airplane to speak for itself. The basic facts, including the fact that it dropped the atomic bomb on Hiroshima, are on the label in front of the airplane.

That has drawn the ire of protesters. Demonstrators, activists, and others—including a self-appointed committee that includes such luminaries as Oliver Stone, Daniel Ellsberg, and Noam Chomsky—are demanding that the museum rework the exhibit to emphasize Japanese death and suffering at Hiroshima.

In effect, the activists want the museum to depict the Japanese as victims, not as aggressors, in World War II. That was the line of the show that was blown away by public outrage in 1995.

The mayor of Hiroshima, Tadatosh Akiba, has written to museum director John R. Dailey to complain. The exhibition canceled in 1995, the mayor said, would have included displays of A-bomb damage and the suffering the atomic bombs inflicted on living human beings. This balanced exhibition was stopped by a Congressional resolution at the insistence of veterans groups determined to protect their cherished belief that the atomic bombings were justified and indispensable.

Dailey said the museum does not plan to change the display of the *Enola Gay* at Udvar-Hazy.

on a direct ramp from the runway.

The first big artifact to arrive was the shuttle *Enterprise*, which rode in piggyback atop a Boeing 747 and went into long-term storage near the future site of Udvar-Hazy.

The classiest arrival was by the SR-71, which set a transcontinental speed record on its last flight, March 6, 1990. That day, the Blackbird flew from Los Angeles to Dulles in 64 minutes, 20 seconds, averaging 2,124 mph. (In operational service with the Air Force, the SR-71 could reach top speeds of Mach 3.3.) It was stored at Dulles until towed to Udvar-Hazy last September.

More aircraft continue to arrive at the aviation hangar, and the space hangar will be open sometime this year. Other attractions, such as an IMAX theater, are already in operation.

Still more lies ahead. The second phase of construction will include a huge restoration hangar, where visitors will be able to watch the preservation and restoration of historic aircraft and spacecraft.

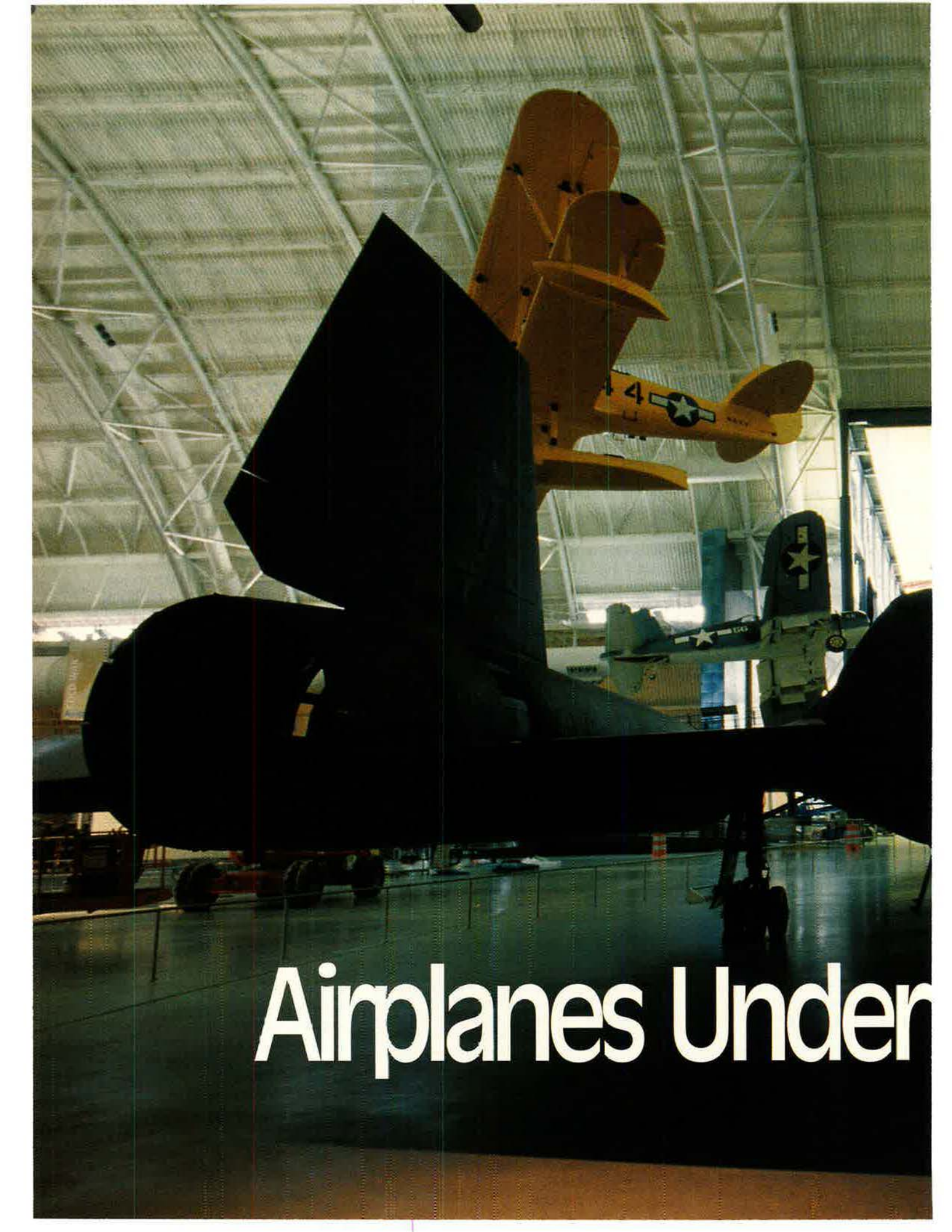
This, however, awaits funding. The total cost of the Udvar-Hazy project was \$311 million, and the enabling legislation from Congress stipulated that no federal funds could be used for construction.

"An additional \$92 million needs to be raised," Dailey said. "This will enable us to pay off the existing debt and continue Phase 2, which consists of the restoration center and archival research center."

Visitors can reach Udvar-Hazy by car—from Interstate 66 to Route 28 north, exiting on Air and Space Museum Parkway—although a shuttle bus is available from the museum downtown. Further information is available on the museum's Web site, www.nasm.si.edu.

Air and Space was already the most popular museum in the world. It set an attendance record of nearly 11 million last year, and that was with the downtown building alone. Now that Udvar-Hazy has been added, there's no telling what altitudes the response might reach. ■

John T. Correll was editor in chief of Air Force Magazine for 18 years and is now a contributing editor. His most recent article, "European Command Looks South and East," appeared in the December 2003 issue.



Airplanes Under

Photography by Guy Aceto, Art Director, and Paul Kennedy

Glass

Acres of aircraft, spacecraft, and artifacts of flight are on display at the Smithsonian's new Udvar-Hazy Center.

The SR-71 Blackbird dominates the entrance of the center.

The new Steven F. Udvar-Hazy Center has been a long time coming, but it is now open. At right and below are exterior views of the National Air and Space Museum's new facility. One of its hangars is longer than three football fields placed end to end. Plans call for the center to house 200 aircraft and 135 spacecraft.



Staff photos by Guy Accelo

Photo by Paul Kennedy



This photo provides a glimpse of the overall size of the center. USAF's SR-71 Blackbird is featured near the entrance. Above it hangs a World War II P-40 Warhawk. The Lockheed SR-71 was designed and built in the 1960s, but it is still the highest flying and fastest standard aircraft ever built. This SR-71 made numerous reconnaissance flights during its 24-year career. The Curtiss P-40 is one of the most famous aircraft of its era. It's perhaps best known in its Flying Tiger paint scheme, showing a shark's mouth. This particular P-40E did not fly in the war with US forces; instead it saw action with the Royal Canadian Air Force.

These two foes from the Korean War are an F-86 Sabre (left) and a MiG-15. This F-86 was assigned to the 4th Fighter-Interceptor Group, and most of its combat missions originated at Kimpo AB, South Korea. The MiG-15 is a Chinese-built MiG, dubbed F-2, acquired from another US museum.





Photo by Paul Kennedy

The B-29 Enola Gay (above and right) has been fully reassembled. In the foreground, under a wing, is a P-38 Lightning. The B-29 was the most sophisticated propeller-driven bomber to fly in World War II and the first to offer pressurized compartments for its crew. The twin boom, twin engine P-38 downed more aircraft in the Pacific during the war than any other fighter. This P-38 was converted to a two-seat trainer.

The P-26 "Peashooter," shown below, was a high-performance, all-metal monoplane but still had older design elements, such as an open cockpit and fixed landing gear. Peashooters were used in the 1930s for air defense. This one flew in the States until its transfer to the Panama Canal Zone in 1938. It eventually served in the Guatemalan Air Force.



Staff photos by Guy Acalo



The Spad XVI (left) was a two-seat version of the Spad fighters of World War I. About 1,000 of this type were produced, beginning in January 1918. This Spad was Billy Mitchell's personal aircraft, one he piloted on observation flights over the front lines during the last months of the war.

An ancestor of USAF's current B-2 stealth bomber is the Nothrop N-1M flying wing (right). N-1M stands for Northrop Model 1 Mock-up. The N-1M was developed in 1939-40 and was the first pure all-wing airplane. On July 3, 1940, it made its first test flight—accidentally—when it hit a bump on a dry lake bed and went airborne for a few hundred yards. It was flown for several years, and, although it was overweight and underpowered, it led to more advanced flying wing concepts.



Photos by Paul Kennedy



At left sits a Boeing 307 Stratoliner with a Bde BD-5B under its wing. The Stratoliner, first flown in 1938, was the first airliner with a pressurized cabin. It incorporated the wings, tail, and engines of the Boeing B-17C bomber. This aircraft was flown by Pan American Airways as the Clipper Flying Cloud. The BD-5B is one of the smallest aircraft on exhibit. It is just over 13 feet in length. The museum calls it a build-it-at-home-from-a-kit aircraft. The prototype flew Sept. 12, 1971, and, by December, its designer, James R. Bde, had 4,000 orders for kits. Unfortunately, the airplanes proved difficult to build, taking many years and dollars to complete. According to the museum, about 150 were flying in 2002.

The power plants at right are part of a collection of 35 aircraft engines on display at the museum. They range from an Aichi Atsuta to the Wright Cyclone GR-3350. The center has thousands of smaller artifacts, many of which are already on display. Others will be added later.



Staff photo by Guy Acario



Above is the Mercury Freedom 7 II capsule. It was to be the capsule used by astronaut Alan Shepard, the first American in space, if he had made a second Mercury flight. In the background is the first full-size space shuttle, the Enterprise—a test vehicle. Rockwell International rolled it out in 1976. It was used for approach and landing tests, then vibration tests, and launch complex fit checks. Below, the Enterprise is towed into its home at the Udvar-Hazy Center.



Above is one of four Airstream trailers used by NASA as mobile quarantine facilities. They were used to isolate astronauts returning from the moon in hopes of preventing the spread of any lunar based contagions. NASA ensured the integrity of the quarantine by maintaining negative internal pressure and

filtering effluent air. This unit was used by the crew of Apollo 11. It was carried aboard USS Hornet, then transported to the Johnson Space Center in Houston. There the crew remained in the trailer until deemed "safe."

Photo by Paul Kennedy

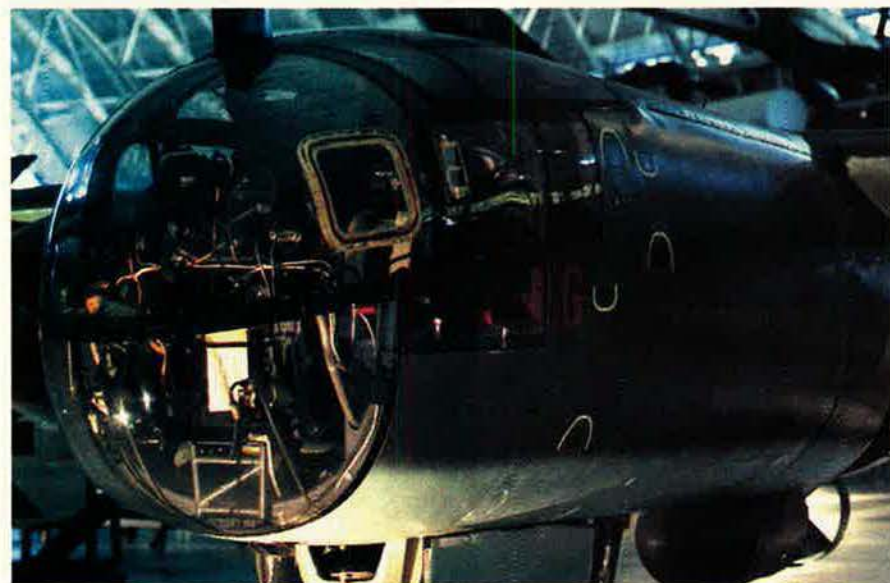


The P-47 Thunderbolt was a premier fighter of World War II. This one (right and below) was flown as an aerial gunnery trainer.

A German Focke-Wulf FW-190 sits near the P-47. A prototype FW-190 first flew in 1939.



Staff photos by Guy Aceto



The German Arado Ar-234B Blitz (Lightning), at left, was the world's first operational jet bomber. Development began in 1940, but the first Ar-234 did not fly until 1943; Germany had diverted engines to its Messerschmitt (Me-262) jet fighters. The bomber prototype flew a year later. This aircraft was one of nine Ar-234s surrendered to British forces in Norway. According to the museum, it is the sole surviving Ar-234.

The newest aircraft at Udvar-Hazy is the Lockheed Martin X-35B short takeoff and vertical landing aircraft. It was a demonstrator for the new Joint Strike Fighter being developed for the US Air Force, Marine Corps, and Navy as well as Britain's Royal Air Force and Royal Navy. Flight testing of the JSF demonstrators ran from October 2000 to August 2001. The other two versions are the X-35A Air Force conventional takeoff and landing aircraft and the X-35C Navy carrier variants.





The sleek, supersonic, delta-wing Concorde (above) saw service with Air France, flying its first Paris-to-Dakar-to-Rio de Janeiro route in January 1976. It flew around the world in 1998 in 41 hours, 27 minutes. It had made 6,966 flights, accumulating 17,820 flight hours, before it was donated to the museum.

The Concorde sits near the Boeing 307 Stratoliner and another Boeing airliner, the 367-80. The "Dash 80," as it is known, first flew on July 15, 1954 and was the prototype for the Boeing 707 and Air Force KC-135 tanker. The Dash 80 also served as the test bed for the Boeing 727 and for a variety of engines and airframe components. It was donated to the museum in 1972.



Displayed near the Dash 80 (left) are several aerobatic aircraft.

Above, mounted on wires, are numerous small aircraft. The bright red Little Butch in the foreground is a Monocoupe 110 Special that flew in air shows beginning in the late 1940s. It was donated to the museum in 1981.

Even aircraft suspended in air are accessible to visitors by means of elevated walkways that rise to four stories above the floor. The vastness of the new center is astounding. ■



Verbatim

By John T. Correll, Contributing Editor

Freedom From Fear

"If I'm President of the United States, I'm going to take care of the American people. We are not going to have one of these incidents."—*Presidential candidate retired Army Gen. Wesley K. Clark on terrorist attacks, Concord Monitor (N.H.), Jan. 9.*

Expert on Baloney

"I've been accused of using nothing but numbers, which is total baloney. In certain situations, numbers are damned important: developing a budget for the nation, reducing combat losses in war."—*Former Secretary of Defense Robert S. McNamara, now starring in a new film, "The Fog of War," Washington Post, Dec. 21.*

The D-Day Diversion

"On June 6, 1944, the Allies opened a daring campaign against Nazi Germany on the beaches of Normandy in northwestern France, finally relieving pressure on Soviet forces battling in the east."—*Description by Reuters, Jan. 2, of D-Day in report on French plans for 60th anniversary commemoration.*

No Safer

"The capture of Saddam Hussein is a good thing which I hope very much will help keep our soldiers safer. But the capture of Saddam has not made America safer."—*Presidential candidate Howard Dean, speech to Pacific Council on International Policy, Dec. 15.*

Can't Fool McDermott

"I'm sure they could have found him a long time ago if they wanted to. I've been surprised they waited, but then I thought, well, politically, it probably doesn't make much sense to find him just yet. There's too much by happenstance for it to be just a coincidental thing that it happened on this particular day."—*Rep. Jim McDermott (D-Wash.) on capture of Saddam Hussein, Seattle radio interview, reported by Seattle Times, Dec. 16.*

Can't Fool Albright, Either

"Do you suppose that the Bush Administration has Osama bin Laden hidden away somewhere and will bring him out before the election?"—*Former Secretary of State Madeleine K. Albright, who later said it was a joke, Washington Times, Dec. 18.*

Bring Back the Embeds

"I do not believe we have had very much accurate reporting from Iraq since the embedded journalists left. More embedding right now would satisfy me."—*Retired Army Gen. Tommy R. Franks, coalition commander in Gulf War II, Palm Beach Post, Jan. 7.*

Imperial But Not Imperialist

"America's armed forces are becoming imperial without their country's becoming imperialist. There is an important difference. Empires take many forms. One is that of an entity that exercises power far from its base without assuming political authority. That promises to be the new American way. America has always been and remains profoundly anti-imperialist."—*British military historian John Keegan, Time, Dec. 29-Jan. 5.*

Don't Go There

"The Chinese people are feeling displeased. We do respect Japanese culture and customs, but (Yasukuni) enshrines class-A war criminals. It is an act that neither China nor any other country that suffered during World War II can accept."—*Chinese Vice President Zeng Qinghong, criticizing visit of Japanese Prime Minister Junichiro Koizumi to the Yasukuni Shrine, which honors Japanese war dead, Japan Times, Jan. 13.*

We're Amis, Really

"It's true that we had a disagreement with the United States over Iraq. We sincerely thought that it was not the best way. But that represents such a tiny part of our overall relationship. It is really a pity that it caused some people to overlook the important military actions

we conduct side by side to fight such blights as terrorism or drug trafficking, to restore peace or reinforce stability."—*French Defense Minister Michele Alliot-Marie, Washington Post, Jan. 16.*

Outward Bound

"We do not yet know where this journey will end, yet we know this: Human beings are headed into the cosmos."—*President George W. Bush, announcing space exploration program, Jan. 14.*

Fuller Partners

"The Joint Strike Fighter is going to be the only show in town. We want to be able to use the airplane. We want to operate it without feeling we have to get the approval of the United States."—*Gerald Howarth, British member of Parliament, on desire of allies for bigger role in the program, Washington Post, Jan. 2.*

Bad War

"[The global war on terrorism] may have set the United States on a course of open-ended and gratuitous conflict with states and non-state entities that pose no serious threat to the United States. ... The GWOT's goals are also politically, fiscally, and militarily unsustainable." [It] is strategically unfocused, promises much more than it can deliver, and threatens to dissipate scarce US military and other means over too many ends."—*Jeffrey Record, member of the Air War College faculty, in a study for the Army War College Strategic Studies Institute, December 2003.*

The Nazi Standard

"I consider the act absolutely brutal, threatening human rights, violating human dignity, xenophobic, and worthy of the worst horrors committed by the Nazis."—*Brazilian judge Julier Sebastiao da Silva, denouncing US fingerprinting of foreigners arriving in the US and ordering similar treatment of Americans in Brazil, Washington Post, Jan. 4.*

Gen. Robert Foglesong, commander of US Air Forces in Europe, says his forces must be re-postured for the war on terror.

SPRINGBOARD FOR AIRPOWER

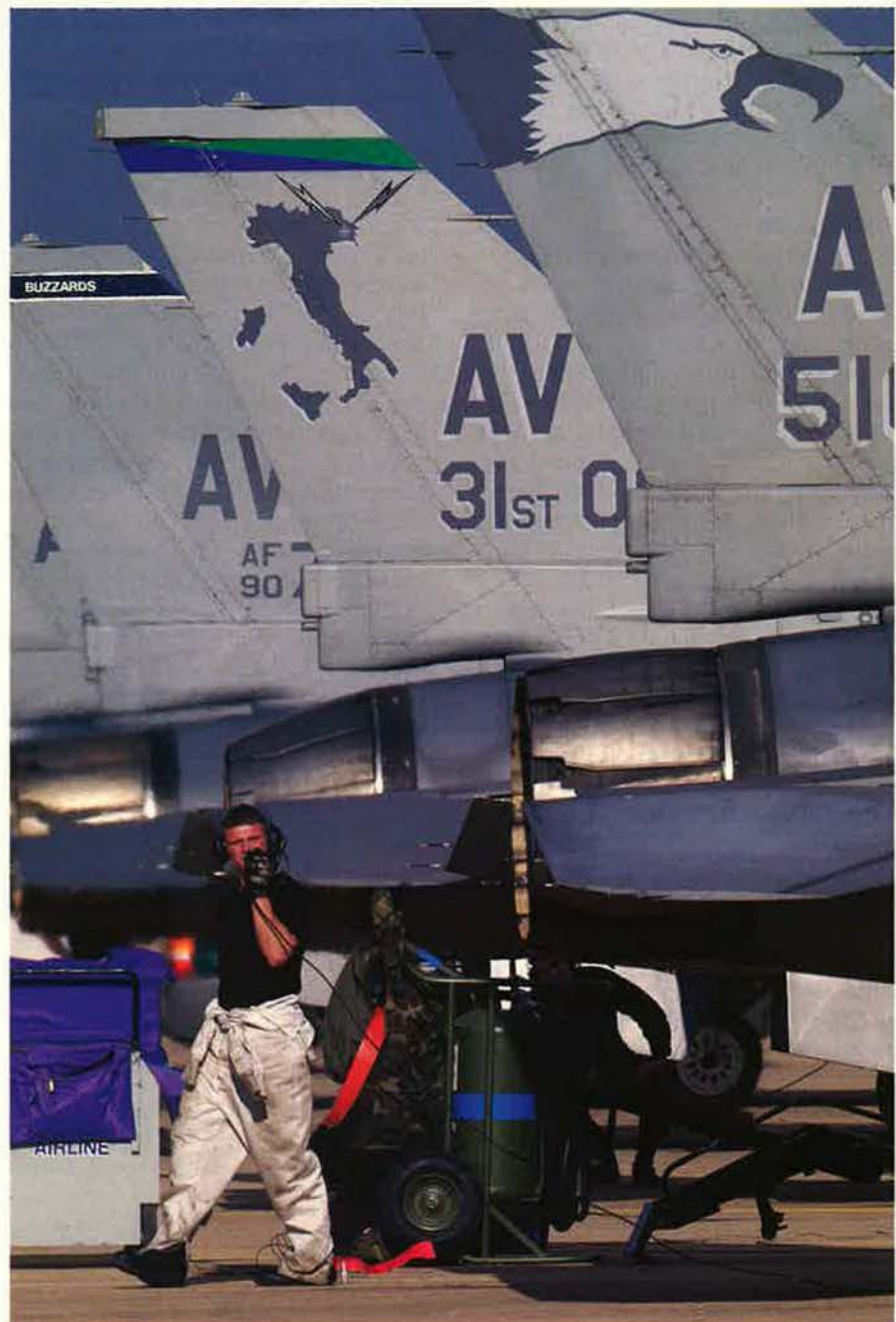
Gen. Robert H. Foglesong, formerly Air Force vice chief of staff, is commander of US Air Forces in Europe, commander of Allied Air Forces Northern Europe, and air component commander of US European Command. In January, he met with the Defense Writers Group in Washington, D.C., to discuss issues, opportunities, and challenges facing his command, as well as broader considerations affecting the entire Air Force. Below are some of his comments.

Force Structure

"Most of the work that I've been doing ... has been focused on whether we're right-sized from an Air Force perspective in Europe and whether we're postured in the right place, whether we're located in the right places. ... That's a work in progress. ...

"The US Air Force started right-sizing about a decade ago. ... At one time we had 12 fighter wing equivalents in Europe. Too many. ... We clearly didn't need that many. We've got about 2.5 fighter wing equivalents now. So there's some balance there. ... That was kind of a smart thing for us to do. And, frankly,

Crew chief SrA. Jon Bolz talks with an F-16 pilot taking off from Zaragoza AB, Spain, for action in the Gulf. Reconstitution of USAFE forces is on "the right glide slope," says Foglesong.



USAF photo by TSgt. Dave Ahlischwede

airpower can get [to Europe] pretty quickly. [Given a] requirement to move a squadron or to get something overseas, we can move pretty quickly over there, so it gave us the latitude of moving stuff back to the United States.”

South and East

“It makes sense for us to have our forces postured in locations to handle this Global War on Terrorism. ... Some of this has to do, in our case, [with] where there are large ramps—where there are large runways. Then, there’s other investment that’s required. ... We’re looking south and east. That makes sense to us to posture our forces in positions ... [where they] could be employed quicker. And, by the way, we have incredible airspace constraints in the western part of Europe now. So the eastern part of Europe is more advantageous to us from that perspective.”

Old Europe

“There are certain bases that are going to be ... enduring bases. ... It’s incredible the construction that’s going on at Ramstein [AB, Germany] right now. The transportation—the hub part of [US military operations]—will continue to be important, and, as part of the draw-down of Rhein–Main [AB, Germany], the construction work that’s going on at [Spangdahlem AB, Germany] is also pretty significant. You wouldn’t want to get to a point in Europe where you only had one hub. ... So, I think, from a transportation perspective, we’re going to have some bases over there that are going to be enduring for a long time.”

The Turkish Question

“[Turkey is] a very important strategic partner of ours. ... From a military perspective, I will tell you they’ve got some incredible [training] ranges there. ... We would like to engage with them militarily where it’s appropriate. ... We have a good working relationship with the chief of their air force now. ...

“The iron effectively left Incirlik [AB, Turkey] at the end of hostilities [Operation Northern Watch and Operation Iraqi Freedom], but Incirlik is active again in a sense. The Turks have let us bring tankers in there, and we’re operating some tanker assets out of there now.”



USAF photo by S/A Matthew Hannan

A KC-135R tanker taxis down the runway at Incirlik AB, Turkey. Incirlik has become a hub for tanker operations. Foglesong would like to see more military-to-military cooperation with Turkey.

Reconstituting USAFE

“My focus initially was on reconstitution. When we got our forces back [from Operation Iraqi Freedom], were we going to be able to reconstitute in a timely manner, and, in case the President decided we need to do something else, ... would we be ready to go? I’m delighted to tell you ... we have had the opportunity to come back and do a significant amount of reconstitution. We think we’re on the right glide slope. ...

“There are pockets out there that will take longer to reconstitute because we used them for longer periods of time. [But] the forces in Europe have had a chance to come back, take a deep breath, ... then start the training process.”

Replenishing Weapons

“When you’re trying to replenish [Joint Direct Attack Munitions], you don’t replenish them overnight. That takes months and sometimes years to replenish those kinds of things. And airplanes that come back that are being pushed into depot earlier—that process happens in due course. ... But the process is established, and the milestones are established. ... I don’t see the units saying we’re short of iron—we can’t do our training because we’re having to reconstitute the iron.”

The New NATO

“Think how far NATO has come over the last couple of years ... to be

able to organize itself in a way ... to do out-of-AOR [area of responsibility] operations like we’re doing in Afghanistan. I think it’s a pretty extraordinary movement by an organization that, for decades, was focused on the Soviet Union. ...

“Eventually, there will be a certification process [for the new NATO Response Force. There will be] some system to certify that the air forces and ground forces and naval forces are all hooked up. ... The ‘air contract,’ if you will, is to have forces available that can provide up to 200 sorties a day. That’s kind of the level we’ve been asked to provide planning for—and resources. ... That would include lift. ... What we’re asking countries to do is to source resources like we do in our AEFs [Air and Space Expeditionary Forces]. ...

“So, we would draw up the requirement that said, in order to provide 200 sorties a day, these are the kind of assets that we think we’d need. ... Some countries will come in and say, ‘OK, we can provide a little [tactical] lift, or we can provide some fighter support.’ ... Then we kluge that all together in a mechanism that we then know precisely who’s on the bubble. Then both Air North and Air South ... can actually go out and do tactical evaluations of the units that have been volunteered by the nations to be part of the NATO Response Force. And that’s part of the certification process—to make

sure their pilots can deliver the ordinance or can deliver the goods or provide the air refueling capability needed.”

Commonality

“On the air element side of [the NRF], I will tell you we’re focused ... in Air North on ensuring ... that we’re hooked up with the other NATO air forces, and all of them are hooked closely together as far as tactics, training, and procedures. Our US experience and our NATO experience is that we rarely go into a contingency unless we’re hooked up with our allies and coalition partners, in some way. So it’s a good thing when ... we’re on the same playbook. ...

“We’ve got a lot of different waveforms and radios in NATO. That’s one of the things we talked about in [the NATO air chiefs] meeting—the common threads. Some of that is very expensive to unplug and re-plug ... We’re looking where opportunities are available. ... That’s long term, frankly. That won’t happen overnight. That’s over years, as they acquire new iron or as they modify their iron to make sure we’re on the same equipment.”

Crossing Theater Lines

“We’re in the process in the United States Air Force of trying to lash up our air operating centers around the world. This has been a real priority for General Jumper [Air Force Chief



USAF photo by SMSgt. Edward Snyder

F-16CJs from Spangdahlem AB, Germany, and the South Carolina Air National Guard await takeoff at a forward location during OIF. USAFE has a process established to push returning warplanes through depot maintenance earlier.

of Staff]. ... The reason we’re doing that is this Global War on Terrorism doesn’t care one iota about boundaries. ... It’s desirable for us to know what’s going on in CENTCOM [US Central Command], and it’s desirable for CENTCOM to know what’s going on in our AOR. ...

“On 1 December, I stood up my 24/7 air operations center, and we’re lashing up with other air operations centers. ... It’s important that we all have what we’ll call a common air picture. ... There’s a lot of energy going into making sure we’re hooked up in a more global fashion than

what we traditionally thought—each combatant commander [having] his own footprint and the boundaries between them. ... The Secretary of Defense has been very clear about this: This is a global war. We’re going to have to work back and forth across those boundaries.”

The Army Can Be Intimidating

“We really have the most inspirational and intimidating military in the world, we really do. I’m very proud of the United States Air Force because I think they represent a lot of that, but so does the US Army. It’s an inspirational Army. They go out and do incredible work. ... [They can] be intimidating.

“So the Army deserves all the help the United States Air Force can give them right now. Because, while we’re back home and we’ve got some of the opportunity to reconstitute, they’re out there slugging away.

“I’m always reminded of when I was doing some interesting work in the negotiation business in Kosovo—what a great air war that was for us; ... it was a great chance for us to beat our chest and proudly proclaim what airpower can do—[but] three days later I happened to go to Pristina and guess who was standing on the street corners up there? I’ll tell you who it wasn’t. It wasn’t the United States Air Force. It was the United States Army and the Marine Corps.

“I was reminded of [that fact]



C-5 airlifters sit on the ramp at Ramstein AB, Germany. Ramstein is undergoing extensive airfield renovations, as is Spangdahlem Air Base. German air bases will continue to be important to US operations, says Foglesong.

Staff photo by Guy Aceto

again in Afghanistan. Jack [Army Gen. John M. Keane] and I kind of laughed about this—not in a humorous way—but [USAF] took great credit ... in the air campaign that went on in Afghanistan, [but] guess who had to go into those caves and pull those people out? Well, it wasn't [USAF]. We may have been on the ground down there with them to assist them to a degree, but it was that inspirational and intimidating Army."

Close Air Support

"In a sense, the Air Force and the Army had ... drifted apart over the years in close air support. And it wasn't because somebody, years ago, made the decision that we wanted to drift apart, it was just that that had happened. ... We thought we were doing close air support. We had let ourselves believe we were doing close air support for a decade. ... The last time that we believe that we did close air support—bad guys mixed with good guys, the classic definition of close air support—was in Vietnam. ...

"So ... three decades later, ... here we are doing close air support in OEF [Operation Enduring Freedom]. So our cultures had moved away, and ... so had our dedication to a couple of things. One was making sure ... we sent the right people and the right number of people with the Army when they deployed forward to go into combat. And, two, we needed to get our act together ... on talking with each other. ... We need to make sure we're all on the same frequency with handheld radios, talking to somebody up in an airplane. And, even better, not talking: If we could send data straight up to the airplanes. ...

"Close air support ... used to be defined as seeing and hearing an airplane. It made you comfortable if you were a forward air controller on the ground because you could see the airplane. You could tell him, 'My smoke's over there, go two clicks [in] this direction, and that's where the target is.

"Now, we had a new form of close air support that was being delivered from 30,000 feet. It depended upon somebody on the ground who could get you a very finite set of coordinates and somebody in the airplane



Foglesong, in an F-16, says USAFE is "OK" on end strength. He thinks it's "premature" to ask for more manpower until the Air Force figures out how to "mine" airmen from civilian-type jobs and put them in "trigger-pulling" jobs.

who could fat-finger them in a very precise way. ... So it was an uncomfortable thing, to a degree, for the ground forces, that all of a sudden have to accommodate this change in culture. ...

"There're new ways of doing business, and we had not hooked ourselves up in a way that we should have over the last two decades. Nobody's fault. This is not being critical, it just happened that way. ... The Army and Air Force have had several meetings on this and really have made great strides. ... We figured out how to talk to each other; we figured out how to lash up with each other; and ... we had general officers embedded with Army general officers and Marine general officers. ... So if the Army general officer needed something, all he needed to do was turn around and say, 'I need a little help.' ... So we ... now have remarried, I guess. But we still have work to do."

Future of A-10s

"It does bring a capability ... that we're going to keep around for a significant period of time. It's going to depend, of course, on how long the airframe can last. There are certain points where it gets too expensive. ... But for right now, the A-10's got a lot of legs left on it, and we have just proven that. We just revalidated that that airplane has a mission that's very valuable to us."

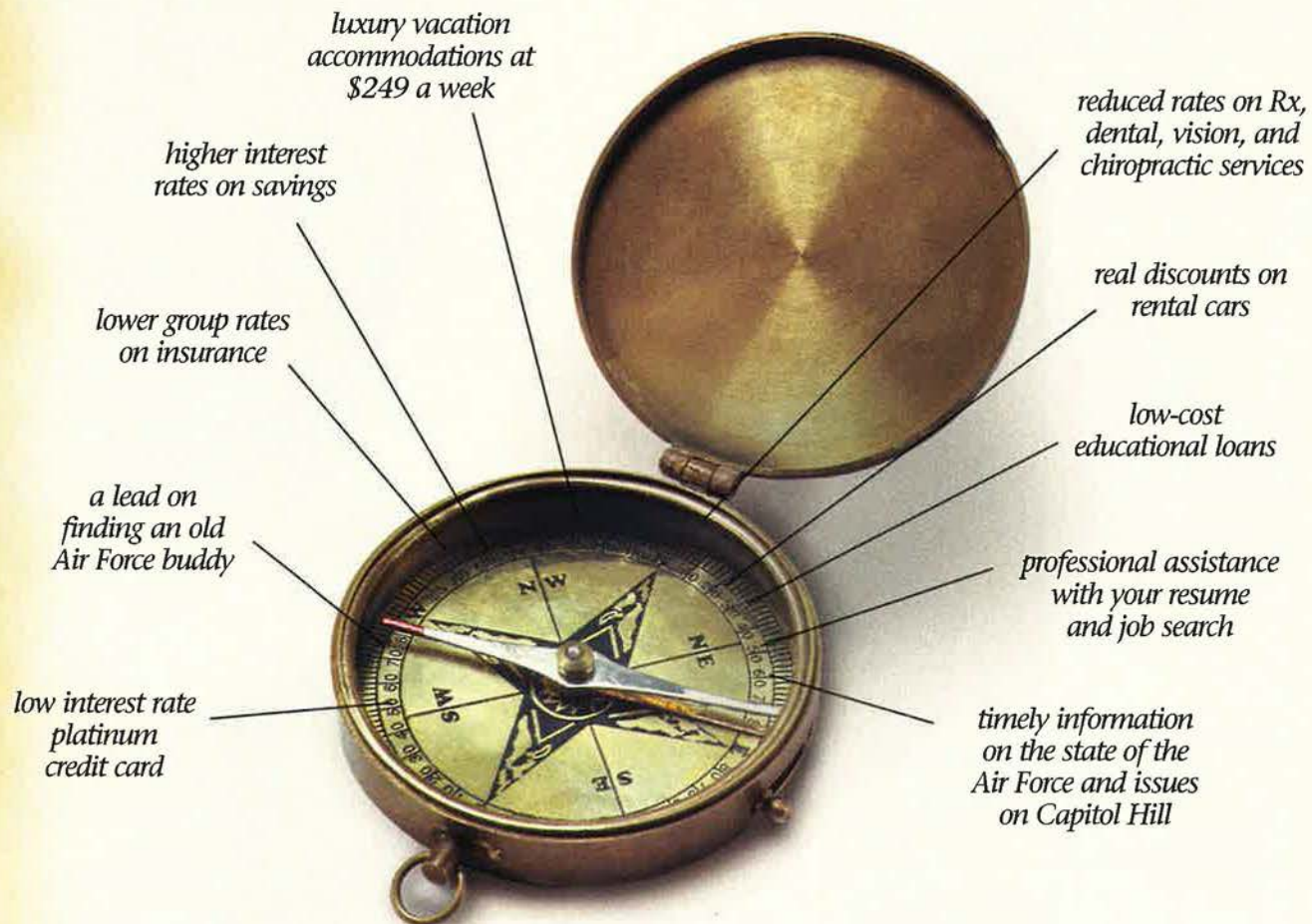
End Strength

"There's always the question of: Do you have enough people? ... My sensing is, right now, that we're OK. ... We have figured out how to 'mine,' if I can use that term, uniforms from areas that are not in the trigger-pulling business and put them in the trigger-pulling business. We have been able to convert slots that we can either contract out—we can buy the service from somewhere—or we can have a civilian who's not in uniform do the job for us. And then we can take that manpower position, and, instead of turning it in, we take that manpower position and redistribute it into those areas that were highly stressed for us, like security forces and comm and intel.

"That doesn't happen overnight because there's a training tail that goes with it. ... But I'm starting to see the results of all that. In our security forces, for instance, we have added literally hundreds of people. ... If you go talk to our security forces right now, they feel a lot more comfortable about what we're asking them to do. So that process is starting to work. Actually, it's well down the path of working.

"It's premature for me to say ... that we need more manpower. What we need to do is continue down the path of mining these individual manpower positions so we can convert them into our more stressed career fields." ■

Where Can You Get...



luxury vacation accommodations at \$249 a week

higher interest rates on savings

lower group rates on insurance

a lead on finding an old Air Force buddy

low interest rate platinum credit card

reduced rates on Rx, dental, vision, and chiropractic services

real discounts on rental cars

low-cost educational loans

professional assistance with your resume and job search

timely information on the state of the Air Force and issues on Capitol Hill

...Closer Than You Think.

All these time and money-saving opportunities are available to you through your Air Force Association Member Benefits. And new products and services are continually added to make membership even more valuable. For an update, visit Member Benefits online or call toll free.

USE YOUR AFA MEMBER BENEFITS OFTEN!



Visit www.afa.org and click Member Benefits

Call toll free
1-800-727-3337
weekdays 8:30 AM
to 5:00 PM ET

And please: if it's time, renew now. If you're not a member, join today. If you have a friend/relative who might like the best association benefit package while supporting The Force Behind The Force, pass this information on.



The new triple-purpose fighter experiences growth—and growing pains.

The F-35 Gets R

Pictured here is Lockheed Martin's X-35 Joint Strike Fighter concept demonstrator. The first development F-35 will emerge late next year.

THE NEW F-35 Joint Strike Fighter is transforming from a "paper" airplane into a "real" airplane. The shift got underway in November, when the fighter subcontractors began fabricating the first actual airframe components. This is always a tense time for a big procurement program, but F-35 officials are confident that they will keep development turbulence at a minimum.

The changeover has not been without its rough spots, however. What had been a nearly problem-free program began to experience some difficulties.

The F-35 for years had seen little or no cost, schedule, or design problems, but, in recent months, it has seen some of each—for example, unanticipated weight growth.

The Air Force and prime contractor Lockheed Martin are not exactly novices at handling fighter growing pains. They have the recent experience of bringing in the F/A-22 Raptor, a highly complex aircraft. Lessons derived from the Raptor's past difficulties with avionics and aerodynamics will be applied to the new strike fighter, enabling program officials to head off many problems before they occur.

The F-35 is also benefiting from the Raptor's technology—primarily

in the areas of avionics, propulsion, and stealth. Some 30 percent of the mission software in the strike fighter's avionics comes from the F/A-22, said Tom Burbage, executive vice president at Lockheed Martin and JSF general manager. Reuse of that code will reduce the nominal cost of the F-35 program by roughly \$400 million, said Burbage.

The F-35's Pratt & Whitney F135 engine, which will be installed in the initial production aircraft, is derived from the F/A-22's PW F119 power plant, and program officials say the engine has performed flawlessly so

Adam J. Hebert, Senior Editor



real

far. An alternative engine, the General Electric F136, will be introduced around the fifth production lot. Thereafter, the two engine makers will compete for annual sales. The two engines will be functionally identical to ensure either engine can be used at any time.

The strike fighter program also has benefitted from USAF and industry F-117 and F/A-22 stealth technology experience.

Ambitious Effort

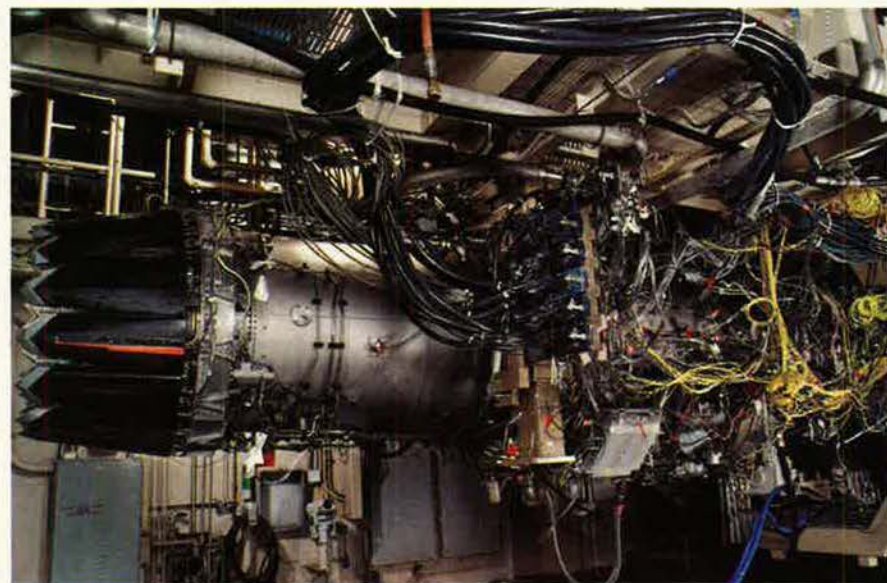
The F-35 program is the largest Defense Department acquisition effort ever. It's an ambitious undertaking to replace thousands of legacy fighter and attack aircraft with three highly common variants of a single fighter.

The Air Force, Marine Corps, and Navy each have their own variant.



Lockheed Martin photo

The F-35 started to become a "real" airplane with the fabrication of the first major airframe components in November. Progressive, Inc., H.M. Dunn, and Brek Manufacturing were first to cut F-35 structural parts.



Lockheed Martin photo

Pictured is Pratt & Whitney's first production-spec F135 power plant. It is derived from P&W's successful F119, developed for the F/A-22 Raptor program.

The three JSFs are designed with maximum commonality in mind, to simplify and streamline development, supply, and maintenance.

The Air Force's F-35A will be a conventional takeoff and landing (CTOL) version to replace F-16s and A-10s. The Navy plans to replace F-18A/Cs and introduce stealth into its fleet with its carrier variant (CV) F-35C. The Marine Corps version, the F-35B, will be a short takeoff and vertical landing (STOVL) aircraft to succeed its elderly AV-8 Harriers and early F/A-18s.

Each F-35 is expected to be able to

perform all the missions of the legacy aircraft it replaces.

For the Air Force, the role of the JSF may become more a function of training specialization or commander requirements.

"How we decide to employ that [aircraft], as a service, is going to be up to our leaders of the time," Col. Daniel Conroy, chief of Air Combat Command's JSF management office at Langley AFB, Va., said in an interview.

"Right now, you've got F-16s that do SEAD [suppression of enemy air defenses] only, you've got F-16s that

concentrate on interdiction, you've got the A-10 in the CAS [close air support] role," explained Conroy, adding, "You could design ... all those capabilities in a single squadron." Then, he said, a combatant commander "can roll [the F-35] into his warfighting effort any way he wants to."

Alternately, Conroy said, USAF could decide to continue to organize squadrons the way it does today, developing different mission expertise in specific squadrons.

The US military needs the Joint Strike Fighter primarily in an air-to-ground role. The Air Force plans to use it to complement its new F/A-22 fighter. Likewise, the Navy wants a similar complement for its new F/A-18E/F.

The JSF will also have an aerial combat capability, due largely to another unique aspect of the program—extensive international cooperation in the development of the aircraft. To fulfill the needs of the JSF program's international partners, the F-35 will have "a reasonable, inherent air-to-air capability," said Air Force Maj. Gen. John L. Hudson, JSF program manager.

The program's international partners (Australia, Britain, Canada, Denmark, Italy, the Netherlands, Norway, and Turkey) want a true multirole aircraft—for everything from close air support and suppression of enemy air defenses to aerial combat. They are contributing to the

program's development phase, in exchange for input into the design and preferential consideration for their national suppliers.

The partner nations have varying input into the program, based on the level of their financial support. The US will receive more than \$4 billion from these nations to help develop the F-35.

Britain was the first international participant in the program and, as the leading partner, has significant input into the design. Britain plans to procure 150 STOVL versions for the Royal Air Force and Royal Navy to replace the GR7 and the Sea Harrier.

Britain is already making plans based on the JSF's advanced capabilities. The strike fighter is "extremely important to us," said Air Chief Marshal Jock Stirrup, Chief of the RAF. In an interview last fall, Stirrup said the RAF envisions the JSF will perform most of the "heavy lifting" in well-defended zones because of its stealth characteristics. Meanwhile, the RAF's Eurofighter Typhoon fleet will operate in a stand-off role in the early days of a conflict.

Britain expects the JSF "to mount offensive air operations from either afloat or ashore," Stirrup explained. "Hence, we have formed what we call Joint Force Harrier ... under a single command, RAF's Fighter Command." This unified force, now flying Harriers, will later migrate to the JSF. That will give Britain "a powerful, precision attack capability," he said.

The F-35 will bring a "leap in technology" and be "one of the more flexible fighters," said Conroy. It will also have a "range that will exceed any of our legacy fighters," he added.

That technology leap creates a minor concern for the international consortium. Some participants have said that technology transfer has been too difficult—an issue the program office continues to work.

"Access to sensitive US technology is always a concern and needs to be treated with the utmost care," said Jon Schreiber, JSF's director of international programs.

Schreiber said partner nations have been assured they will receive an aircraft, at the end of the day, that meets their national requirements and that is "not only superior from a performance standpoint, but one that



Lockheed Martin photo by Tom Reynolds

The X-35 (left) and an F-16D display different profiles. The new strike fighter maintains low-observable characteristics by carrying weapons and fuel internally.

DOD Shuffles JSF Schedule, Dollars

The Defense Department in February announced that the F-35 Joint Strike Fighter program was being restructured because the cost of the system development and demonstration phase was increased by \$7.5 billion. The restructure will yield a "net zero change" in the overall program, according to DOD.

The cost estimate for the development phase rose from \$33 billion to \$40.5 billion when officials had to extend the program schedule by one year to accommodate "additional design work, known risks, and [to provide] a higher-confidence, risk-adjusted cost estimate," stated a DOD budget document outlining the restructure.

"Schedule delays on this very complex aircraft are prudent and necessary to mature its design and ensure its ultimate success," noted the Pentagon in its news release on the 2005 budget.

In the near term, \$5.1 billion was shifted out of procurement appropriations in Fiscal 2005-09. As a result, there will be 70 fewer aircraft built by 2009.

Additional design work is necessary because some integration activities are taking longer than planned, and all three variants are estimated to be at least 1,400 pounds overweight. Officials point out, though, that weight growth is not uncommon.

"To my knowledge, there's not a single aircraft in the last 50 years that hasn't had weight growth," said DOD Comptroller Dov S. Zakheim at the Feb. 2 DOD budget press briefing. "Weight growth correlates phenomenally well with increase in cost," he added. The department needs to address the problem "now, not later," he said, so significant research and development funding is now going to be devoted to cutting the F-35's weight.

Officials said production funds may be added back into the F-35's budget in later years, because the Air Force and Navy quantity requirements have not changed. Further, the triservice F-35 does not operate under a cost cap, as the F/A-22 Raptor does. Therefore, aircraft lost from the early production lots could be bought later.

The restructure means USAF in Fiscal 2006 will buy six fewer of its conventional takeoff and landing F-35s and 35 fewer through Fiscal 2009. The Marine Corps will cut its purchase of the short takeoff and vertical landing variant by 35 through 2009.

Overall, the Pentagon will acquire 164 fewer F-35s through 2013.

The restructure also produces a one-year delay in low-rate initial production. The first aircraft for the Air Force and Marines will now be built in Fiscal 2007, not 2006. Officials said there is no schedule change on the Navy's carrier version; production is still set to start in Fiscal 2008.

A senior Air Force budget official said that the changes are not expected to delay the first flights of the program's developmental aircraft or postpone USAF's initial operational capability date of 2011.



The F-35's short takeoff and vertical landing variant was specifically designed for Marine Corps use. However, USAF has now decided to acquire this aircraft to replace the A-10 (see box below). The exact number has not yet been specified.

is more affordable from a life cycle cost perspective and [which] can be operated and maintained [abroad]."

Affordability has been a central theme from Day 1 for the JSF program, which has been billed as "the affordable solution" both from a sustainability and up-front cost perspective.

In the year since *Air Force Magazine* reported that the F-35 program had reached its first major development milestone with cost and schedule on track, development cost has risen. (See "The F-35 Steps Out," April 2003, p. 46.) At that time, Hudson said, "So far, our cost performance has been excellent."

In that same article, however, Hudson did allude to potential software difficulties and efforts to save weight. Now, those two issues, plus some design problems, are adding to a cost increase and schedule delays.

The Key Problems

"My two biggest concerns are weight—because that's one of the drivers for performance—and software," Hudson told *Air Force Magazine* in January.

Every additional pound limits performance, but contract specifications primarily are directed toward achieving certain performance requirements for each individual system, not toward maintaining a specific weight for those systems.

"The empty weight of this airplane is about 27,000 pounds—it's a

There Will Be an Air Force F-35 STOVL

The Air Force recently ended any ambiguity over whether it intended to buy the short takeoff and vertical landing F-35. The service will buy some STOVL F-35s. Top leaders made the announcement on Feb. 12 at the Air Force Association's annual Air Warfare Symposium in Orlando, Fla.

Gen. Ronald R. Fogleman, Air Force Chief of Staff in the period 1994-97, first broached the idea of acquiring STOVL versions to replace some A-10s. Until last month, however, service officials had not made an official commitment.

When asked about the STOVL last fall, Gen. John P. Jumper, the current Chief, did say, "It is not out of the question that the Air Force would be interested."

Jumper said that USAF must pay "specific attention" to CAS, but he noted that USAF was developing new ways to conduct the mission. These included use of USAF bombers dropping satellite guided bombs in the CAS role.

"The course we are on right now is to make sure we can get everything we can out of the A-10," he said, adding, "we know that in the not-too-distant future, the A-10 will be difficult to make survivable in the most difficult battlespaces."

That means, Jumper said, "we're going to have to have something else."

pretty good size airplane," Hudson said. That is without weapons or gas. "When you put 18,000 pounds of gas in it, two 2,000-pound bombs, two air-to-air missiles, ... you are up to about 50,000 pounds at takeoff or around the low 40s at maneuvering weight," he added.

Hudson projects that the Air Force's CTOL version will be "about 1,400 pounds heavy" when it becomes operational. He said that the Navy's CV aircraft probably will also be about 1,400 pounds beyond its target weight and the Marine Corps' STOVL version about 2,200 pounds overweight.

Those extra pounds translate into reduced capability in a key perfor-

mance parameter—combat radius. The KPP requirement for the Air Force's CTOL combat radius is 590 nautical miles. At its target weight, said Hudson, that version of the strike fighter would actually have a radius of about 660 nautical miles. However, he said, "If we're at the 1,400 pounds heavy figure, we're at about 640 [nautical] miles."

Hudson emphasized, "That's still pretty darn good," but it's obvious that weight is degrading range.

On the software issue, Hudson said, "We have our work cut out for us to stay ahead of the game on software." While JSF avionics have not yet caused problems, they pose an area of potential concern.

There are about six million lines of code in the airplane and another six million in the simulator, plus

about three million in associated systems. Some of that 15 million lines of code can be lifted from other programs, such as the F/A-22. However, given the F/A-22's troubled avionics history, F-35 program officials cast a cautious eye toward software development.

"We know that software is, and will continue to be, a big challenge for us," Hudson acknowledged, but he added that avionics design is "going pretty well."

The avionics are critical to the aircraft. "In some ways, this is an extremely sophisticated set of avionics and sensors that needs an airplane to carry it ... into combat," Hudson said.

A slowdown in design of the Air Force's CTOL airframe is also causing some problems. The CTOL design is "not coming as quickly as we'd like," said Hudson, adding that it is "going to take us a little longer than we'd anticipated."

The Air Force's CTOL F-35 is still scheduled to undergo its critical design review next month, the last major developmental milestone before the aircraft begin flying. At the CDR, program officials expect to lock in the strike fighter's CTOL design as much as is possible before flight testing begins in late 2005.

The CV and STOVL variants will have separate CDRs. Hudson said, "We've got some schedule pressure on both of those."

All these current program challenges led the Office of the Secretary of Defense late last year to direct a slow down—beginning with the Fiscal 2005 budget—in the F-35's development program. The delay has forced the program office to move funds from production accounts into development. That means fewer aircraft will be built in this decade than originally planned. (See "DOD Shuffles JSF Schedule, Dollars," p. 47.)

The Pentagon still plans to produce a total of 2,443 aircraft: 1,763 for the Air Force and 680 for the Navy and Marine Corps. And the program is still slated to achieve initial operational capability for the Marines in 2010, the Air Force in 2011, and the Navy in 2012.

Program officials also noted that since the F-35 does not operate under a cost cap like the F/A-22 does, production funds (and aircraft) that are cut in the near term can be added in again later.

The Scorecard

In other ways, the JSF is on track, said Hudson. He rated the program "good" on four of six key performance parameters common across all three variants. (The progress of two KPPs is unknown at this time.) The KPPs are the core fighter capabilities that cannot be traded away in a tug of war between capabilities and affordability. The common KPPs are:

- Radio frequency signature.
- Combat radius.
- Sortie generation.
- Logistics footprint.
- Mission reliability.
- Interoperability.



This is an artist's conception of an F-35. Combat-ready F-35s are expected to have all the capabilities of the F-16s, A-10s, Harriers, and F/A-18 Hornets that they replace, plus more.

Hudson said that radio frequency signature, also known as radar cross section (the very low observability feature) was in good shape, to a great extent because of previous stealth work with the F-117 and F/A-22. He said, "We learned a lot from these systems, not only about how to make it work but how to keep it supportable, so it's not a burden to our maintainers." That last comment also supports elements of both the logistics footprint and mission reliability.

Combat radius, as stated earlier, depends primarily on weight. Even though the CTOL version is heavier than its target weight, program officials still expect to see a better-than-required combat radius.

Hudson projected that the CTOL variant will demonstrate the needed sortie generation rates as it heads into April's CDR.

He said the logistics footprint is defined as the number of "C-17 loads it takes to deploy a fighter squadron for a combat operation." The footprint is on track, he said, adding that the F-35 will be significantly easier to deploy than the F-16.

Interoperability is an unknown, but Hudson said that most interoperability factors, such as the way the fighter will communicate with joint and coalition aircraft, ships, and space assets, are progressing well. Other interoperability factors, he said, are in the category of "we just don't know if we'll meet [them]." The rea-

son, though, is simply that the "standards ... haven't been defined yet or they're shifting," said Hudson. He added, "There's some uncertainty out there about what those standards are going to look like."

Another unknown is mission reliability. The rate for that KPP must be at least 93 percent for USAF's F-35A.

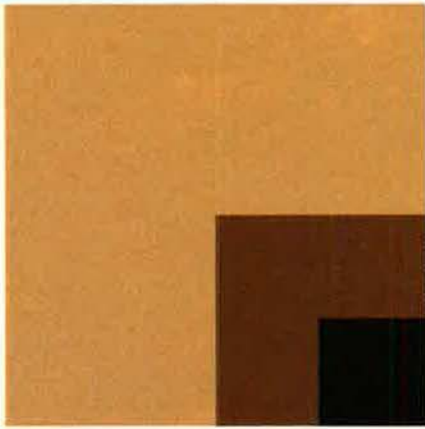
Despite the program's current problems, Hudson maintains that it has been successful in the past in hitting its milestones on time. And there have been naysayers at every turn.

"I've been in the program almost five years," Hudson said. In that time, "people said the concept demonstrators wouldn't be able to fly. They did."

He went on to say critics also questioned the ability of the CV and STOVL versions to fly in time for the 2001 downselect. There was a Congressional mandate that those variants would fly 20 hours before source selection. That requirement was met, Hudson said, and source selection occurred "on the day and the time we said."

The delays began to emerge last spring, when the preliminary design review took longer than expected. The PDR "took an extra three months to close," said Hudson. That was due primarily to "weapons bay issues and internal routing issues, but we got through that," he noted.

Still, Hudson said, "We've got some significant challenges ahead." ■



By Peter Grier

The New

The Air Force must cut another 16,000 airmen at a time when the service is still stretched thin.

THE Air Force has changed dramatically over the last 15 years: It's 40 percent smaller than it was at the end of the Cold War, yet operational deployments are up—way up.

Many airmen now on active duty went through the turbulent time of the drawdown in the early 1990s. Now Air Force members face another upheaval as service leaders trim the force by some 16,000 personnel and reshape it to correct current manning and skill imbalances.

The new cuts will be the largest the Air Force has made in years and come at a time when the service remains stressed. Even before the surge in operations generated by the Global War on Terror (GWOT), the pace of long-standing deployments and pop-up crises had caused serious problems. Some officials estimated at the time that the Air Force should boost its end strength by at least 10,000 active duty personnel.

Officials have known since USAF became engaged in operations in Afghanistan and Iraq, as well as the increased homeland defense mission, that the service has a bigger

Drawdown



USAF photo by TSgt. Scott Reed

As USAF undergoes another large personnel drawdown, some active duty airmen may opt to join Guard and Reserve counterparts such as SSgt. Jonas Concepcion, a Connecticut Air National Guard crew chief.



problem. The Air Force's Human Capital Task Force, in a 2003 report, called it a "content/skills mix problem."

According to the task force, the Air Force's "documented workload is at least 10 percent greater than assigned people." However, it added, "The problem is exacerbated by the fact that workload is not consistent across career fields nor installations."

Air Force Chief of Staff John P. Jumper emphasized that point in a formal statement released Jan. 29. He said, "We are out of balance for the contingency world in which we live."

Air Force leaders have been attempting since at least mid-2002 to identify the manning imbalance and redirect manpower into the most stressed areas. What they are not willing to do at this point is call for a permanent increase in end strength.

The problem, they say, is too complex to be solved by a single expedient.

"Increasing end strength isn't the answer," stated Air Force Secretary James G. Roche last fall. "We need to look at what we're doing, why we're doing it, and ask ourselves if there's another way to get the job done or if it's a job we should be doing."

The Understrength Years

Before the Sept. 11, 2001, terrorist attacks, the Air Force had been below its authorized end strength for several years. Jumper said that the robust economy in the late 1990s brought a drop in recruiting that the Air Force had not seen since 1979. To fill its rolls, the service pumped up recruiting and began taking in new active duty members in a variety of skill mixes. Some of those skills, said Jumper, "are no longer applicable to the demands of the GWOT."

After 9/11, however, the Air Force continued its recruiting push and implemented Stop-Loss to keep its end strength up as it headed into Operation Enduring Freedom in Afghanistan and pursued Operation Noble Eagle at home. By the end of Fiscal 2002, the service's active duty rolls exceeded authorized end strength by almost 9,500 personnel.

When USAF ended its Stop-Loss in 2002, said Jumper, many airmen



USAF photo by A1C Nichole Adamowicz

The Air Force must sustain critical career fields even as it cuts some 16,000 airmen to reach its authorized end strength for 2005. Above is SrA. Sara Trent, a weapons loader.

who had intended to separate elected to stay. USAF, in 2003, implemented Stop-Loss for Operation Iraqi Freedom. When it was lifted, the same thing happened.

Meanwhile, programs designed to fill critical skill shortages by enticing prior-service members to come back on active duty and reservists to shift to active duty were swelling the force even further. Retention was surprisingly strong. The Air Force goal for first-term enlisted retention was 55 percent, but, at the end of Fiscal 2003, actual first-term retention hit 61 percent.

Both patriotism and increased pay figured in this higher-than-normal rate of retention, according to Jumper. Such incentives as Imminent Danger Pay, Hardship Duty Pay, the Combat Zone Tax Exclusion, and the Family Separation Allowance, plus critical skills bonuses, really work, he said.

At the end of Fiscal 2003 (last Sept. 30), the service was exceeding its Congressionally authorized end strength by more than 16,000 airmen.

Jumper said that this was a temporary situation fueled by the war on terrorism. Everyone—top Air Force leaders, the Secretary of Defense, and lawmakers—agreed it was appropriate to be temporarily overweight, considering the President's declaration of a national emergency.

The catch was that Congress did not give the Air Force a temporary

increase in funds to pay for the extra people. Officials had to raid other accounts and programs for the money.

"Our task now is to reduce the force while also fixing this skill mix imbalance," Jumper wrote.

Service officials said they must cut 16,600 airmen—12,700 enlisted members and 3,900 officers—to meet USAF's authorized end strength of 359,700 by the end of Fiscal 2005. They plan to identify those cuts this year.

Shaping the Force

The Air Force first will change its recruiting targets. Goals will be slowly reduced from 37,000 recruits this year to 35,600 in Fiscal 2005 and 34,500 in 2006.

More recruits will be directed into stressed career fields. That will only partially fix shortages, as people right out of technical school cannot immediately step into more senior enlisted roles.

"Part of our force shaping will have to be done by retraining and shifting experienced people from over-staffed career fields," said Jumper.

Many airmen are willing to shift, and the service will support waivers to qualify for retraining into critical fields. Jumper pledged that the Air Force will work to unclog any training backlogs caused by limited training capacity in some fields.

"I am dedicated to reducing our



Firefighter SrA. Frank Abreu and other airmen in critical fields are in high demand. The service has excluded them from drawdown programs such as the one that will waive some active duty service commitments.

stressed career fields and putting in place the right incentives to retain the people we task the most," wrote Jumper in his Jan. 29 statement.

Service reshaping also will change where and in what jobs uniformed Air Force personnel serve. The aim here is to reclaim people who work outside the "blue" Air Force. In 2002, 14,000 Air Force personnel worked in non-Air Force jobs, primarily in unified commands and defense agencies. Though the Air Force accounts for about 26 percent of the Defense Department's active duty military strength, Air Force members filled about 37 percent of non-service-specific military billets.

Some of these jobs do benefit the Air Force. It may be important to have an airman's perspective in certain joint or agency positions, for instance. Others may not have to be filled by a blue-suiter or any uniformed person from any of the other services. Greater use of private contractors might help Air Force leaders "reclaim" some positions into their ranks.

Jumper said that more than 13,000 of these Air Force positions have already been eliminated, in the sense that, when the people currently in these positions leave, they will not be replaced. However, not all of the airmen in those jobs have been moved, he said.

"It's hard for me to argue to the Congress that we don't have enough

people when we should be using some of our airmen in other required positions," said Jumper.

Other planned initiatives include:

- Restricting re-enlistment in overmanned career fields.
- Allowing more volunteers to transfer from the regular ranks to the Air National Guard or Air Force Reserve.
- Shortening some active duty service commitments.
- Commissioning some Reserve Officer Training Corps cadets directly into the reserves rather than bringing them on active duty.

■ Rolling back some separation dates.

■ Limiting reclassification of those eliminated from technical school.

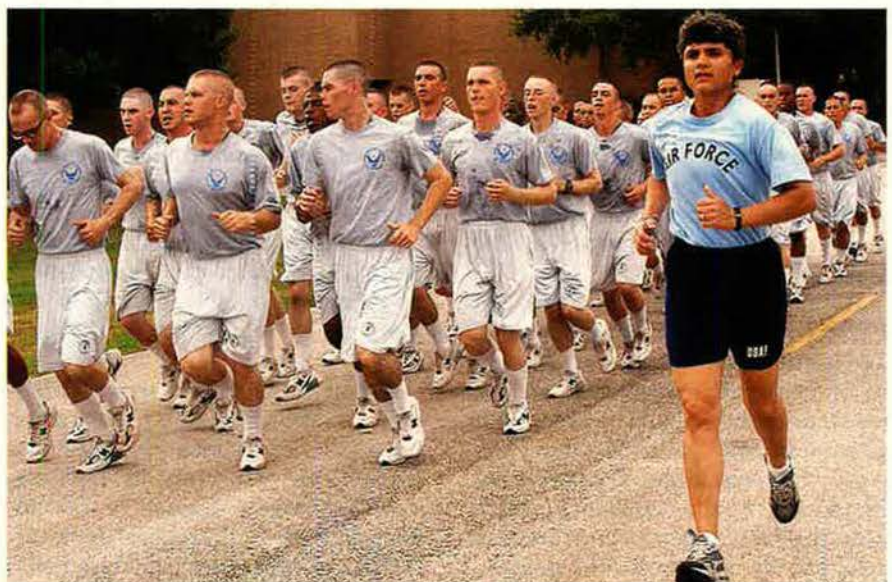
The Air Force must exempt certain categories of personnel from this new drawdown. "Because of manning shortages, 29 officer and 38 enlisted specialties will not qualify for many of the waivers," said Maj. Gen. John M. Spiegel, the Air Force's director of personnel policy. Spiegel said the areas of shortage include pilots, navigators, air battle managers, aerial gunners, fuels specialists, nurses, and first sergeants.

"We don't want to break any career fields during our force-shaping efforts or create problems in future years similar to the ones caused by the downsizing in the early 1990s," said Spiegel.

Officials did not directly rule out involuntary separations. They predict that the first round of inducements should attract about 4,000 volunteers out of the 16,600 they need to cut.

"If at all possible, our goal is to give every qualified airman who wants to stay in the Air Force the opportunity to do so," wrote Jumper. "In addition, we will use every tool to shape the force we have available to avoid the extreme measures that were used in the early 1990s."

It might seem counterintuitive that the Air Force is planning to get smaller at a time when it is overburdened by major worldwide deploy-



Air Force plans call for limiting the number of new recruits the service will take on active duty during 2005 and 2006. It also will direct many of those recruits into certain career fields, to shape the force for the future.

ments. However, bigger is not always better for a service so heavily dependent on advanced technology. Just adding people without changing how you do things can drain millions of dollars in away from important weapons programs.

Adding 7,000 new airmen would equal the cost of seven upgrades to E-3 early warning aircraft, pointed out Roche in a 2002 interview with Air Force Television News.

"That's a lot of money," said Roche. "We as leaders have the responsibility to look to see [if] there are smarter ways of doing things. Are we asking people to do things we shouldn't? Do we have airmen serving in places that are not central to the mission of the Air Force?"

Sweeping personnel change is difficult but not impossible. When the idea of the Air Expeditionary Force was introduced several years ago, about 80,000 Air Force personnel, out of 360,000, were capable of deploying. That number is now up to 272,000.

"The same sort of process is what we're trying to do, as we find ways to make sure that [airmen] are actually engaged in the core competencies of our Air Force," said Jumper.

The Rumsfeld Mandate

Each service has been directed by Defense Secretary Donald H. Rumsfeld to scour its ranks for personnel and technology efficiencies and internal force shifts before asking for more troops. Specifically, Rumsfeld wanted a hard scrub of support jobs being performed by uniformed personnel that could be eliminated or done by civilians.

One DOD estimate found there may be 320,000 military jobs in this category. This year, the department plans to "move 10,000 military personnel out of civilian tasks and return them to the operational force," Rumsfeld told lawmakers in early February. He added that another 10,000 conversions were slated for 2005.

Rumsfeld believes the increased demand on US forces today is "likely



Pilots such as Lt. Col. Jeffrey Harrigian (above) are in short supply, as are air battle managers, navigators, and medical officers. Because of shortages, 29 officer and 38 enlisted specialties will be held exempt from waivers of duty.

a spike"—meaning a temporary problem.

Many in Congress have been arguing that the US military needs more people overall, not fewer. For example, Rep. Heather A. Wilson (R-N.M.), a former Air Force officer and member of the House Armed Services Committee, has called for an additional 150,000 troops across the board.

Rumsfeld reminded lawmakers that the Pentagon has already added troops. He was referring to recent temporary increases that have pushed each service above its authorized end strength. In addition to USAF's extra 16,600, the Army is up 7,800, the Navy roughly 6,000, and the Marine Corps about 2,000.

Rumsfeld maintains, "The real problem is not the size of the force, per se, by rather the way the force has been managed and the mix of capabilities at our disposal."

He attributes a large part of the "spike" problem to the need to garrison more than 100,000 US soldiers in Iraq. To help alleviate this problem, the Administration on Jan. 28 agreed to boost the Army temporarily by 30,000 troops over its authorized strength of 482,000.

Money for the 30,000 increase

would come from the \$87 billion emergency fund for operations in Iraq and Afghanistan that passed Congress last year. Army officers estimated the extra manpower would be needed for the next four or five years. They also estimated that every new 10,000-troop increment would cost \$1.2 billion.

In keeping with Rumsfeld's directive, the Air Force has already identified some 22,000 blue-suiters whose jobs could go to civilians. However, the Human Capital Task Force estimated that the service would have to hire 14,000 new civilian employees—a mix of civil service and contract—at a cost of \$5 billion through 2009, while it still pays for the 22,000 military personnel.

It is too big a sum to take in one bite, so the Air Force plans to take a phased approach. During Fiscal 2005, the service expects to make 1,000 military to civilian realignments. The goal for 2006 is to realign 7,000 positions.

Planning for future Air Force manpower needs is difficult. End strength needs, recruitment targets, career field requirements, and other important aspects of the problem are interlinked. All must be addressed at the same time. The effort is similar to playing chess in three dimensions.

Air Force officials must play this game, and win, even amidst the stresses and strains of a continuing high operations tempo. ■

Peter Grier, a Washington editor for the Christian Science Monitor, is a longtime defense correspondent and a contributing editor to Air Force Magazine. His most recent article, "A Line in the Sand," appeared in the February issue.

DOD

Senior Leadership

Compiled by Chequita Wood, Editorial Associate



Secretary of Defense
Donald H. Rumsfeld



Deputy Secretary of Defense
Paul D. Wolfowitz

KEY:

- ADUSD** Assistant Deputy Undersecretary of Defense
- ASD** Assistant Secretary of Defense
- ATSD** Assistant to the Secretary of Defense
- DASD** Deputy Assistant Secretary of Defense
- DATSD** Deputy Assistant to the Secretary of Defense
- DUSD** Deputy Undersecretary of Defense
- PDASD** Principal Assistant Deputy Undersecretary of Defense
- PDASD** Principal Deputy Assistant Secretary of Defense
- PDUSD** Principal Deputy Undersecretary of Defense
- USD** Undersecretary of Defense



ASD, Legislative Affairs
Powell A. Moore

PDASD, Legislative Affairs
Daniel Stanley

DA3D, Senate Affairs
Steven Moffitt

DA3D, House Affairs
Jeanine Veronica Esperne



ASD, Networks & Information
Integration &
Chief Information Officer
John P. Stenbit

PDASD, NII
Linton Wells II

DASD, Deputy CIO
Priscilla Guthrie

DASD, C³, Space, & IT Programs
Michael S. Frankel

DASD, Resources
Cheryl J. Roby

DASD, Spectrum, Space, Sensors, &
C³
Linton Wells II (acting)



ASD, Public Affairs
Lawrence Di Rita (acting)

PDASD, PA
Vacant

DASD, PA (Media)
Bryan Whitman

DASD, PA (Public Liaison)
Chris Wilcox

DASD, PA (Internal Communications)
Allison Barber



ATSD, Intelligence
Oversight
George B. Lotz II



Dir., Administration
& Management
Raymond F. Dubois



Dir., Force
Transformation
Arthur K. Cebrowski



Dir., Operational
Test & Evaluation
Thomas P. Christie



Dir., Program Analysis
& Evaluation
Ken Kreig



General Counsel
William J. Haynes II
Principal Deputy
Daniel J. Dell'Orto



Inspector General
Joseph E. Schmitz

Acquisition, Technology, & Logistics



USD, ATL
Michael W. Wynne
(acting)

PDUSD, ATL
Michael W. Wynne

DUSD, Acquisition & Technology
Michael W. Wynne

DUSD, Industrial Policy
Suzanne D. Patrick

DUSD, International Technology Security
John A. Shaw

Dir., Defense Procurement & Acquisition Policy
Deidre A. Lee

Dir., Defense Systems
Glenn F. Lamartin

Dir., Small & Disadvantaged Business Utilization
Sean M. Moss

Dir., Acquisition Resources & Analysis
Nancy L. Spruill

Dir., International Cooperation
Alfred G. Volkman

Dir., Special Programs
Rear Adm. Richard P. Terpstra, USN

Exec. Dir., Defense Science Board
Brian Hughes

DUSD, Installations & Environment
Raymond F. DuBois Jr.

PADUSD, Installations & Environment
Philip W. Grone

ADUSD, Environment, Safety, & Occupational Health
Alex A. Beehler

ATSD, Nuclear, Chemical, & Biological Defense Programs
Dale E. Klein

DATSD, Chemical & Biological Defense
Brig. Gen. Patricia L. Nilo (acting)

DATSD, Nuclear Matters
Steve Henry

DATSD, Chemical Demilitarization & Threat Reduction
Patrick J. Wakefield

Dir., Defense Research & Engineering
Ronald M. Segal

DUSD, Advanced Systems & Concepts
Sue C. Payton

DUSD, Laboratories & Basic Sciences
John H. Hopps Jr.

DUSD, Science & Technology
Charles J. Holland

DUSD, Logistics & Materiel Readiness
Vacant

ADUSD, Logistics Plans & Programs
Louis A. Kratz

ADUSD, Logistics Systems Management
Gary W. Jones

ADUSD, Maintenance Policy, Program & Resources Materiel Readiness
Robert T. Mason

ADUSD, Supply Chain Integration
Alan Estevez

ADUSD, Transportation Policy
Earl B. Boyanton Jr.

Comptroller



USD, Comptroller & Chief Financial Officer
Dov S. Zakheim



PDUSD, Comptroller
Lawrence J. Lanzillotta

DUSD, Management Reform
Lawrence J. Lanzillotta

DUSD, Resource Planning & Management
Wayne A. Schroeder

DUSD, Financial Management
David Norquist

Deputy Chief Financial Officer
JoAnn R. Boutelle

Deputy Comptroller, Program & Budget
John P. Roth

Defense Agencies

Defense Advanced Research Projects Agency
Anthony J. Tether

Defense Commissary Agency
Maj. Gen. Michael P. Wiedemer, USAF

Defense Contract Audit Agency
William H. Reed

Defense Contract Management Agency
Brig. Gen. Darryl A. Scott, USAF

Defense Finance & Accounting Service
Patrick T. Shine (acting)

Defense Information Systems Agency
Lt. Gen. Harry D. Raduege Jr., USAF

Defense Intelligence Agency
Vice Adm. Lowell E. Jacoby, USN

Defense Legal Services Agency
William J. Haynes II

Defense Logistics Agency
Vice Adm. Keith W. Lippert, USN

Defense Security Cooperation Agency
Lt. Gen. Tome H. Walters Jr., USAF

Defense Security Service
William A. Curtis (acting)

Defense Threat Reduction Agency
Vacant

Missile Defense Agency
Lt. Gen. Ronald T. Kadish, USAF

National Geospatial-Intelligence Agency
James R. Clapper Jr.

National Security Agency/Central Security Service
Lt. Gen. Michael V. Hayden, USAF

Pentagon Force Protection Agency
John Jester

Intelligence



USD, Intelligence
Stephen A. Cambone

DUSD, Intelligence & Warfighting Support
Lt. Gen. William G. Boykin, USA

DUSD, Policy, Req., & Resources
Letitia Long

DUSD, Preparation & Warfighting
Tom Behling

DUSD, Counterintelligence & Security
Carol A. Haave

Personnel & Readiness



USD, Personnel & Readiness
David S. C. Chu

DUSD, Program Integration
Jeanne B. Fites

DUSD, Readiness
Paul W. Mayberry

ASD, Force Management
Policy

Charles S. Abell

PDASD, Plans

Gail H. McGinn

DUSD, Civilian Personnel
Policy

Ginger Groeber

DUSD, Equal Opportunity
John M. Molino (acting)

DUSD, Military Community &
Family Policy

John M. Molino

DUSD, Military Personnel
Policy

Bill Carr (acting)

ASD, Reserve Affairs
Thomas F. Hall

PDASD, Reserve Affairs
Craig W. Duehring

DASD, Manpower &
Personnel

John D. Winkler

DASD, Materiel & Facilities
Patricia J. Walker

DASD, Readiness, Training,
& Mobilization
Karen I. McKenney (acting)

DASD, Resources
Jennifer C. Buck

Dir., Civil-Military Policy
John G. Hathaway



PDUSD, Personnel & Readiness
Charles S. Abell

ASD, Health Affairs

William Winkenwerder Jr.

PDASD, Health Affairs
Ronald Richards (acting)

DASD, Clinical & Program Policy
David N. Tornberg

DASD, Force Health Protection &
Readiness

Ellen P. Embrey

DASD, Health Budgets &
Financial Policy

Nelson M. Ford

DASD, Health Plan Administration
Vacant

DASD, Health Program Integration
& External Affairs

Ronald Richards (acting)

Dir., Tricare Management Activity
William Winkenwerder Jr.

Policy



USD, Policy
Douglas J. Feith

DUSD, Policy Support
Kenneth E. de Graffenreid

ASD, Homeland Defense
Paul McHale

PDASD/DASD, Security
Coordination

Pete Vega

DASD, Force Planning &
Employment

Vacant

DASD, Civil Support
Vacant

DASD, Strategy, Plans, &
Resources

Vacant

ASD, International
Security Policy

J. Dyer Crouch II

PDASD, ISP
David J. Trachtenberg

DASD, Eurasia

Mira Ricardel

DASD, Forces Policy
Keith Payne

DASD, NATO & Europe
Ian Brzezinski

DASD, Negotiations Policy
Mark Esper

DUSD, Technology Security
Policy &

Counterproliferation
Lisa Bronson



PDUSD, Policy
Christopher Henry
DASD, Plans & Resources
Christopher Lamb

DASD, Strategy
Andy Hoehn

ASD, International Security Affairs
Peter W. Rodman

PDASD, ISA
Peter C.W. Flory

DASD, Africa
Thresa Whelan (acting)

DASD, Asia & Pacific
Richard Lawless

DASD, POW/Missing Personnel
Affairs

Jerry D. Jennings

DASD, Western Hemisphere
Rogelio Pardo-Maurer IV

DUSD, Near East & South Asia
William J. Luti

ASD, Special Operations &
Low-Intensity Conflict
Thomas W. O'Connell

PDASD, SOLIC
Marshall Billingslea

DASD, Counternarcotics
Andre Hollis

DASD, Special Operations &
Combating Terrorism
Michael A. Westphal

DASD, Stability Operations
Joseph J. Collins

DASD, Information & Detainee
Operations
Vacant

Military Departments



Secretary of the Air Force
James G. Roche

Undersecretary of the Air Force
Peter B. Teets



Secretary of the Army
Les Brownlee (acting)

Undersecretary of the Army
Les Brownlee



Secretary of the Navy
Gordon R. England

Undersecretary of the Navy
Dionel M. Aviles (nominated)

Office of the Joint Chiefs of Staff



Chairman
Gen. Richard B. Myers, USAF



Vice Chairman
Gen. Peter Pace, USMC



Air Force Chief of Staff
Gen. John P. Jumper



Army Chief of Staff
Gen. Peter J. Schoomaker



Chief of Naval Operations
Adm. Vern Clark



Commandant of the Marine Corps
Gen. Michael W. Hagee

The Joint Staff

Chairman
Gen. Richard B. Myers, USAF

Vice Chairman
Gen. Peter Pace, USMC



Asst. to the CJCS
Vice Adm. James W. Metzger, USN

Director, Joint Staff
Vice Adm. Timothy J. Keating, USN

J-1 Manpower & Personnel
Brig. Gen. Maria C. Owens, USAF

J-2 Intelligence
Maj. Gen. Ronald L. Burgess Jr., USA

J-3 Operations
Lt. Gen. Norton A. Schwartz, USAF

J-4 Logistics
Vice Adm. Gordon S. Holder, USN

J-5 Strategic Plans & Policy
Lt. Gen. Walter L. Sharp, USA

J-6 C³ & Computer Systems
Lt. Gen. Robert M. Shea, USMC

J-7 Operational Plans & Joint Force Development
Brig. Gen. John J. Catton Jr., USAF

J-8 Force Structure, Resources, & Assessment
Lt. Gen. James E. Cartwright, USMC

Combatant Commanders, Unified Commands



US Central Command
Gen. John Abizaid, USA



US European Command
Gen. James L. Jones Jr., USMC



US Joint Forces Command
Adm. E.P. Giambastiani Jr., USN



US Northern Command
Gen. Ralph E. Eberhart, USAF



US Pacific Command
Adm. Thomas B. Fargo, USN



US Southern Command
Gen. James T. Hill, USA



US Special Operations Command
Gen. Bryan D. Brown, USA



US Strategic Command
Adm. James O. Ellis Jr., USN



US Transportation Command
Gen. John W. Handy, USAF

The Congressional Budget Office says the average service member “makes” \$99,000 a year. Less than half shows up in a paycheck, however.

The Compensation Issue

This article was adapted from “Military Compensation: Balancing Cash and Noncash Benefits,” published by the Congressional Budget Office on Jan. 16, 2004. It was written by Carla Tighe Murray, a CBO analyst in the National Security Division.

TO ATTRACT and retain the military personnel that it needs, the Department of Defense must offer a compensation package that is competitive with those in the civilian sector and that adequately rewards service members for the rigors of military life. The Congressional Budget Office estimates that in 2002 (the most recent year for which comprehensive data are available), the average active duty service member received a compensation package worth about \$99,000.

Noncash compensation represents almost 60 percent of the military pay package. Cash compensation—basic pay, allowances for things like food and housing, special pay and bonuses, and the tax advantage that service

members receive because some allowances are not subject to federal income tax—makes up the other 40 percent. (See Fig. 1.)

About 40 percent of noncash compensation consists of subsidized goods and services that can be used immediately—such as medical care, groceries, housing, and child care. The remaining 60 percent of noncash compensation is the accrued cost of retirement pensions and other deferred benefits that service members receive after they leave active duty—including health care for retirees and veterans’ benefits. (About half of that deferred noncash compensation goes to veterans when they leave the military before retirement, and about half goes

to veterans who reach retirement.) Yet only about one-third of officers and 10 to 15 percent of enlisted personnel serve the 20 years needed to retire.

This issue brief provides an overview of the military compensation package and the issues surrounding the current mix of compensation. The military's traditional use of noncash benefits reflects, in part, a belief that such benefits are cost-effective because they support unit cohesion and reduce the costs that service members incur in searching for new schools, stores, and housing as they move among installations. However, today's military increasingly emphasizes a more expeditionary force—deploying service members overseas without their families for a shorter period of time rather than rotating members and families to and from overseas garrisons for extended tours. Therefore, some analysts believe that a compensation package more heavily weighted toward cash, which would allow service members to choose the goods and services that they valued most, would enable DOD to maintain a larger and even more capable force for the same total cost.

At present, the federal budget does not display the total cost of military personnel or show the distribution of that total cost among its different components. Policymakers may therefore find it difficult to evaluate the size of the compensation package or the implications of changing the mix of cash and noncash elements. For example, some recent policy initiatives—including allowing some

disabled retirees to receive both full retirement pay and tax-free disability compensation—have shifted the overall mix of compensation further toward noncash and deferred benefits. Other policy initiatives, such as expanding health care coverage for reservists, have shifted the mix for that component of the service as well.

Trends in Noncash Compensation

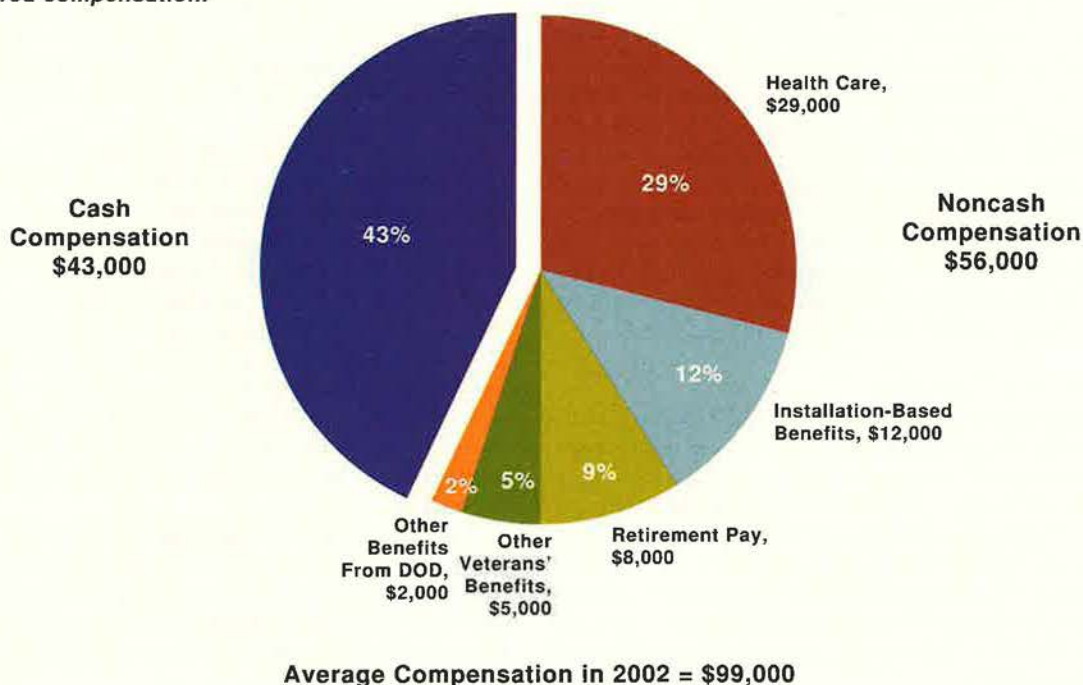
In 2002, noncash benefits for military personnel totaled \$78 billion, CBO estimates, or about \$56,000 per active duty service member. Noncash benefits include primarily health care, installation-based benefits, retirement pay, and veterans' benefits.

Health Care

Health care, the largest component of noncash compensation, amounts to approximately \$29,000 per active duty service member, or nearly 30 percent of the average compensation in 2002. (See Fig. 2.) The federal government spends (or accrues liabilities of) almost \$40 billion annually for military health care. About \$9 billion per year funds the care of active duty service members and their families. In addition, the federal government accrues annual liabilities of roughly \$14 billion to pay for the medical expenses of future retirees. (Because military members can retire in their 40s, DOD serves two distinct groups of retirees: those who are not eligible for Medicare—generally those under 65 years of age—and

Fig. 1 Cash and Noncash Compensation per Active Duty Member

This figure includes compensation that service members receive while on active duty and the estimated accrued cost of deferred compensation.



Source: Congressional Budget Office, based on data from the Department of Defense and the Office of Management and Budget.

those who are eligible. DOD's health care for younger retirees is funded through current appropriations, while care for Medicare-eligible retirees is funded on an accrual basis.)

Military members who leave active duty (and become veterans) are also eligible for health care provided by the Department of Veterans Affairs, worth about \$15 billion annually on an accrual basis.

Health care is also the fastest-growing element of military compensation. Between 1988 and 2002, for example, DOD's portion of health care spending per active duty service member—adjusted for the overall rate of inflation in the economy—tripled, while cash pay per active duty member increased by 39 percent. Some of that growth in health care spending resulted from legislation in 2000 that eliminated co-payments and deductibles for the families of many active duty personnel. Much of the growth, however, reflects real (inflation-adjusted) increases in health care costs in the economy as a whole, a trend that is expected to continue.

Installation-Based Benefits

Installation-based benefits, which cost more than \$16 billion in 2002—or about \$12,000 per active duty service member—are the second largest component of non-cash pay. They include free or subsidized food, housing, education and child care for dependents, and other goods and services routinely found on military installations. Although total spending on these benefits declined from 1988 to 2002, spending per active duty member increased by 48 percent in real terms. That growth may reflect efforts to improve the quality of life of military personnel, particularly their housing and child care.

Retirement Pay

Service members who leave with 20 or more years on active duty receive an immediate lifetime annuity funded by DOD on an accrual basis. The department contributed \$12 billion to the military retirement fund in 2002—or about \$8,000 per active duty service member. That contribution has fallen from about \$23 billion in 1988. Some of that decrease is due to the downsizing of the force. In addition, DOD's board of actuaries lowered the annual accrual charge per military member to reflect a series of relatively low pay raises in the 1990s (lowering projections of future payments to the fund) and relatively high interest earnings on the fund's balances. Accrual charges could increase in the future, though, as a consequence of higher pay raises and lower earnings for the fund.

Other Veterans' Benefits

Noncash compensation for nonmedical veterans' benefits makes up about five percent of average compensation when estimated on an accrual basis. This category includes the military's largest educational benefit, the provisions of the Montgomery GI Bill, disability compensation, and home mortgage assistance, as well as other programs administered by the Department of Veterans Affairs. (Veterans' benefits are not taxable, but the magnitude of that tax advantage has not been estimated for this issue brief.)

Other Benefits From DOD

Other benefits from DOD are the department's con-

tributions to Social Security's Old-Age and Survivors Insurance and Disability Insurance programs and to Medicare's Hospital Insurance program fund, as well as the department's payments to the Unemployment Compensation for Ex-Servicemen program. Those programs constitute two percent of average compensation.

Mix of Cash and Noncash Compensation

Opinions vary about whether a military system in which noncash benefits account for almost 60 percent of total compensation is cost-effective or appropriate, particularly when compared with civilian compensation, in which noncash benefits make up between 20 and 35 percent of the total.

Views Supporting Noncash Benefits

Those who advocate a compensation package favoring noncash benefits point out that it provides unique benefits to the military by:

- Promoting military readiness;
- Ensuring a good quality of life for young service members;
- Attracting and retaining service members at a lower cost than cash compensation; and
- Providing a stable form of compensation.

Promotes Military Readiness. Subsidized physical fitness centers can contribute directly to military readiness by encouraging physical training. Programs that support families—such as subsidized child care or family housing—promote readiness indirectly, as deployed service members who feel that their families are taken care of may perform their jobs more effectively. Moreover, quality-of-life programs that encourage experienced people to remain in the military or that attract high-quality recruits could be said to enhance readiness.

Ensures Quality of Life. To offer a good quality of life for service members, DOD establishes standards for some of its in-kind benefits, particularly family housing and child care. Ninety-six percent of DOD's child care centers are accredited, for example, whereas just eight percent of private child care centers are, according to a 2002 RAND study.

Costs Less. Noncash benefits can be cost-effective if the employer can provide goods and services for less than it would cost individual employees to purchase the items themselves. Because group health insurance policies can pool risks, for example, employer-provided health insurance is generally cheaper than individually purchased policies. DOD may similarly be able to offer goods, such as housing, in isolated locations where markets are too thin to support private-sector suppliers. The availability of relatively uniform goods and services, including housing, at military bases throughout the world also reduces the search costs that frequent moves impose on military families.

Provides Stable Compensation. Noncash benefits can be more cost-effective than cash payments if service members perceive them as more permanent than cash. If members think cash allowances will substitute for future pay raises, for example, they would value an in-kind benefit more highly.

Views Supporting Cash Benefits

Many analysts question the extent of the military's

reliance on noncash benefits and believe that a greater emphasis on cash would be more efficient for several reasons:

- The value of cash is more easily recognized by potential recruits, current military members deciding whether to re-enlist, and senior decision-makers.
- Cash makes individuals better off by giving them more choices in how they spend their compensation.
- Changes in forces and doctrines have made the current system favoring noncash compensation less effective.

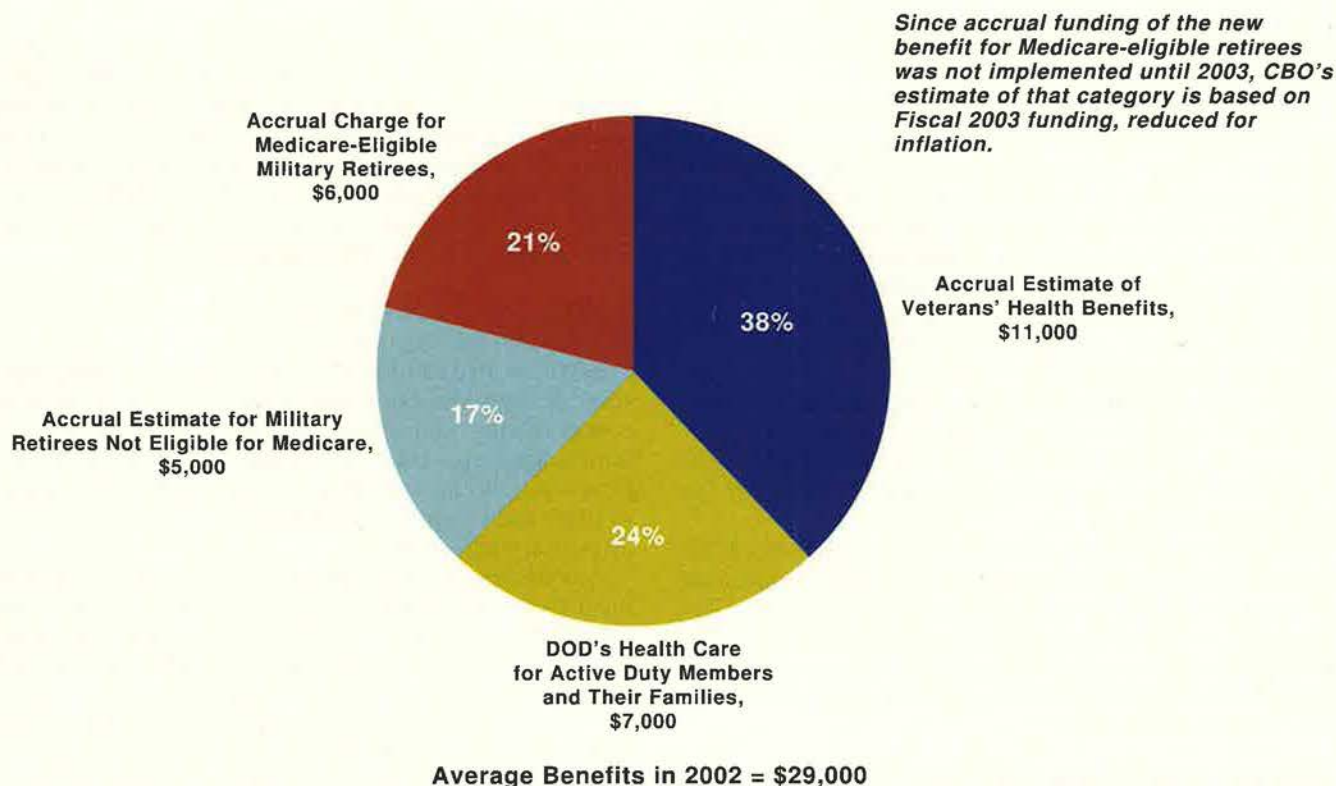
Easily Recognized Value. If potential recruits and experienced service members do not recognize the full value of the benefits package, enlistments and retention will be lower than they might be otherwise. People deciding whether to join or continue in the military might compare military and civilian cash pay without taking into account the full value of the military's non-cash and deferred benefits. For example, potential recruits and younger service members may greatly discount the 60 percent of noncash compensation that is deferred (such as payments from a retirement plan in which members are vested only after 20 years of service). Thus, a system relying more on cash could provide a larger, more stable force for the same money. (A study published in the March 2001 *American Economic Review* found that the vast majority of military members had a strong preference for current vs. deferred compen-

sation. Their perspectives indicated discount rates of at least 18 percent; that is, they perceived \$1 received next year to be worth, at most, about 85 cents today. Such a discount rate would mean that new recruits value \$1 received after 20 years of service at only four cents.) Finally, it is difficult for policy-makers and senior decision-makers—in the role of “employers”—to assess the adequacy of total compensation when much of it is provided through noncash benefits.

Greater Choice. Cash pay is more efficient than non-cash compensation in an economic sense because cash provides employees maximum discretion in how they spend their compensation. In general, because cash gives people more control over their spending choices, people value in-kind benefits less than cash. For example, proponents of a more cash-based system would favor a pay package with relatively lower benefit costs or cash allowances that service members could use to purchase child care, physical training, groceries, and other commodities from any provider.

Diminished Effectiveness of the Current System. Critics of the current system argue that it is rooted in a Cold War strategy that required service members and their families to rotate between the United States and permanent bases overseas. They also note that cash can be more easily targeted to those members who are most productive or who possess special skills that DOD most wants to retain. If today's more expeditionary force

Fig. 2 Health Care Benefits per Active Duty Member



Source: Congressional Budget Office, based on data from the Department of Defense and the Office of Management and Budget.

allows families to remain in the United States and to develop roots in civilian communities, DOD's efforts to ease the impact of family moves by providing on-base towns with subsidized housing, shopping, schools, and child care may no longer be needed. In addition, installation-based benefits favor active duty service members living on base. The two-thirds of active duty members, plus reservists, who live off base may prefer benefits that are not tied to specific locations.

Shaping Future Compensation

Further increases in the share of noncash benefits in military compensation could occur. For example, if DOD's future health care spending rises at the same rate as that projected for per capita health care costs in the United States as a whole, the department's health care spending, adjusted for inflation, will increase from its 2003 level of \$27 billion to almost \$46 billion in 2020, CBO estimates.

Noncash compensation could also grow as DOD and Congress seek to respond to the changing needs of the force. For example, costs could grow if any of the following policies, all of which have been considered by Congress or proposed by advocacy groups, were implemented:

- Further expanding access to DOD's health care system for reservists and their dependents;
- Further expanding reservists' access to subsidized on-base activities; or
- Further expanding veterans' benefits, including eliminating the provision that offsets recipients' retirement pay when they receive disability compensation.

Some types of noncash compensation can offer unique advantages to the military. But even when cash compensation is more efficient, changing the current mix to emphasize cash compensation or forestalling further increases in noncash benefits can be difficult for several reasons.

Noncash benefits are hard to quantify because they come in many forms and are funded from many different budget accounts. For example, part of the subsidized housing program is funded through cash allowances, which are included in the military personnel appropriation, while the construction and maintenance of on-base housing are funded from other appropriations to DOD.

Noncash benefits often develop diverse constituencies. In the case of commissaries, for example, the American Logistics Association—a voluntary nonprofit organization of manufacturers, brokers, distributors, and other companies that provide goods and services to the military resale system—has a mission “to promote, protect, and ensure the existence and continued viability of the military resale systems.”

Finally, substituting cash for noncash benefits is difficult because the switch could prove costly in the near term, even though it would save money eventually. For example, to avoid charges of inequity, switching to a cash allowance system could require payments to all eligible beneficiaries and not just to those who currently use a particular benefit.

Options to Increase the Cash Share

Analysts have frequently explored the economic and budgetary implications of options that could increase the military's reliance on cash payments and reduce its

reliance on noncash benefits. Options examined by CBO include these:

Offer Medical “Cafeteria Plans”

To give service members greater choice about the form of their health care benefits, DOD could offer medical “cafeteria plans.” The idea is modeled on trends in the private sector, where some employers have made their compensation systems more flexible by letting employees choose among several different types of non-cash benefits and cash. In its 2003 *Budget Options* volume, CBO included an option that would establish a medical cafeteria plan to give active duty service members the choice between cash compensation and a generous medical insurance plan with few co-payments and deductibles. While all active duty members must receive care within the military's health care system, members would receive a cash allowance for family coverage that they could use to:

- Purchase the current level of coverage for their families (which would entail low co-payments and deductibles);
- Purchase a lower level of coverage and keep the extra cash; or
- Purchase other insurance (perhaps through a spouse's employer or other means).

CBO estimated that the net savings in Fiscal 2004 would be \$18 million, rising to \$185 million in 2006 as the program was fully implemented. By Fiscal 2020, savings could rise to \$245 million annually. Because active duty personnel and their families would choose the level of coverage that they wanted, recruiting and retention and the quality of the force could improve.

Offer Cash Allowances

A related option would gradually substitute allowances in place of in-kind benefits. In its 2003 *Budget Options*, CBO examined an option in which commissaries and exchanges would be consolidated to eliminate duplicate functions, and eligible families would receive tax-free grocery allowances of about \$500 per year. Under that system, the federal government could save \$550 million a year, CBO estimated.

Incorporate Some Noncash Benefits into the Military Personnel Appropriation

CBO has also examined possibilities for consolidating some personnel-related expenditures—such as those for commissaries, some medical care, DOD schools, and family housing—into DOD's appropriation for military personnel. Greater visibility would allow senior leaders in DOD and Congress to more easily assess the total cost of military personnel.

Advantages of this option would include improved incentives for DOD managers to use military personnel effectively, encouraging them to substitute less costly civilian employees or contractors or labor-saving technology for military personnel, where appropriate. Some of those same advantages might be gained if the Administration's annual budget submission to Congress were to provide a consolidated display of all federal costs for military personnel for the past fiscal year, estimates for the current year, and requests for the budget year. ■



NATIONAL OFFICERS



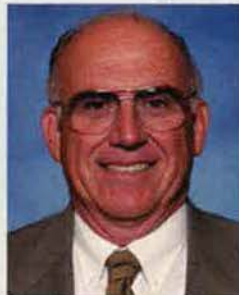
BOARD CHAIRMAN

John J. Politi
Sedalia, Mo.



PRESIDENT

Stephen P. "Pat" Condon
Ogden, Utah



SECRETARY

Thomas J. Kemp
Fort Worth, Tex.



TREASURER

Charles A. Nelson
Sioux Falls, S.D.

NATIONAL DIRECTORS

Craig E. Allen
Hooper, Utah

L. Boyd Anderson
Ogden, Utah

Roy A. Boudreaux
Venice, Fla.

Billy M. Boyd
Carthage, Miss.

Kathleen Clemence
Reno, Nev.

David R. Cummock
Daytona Beach, Fla.

Eugene M. D'Andrea
Warwick, R.I.

Vivian P. Dennis
Centerville, Ga.

Frederick J. Finch
San Antonio

W. Ron Goerges
Fairborn, Ohio

M.N. "Dan" Heth
Hurst, Tex.

Stanley V. Hood
Columbia, S.C.

John Lee
Salem, Ore.

Thomas J. McKee
Fairfax Station, Va.

Lester L. Lyles
Columbus, Ohio

Brian P. McLaughlin
Colorado Springs, Colo.

John C. Moore
Arlington, Tex.

George K. Muellner
Huntington Beach, Calif.

Lloyd W. Newton
Avon, Conn.

Michael J. Peters
Auburn, Calif.

Julie E. Petrina
Laurel, Md.

Joseph Price
Newport News, Va.

Robert C. Rutledge
Johnstown, Pa.

Michael E. Ryan
Arlington, Va.

Richard Schaller
Niceville, Fla.

Victor Seavers
Eagan, Minn.

Thomas G. Shepherd
Capon Bridge, W.Va.

Brad Sutton
Mountain Green, Utah

Richard C. Taubinger
Roseville, Calif.

Mary Anne Thompson
Oakton, Va.

Edward I. Wexler
Stockbridge, Ga.

Robert M. Williams
Omaha, Neb.

DIRECTORS EMERITUS

John R. Alison
Washington, D.C.

Richard D. Anderson
Poquoson, Va.

Joseph E. Assaf
Sandwich, Mass.

David L. Blankenship
Tulsa, Okla.

John G. Brosky
Carnegie, Pa.

Dan Callahan
Centerville, Ga.

Robert L. Carr
Pittsburgh

George H. Chabbott
Dover, Del.

O.R. "Ollie" Crawford
Blanco, Tex.

R.L. Devoucoux
Green Valley, Ariz.

Jon R. Donnelly
Richmond, Va.

Russell E. Dougherty
Arlington, Va.

George M. Douglas
Colorado Springs, Colo.

Charles G. Durazo
Yuma, Ariz.

Joseph R. Falcone
Ellington, Conn.

E.F. "Sandy" Faust
San Antonio

John O. Gray
Arlington, Va.

Jack B. Gross
Harrisburg, Pa.

Martin H. Harris
Montverde, Fla.

Gerald V. Hasler
Encinitas, Calif.

Monroe W. Hatch Jr.
Clifton, Va.

H.B. Henderson
Santa Ana, Calif.

John P. Henebry
Winnetka, Ill.

David C. Jones
Sterling, Va.

Victor R. Kregel
Colorado Springs, Colo.

Jan M. Laitos
Rapid City, S.D.

Doyle E. Larson
Burnsville, Minn.

Nathan H. Mazer
Roy, Utah

William V. McBride
San Antonio

James M. McCoy
Bellevue, Neb.

Bryan L. Murphy Jr.
Fort Worth, Tex.

Ellis T. Nottingham
Arlington, Va.

Jack C. Price
Pleasant View, Utah

William C. Rapp
Niagara Falls, N.Y.

Walter E. Scott
Dixon, Calif.

Mary Ann Seibel-Porto
St. Louis

John A. Shaud
Springfield, Va.

Joe L. Shosid
Fort Worth, Tex.

James E. "Red" Smith
Princeton, N.C.

R.E. "Gene" Smith
West Point, Miss.

William W. Spruance
Las Vegas

Harold C. Stuart
Jensen Beach, Fla.

Walter G. Vartan
Chicago

A.A. West
Hayes, Va.

Sherman W. Wilkins
Issaquah, Wash.

Joseph A. Zaranka
Bloomfield, Conn.

EX OFFICIO

Donald L. Peterson
Executive Director
Air Force Association
Arlington, Va.

Donald J. Harlin
National Chaplain
Albuquerque, N.M.

Stanley J. Miller
National Commander
Arnold Air Society
West Lafayette, Ind.

At Tactical Air Command, Gen. Robert Dixon helped the Air Force kick the post-Vietnam blues.

Dixon

By Rebecca Grant

IN WORLD War II, the German synthetic oil refinery at Merseburg churned out high-quality aviation gasoline used by the Luftwaffe. That made it a prime target of the anti-oil air campaign then being waged by Eighth Air Force. Bomber crews attacked the site in mid-May 1944, returning more than a dozen times that year. Germany protected Merseburg with rings of anti-aircraft batteries, making it a dangerous target indeed.

Every raid generated demands for bomb damage assessment pictures, which were the responsibility of the 7th Photographic Group. One squadron—the 14th—used low-flying Mark XI Spitfires, P-38s, and P-51s for this dangerous work. Its commander was a risk-taking, Ivy League-educated New Yorker trained to fly Spitfires by the Royal Canadian Air Force even before the US entered the war.

His name was Robert J. Dixon.

This same Dixon was to become, three decades later, a towering figure in the United States Air Force. He was the hard driving commander of Tactical Air Command in the critical years 1973-78, a formidable figure given to bold ideas and “wire-brushings” of foes and incompetents. One year ago this month, on March 21, 2003, as the US Air Force embarked on war in the Persian Gulf, retired Gen. Robert J. Dixon died in Fair Oaks Ranch, Tex. His imprint on the Air Force, however, is a lasting one.

Dixon was born in New York City in 1920 and graduated from Dartmouth College in June 1941 with a degree in literature. Soon, he entered pilot training in the Royal Canadian



Air Force and was commissioned. In September 1943, Dixon transferred to the US Army Air Forces.

Dixon had a long career as an airman, but it almost ended over Merseburg. The intense German flak that engulfed the bombers at 27,000 feet was even more lethal for Dixon's fighters flying photoreconnaissance at low altitude. Dixon had survived the flak on more than 65 combat missions, but, during one flight over Merseburg, he was shot down.

Just the Start

He survived the ordeal, however, and was picked up by the Nazis. Dixon became a prisoner of war and was held captive until May 1945, when Nazi Germany surrendered and Allied prisoners were released. What might have been the end of the line for another airman was just the beginning for Dixon.

For one thing, Dixon was not done with combat. He spent 11 months in theater in the Korean War, where he flew another 28 combat missions and commanded the 335th Fighter-Interceptor Squadron. Much later, in the period 1969-70, Dixon served as vice commander of 7th Air Force and logged 36 combat missions over Vietnam.

It was after his tour in Southeast Asia, though, that Dixon found his opportunity to help reshape the Air Force, and he took it.

One who vividly recalls Dixon in the post-Vietnam period is retired Gen. Michael E. Ryan, Chief of Staff in 1997-2001. "He was my dad's DP [director of personnel]," said Ryan, referring to Dixon's three-star assignment under Gen. John D. Ryan, who served as Chief of Staff in the early 1970s.

The DP post was but one in a long series of personnel jobs held by Dixon. After World War II, Dixon worked as a group and wing personnel officer for the 82nd Fighter Wing. He followed this up with five years in personnel at Strategic Air Command headquarters. Dixon also spent the period 1967-69 at Randolph AFB, Tex., as commander of the Military Personnel Center.

This gave Dixon a deep interest in and knowledge of airmen. His experience was broadened in other ways. During tours with the Air Staff, Dixon immersed himself in national security issues. He did the same thing while assigned in the early 1960s to Supreme Headquarters Allied Powers, Europe, which was then in Paris.

Dixon's years under the elder Ryan earned him a fourth star and led to the crowning assignment of his career. On Oct. 1, 1973, he took command of TAC, headquartered in Virginia's Tidewater area.

The Dixon years are well-remembered by retired Gen. Larry D. Welch, a former Chief of Staff who served under Dixon at TAC. Dixon, said Welch, "took command of Tactical Air Command during one of the most challenging times in its history." Welch said that the year 1973 was a low point in public support for the post-Vietnam military, and the Air Force badly needed to rebuild its morale and force structure.

Training was at the top of the list for a combat veteran like Dixon. Michael Ryan recalled how USAF

squadrons deploying to Vietnam had never been given a chance to conduct dissimilar air combat training—that is, flying against different kinds of aircraft and tactics—all because of the fear of an accident.

Dixon was "well aware of these stupidities," said Ryan. Dixon implemented more realistic training and made sure airmen got the most out of every precious hour of flying time.

Red Flag

One day, Dixon took a briefing from Col. Richard M. Suter, an original thinker with a new concept of realistic air crew training. It was called Red Flag. "Moody" Suter based his plan on lessons from Vietnam. He realized that young pilots who were shot down or had accidents usually suffered these reverses during the first 10 combat missions. His plan was to get those young pilots into a combat-like environment, where those first 10 missions could be performed in a controlled, nonlethal arena.

Dixon leaped at the concept, seeing in it a chance to further improve TAC's warfighting skills. He ordered TAC's deputy for operations—Maj. Gen. Charles A. Gabriel, who also would later become a Chief of Staff—to have Suter's brainchild up and running in four months.

Ryan noted of Dixon, "He took huge risks by pushing things like Red Flag and the aggressors. He was a man who said, 'Yes.'"

In recognition of the great work done on Red Flag, Dixon and TAC were jointly awarded the 1977 Collier Trophy.

Dixon would prove to be a strong patron of Red Flag throughout his final years at TAC. Dixon's successor, Gen. W.L. Creech, expanded the training program. Dixon and Creech certainly were not close, but the need for Red Flag was a point of agreement.

Dixon did not stop at the tactical level. He pioneered a form of "system of systems" thinking about airpower and how to integrate the new technologies then becoming available. Welch said Dixon got TAC airmen to think about integrated concepts of operations.

These, according to Welch, included such concepts as combining EF-111 and F-4G defense suppression capabilities with A-10 and F-16 attack capabilities to provide maximum combat power in high-threat areas, and linking together E-3 AWACS and the F-15 fighter aircraft with ground-based radars and command and control systems to win early air superiority.

All of these concepts, said Welch, were "honed during long Saturday morning sessions."

Ryan came to TAC as a major in July 1976, and he has not forgotten what Dixon's honing felt like to staff officers such as himself.

"I was under his scrutiny," said the retired Chief of Staff. Their encoun-



Dixon began his career with World War II photoreconnaissance missions. He initially flew XI Spitfires, such as this one, on more than 65 combat missions before being shot down over Nazi Germany.



After assuming command of Tactical Air Command in October 1973, Dixon was an early proponent for Red Flag. This F-16 at Nellis AFB, Nev., sports the Red Flag aggressor paint scheme.

ters were frequent, as Ryan had the duty of briefing the man known as “the Tidewater Alligator.”

Cut to the Chase

Dixon was famously impatient. Those who briefed him had to move fast. “Ryan, cut the striptease and show me the naked lady,” he shouted one day. On another occasion, Dixon simply took over the briefing and began flipping through the slides himself. When he finished, he rose from the conference table.

“That’s not a *bad* concept,” Dixon said to Ryan. He walked out the door, slammed it, and yelled back, “That’s a *terrible* concept.”

Ryan later realized the bark was worse than the bite. Welch agreed.

“Dixon was often a hard taskmaster,” said Welch, who added that the general frequently fired for effect. “When he was impatient,” Welch went on, “it was because he thought more of a subordinate’s potential than did the subordinate.”

Dixon put his heart into his work. At TAC, he called for improving maintenance as a means for strengthening combat readiness.

“He shed tears over the frustration of an F-111 mechanic coping with multiple fuel tank leaks,” said Welch, “and responded by demanding that everyone from TAC generals to defense contractors leave no stone unturned to support that F-111 mechanic. And they did.”

The sagging state of TAC’s top fighter

aircraft—the old F-105s, F-4s, and so on—spurred Dixon to make sure the Air Force revamped its force structure.

“In the 1970s, after Vietnam, we were in free fall when it came to force structure,” Ryan said, adding that Dixon fought the battle to recapitalize the Air Force with major new programs such as the F-15 and F-16, creating a new and modern core to the fighter force.

As US attention shifted from Southeast Asia to Europe in post-Vietnam years, Dixon reached out to other services to help develop a common doctrine of warfighting. According to Welch, Dixon would not tolerate parochialism. Yet Dixon’s view of how the services operated was hard and realistic.

His combat experiences and command of units ranging from squadron to numbered Air Force gave Dixon a clear view on the key airpower issues of the day. In conversations with historians of the Vietnam conflict, Dixon talked of the battles over air apportionment, noting that there were times when Marines, Army units, and even diplomats demanded dedicated airpower.

“That’s what you’ve got generals like 7th Air Force commanders for,”

Dixon argued, “to say that nobody owns it, it belongs to us, and we’ll put it where it belongs.”

Dixon placed a high priority on improving cooperation between the Air Force and Army. In this, he helped to lay the foundation for dialogue between TAC and the Army’s Training and Doctrine Command on issues such as close air support.

“If you look at their public statements and listen to what they said, you kind of wonder why we ever had any argument with the Army about close air support [in the 1970s],” Dixon said, “but, if you get in the competitive arena for money, ... you’re liable to hear a different story.”

Dixon believed frequent demands for close air support attested to the Army’s desire for and reliance on it. He hoped for “a better understanding of the interrelationship between airpower and ground power.”

“He cared about everything,” said Welch.

That dedication continued long after his time at TAC. Dixon served as president of Fairchild Republic Co., but he never lost contact with the Air Force. Twenty years after Dixon’s retirement, Ryan, as Chief of Staff, gave him a major advisory role in the Developing Aerospace Leaders project, an initiative to reevaluate the Air Force’s management of officers on their way to the top.

Dixon’s style had not changed.

“Everything that man said was for a purpose; every dagger was to get you to react and think,” said Brig. Gen. Richard S. Hassan, who has for several years run the Air Force office in charge of general officer assignments and who worked closely with Dixon on the Developing Aerospace Leaders project.

In Hassan’s view, it was the combination of Dixon’s unique experiences—combat in three wars, time at SHAPE, work for Gen. John D. Ryan, time at TAC—that made him great. “There’s this other level of general, a sort of military statesman,” Hassan explained. Dixon was one.

“The Air Force was his life,” said Hassan. ■

Rebecca Grant is a contributing editor of Air Force Magazine. She is president of IRIS Independent Research in Washington, D.C., and has worked for RAND, the Secretary of the Air Force, and the Chief of Staff of the Air Force. Grant is a fellow of the Eaker Institute for Aerospace Concepts, the public policy and research arm of the Air Force Association’s Aerospace Education Foundation. Her most recent article, “Trenchard at the Creation,” appeared in the February issue.



FELLOWS FOR 2003

Gen. Bernard A. Schriever Fellows (represents a \$2,500 contribution)

Fellow	Sponsor
Gen. Lance W. Lord	Northern Utah Chapter, AFA
Lt. Gen. Donald L. Cromer, USAF (Ret.)	Gen. B.A. Schriever Los Angeles Chapter, AFA
Maj. Gen. Scott C. Bergren	Utah State AFA
Lt. Gen. William R. Looney III	Paul Revere Chapter, AFA
Gen. Lester L. Lyles	Gen. B.A. Schriever Los Angeles Chapter, AFA

Ira C. Eaker Historical Fellows (represents a \$1,000 contribution)

Fellow	Sponsor
Lockheed Martin Skunk Works	Central Florida Chapter, AFA
Dryden Flight Research Center, NASA	Central Florida Chapter, AFA
Honeywell	Central Florida Chapter, AFA
Pratt & Whitney	Central Florida Chapter, AFA
GE Aircraft Engines	Central Florida Chapter, AFA
Charles P. Zimkas Jr.	Ursula Zimkas
Lt. Gen. Bruce Carlson	Gen. E.W. Rawlings Chapter, AFA
Maj. Gen. George N. Williams	Iron Gate Chapter, AFA

Associate Fellows of the Foundation (represents a \$250 contribution)

Fellow	Sponsor
Brig. Gen. Thomas A. Dyches	Fort Worth Chapter, AFA
EMC/Northrop Grumman CS	Lance P. Sijan Chapter, AFA
IITC	Lance P. Sijan Chapter, AFA
Frank J. Guariono III	Craig Unger
Matthew J. Steele	Aerospace Education Foundation
Alison E. Campo	Aerospace Education Foundation
Lt. Col. Andrew R. Larson	Ute-Rocky Mountain Chapter, AFA
Fred Kubli	Ohio State AFA
Chuck Zimkas	Colorado State AFA

Scott Associate Fellows (represents a \$50 contribution)

Fellow	Sponsor
George Aguirre	Leigh Wade Chapter, AFA
Theodore H. Dietsch	Fort Worth Chapter, AFA
Pollina Sonntag	Utah AEF
Kathleen Ochsenbein	Utah AEF
Heather Hill	Utah AEF
Patricia Accetta	Pennsylvania State AFA
IITC	Lance P. Sijan Chapter, AFA
Raytheon	Lance P. Sijan Chapter, AFA
The Boeing Company	Lance P. Sijan Chapter, AFA
Lockheed Martin Corp.	Lance P. Sijan Chapter, AFA
Bravo Crew, 1st Space Control Squadron	Colorado State AFA
Robert Wheeler	Colorado State AFA

Jimmy Doolittle Educational Fellows (represents a \$1,000 contribution)

Fellow	Sponsor
Lee Terrell	Eglin Chapter, AFA
Hugh L. Cox III	Eglin Chapter, AFA
Bruce Marshall	Eglin Chapter, AFA
Maj. Gen. Craig P. Weston	Iron Gate Chapter, AFA
Col. Paul R. Groskreutz	Gen. E.W. Rawlings Chapter, AFA
Monte Correll	Langley Chapter, AFA
Barry Creighton	Langley Chapter, AFA
Steve Mosier	Langley Chapter, AFA
Dick Price	Langley Chapter, AFA
Lt. Col. Mariano Campos	Gen. E.W. Rawlings Chapter, AFA
Pearlie M. Draughn	John O. Gray
Doreatha J. Major	John O. Gray
Katie A. Storm	John O. Gray
Maj. Gen. Edward F. Grillo Jr., USAF (Ret.)	Jack B. Gross
Lt. Gen. Michael D. McGinty, USAF (Ret.)	Jack B. Gross
Maj. Gen. Richard A. Mentemeyer	Jack B. Gross
Brig. Gen. Bradley W. Butler	Paul Revere Chapter, AFA
Brig. Gen. Stephen J. Miller	Langley Chapter, AFA
Col. Gary Cook	Gen. E.W. Rawlings Chapter, AFA
Richard B. Goetze Jr.	Aerospace Education Foundation
In Memory of Irwin Levy	Dale O. Smith Chapter, AFA
Capt. Kim Campbell	Iron Gate Chapter, AFA
Sylvia A. French	AFA Field Units

Fellows of the Foundation (represents a \$500 contribution)

Fellow	Sponsor
General Dynamics-Advanced Information	Lance P. Sijan Chapter, AFA
Lt. Gen. Charles H. Coolidge	Wright Memorial Chapter, AFA
Gen. T. Michael Moseley	Donald W. Steele Sr. Memorial Chapter, AFA

Presentation Fellowships (represents a minimum \$100 contribution)

Charles H. Church Jr. Memorial Fellowship	
Graham Burnley	Missouri State AFA
John and Terri Politi	Judy Church
Devoucoux Family Fellowship	
R.L. "Dev" Devoucoux	New England Region AFA
Harry O. Gestrich Memorial Fellowship	
Georgia Gestrich	Robert Stein
Brig. Gen. Edward Brya Honorary Fellowship	
Brig. Gen. Edward Brya	Arnold Air Society & Silver Wings
Ian R. Dickinson Honorary Fellowship	
Col. Ian R. Dickinson	Communications & Information Directorate, 44th Air Base Sq.

Flights From the

By Norman Polmar and Kenneth J. Moore

Two revolutionary weapons were introduced early in the 20th century: the airplane and the submarine. Combining the two took some imagination and lots of ingenuity.

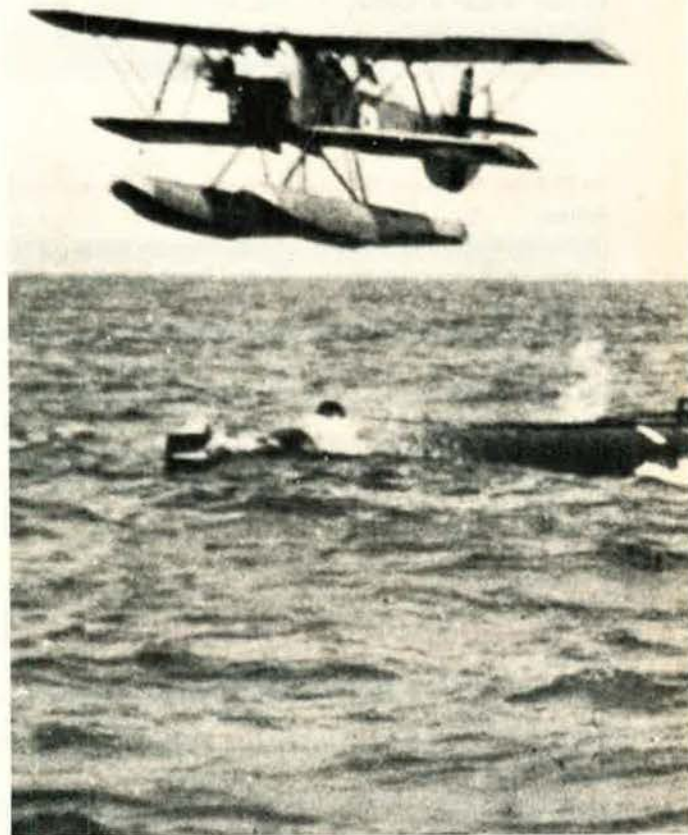
The first rudimentary steps toward the combination took place during World War I. The British and German navies used standard submarines that carried floatplanes on the surface that would then submerge just enough to float off the aircraft. After carrying out their mission, the aircraft would return to a land base or put down at sea, where they were scuttled after the pilots were recovered.

Between the world wars, three other countries began to take an interest in placing aircraft on subs. France, Japan, and the United States experimented with subs and floatplanes. Their approaches varied, and, while most efforts might be described as dilettante, Japan managed to produce a system in World War II that could deliver an aircraft to within striking distance of the US mainland.

Britain continued its earlier work, converting the large submarine monitor, designated *M2*, to carry a float-

plane. France built the submarine cruiser *Surcouf* with large guns to attack merchant ships and a floatplane to search out targets. The US Navy modified the submarine *S-1* for experiments with a collapsible floatplane that could be stowed in a hangar on deck.

The more extensive work, however, was begun in 1923 by Japan. It first used two German Caspar-Heinkel U-1 biplanes, fitted with floats, to conduct trials aboard a submarine. It then developed a series of floatplanes for submarine use, beginning with the Watanabe Type 96 (E9W1), which entered service in 1938. This biplane aircraft and the monoplane Yokosuka Type 0 (E14Y1), which entered service in 1941, had far-reaching ser-



Attempts to launch aircraft from submarines date to World War I. Between the world wars, Britain used a modified submarine monitor, M2. By World War II, Japan had taken the lead in sub-launched aircraft capabilities.

War produces many strange results. The submersible aircraft carrier was one.

Deep



Photos courtesy Norman Polmar

vice in the Pacific in the early years of World War II. (The Yokosuka Type 0 was given the Allied codename Glen.)

By the start of World War II, Japan's Navy had 12 large I-series submarines that could each carry a single floatplane. Japan didn't stop there. It had more aircraft-carrying submarines under construction, of which several became operational during the war.

The new subs had hangars for a single, disassembled floatplane, with a catapult built into the deck. The submarine surfaced, the crew extracted the aircraft from the hangar, extended the wings, prepared it for flight, and catapulted the airplane off the sub. After completing their

mission, the crew would land the aircraft in the water alongside the submarine, where it would be hoisted aboard by a crane.

These airplanes flew missions throughout the southwest Pacific and Indian Ocean areas, seeking Allied shipping and performing reconnaissance of Allied ports.

To the United States

In 1942, Japan extended operations to the US mainland.

The Japanese submarine *I-25* twice launched a Yokosuka Type 0 monoplane from a position off Cape Blanco, Ore., on incendiary bombing raids against the United States. The goal was to ignite forest fires in the northwestern United States.

On these two missions, both piloted by Warrant Flying Officer Nobuo Fujita, the aircraft flew about 50 miles inland, where Fujita released incendiaries. The missions failed. There were no major fires and no casualties.

These were the only known aircraft attacks mounted against the continental United States during the war. Japan also employed large submarines to refuel seaplanes, including two flying boats that bombed Pearl Harbor on the night of March 3-4, 1942.

Japan continued to pursue the submarine-aircraft combination, building even larger subs intended to carry aircraft to bomb Washington, D.C., and New York City.

In 1942, Japan began construction of the I-400 class—the Sen-Toku (STo) or special submarines. These were the largest non-nuclear submarines ever constructed. They had a surface displacement of 5,223 tons and were 400.25 feet long—a length not exceeded by submarines until the nuclear-propelled submarines of the mid-1960s. The I-400s were propelled on the surface by diesel engines and submerged by electric motors, which obtained their energy from batteries.

While the first I-400s were under construction, the changing course of the Pacific war caused Japan to change the I-400 mission from strikes on Washington and New York City to the Panama Canal. Japan wanted to slow the flow of US warships into the Pacific.

The original 1942 design of the I-400 provided a hangar to accommodate two floatplanes, but it was enlarged to handle three aircraft. The aircraft hangar, beneath the conning tower, opened to an 85.4-foot catapult track forward of the hangar. The aircraft were pre-warmed in the hangar, while the submarine was still submerged, by circulating heavy lubricating oil through their engines. The submarine then surfaced to launch aircraft.

Japan planned 18 of the I-400 class submarines, completing the first in December 1944. The *I-401* and *I-402* followed in 1945. However, the *I-402* was converted to a tanker configura-

tion to carry fuel from the East Indies to Japan. The war ended before the *I-402* undertook a tanker mission. Japan launched a fourth, the *I-404*, but work on the sub stopped in March 1945 when it was 90 percent complete. US carrier-based aircraft sank the *I-404* at Kure, Japan, on July 28, 1945. None of the other 12 I-400s reached the launching stage.

Unique Aircraft

Complications also arose with the aircraft—the high-performance Aichi M6A1 Seiran floatplane—that Japan was building for the I-400 submarines. The Seiran, which translates to “mountain haze,” would be the world’s only attack aircraft built specifically to operate from submarines. (The Allies did not learn of the aircraft until after the war, so it had no Allied codename.)

The single-engine Seiran was 38 feet long and 15 feet high, with a wingspan of just more than 40 feet. It weighed 7,277 pounds empty. It had to fit inside an 11.5-foot cylinder-shaped hangar, so a ground crew rotated the wings, then folded them to lie flat alongside the fuselage. They could also fold each side of the horizontal stabilizer and the vertical stabilizer part way.

The aircraft’s initial specifications called for no undercarriage. There were provisions for support pylons with floats that would enable the aircraft to land on the water but limited its payload to one 551-pound

bomb. The Seiran could be launched without the pylon-attached floats, but then the pilot would have to ditch at sea. Without the large pylons and floats, the aircraft could carry one torpedo or 1,760-pound bomb or two 551-pound bombs.

During practice, the time to unfold the aircraft’s wings and tail surfaces and ready it for launching—in darkness—was less than seven minutes. The three aircraft could be readied for flight and launched within 30 minutes of the submarine coming to the surface. Although, even at night, this was a long time for the submarine to be exposed, it was a remarkable achievement.

The giant submarine had a magazine that could hold four aerial torpedoes, three 1,760-pound bombs, and 12 550-pound bombs. Beyond its aircraft weapons, each I-400 was armed with eight 21-inch torpedo tubes forward and carried 20 torpedoes. Each sub also had one 5.5-inch deck gun and 10 smaller anti-aircraft guns.

Japan also modified two slightly smaller AM-class submarines, the *I-13* and *I-14*, to embark two M6A1 aircraft. The *I-13* and *I-14* were intended to operate with the I-400s in long-range air strikes.

Finally, on July 26, 1945, the *I-400* and *I-401*—with their six attack aircraft—sortied from the Inland Sea to strike the US naval anchorage at Ulithi Atoll in the Caroline Islands in an operation called Hikari. The *I-13*

Photos courtesy Norman Polmar



One of Japan’s large I-series submarines twice used submarine-launched aircraft to mount attacks against the US mainland. These were the only manned attacks against any part of the 48 contiguous states during World War II.



Warrant Flying Officer Nobuo Fujita was the pilot for both of Japan’s 1942 incendiary attacks on the US.

and *I-14* preceded them, each with two aircraft to fly from Truk Island to scout the lagoon at Ulithi before the attack. (The *I-13* was sunk before reaching the area.)

However, the war in the Pacific ended on Aug. 15, two days before the planned strike. The submarines returned to Japan to be surrendered, along with their sister ships, to US forces.

Japanese plans for these underwater aircraft carriers—had the war continued—included replacing their Seiran aircraft with Baka rocket-propelled suicide aircraft. There were unconfirmed reports of proposals to use the submarines to launch aircraft carrying biological agents against the United States.

US naval officers studied the I-400 submarines after the war. One idea was to convert one or more of these giants to transport submarines. However, to meet US Navy safety standards and rehabilitate the ships would take six months of yard work and would cost some \$750,000 per submarine. This did not include later modifications that would be needed



Pictured is a Japanese I-400 submarine, surrendered to the US at the end of World War II. Note the large metal hangar below the submarine's island. It was used to house the Aichi M6A1 Seiran attack aircraft.

to use US electric batteries for underwater propulsion. In the end, the work was not undertaken, and all three I-400s were sunk or scrapped.

Shortly after World War II, the United States showed little interest

in pursuing some form of aircraft-carrying submarine. A 1946 submarine officers conference noted, "No design studies should be made on this type of submarine at this time unless the Chief of Naval Operations believes that the need for such a type submarine may be required in the near future."

The Soviet Union, however, took an initial step. In 1948, the Soviets developed a draft design for Project 621—a large landing ship-transport submarine—that, in addition to a battalion of troops, tanks, and vehicles, was to carry three La-5 fighter aircraft in a hangar built into the conning tower. The aircraft would be launched by catapult. Project 621 was the only known Soviet aircraft-carrying submarine to reach that stage of design.

Although, as it turns out, the Soviets never took the project beyond design, in the early 1950s, US intelligence agencies did give credence to the possibility of a submarine-launched nuclear air attack against Strategic Air Command bomber bases.

Wiping Out SAC?

In 1953, a secret Project RAND study—sponsored by the US Air Force—concluded, "Using the submarine-launched or low-altitude Tu-4 [land-based bomber] surprise attack, the enemy can destroy a major part of SAC potential at relatively small cost in A-bombs and aircraft. With no more than 50 aircraft and bombs,

Photo by Paul Kennedy



The last Aichi Seiran ever built now sits in the National Air and Space Museum's Udvar-Hazy Center. At right is a Japanese manned suicide flying bomb.

The Aichi Seiran Today

The Smithsonian's new Steven F. Udvar-Hazy Center, near Dulles Airport outside Washington, D.C., has the only existing Seiran. It was the last M6A1 airframe Japan built. Allied forces found it in the remains of the Aichi aircraft factory.

The US transported the Seiran to NAS Alameda, Calif., where it was periodically displayed. The Navy transferred the aircraft to NASM's Paul E. Garber Facility in Silver Hill, Md. It remained in storage there for 12 years. The facility began restoration of the aircraft in 1989 and finished in 2000. No production drawings had survived.

Projected Destruction of SAC Bombers, Circa 1950s

The RAND estimate of damage to the US strategic bomber force by Soviet submarine-launched aircraft and land-based Tu-4 Bull strategic bombers.

Type	No Warning		With One Hour Warning	
	Heavy Bombers	Medium Bombers	Heavy Bombers	Medium Bombers
Sub-launched	100%	76%	100%	73%
Tu-4 low altitude	100%	82%	100%	72%
Tu-4 high altitude	90%	64%	43%	42%

Source: Project RAND, "Vulnerability of US Strategic Airpower to a Surprise Enemy Attack in 1956," Special Memorandum SM-15 (April 15, 1953).

two-thirds or more of SAC bomber and reconnaissance aircraft could be destroyed." (Italics in original.)

The RAND study postulated that Soviet submarines each would carry one aircraft with performance similar to the North American F-86 Sabre, a Mach 1 fighter aircraft that in its F-86H variant would be able to carry a nuclear weapon. In a submarine-launched attack, each Soviet aircraft, armed with a 40-kiloton bomb (i.e., more than twice the explosive power of the Hiroshima A-bomb), could strike all occupied SAC bomber bases in the US and overseas within about 800 miles of the coast. Most bases in the continental United States and 15 overseas SAC bases could be targets of the proposed submarine attack. Only eight of 39 US strategic bomber bases were beyond the 800-mile range.

Further, the RAND study estimated that Soviet aircraft, with only a slight increase in size over the US F-86, would provide a range of about 1,380 miles, enabling attacks on the remaining eight continental SAC bases.

The study estimated that, if the attack against Stateside bases came without warning, the Soviets would be able to destroy all heavy bombers (B-36) and 76 percent of the medium bombers (B-47). If the US had warning—defined as about one hour—the submarine-launched strike would still destroy 100 percent of the heavy bombers as well as 73 percent of the medium bombers. Overseas SAC bases would fare slightly better because their larger size would make aircraft on them less vulnerable to 40-kiloton bombs.

Such a Soviet submarine-launched aircraft strike existed only in the

deliberations of the RAND study group.

Meanwhile, in the US, the development of nuclear propulsion sparked some interest in aircraft-carrying submarines, prompting the Office of Naval Research to issue a solicitation for proposals. In response, Edward H. Heinemann, an aircraft designer who preferred to be called an innovator, developed a series of design sketches for a fighter aircraft that could be carried aboard the nuclear-powered submarine *Halibut* that had been specifically designed to carry and launch guided ballistic missiles. *Halibut* was commissioned in January 1960 and could carry four Regulus II missiles in a massive bow hangar.

Heinemann's sketches indicated how a new-design aircraft or his versatile Douglas A4D Skyhawk could

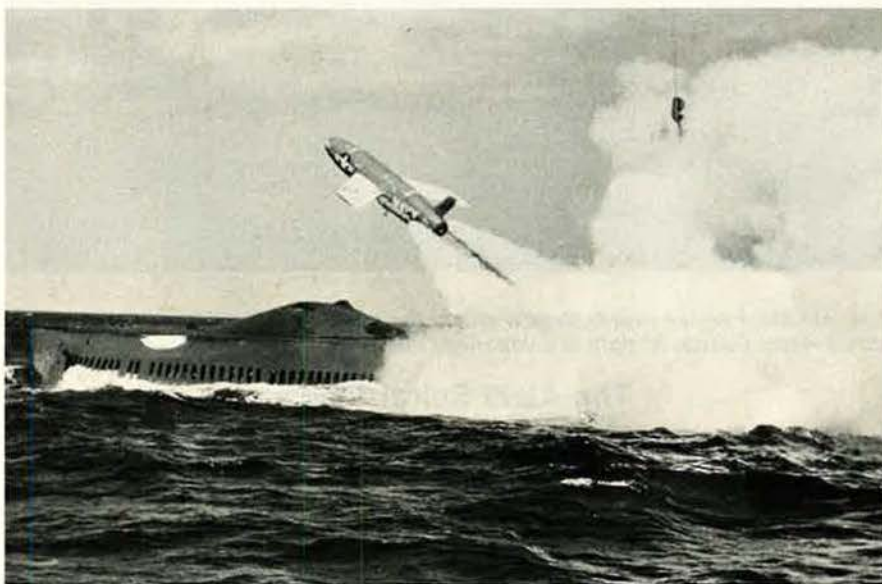
fit into the submarine's hangar with minimum modification. The basic *Halibut* hangar was 80 feet long. The new-design aircraft was the Douglas model 640, a turbojet attack aircraft with a flying boat hull. It would be catapulted from the surfaced submarine, would come down at sea, and would be recovered aboard the submarine by a telescoping crane. Depending upon modifications to the hangar, the aircraft's wings, tail fin, or nose section would fold for ship-board stowage.

Flying Carpet

The Navy did not pursue Heinemann's proposals, but there were several other proposals for nuclear-propelled, aircraft-carrying submarines. The Navy's aircraft development office—the Bureau of Aeronautics—sponsored the most ambitious one, called Project Flying Carpet.

Boeing Aircraft Co. undertook the extensive feasibility study of aircraft-carrying submarines for the project. The secret study employed, initially, hangar configuration and hull lines based on the *Halibut* design and the S5W propulsion plant used for the *Thresher*-type submarine.

The Boeing study proposed a near-term submarine carrier configuration—designated AN-1—that would carry eight high-performance aircraft in two large hangars, built into the forward hull. The nuclear-propelled submarine would be some 500 feet



In the 1950s and 1960s, the Navy test-fired from submarines nearly 1,000 Regulus I cruise missiles, which were the size of contemporary fighters. This was the first shot from USS *Halibut*.

long and displace 9,260 tons on the surface—larger than any US submarine then planned, including the 380-foot-plus Polaris ballistic missile submarines.

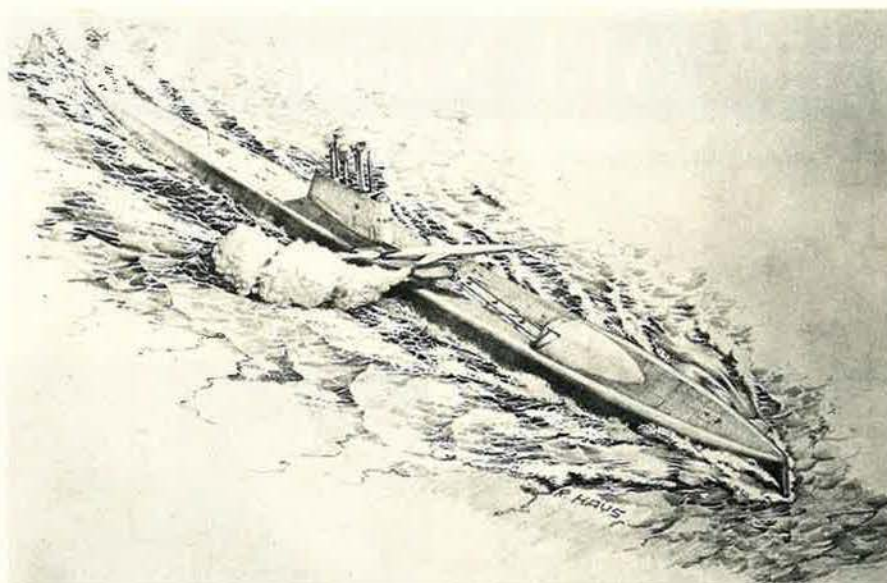
The starting point for AN-1 aircraft would be a modified Grumman F11F Tiger turbojet fighter. The aircraft's standard folding wings (for carrier use) would be supplemented by a folding tail fin, and it would employ a large rocket booster for launch from a "zero length" catapult. The catapult would be elevated to the vertical (90 degrees) to launch aircraft. The pilot would climb into the aircraft while it was still in the hangar, then an automated system would move the aircraft onto the catapult.

The aeronautics bureau conducted a feasibility study to investigate the submarine weight, stability, and equilibrium using an F11F conventional aircraft stowed in the Regulus missile hangar of USS *Grayback*. *Grayback* could carry two Regulus II missiles, one in each of two hangars faired into her forward superstructure.

The plan was, eventually, to replace the Mach 1+ F11F fighter with a Mach 3 aircraft. The aircraft would land aboard the submarine through the use of an innovative hook-and-cable arresting system. An aircraft that had to set down at sea could be brought back aboard the submarine by crane.

Initially, designers expected each aircraft-carrying sub to be able to haul aircraft fuel, weapons, and other stores for 10 missions per aircraft—a total of 80 missions per submarine. That estimate grew during the preliminary design process to at least 160 missions, with only minor changes in the submarine design.

Designers developed a subsequent AN-2 variant aircraft-carrying submarine with similar hull lines to the AN-1, but the AN-2 would operate vertical takeoff and landing aircraft. The sub would carry these VTOL aircraft in eight vertical hangars built into the hull forward of the sail structure. The below-deck configuration of the AN-2's forward hull would differ considerably from the AN-1, while



The Navy for some years investigated ideas for aircraft-carrying submarines. Pictured is a 1957 Navy concept for a 346-foot, nuclear-powered submarine capable of launching large Regulus II cruise missiles from the deck.

the after section of the submarine—containing crew quarters, control spaces, propulsion, and reactor plant—would be similar.

The Boeing study noted that "flight deck operations in the conventional meaning of the word do not exist." It estimated a ground crew could launch four VTOL aircraft within 5.5 minutes of surfacing and eight aircraft in just over nine minutes. If the aircraft engine start used self-contained starters rather than ship-board power, those times could be cut. The study further concluded that, under even the most adverse sea conditions, the time to launch all eight aircraft would be 18 minutes. To compensate for the adverse conditions, the ground crew would move the aircraft, via deck tracks, to the amidship launchers closest to the ship's center of buoyancy.

The Boeing study calculated that the AN-1 submarine would cost about half again as much as a Polaris missile submarine.

However, the Navy did not pursue the aircraft-carrying submarine. Defense analysts have offered a number of reasons: a questionable operational requirement for submarine-based aircraft; bureaucratic opposition to a ship concept developed by the Navy's

Bureau of Aeronautics, not the Navy's Bureau of Ships; and a shortage of submarine construction capability since the Navy was accelerating the construction of both torpedo-attack submarines and Polaris missile submarines.

Despite the Navy's ultimate lack of interest in aircraft-carrying subs, proposals continued to surface from a variety of sources.

Over the years, the US Patent and Trademark Office routinely received such proposals. One dated 1930 shows a submarine with a hangar built into the superstructure, carrying two floatplanes that were to be launched on rollers. A post-World War II patent shows a conventional submarine with a large hangar within the pressure hull and an elevator to lift floatplanes to the main deck. That proposal had the submarine recovering the floatplanes, after they landed at sea, at the sub's stern.

The patent office has issued patents on numerous other designs. Although few of the proposals were feasible from an engineering or operational viewpoint, they were interesting and demonstrated the continued interest in this type of weapon system.

Today's long-range bombers, cruise missiles, satellites, and unmanned aerial vehicles have eliminated any practical reason for aircraft-carrying submarines. Still, the idea was ingenious for its time. ■

Norman Polmar is the author of numerous books about submarines and aircraft. He and Kenneth J. Moore are leading analysts of submarine technology and programs. This article is adapted from their book Cold War Submarines (Brassey's, 2004).

By Frances McKenney, Assistant Managing Editor

2nd Lt. Starter Kit

Central Florida Chapter representatives attended the commissioning ceremony for cadets at the University of Central Florida in Orlando, where they gave the brand-new Air Force officers three-year memberships to the Air Force Association and second lieutenant "starter kits."

The kits contained a set of gold-bar insignia, a hat insignia, and an Air Force training ribbon.

Eleven cadets received their gold bars at the ceremony: Benjamin U. Amason, John B. Davidson Jr., Carson L. Dodds, Dario A. Donahoo, Brad L. Haynes, Derrick Langley, Jaya N. Martin, Ian V. Phillips, Jeremy W. Regans, Geoffrey F. Soule, and Paul D. Whitmore.

Among the more than 200 guests at the Det. 159 pinning on were John Timothy Brock, chapter president; Martin H. Harris, an Air Force Association national director emeritus; Richard A. Ortega, the chapter's aerospace education vice president; and Tommy G. Harrison, chairman of the black-tie gala held in Orlando every February during the AFA Air Warfare Symposium.

Brock said UCF cadets provide support for the February gala and other chapter events, so members attend the commissioning as a way of thanking them.

"It's also an opportunity for us to speak to a non-choir audience when we meet the parents and friends of these new second lieutenants," Brock said. "Richard always manages to sign up one or two new members at the ceremony."

"To the Heart of Every Person"

When Capt. Kim Campbell finished her presentation about the A-10 mission she flew in Iraq last spring, the audience at the **Iron Gate Chapter (N.Y.)** November meeting rushed the podium.

"People couldn't wait to get up there to shake her hand and thank her," said Frank T. Hayes, chapter president. Even the maitre d' and waiters who overheard her presentation at New York City's 21 Club that after-



USAF photo by Sandy Wassermiller

During a visit to Sheppard AFB, Tex., AFA National President Pat Condon listens to Lt. Col. Kevin Smith, 88th Flying Training Squadron commander, discuss pilot training. Condon was guest speaker for the Donnelly Chapter's "Lunch and Learn" lecture series. His visit boosted the number of Community Partners by 50 percent, said Lt. Col. Jeffery Snell, chapter president.

noon told Hayes they were moved. "She really got to the heart of every person in the room," he said.

Campbell was deployed from the 75th Fighter Squadron, Pope AFB, N.C., for Operation Iraqi Freedom last year. On April 7, she had just finished supporting ground troops and was still over Baghdad, when enemy fire hit one of her Warthog's engines, knocking out the aircraft's hydraulics. Flying the A-10 manually, Campbell brought the severely damaged aircraft back to a coalition base. Even after the safe landing, however, her airmanship continued to be tested: She had to get the A-10 to stay on the runway and stop, despite the lack of steering capability or brakes.

The mission brought the 1997 Air Force Academy graduate widespread media attention. (See "Aerospace World" photo, May 2003, p. 20.) Chapter President Hayes saw some of the TV and newspaper coverage and asked Air Combat Command's public affairs office to put her in touch with the chapter. Campbell replied by e-mail the next day, Hayes said.

In the audience for Campbell's Iron Gate talk were representatives from the A-10's original contractor, Fairchild, as well as Raymond P. "Bud" Hamman, AFA's Northeast Region president, and Richard B. Goetze Jr., the Aerospace Education Foundation's past chairman of the board. Chapter presidents from New York state included William G. Stratemeier Jr., **Long Island Chapter**, and Edward V. Giampoli, **Gen. Carl A. "Tooey" Spaatz Chapter**.

Campbell was also guest speaker at the AFA Air Warfare Symposium in Orlando last month.

Textbook Sticker Shock

Bought a college textbook lately? The price tag is eye-opening. Various studies claim that books cost students an average of \$700 to \$1,200 a year—an expense often overlooked when planning for college. The high price is not news to the **Ak-Sar-Ben Chapter (Neb.)**, though.

In January, it began the second year of its textbook grant program.

The grants go to active duty Air

Force personnel, in grades E-4 through E-7, at Offutt AFB, Neb. The recipients must have at least four years in service and be enrolled in a degree program at an accredited college or university. This includes the Community College of the Air Force.

The chapter presented grants in January to: MSgt. Todd DePorter, SSgt. Christa Dossett, SSgt. David Dossett, TSgt. Mike Ellis, TSgt. Anthony Fisher, MSgt. Paul Gagnon, TSgt. Demetria Gerald, SSgt. Jason Shell, and MSgt. Simone White.

The nine enlisted members received a total of \$1,000, and another \$1,000 remains in the chapter's program for the spring term, said Robert D. Lewallen, the chapter's aerospace education vice president.

When the program first began in January 2003, the chapter approved 14 grants before using up the \$2,000 set aside for the project. Another dozen applications poured in "before the chapter could get word out that we were out of money," Lewallen said. He noted that textbook grants are an innovative way to fulfill the chapter's mission to promote the education of military service members.

Head of the Class

It was a kind of "Back to School Night" for the **Blue Ridge Chapter (N.C.)**. The 36 chapter members at the December meeting didn't have to squeeze into wee-size chairs, but the focus was on education, and a teacher presented the "lesson."

At the meeting, William T. Stanley, state aerospace education VP, announced that the chapter would begin sponsoring five classrooms in the Visions of Exploration program in January. Visions is a joint effort by AEF, *USA TODAY* newspaper, and AFA chapters to encourage youngsters in elementary and middle schools to develop skills in math, science, and technology.

According to William D. Duncan Jr., North Carolina state president and chapter secretary, the Blue Ridge Chapter is at the head of the class: This is the first time it—or any chapter in the state—has participated in Visions of Exploration.

Judy Sink teaches in one of those Visions classrooms. She was also named chapter Teacher of the Year and was guest speaker for that chapter meeting. Sink spoke about how she uses aerospace topics to motivate her second-graders and reinforce their curriculum at Hardin Park Elementary School in Boone, N.C. Among her strategies, she involves parents in classroom activities; they helped the students build models of

the international space station and the space shuttle, for example.

After her talk, Chapter President Thomas N. Walker presented her with Teacher of the Year awards: membership to AFA and \$100. Duncan presented national-level awards to chapter members, as listed in the November 2003 issue.

Awards Luncheon

The Air Force vice chief of staff was guest speaker for an awards luncheon of the **Donald W. Steele Sr. Memorial Chapter (Va.)** in January.

Gen. T. Michael Moseley described highlights of Operation Iraqi Freedom and ongoing USAF operations in Iraq. He also talked about the Air Force fighter modernization program, the status of its tanker fleet, personnel issues, and other challenges facing USAF leaders today.

Moseley joined Chapter President James R. Lauducci in presenting national-level AFA awards (as listed in the November 2003 issue). The chapter also named the general an AEF Fellow, with AEF President Mary Anne Thompson and Lauducci giving Moseley a limited-edition copy

of *Crusade for Airpower, the Story of the Air Force Association*. The book—published by AEF in 1982—is signed by 11 former Air Force Secretaries and five former USAF Chiefs of Staff, including W. Stuart Symington and Gen. Curtis E. LeMay.

Lauducci reported that the audience at the Army–Navy Country Club in Arlington, Va., numbered more than 200, including defense industry representatives and air attaches from a dozen countries.

The chapter signed up 18 new members at this meeting.

Centennial of Flight: Nebraska

In December, the **Lincoln Chapter** helped its namesake Nebraska city observe 100 years of powered flight. The chapter invited William C. Diehl, Lockheed Martin's business development manager for the Joint Strike Fighter program, to be its VIP guest and lined up several speaking engagements for him.

Mark Musick, chapter president, opened the presentations with a PowerPoint briefing describing the challenges Wilbur and Orville Wright overcame to make that first flight. He then turned the podium over to Diehl,

AFA In Action

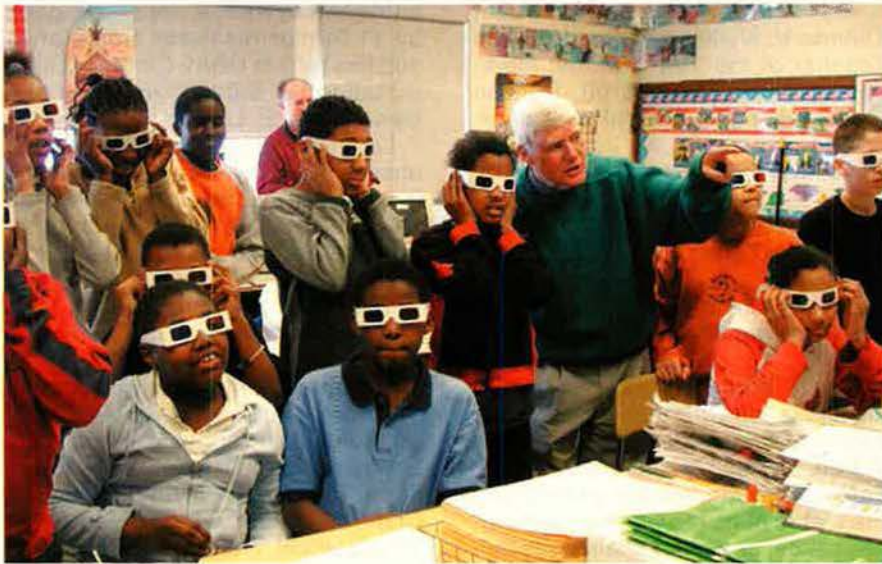
The Air Force Association works closely with lawmakers on Capitol Hill, bringing their attention to issues of importance to the Air Force and its people.

■ AFA's Government Relations staff met with Alan Hill, House staff director of the Air Force Caucus, and representatives of the Air Force Office of Legislative Liaison (OLL) to plan Air Force Caucus events for the second session of the 108th Congress. The Air Force Caucus, comprised of 68 members of Congress, meets periodically to learn about USAF people, issues, and programs then advocates for them in Congress. **Sen. Michael Enzi** (R-Wyo.) heads the Senate Air Force Caucus, and **Rep. Cliff Stearns** (R-Fla.) is chairman of the House Air Force Caucus.

Programs AFA and the Office of Legislative Liaison planned for this year include a breakfast meeting with Air Force Vice Chief of Staff **Gen. T. Michael Moseley**—who will discuss continuing air operations in Afghanistan and Iraq—and an educational off-site for caucus professional staff members to learn more about the Air Force. AFA and OLL also discussed building support for the special needs of overseas Air Force bases, the Air Force legislative agenda for the second session of the 108th Congress, the Quadrennial Defense Review, inviting additional members of Congress to join the Air Force Caucus, and planning AFA's series of Congressional education programs.

■ AFA Executive Director Donald L. Peterson and the GRL staff met with the Air Force Legislative Fellows on Capitol Hill. This year, USAF has seven fellows working for a year in Congressional offices as professional staff members. The fellows come from throughout the Air Force and serve within a member's office as a resource on USAF issues and programs. This year's group is: Maj. James Drape in the office of **Rep. James Gibbons** (R-Nev.); Maj. Lee Erickson with **Sen. James Inhofe** (R-Okla.); Cathryn Kennedy with **Sen. Richard Durbin** (D-Ill.); Lt. Col. Samuel Mahaney with **Rep. Jerry Lewis** (R-Calif.); Maj. Paul Mazzeno with **Rep. Randy Cunningham** (R-Calif.); Maj. Russell Ponder with **Sen. Ben Nelson** (D-Neb.); and Maj. Reginald Robinson with **Rep. John Spratt** (D-S.C.).

Peterson spoke to the group about AFA's work on Capitol Hill, its joint efforts with the Air Force Office of Legislative Liaison, AFA events and programs of interest, and how the association can serve as their resource for information.



Kent Hemphill of the Genesee Valley Chapter (N.Y.) explains 3-D images from the Mars rover "Spirit" to students at Rochester City School #36. Hemphill leads a group of chapter members who visit the school five times a year to teach fundamentals of flight and aerospace topics to fourth- and fifth-graders.

who spoke about the multiservice, multirole stealthy F-35 that USAF plans as a replacement for its F-16s and A-10s.

Diehl and Musick took their presentation to a Lincoln Chapter luncheon—which included guests from the city's business, government, military, and general aviation sectors—held on the anniversary of the Wright brothers' Dec. 17 flight. Other venues for their talk: AFOTC Det. 465 at the University of Nebraska at Lincoln; Lincoln's North Star High School; Bellevue East High School in Omaha, Neb.; and a luncheon near Offutt AFB, Neb., arranged by the **Ak-Sar-Ben Chapter**.

Diehl is based at Lockheed Martin Aeronautics in Fort Worth, Tex., where he is a member of the local AFA chapter.

Centennial of Flight: Florida

The **Miami Chapter (Fla.)** sponsored a celebration at the Wings Over Miami Museum on the 100th anniversary of the Wright brothers' flight.

Rep. Ileana Ros-Lehtinen headed the list of speakers at the military and classic aircraft museum, located at the Kendall-Tamiami Airport. Joining her on the program were Brig. Gen. Thomas A. Dyches, director of transformation, US Southern Command; Col. Steven R. Fulghum, commander of the 482nd Fighter Wing at Homestead ARB, Fla.; and Angela Gittens, aviation director for Miami Airport.

Walter E. Collier, chapter programs

VP, said the speakers not only talked about advances in aviation but also paid tribute to the 482nd FW personnel serving in Iraq. Collier noted that 250 guests turned out for the evening program, cosponsored by 20 other aviation and civic organizations.

Osprey OK

A government acceptance test pilot for the V-22 Osprey told the **Panhandle AFA Chapter (Tex.)** that he has no hesitation in flying the controversial tilt-rotor.

Maj. James A. Donald, an Air Force special operations helicopter pilot, is assigned to the Defense Contract Management Agency-Bell Helicopter in Amarillo, Tex. He is also the aviation safety officer there.

USAF intends to buy its version of the tilt-rotors—designated CV-22—for special operations missions, as replacements for its fleet of MH-53 helicopters.

In his briefing in December to the Panhandle Chapter, Donald covered the history, development, testing, and future use of the Osprey.

George F. Moore, the chapter's communications VP, reported that Donald "allayed any concerns about the airworthiness or capabilities of the aircraft and its cost effectiveness."

Donald capped his presentation by describing his flying experiences, including missions in Southwest Asia. He said later that he didn't need to reveal special operations information because the AFA audience understood enough without his providing specific details.

World War II Training

Bernard Heitz, 78, flew to the November meeting of Indiana's **Columbus-Bakalar Chapter** in his Piper Comanche, at night. Nothing special about that, Heitz said later, noting that he has more than 10,000 hours of flight time.

The chapter invited him to talk about his World War II training as a P-38 reconnaissance pilot. He described basic training at Keesler, Miss., as



At an Air Force Ball at Andrews AFB, Md., in November, Thomas W. Anthony Chapter members pause for a photo. L-r are: retired MSgt. Frank Coorsen; Andrew Veronis, state president; retired Lt. Col. Spann Watson, a Tuskegee Airman; and Civil Air Patrol Col. Charles Suraci Jr., chapter president.

well as pilot and specialized photo-reconnaissance training, and showed some aerial photos of US cities and a dam, taken with one of his aircraft's three cameras.

Heitz was completing his training at Coffeyville, Kan., when the war ended, but he continued to serve, first with the Kentucky Air National Guard, flying P-51s and F-86s for 12 years, then with the Army National Guard's aviation division in Indiana, flying L-19s.

Accompanying Heitz to the chapter meeting was his son Pat, who runs the sign company started by the elder Heitz after the war. Pat told Chapter President Robert J. Goeld that he had never heard some of the wartime experiences his father had related to the chapter. "That meant more to me than giving the actual speech," Bernard Heitz said later.

State Teacher of the Year

In Massachusetts, the **Pioneer Valley Chapter** honored the state AEF Teacher of the Year, Cynthia Amato, in a December ceremony at her school.

Chapter President Patrick Ryan said more than 300 students filled the auditorium at Milton Bradley Elementary School in Springfield, Mass., for the event. They were current and former members of Amato's Space Club, a school activity that she organized to teach youngsters about aerospace technology.

Ryan explained that Amato earned the honor as the Bay State's Teacher of the Year not only because of the club but because the third-grade science teacher has gathered aerospace study resources for her students on her own time and at her own expense.

Eric P. Taylor, New England Region president, and Winston S. Gaskins, the chapter's aerospace education VP, organized the ceremony. They joined Ryan in presenting Amato with a commemorative plaque and \$500.

More AFA/AEF News

■ EDIMGIAFAD. At first glance, the word looks Welsh—or perhaps like something you holler when hammering your finger by mistake. According

to Jack H. Steed of the **Carl Vinson Memorial Chapter (Ga.)**, however, nearly everyone in the city of Warner Robins knows that it stands for: Every Day in Middle Georgia Is Air Force Appreciation Day. Steed, who's also chairman of AFA's national Membership Committee, said the chapter created the slogan years ago and last spring arranged to have shrubs shaped in the acronym's letters planted alongside a major highway. A chapter Community Partner sponsored the display, which gets decorated according to the seasons, most recently for the December holidays.

■ Two AFROTC cadets from the **Fort Worth Chapter (Tex.)** dressed

for the part when they delivered a presentation on the history and evolution of Air Force uniforms to their classmates at Det. 810, Baylor University in Waco, Tex. Marc R. Bradle wore an Army Air Corps officer's uniform, representing the look of uniforms in 1912. Matthew J. Mansell donned the World War II era "pinks and greens," including a "crush cap." Other uniforms worn by their fellow cadets during the presentation: a "Midnight Blues" winter work uniform from the Korean War, a summer dress uniform from the early 1960s, and the White Dress and Dress Blues uniforms that were phased out in the 1990s. ■

AFA Conventions

April 23-24
April 30-May 1
April 30-May 1
May 13-15
June 4-6
June 4-5
July 17
July 23-25
Aug. 12
Aug. 13-14
Aug. 14
Aug. 20
Aug. 21
Sept. 11-15

Iowa State Convention, Fort Dodge, Iowa
New Jersey State Convention, Atlantic City, N.J.
South Carolina State Convention, Columbia, S.C.
California State Convention, Palm Springs, Calif.
New York State Convention, Ronkonkoma, N.Y.
Oklahoma State Convention, Enid, Okla.
Florida State Convention, Tampa, Fla.
Texas State Convention, Fort Worth, Tex.
Alaska State Convention, Anchorage, Alaska
Missouri State Convention, Kansas City, Mo.
Georgia State Convention, Warner Robins, Ga.
Colorado State Convention, Aurora, Colo.
Utah State Convention, Ogden, Utah
AFA Air and Space Conference, Washington, D.C.



NEW at AFA!



#139. AFA Polo Shirt by Lands' End. Mesh with full color AFA logo, available in Chambray, Heather. Sizes: M, L, XL. \$31



#138. AFA Polo Long Sleeve. Pima cotton by Lands' End with full color AFA logo, available in Black, Ivory. Unisex sizes: M, L, XL. \$38

#107. AFA Logo tie. 100% silk available in Yellow, Dk Blue, Burgundy. \$23



#118. AFA T-Shirt. 50/50 cotton/poly available in Ash Gray, White. AFA logo on front, eagle on back. Unisex sizes: M, L, XL, XXL. \$15

Order TOLL FREE! 1-800-727-3337
Add \$3.95 per order for shipping and handling
OR shop online at www.afa.org

Have AFA/AEF News?

Contributions to "AFA/AEF National Report" should be sent to *Air Force Magazine*, 1501 Lee Highway, Arlington, VA 22209-1198. Phone: (703) 247-5828. Fax: (703) 247-5855. E-mail: afa-aef@afa.org.

5th AF, Hq & Hq Sq, 314th Composite Wg (WWII) and **5th Bomb Command** (Korea). Sept. 19-23 in Louisville, KY. **Contact:** Louis Buddo, Box 270362, St. Louis, MO 63127 (314-487-8128).

5th/108th Station Hospital (WWII), 5th AF. Sept. 19-23 in Louisville, KY. **Contact:** Jeff Seabock, PO Box 3635, Hickory, NC 28603 (828-324-6464).

6th BG Assn, Tinian Island (1944-45), April 29-May 2 at the Best Western Bradbury Suites in Savannah, GA. **Contact:** Virgil Morgan, 1450 80th St. S.W., Everett, WA 98203 (425-438-9600) (virgil@morganaero.com).

25th FIS. April 18-21 in Las Vegas. **Contact:** Robert Cleaves, 1224 Roberto Ln., Los Angeles, CA 90077-2334 (310-472-2593).

34th PRS, 111th and 162nd TRS, and 215th EFAP. Sept. 17-19 in Lupcourt-Azelot. **Contact:** Francois Bernard (571-333-9639).

42nd BW, SAC (1960s). Oct. 14-18 at the Best Western Rio Grande Inn in Albuquerque, NM. **Contacts:** Paul Maul (303-688-0967) (pablomaul@aol.com) or Jim Sexton (321-449-9767) (jimsexton@msn.com).

80th Service Gp (WWII), 5th AF. Sept. 19-23 in Louisville, KY. **Contact:** Virgil Staples, 725 16th St., West Des Moines, IA 50265 (515-225-8454).

84th ATS/MAS Sq. May 14-15 at the Holiday Inn in Fairfield, CA. **Contact:** John Burnett, 579 Leisure Town Rd., Vacaville, CA 95687 (jnburnet@cwnet.com).

317th Troop Carrier Gp, Hq, 40th, 41st, and 46th TCS, 5th AAF (WWII). Sept. 9-12 in Milwaukee. **Contact:** Leonard Stolz, 2632 S. 78th St., West Allis, WI 53219 (414-541-1464) (schich@wi.rr.com).

405th Signal Co, 5th AF. Sept. 19-23 in Louisville, KY. **Contact:** Phil Treacy, 2230 Petersburg Ave., Eastpointe, MI 48021-2682 (810-775-5238).

485th Tactical Missile Wg. June 10-13 in Albuquerque, N.M. **Contact:** John Rudzianski, 485th TMW Alumni Assn, PO Box 339, S. Montrose, PA 18843-0339 (570-278-2482) (485tmw@stdcomp.com).

502nd Tactical Control Gp (Korea), 5th AF. Sept. 19-23 in Louisville, KY. **Contact:** Fred Gorsek, 445 S. State, Greenview, IL 62642 (217-968-5411).

610th ACW/618th AC&W Sq/527th AC&W Gp, Japan (1947-60). Sept. 12-15 in Branson, MO. **Contact:** Marvin Jordahl (904-739-9337) (jordahlmarvin@comcast.net).

AACS Alumni Assn, all eras. Sept. 23-26 at the Marriott Mountain Shadows Resort and Golf Club in Scottsdale, AZ. **Contact:** Mac Maginnis (253-474-8128) (cmagin4375@aol.com) (www.aacsalumni.com).

C-7A Caribou Assn. Sept 30-Oct. 2 in Odessa, TX. **Contact:** Jim Collier, 5607 Jolly Ct., Fair Oaks, CA 95628-2707 (916-966-4044).

Flying Tigers of the 14th AF Assn (WWII), veterans of the American Volunteer Gp (1941-42), China Air Task Force (1942-43), and 14th AF (1943-45). May 27-30 in Arlington, VA. **Contact:** Robert Lee, 717 19th St. S., Arlington, VA 22202-2704 (703-920-8384).

Malden AFB, MO, all personnel during Anderson Air Activities era. Sept. 24-25 in Malden, MO. **Contact:** Robert Thorpe, 6616 E. Buss Rd., Clinton, WI 53525 (608-676-4925).

Pilot Classes of 1944. Sept. 9-12 in Albuquerque, N.M. **Contact:** Stan Yost, 13671 Ovenbird Dr., Fort Myers, FL 33908 (239-466-1473).


Pilot Training Class 64-G (Webb AFB, TX), students and instructors. April 23-25 at the St. Anthony Hotel in San Antonio. **Contact:** Bill

Wirant, 401 Avenida Adobe, Escondido, CA 92029 (760-489-0920) (billandvannete@cox.net).

Seeking members of **Pilot Training Class 56-M** for a reunion. **Contact:** John Mitchell, 11713 Decade Ct., Reston, VA 20191 (phone: 703-264-9609 or fax: 703-264-1746) (mitchellj@yahoo.com).

Society of Combat Search and Rescue, including survivors, Sandys, Jollys, and Crowns. May 12-16 at Pope AFB, NC. **Contacts:** CSAR, PO Box 1962, Clovis, NM 88102-1962 or Gene McCormack (850-283-2071) (genemac@knology.net).

Mail unit reunion notices four months ahead 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. We reserve the right to condense notices.



"No act of kindness, no matter how small, is ever wasted."

—William Wordsworth

Don't wonder whether you need a will.....everyone does. It's your plan for your family and an estate that took a lifetime to build.


Where will your property go? Who will be your heirs?

Which causes or charities that you supported during life will you want to remember in your will?

Don't give up your right to decide. Request AEF's guide sheet to assist you and your advisors in making your will.

www.aef.gift-planning.org • 1-800-291-8480
1501 Lee Highway • Arlington, Virginia 22209

AFA's Aerospace Education Affiliate



AFA Field Contacts



Central East Region

Region President

James Hannam

6058 Burnside Landing Dr., Burke, VA 22015-2521 (703) 284-4248

State Contact

DELAWARE: Richard B. Bundy, 39 Pin Oak Dr., Dover, DE 19904-2375 (302) 730-1459.

DISTRICT OF COLUMBIA: Rosemary Pacenta, 1501 Lee Hwy., Arlington, VA 22209-1198 (703) 247-5820.

MARYLAND: Andrew Veronis, 119 Boyd Dr., Annapolis, MD 21403-4905 (410) 571-5402.

VIRGINIA: Mason Botts, 6513 Castine Ln., Springfield, VA 22150-4277 (703) 284-4444.

WEST VIRGINIA: John R. Pfalzgraf, 1906 Foley Ave., Parkersburg, WV 26104-2110 (304) 485-4105.

Far West Region

Region President

John F. Wickman

1541 Martingale Ct., Carlsbad, CA 92009-4034 (760) 476-9807

State Contact

CALIFORNIA: Dennis R. Davoren, P.O. Box 9171, Beale AFB, CA 95903-9171 (530) 634-8818).

HAWAII: Jack DeTour, 98-1108 Maluua St., Aiea, HI 96701-2819 (808) 487-2842.

Florida Region

Region President

Raymond Turczynski Jr.

229 Crewilla Dr., Fort Walton Beach, FL 32548-3942 (850) 243-3649

State Contact

FLORIDA: Raymond Turczynski Jr., 229 Crewilla Dr., Fort Walton Beach, FL 32548-3942 (850) 243-3649.

Great Lakes Region

Region President

J. Ray Lesniok

11780 Jason Ave., Concord Township, OH 44077-9515 (440) 352-5750

State Contact

INDIANA: William R. Grider, 4335 S. County Rd., Kokomo, IN 46902-5208 (765) 455-1971.

KENTUCKY: J. Ray Lesniok, 11780 Jason Ave., Concord Township, OH 44077-9515 (440) 352-5750.

MICHIGAN: Billie Thompson, 488 Pine Meadows Ln., Apt. 26, Alpena, MI 49707-1368 (989) 354-8765.

OHIO: Daniel E. Kelleher, 4141 Colonel Glenn Hwy., #155, Beavercreek, OH 45431-1666 (937) 427-8406.

Midwest Region

Region President

Keith N. Sawyer

813 West Lakeshore Dr., O'Fallon, IL 62269-1216 (618) 632-2859

State Contact

ILLINOIS: Frank Gustine, 998 Northwood Dr., Galesburg, IL 61401-8471 (309) 343-7349.

IOWA: Marvin Tooman, 1515 S. Lakeview Dr., West Des Moines, IA 50266-3829 (515) 490-4107.

KANSAS: Gregg A. Moser, 617 W. Fifth St., Holton, KS 66436-1406 (785) 364-2446.

MISSOURI: Judy Church, 8540 Westgate St., Lenexa, KS 66215-4515 (913) 541-1130.

NEBRASKA: William H. Ernst, 410 Greenbriar Ct., Bellevue, NE 68005-4715 (402) 292-1205.

New England Region

Region President

Eric P. Taylor

17 Foxglove Ct., Nashua, NH 03062-1492 (603) 883-6573

State Contact

CONNECTICUT: Carolyn R. Fitch, 952 Tolland St., East Hartford, CT 06108-1533 (860) 292-2449.

MAINE: Eric P. Taylor, 17 Foxglove Ct., Nashua, NH 03062-1492 (603) 883-6573.

MASSACHUSETTS: Eric P. Taylor, 17 Foxglove Ct., Nashua, NH 03062-1492 (603) 883-6573.

NEW HAMPSHIRE: Ed Josephson, 23 Ole Gordon Rd., Brentwood, NH 03833-6213 (603) 778-1495.

RHODE ISLAND: Joseph Waller, 202 Winchester Dr., Wakefield, RI 02879-4600 (401) 783-7048.

VERMONT: David L. Bombard, 429 S. Prospect St., Burlington, VT 05401-3506 (802) 862-7181.

North Central Region

Region President

Robert P. Talley

921 1st St. N.W., Minot, ND 58703-2355 (701) 723-3889

State Contact

MINNESOTA: Richard Giesler, 16046 Farm to Market Rd., Sturgeon Lake, MN 55783-9725 (218) 658-4507.

MONTANA: Al Garver, 203 Tam O'Shanter Rd., Billings, MT 59105 (406) 252-1776.

NORTH DAKOTA: Larry Barnett, 1220 19th Ave. S.W., Minot, ND 58701-6143 (701) 723-3390.

SOUTH DAKOTA: Ronald W. Mielke, 4833 Sunflower Trail, Sioux Falls, SD 57108-2877 (605) 339-1023.

WISCONSIN: Henry C. Syring, 5845 Foothill Dr., Racine, WI 53403-9716 (414) 482-5374.

Northeast Region

Region President

Raymond "Bud" Hamman

9439 Outlook Ave., Philadelphia, PA 19114-2617 (215) 677-0957

State Contact

NEW JERSEY: Robert Nunemann, 73 Phillips Rd., Branchville, NJ 07826-4123 (973) 334-7800, ext. 520.

NEW YORK: Fred Di Fabio, 8 Dumplin Hill Ln., Huntington, NY 11743-5800 (516) 489-1400.

PENNSYLVANIA: Edmund J. Gagliardi, 151 W. Vine St., Shiremanstown, PA 17011-6347 (717) 763-0088.

Northwest Region

Region President

O. Thomas Hansen

97-D Chinook Ln., Steilacoom, WA 98388-1401 (253) 984-0437

State Contact

ALASKA: Gary A. Hoff, 16111 Bridgewood Cir., Anchorage, AK 99516-7516 (907) 552-8132.

IDAHO: Donald Walbrecht, 1915 Bel Air Ct., Mount Home, ID 83647 (208) 587-2266.

OREGON: Greg Leist, P.O. Box 83004-0004, Portland, OR 97283-0004 (360) 397-4392.

WASHINGTON: Kenneth J. St. John, 8114 29th St. W., University Place, WA 98466-2725 (253) 279-6832.

Rocky Mountain Region

Region President

Charles P. Zimkas Jr.

310 S. 14th St., Colorado Springs, CO 80904-4009 (719) 576-8000, ext. 130

State Contact

COLORADO: David Thomson, 29 Kyndra Ct., Canon City, CO 81212-9465 (719) 275-8818.

UTAH: Ted Helsten, 1339 East 3955 South, Salt Lake City, UT 84124-1426 (801) 277-9040.

WYOMING: Irene Johnigan, 503 Notre Dame Ct., Cheyenne, WY 82009-2608 (307) 632-9465.

South Central Region

Region President

Peyton Cole

2513 N. Waverly Dr., Bossier City, LA 71111-5933 (318) 742-8071

State Contact

ALABAMA: Albert A. Allenback Jr., 7325 Wynlakes Blvd., Montgomery, AL 36117-5196 (334) 834-2236.

ARKANSAS: Paul W. Bixby, 2730 Country Club Dr., Fayetteville, AR 72701-9167 (501) 575-7965.

LOUISIANA: Albert L. Yantis Jr., 234 Walnut Ln., Bossier City, LA 71111-5129 (318) 746-3223.

MISSISSIPPI: Leonard R. Vernamonti, 1860 Mcraven Rd. Clinton, MS 39056-9311 (601) 925-5532.

TENNESSEE: James C. Kasperbauer, 2576 Tigrett Cove, Memphis, TN 38119-7819 (901) 685-2700.

Southeast Region

Region President

Robert E. Largent

817 Forest Hill Rd., Perry, GA 31069-3645 (478) 987-2435

State Contact

GEORGIA: Art Bosshart, 100 Park Dr., Warner Robins, GA 31088-5167 (478) 929-1454.

NORTH CAROLINA: William D. Duncan, 11 Brooks Cove, Candler, NC 28715 (828) 667-8846.

SOUTH CAROLINA: David T. Hanson, 450 Mallard Dr., Sumter, SC 29150-3100 (803) 469-6110.

Southwest Region

Region President

Peter D. Robinson

1804 Llano Ct. N.W., Albuquerque, NM 87107-2631 (505) 343-0526

State Contact

ARIZONA: James I. Wheeler, 5069 E. North Regency Cir., Tucson, AZ 85711-3000 (520) 790-5899.

NEVADA: Robert J. Herculson, 1810 Nuevo Rd., Henderson, NV 89014-5120 (702) 458-4173.

NEW MEXICO: Ed Tooley, 6709 Suerte Pl. N.E., Albuquerque, NM 87113-1967 (505) 858-0682.

Texoma Region

Region President

Michael G. Cooper

1815 Country Club Dr., Enid, OK 73703-2027 (918) 596-6002

State Contact

OKLAHOMA: George Pankonin, 2421 Mount Vernon Rd., Enid, OK 73703-1356 (580) 234-1222.

TEXAS: Edward W. Garland, 6617 Honey Hill, San Antonio, TX 78229-5423 (210) 339-2398.

Special Assistant Europe

Special Assistant

Denny Mauldin

PSC 2, Box 9203, APO AE 09012 011-49-631-52031

Special Assistant Pacific

Special Assistant

Gary L. McClain

Komazawa Garden House D-309, 1-2-33 Komazawa Setagaya-ku, Tokyo 154-0012, Japan 81-3-3405-1512

For information on the Air Force Association, see www.afa.org

Pieces of History

Photography by Paul Kennedy

Each and Every Piece



The Smithsonian's Steven F. Udvar-Hazy Center in Chantilly, Va., not only has a large aircraft collection but also fascinating aviation artifacts. Display cases placed throughout the museum focus on such themes as women in the military, World War I aircraft models, balloomania, and air racing. In this Cold War display case, above, the top shelf is devoted to Francis Gary Powers, the U-2

pilot shot down over the Soviet Union and captured in May 1960. Other displayed items in this case include Gen. Curtis LeMay's uniform, medals, and a trademark cigar; a survival kit from the ejection seat of an SR-71; and a pressure suit worn by one of the crew members who flew the museum's SR-71 (background) from Los Angeles to Dulles Airport, in Virginia.

**Only one BMC2 team
can see through the storm.**



Northrop Grumman knows it takes more than just connections to take the fight to our enemies and win decisively. We are leading a team of premier and proven industry leaders to offer our Nation the E-10A Battle Management Command and Control (BMC2) system. The E-10A will join the United States Air Force constellation team of sensors, decision makers and shooters as a critical node for network centric warfare at the forward edge of the battlespace. Our solution exploits our open systems architecture to ensure low risk, affordability and flexibility for the growth needed to meet demanding future mission requirements. We bring proven performance in meeting the full spectrum of engineering and operational challenges from quality of service to predictive battlespace awareness. With our extensive air and ground surveillance experience we know how to exploit the potential of the latest technology for Cruise Missile Defense. The Northrop Grumman BMC2 Team cuts through the storm, translating data into timely, decision-quality knowledge.



US101



45,000
~~40,000~~

MISSION DRIVEN ~~32,000~~ HOURS.

The only mission-proven choice, from Combat Search and Rescue to Executive Transport.

- Mission-proven worldwide: 45,000 flying hours and counting
- 170 mph speed
- 750-nautical-mile range
- 7-hour-plus endurance
- Can carry 30-plus troops, depending on configuration
- Air-transportable and self-deployable
- All-weather operation
- Exceptional systems redundancy
- Advanced survivability technologies
- The new standard in personnel recovery
- The next generation of helicopter, ready now

US101 REPORTING FOR DUTY

AGUSTAWESTLAND


LOCKHEED MARTIN 

bell Helicopter
A Textron Company