

January 2004/\$4

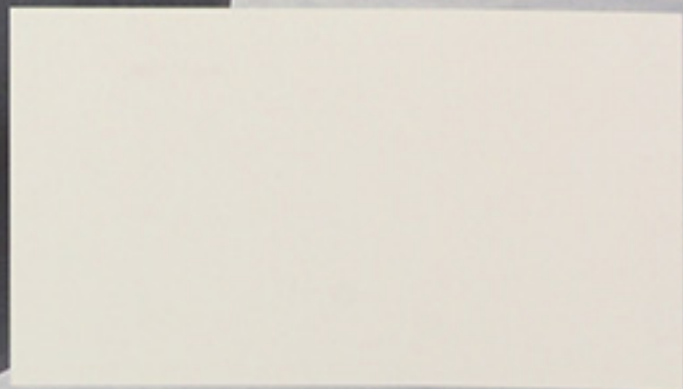
AIR FORCE

JOURNAL OF THE AIR FORCE ASSOCIATION

MAGAZINE

The Year of the Missile Shield
Homeland Air Force
The Viper Revolution

Saving the Galaxy





INBOUND MISSILE

TARGET CITY

QUESTION: WHAT IF AN ENEMY MISSILE HAD JUST BEEN LAUNCHED?

What would it take to stop it? Information, speed and accuracy in a multi-layered system that integrates all three. Decisive action. Helping to protect our country for generations to come. Missile Defense. Turning data into knowledge, and knowledge into action.

www.lockheedmartin.com

LOCKHEED MARTIN

We never forget who we're working for™



www.afa.org

- 4 Letters
- 7 Verbatim
- 12 Aerospace World
- 17 Index to Advertisers
- 19 Senior Staff Changes
- 20 Action in Congress
- 22 Flashback
- 42 The Keeper File
- 55 This Is AFA
- 79 Books
- 80 AFA/AEF National Report
- 86 Unit Reunions
- 87 Field Contacts
- 88 Pieces of History



About the cover: A C-5 Galaxy. Photo by Ted Carlson. See "Saving the Galaxy," p. 30.

2 Editorial: Tanker Turmoil

By Robert S. Dudney
The Air Force must replace its old tankers without robbing other programs.

8 Washington Watch

By John A. Tirpak
Return of the B-1Bs; EW Must Wait Its Turn; Tension in the Taiwan Strait ...

24 Year of the Missile Shield

By Michael C. Sirak
If all goes as planned, the US on Oct. 1 will throw the switch on its first true ballistic missile defense.

30 Saving the Galaxy

By John A. Tirpak
USAF can't do without workhorse C-5s, and it can't afford to replace them, so it has to make them work better.

36 Homeland Air Force

By Adam J. Hebert
Two years after the attacks, USAF has settled into a steady state of defense operations in the United States.

46 The United States Air Force Museum

Photography by Jeff Fisher and Paul Kennedy
Now in its ninth decade, the world's premier military aviation museum continues to grow.

52 The VA's Big Makeover

By Tom Philpott
The agency is about to embark on a comprehensive overhaul of its health care facilities.

56 Upheaval at the Academy

By Richard J. Newman
For a full year, the Air Force Academy has been grappling with a major sexual assault problem.



24

60 The Limits of Outsourcing

By George Cahlink
To DOD managers, it's healthy capitalism, but federal unions and some lawmakers aren't pleased.

64 The Viper Revolution

By Peter Grier
Twenty-five years ago this month, the F-16 began to transform USAF's fighter forces.

70 Jumper to Airmen: "Get in Shape"

By Bruce D. Callander
Physical fitness is no longer a "nice to have." It is now a factor in combat readiness.

74 Von Karman's Way

By Walter J. Boyne
The legendary scientist used every available means to push the Air Force into the future.

AIR FORCE Magazine (ISSN 0730-6784) January 2004 (Vol. 87, No. 1) 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

Tanker Turmoil

IN RECENT weeks, strong headwinds have buffeted the Air Force's plan for acquiring 100 Boeing KC-767 tankers. Sen. John McCain (R-Ariz.), a relentless critic, forced a fundamental change in the original deal, the net effect of which was to saddle USAF with onerous up-front acquisition costs.

Next, Boeing went public with allegations of improper contacts between a top executive and a former Air Force official who had handled the tanker deal. Defense Secretary Donald H. Rumsfeld put the plan on hold pending an investigation. Finally, Sen. John Warner (R-Va.), chairman of the Senate Armed Services Committee, announced plans to hold hearings, raising the specter of more delays—or worse.

As the new year approached, the tanker plan seemed in danger. Some worried that the financially strapped Boeing might be forced to shut down its 767 line in Everett, Wash.

The consensus was that these problems probably would be finessed and cause no lasting damage. That may be so, but sudden uncertainty in such a critical program was worrisome.

To begin with, it would be hard to exaggerate the importance of maintaining a healthy fleet of aerial refuelers. They are key to the US ability to project military power. Tankers are used to refuel fighters, bombers, airlifters, and support aircraft, greatly extending the reach of US forces.

Operations in the Gulf, Balkans, Afghanistan, and Iraq relied heavily on tankers. The Air Force isn't the only customer, either. In the Afghanistan war, 55 percent of all fuel delivered in the early weeks went to Navy aircraft flying off carriers.

In the future, the US may be even more dependent on tanker support, given a decline in forward bases.

However, for all their importance, most tankers are old, costly to maintain, and frequently out of service. USAF's fleet of tankers consists of 544 KC-135 aircraft (133 E models and 411 more-modern R models) and 59 KC-10 aircraft. The average KC-

135 is 43 years old—an artifact of the Eisenhower era.

They are shot through with structural maladies. Corrosion is the biggest problem, accounting for half of all KC-135 maintenance. This has led to rising repair costs, more time in depot, and decreasing availability.

Until recently, the problems were viewed as manageable. USAF did

The Air Force must replace its old tankers without robbing other programs.

not plan to begin replacing KC-135Es until 2010 and expected to keep some KC-135Rs in service until 2040.

The Sept. 11 terrorist attacks changed the calculus. Wars in Afghanistan and Iraq and combat air patrols over US cities caused great wear and tear on the KC-135s. The Air Force, faced with new risks and huge costs, made replacement a priority.

The idea of converting 767s into tankers dates to early 2001, when Boeing proposed to convert 36. In the wake of Sept. 11, the idea was revived and expanded to 100 aircraft. It also came with a twist: Rather than buying the airplanes, USAF would lease them.

Under this plan, the service would take possession of the first new tanker three years earlier than previously projected and acquire 100 six years earlier.

More importantly, the lease allowed USAF to spread out the cost. Officials argued they could not afford huge up-front outlays of an outright purchase, on top of all other existing budget demands.

Those demands are huge. Through the 1990s, USAF took one budget cut after another and diverted money from investments to pay for everyday expenses. In September 2000, Gen. Michael E. Ryan, USAF Chief of Staff, told Congress, "Our aircraft are aging out at a rate that has us very concerned. ... We have never dealt with a force this old."

Now, the Air Force no longer can

defer aircraft recapitalization, but its near-term budget isn't big enough to buy all the aircraft it needs, so USAF tried to postpone some of the costs by leasing the tankers.

To be sure, it was not the most cost-effective plan. Cost, however, was not the only consideration for Air Force officials. Also important was the need to get new tankers on the ramp without robbing funds from other key programs.

In any event, the lease issue is now largely moot. The Pentagon, pressured by McCain, agreed on Nov. 5 to a compromise in which it would lease only 20 KC-767s and buy the last 80. They would be delivered between 2006 and 2014.

The program entails \$18.3 billion in acquisition costs. The budget rules require cash up front for any purchase, so USAF will have to find new billions fairly soon.

Where will the money come from? Congress could increase the Air Force appropriation. What is more likely, however, is that the Pentagon will push USAF to finance much of the deal with cuts in other areas. The service's top weapons buyer, Marvin R. Sambur, told Reuters in December that every major USAF weapon program would be vulnerable to cuts or delays to pay for the tankers. Press speculation, predictably, has fallen on the F/A-22 Raptor.

There is general agreement that the Air Force's tanker fleet needs to be modernized. However, the Congress and Pentagon should not forget two critical requirements.

First, tanker replacement must be accomplished relatively soon, given the KC-135's high maintenance cost and vulnerability to catastrophic problems. Second, the tanker cost cannot be allowed to crowd out critical fighter and other programs. An increased appropriation is in order.

With its lease plan, the Air Force had found a way to thread the budgetary needle. 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. ■

Presenting
The U.S. AIR FORCE TRIBUTE™
 A Family Heirloom... an Important Firing Collector First!



Limited Edition: 1911
 Plating: 24-Karat Gold



**A RARE AND
 IMPORTANT
 SYMBOL OF
 YOUR PRIDE
 IN THE
 U.S. AIR FORCE**



To safely display your investment, a custom-built American Walnut Display Case with locking glass lid is available. Easily wall mounted or displayed flat, it features a form-fitted velvet lining and I.D. plaque. 14" x 9" x 4".

Three generations of Americans fought with it — first against the Kaiser, then against the Fuhrer and the Emperor, and twice against the Communists. The "Old Forty-Five" was the most powerful military-issued pistol in history.

If you were born between the late 1800's and 1968, it is the symbol of your time, your day, your age. And future Americans will look back on our period, with reverence, as the "45 Era".

But "Old Slabsides" has been retired from the skies and the flightlines, replaced by the less-powerful 9mm, so we can fire the same ammo as our NATO Allies.

How much longer will the M1911A1 .45 be made? No one knows. But, while it is, we're proud to salute the Americans it symbolizes by issuing this firing Commemorative .45 in honor of the U.S. Air Force.

24-Karat Gold Plating

When you pick up this three-pound slab of steel and gold, you'll hold the finest, firing limited edition .45 ever made.

As a proper memorial to the U.S. Air Force, patriotic symbols and inscriptions are deeply etched and 24-Karat Gold plated across the slide. Custom-made grips complement the mirror-polished slide, receiver and ten 24-Karat Gold plated parts. All the 24-Karat Gold plating is to Jewelers Grade-Heavy thickness for lasting beauty and value.

Your name or that of a family member can be engraved on the reverse side of the slide, along with other data to make this pistol a lasting, personal memorial.

Limited Edition; Fires .45 ACP

The worldwide edition limit is only 1,911, in honor of the year it was adopted for military use. This highly-restricted limit is your immediate guarantee of rarity and collector value. Each is engraved with its own Registry Number between

USAF 0001 and USAF 1911 and accompanied by a detailed Certificate of Authenticity.

This is the military-model M1911A1 and it fires .45 ACP ammo. It is even fitted with a rare and desirable lanyard with 24-Karat Gold-plated mounts.

Each pistol is built by the gunsmiths of Thompson/Auto-Ordnance, the company founded by General John T. Thompson, who developed the .45 ACP cartridge, and who invented the Thompson Submachine Gun. NRA test firings of their .45 show accuracy "significantly better than the average military-issued M1911".

Satisfaction Guaranteed

To reserve, or for questions, call our Member Relations Staff, toll free, at 1-800-368-8080, 9am-9pm ET, M-F, or return the enclosed reservation to "Columbia", our National Historic Landmark Headquarters and Museums, as seen on The History Channel. You may reserve with a small deposit, a



Personalized engraving available on right side of slide.

monthly payment plan is available, and major credit cards are accepted. Your satisfaction is guaranteed, or return within 30 days for a full refund.

This is an historically-important, museum-quality symbol of your pride—and, quite possibly, your service—in the United States Air Force.

Continue the mission... lest we forget.

RESERVATION REQUEST

Satisfaction guaranteed or return within 30 days for a full refund.

Please enter my reservation for the U.S. Air Force .45. I will also receive a Certificate of Authenticity attesting to the edition limit, special registry number and the purity of the 24-Karat Gold plating.

- My deposit* (or credit card authorization) of \$195 per pistol is enclosed. Please charge or invoice the balance due prior to delivery...
 - in ten monthly payments of \$160, or in full.
 - My payment in full of \$1,795 per pistol is enclosed.
 - Please send the wall mounting American Walnut Display Case with locking glass lid, adding a final payment of \$149.
- If I cancel my reservation prior to delivery, I will receive a full refund, less a commissioning fee of \$195.*
- Please personalize my pistol, or send the Engraving Form.
 - Check or money order enclosed.
 - Please charge: Visa MC Am. Ex. Discover

Card No. _____ Exp. _____
 Signature _____
Virginia residents please add 4.5% tax.
 Name _____
 Address _____
 Daytime Telephone (_____) _____

THE AMERICAN HISTORICAL FOUNDATION
 1142 WEST GRACE STREET, RICHMOND, VA 23220
 PHONE: (804)353-1812 FAX: (804)359-4895
 E-MAIL: AHFrichmond@aol.com
 WEB SITE: AHFrichmond.com
TOLL FREE 9AM-9PM ET, M-F: 1-800-368-8080

Enola Gay II

For all the generations to come, the B-29 *Enola Gay* must remain on tasteful historic display, as a silent and honest witness to the horrendous events of World War II. [See "Editorial: Enola Gay II," December, p. 3.]

The Superfortress was not designed as an exercise in morality. It was a lethal weapon intended to destroy and kill an enemy on a vast scale. A million Japanese soldiers were used to accomplish exactly the same thing.

Yielding to some who feel conscience-bound to twist history into a lie is to dishonor all those, in their millions, who fought or died to end tyranny in World War II.

James P. McDonnell Jr.
Buffalo, Minn.

"Well done," to Editor in Chief Robert S. Dudney. His editorial in the December issue is a target hit and very timely. The dropping of the atomic bomb brought World War II to an end and saved far more Japanese, US, and Allied forces' lives than were taken by the bomb. We cannot be neutral on this.

Col. Walt Ford,
USMC (Ret.)
Editor, *Leatherneck Magazine*

I am truly disgusted [by] the activists who are against the display of the *Enola Gay*. It's shameful that they do not know how many lives were saved, on both sides, by the dropping of the two bombs on Japan. They fail to realize—or just don't want to accept—that Japan had a formidable collection of planes, hardware, and manpower set aside to repel an invasion, not to mention that every single citizen was capable of inflicting many losses on our troops.

Had we not dropped the bombs, our losses would have been so great that these activists would have complained about *that!* Japan would have ceased to be a nation and would have been nearly wiped from the face of the Earth.

The display should show the Japanese records of their resources and plans to repel an invasion. Maybe, just maybe, these activists would see the light. I doubt it.

Lou Giordano
Mount Laurel, N.J.

The revisionists are on the rampage again, and again it's time to clear the air. Dropping the atomic bombs from *Enola Gay* and *Bockscar* was necessary.

The Japanese officials who masterminded Pearl Harbor and the "Greater Asia Co-Prosperity Sphere" were planning to make any invasion of Japan by Allied forces a bloodbath. History provides the proof. History also shows the fanaticism faced by Allied forces which landed on Okinawa and Iwo Jima.

The revisionists and their allies conveniently pass over the kamikaze attacks during the struggle for these islands—thousands of Allied soldiers and sailors were killed or injured in these attacks. Have the revisionists forgotten? The families who lost loved ones haven't. My dad served in Burma. He always said the bombs saved many lives on both sides of the conflict.

The revisionists want to simplify the war into a question of the *Enola Gay*. This isn't Hollywood, where things can be revised in the name of audience attendance and profit; this is real history.

Let the aircraft that helped end World War II stand as a tribute to

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

AIR FORCE

JOURNAL OF THE AIR FORCE ASSOCIATION

Publisher

Donald L. Peterson

Editorial

afmag@afa.org

Editor in Chief

Robert S. Dudney

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



Circulation audited by
Business Publication Audit

mistakes made by politicians who started that conflict and the means necessary to bring it to a close. If aircraft like them [the B-29s] and the weapons they carried make people think about the awesome responsibility of avoiding war and preserving the peace, so be it.

William Christian
Washington, D.C.

I applaud your wonderful organization for the outstanding and sustained support of the initiative to properly display this magnificent flying machine and instrument of war and peace! It is far overdue, and it is contemptible that the aircraft has lain in pieces through these many years in Suitland, Md., and been the subject of disgusting and misguided revisionists, as well as naive "historians."

I am grateful that we will be able to walk around the [*Enola Gay*] and do our own "preflight"—free from the idiots who have maligned the 20th Air Force Pacific operations that ended the war.

I trust you will maintain your vigilance and ensure no revisionist narratives nor inaccuracies find their way into the display of the aircraft and that its truer history is properly represented. The previous attempt by the "unknowing" was nauseating and insulting to those of us familiar with the truth. It's too bad that the crews of Paul Tibbets and Chuck Sweeney can't be permanently stationed at the nose wheel of *Enola Gay* to personally explain and describe the momentous mission it and *Bockscar* flew.

Until the Japanese government gets the guts as well as good sense to responsibly face up to the unimaginable terror, cruelty, and inhumanity that they imposed upon the world [during] World War II we must remain on guard. They were the perpetrators of terrorism and havoc, and there are millions of Chinese, Koreans, Manchurians, and other Asians that paid the ultimate price of their evil designs. Until this fact can be taught to their children in the context of truth, we have to make no apologies for displaying the *Enola Gay*.

We saved literally millions of Allies from sure death if the maniacs that wore the Japanese uniform had been allowed to prevail and an invasion became imperative. Hooray for American technology that brought the end to a tragic and terrible world conflict. Hats off to the brave men who fought the war in the Pacific and took on the enemy for his cowardly prosecution of the war in every evil aspect.

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



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

My deep appreciation goes to the crews and support people of the many B-29 units that fought with so much dedication, bravery, and honor. I cannot tell you how grateful I am to be able to visit the *Enola Gay* in all her splendor and contemplate the significance of her mission and contributions to freedom. Subsequently, I never fly across the Pacific nor look on the horizon of that vast expanse of water without their memory coming to my mind!

Col. Joseph P. Nichols,
USAF (Ret.)
Midway, Utah

I'm concerned that future generations will get a very distorted view of the role and purpose of the *Enola Gay*. There are those factions here in the US that would have our children believe that we are pretty awful people—what with taking the Indian lands, Columbus bringing treachery and conquest to our shores, and a host of approaches clearly intended to revise history. As for the exhibit itself, it should include the phrase, "If not for Pearl Harbor, Hiroshima would never have happened."

Lt. Col. Ron Gawlitta,
USAF (Ret.)
Phoenix

Long-Range Bombers

I found the article "The Long Reach of the Heavy Bombers" in the November issue [p. 24] interesting and informative. The Afghan and Iraq wars certainly proved how a relatively small number of very capable long-range bombers can influence the outcome of battle. The author makes an outstanding case for the continued funding and modernization of the USAF long-range bomber fleet. This must occur even, in my opinion, at the

expense of some of the Air Force's high priority projects such as the F/A-22.

I did find it amusing and troubling that it took a federally funded research center to determine that B-1B mission capable rates are heavily dependent upon sufficient spare parts, equipment, and personnel. Any aircraft maintainer will tell you that statement demonstrates a firm grasp of the obvious. I suppose next the taxpayers' money will be used to fund a program that concludes snowfall is heavily dependent upon below freezing temperatures and clouds.

CMSgt. Michael E. Rowan,
USAF (Ret.)
Panama City, Fla.

The First Law of Holes

I wholeheartedly agree with your editorial "The First Law of Holes" in the November issue [p. 3]. As one whose AFSC is being eliminated and "civilianized," I confess to being befuddled by the whole concept. The Air Force is replacing enlisted historians (a master sergeant slot) with GS-11 and GS-12 civilians who will be paid more than those they replace. These civilians will be expected to deploy to bare bases around the world, just like current historians. What am I missing here? Where is the savings or advantage? The couple of hundred active duty historians will either retire or be retrained into "stressed" career fields, so the overall personnel cost goes up. Other, much larger AFSCs may soon follow, with similar cost results as they are replaced with expensive civilians.

In the Air National Guard and Air Force Reserve Command, there are different issues, since one can hardly

Letters

justify replacing a \$5,000-per-year traditional Guardsman with a \$42,000-per-year civilian. So, perhaps the Guard and Reserve will maintain an "orphaned" AFSC; the decision is pending. Again, other AFSCs will have similar issues in the reserve components.

It seems clear to me that there is a deeply held philosophical belief that the force structure cannot be increased. I don't begin to understand the logic—I only hope the philosophy will be seriously re-examined soon.

MSgt. Bill Brockman,
ANG
Atlanta

Who Thought This Up?

In the photo spread on the Aerospace Technology Exposition in the November 2003 issue [p. 84], you included a photo of "USAF's new battle dress uniform." I would love to hear the logic behind the design of a blue BDU. Exactly where can someone wearing such a design conceal himself? How will the blue motif help in the forests of Europe or the deserts of Southwest Asia?

The caption said that the new BDU attracted attention. I'll bet it did! Comments such as "Huh?" and "Who thought this up?" come to mind.

MSgt. William C. Cate,
USAF (Ret.)
St. Louis

Eyes Wide Open

Rebecca Grant's article, "Eyes Wide Open," in the November 2003 issue [p. 38] was great! It appears that the drone, RPV, UAV, or whatever they can be called is finally being recognized as a valuable addition to the inventory. For so many years, they were under such tight wraps that very few knew of them or their capabilities.

There was a bird known as the 147-H which preceded the 154 Compass Arrow and did some amazing things at the same and higher altitudes as [flown by] the Global Hawk, but I doubt that the full story will ever get out or if anyone would even care to hear it these days, although it was no small part of Air Force history.

Also, the particular 147-S that did yeoman's work in Vietnam and had a higher than normal survival record was known as "Super Chicken" to those associated with the program, not "Tom Cat." As for the high loss rate of the 147 in Vietnam, that was the way it was supposed to be. Better to lose a relatively "cheap" drone in a high-threat environment rather than

a human aircrew going after the same information.

Lt. Col. Richard D. Le Doux,
USAF (Ret.)
Eunice, La.

The F101 vs. CFM56

Retired Lt. Col. Terry Van Keuren states [in "Letters: Re-engineing the B-52," November, p. 7]: "For new engines, we strongly considered using four CFM56s (same power plant as on the B-1B and re-engined KC-135) in place of the eight original engines." This statement is in error. The B-1 aircraft never used the CFM56 engine.

The B-1B is configured with four F101-GE-102 engines which continue to provide excellent and reliable performance. The F101-GE-102 engine was the original template for other new generation turbofan engines manufactured by General Electric. These "F Series" engines include the F110-100/100B/129 (F-16 C/D), F108 (KC-135R), F118-100 (B-2), and F118-GE-101 (U-2).

The F101 engine is staying on wing longer than ever and proved its reliability during Operation Iraqi Freedom. However, the F101 is aging, and improvements are planned to support the B-1B until its retirement date.

One note: The F101 does share the "common core" with the CFM56, but the two engine configurations totally differ in design and functionality.

Michael K. Daniel
Langley AFB, Va.

The Real Issue, It Isn't

To fault Rumsfeld for the termination of the Crusader artillery system is without merit. [See "Letters: The Real Issue?," November, p. 5.]

Heavy forces are antiquated. This decision should have been initiated below Rumsfeld's level. Heavy thinkers need to move on and out.

CMSgt. Leroy Hassler,
USAF (Ret.)
San Antonio

Corrections

In the December 2003 article "Up From Kitty Hawk," the aircraft in the Berlin Airlift photo on p. 44 was incorrectly identified. It is a C-54.

Also, the entry for Aug. 15, 1973, on p. 52 should say Maj. John H. Hoskins.



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.

Verbatim

By John T. Correll, Contributing Editor

Looks Like a Slog ...

"It is pretty clear that the coalition can win in Afghanistan and Iraq in one way or another, but it will be a long, hard slog."—**Secretary of Defense Donald H. Rumsfeld, Oct. 16 internal memo.**

... Depends on What Slog Is

"The Oxford Dictionary... has a definition of 'slog,' the preferred one, I believe, which is: 'slog—to hit or strike hard, to drive with blows, to assail violently.' And that's precisely what the US has been doing and intends to continue to do."—**Rumsfeld, Pentagon press conference, Oct. 23.**

Don't Get Too Chummy

"Just as well, the Americans don't know exactly who the Russians are. It has been stated that they aren't an enemy, but they aren't allies either, that's for sure."—**Russian Defense Minister Sergei B. Ivanov, interview with Moskovsky Kom-somolets, cited by Associated Press, Oct. 28.**

Sign of Progress

"The more successful we are on the ground, the more these killers will react. ... The more progress we make on the ground, the more free the Iraqis become, the more electricity is available, the more jobs are available, the more kids that are going to school, the more desperate these killers become, because they can't stand the thought of a free society."—**President Bush, about suicide bombings in Iraq, remarks at Oval Office photo opportunity, Oct. 27.**

Protocols of the Scholars of Baghdad ...

"I am sure that the people who did this are enemies of Iraq, not the enemies of the Americans. Whether it was the Israelis or the Americans themselves, they are aiming at us."—**Dunya Khalil Ismail, college lecturer in Baghdad on the suicide bombings, Los Angeles Times, Oct. 30.**

... And Echoes in Europe

"Europeans view Israel as the No. 1 threat to world peace, ahead of

Iran and North Korea, according to a European Commission survey yesterday."—**London Daily Telegraph, Nov. 4. The commission is an arm of the European Union.**

Whirlwind Not Selective

"Should the balance within the Islamic world shift toward radicals and fundamentalists, moderate secular governments would be in jeopardy, and the world from Southeast Asia to India and Western Europe would risk growing turmoil. Nor would countries such as France, Germany, and Russia be able to avoid reaping the whirlwind by dissociation from the United States."—**Henry A. Kissinger, Tribune Media Services International column, Nov. 2.**

Long War on Terrorism

"The important thing for the American public to understand, I think, is that this global war on terrorism is going to be years, not months or days. It's going to be 10, 15, 20 years of protecting ourselves against the terrorists who are out there."—**Marine Corps Gen. Peter Pace, vice chairman, Joint Chiefs of Staff, Boston Herald, Nov. 11.**

Déjà Vu?

"We heard the garbage and the lies. We saw the sacrifice, and we swore never again would we allow it to happen. And I ask you, is it happening again?"—**Retired Marine Corps Gen. Anthony C. Zinni, former commander of US Central Command, referring to the government's handling of news from Vietnam War, USA Today, Nov. 7.**

Public Enemy No. 1

"There is no enemy of Iraq but Saddam the destroyer and his cronies, whom we denounce until judgment day and they are in immortal hell."—**Iraqi Muslim cleric Muqtada al-Sadr, softening his anti-American tone, Associated Press, Nov. 10.**

The Real Troop Problem

"The issue isn't having enough troops in Iraq. The question is how long you keep them there. We need a [bigger] rotational base. We've become depen-

dent on the reserves, and they are resisting strongly [against continued long-term deployments]. We need to add active duty forces, not cut them, before there's an exodus from the National Guard and Reserves."—**Retired Air Force Gen. John Michael Loh, former commander of Air Combat Command, Aviation Week & Space Technology, Oct. 20.**

Sounds Like LBJ

"I wake up every morning and think I'm back in 1967 listening to Lyndon Johnson say, 'Stay the course.'"—**Max Cleland, former Senator and former head of Veterans Administration, who lost both legs and his right arm in Vietnam, Washington Post, Nov. 14.**

Gallic Bastion

"France, which fully subscribed to the objective of disarming Iraq, never ruled out the use of force as a last resort if Iraq refused to cooperate with UN inspectors. France's determination to see Iraq comply with its international obligations cannot be called into question."—**Jean-David Levitte, French ambassador to the US, letter to the editor, Wall Street Journal, Nov. 13.**

Nukes in Iran

"In what can only be an attempt to build a capacity to develop nuclear materials for nuclear weapons, Iran has enriched uranium with both centrifuges and lasers and produced and reprocessed uranium."—**US Undersecretary of State John R. Bolton, American Spectator dinner, Nov. 12, in Los Angeles Times.**

Intensifying the Response

"Although the coalition can be benevolent, this is still the same lethal formation that removed the former oppressive regime. And we will not hesitate to employ the appropriate levels of combat power in order to safeguard the interests and safety of the Iraqi people, as well as our coalition service members."—**Army Lt. Gen. Ricardo S. Sanchez, Combined Joint Task Force 7 commander, news briefing in Baghdad, Nov. 11.**

Washington Watch

By John A. Tirpak, Executive Editor

Return of the B-1Bs; EW Must Wait Its Turn; Tension in the Taiwan Strait

Bringing Back the Bones

The good news is that the Air Force is getting 23 more bombers in its inventory. The bad news is that the Air Force is getting 23 more bombers in its inventory.

The Fiscal 2004 defense authorization bill includes a provision requiring USAF to bring back into service 23 of the 32 B-1Bs it recently retired as a cost-saving, fleet-enhancing measure. Lawmakers provided \$20.3 million to accomplish the reconstitution, but Air Force officials estimate the cost actually will be at least \$1 billion.

The \$980 million gap will have to be made up by reductions elsewhere in the USAF program, and the service says it just doesn't have the money to spare.

Senate Minority Leader Tom Daschle (D-S.D.), who introduced the measure to restore the Bones, justified the reconstitution on the grounds that the B-1B fleet reduction decision was made before the 9/11 attacks and that, since then, bombers have shown their worth in recent combat operations.

South Dakota is one of the two states—Texas is the other—that still have B-1B units. The states that lost B-1Bs were Georgia, Idaho, and Kansas. When USAF announced the retirement plan in June 2001, lawmakers in Georgia and Kansas, whose Air National Guard B-1B units would have been left without a mission, accused the Bush Administration of playing politics because the proposal placed all remaining B-1Bs in the President's and then-majority leader Daschle's home states. The Air Force promised to create new missions for the ANG units, and Congress approved the plan, although it delayed funds for it until 2002.

The service completed its B-1B relocation and retirement plan last fall even as it attempted to fend off the fresh Congressional effort to restore the Bones.

Air Force officials maintain that the service needs to stand by its 2001 decision to cut the B-1B force. Within available dollars, USAF would rather have 60 fully upgraded bombers—well-maintained and ready for war—than maintain 90-plus airplanes that were all deficient in some way.

In a letter sent to Capitol Hill last July, reported *Inside the Air Force*, the Defense Department said that a larger fleet would be "increasingly unsupportable." The letter continued, "The smaller, modernized [fleet] ... will be more effective, survivable, and supportable." It argued that the bring-back plan will suck \$1.1 billion out of the Air Force's future years defense plan and put "at risk" improvements planned for the 60-aircraft B-1B force.

The service said that, since USAF began retiring the 32 B-1Bs, the bomber's readiness rate has increased and accidents have declined.

Air Force officials have not yet decided what the service must cut to be able to finance the return to service of the 23 B-1Bs, a service spokeswoman said.

The returning bombers are to get the Block E upgrade, which adds new weapons and defensive equip-



USAF photo by Steve Zapka

Can USAF afford to "un-retire" 23 B-1Bs?

ment, such as the ALE-50 towed decoy system, and updates older avionics systems. Lawmakers added \$5 million to the Air Force's Fiscal 2004 request of \$92 million for B-1B upgrades to cover the cost of upgrades for the additional aircraft.

Daschle's original amendment contained a provision for the Air Force to explain how much money is really needed to restore the full fleet to combat status. That requirement was dropped in conference. As a result, there's no provision within the framework of the bill for the Air Force to make its case for adequate funding of the Lancer fleet.

On to the Next Bomber

Lawmakers also authorized \$100 million for the Air Force to begin the search for a next generation bomber. The Administration had not requested any funds for such an effort in the Fiscal 2004 defense budget.

House and Senate authorizers took exception to the Air Force plan to wait another decade before starting research and development on the next manned strike platform. They believe USAF must have a fast, stealthy replacement for the aging B-52 sooner rather than later.

The conference report said: "The bulk of the Air Force bomber fleet consists of 94 B-52s, which will be 50 years old by the year 2012. The conferees believe this is insufficient to meet ongoing requirements."

EW Plans Not a Priority

Despite a stinging criticism from a Congressional caucus, the Pentagon was not prompted to accelerate its efforts to produce a comprehensive, joint service plan for electronic warfare.

The 23-member Electronic Warfare Working Group fired off a letter to DOD, charging the Pentagon with "chronic neglect" of EW and requesting a meeting with top acquisition and intelligence officials to discuss the

**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.



www.northropgrumman.com

© 2003 Northrop Grumman Corporation

NORTHROP GRUMMAN

USAF photo



The world may see an electronic BUFF.

issue. Electronic warfare systems, the working group said, don't get the funding or attention they need, and the group complained that a comprehensive, joint service plan has been shuffled around for several years without reaching closure.

The lawmakers said DOD "needs to have a coherent plan for preserving and advancing its electronic warfare capabilities, one that reflects the high priority of spectrum dominance."

The letter was addressed to Michael W. Wynne, acting undersecretary of defense for acquisition, technology, and logistics, and Stephen A. Cambone, undersecretary of defense for intelligence. It was signed by the four co-chairs of the EWWG: Rep. Randy Cunningham (R-Calif.), Rep. Mark S. Kirk (R-Ill.), Rep. Rick Larsen (D-Wash.), and Rep. Joseph R. Pitts (R-Pa.).

Cambone, speaking with reporters in mid-November, admitted that there's been no rush to construct a plan such as the one the EWWG advocates.

"The question is, is EW No. 1 on everybody's list? And it would probably be fair to say, 'No,'" admitted Cambone. He added that "there are a number of programs that are of interest to my office. ... As you get into the period of time over the winter and spring, people will have had a chance to look at it [EW] in the way the members asked that we do."

Cambone said that the policy, acquisition, and intelligence shops, as well as the Joint Staff, "are going to be working under a sort of roadmap arrangement to sort of think our way through all those elements of the information operations world. ... That process has just gotten started." He predicted that the process "will pick up a lot of momentum over the course of the coming year."

The last major effort toward creating a master plan for electronic warfare culminated in 2001, when a two-year analysis of alternatives was concluded. The AOA determined that the services need a cooperative and coherent EW master plan but suggested service-unique approaches for dealing with the problem. It was so geared toward platform approaches and estimating the cost of each one that Edward C. Aldridge, then the Pentagon acquisition chief, threw it back to the services for more work.

Since then, the Navy has selected the E-18G Growler—a variant of the F/A-18F two-seat fighter—as its preferred approach to performing the airborne electronic attack mission. The Growler will replace the EA-6B Prowler, now being flown by joint service crews. The Air Force surrendered its own EF-111 jamming

aircraft in the 1990s in a round of budget cuts. The consolation prize was that USAF would get to fly the EA-6B, too.

The EWWG, however, takes pains to point out that airborne electronic attack is but one facet of the electronic warfare mission. Besides jamming, the field also includes systems that gather electronic and signals intelligence, such as the Air Force's RC-135 Rivet Joint and U-2, the Navy's EP-3, and the Army's RC-12 Guardrail. The group believes that these systems are underfunded and need to be brought to the forefront of Pentagon war planning.

The Air Force has said it is considering putting electronic warfare gear on B-52s, as the bombers offer a persistent-presence capability over a given area of the battlefield vs. shorter-dwell-time drones or fighter-type aircraft. However, it is also reviewing its options with regard to emerging unmanned vehicles technology and alternative approaches to combat EW and suppression of enemy air defenses.

China Warns Taiwan

If Taiwan takes any further steps toward formal independence—say, if the Taiwan president, Chen Shui-bian, moves to put the issue up to a referendum—the use of force by China against the breakaway island "may become unavoidable," according to a Chinese official.

In fact, "Taiwan independence means war," according to Maj. Gen. Wang Zaixi, vice minister of mainland China's Taiwan Affairs Office of the State Council. Wang made his comments in mid-November, and they were featured prominently by the state-run China *Daily*, meaning they were meant by the Chinese government to be interpreted as official policy.

The remarks were the first such threats in three years by the Communist mainland state. Wang softened his remarks somewhat by saying that China feels kinship to the citizens of Taiwan and that it does not want its two peoples to "meet at the battleground."

However, Wang was firm in saying that if the Taiwan government "openly" joins forces with the pro-independence movement and formally challenges the one-China concept, then mainland China would have no choice but to attack.

Chen planned to put the issue to a vote in a March 20 referendum.

Both Beijing and Taiwan claim to be the true government of China, and both say that, eventually, they hope



Chinese soldiers might find war "unavoidable."

AP photo/Michael Reynolds

the two will be reunited through peaceful negotiations. The two governments have managed to avoid war since the Nationalist Chinese government set up shop on Taiwan in 1949.

However, relations between the two have always been tense, and China's new threat was aimed directly at Taiwan President Chen Shui-bian. Chen, who is in a re-election campaign, has said that Taiwan's constitution should be amended, declaring the country an independent state, free of any claim by mainland China.

For its part, the US has warned Taiwan not to press the sovereignty issue. During a December visit to Washington by China's prime minister, Wen Jiabao, President Bush said the US opposes any change in the status quo and chided Chen for "unilaterally" moving to do so.

There was shock in Taiwan that Bush seemed to side with Beijing, and Chen told CNN in an interview that he believes the US will ultimately support "the public opinion of Taiwan's 23 million people" and their pursuit of "deeper democracy and peace."

RAND Applauds Jumper Approach

The Air Force Chief of Staff has focused the service's transformation efforts on concepts of operations rather than platforms to achieve operational capabilities and that, according to a recent RAND report, could be a model for the entire Defense Department.

In "A Framework for Modernization Within the United States Air Force," authors Glenn A. Kent and David A. Ochmanek praise Gen. John P. Jumper's logical and innovative approach to transformation and suggest ways to codify his methods.

Jumper has "invigorated" the process of modernization, the authors wrote, by stressing that concepts of operation must be developed before even thinking about the hardware needed to accomplish a given mission. Jumper himself has said that sometimes, merely making an organizational change can eliminate the need to develop a new and costly machine.

In Kent and Ochmanek's view, Jumper is on the right track in designating officers to serve as what Jumper terms "champions" for new concepts and technologies. The RAND analysts said the framework or model they present in their report "builds on the approach promoted by Gen. John Jumper."

They identified "seven principal actors" who they say are "involved in the modernization process within a service." The actors are:

- The Definer, who frames a "finite set of high-priority operational challenges."
- The Conceivers, who "formulate, define, and, when appropriate, demonstrate new concepts of execution."
- The Proponents, who "define new concepts of employment ... to achieve a particular operational objective."
- The Independent Evaluators, who advise service leaders on the "merit of any proposed new concepts."
- The Programmers, who "estimate the cost ... and suggest ways for balancing resources."
- The Providers, who "provide capabilities (not forces) to combatant commanders" and acquire the new systems.
- The Secretary of the Air Force and Chief of Staff, who "preside over" the process and "render decisions at key points."

The authors condemned the initial capabilities document (ICD) and the mission needs statement—two of today's major "gates" to enter concept and technology development—as being so entwined with legalistic ac-

quisition requirements that the Defense Department "has inhibited innovation by compelling would-be innovators to engage in a mystifying array of 'filling squares' prior to engaging in exploration of new concepts." They note that before there can even be an ICD, the service must present an "analysis of capability solution sets" or, in other words, the likely answers to the requirement.

The RAND analysts suggested overhauling the Pentagon's 5000-series acquisition laws toward making the system more open to "innovation and timely progress." Despite nearly two decades of attempts to streamline it, the system is too cumbersome.

The authors' method would emphasize the distinctions "between concept development, which plays the



Jumper speaks to the troops.

USAF photo by TSgt. Stephen Faulisi

central role in determining *what* systems to pursue, and acquisition, which is properly focused on *how* to develop and procure such systems." The goal, they said, would be to "minimize the constraint and strictures placed upon those charged with generating innovation and to create a more level playing field on which new concepts can compete for resources."

Kent and Ochmanek suggested shifting the system toward the people involved, rather than checklists of documents. Within their model, the actors listed above would be focused on how to achieve effects at the operational and tactical levels instead of at the campaign level or above.

"The model ignores any supposed requirement to ask 'May I?' from some higher authority" before delving into the "art and science of exploring new concepts." It sets objectives and tasks in the context of joint service efforts.

Finally, the process would have "a rigorous lexicon," or definitions of terms. This is "not a trivial virtue," given the "proliferation of undisciplined vernacular and confusing slogans" that sound alike but mean different things within the defense community.

The analysts suggested building a template of how innovative ideas can be nursed from concepts through demonstrations free of the sluggish effects of the current process. Such a template will be useful "when there is no obvious model to follow or, if one exists, it lacks coherence and logic."

They added that trying to change "flawed models within a large bureaucracy is generally a lost cause." ■

By Adam J. Hebert, Senior Editor

"We Got Him"

Those three words, uttered by L. Paul Bremer III, the coalition administrator, summed up the situation in Iraq after US military forces captured former Iraqi dictator Saddam Hussein.

Ground forces on Dec. 13 found Saddam hiding in a hole on a farm outside his hometown of Tikrit. He surrendered without a fight.

According to Bremer, Saddam was "cooperative and talkative."

Helo Crash Claims Five

The Pentagon on Nov. 24 announced that four airmen and one soldier were killed when an Air Force MH-53M Pave Low transport helicopter crashed near Bagram, Afghanistan, on the previous day. Another seven soldiers were injured in the crash, which is still under investigation.

The helicopter was transporting troops engaged in Operation Mountain Resolve, the hunt for anticoalition insurgents in eastern Afghanistan that began Nov. 7.

The airmen killed were: TSgt. William J. Kerwood, 37, of Houston, Mo.; Maj. Steven Plumhoff, 33, of Neshanic Station, N.J.; SSgt. Thomas A. Walkup Jr., 25, of Millville, N.J.; and TSgt. Howard A. Walters, 33, of Port Huron, Mich. All three NCOs were assigned to the 20th Special Operations Squadron, Hurlburt Field, Fla. Plumhoff was with the 58th Special Operations Wing at Kirtland AFB, N.M.

DOD To Review Tanker Deal

Following the firing of two Boeing officials connected with the Air Force's proposed tanker lease/buy arrangement with Boeing, Defense Secretary Donald H. Rumsfeld called for a new review of the entire process.

At issue for Rumsfeld is whether the alleged ethical improprieties by those two individuals, one of whom was a top Air Force acquisition official during most of the tanker negotiations, may signify problems with DOD's



USAF photo by MSGt. Val Gempis

US Air Force crew chiefs talk with a Japan Air Self-Defense Force pilot during Exercise Cope North. More than 100 airmen, including pilots, weapons loaders, and life support technicians, from Kadena AB, Japan, deployed to Guam for the two-week exercise with Japanese forces.

acquisition practices in general or the USAF tanker deal in particular.

The Bush Administration reached an agreement with Congress in early November on the tanker deal and USAF was poised to sign a contract with Boeing. (See "Aerospace World: Tanker Compromise Reached," December 2003, p. 12.)

That action was placed on hold in early December.

Boeing Fires Two, CEO Quits

On Nov. 24, Boeing fired its chief financial officer, Michael M. Sears, and Darleen A. Druyun, vice president and general manager of missile defense systems, after a company investigation concluded that Sears had improperly contacted Druyun about employment at a time when Druyun was still overseeing Boeing contracts for the Air Force.

The Boeing review further determined that Sears and Druyun "attempted to conceal their misconduct," according to a company statement.

Druyun had served as the Air Force's No. 2 acquisition official until she took a position at Boeing.

On Dec. 1, Boeing Chief Executive Officer Philip M. Condit announced his resignation. Replacing him is former Boeing chief operating officer, Harry C. Stonecipher, who was CEO for McDonnell Douglas before it was acquired by Boeing.

DOD Clears Raptor

The Air Force in November notified DOD that the F/A-22 Raptor had met all requirements set by the Defense Acquisition Board before USAF could award Lot 4 production contracts.

At its last review of the program, the DAB lauded the F/A-22's progress toward meeting its developmental goals, such as software reliability rates, but the board requested that certain criteria, including software improvements, be met before the next round of contracts could be awarded to contractor Lockheed Martin.

Air Force testers in November confirmed that the Raptor had met all the DAB requirements, clearing the way for Lot 4 procurement and Lot 5 advance procurement contracts.

The F/A-22 began its initial opera-

tional test and evaluation (IOT&E) program on Oct. 31. The Pentagon's IOT&E program will be used to verify that the next generation stealth fighter, the Air Force's top modernization priority, is capable of meeting its mission requirements.

AEF Silver Takes Over

The second of USAF's two longer-duration air and space expeditionary forces (AEFs) began its rotation to cover operations in Afghanistan and Iraq. AEF Silver members started replacing AEF Blue members in early November.

To recover from the strains of Operation Iraqi Freedom, the Air Force temporarily shelved the schedule of using 10 rotating AEFs on 90-day cycles, instead creating two new AEFs—Blue and Silver—for 120-day deployment cycles. The two transitional AEFs primarily included airmen who had not deployed with the regular AEF system for the Iraq war.

Some AEF Blue members in high-demand fields were told they will be kept deployed longer. AEF Silver is to remain in place until March, at which time regular AEF rotations are expected to resume for most airmen.

B-2 Reaches FOC

After participating in three wars, the Air Force's fleet of 21 stealth bombers finally reached full operational capability last fall, service officials announced in November. The culminating factor was completion of the Block 30 upgrade for all 21 B-2 bombers.

Block 30 added software and struc-

tural improvements to the aircraft. These changes could not be carried out prior to delivery of the aircraft to their home base at Whiteman AFB, Mo., according to a USAF release.

When the first of the B-2s arrived at Whiteman some 10 years ago, said Lt. Col. Casey Hughson, deputy commander of the base's 509th Maintenance Group, the bombers were "flyable but not fully combat ready."

Balancing Force May Take Two More Years

The Air Force's ongoing effort to balance its force to better meet post-9/11 manpower demands may be only halfway to resolution.

"Two years is probably about half the time we need to get that job done," Gen. John P. Jumper, Chief of Staff, cautioned in a November interview with *Air Force Magazine*.

The 2001 terrorist attacks and subsequent combat operations worldwide revealed numerous imbalances in the Air Force's staffing levels. For example, the sudden, unanticipated surge in demand for security personnel to guard bases worldwide and in the US forced USAF to turn to the Army to provide some 8,000 security personnel.

For the past two years, the Air Force has been trying to reconfigure its force to best meet the new demands, but USAF is also working within the constraints of a force structure that many feel is too small for the requirements placed upon it. However, service leaders agreed with Defense Secretary Donald H. Rumsfeld that before asking for additional end strength, they should explore all avenues to balance their personnel books in-house.

Unfortunately, balancing the force is a complicated task made more difficult by ongoing operational demands that are limiting training opportunities. Jumper noted that a veteran sergeant from the transport realm cannot instantly be made into an engine mechanic—there are training and experience requirements that must be met.

With large numbers of deployments for both instructors and prospective students, it has been difficult to staff the schoolhouses. The Air Force, therefore, is "on that journey just as quick as we can get there," Jumper said.

"I would not be alarmed that two years hasn't fixed the [force imbalance] problem," he said, pointing out that "if you want a good seven-level jet mechanic, it takes seven years to get one."

The Air Force and contractor Northrop Grumman developed the Post Delivery Change Incorporation Program, which began in 1998, to retrofit the bombers to a single Block 30 configuration. As the bombers were being upgraded, the 509th still had to meet its operational and training requirements.

USAF plans to continue with other B-2 upgrades, such as satellite communications improvements.

First C-5 Goes to Boneyard

The first C-5 Galaxy to be retired from the Air Force active inventory arrived Nov. 11 at the Aerospace Maintenance and Regeneration Center—known as the boneyard—at Davis-Monthan AFB, Ariz. The service plans to retire another 12 of the giant airlifters over the next few years. (See "Saving the Galaxy," p. 30.)

This year, four C-5s from Travis AFB, Calif., will join the first, which came from Lackland AFB, Tex.

"Retiring the older C-5s is paving the way for the modernization of the C-5 fleet and the beddown of the C-17 at Travis Air Force Base by 2007," said Col. Steven Miller, commander of the 60th Operations Group at Travis.

Museum Needs More Oversight

An independent review of the Air Force Museum, located at Wright-Patterson AFB, Ohio, determined that

USAF photo by Sue Stapp



One of the 14 C-5As destined for retirement is set to undergo tests as part of a structural risk analysis and model revalidation study. USAF plans to assess the long-term viability of the C-5. (See "Saving the Galaxy," p. 30.)

USAF photo by SSgt. John Barton



USAF critical-care personnel in Iraq with the 332nd Expeditionary Medical Squadron prepare a wounded nine-year-old Iraqi child for an aeromedical evacuation to the Children's Hospital and Research Center in Oakland, Calif.

the museum needs stronger oversight to meet recognized professional standards.

Air Force Secretary James G. Roche ordered the review last fall after reports emerged that large numbers of museum artifacts were lost or missing. (See: "Aerospace World: USAF Reviews Museum Policies," November 2003, p. 14).

The review group, which was led by retired Lt. Gen. Charles J. Cunningham Jr., recommended primarily that USAF:

- Clarify the museum's chain of command.
- Create a board of directors to replace the board of advisors.
- Provide additional manpower for a growing workload.
- Improve security.

Security improvements, the panel emphasized, should begin with a comprehensive security review. The panel also suggested that the service should consider elevating the level of the museum's director to senior executive status.

Air Force historian Dick Anderegg, who fielded questions along with Cunningham during a press conference announcing the panel's findings, noted that if collections are not properly preserved at the Air Force Museum, "they likely will never be preserved."

RAF To Slash Eurofighter Buy

Britain's Royal Air Force will cut its planned purchase of Eurofighter Typhoons by a third—from 232 aircraft

to 143—London's *Sunday Telegraph* reported. The fighter program has suffered long delays and is well over budget.

UK defense officials now say the Eurofighter, conceived in the 1970s, is already out of date. It was originally to enter service in the early 1990s and now is not slated to come on line for at least another two years.

The savings from cutting the number of Typhoons will go toward development of future combat systems, such as unmanned aircraft and smart weapons.

According to the *Telegraph*, officials may also scale back the UK Joint Strike Fighter program, among other defense cuts. Britain has committed to purchase 150 F-35s for the RAF and Royal Navy.

Wynne: F-35 "Going Very Well"

Acting Pentagon acquisition chief Michael W. Wynne told lawmakers in November that the F-35 Joint Strike Fighter program is "going very well."

Testifying before the Senate Armed Services Committee at his confirmation hearing for the top acquisition job, Wynne said, however, that there are "some concerns with weight," in the single-engine fighter at this stage in its design.

The greatest weight problem rests with the Marine Corps' short takeoff, vertical landing variant, he said, adding, "I think, though, that they have a pathway forward."

Of the overall F-35 design, Wynne said, "It appears that the products all work and they fly very well. ... It's an extraordinary airplane."

New Mortuary Facility Opens

Officials on Oct. 27 opened a new, state-of-the-art mortuary at Dover

V-22 Gears Up for Revised Production Plan

V-22 tilt-rotor program officials are working with the Air Force and the Navy to determine how best to meet new program guidance that calls for interoperability improvements and a new production plan, said Col. Craig Olson, V-22 program director. Unfortunately, some of that guidance is ambiguous.

The last Defense Acquisition Board that reviewed the V-22 program issued guidance that, in Olson's view, was clear in some areas but generic in others. The guidance has left the V-22 office and its service "customers" to thrash out specific program details before the next DAB meeting in April.

Specific guidance from the DAB included the need to build 11 aircraft in Fiscal 2005, 17 in 2006, and 152 tilt-rotors by 2009. Other, less clear program guidance simply will not be resolved by the time the Administration releases the Fiscal 2005 budget request, Olson told *Air Force Magazine*.

There is no decision, for example, on exactly how many CV-22s per year will be built for Air Force Special Operations Command use or how many MV-22s will go toward Marine Corps troop transport. Neither has a determination been made on exactly what connectivity improvements, such as the addition of data links, will be added to which version of the tilt-rotor aircraft.

Olson noted that the DAB's guidance calls for slowing the initial ramp rate and adding features—all while buying more aircraft by 2009 than were planned under the budget plan. This type of reorganization "takes money," he said.

Acting Pentagon acquisition chief Michael W. Wynne expressed confidence in the program, which was redesigned after two fatal crashes in 2000. In testimony, Wynne said the V-22 is "coming back strong."

Wynne cautioned, however, that the program is not out of the woods yet because of its past high-profile failures.

Those problems would influence how the aircraft is viewed—even if a crash is caused by lightning. The headline would read, said Wynne, "The Troubled V-22 Crashes," and on page 50 it's going to say, "The cause was allegedly lightning."

AFB, Del., replacing a 48-year-old facility.

The Dover facility, the Defense Department's only Stateside mortuary, is used to prepare the remains of deceased service members and government officials who died in Europe and Southwest Asia. Dover is a major Air Force airlift hub.

The 70,000-square-foot facility was built in just more than a year. It is named the Charles C. Carson Center for Mortuary Affairs, in honor of Dover's mortuary director for 26 years.

CIA: NK Has Simple Nukes

A Central Intelligence Agency assessment determined that North Korea "has produced one or two simple fission-type nuclear weapons" without having conducted nuclear tests, according to an unclassified response to query from the CIA to the Senate Select Committee on Intelligence.

First reported by the Federation of American Scientists' *Secrecy News* electronic newsletter, the assessment adds that recent actions by North Korea "suggest the Kim Jong-Il regime is prepared to further escalate tensions and heighten regional fears in a bid to press Washington to negotiate with Pyongyang on its terms."

An overt nuclear test "would be one option" for escalating these tensions, the CIA reported.

The CIA was responding to questions for the record raised in February 2003 during the annual hearing to discuss worldwide threats. Typically, the responses are made months after the original hearing and made public even later.

In its responses, the CIA further noted that North Korea has "publicly claimed that the Iraq war shows only tremendous deterrent force can avert war."

Russian Nuke Smuggling Persists

The CIA responses to Senate queries also called attention to persistent problems with the security of Russian nuclear materials. "Since 1992, there have been 16 seizures of weapons-usable [nuclear] material—six in Russia and 10 in Europe," the CIA informed the Senate intelligence committee.

While none of these seizures were connected to terrorists, and no buyers were in place, the CIA believes that "other undetected smuggling has occurred." The CIA does not know "the extent or magnitude of undetected thefts."

The intelligence agency said it remains "concerned about the total amount of material that could have

been diverted in the last decade," even while security at Russian nuclear sites has improved in recent years.

F/A-22 Gets Three-Star Oversight

The Air Force has instituted a new steering group of lieutenant generals to help review and guide the F/A-22 Raptor program toward its operational rollout at Langley AFB, Va., next year.

The group is made up of the vice commanders of Air Combat Command, Air Education and Training Command, Pacific Air Forces, US Air Forces in Europe, and Air Force Materiel Command.

The Raptor has embarked on its first official operational tests and is scheduled for initial operational capability at the end of 2005. The three-star group was established to ensure a smooth transition from test to op-



A n o t h e r S u p e r i o r R a t e

1.9%
1 APR
First 6 billing cycles

4.0%
4 APR
Prime variable
(current as of 1/1/04)


"We couldn't have done it without Pentagon Federal Credit Union. We needed a little bit of extra money to put the finishing touches on our new living room. We found that a Home Equity Line of Credit is **one of the least expensive ways to borrow money.** And, on top of that, **Pentagon Federal Credit Union has one of the least expensive rates**—among the lowest in the nation. Next up—a new kitchen?"

1-800-247-5626
PenFed.org



**Pentagon Federal
Credit Union**

Superior Rates. Proven Service.

NCUA Please mention code 800. All ROA members and your families are eligible to join. Call anytime or visit online to join. Promotional rate current as of January 1, 2004 and subject to change. Home Equity Line of Credit (ELOC) not available in Texas. Refinance of an existing Pentagon Federal ELOC does not qualify for the promotional rate. Maximum APR is 18%. Other terms and conditions apply. We do business in accordance with the Federal Fair Housing Law and the Equal Credit Opportunity Act. *If Loan to Value is greater than 90%, 1.9% promotional rate increases to 2.9%. 

News Notes

By Tamar A. Mehuron, Associate Editor

■ USAF's 12th and 19th Fighter Squadrons, part of the 3rd Wing at Elmendorf AFB, Alaska, on Nov. 13 became the first units to receive the new AIM-9X Sidewinder missile. The units fly F-15 Eagle fighters. USAF procurement plans call for more than 5,000 of the new missiles over an 18-year production schedule.

■ Lockheed Martin plans \$200 million in upgrades to the SLC-3E launch site at Vandenberg AFB, Calif., to enable it to serve as a launch facility for the heavier Atlas 400 and Atlas 500 series rockets, reported the *Los Angeles Times*. The first Atlas V West Coast launch is slated for mid-2005.

■ Ambassador Richard Jones, during an Oct. 21 press conference, announced the departure of the last US military aircraft from Al Jaber AB, Kuwait. The base had been used by US forces since Gulf War I in 1991.

■ The Air Force translator arrested July 23 and charged with espionage was slated to face a court-martial Jan. 13, Air Force officials said in early December. SrA. Ahmad I. Halabi, assigned to Travis AFB, Calif., served as a translator at Guantanamo Bay, Cuba. (See "Aerospace World: Airman Arrested for Espionage," November 2003, p. 16.)

■ China and the European Union have joined forces to develop a satellite navigation system to rival the US Global Positioning System. China

signed an agreement last fall to contribute research for Europe's Galileo space program, reported the *London Times*. Galileo, which is expected to be completed in 2008, is intended for civil use but could have military application.

■ USAF plans to deal with a 10 percent shortfall in filling first sergeant slots by selecting 400 individuals to undergo the necessary training. According to SMSgt. Chris Anthony, the process mirrors the ones in place to fill commander or command chief slots when the service doesn't have enough volunteers. There has been a drop in first sergeant manning—it's down from 96 percent to 89 percent. Out of the 400 selected, Anthony said about 120 will become first sergeants.

■ USAF promoted more than 500 senior master sergeants to chief master sergeant. The promotion board considered 2,649 senior master sergeants and selected 19.86 percent, which is down slightly from last year's selection rate of 19.93 percent.

■ A mobile bird-detection radar system recently installed at Elmendorf AFB, Alaska, may eventually help air traffic controllers alert pilots to bird activity in their flight area. The goal is to gather enough information on migration patterns to predict trends and thus reduce damaging bird strikes.

■ USAF awarded Boeing a \$10

million contract for depot maintenance and aircraft modifications to E-4B National Airborne Operations Center aircraft. The contract calls for work to be completed by December.

■ Two separate accidents at Pratt & Whitney's missile propellant mixing facility in San Jose, Calif., prompted Missile Defense Agency officials to switch from a Lockheed Martin booster using the propellant to an alternate boost vehicle built by Orbital Sciences for up to 10 ground-based interceptors at Ft. Greely, Alaska, and Vandenberg AFB, Calif., officials said in November. Both Lockheed and Orbital are subcontractors to Boeing on the booster rocket for the ground-based midcourse defense element of the Ballistic Missile Defense System.

■ DOD plans to conduct another review of USAF's Space Based Infrared System-High program in response to a critical General Accounting Office report released in the fall. GAO found that SBIRS-High remains at risk for cost and schedule overruns because of long-term problems, such as the rush to proceed with development without first establishing a solid base of critical knowledge. SBIRS-High is designed to replace the decades-old Defense Support Program missile-detection satellites.

■ An F-16 crash June 10, 2003, at Luke AFB, Ariz., was caused by a manufacturing defect in a turbine blade, Air Force investigators determined. During a low-altitude bombing training run, the pilot, Capt. David O'Malley, felt the aircraft vibrate beneath him and heard a loud bang, followed by a grinding noise from the engine. He increased altitude and tried twice to restart the engine. He ejected safely after his wingman said fire appeared out the aircraft's aft end.

■ The copilot and an aircraft mechanic share blame for \$2.1 million in damage to a KC-135 tanker on the ground on April 1, 2003. According to investigation board results released Nov. 6, each failed to follow their checklists, thereby causing the aircraft's two inboard engine nacelles to come in contact with the ground. The accident occurred on deployment to RAF Akrotiri, Cyprus, for Operation Iraqi Freedom. The aircraft was assigned to the 100th Air Refueling Wing, RAF Mildenhall, UK.

■ The Vietnam Veterans Memorial in Washington, D.C., will gain a visitors center by 2006, according to legislation signed by President Bush Nov. 17. No federal funds will be used in its construction, which will take about three years and cost about \$13 million.

Northrop Grumman photo by Gene Yang



A US Air Force Global Hawk unmanned aerial vehicle deployed last fall to Nordholz AB, Germany, so that the Luftwaffe could take a close look at the high-flying UAV. Germany may buy Global Hawk for its own military.

erations for the service's highest priority acquisition program.

DOD Launches Mini-Sat Program

Retired Vice Adm. Arthur K. Cebrowski, the Pentagon's director of force transformation, announced that the Defense Department will be entering the mini-satellite business next year.

A new tactical satellite program—TacSat-1—is the first element in the Operationally Responsive Space Experiment that has as its goal to orbit the satellite within a year and for less than \$15 million, including launch costs.

The Pentagon expects to launch TacSat-1 in early 2004.

"What we want to be able to do is craft a payload, integrate it into a rocket, launch it, and have it orbiting, all within the time lines for the planning of a major contingency," Cebrowski explained in a white paper released last fall. "We are talking about space capabilities in weeks and months, not decades," he added.

The satellite is slated for launch aboard a Falcon launch vehicle, a new two-stage, liquid-fueled booster provided by a new company called SpaceX, for Space Exploration Technologies Corp.

If successful, the TacSat-1 program will launch the US into the micro-satellite business, an area that's been dominated by foreign entities.

DOD Selects Demo Sites

The Defense Department last fall selected eight medical facilities to participate in joint demonstrations with the Department of Veterans Affairs. The demo projects were mandated by Congress in the Fiscal 2003 defense authorization bill.

The goal of the projects, which will run through 2007, is to help the facilities improve and eliminate duplication in three areas: budget and financial management; staffing and assignment; and medical information and information technology systems.

Hawaii and Alaska will be the sites for the budget and financial demonstrations. In Hawaii, Tripler Army Medical Center will work with the VA Pacific Islands Health Care System. In Alaska, the Air Force's 3rd Medical Group, Elmendorf Air Force Base, will work with the Alaska VA Health Care System.

The staffing and assignment projects will be conducted in three areas: Madigan AMC, Wash., and Puget Sound VA HCS; Eisenhower AMC, Georgia, and Augusta VA HCS; and 1st Medical Group, Langley AFB, Va., and Hampton VA Medical Center.

The Latest From Iraq

US Launches Major Counterattack

Coalition forces in Iraq on Nov. 12 began the largest combat operation since April, seeking to eliminate persistent enemy counterattacks on US and allied forces.

Dubbed Operation Iron Hammer, a series of air strikes involving AC-130 gunships, F-16 fighters, and other Air Force assets helped destroy a warehouse being used as an enemy staging area, while precision weapons were used to target a munitions store used by insurgents.

Iron Hammer was a marked change from US combat tactics in recent months and was undertaken to help squash a rising level of armed resistance by Saddam Hussein supporters that has continued to threaten coalition forces almost daily.

Suspects Nabbed in Rocket Attack

US troops nabbed 12 suspects believed to be involved in the Oct. 26 rocket attack on Baghdad's Rasheed Hotel, a primary meeting point of US forces in Iraq. Deputy Defense Secretary Paul D. Wolfowitz was staying at the hotel, during his visit to Iraq, at the time of the attack. Wolfowitz was not injured.

According to wire reports, Army Brig. Gen. Martin E. Dempsey, commander of the 1st Armored Division, said an overnight raid in western Baghdad on Nov. 8 ended with the capture of 12 of the 18 individuals suspected of involvement in the attack.

Bombing at Italian Post in Nasiriyah Kills 29

A suicide bombing on Nov. 12 against Italy's military police headquarters in Nasiriyah, Iraq, killed at least 18 Italians and 11 Iraqis. The attack was the deadliest against a coalition partner in Operation Iraqi Freedom.

It was also noteworthy because it occurred about 185 miles south of Baghdad, in an area that had previously been peaceful.

Italian Prime Minister Silvio Berlusconi said his nation remained committed to the effort in Iraq and that Italy would not withdraw its 2,300 troops because of the bombing, the *Washington Post* reported.

Casualties

The deaths of 32 soldiers killed in three helicopter crashes sharply elevated the US casualty statistics for November, compared to previous months.

The Defense Department reported that through Nov. 21, a total of 424 US troops had been killed in Iraq since the beginning of Operation Iraqi Freedom. This included 62 deaths in the first three weeks of November, 42 in October, and 33 in September.

Of the total fatalities, 294 Americans were killed in combat incidents, while 130 died in noncombat events such as accidents.

DOD figures also revealed that the number of Americans killed after May 1—the end of major combat operations—reached 115 by Oct. 29. That surpassed the 114 that were killed during the major combat phase of OIF.

Index to Advertisers

American Historical Foundation	3
Agusta Westland	Cover IV
Boeing	44-45
Lockheed Martin	Cover II
Motion Models	5
Northrop Grumman	9, 23, Cover III
Pentagon Federal Credit Union	15
<hr/>	
AEF Planned Giving	83
AFA Membership	82
AFA on the Green	86
Air Warfare Symposium	43
Industrial Associates	41

Congress Authorizes \$401 Billion for Defense

Lawmakers in November authorized \$401.3 billion for Fiscal 2004 for the Defense Department and for national security programs within the Energy Department.

Authorizers approved \$74.2 billion for procurement; \$63.4 billion for research and development; and \$114.4 billion for operations and maintenance expenses.

Expenses to be handled through other accounts include the continuing costs of combat operations worldwide and possibly an additional amount for the Air Force to begin leasing and purchasing 100 new KC-767 refueling tankers. The conference report authorized the Air Force to lease 20 new KC-767s and purchase another 80 through 2014.

The bill was signed by President Bush on Nov. 24.

Highlights of the authorization package include:

- \$3.5 billion for procurement of 22 F/A-22 Raptors. This represents "a reduction of \$161 million to reflect cost savings," according to the Senate Armed Services Committee's summary of the legislation. (USAF had hoped to use the cost savings to purchase additional aircraft as arranged in its "buy-to-budget" deal with DOD.) House and Senate conferees also approved \$620.7 million for continued F/A-22 development.

- \$2.1 billion for the next lot of 11 C-17s, bringing the Air Force closer to its current goal of a fleet of 180 of the new strategic airlifters.

- \$9.7 billion for military construction and family housing, \$434 million more than requested. Senate authorizers noted in their summary that the additional funding includes "prudent investment in overseas locations with an enduring presence."

- \$6.7 billion for US Special Operations Command. This is an increase of almost 30 percent, compared to the funding enacted in Fiscal 2003. The growth recognizes the larger role SOCOM has assumed in US military planning and operations.

- \$11 billion for defense science and technology programs. This includes nearly \$800 million in additional funding that lawmakers said will help bring DOD closer to its stated goal of investing three percent of the defense budget in S&T.

- A pay raise of at least 3.7 percent for all uniformed military personnel.

The F-35 Moves Ahead

Congress authorized \$4.4 billion for continued development of the triservice F-35 Joint Strike Fighter. Funding is split evenly between the Air Force and Navy.

The approval came as contractors in November for the first time began bending metal for the initial developmental F-35s.

The strike fighters will be flown by the Air Force, Marine Corps, and Navy and will eventually replace a wide range of aircraft, including the F-16 and A-10.

The authorizers also added \$56 million to DOD's F-35 funding requests to fully fund the alternate engine development program.

Civil Service Overhaul Approved

Defense Secretary Donald H. Rumsfeld largely got his wish for an overhaul of DOD's Civil Service regulations. The 2004 authorization bill includes provisions that will make it easier for the department to hire, promote, and fire civilian employees.

Managers will also have greater leeway to pay employees based on their individual performance. In a concession to DOD's unions, civilians will have access to an independent review before being disciplined.

Pay for DOD's Senior Executive Service employees is also being revamped. Maximum pay for the department's senior civilians is being increased from \$134,000 to \$142,000—but could actually top out at more than \$154,000 for certain individuals.

B-1Bs Coming Back

The House and Senate authorizers approved a provision that will require the Air Force to reconstitute 23 B-1Bs out of the 32 B-1B bombers USAF has retired. (See "Washington Watch," p. 8.)

Lawmakers authorized \$97 million—some \$5.4 million more than the Administration's request—for B-1B modifications. Part of the funds would be used to begin the regeneration process for the 23 B-1Bs.

Goodbye "Buy America"

Conferees removed most of the controversial "Buy America" legislation that had been proposed as part of the 2004 defense authorization. Critics had decried the effort as being protectionist and harmful to multinational programs such as the F-35.

Left in place was "a balanced set of provisions that will support the US industrial base in a manner that will maintain and expand defense cooperation with our allies, while removing several unnecessary barriers to defense trade in current law," according to the Senate Armed Services Committee's summary of the legislation.

Lawmakers retained a provision calling for the defense and service Secretaries to assess the US industrial base's ability to produce systems, components, and materials needed to win the war on terrorism.

For the medical information and IT systems demonstrations: Madigan and Puget Sound; William Beaumont AMC, Tex., and El Paso VA HCS; and Wilford Hall Medical Center, Lackland AFB, Tex., with Brooke AMC, Tex., and South Texas VA HCS.

The facilities had applied to participate in the projects, according to a DOD statement, and were selected by the DOD/VA Health Executive Council.

Bush Awards Medal to Robertson

President Bush on Nov. 12 awarded the Medal of Freedom to George Robertson, the outgoing NATO secretary general. "The Presidential Medal of Freedom is our nation's highest civil award, given to individuals of

exceptional merit and integrity," Bush said in the Roosevelt Room presentation.

The British subject has been a staunch proponent of NATO modernization and reform during his four years as the alliance's top civilian official. He has repeatedly pressed the European NATO members to improve in areas such as interoperability, airlift capabilities, and precision weapons—while frequently blasting the inefficiencies in many of Europe's standing armies.

Robertson said he is leaving an alliance that has been transformed with "new partners, new missions, and new capabilities—ready to stand firm against the new and deadly threats that we face in the 21st century."

Law Schools Challenge DOD

Several law schools are suing the Pentagon, challenging the constitutionality of a 1996 federal law that requires the schools to permit military recruiters on campus or risk losing federal funds.

Military officials, in the last couple of years, began invoking the law to force open the doors of some law schools that had barred military recruiters for years. (See "Aerospace World: Yale Opens Doors to Military Recruiters, Vowing to Challenge Pentagon," November 2002, p. 27.)

Schools that have filed suit include Yale and the University of Pennsylvania, according to the *Christian Science Monitor*. Others participating in the suits have remained anonymous.

At issue for the schools is the Pentagon's policy toward homosexuals, specifically the "Don't Ask, Don't Tell" policy that was implemented by the Clinton Administration.

2004 ACP Program Has Changes

The Air Force has retained Aviator Continuation Pay for 2004 but made some changes to the program.

USAF re-evaluates the ACP program each year and this year elected to drop the three-year and to-25 years options, said Lt. Col. Harrison Smith, chief of USAF's rated force policy branch. Essentially, he said, the service dropped those options that didn't work and kept ones that do.

The bonus "take rate" for 2003, said Harrison, doubled the rate for 2001. The number of pilots who took an ACP bonus rose from 30 percent to more than 60 percent.

USAF extended the ACP bonus program for the first time to navigators and air battle managers in 2003. Their 2003 take rate was 55.3 percent and 75.9 percent, respectively.

AFRC Activates New Space Unit

Air Force Reserve Command has established its third space squadron—the 26th Space Aggressor Squadron—at Schriever AFB, Colo.

AFRC's 6th and 19th Space Operations Squadrons fly satellites, while the 26th SAS anticipates threats to those satellites.

The new unit's members provide threat replication—demonstrating potential threats to space systems and helping develop the means to defend against an enemy attempting to deny space capability to US forces.

"As America has been mastering space, we must ensure our defense of these systems is as robust as our ability to operationally support the warfighter," said Lt. Col. Guy Morley, 26th SAS commander. "We're here to mitigate the threat before it manifests itself on the battlefield," he noted.

The reserve unit has 35 positions—eight full-time Active Guard Reserve and 27 traditional reserve slots. They work directly with their active duty counterparts in the 527th SAS at Schriever in a "completely synergistic" operation, said Lt. Col. Anthony J. Russo, commander of the 527th. Russo said his biggest problem had been manpower, with many of the personnel in his "elite but extremely small squadron" on deployments.

"Activation of the 26th gives me more flexibility to meet the geometric increase in demand for aggressor support," said Russo. He added, "The working relationship can only be described as seamless." ■



USAF photo by SSgt. Jeffrey A. Wolfe

A USAF A-10 pilot fires the Warthog's cannon at a target in Iraq Nov. 17 during Operation Ivy Cyclone, a ground and air operation to strike insurgents. The A-10 is from the 74th Fighter Squadron, Pope AFB, N.C.

Worldwide Basing Changes Are Coming

Defense Secretary Donald H. Rumsfeld said in November that the Pentagon plans to make major changes in its worldwide basing posture to make the US presence overseas more flexible and less static. The process will take years, he said.

Rumsfeld offered the situation on the Korean peninsula as a rare example of how the reforms might be accomplished.

After meeting with the South Korean defense minister, Rumsfeld said, "We discussed ways to realign and consolidate US forces based in Korea into two major hubs in two phases."

The Defense Department seeks to pull back US troops from the demilitarized zone into more defensible positions farther south. With a total US force of 37,000 troops in South Korea, Administration officials see no reason to continue to have some troops serve as "trip wires" in 19 camps along the North Korean border.

"Any changes to [the] US military posture in Northeast Asia will be the product of the closest consultation," Rumsfeld said, while visiting South Korea as part of a tour of Pacific bases. These changes "will result in increased US capabilities in the region," he added.

The Pentagon plans to modernize its capabilities on the Korean peninsula, and Rumsfeld said, "Whatever adjustments we make will reflect the new technologies that are available, ... and they will strengthen our ability to deter and, if necessary, defeat any aggressions against allies such as South Korea."

Earlier in his trip, while visiting Guam, Rumsfeld said it could take eight years to implement all the basing changes that DOD envisions. He added that the first details probably will be announced by early 2004.

Senior Staff Changes

PROMOTIONS: To Lieutenant General: Victor E. Renuart Jr., Garry R. Trexler, William Welser III. To Brigadier General: Stephen L. Lanning.

CHANGE: Maj. Gen. Mark A. Volcheff, from Dep. Dir., P&P, AMC, Scott AFB, Ill., to Dir., Ops., AMC, Scott AFB, Ill. ■

Action in Congress

By Tom Philpott, Contributing Editor

Fiscal 2004 Pay and Benefits; Medicare Part B Penalty; "Keep the Promise" Pros and Cons

New Pay and Benefits

President Bush on Nov. 24 signed into law the National Defense Authorization Act for Fiscal 2004, containing a basketful of increases in military pay and benefits for active duty members, retirees, and reservists.

Active Duty Members

- **Basic Pay:** An average raise of 4.15 percent on Jan. 1. Individual raises will range from 3.7 percent to 6.25 percent, depending on grade and length of service.

- **Housing Allowance:** An average 6.5 percent increase in basic allowance for housing will continue a string of BAH raises above average rental costs nationwide. The aim is to end out-of-pocket costs for military renters. The perceived out-of-pocket gap between BAH and local rents will narrow to 3.5 percent in 2004 and be wiped out with the 2005 BAH adjustment.

- **Wartime Pays:** Recent increases in Imminent Danger Pay and Family Separation Allowance will continue through at least December. Last April, IDP was raised from \$150 a month to \$225. FSA was increased from \$100 to \$250. Congress rejected a call by the Bush Administration to roll back these increases and replace with them with an equal increase in hazardous duty pay but only for persons assigned to Iraq and Afghanistan.

- **Setting Raises:** Annual military pay raises after 2006 will be set to match private sector wage growth as measured by the Bureau of Labor Statistics' Employment Cost Index (ECI). This modifies a law that, after 2006, would set military pay raises a half percentage below yearly changes in the ECI.

- **Moving Damage:** The services are to enter contracts with household movers to require reimbursement to military families of full replacement costs of personal property damaged or lost during change-of-station moves. Current mover contracts allow reimbursements at moving industry standards which seldom cover the full value of objects lost.

Military Retirees

- **Concurrent Receipt:** A 10-year



California Air National Guardsman. Reservists gained greater access to Tricare.

US Navy photo by PH1 Arto K. Abrahamson

phase-in of concurrent receipt of military retired pay and VA disability compensation will begin Jan. 1 for retirees with a disability rated 50 percent or higher. Their full military retired pay gradually will be restored. Retirees rated less than 50 percent disabled will continue to see retired pay reduced, dollar for dollar, by the amount drawn in disability pay.

- **Combat-Related Special Compensation:** The CRSC benefit will be expanded to cover anyone with 20 or more years of service and combat or combat-training-related disabilities of 10 percent or more. Before Jan. 1, CRSC was offered only to retirees with combat-related disabilities of 60 percent or higher, or any disability tied to wounds for which members received the Purple Heart. Retirees have to apply for CRSC. Payments are immediate, rather than phased, and are tax free. No retiree can receive both CR and CRSC. Finance centers will pay retirees whatever benefit is higher, but retirees, perhaps for tax reasons, will be able to select the alternative.

- **Tricare Assistance:** Defense officials must develop and implement an outreach program for users of Tricare Standard, the military's fee-for-service health insurance option. The goal is to assist beneficiaries in finding participating civilian providers.

Guard and Reserve

- **Tricare Expanded:** The triple option of Tricare Prime, Standard, and Extra will be opened to about 170,000 drilling or inactive reservists, those who are unemployed, or have no employer-provided health insurance. To enroll, uninsured reservists will pay an extra premium on top of usual Tricare co-payments and deductibles. Premiums are expected to be about \$420 a year for self coverage or \$1,440 for self and family. The Bush Administration strongly opposed this change, so the authority is set to expire Dec. 31—perhaps before the program can get started—unless Congress votes to make the program permanent.

- **Transitional Health Coverage:** National Guard personnel and Re-

servists activated for 30 days or more will have access to transitional military health care for up to 180 days after leaving active duty. The current limit is 60 to 120 days. This program, too, would end Dec. 31, unless made permanent.

- **Preactivation Health Care:** The services are authorized to provide medical and dental care to Guard and Reserve personnel as units are alerted that they will mobilize. No health care had been allowed until units were activated.

- **Premobilization Tricare:** Coverage for reservists and their families could begin up to 90 days before mobilization. Tricare coverage had been available only after personnel were activated. Congress ordered the General Accounting Office to prepare a report on reserve health care needs by May and to judge the effectiveness of these new enhancements.

- **Commissary Privileges:** Drilling Guardsmen and Reservists are allowed unlimited shopping privileges in base grocery stores.

- **Imminent Danger and Hostile Fire:** Mobilized reservists will qualify for Imminent Danger Pay and Hostile Fire Pay under the same conditions set for active duty members.

Defense Civilians

- **National Security Personnel System:** New methods of managing defense civilian employees will emphasize flexibility, from recruitment through retirement. The new system will award merit and performance over longevity. Up to 25,500 defense civilians a year will be eligible for voluntary early retirement or separation pay to ease workforce restructuring.

Medicare Part B Changes

The Medicare Prescription Drug and Modernization Act of 2003 (H.R. 1) includes a long-sought waiver of premium penalties for elderly military retirees using Medicare Part B.

The reform law waives the penalty for military retirees who enrolled in Part B in 2001 or later. The change applies to monthly premiums from January 2004 on. No reimbursements will be provided for penalties paid before then.

On Jan. 1, Part B insurance, which covers physician services and outpatient care, experiences a rise in its standard monthly premium. It goes to \$66.60, up 13.5 percent over 2003.

A Medicare user who delays Part B enrollment pays an extra 10 percent per month in premiums for

each year in which he delays enrollment beyond age 65. For example, if a retiree waits until 70 to enroll in Part B, his premium will be 50 percent higher, or \$99.90 a month in 2004.

Five to 10 percent of elderly military retirees have declined to sign up for Part B coverage at age 65. They believed it was unnecessary because, they reasoned, military health care always would be available.

With the advent of Tricare a decade ago, however, access to care on base began to tighten dramatically. Thousands of service elderly were forced to use Medicare. Congress in 2001 finally came to the rescue with Tricare for Life, a supplement to Medicare.

To use Tricare for Life, however, elderly must be enrolled in Medicare Part B. Many recent enrollees were hit with heavy late penalties.

There will be a special open enrollment for Medicare Part B for military retirees who declined coverage at age 65. Part B coverage will begin in the first month following enrollment.

Elsewhere in the Medicare Bill ...

The Medicare reform bill contained at least two other measures of interest to military retirees.

- It stopped a planned 4.5 percent cut in payments to physicians under Medicare and under Tricare and Tricare for Life. Instead, physician reimbursements are set to climb by 1.5 percent.

- The bill lifts a \$1,500-per-year coverage cap on physical therapy services, which would have affected many disabled military elderly.

"Keep the Promise" Bill

Two lawmakers from each political party in November introduced a "Keep the Promise" bill (H.R. 3474) that would begin to expand the range of military retiree health care options.

The sponsors are Reps. Chris Van Hollen (D-Md.), Jeff Miller (R-Fla.), Chet Edwards (D-Tex.), and Randy Cunningham (R-Calif.).

Col. George "Bud" Day, USAF (Ret.), and his Class Act Group lobbied for the bill after exhausting judicial remedies to force the government to honor promises of free lifetime health care for military retirees who entered service in 1956 or earlier.

The bill would allow military retirees to participate in the Federal Employees Health Benefits Program,

selecting from a menu of health insurance plans available to federal civilian employees.

Proponents say it would give health insurance to military retirees no matter where they live, and out-of-pocket cost would be no more than under Tricare Standard. The government would pick up at least that much of FEHBP costs.

The bill also would:

- **Waive Medicare Part B premiums** for military retirees who joined the service before Dec. 7, 1956, the effective date of a law that limited retiree health care benefits to "space-available" care.

- **Require DOD to establish a system** to reimburse pharmacy expenses at Tricare network rates to military retirees who cannot access network pharmacies because they live in a nursing home or have other limiting medical conditions.

- **Go beyond this year's Medicare reform law** to provide rebates to eligible military retirees for premium penalties on Part B coverage paid since January 2001.

All the changes would take effect Oct. 1.

Blowback on "Keep the Promise"

A group of retirees that prepared a "White Paper" nearly two years ago on Tricare failings for retirees has criticized the new "Keep the Promise" bill. They questioned the affordability of the Federal Employees Health Benefits Program option, calling it a "generals and admirals" FEHBP.

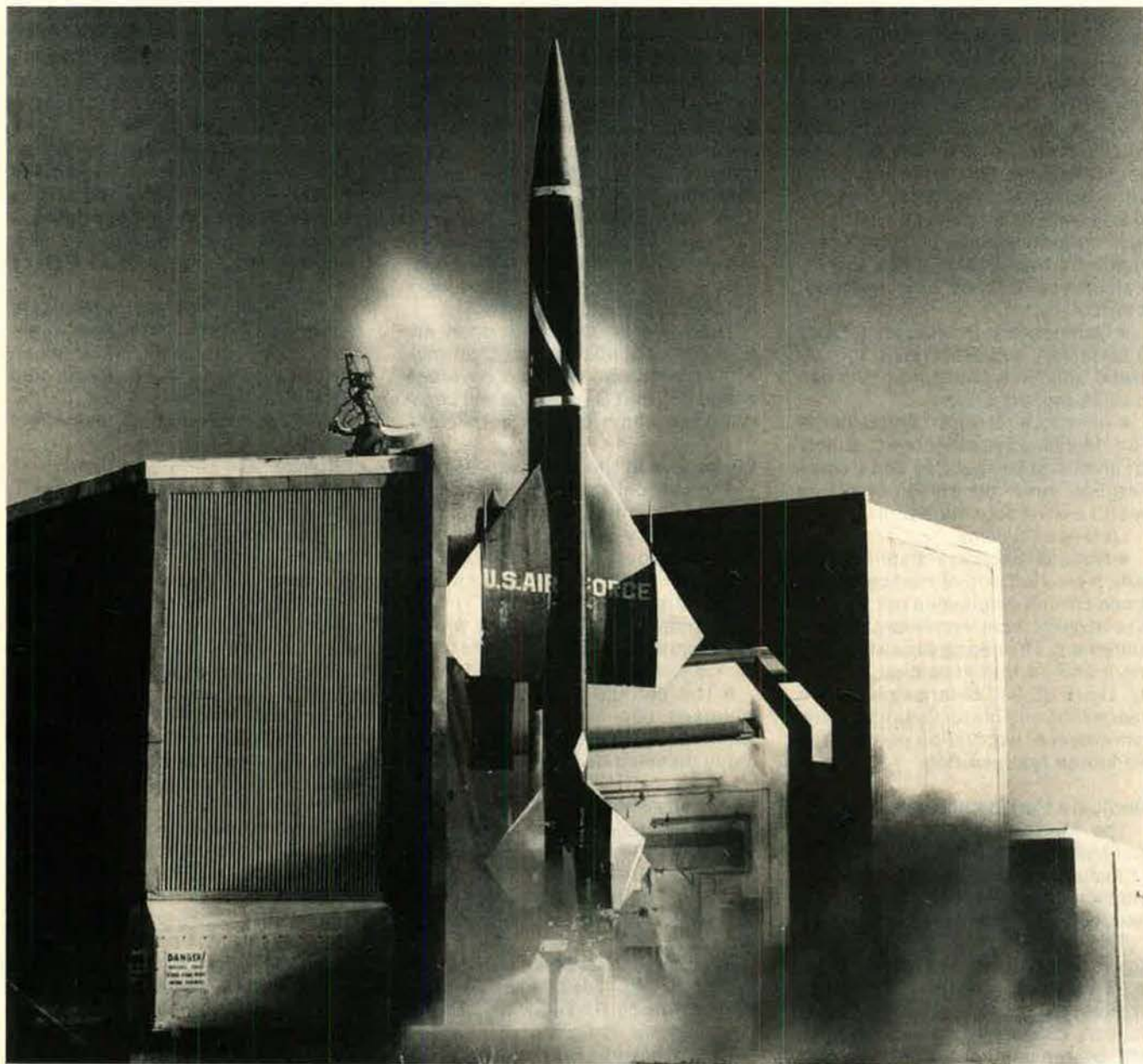
They note that they would pay the same premiums as federal civilians, a fact that steams them because they had expected the government to pick up more of the tab.

They don't like establishing a separate "risk pool" of military retirees, which could lead to higher premiums still.

Only one to two percent of retirees, the White Paper Group predicted, "will find it [the FEHBP option] affordable, despite the desirability for all of us of having FEHBP as an option." H.R. 3474, the group said, "does not keep any promises for under-65 retirees and many others, including active duty families experiencing problems with Tricare."

Defenders of the bill, however, said no single piece of legislation can correct all of Tricare's complex problems. In sharp contrast with the critics, the bill's supporters say that its affordability is one of its strengths. ■

Bomber Buster



In the 1950s, the Soviet bomber threat produced calls for a stronger North American air defense. USAF responded, in part, with BOMARC, the world's first long-range, supersonic, anti-aircraft missile. The pilotless BOMARC ("BO" from Boeing, "MARC" from the Michigan Aeronautical Research Center) was designated XF-99, then IM-99, and then

CIM-10A. The system became operational in 1960 and was retired from active service in 1972.

In the test pictured here, an IM-99 in Florida is launched by electronic impulse sent from Kingston, N.Y. A rocket booster would propel BOMARC to high speed, at which point ramjets would kick in. Ground control would

guide the weapon to the vicinity of a target, but an internal target seeker would carry out the final stage of the engagement. BOMARC could attack targets up to 400 miles distant, with nuclear or conventional warheads.



The path to missile
defense is looking up.

The need for missile defense is both global and urgent. Northrop Grumman is committed to the Missile Defense Agency's (MDA) innovative procurement strategy called spiral development. This strategy enables the building of an immediate Ballistic Missile Defense System (BMDS), while adding to it and improving it incrementally based on future testing and emerging technology. Our advanced solutions arise from the blending of core competencies in every dimension: land, sea, air, space and cyberspace. Clearly, successful global missile defense is on the ascent.

www.northropgrumman.com

©2003 Northrop Grumman Corporation

NORTHROP GRUMMAN DEFINING THE FUTURE™

If all goes
as planned,
the US on Oct. 1
will throw the
switch on its
first true
ballistic missile
defense.

*To the Rendezvous.
An interceptor streaks
from Kwajalein Island
Atoll in the Pacific
toward a target in
space in this success-
ful Oct. 14, 2002, test
of the Ground-based
Midcourse Defense
System.*



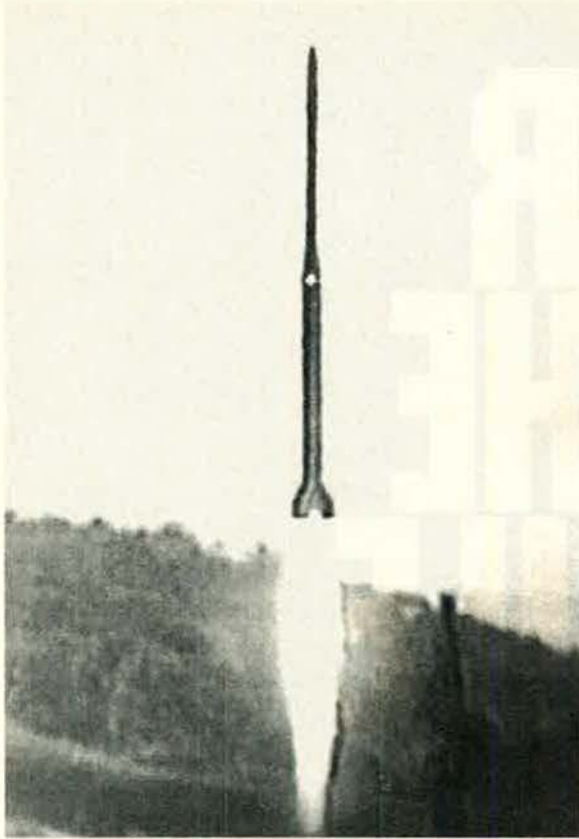
YEAR OF THE MISSILE SHIELD

By Michael C. Sirak

AFTER decades of research, billions of dollars in investments, and vast amounts of energy spent in both support and protest, the US is poised to activate its first defense against long-range missile attack. All signs are that, by year's end, Washington finally will have in place the means to shoot down a ballistic missile fired at the American homeland.

The Pentagon has set a date for "IDO"—for initial defensive operations. It is Oct. 1.

This system will not be the robust "shield" that President Reagan envisioned on March 23, 1983, when he startled the nation with a televised address that laid out his hope for missile defenses. On that occasion, Reagan spoke of negating the threat of a massive Soviet nuclear strike with technology that would, in his



Main Threat. North Korea said this photo depicts the August 1998 launch of its first satellite but analysts claim it is the three-stage Taepo Dong 1 missile. The defense system is aimed at checking the Taepo Dong family of missiles.

words, render nuclear weapons “impotent and obsolete.”

By comparison, the 2004 version of missile defense will be quite modest. The system will feature 10 silo-based interceptor missiles in central Alaska and southern California and a mix of space- and land-based sensors, all tied together by a vast command and control network. It probably will be able to defeat, at best, a handful of intercontinental ballistic missiles, which would most likely be fired from North Korea.

Even so, the contiguous 48 states, Alaska, and Hawaii will not stand naked against a missile fired at them in anger—for the first time in the nuclear age. If diplomacy fails and the threat of a devastating response does not dissuade an attacker, the United States can call on its Ballistic Missile Defense System (BMDS) as a last line of protection.

Through Thin and Thick

This line admittedly will be thin at first but will grow thicker and more sophisticated over time, say Bush Administration officials. It will evolve into a layered and integrated system geared to defeat missiles of all ranges fired from anywhere on the globe. The goal is to protect not only US

soil but also large concentrations of forward-based US troops and assets, as well as friends and allies.

Will even this thin, initial defensive system be ready for prime time by the end of 2004?

“Yes,” said Army Maj. Gen. John W. Holly, director of the so-called Ground-based Midcourse Defense (GMD) element developed by the Pentagon’s Missile Defense Agency (MDA). The GMD—previously known as the National Missile Defense system—will form the bedrock of the overall missile shield.

“We have a lot of challenges ahead of us,” noted Holly, “but the people working on this program, in industry as well as government, are the most talented and dedicated people in this nation, and they are going to make it happen.”

Holly compared the BMDS that will go on alert this year to a basic, serviceable Honda automobile. It will lack the “frills” of later BMDS configurations—which he equated to the sophisticated Lexus—but it will be “reliable” and do the basic job well.

Not everyone is convinced that the initial system will be ready to handle even an unsophisticated North Korean missile. “They don’t have a Honda yet,” said Philip E. Coyle, a

former Defense Department official.

In general, critics believe the Bush Administration’s deployment decision has been driven by political considerations—not by the emergence of mature and proven capabilities.

Ballistic missile defense has been an urgent DOD priority ever since the Bush Administration came to power in early 2001. Under President Bush, Washington withdrew from the 1972 Anti-Ballistic Missile Treaty, effective June 2002. Among that pact’s constraints was a prohibition on defending one’s entire national territory from missile attack. The intent was to fortify Soviet–American mutual deterrence by eliminating any chance that one side might attack first and use defenses to ward off a weakened counterstrike.

In 1991, however, the Soviet Union vanished, leaving in its place democratic Russia and a host of former Soviet republics. The Bush Administration entered into a new strategic relationship with Russia, anchored by the Moscow Treaty. It calls for significant reductions in deployed nuclear forces. Further, the US conducted a new Nuclear Posture Review, which enshrined missile defense as one leg of a new US strategic “triad”—along with nuclear and non-nuclear strike forces and a more-responsive infrastructure.

Then came the Sept. 11 terrorist attacks in the US. The attacks proved to be a defining event for the nation’s missile defense project. President Bush made the decision to place the BMDS on alert by December 2004, consistent with the National Missile Defense Act of 1999 that made it US policy to deploy a system “as soon as is technologically possible.”

“Sept. 11, 2001, underscored that our nation faces unprecedented threats, in a world that has changed greatly since the Cold War,” said the President in a Dec. 17, 2002, statement explaining his decision.

The Nightmare

A chief concern is that the United States could be devastated by a nuclear, biological, or chemical attack carried out with missiles in the hands of states such as North Korea and Iran or even a stateless terrorist organization. For the Administration, the issue is not in doubt. Senior officials have repeatedly argued that the nation’s adversaries eye these capa-

bilities as an asymmetric means to check US conventional military power and coerce Washington or its allies in a crisis.

The threat is no fantasy. Navy Vice Adm. Lowell E. Jacoby, director of the Defense Intelligence Agency, recently told Congress that North Korea's Taepo Dong 2 missile "could target parts of the US [meaning Alaska and Hawaii] with a nuclear weapon-sized payload in the two-stage configuration. The missile has the range to target all of North America if a third stage were used."

In August 1998, North Korea successfully flew its three-stage Taepo Dong 1 design over Japan. Since then, North Korea has abided by a self-imposed flight moratorium. However, in a 2003 report to Congress, the CIA claimed Pyongyang "may be ready for flight testing."

Iran, too, is believed to have a covert nuclear weapons program and is working on ballistic missiles at a feverish pace; yet its capabilities are not as advanced as North Korea's, according to US intelligence officials.

China, which some in the Administration view as an emerging threat, also continues to evolve its ballistic missile fleet.

This new threat environment differs "fundamentally" from that of the Cold War and "requires a different approach," noted a May 20, 2003, White House statement that sets down Administration policy on missile defense. "To deter such threats, we must devalue missiles as tools of extortion and aggression."

While missile defenses will not replace offensive strike capabilities, "they are an added and critical dimension of contemporary deterrence," the document stated, and will assure allies and friends and dissuade adversaries "from pursuing ballistic missiles in the first instance by undermining their military utility."

The initial BMDS is clearly intended to check the emerging North Korean Taepo Dong family of long-range missiles. Most of the system's fixed assets will be positioned in the Pacific Ocean area looking toward East Asia. Future upgrades will increase the BMDS ability to deal with missiles launched from other regions, such as the Middle East.

Now under way is a vast effort to integrate the operational elements of the defense system with a test bed that MDA has established in the Pacific. The test bed builds upon existing BMD test infrastructure at the

Ronald Reagan Ballistic Missile Defense Test Site at Kwajalein Atoll in the Marshall Islands, Pacific Missile Range Facility in Hawaii, other sites in and around that state, and Vandenberg AFB, Calif.

The Test Bed

Before the President's deployment decision, the agency's efforts were concentrated on creating the test bed so that the agency could conduct robust testing and evaluation of new and maturing BMD concepts. This included establishing a base for interceptor missiles at Ft. Greely, Alaska; expanding a launch site on Kodiak Island, Alaska, to accommodate BMD target missiles; and upgrading the Cobra Dane surveillance radar on Shemya island at the western end of the Aleutian chain. The US placed the radar on the strategically located island to monitor Soviet missile launches during the Cold War.

The test bed was to have a limited operational capability for use in a crisis. In such an emergency, five test silos at Ft. Greely could have launched their interceptors in an attempt to bring down a missile.

With the President's deployment mandate, the agency's efforts—and, in particular, Holly's activities—have expanded not only to complete the test bed but also to get in place the operational assets that will remain on continuous alert. The test bed will support the operational elements.

At Ft. Greely, the initial plan for five test silos has morphed into a requirement for six operational silos that will house GMD's combat-ready ground-based interceptor. Similarly, the agency will station four operational interceptors at Vandenberg, for a total of 10 interceptors on alert at IDO.

The ground-based interceptor consists of a three-stage booster atop which sits Raytheon's Exoatmospheric Kill Vehicle. The booster carries the EKV to a point in space where it detaches and searches for a missile. Once it has identified the missile's warhead, it homes in and smashes it, destroying the warhead by the sheer kinetic force of the impact.

MDA is pursuing two boosters for the interceptor: the Lockheed Martin Boost Vehicle Plus (BV Plus) and an Orbital Sciences design. In November 2003, the agency an-

DOD photo



The EKV. The system features 10 silo-based interceptor missiles, each tipped with an Exoatmospheric Kill Vehicle. Some 140 miles in space, the EKV will detach, locate the missile, and smash it.

nounced that the availability of the BV Plus will be affected by accidents in preparing its solid rocket propellant.

Originally, MDA planned to field six Orbital Sciences interceptors at Ft. Greely and four BV Plus interceptors at Vandenberg. In the wake of the mishaps, the agency is accelerating the pace of the Orbital booster program. It is likely that the Orbital booster will be used in all 10 initial interceptors.

"That appears right now to be where we will end up," said Holly. Nonetheless, he said, MDA remains "absolutely committed" to maintaining a dual-booster strategy. "We will bring Lockheed Martin back on line as soon as we can start pouring motors again," he said.

Diversity Needed

The Orbital design is slightly larger and faster. It flies at about 3.7 miles per second, compared with 3.4 miles per second for the BV Plus, according to MDA. Orbital's system made a successful nonintercept flight test in 2003.

"Having a faster booster and a slightly slower booster is a very good thing," said Holly. "If you can match the right weapon with the target that you are going after, ... you are much more efficient in your engagement."

The US eventually will deploy both types of boosters at Ft. Greely, said Holly. It also plans to test both designs from Vandenberg over the Pacific Ocean against targets launched from Kwajalein and Kodiak. There are no plans to fire test interceptors from Greely, he noted.

The initial BMDS sensor network will include USAF's Defense Support Program infrared early warning satellites, the enhanced Cobra Dane radar on Shemya, and an upgraded early warning radar at Beale AFB, Calif.

These systems have limitations. Only a portion of Cobra Dane's field of view can pick up North Korean missile launches. While the Beale radar's software and hardware enhancement should be completed by September, the radar will not have completed all of its operational testing by then, said Holly.

The system will also rely on forward deployed Navy Aegis destroyers that have been upgraded with Spy-1 radars. They will offer early target-track data to the system.

"Launching on Aegis [cues] is absolutely integral to our approach," said Holly.

The Navy expects to have three Aegis-equipped destroyers available for BMDS use no later than Oct. 1. These will be used for forward based surveillance and tracking, said Lt. Cmdr. Tate Westbrook, MDA's deputy program manager for the Aegis BMD element. By the end of this year, the Navy will have fitted one Aegis cruiser, *Lake Erie*, with up to five Standard Missile (SM-3) interceptors. *Lake Erie* will be a dedicated test bed asset, but will be available for combat in a crisis.

While Aegis tracking data can contribute to the intercept of a long-range missile, the SM-3 is capable of engaging only short- and medium-range ballistic missiles, said MDA officials.

The Army's Patriot Advanced Capability 3 (PAC-3) system is also considered part of the initial BMDS. It is already serving with forward deployed troops in South Korea and the Persian Gulf, protecting them from air and short-range missile threats.

The heart of the BMDS is its vast Command and Control, Battle Management and Communications network that will be headquartered at Schriever AFB, Colo.

Fiber-Optic Highways

Connecting the various GMD nodes will be a vast fiber-optic network spanning the contiguous 48 states and running underwater to Alaska and then spreading out over the state. In August 2003, the MDA completed, ahead of schedule, the 10,000-mile fiber-optic ring for the continental US. Plans called for a late 2003 completion of the Alaska ring. Eventually, the network will cover some 20,000 miles when it incorporates links to nodes outside the US, said Holly.

In an actual engagement, DSP satellites would pick up a threat missile's plume shortly after launch. They would alert the GMD fire-control network, which would begin planning an intercept, based on the satellite data, while simultaneously cueing Cobra Dane, Aegis, and any other sensors to track the missile.

Upon receiving higher quality track data from these sensors, operators would launch one or more interceptors. The radars would continue to

track the target and provide updated data to the kill vehicle once it deploys in space. This data would come via a ground-based In-flight Interceptor Communications System Data Terminal. Using the updates and its own sensors, the kill vehicle would then acquire the missile's warhead, home in on it, and stage a body-on-body collision. The radars then would assess whether the warhead had been stopped. If not, the system could launch additional interceptors.

MDA already has completed much of the construction work. Next comes installation of new mission equipment.

Last October, MDA conducted a successful test of the linkages between the GMD fire control and communications suite, Aegis, and the BMDS command and control setup—the three major elements that will be present for IDO.

"That was a significant event," said Holly.

Also in October, the Army activated the brigade of approximately 200 soldiers that will operate the GMD element. It is headquartered in Colorado Springs, Colo. A battalion will be located at Ft. Greely. Training of these soldiers, who are predominantly Army National Guard troops, is continuing.

Under the Army's concept of operations, the battalion fire direction center at Ft. Greely would launch interceptors and control the engagement, said Holly. The brigade headquarters at Schriever will have a duplicate set of hardware and software to serve as an immediate backup. Otherwise it likely will be used to do the planning and prepare the defense for the next potential attack, he said.

Despite the progress, many tasks remain.

"We have a lot of software development yet to do," said Holly. "We have flight testing, ground testing. We have to complete construction of the facilities. We have to complete the training of the warfighter. And we need to go through a series of integration interoperability checkouts to make sure that the system works as advertised. We have a great deal to accomplish."

MDA plans call for carrying out a major integrated ground exercise with the BMDS operators around April or May. "This is a significant ground test for us," said Holly. "Everybody

focuses on flight testing, ... but we gain the greatest benefit overall ... from our ground testing."

Final Tests

The agency expects to place the first interceptors in silos in June and will stage four or five flight tests before the arrival of IDO. To date, the GMD element has scored hits in five of eight intercept attempts. After the demonstration flight of BV Plus using motors finished before the propellant mishap, the agency early this year will conduct Integrated Flight Test 13b, a nonintercept test of the Orbital booster out of Kwajalein. It will carry and deploy a mock EKV as in an actual mission.

That will be followed by IFT 13c, a nonintercept phenomenology test that lets BMDS sensors collect data on certain types of targets. IFT 14 will be an actual intercept attempt using the Orbital booster, this spring. IFT 15, another intercept mission, may or may not occur prior to IDO. IFT 16a will be a "radar characterization" mission around October. A target missile launched from Kodiak will fly along the West Coast so that the Beale radar and an Aegis ship can assess their upgraded software.

Holly said there will be no time to rest. As soon as IDO occurs and the system goes on alert, he will be looking toward a new flight test in November and the next software upgrades.

MDA plans to have on alert, by the end of 2005, 10 more ground-based interceptors at Ft. Greely. Moreover, it will have completed an upgrade of an early warning radar in Britain, along with fiber-optic connections.

It will also integrate into the BMDS a deployable sea-based X-band radar produced by Raytheon. The agency considers the radar's higher resolution capabilities to be key for distinguishing warheads from decoys or countermeasures that a missile may also deploy. The radar will use Adak, Alaska, in the Aleutian chain, as its home base initially.

A prototype of the Air Force's Airborne Laser (ABL) system is also scheduled to be available in 2005. The ABL is a modified 747 freighter

From the Sea. The Navy in 2004 will outfit one Aegis cruiser, USS Lake Erie, with five Standard (SM-3) interceptors. The SM-3 can engage only short- and medium-range ballistic missiles. At right, USS Antietam conducts a test launch of an SM-2.



aircraft that features a megawatt-class directed energy laser in its nose to shoot down boosting missiles.

MDA plans to incorporate major improvements into the BMDS on a biennial basis in block increments. The capabilities that it will field in 2004 and 2005 will be part of the Block 2004 BMDS.

The agency's long-term goal is to build a system that will defeat any missile threat, however sophisticated. It wants the defense to have multiple shots at a missile from different angles and during all phases of the missile's trajectory—in the boost phase, post-boost as it traverses space and deploys its payload, and re-entry.

Having multiple sensors of varying types, such as infrared or radar, viewing the missiles from different locations mitigates the chances of being fooled by a decoy or countermeasure, noted agency officials.

"If you can achieve an integrated, layered defense, that is a lot harder to overcome and defeat as an attack strategy than if you have one element to try to overcome," said Air

Force Maj. Gen. Henry A. Obering III, MDA deputy director.

Overall, the agency will take both an evolutionary and a revolutionary approach to incorporating new capabilities, said Obering.

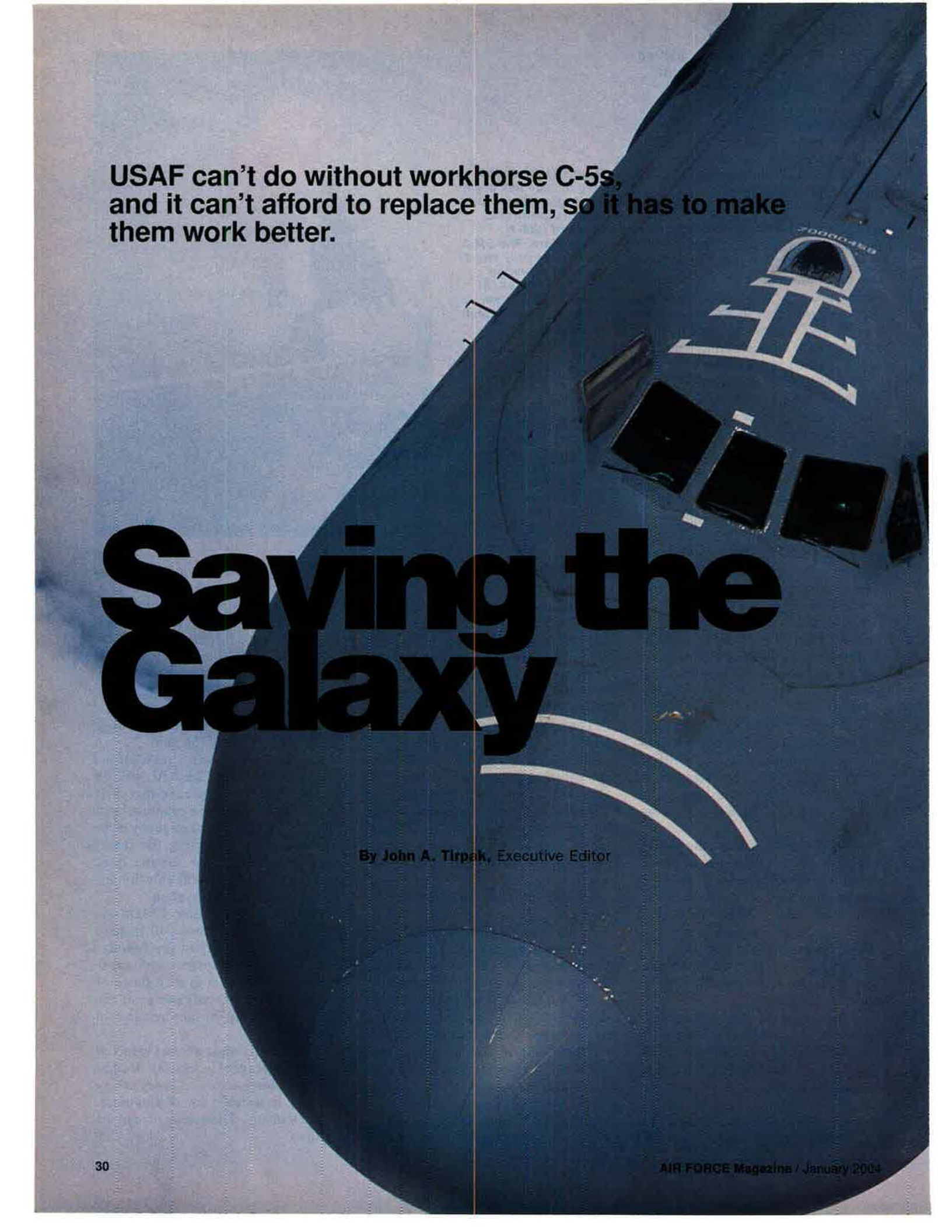
"We will add [evolutionary pieces to the initial BMDS] in terms of adding numbers of interceptors ... and expanding coverage by adding additional sensors," he said.

At times, however, "revolutionary" pieces such as the ABL will be added. "These are pieces that will cause a giant [leap] in capabilities," he noted, adding that the agency must be vigilant in designing the interfaces that will allow for the easy incorporation of these revolutionary capabilities into the system.

MDA has no ultimate BMDS architecture in mind, but will instead continue to build upon the foundation of the initial system with capabilities that allow it to stay ahead of the threat and take advantage of the most promising breakthroughs in technology.

A capability must not be perfected before fielding, officials say. Rather it must demonstrate a military utility making it suitable for deployment, said Obering. Thereafter it can be refined. ■

Michael C. Sirak is a Washington, D.C.-based staff reporter with Jane's Defence Weekly, an international defense magazine. His last article for Air Force Magazine, "Threats to the Nets," appeared in the October 2001 issue.



**USAF can't do without workhorse C-5s,
and it can't afford to replace them, so it has to make
them work better.**

Saving the Galaxy

By John A. Tirpak, Executive Editor

THE story of the Air Force's C-5 Galaxy airlifter is a tale equally divided between promise and problems. In the recent surge for Gulf War II, for example, the huge transport aircraft proved invaluable, giving the logistics train a kick in the pants so that supplies could move swiftly to the war theater.

Gen. John W. Handy, the commander of US Transportation Command and Air Mobility Command, recalled, "In this last conflict," there were "many, many times when, frankly, the only way to unclog" Charleston AFB, S.C., Dover AFB, Del., or Ramstein AB, Germany, was "to get the C-5 in there in sufficient numbers ... and, literally, in a weekend, ... clean out all three aerial ports."

The C-5's vast volume—the ability to carry 36 standard pallets, and 265,000 pounds of cargo, roughly double that of the newer C-17—is an "astounding capability," Handy said.

He added, "We certainly need to keep [it] at our fingertips for as far as I can see into the future."

The Galaxy also has major problems, as was glaringly apparent during one particular C-5's trip from Dover to Europe. As it readied for takeoff, an engine warning light appeared in the cockpit. The flight crew taxied the airplane back to the apron, the passengers got off, and maintenance crews investigated. After the problem was fixed and the passengers had reboarded, the aircraft headed out again, but another warning light came on—this time during the takeoff run.

Five more times, the C-5 attempted to leave, and each time there was a glitch.

Airborne at last, the heavily laden giant lumbered up to cruising altitude, but, some 100 miles out over the Atlantic, yet another warning light came on—this time, a landing gear door seemed ajar. The airplane returned to Dover for yet another re-



Dwarfing a KC-135, a C-5A takes on gas. The Galaxy was the largest aircraft in the world when it entered service. More than 30 years old, some C-5As are being retired, but others may be around for another 20 years.

pair. The C-5 finally reached its destination in Europe—but more than 18 hours late.

Most C-5 missions are not nearly as fraught with mechanical problems as this one, but such episodes are not rare, either. The C-5 has been a poor performer in the reliability arena since its entry into the fleet in 1970. During the wars in Afghanistan and Iraq, the transport edged close to Air Mobility Command's standard mission capable rate of 75 percent, but its typical, nonsurge performance puts it in the 65 percent range.

If the huge airlifter could be made to work reliably and predictably, AMC officials say, it would vastly improve scheduling and give a big boost to overall airlift capacity.

To make that happen, AMC is planning a two-step upgrade that is expected to bring the C-5 fleet up to—and possibly well beyond—the command's 75 percent mission capable benchmark.

No Replacement

There are few alternatives to making the C-5s work better, according to Handy. The idea of replacing the C-5 outright, he said, is a nonstarter.

"In all sincerity, there is an awful lot on the plate for the budget, and that's just from an AMC perspective," Handy observed. "If you look at it from an Air Force perspective, it's an even greater challenge."

AMC is one of the few commands that is consistently receiving new airplanes. The C-17, AMC's top priority, is being delivered at the rate of about one a month, and the command is also receiving new C-130Js—both are being bought on a multiyear contract basis. In addition, Congress recently green-lighted USAF's plan to lease and buy 100 KC-767 tankers to replace 40-plus-year-old KC-135Es.

Taken collectively, this recapitalization of the airlift fleet "consumes a tremendous amount" of the Air Force's discretionary spending, Handy said. Given that the C-5 fleet can be improved for about \$75 million apiece—vs. about \$204 million to purchase a brand-new C-17—and that much of the Galaxy fleet still has about 80 percent of its design life ahead of it, the C-5 is a capability that AMC isn't about to discard.

Nor can it. The C-5 is the only aircraft able to lift some of the oversize and oversize gear that the US military needs moved from time to time—things like special operations assault boats and scissors bridges.

However, the oversize/oversize issue is not of prime concern to Handy. He actually sees the need for such missions declining.

All the services, Handy observed, are trying to get "light, lean, and lethal." The Army, he noted, is trying to move toward gear that will

require nothing larger than a C-130 to move.

"That tells me that, as a transporter, my job for really large stuff by air is going to be diminished over time," Handy said. "Some time in the next 10-15 years, that could go away entirely as a requirement."

However, the C-5, he said, "is an airplane whose value is dramatically underappreciated, I think, outside Air Mobility Command and TRANSCOM." Sometimes, Handy said, "it's not just the oversize and oversize that drives that requirement."

Unsung Warrior

While the C-17 stole the spotlight in Afghanistan and Iraq by bringing troops and equipment directly to the front lines, the C-5 fleet brought nearly half (48 percent) of all cargo to the two countries during both Operations Enduring Freedom and Iraqi Freedom.

A total of 131 C-5s have been built. The first 81 were C-5A models built in the late 1960s and early 1970s. In the 1980s, production resumed, and 50 new Galaxys—designated C-5Bs—were built with some modest improvements. Two of the original C-5As—designated C-5Cs—were specially modified to carry spacecraft pieces that need to be transported quickly. Today, there are 126 C-5s left: 74 A models, 50 Bs, and two Cs.

AMC's two upgrade projects now in development are expected to give the C-5 sharply better performance. If they work, they will allow the big aircraft to complete far more missions each year, adding significantly to strategic airlift capacity. The two projects are the Avionics Modernization Program (AMP) and the Reliability Enhancement and Re-engineering Program (RERP).

Neither program is intended to extend the C-5's service life, which AMC analysts think already could last beyond the 2030s. Rather, the upgrades are intended to make the Galaxy fleet more reliable, more efficient, and able to comply with increasingly stringent rules regarding international airspace management.

The AMP is replacing the C-5's old analog instrumentation with digital "glass cockpit" displays and communications equipment that will bring



This HH-60G Pave Hawk looks tiny in the cavernous cargo bay of the C-5; up to six of these helicopters will fit inside. The C-5 is unrivaled for its outsize/over-size cargo-carrying capacity.

it into compliance with Global Air Traffic Management rules now in effect overseas. These rules demand more precise navigation and smaller separations between aircraft, as well as new communications gear, among other performance requirements. (The rules are designed to speed up commercial air traffic by increasing the number of aircraft that can be allowed in a given region of airspace at one time.)

The new equipment will also reduce the amount of service needed for C-5 avionics, replace problem-prone systems with less costly commercial units, and increase the intervals between hardware failures.

Without the GATM upgrades, aircraft must fly longer, more circuitous routes at less-desirable altitudes. That, in turn, leads to greater fuel consumption, smaller loads, and reduced efficiency all around. The AMP will help “buy back” access to preferred routes and altitudes that would be denied to the C-5s.

Two test aircraft already have been fitted with the AMP upgrade, and 47 more C-5Bs are funded, according to Maj. Gen. Mark A. Volcheff, AMC’s director of operations. In all, AMC expects to perform the avionics update on 112 airplanes: 60 of the older C-5As, all 50 C-5Bs, and both C-5Cs. Upgrading all 112 will take until 2010. The remaining 14 C-5s will be decommissioned.

“We plan to start retirement of 14

C-5As this fiscal year,” Volcheff said.

The aircraft in question happen to include the oldest 11 C-5As, plus three others that have posed particularly vexing maintenance problems over the years.

AMC found those “worst actors” by conducting a logistics study, said Maj. Christopher Leist, an AMC planner.

There is no one problem that accounts for all the airplanes’ troubles, Leist said, noting “various issues, including hydraulic leak problems [and] reliability problems with the

engines. We have obsolescence of parts issues such as [with] fuel indicators—those sorts of things.”

The retirements mirror the Air Force’s decision last fall to retire some KC-135Es. Even though the aerial refueling capability was still needed, the aircraft themselves were no longer cost-effective to keep flying.

Examining the Stress

One of the retired C-5As will be X-rayed and torn down, panel by panel, spar by spar, to see just how stressed, cracked, and corroded it is. The information obtained in the tear down will be used to determine whether to give the RERP upgrade to all the C-5s or just some of them, Volcheff explained.

The big upgrade will have to wait until the aircraft receive the AMP, however.

“AMP is the prerequisite for RERP,” Volcheff said.

The new avionics are not only necessary to comply with the international air traffic regulations, they are also needed to enable installation of the far-more-involved RERP. Under this second upgrade, the C-5s will receive four new engines—with digital engine controls—and pylons, as well as a new engine-driven generator and auxiliary power unit. Additional improvements will be made to the landing gear, hydraulics, flight controls, and environmental control system. All in all, there are more



The Avionics Modernization Program brings the C-5 into the 21st century, with glass cockpit avionics, digital systems, and the ability to comply with new international air traffic regulations.



Three C-5s—two B models and one A—will get the RERP upgrade. They will then be evaluated and test-flown for two years. If approved, the upgrade would take until 2018 to refit the entire fleet.

than 50 systems on the airplane that will be replaced or revamped.

Both upgrades are being performed by Lockheed Martin, which built the C-5 in the first place. The company has selected the General Electric CF6-80C2L1F turbofan power plant to replace the old, problem-prone TF-39 engines.

The new engine is “very common ... in the [airline] industry,” Volcheff noted. The CF6-80 series has “a well-established track record” commercially on 767s and is used on Air Force One, the KC-10, and the E-4B, he said. The engines would be factory-new, not reconditioned.

The new engines are essential to meet the rest of the GATM rules, which require aircraft to expedite a climb to an assigned altitude. Carrying a full load, the C-5s today simply cannot get to that altitude fast enough. With the RERP improvements, a fully loaded C-5 could take off and get to an assigned 31,000-foot flight level in only 20 minutes—13 minutes faster than it takes the unmodified aircraft to get to 26,000 feet today. Once modified, the C-5 will also be able to use shorter runways.

In reliability terms, the engine improvements alone are expected to raise the C-5’s mission capable rate from about 66 percent to more than 72 percent, or more than half the way toward the required level.

Once an aircraft has received the RERP upgrade, its designation will change to C-5M.

However, Air Mobility Command has not yet committed to the conversion program. It plans to test out the modifications on two C-5Bs and one C-5A to determine if the improvements truly will provide the anticipated boost in performance and reliability.

“We’re going to RERP an A and ... two Bs, ... and then we’ll do testing and evaluation of their viability,” Volcheff said. “If they’re both successful, then we continue on.”

Lockheed Martin has offered a warranty that the RERP airplanes will achieve a 75 percent mission

capable rate but believes the actual figure will be closer to 85 percent.

The average number of flying hours in the C-5A fleet is about 18,000 out of an expected service life of 80,000. The B models, which were used more in recent operations because they tend to be more reliable and, unlike the A models, have defensive systems against missile attacks, average about 14,000 hours. However, Volcheff said he does not expect that the C-5Bs will ever catch up to the A models in service life consumed, despite their greater usage. The A models have a 15-year head start.

The Air Force will begin the RERP modifications for the three test aircraft in September. It will take a year to finish the first airplane, which will enter flight test in October 2005. Flight testing will take nearly two years. Production could begin in 2008.

The modifications would be done at the same time an aircraft comes in for depot maintenance, so there would be no operational impact on the fleet, AMC officials reported. However, the installations would be done at the rate of one a month, meaning that it would take until 2018 to RERP the entire C-5 fleet. That date is a troubling one for Handy.

The C-5B fleet will be done first, Handy said, because the airplanes are newer, more capable, and represent the biggest bang for the buck. By the time the B models are fin-



Although unable to use dirt strips right at the edge of the battlefield, C-5s went “most places” in the theater, AMC officials said. The C-5 is a whiz at unclogging backed-up ports.

ished in 2012, though, the A models will be 42 years old and will have seen significant wear and tear.

"By 2012," Handy said, "it may be that the whole notion [of performing the RERP on the C-5As] is overcome by events." The A models, he said, might be too far gone to be worth the investment.

The test determining whether RERP would be worthwhile for the A models will conclude in 2008, but it will be another three years before AMC actually has to commit to the upgrade, an AMC official reported.

"There's ... a chunk of time where you can think about your A model decision," he noted. "We don't have to make it overnight."

Whether the A models go forward into RERP will depend in large part on the results of the tear-down analysis, better models of C-5 utilization, and actual field experience.

Or More C-17s?

It's by no means a cut-and-dried decision. The Congressional Research Service, in an October report, predicted there will be extensive debate on whether to modify C-5s for better performance or simply put the dollars into new C-17s, which seem to be more useful for the kinds of warfare in which the US is now engaged.

Supporters of the C-5 upgrades, the CRS said, will point to the experience in Iraq and Afghanistan as proof positive that "the United States needs all the airlift volume that it can muster" and that the C-5 modifications offer the fastest and cheapest way to preserve capacity. It takes "almost two new C-17s to replace the lost payload volume of every C-5 that is retired," the CRS pointed out.

Those preferring to shift to C-17s, the CRS said, can, in turn, argue that, while overall volume is important, "being able to move large payloads directly to short or austere airfields in the combat theater is more important" and that the C-17 was the only strategic airlifter "that could use the full range of airfields available in the Iraq theater of operations." Like Handy, the CRS noted that the outsize equipment that the C-17 can't carry is becoming "less important" and could travel to theater by ship.

Today, there is less worry that, if



USAF photo by A1C Franklin J. Perkins

A tear-down evaluation of an early C-5A will help AMC officials decide how much life is really left in the giants. All signs indicate the C-5 may be flown by another generation or two.

the C-17 fleet were suddenly grounded, the US would be left without any strategic airlift capacity if it forgoes upgrades to ensure a healthy C-5 fleet.

"We're a little less concerned today than we were yesterday about one-aircraft reliance," Handy said. Because the C-17 has been improved on the production line in blocks over the last 12 years, "you've got enough differences that the likelihood of a fleet grounding [is] even more remote, on top of the fact that ... it's proved itself to be well beyond our fondest expectations for performance."

The C-17's mission capability rate is consistently above 85 percent, and its departure reliability rate averages more than 93 percent. The C-5's departure reliability rate recently averaged just under 80 percent. However, Lockheed Martin projects that the C-5M would have a departure reliability rate of nearly 95 percent.

Moreover, with C-5s, C-17s, KC-10s, KC-135s, and nearly 70 C-141s still in the strategic airlift mix "well into the future," Handy said, "we're not going to face a single-airplane fleet for a long, long time."

Handy is on record as believing that airlift requirements demand at least 222 C-17s, and he has been advocating that the Joint Staff perform a new Mobility Requirements Study as soon as possible to verify or debunk that notion.

"My pressure was to try to get it

done before the budget debates on the 2006 budget ... [because] that's when we have to lay in the long lead [funding]" to go beyond the 180 C-17s now programmed, he observed.

AMC is not treating the C-5M and the C-17 as an either-or issue, command officials said. And there is no reason at this point to think that the C-5M will not achieve its objectives, since the pieces of it are well-understood and software—the biggest unknown—is being built at a rate slightly ahead of schedule.

If the tests show that the C-5M falls short of the 75 percent mission capable goal, "we certainly wouldn't automatically cancel the program," Volcheff said.

"We'd want to find out what is at issue that prevents us" from reaching the goal, he said, and work with Lockheed Martin on ways to reach it.

"Certainly we would have to discuss and negotiate on what they could do to get it there," he added.

Volcheff doubts the C-5 would be discarded in favor of some new capability if the RERP does not pan out in test and can't be made to work.

"We don't have anything on the drawing board that would fill the gap" if the C-5 couldn't go on with the RERP, he said. If the upgrade wouldn't provide the needed improvement, then "of course we wouldn't do it, but the airplane would just go on—at a lower mission capability-mission reliability rate." ■



Homeland

By Adam J. Hebert, Senior Editor

Two years after the attacks, USAF has settled into a steady state of defense operations in the United States.



IN THE days after the Sept. 11, 2001, terrorist attacks, the Air Force had to rebuild what had become, in the post-Cold War years, a largely backburner mission—air defense of US territory. In the two years since, the homeland defense mission has become ingrained in the service's day-to-day operations and is now creating a set of new requirements.

The overnight transition was possible because some 70 percent of Air Force assets can serve homeland defense or overseas missions. Reconnaissance and space assets monitor threats here and abroad, airlifters allow military and civil response teams to quickly reach Stateside disaster sites, and Air Force personnel trained to respond to weapons of mass destruction attacks can serve in both theater and homeland roles. The Civil Air Patrol, the USAF civilian auxiliary, has been a key contributor to homeland missions for years.

After two years, officials still consider the Air Force's homeland defense posture to be in "emergency mode." They say more changes are in the works.

In the chaotic days after 9/11, the Air Force benefitted from its experience with the most prominent of its homeland defense missions—defending the US airspace. As part of Operation Noble Eagle, the service flew round-the-clock combat air patrols conducted by armed fighter aircraft. It later moved to a greater reliance on "alert" operations in which fighters sit ready to take off on short

notice, much as they had done during the Cold War.

During the Cold War, though, some 100 sites had fighters on alert, ready to fly air defense missions. After the Cold War, that number was cut drastically—to just seven sites on 9/11. Today, the service has increased that number to around 18 alert bases. (The number may fluctuate due to perceived threats.) Each base has sitting on strip alert fighters that can be airborne, said officials, within five minutes.

The Air Force keeps a minimum of 35 fighter aircraft, eight refueling tankers, and a pair of E-3 Airborne Warning and Control System aircraft ready to respond to an airborne threat against the United States. Before 9/11, only 14 fighters and no tankers or ISR aircraft were kept on alert.

Compared to mid-2001, the service has more than five times as many airmen devoted to the alert mission.

Brig. Gen. David E. Clary, Air Force homeland security director, noted in an interview that there are numerous threats—and capability deficiencies—for USAF to address.

Leading the Noble Eagle mission is the Air National Guard's 1st Air Force, headquartered at Tyndall AFB, Fla. It is in charge of NORAD's continental US air defense region and runs the day-to-day air defense operation. First Air Force's air operations center, which is undergoing upgrades, puts together an air tasking order for all the aircraft involved in the air defense mission, just as is done for combat theaters overseas.

Air Force

Focus Has Changed

Where that mission once was directed outward, it now must encompass threats from within and without.

Intelligence comes from NORAD's radar system, just as it always has. Now, however, it includes information from the Federal Aviation Administration's radar network, which covers the three million square miles of US airspace. Additional data about possible threats comes from tethered aerostat radars along the

Two F-15 Eagles from the Air National Guard's 102nd Fighter Wing, Otis ANGB, Mass., fly combat air patrol over New York.



The fighter force patrolling homeland skies works closely with numerous support aircraft. Here, a New Jersey Air National Guard KC-135 tanker refuels a New Jersey Guard F-16.

southern US border and from AWACS radar.

By mid-October 2003, the Air Force had flown more than 32,000 sorties supporting Noble Eagle. According to NORAD, more than 1,500 of those sorties were fighter intercepts of possible air threats. While Navy and Marine Corps aircraft assisted with CAPs in the immediate aftermath of 9/11, officials said air defense is expected to remain an Air Force mission at the current alert levels.

The threat of another terrorist hijacking is something USAF now trains for routinely, said Air Force Gen. Ralph E. Eberhart, NORAD's commander.

Eberhart, who also serves as chief of US Northern Command, told reporters that "several times every week" NORAD exercises scenarios involving hijacked airliners. These are missions requiring an aircraft to shoot down an airliner, or missions in which an air defense system must shoot down an airliner. As 9/11 showed, hijacked commercial aircraft can be turned into deadly weapons, and an aircraft may have to be brought down before it can be flown into a terrorist target.

Part of the reason for NORAD's exercises is to overcome possible "trigger hesitancy" among defenders who could face the troubling prospect of killing hundreds of innocent passengers to prevent an even larger loss of life, said Eberhart.

Absent a change in the perceived

threat, the current setup of alert bases and aircraft is now seen as the steady state for homeland air defense. The resources devoted to the mission "could go up higher," said Col. Ed Daniel, assistant operations director for 1st Air Force, if NORAD determines there is a changed threat. The assets available to Noble Eagle, however, will probably not go lower in the foreseeable future, he said.

Clary said that deciding what assets to dedicate to homeland defense is a complicated process. One of the questions the Defense Department has had to answer has been, "Should

we create new organizations or sequester forces to do just homeland security?" he noted.

From the Air Force's perspective, Clary said, the answer is: not necessarily.

USAF would like to support Northern Command's homeland defense missions in the same way it supports requirements coming from other regional commanders. "We'd still like to stay to our doctrine, which says, 'We'll supply forces when requested, as requested, within the AEF [Air and Space Expeditionary Force] construct,'" Clary said. If forces are required in the homeland, the Air Force would like to go to the AEF process to determine who is on call, and, said Clary, "those should be the people we go to first."

The Uncertain Threat

Eberhart said terrorism's uncertainty is his prime concern. Just as the 9/11 attacks were a surprise, Eberhart said, "I am most concerned about what I don't know, ... about what the terrorists are out there planning."

He explained that the military had not worked the 9/11 scenario, so planners now wonder, "What scenario aren't we practicing today that we might face?"

Clary said that since 9/11, "we as a nation have come a long way, but we have a long way to go." Success, however, is hard to measure.

There is, noted Daniel, "not much



After 9/11, most public attention focused on the CAPs over the Eastern US, but USAF elements on the West Coast, including this Oregon ANG F-15, also conducted patrols and today stand alert.

instant gratification” available when operating in a defensive posture. There have not been any successful attacks against targets within the United States since 9/11, but, as Daniel observed, “Have we negated the threat at this point? Who knows?”

Gen. John P. Jumper, Air Force Chief of Staff, believes that homeland air defense is now “set up in a fairly steady state, but we’re going to have to reconfigure ourselves ... to make it easier and to make sure we are in the right place.”

It is the job of 1st Air Force, NORAD, and NORTHCOM to determine what operational changes are needed. USAF will back up those decisions.

“What we’ve done to date has largely been in emergency mode,” Jumper said in an interview. One concern is making sure that the Air National Guard units that bear the lion’s share of the alert responsibilities have the personnel and equipment needed for the mission.

Officials feel strongly that the Air Guard is the right place to have the alert mission, because of the geographic dispersal of Guard units and



USAF photo by SSGT. Aaron D. Allmon II

While the brunt of CAP duty falls on Guard units, active duty forces, such as this 20th Fighter Wing F-16CJ from Shaw AFB, S.C., are being tasked to fill in during high-profile events and to meet specific threats.

their long ties to homeland security missions in general.

The Air Force has “pre-identified certain units that will pick up the alert mission,” Clary said, and the Air Force is “going to be sure they have the resources to get it done.”

NORAD has “developed a set of alert postures,” added Clary. The steady state calls for 16 continental US alert locations, one in Alaska, and one in Hawaii. Additionally, the Air Force flies “irregular” combat air patrols, so that enemies can never

No More 9/11s

One of the Air Force’s primary goals in homeland defense is to avoid the type of surprise it experienced on Sept. 11, 2001. After decades of looking outward from US borders, to detect aircraft or missiles heading toward the United States, the Defense Department found it was looking the wrong way when airliners were hijacked from inside the US.

Domestic commercial aircraft were considered “friendly by origin” at the time and were monitored by the Federal Aviation Administration, not DOD. Hijackings were generally considered a law enforcement issue, not one requiring a military response.

After nearly 3,000 were killed in New York City, at the Pentagon, and aboard the four hijacked airliners, these views changed.

Because the air defense mission was thought to have died with the Soviet Union, Air Force assets kept on alert had been cut repeatedly in the 1990s, leaving just seven bases and 14 fighters on alert in September 2001. These were spaced along the perimeter and left some large gaps in coverage.

The Air Force was utterly unprepared for 9/11, according to Congressional testimony earlier this year by the current and previous heads of 1st Air Force (ANG), headquartered at Tyndall AFB, Fla., and tasked with managing day-to-day air defense operations throughout the continental United States.

Maj. Gen. Larry K. Arnold (now retired) said he did not learn of authority to shoot down hijacked airliners until five minutes after the last one had crashed in the Pennsylvania countryside.

Meanwhile, the first military aircraft to arrive at the Penta-

gon, moments after American Airlines Flight 77 was flown into the building, were not air defense aircraft at all. The first two F-16s on the scene were rerouted while returning to nearby Andrews AFB, Md., from a training mission—unarmed and nearly out of fuel.

Maj. Billy Hutchison, the F-16 flight lead, was tasked with preventing any additional airliners from hitting targets in Washington, D.C. The problem was, he didn’t have live weapons, just training rounds. (Armed fighters out of Langley AFB, Va., were on their way.)

The Air Force now has five times as many people devoted to air defense as it did on 9/11 but must continue to push for the initiative, said Brig. Gen. David E. Clary, USAF’s homeland security director. Another 9/11-style attack is unlikely today because of changes made throughout government, he said, but the Air Force has to stay vigilant.

The Air Force cannot “wait for perfect information,” become complacent again, or “dwell on constraints or concerns,” a service homeland defense briefing states. To keep the Air Force on the offensive, the homeland security office, under the deputy chief of staff for air and space operations, was established in January 2002. That was less than four months after the terrorist attacks and before the Cabinet-level Department of Homeland Security or US Northern Command were officially established.

To prevent the types of oversights that occurred in the past, the new office serves as the focal point for Air Force homeland defense efforts and helps to shape NORTHCOM planning efforts and plan exercises, experiments, and wargames.



Officials are concerned about cruise missile threats. They say the F/A-22 offers the best prospect for tracking and stopping them. Until the Raptors are fielded in sufficient numbers, USAF may need to upgrade radars on more F-15Cs.

be certain exactly what the US defensive posture is. The random CAPs are typically flown by the ANG units already sitting on alert. They will fly "over the areas we are asked to by NORAD," Clary explained.

To prevent the mission from becoming a total Air Guard burden, active duty forces will participate in surges in air patrols. With ANG handling the majority of alerts, tasked combat air patrols requiring "a known amount of commitment" will be met by the active force, Clary said. Examples would include providing security for a major event that would be an inviting target to terrorists or additional security over major cities because of a specific intelligence threat.

Room for Improvement

Once the air defense mission is stabilized to the point that it is no longer considered an emergency, there will still be improvements to be made. The Air Force needs to "look forward," Jumper said.

That, he said, pertains to the "extremes of the threat." For instance, Jumper pointed to "the very low altitudes and the emergence of cruise missiles."

While most of the scenarios and threats that concern DOD are classified, top officials have spoken out about the need to do more to counter cruise missiles. Targets approaching the United States are harder to detect and track when they are small,

fast, low flying, and stealthy. Cruise missiles potentially combine all three characteristics.

"Cruise missiles concern me," said Eberhart, because for most of the other threats against the homeland, "we have a way ahead." For cruise missiles, however, the solution is less clear. DOD needs to "come to grips with what we are going to do to counter cruise missiles in the years ahead," he said. The issue is of particular concern because technological advances may be making cruise missiles more accessible to would-be adversaries. (See "Cruise Control," December 2002, p. 42.)

Clary concurred. "Our capabilities are not at a stage yet where we are comfortable with countering that threat," he said, adding that the Air Force does have options it is pursuing. Clary noted that defending the US against cruise missiles is "a national issue" but that it also clearly falls within the Air Force's traditional "lane" of defending against "bad things that fly through the air."

At present, the Air Force's best defense against cruise missiles may reside in Alaska, where a group of 18 F-15Cs at Elmendorf Air Force Base have been upgraded with advanced radars. These Eagles are now capable of tracking multiple targets and guiding air-to-air missiles against them.

While Air Combat Command has expressed interest in upgrading the

radars on all its F-15Cs, greater capability of this sort may have to wait for the fielding of the F/A-22 in large numbers.

Advocates note that the Raptor's ability to supercruise—to fly faster than the speed of sound without use of fuel-guzzling afterburners—will allow fewer aircraft in a combat air patrol environment to protect more territory than is possible with the F-15.

Unmanned aerial vehicles may also prove useful in the homeland air defense mission. Certainly the ability to stay on station for extended periods could make UAVs valuable intelligence-surveillance-reconnaissance systems for border defense, yet defense analysts say there are unresolved issues for UAV in an air defense role.

"While UAVs cost less to field and operate than manned aircraft, concerns exist about operating these aircraft over populated areas or in airspace heavily used by civilian aircraft," noted a report by the Congressional Research Service. CRS added that "using UAVs for air defense would require replacing the sensors on current UAVs" or fielding new systems, because existing UAVs do not have sensors suited to the homeland defense mission.

Clary said the Air Force looks at a broad range of possible threats and essentially has to make educated guesses about where to devote resources. The service has capabilities gaps, he acknowledged, and threat analysis and capabilities reviews will help guide improvements.

The homeland defense scenarios DOD chooses to evaluate will be "drivers in the capabilities we picked" to emphasize, Clary noted. The Air Force went to its homeland defense customers—the Office of the Secretary of Defense and NORTHCOM—to help quantify the concerns. One priority, Clary said, was to identify things a terrorist may be able to accomplish easily but which would create grave consequences.

Unfortunately, DOD has heard "lots and lots" of possible terrorist scenarios, he said. "When it comes to protecting the homeland, there's not enough money, [there are] not enough people to counter or prevent every" scenario or risk, Clary noted. "This is a problem where you have to [balance] risk ... knowing that you can't take risk to zero." ■

Industrial Associates



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

3M/Federal Systems Dept.	FR Countermeasures, Inc.	Northrop Grumman Corp., Space Technology
AAI Corp.	GE Aircraft Engines	Oracle Corp.
Abacus Technology Corp.	GEICO	Orbital Sciences Corp.
Accenture	General Atomics	Orenda Aerospace, division of Magellan Aerospace
Actus Lend Lease LLC	General Dynamics	OSI Software
Aerojet	General Dynamics Decision Systems Inc.	Parker Aerospace
Aerospace Corp.	GKN Aerospace Services--St. Louis	PEC Solutions, Inc.
Agusta Westland, Inc.	Goodrich Aerospace	Pemco Aeroplex, Inc.
Alliant Techsystems	Gulfstream Aerospace Corp.	Perry Judd's, Inc.
Alion Science & Technology	Harris Government Communications Systems Div.	Rafael USA, Inc.
American Military University	Honeywell Inc., Space & Aviation Control	RAND
Analytic Services Inc. (ANSER)	Howell Instruments, Inc.	Raytheon Aircraft Co.
Anheuser-Busch, Inc.	IBM Business Consulting Services	Raytheon Co.
Anteon Corp.	Intergraph Solutions Group Government	RECON/OPTICAL, Inc.
AT&T Government Solutions	Israel Aircraft Industries Intl.	Robbins-Gioia, Inc.
Aviall Services, Inc.	ITT Industries, Defense	Rockwell Collins Avionics & Communications Div.
Aviation Week	Jane's Information Group	Rolls-Royce, Inc.
BAE Systems, Inc.	Johnson Controls World Services, Inc.	RS Information Systems, Inc.
Barnes Aerospace	Kellogg Brown & Root	Sabreliner Corp.
Battelle	Kollsman	Sargent Fletcher Inc.
Bearing Inspection, Inc.	L-3 Communications	Science Applications International Corp. (SAIC)
BearingPoint, Inc.	L-3 Communications Analytics Div.	Sierra Nevada Corp.
Bell Helicopter Textron	Lear Siegler Services, Inc.	Silicon Graphics Inc.
Boeing Co., The	Lockheed Martin Corp., Aeronautics Sector	Smiths Aerospace
Booz Allen Hamilton, Inc.	Lockheed Martin Corp., Electronics Sector	Smiths Electronic Systems
Bose Corp.	Lockheed Martin Corp., Federal Systems	Spectrum Astro, Inc.
Burdeshaw Associates, Ltd.	Lockheed Martin Corp., Information & Services Sector	Sprint Government Systems Div.
CACI, Inc.	Lockheed Martin Corp., Space & Strategic Missiles	Stewart & Stevenson TUG
Calibre	Logistics Management Institute	Sun Microsystems, Inc.
Camber Corp.	Lord Corp.	Sverdrup Technology, Inc.
Camelbak	Martin-Baker Aircraft Co. Ltd.	Symetrics Industries
CMC Electronics Inc.	MBDA	Synergy, Inc.
Computer Sciences Corp. (CSC)	MCR, Inc.	TEAC America, Inc.
Cubic Defense Applications, Inc.	MegaStar Systems	Teledyne Brown Engineering
Cypress International, Inc.	NavCom Defense Electronics, Inc.	Terma AS
DFI International	NCI Information Systems, Inc.	Textron
DuPont Aviation	Northrop Grumman Corp.	Textron Systems
EADS	Northrop Grumman Corp., AGS & BMS	Titan Corp.
EADS CASA	Northrop Grumman Corp., Information Technology	Ultra Electronics
Eastman Kodak Co., C&GS	Northrop Grumman Corp., Mission Systems	USAA
EDO Communications & Countermeasures		UTC, Hamilton Sundstrand
EDO Corp.		UTC, Pratt & Whitney
EDS		UTC, Sikorsky Aircraft
EFW, Inc.		Veridian
Embraer Aircraft Holding, Inc.		Vought Aircraft Industries, Inc.
Engineered Support Systems, Inc.		Zel Technologies, LLC
Evans & Sutherland		
Firearms Training Systems, Inc.		
FMC Airport Systems		

Weinberger's Six Tests

Caspar W. Weinberger, Secretary of Defense under President Reagan, made headlines around the world with his views concerning when the US should—and should not—use military power. He spoke in the aftermath of the Oct. 23, 1983, suicide truck bombing that killed 241 American servicemen, most of them Marines, who were in Beirut, Lebanon, on an ill-defined peacekeeping mission. Weinberger urged caution in use of force and, in this notable speech, listed six tests that should govern sending troops into combat.

The Washington Post immediately labeled this statement "the Weinberger Doctrine" (later misidentified by many as "the Powell Doctrine" and attributed to Secretary of State Colin Powell). Weinberger's view is considered the intellectual counterweight to the so-called "Limited Objectives" doctrine, which holds that the United States can and should conduct limited military operations for limited political goals. The issue flared in a different form in the debate over the size of the force deployed to Iraq.

Once it is clear our troops are required because our vital interests are at stake, then we must have the firm national resolve to commit every ounce of strength necessary to win the fight to achieve our objectives. ... Just as clearly, there are other situations where United States combat forces should not be used.

I believe the postwar period has taught us several lessons, and from them I have developed six major tests to be applied when we are weighing the use of US combat forces abroad. Let me now share them with you.

First, the United States should not commit forces to combat overseas unless the particular engagement or occasion is deemed vital to our national interest or that of our allies. That emphatically does not mean that we should declare beforehand, as we did with Korea in 1950, that a particular area is outside our strategic perimeter.

Second, if we decide it is necessary to put combat troops into a given situation, we should do so wholeheartedly, and with the clear intention of winning. If we are unwilling to commit the forces or resources necessary to achieve our objectives, we should not commit them at all. Of course if the particular situation requires only limited force to win our objectives, then we should not hesitate to commit forces sized accordingly. When Hitler broke treaties and remilitarized the Rhineland, small combat forces then could perhaps have prevented the holocaust of World War II.

Third, if we do decide to commit forces to combat overseas, we should have clearly defined political and military objectives. And we should know precisely how our forces can accomplish those clearly defined objectives. And we should have and send the forces needed to do just that. As Clausewitz wrote, "No one starts a war—or rather, no one in his senses ought to do so—without first being clear in his mind what he intends to achieve by that war and how he intends to conduct it."

"The Uses of Military Power"

Caspar W. Weinberger
National Press Club, Washington, D.C.
Nov. 28, 1984

Find the full text on the
Air Force Association Web site
www.afa.org
Air Force Magazine
"The Keeper File"

War may be different today than in Clausewitz's time, but the need for well-defined objectives and a consistent strategy is still essential. If we determine that a combat mission has become necessary for our vital national interests, then we must send forces capable to do the job—and not assign a combat mission to a force configured for peacekeeping.

Fourth, the relationship between our objectives and the forces we have committed—their size, composition, and disposition—must be continually reassessed and adjusted if necessary. Conditions and objectives invariably change during the course of a conflict. When they do change, then so must our combat requirements. We must continuously keep as a beacon light before us the basic questions: "Is this conflict in our national interest?" "Does our national interest require us to fight, to use force of arms?" If the answers are "yes," then we must win. If the answers are "no," then we should not be in combat.

Fifth, before the US commits combat forces abroad, there must be some reasonable assurance we will have the support of the American people and their elected representatives in Congress. This support cannot be achieved unless we are candid in making clear the threats we face; the support cannot be sustained without continuing and close consultation. We cannot fight a battle with the Congress at home while asking our troops to win a war overseas or, as in the case of Vietnam, in effect asking our troops not to win but just to be there.

Finally, the commitment of US forces to combat should be a last resort. ...

These tests I have just mentioned have been phrased negatively for a purpose; they are intended to sound a note of caution—caution that we must observe prior to committing forces to combat overseas. When we ask our military forces to risk their very lives in such situations, a note of caution is not only prudent, it is morally required. ■



Air Force Association's 20th Annual Air Warfare Symposium

“Integrated Air War in the 21st Century: Lessons From Operation Iraqi Freedom and the Way Ahead”

February 12-13, 2004 Wyndham Palace Hotel, Lake Buena Vista, Fla.



Invited Speakers:

James G. Roche

Secretary of the Air Force

Gen. John P. Jumper

Chief of Staff, USAF

Gen. Hal M. Hornburg

Commander, Air Combat Command

Gen. Lance W. Lord

Commander, Air Force Space Command

Gen. Gregory S. Martin

Commander, Air Force Materiel Command

Gen. John W. Handy

Commander, US Transportation Command and Air Mobility Command

Adm. Edmund P. Giambastiani Jr.,

Supreme Allied Commander Transformation, and Commander, US Joint Forces Command

The AFA Symposium

The imperative of modern airpower is now apparent as power projection forces in air and space play a pivotal role in the success of joint operations. In the ongoing war on terrorism, speed, range, flexibility, lethality, and precision—all fundamental attributes of modern airpower—will be in increasing demand by joint and combined forces. In the aftermath of the war in Iraq, there is no turning back. The 21st century air and space expeditionary force is here to stay. The 20th annual Air Warfare Symposium will focus on the future of the Air Force and integrated air war in the 21st century.

Registration/Fees

The symposium registration fee is \$695. There is a reduced rate of \$650 for representatives from AFA Industrial Associate companies and \$625 for an AFA individual member. All registrations after Feb. 4, as well as on site, will be \$695.

Golf Tournament

AFA's Central Florida Chapter will sponsor a golf outing on Walt Disney World's Magnolia and Palm Courses on Wednesday, Feb. 11. For information contact Jim DeRose at james.l.derose@lmco.com or at 407-356-5750.

Gala

The chapter will sponsor its 20th annual black-tie Gala on Friday, Feb. 13. The contact for this event is Tommy Harrison at tgharrison@aol.com or 407-886-1922 or fax 407-886-1331.

Hotel Reservations

For hotel reservations, call the Wyndham Palace Hotel at 407-827-3333 or 800-996-3426 or the nearby Grosvenor Hotel at 407-828-4444 or 800-624-4109. Mention the AFA symposium for a special rate. The deadline for reservations at both hotels is Tuesday, Jan. 6. You may inquire after that date for room availability.

For industry inquiries, please contact Jennifer Anderson at 703-247-5838, e-mail: janderson@afa.org. For all other inquiries, please contact Barbara Coffey at 703-247-5805, e-mail: bc Coffey@afa.org.



www.afa.org

The Department of Defense finds that the business portions of this event meet the minimum regulatory standards for official attendance by DOD employees. This finding does not constitute a blanket approval or endorsement for attendance. Individual DOD component commands or organizations are responsible for approving or disapproving official attendance of their DOD employees based on mission requirements and DOD regulations. The propriety of attendance by DOD employees in their personal capacities at incidental social portions of this event shall be determined by the individual DOD employee's Ethics Counselor based on standards of conduct and community relations requirements.



THE LONG AND

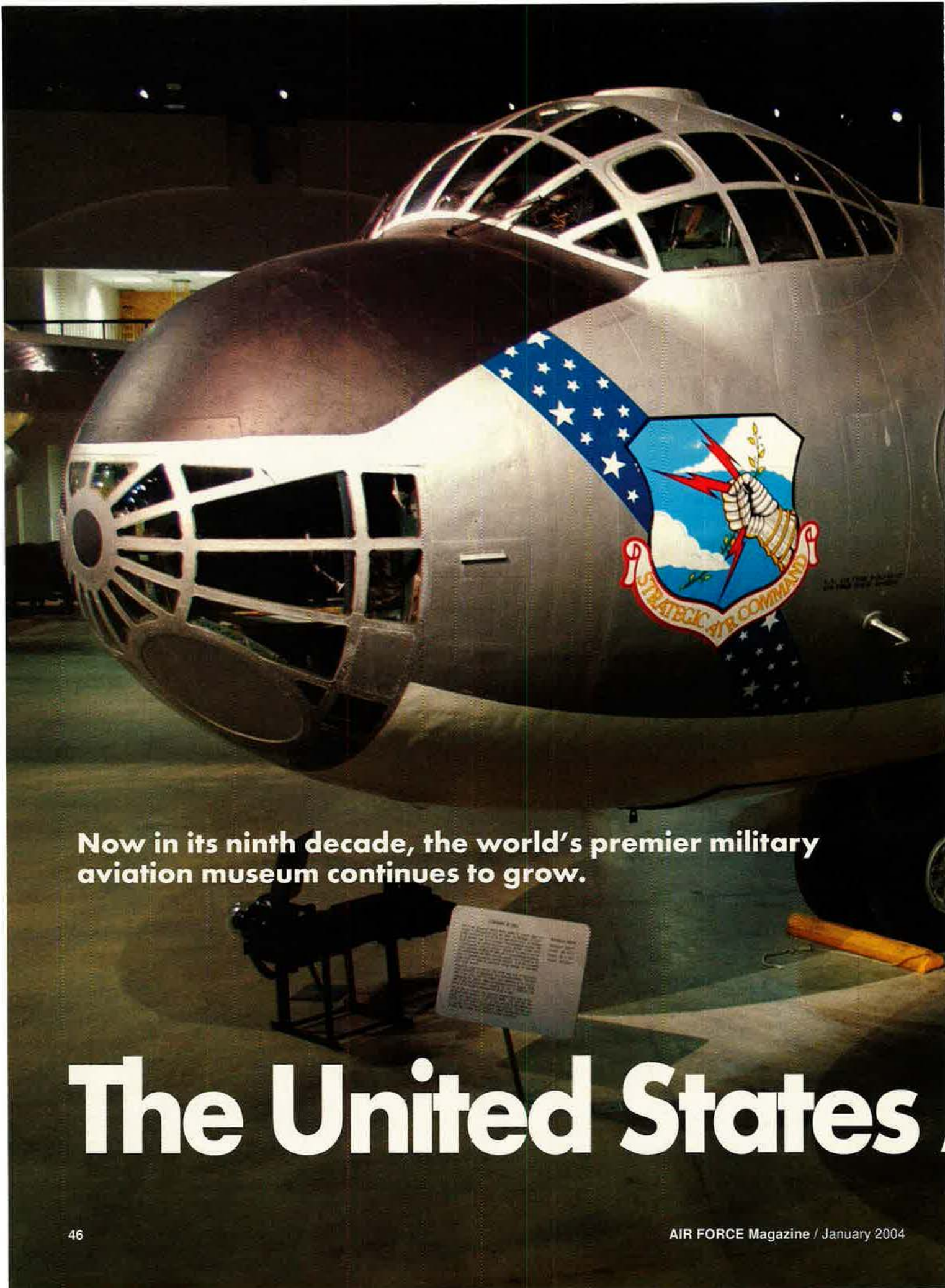


THE SHORT OF IT.

The C-17 Globemaster III is the world's most versatile airlifter, performing a vast complement of strategic and theater ops missions. It can fly payloads up to 160,000 lbs. around the world without fuel stops, land in 3,000 ft. or less, and load/offload with virtually no ground support.

An ideal combination for long range theater operations and any mission where turn time is critical. It's what makes the C-17 like nothing else, by any measure.

 **BOEING**
Forever. New Frontiers



Now in its ninth decade, the world's premier military aviation museum continues to grow.

The United States



With a 230-foot wingspan, this B-36J is the museum's largest display aircraft. The huge B-36 now resides inside the new Eugene W. Kettering Gallery, as does an F-94C (right foreground), as well as the Cessna U-3A (left background) and DeHavilland U-6A Beaver (right background).

Air Force Museum

Established in 1923 in a corner of a hangar at McCook Field in Dayton, Ohio, the US Air Force Museum is the oldest and largest military aviation museum in the world. It was moved several times over the years, finally finding a permanent home in 1971 on what was the Wright Field portion of Wright-Patterson Air Force Base outside Dayton. It was housed in a huge Quonset-hut-type hangar, that, even then, was too small for its collection. Some aircraft had to be exhibited outdoors, exposed to the weather. A second hangar was added in 1988. It would be another 15 years before the museum could add a third hangar, enabling it to move more aircraft indoors. At right, the museum entrance as it looks today.



Photos by Paul Kennedy



Above, two of the many museum volunteers work on a new exhibit. At left, the museum's B-58A Hustler is towed to the new facility.

The opening of the third hangar—the Eugene W. Kettering Gallery—added some 200,000 square feet of exhibit space. The new hangar houses many of the Cold War-era aircraft, such as the B-36, providing room to display the aircraft and artifacts in a chronological order.

At right is an A-10 Thunderbolt II—affectionately known as the Warthog. It was flown by Capt. Paul Johnson during Operation Desert Storm. USAF awarded Johnson an Air Force Cross for his part in an eight-hour rescue mission on Jan. 21, 1991.



United States Air Force Museum photo by Jeff Fisher



United States Air Force Museum photo by Jeff Fisher

One of the latest additions to the museum's collection is the B-1B bomber (above). The 16-year veteran was the first B-1B to reach 2,000 flying hours and flew primarily as a training aircraft for bomber crews at Dyess AFB, Tex.

The museum is not just a collection of aircraft. Pictured below is a pair of aircrew headphones. Many of these individual elements are used to help create the museum's new-style exhibits featuring dynamic representations of actual events. Lifelike mannequins are essential pieces in many of the new dioramas.



Photos by Paul Kennedy

The museum expansion plans also include galleries devoted to ballistic missiles and space. Once completed, the new vertical and cylindrical Hall of Missiles will house 15 missiles indoors. The Space Gallery will include other types of artifacts. Above, a mannequin in a 1960s experimental space suit rides the Marquardt space sled, designed to

allow individual spacefarers to maneuver outside a spacecraft. It was never used.





The museum would not be what it is without the professional and volunteer members of its restoration division. Not all aircraft arrive in the condition of this World War II Japanese fighter (at left), but many do require extensive work to get them into prime display shape. The aircraft shown here is a Kawanishi NIK2 Shiden Kai, known by American forces as "George 21."

Restoration work includes fabricating parts that are no longer available or hard to get, such as parts for a Soviet-built MiG-23. To restore the MiG, the museum had to fashion missing panels and the vertical stabilizer—all with an eye toward authenticity.

Photos by Paul Kennedy



Above is one of the many leather flight jackets in the new gallery's Cold War collection. Painting on leather jackets was an art form that carried over from World War II to the Korean War. This Korean War-era jacket sports an F-86 Sabre attacking a MiG-15.

The Kettering Gallery is named after the man the museum credits with "jump-starting" the museum back in the 1970s. Eugene W. Kettering was an engineer, industrialist, and philanthropist, as well as Air Force advocate for more than 40 years. Museum officials expect to be moving and shifting aircraft and exhibits in the gallery over the next few years but plan to keep the new facility open during the process.



United States Air Force Museum photo by Jeff Fisher



Shown above is part of the Korean War section in the Kettering Gallery. It contains a diorama (left) of a scene from the war that is reminiscent of the well-known photo of two 4th Fighter-Interceptor Wing pilots walking through the torii-style gateway at Kimpo AB, South Korea, on their way to combat in MiG Alley. The gateway featured the sign "MiG Alley 200 Miles." In the museum display, full-size mannequins depict a pilot and a maintenance crew chief walking through the historic portal.



One of the first of the museum's new-style exhibits was the depiction (above) of Lt. Col. Jimmy Doolittle and members of his Raiders aboard USS Hornet. The display required nearly 5,000 hours of work.


At right is an F-117 stealth fighter. USAF flew the F-117 in combat for the first time during Operation Just Cause in December 1989. The stealth fighter was also key to Operations Desert Storm and Iraqi Freedom. This F-117 is the second built and was specially modified for testing.



The Air Force Museum now also has the only B-2 stealth bomber on display. The museum rolled out its restored ground-test airframe B-2 in a special ceremony last month. Restorers spent nearly three years working on the bomber, which had been intentionally subjected to extreme tests to determine the limits of structural tolerance. The B-2 came to the museum disassembled, so the restoration crew had to rebuild the

aircraft, some sections of which weighed 70,000 pounds.

The addition of the B-2 and other key artifacts ensures that the Air Force Museum will remain the world's premier military aviation museum. ■



The agency is about to embark on a comprehensive overhaul of its health care facilities.

The VA's Big Makeover

By Tom Philpott

AFTER years of study and analysis, the Department of Veterans Affairs is poised to launch a far-reaching restructuring of its mammoth, \$26 billion-a-year health care system. The impact will be felt by veterans and communities nationwide.

The new organizational plan is titled "Capital Asset Realignment for Enhanced Services," or CARES. It shapes up to be the most comprehensive overhaul of veterans' health care facilities ever conducted.

The government has not yet reached decisions about every aspect of the CARES plan. In fact, VA officials and members of a blue-ribbon outside review commission were still struggling with key issues late in 2003. The expectation was the panel's findings would be decisive in VA decisions this year.

Even so, the question is not whether there will be dramatic change, only when and in what specific ways.

At present, the VA operates 163 major hospitals and some 5,000 other buildings on almost 20,000 acres of land.

It was during the Clinton Administration years that the Department of Veterans Affairs recognized it had no

choice but to restructure these facilities. The agency began transforming itself into a more modern health delivery system by emphasizing outpatient care and setting up many more clinics in veteran-population areas.

Even so, the changes did not go far enough. According to a 1999 report by the General Accounting Office, a Congressional watchdog agency, VA still was wasting up to \$400 million a year by maintaining old, decrepit, and underused facilities.

What Money Can Do

This was duly noted by VA Secretary Anthony J. Principi. That money, said Principi, "can buy a lot of health care and state-of-the-art ambulatory clinics and sophisticated bed towers and surgical suites and more digital technology so a doctor on the West Coast can be diagnosing a patient on the East Coast."

In June 2002, Principi formally launched the CARES process, and VA officials went to work. The draft national CARES plan was completed last August. It makes hundreds of recommendations to realign and modernize VA health facilities over the next 20 years.

Among the highlights is the VA's determination that it should shut down seven aged inpatient hospitals. They are in Brecksville, Ohio; Canandaigua, N.Y.; Gulfport, Miss.; Lexington, Ky.; Livermore, Calif.; Pittsburgh; and Waco, Tex.

Under the CARES plan, the VA would also build large new facilities. These include new hospitals in Las Vegas and Orlando, Fla., new centers for the blind in Biloxi, Miss., and Long Beach, Calif., and new spinal injury centers in Denver, Little Rock, Ark., Minneapolis, and either Albany or Syracuse, N.Y.

The VA would open at least 48 new outpatient clinics and close or consolidate many other small facilities.

The aim of all this activity, said Principi, is not mere cost-cutting, as wary veterans suspect, but, rather, to make VA's care more efficient and accessible by closing older, underused hospitals and opening modern units where needed most. According to Principi, the redistribution of VA resources should reflect veteran-population shifts in recent years (and projected shifts) and allow VA to take full advantage of new treatments and technologies.

"We'll either be on the cutting edge of medicine in the 21st century" via restructuring, said Principi, or "on the trailing edge of the past century."

He went on, "We have a responsibility to make changes, ... much like the private sector has to its systems, and to make sure the extraordinary amount of dollars the American people send us are being spent wisely."

After Principi launched CARES, health officials in each of the VA's 21 regions, now called Veterans Integrated Service Networks or VISNs (pronounced "visens"), were to review facility needs and recommend moves to dispose of underused buildings and property and to propose new ones. Computer models were available to help predict veteran-population trends and demand for services.

In June 2003, however, VA officials decided the VISN recommendations were not aggressive enough. They ordered changes aimed at closing and consolidating even more facilities.

Blowback

Every lawmaker or community resists closing the local VA facility. Such closures affect not only care for veterans but also the state of the local economy. As the CARES process reached its summer conclusion, many lawmakers who thought they knew how it would affect their districts were unpleasantly surprised. The final draft, prepared by Robert H. Roswell, VA undersecretary for health, was different from what they had been led to believe in the VISN briefings.

In hindsight, VA chief Principi conceded, "I might have directed [Roswell] to spend a little more time with Congressional delegations [affected] by the plan."

Release of the draft plan (<http://www.appc1.va.gov/cares/>) moved the CARES process into a new phase. With Congress critical of the VA action, Principi created an independent panel that would review the plan and give it more credibility within the veterans community.

For its chairman, Principi selected Everett Alvarez Jr., a retired Navy aviator, eight-year Vietnam prisoner of



"We have a responsibility to ... make sure the extraordinary amount of dollars the American people send us are being spent wisely." – Principi

war, and VA deputy administrator during the Reagan Administration. Each of the panel's 16 commissioners have broad experience with health care or veterans issues. They began visiting VA facilities even before receiving the draft report.

Alvarez has faulted the draft CARES plan for including so many last-minute changes. "It caught everybody off guard," he said, "including the political people on the Hill." He went on, "What came out of headquarters were proposals counter to the VISN plan. They should have handled it with a little more sensitivity. I guess they were pressed for time."

The Alvarez commission began work in August. It held 38 public hearings, visited 68 VA medical facilities, and received 175,000 written comments from anxious veterans and community leaders. They drew crowds of thousands to meetings held in areas where hospitals are set to be closed, Alvarez said, attesting to the level of concern. These individuals want their hospitals to remain open. However, said Alvarez, what they really need is more information.

"When they first hear about it, it's 'Oh, they are closing up our hospital! They are going to throw us to the wolves!'" said Alvarez, "but the whole objective is to increase and enhance their care, with tomorrow's medicine—not [by keeping open] 70-year-old facilities. It doesn't help that Congressmen and Senators are up there leading the charge."

Alvarez said that even the draft CARES plan addresses the real health care needs of veterans far more thoughtfully than one would conclude just by reading newspaper articles about hospitals "on the chopping block" and so forth.

The unease felt by veterans and politicians lessens, he said, once the facts are known. As an example, he pointed to plans to close the VA hospital in Waco, a town not far from President Bush's ranch outside Crawford. The shuttering of this hospital and the one in Canandaigua, N.Y.,

has drawn some of the harshest reaction from local residents.

Anger on Wheels

In October, as the commission held its hearing in Waco, a rally of vets on motorcycles traveled from Waco to Crawford in protest. The Waco mayor, Linda Ethridge, complained to local media that the VA intentionally left the community with little time to react.

What the VA sees at Waco, said Alvarez, is an old, large hospital and surrounding campus, built in 1932, delivering far more outpatient than inpatient care, and with only 109 beds, most of which are for psychiatric patients. When one of those patients becomes physically ill, VA must transfer him immediately to a nearby civilian hospital. There he stays until he is stable or until he is sent to the Olin E. Teague Veterans' Center in Temple, 35 miles away.

The VA wants to transfer those 109 beds to Temple now, with its full range of services, Alvarez said, and offer employment there to current Waco hospital employees.

"All the rest of the care—93.5 percent of the workload of that facility—will stay in Waco," said Alvarez. All ambulatory care and special programs would be moved into modern leased or new-construction buildings, rather than remaining on the old 127-acre campus.

The veteran population in both Waco and Temple is sliding, and, in Texas, Austin is where demand for services is rising, he said. Alvarez believes that the VA and the University of Texas Medical School should jointly build a new hospital in Austin.

"When you build a hospital today, it should be right-sized and it should be for today's research, today's medical training, [and able to handle] complex cases," he said.

In Canandaigua, the 23-building VA campus has its own fire department, bowling alley, and laundry, even though the hospital has only 200 inpatient beds, down from 1,700 at one time. Most are for psychiatric patients. Outpatient services won't be affected by closing the hospital, Alvarez said. "The question is, in the next 10 to 15 to 20 years, when do you take the small number of inpatients beds you have, consolidate them, and unload a major [campus] that is draining you?"

Principi seconded that statement.

"Some facilities, we inherited from the Army at the turn of the 20th century," Principi said. "At their peak, these facilities may have had 2,000 patients [apiece]. Today, there may be fewer than 200 patients, and we're maintaining 200, even 350, acres of land."

Alvarez agrees that expansive campuses are anachronisms, suited to an era when almost all surgical procedures entailed a hospital stay. Today, he said, 70 percent of surgeries nationwide are outpatient procedures.

Alvarez said that, while the panel agreed with much of the draft national plan, it is not without flaws, and the commission decided to propose changes.

The commissioners questioned the reliability of the models used to project demand for care, had concerns about proposed uses of vacant space, and questioned whether community-based outpatient clinics can provide the required level of services.



**The
commissioners
questioned
whether
community-based
outpatient
clinics can
provide the
required level of
services.**

Commissioners strongly supported greater sharing of Defense and VA medical support services.

Alvarez noted that the job of the commission was "to look at the strategic plan in terms of whether or not it makes sense, whether or not the recommendations can withstand scrutiny, are defensible, and to make sure quality of health care does not fall as we go through the process." He added that the plan would take years to execute.

Careful Review

Principi promised a careful review of commission recommendations and could send some back for further work and consideration. He hoped to announce the final restructuring plan within a month of receiving the commission's work.

How successful that CARES plan becomes in restructuring VA health care ultimately will depend on VA budgets, year to year, and how well Congress funds initiatives to close, consolidate, and build facilities.

"Money is very important," said Alvarez.

"I have the authority" to execute a plan, Principi said. "I don't perceive Congress blocking me. I may be wrong."

The VA chief is optimistic that through the CARES process, VA will reshape health care for the future. Reaction overall has "gone as well as one could hope for, given the gravity and comprehensive nature of this report," Principi said.

Meanwhile, he said, veterans service organizations "are keeping an open mind and have not tried to sabotage this effort in any way. They recognize that health care has changed, and the demographics of the veterans population have changed." ■

Tom Philpott is a contributing editor of Air Force Magazine. He is the editor of "Military Update" and lives in the Washington, D.C., area. His most recent article for Air Force Magazine—"Are There Enough Doctors in the House?"—appeared in the March 2003 issue.



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.

Sam Johnson
Washington, D.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.

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.

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.

Joseph E. Assaf
Sandwich, Mass.

Richard H. Becker
Downers Grove, Ill.

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.

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.

For a full year, the Air Force Academy has been grappling with a major sexual assault problem.

Uproar at the Academy

By Richard J. Newman

It was one year ago this month that the Air Force Academy was rocked by allegations of sexual assault. The first of dozens of women cadets—current and former—began coming forward, claiming they had been victimized during their time at the academy. Moreover, some reported that they had been criticized, ostracized, or even punished for reporting the assaults.

The Air Force, Pentagon, and Congress all opened investigations at Colorado Springs, Colo. The probes produced a claim that 142 women had been assaulted since 1993. That figure may be low; in a DOD inspector general survey, 19 percent of women claimed they experienced some form of assault, defined as anything from unwanted touching to rape.

Such news would be cause for concern on any campus. It was, however, particularly troubling for the Air Force Academy, which aspires to standards higher than those in society at large.

In the upheaval of the past 12 months, the academy has adopted many reforms and undergone high-level lead-

ership changes. Air Force leaders express cautious confidence that the steps will bring greater security to women cadets and help to prevent a recurrence of felonious sexual behavior.

However, the academy is not likely to fix the entire problem overnight, as has been made clear in several recent reviews.

"The Air Force has known for many years that sexual assault was a serious problem at the academy," said a September report by a Congressionally mandated commission. "Sexual assault problems at the academy are real and continue to this day."

The Storm Breaks

The storm that engulfed the academy broke with a force that stunned USAF leaders.

In late 2002, two women prepared and then broadcast an e-mail message claiming they had been assaulted at the academy and largely ignored when they complained about it. They sent the e-mail to various news organizations and the office of Sen. Wayne Allard, a Colorado Republican.

In January 2003, the rapes became a major public issue. A Denver weekly, *Westword*, carried a lengthy article. The *Colorado Springs Gazette* and Denver TV station KMGH covered the allegations, leading other women cadets to come forward. Over the next months, some shed their anonymity and aired their charges in the media.

■ Sharon Fullilove said that, in late 1999, she accepted a ride from an upperclassman whom she trusted. He then drove to a remote area, locked the car doors, and assaulted her, she said.

■ Kira Mountjoy-Pepka, who came to the academy in 2001, said that, during her freshman year, a cadet entered her dorm room, locked the door, and assaulted her.

■ Beth Davis reported that, in October 1999, she was assaulted outside her dorm. Her attacker, she said, was an upperclassman who assaulted her on four more occasions.

■ Lisa Ballas said that, in October 2001, a cadet raped her at an off-campus party, where both were drinking heavily. He did so despite her telling him three times to stop, she said.

■ Jessica Brakey said she was assaulted at a summer 2000 outdoor training exercise when an upperclassman woke her late at night, led her into a tent, pinned her down, and raped her.

Early in 2003, a Colorado Springs rape crisis center reported that 22 cadets sought confidential help over the prior 15 years. Allard's office said it had heard from at least 20 women, including current cadets.

Many of these accounts included a disturbing corollary claim: It was

**Lawmakers
claimed
that
there had
been ample
danger signs
since
at least
1998.**

that, because they came forward with complaints, these women were themselves punished for infractions such as fraternization and underage drinking, even while their alleged assailants received lesser punishments or escaped sanction altogether.

In Washington, D.C., Air Force Secretary James G. Roche and Gen. John P. Jumper, Chief of Staff, moved swiftly to deal with the problem. They tasked the Air Force general counsel, Mary L. Walker, to form a working group and send investigators to Colorado Springs. They also began to formulate broad changes in academy practices and procedures.

Sen. John W. Warner (R-Va.), the chairman of the Senate Armed Services Committee, asked Charles S. Abell, principal deputy undersecretary of defense for personnel and readiness, to review Air Force actions aimed at fixing the problem. The Pentagon inspector general also went into action.

Academy officials acknowledged a problem, but made some verbal missteps. Brig. Gen. S. Taco Gilbert III,

then commandant of cadets, was widely criticized for comments made in reference to a cadet who was raped after a night of heavy drinking. "If I walk down a dark alley with hundred-dollar bills hanging out of my pockets," he said, "it doesn't justify my being attacked or robbed, but I certainly increased the risk by doing what I did."

New Faces

Soon, Roche came under intense Congressional pressure to replace Gilbert (who apologized for the statement). In late March, Roche did recall Gilbert and Lt. Gen. John R. Dallyagher, the superintendent, and two other academy officials. Roche dispatched Brig. Gen. Johnny A. Weida to Colorado Springs to become commandant. Weida also served as acting superintendent until Dallyagher's replacement, Lt. Gen. John W. Rosa Jr., could be confirmed.

Lawmakers from both parties insisted on having an outside review. They claimed that there had been ample danger signs since at least 1998. The Senate proposed that Defense Secretary Donald H. Rumsfeld select a seven-member panel of outside experts. The House quickly agreed with the measure, passing it in April.

Rumsfeld chose as panel chairman former Rep. Tillie K. Fowler, a Republican and lawyer who had served on the House Armed Services Committee during her years on Capitol Hill. The panel also included three retired military officers. Their charge was to spend the summer probing the incidents and issue a report.

In June, the USAF general counsel working group released its report. Walker's investigators found, among other things, that the fear of retribution prevented cadets from reporting sexual assault (and other offenses) at the hands of fellow cadets.

The Walker group also determined that there was, in some cases, a reason that rape cases did not make it to courts-martial or other formal proceedings. The academy had a policy of granting confidentiality to the alleged rape victim. This process limited the information available to commanders charged with enforcing discipline, the Walker group reported.

The process was set up in 1993 and was at the time considered a useful reform. The purpose was to

encourage actual reporting of rape by victims who, without confidentiality, would simply remain silent. Victims were free to provide as much or as little information as desired and could thus greatly influence what ultimately happened to the case.

"[Academy commanders] could order an investigation," Walker told Air Force Print News last June, and added, "but often didn't have sufficient information to do so. We felt [the victim-control process] was problematic, because it allowed alleged assailants, in some cases, to move forward in the system and never undergo an investigation."

The Walker review exonerated academy leaders and their superiors in Washington, concluding that there was "no systemic acceptance of sexual assault at the academy [or] institutional avoidance of responsibility."

Fowler's Criticism

In September, the Fowler Commission followed up with its report. The panel's findings were harsh but were endorsed by key lawmakers and not openly contested by Air Force leaders.

To begin with, the Fowler report criticized Walker's group for absolving USAF officials in Washington of any responsibility. The problem, the panel said, should have been apparent to USAF and academy leaders going back to 1993. "It is simply not plausible," said the Fowler report, "that the working group was unaware of the many instances of involvement by Air Force leadership" in dealing with the problem—especially since some of the working group staff had been involved in earlier investigations.

The commission found numerous failings over the past 10 years. While there had been several efforts to gauge the extent of sexual abuse and implement solutions, virtually all withered away due to leadership changes or institutional confusion.

The Fowler report specifically criticized Col. Laurie S. Slavec for intimidating and punishing women cadets who did report rape allegations. Slavec was responsible for day-to-day training at the academy from May 2002 until March 2003.

The commission also criticized the Air Force for leaving Brig. Gen. David A. Wagie in his position as dean of faculty. According to the

Fowler report, Wagie was the officer most responsible for the sexual assault response program and for downplaying "social climate surveys" that showed an assault problem on campus.

The commission offered 21 recommendations. Some already had been proposed in one form or another but had never been adopted. Some of them would push the academy experience closer to that of students at a civilian college. For instance, the panel called on the academy to offer women multiple ways to gain access to rape crisis centers and confidential counseling, such as allowing all cadets to have unrestricted access to telephones.

Panel members offered three key management recommendations. They said:

- USAF should provide greater continuity of leadership by changing the superintendent's term of service from three years to four and that of the commandant from two years to three.

- Air Force headquarters should exercise greater oversight of what happens at the academy.

- The academy Board of Visitors should be revamped and given greater powers to function like a corporate board of directors.

The Air Force did not challenge the Fowler report. Even before it was released, Rosa, the newly installed superintendent, acknowledged in a statement: "It is conclusive that we have a problem. It is also clear that we have to address the problem, and we have to address it now."

The fact is, the Air Force began taking direct steps to address the issue not long after the first rape reports came to light. In that period, Roche declared that he and Jumper viewed the cases with a simple logic.

"We must not commission any criminal," Roche told a Feb. 27 hearing of the House Armed Services Committee. "These are aspiring officers, and [Congress] has charged me to sign the [commissioning] certificate for each of them that says we [give them] special trust and confidence. ... I certainly can't say that about any assailant. We cannot tolerate an officer who has such bad judgment as to have done something as alleged by the victims at the academy."

Roche told reporters at an acad-

emy press conference that he had directed commanders to more aggressively pursue Article 32 criminal hearings into allegations of sexual assault.

In mid-March, the academy beefed up its hotline for women who felt they had been the victim of a sexual assault.

Limits of Loyalty

When Weida arrived at the academy in April, he delivered to every cadet a 15-page e-mail outlining proper and improper behavior. "Honest mistakes are part of learning and being human," he wrote. "Our loyalty to you ends when you commit a crime."

At the same time, Roche announced a major shake-up of the academy's policies, practices, and procedures. He called it, the "Agenda for Change." It was based on the findings of an Air Force team, which identified 43 weak points in need of correction.

The Agenda for Change is a series of initiatives that are intended to deal mostly with the problem of sexual assault at the academy. It reduces the interaction between men and women in academy dorm rooms, grants immunity to women who come forward with rape allegations, and establishes other protections for women on campus.

Not long afterward, life for cadets began to change. New rules instituted as part of the Agenda for Change included punishments for cadets who shun or harass women who report sexual assault and expulsion for cadets who provide alcohol to an underage cadet—a practice that seemed to be at the root of a large number of assault cases.

Women's dorm rooms, which had been interspersed with those of men, were clustered near the women's bathrooms, the better to reduce interaction between men and women during off-hours.

The right to discipline underclassmen was taken back from juniors and invested in seniors alone.

For women cadets, reporting sexual assault to proper authorities was changed from optional to mandatory, which is the standard throughout the Air Force. This change was meant to give commanders a more accurate picture of the problem, since rape-victim activists claim that some

80 percent of all assaults go unreported.

More change came with the arrival in June of the class of 2007—1,086 men and 225 women. Each cadet received a new booklet warning that sexual misconduct would not be tolerated.

Dormitory floors for the new class were overseen by commissioned officers rather than ranking cadets. The academy is seeking additional funding to expand this practice.

Rosa told American Forces Press Service in October that academy officials had already implemented 140 of the 165 “action items” identified in the Agenda for Change and that they had been incorporated into the school’s operating instructions. Rosa said he hopes to implement all 165 recommendations by March.

Closer Alignment

The net effect of these changes, according to Rosa, is that the policies of the academy have been much more closely aligned with those of the active duty Air Force. For example, Rosa said in the AFPS interview, the academy disciplinary system now strongly resembles the Air Force’s own. The academy now takes a hard line on minors using alcohol or giving it to other minors. Offenders are now charged under the Uniform Code of Military Justice or expelled.

At the top of the list of changes, according to Rosa, was the establishment of clear sexual-assault reporting procedures. There is no discretion; it is the obligation of any cadet—even the victim of sexual assault—to report the fact of a crime and provide evidence. Moreover, Rosa told AFPS, the academy has instituted a new response team to deal swiftly with charges of assault. The team has already gone into action several times, and a handful of alleged offenses are now being investigated, Rosa reported.

Rosa said, “We don’t tolerate criminals, we don’t sexually harass people, we don’t sexually assault people. We are not going to tolerate it.”

Rosa told AFPS that the academy plans to bring into being a cadet

training program that deals with human relations, sexual harassment, and sexual assault. These classes, Rosa explained, will be provided throughout a cadet’s four years at the academy.

While implementing Agenda for Change recommendations, the acad-

The policies of
the academy
have been
much more
closely
aligned with
those of the
active duty
Air Force.

emy is reviewing the Fowler Commission recommendations. Some already have been incorporated. Others are under review.

Rosa said he and his staff are working to rebuild trust and confidence in the academy. Sweeping as these changes may be, said Rosa, they still are “baby steps” in a long-term effort to transform the academy and rebuild its reputation.

The Fowler panel agreed that the Agenda for Change was an important shift of focus, but it thought there should be vigorous oversight of the academy by Air Force headquarters and by the academy’s own Board of Visitors.

It also faulted the agenda for unintentionally limiting the availability of confidential counseling for rape victims. Academy officials concede that it is a contentious issue, but believe that, on balance, it is better

to know the facts of a crime. Even so, the Air Force is working on a new policy. A first draft with limited confidentiality was rejected by Roche in late October. The Secretary told reporters in November that work on the new policy was continuing and that it would resemble the Fowler Commission recommendations.

Tough Cases

Despite the many efforts at reform, it appears that some problems are likely to bedevil the academy for some time. One of these is the matter of “date rape”—nonconsensual sex between two people who know each other, often under circumstances that greatly complicate criminal investigation and prosecution. It is a problem that poses major challenges for college administrators everywhere, not just at the academy.

Several cases highlight the difficulties, but none more than the case of Douglas L. Meester.

Meester, a sophomore, was accused of raping a freshman female cadet in October 2002. He has vigorously denied the charge and is contesting it. The circumstances of the case posed major investigatory problems. Meester and the woman cadet had been drinking heavily before he had sex with her. Moreover, she acknowledged that she never told Meester “no.”

In May, the investigating officer concluded the case should not be referred to a military judge for a court-martial. Weida, the legal authority, overruled him. Meester asked to resign, but was turned down and now awaits judicial proceedings.

The case is being closely watched by both sides—by women’s advocates who wish to see an alleged crime punished and others worried that Meester is being made a scapegoat in the name of political correctness.

Whatever the outcome of any particular case, Rosa said, his biggest challenge is to institutionalize changes at the academy, backing them up with permanent programs. He wants to make sure “that we don’t find ourselves, 10 years down the road, in the same or similar circumstances.”

As the Fowler Commission summed up: “The reputation of the institution and, by extension, the Air Force it serves, depends on finding a lasting solution to this problem.” ■

Richard J. Newman was for many years a Washington, D.C.,-based defense correspondent and senior editor for US News & World Report. He is now based in the New York office of US News. His most recent article for Air Force Magazine, “Ambush at Najaf,” appeared in the October 2003 issue.

To DOD managers, it's healthy capitalism, but federal unions and some lawmakers aren't pleased.

The Limits of Outsourcing

By George Cahlink

VINCE Gasaway, Air Force deputy chief of competitive sourcing and privatization, did some quick math when he was asked how much

money can be saved by opening service jobs to private sector competition. He came up with a dollar figure, but he then thought the better of it and said only that the Air Force would cut the cost of doing that work by at least 25 percent.

"If I give you dollar figure," he said, "then the [Pentagon] comptroller will say, 'Where is that in the budget?'"

As the remark suggests, there are no easy or safe answers when it comes to the status of Air Force efforts to save money by opening

tens of thousands of jobs to commercial competition. At present, USAF comprises 359,000 active duty airmen and 165,500 civilian workers.

The stakes are high for the Air Force, which expects to evaluate 51,500 jobs for possible outsourcing by decade's end. If this move produces monetary savings, the service would be in a position to finance new personnel spaces in areas of shortage, such as security police, intelligence specialists, and combat controllers.

As competition produces savings, "you can invest resources in other priorities," said Gasaway.

Getting the competitive juices flowing has not been easy. The Bush

"The competitive sourcing initiative is not about saving money for the taxpayers."

—AFGE's Simon

Administration made reviewing federal jobs for possible outsourcing the centerpiece of "The President's Management Agenda," a plan for reforming management of government agencies.

Initially, the Administration planned to open 425,000 federal jobs to contractor competition by the end of 2009. That plan, however, was scaled back, partly because of delays in getting competitions started but also as a result of opposition from lawmakers who fear they'll lose federal jobs at home and argue too much work is being handed over to contractors.

Now federal agencies are expected to open only about 103,000 jobs to competition—although no timetable has been set. The Air Force has not made any changes in its plans.

Gasaway said the competitive sourcing effort is not simply a way to cut federal jobs and save money. Rather, he said, it is an effort to figure out how the work can be done more efficiently.

In most cases, federal law requires outsourcing to be preceded by a competition between federal workers and contractors in which the result shows contractors offering best value. If that is not the case, then the outsourcing may not proceed. Even when the work is not outsourced, however, federal agencies usually save money because federal employees are forced to become more efficient to compete against the private sector.

It's Capitalism

Gasaway called competitive sourcing a "capitalistic" approach toward running the government.

Federal-employee unions and their backers in Congress, however, disagree and say the goal of competitive sourcing has nothing to do with improving how well government works.

"The competitive sourcing initiative is not about saving money for the taxpayers," warned Jacqueline Simon, director of public policy for the American Federation of Government Employees, the largest federal-employees union. "It is about replacing federal employees with contractors and shifting money to the private sector."

Rep. Solomon P. Ortiz (D-Tex.),

a member of the House Armed Services Committee, said the Administration is taking great risks with its drive to contract out so much work. This, he said, is particularly true in the case of the Defense Department, because contractors could always go on strike. Federal employees, meanwhile, are barred by law from striking.

Gasaway contended that the Air Force is not looking to outsource any jobs that could put national security in jeopardy. "We do the Yellow Pages test," said Gasaway, explaining that, if the telephone book contains private firms that can do the work, then USAF should consider putting it up for competition.

So far, Air Force job competitions have fallen into a handful of categories—base operations support, information technology support, civil engineering, and some aircraft maintenance. And since 2000, the Air Force has held competitions covering about 21,000 federal jobs.

The military services have been far and away the most aggressive outsourcers of government work, holding more of the so-called A-76 competitions than anyone.

During the Clinton Administration's eight years, no nondefense federal agency held an A-76 competition. The Pentagon, in contrast, outsourced tens of thousands of jobs in recent years. The intent was clear: DOD wanted to free up money to buy new weapons and finance other vital needs as defense spending fell in the 1990s.

Since 2000, the Defense Department has saved about \$5.5 billion by opening 72,000 jobs to competition, according to Philip Grone, principal assistant deputy undersecretary of defense for installations and environment.

The 33 Percent Factor

Jacques S. Gansler, the Pentagon's acquisition chief in the Clinton years and now a professor at the University of Maryland, recently conducted a review of DOD outsourcing. His conclusion: By opening work to commercial competition, DOD cut the cost of this work by an average of 33 percent. At the same time, actual performance improved, too.

Of the other services, the Navy has taken the most aggressive ap-

Defense Secretary Rumsfeld has indicated DOD may be about to feel another, even more powerful wave of outsourcing.

proach toward outsourcing. It has, since 1997, opened about 40,000 jobs to competition and saved \$3 billion. The Navy expects to open another 48,000 jobs by 2009 and plow that money back into modernizing the fleet, although Navy officials say that most of the obvious competitive sourcing candidates are gone.

In the late 1990s, the Navy pioneered an idea known as "strategic sourcing," wherein it sought to avoid competitions and save money by internally eliminating obsolete business practices, consolidating jobs, restructuring organizations, and adopting commercial business practices. The Clinton Administration allowed the Navy and other services to count those savings toward that Administration's goal of opening more jobs to competition.

The Bush Administration has said strategic sourcing—while something that should be pursued to improve efficiency—could not be a substitute for actual commercial outsourcing.

The Army has been the slowest to open up its jobs, often leaving it to individual bases to decide what work can and cannot be put up for competition. In October 2002, however, the Army announced it would consider outsourcing more than 150,000 positions (nearly two-thirds of all Army civilian jobs), but since then the service has backed off that ambitious goal, allowing exemptions for work such as health care jobs.

Defense Secretary Donald H. Rumsfeld has indicated DOD may be about to feel another, even more powerful wave of outsourcing. He has told lawmakers that as many as 320,000 support jobs could be eliminated from active duty military ranks and transferred to either the civilian side of DOD or outsourced to contractors to free up military slots in areas where the military is short of personnel. So far, defense has not offered a detailed plan for exactly which jobs would be cut from which service.

The Depot Rumble

The military's in-house weapons repair centers, known as depots, are discussed frequently as candidates for outsourcing. Those repair centers include three Air Force

depots (Oklahoma City Air Logistics Center, Tinker AFB, Okla.; Warner Robins ALC, Robins AFB, Ga.; and Ogden ALC, Hill AFB, Utah) which employ tens of thousands of defense civilians and cost billions of dollars to operate. A federal law, known as the 50-50 rule, bars DOD from outsourcing more than 50 percent of the repair work. The Pentagon has pushed for repeal, but Congressional members have turned down that request in favor of protecting high-paying federal jobs in their states and districts.

Outsourcing critics claim the competitions unfairly favor contractors, while the private sector says federal employees have an edge in winning the work. In truth, the competitions are often evenly split between government and contractor winners as evidenced by two of the Air Force's largest competitions.

■ In 1997, Del-Jen won a \$131 million contract at Tyndall AFB, Fla., to take over infrastructure and communications support jobs performed by 274 civilian workers and 1,086 military personnel.

■ In 2002, 313 civilian and 1,146 military personnel at Offutt AFB, Neb., beat out DynCorp Technical Services to keep their operations support, aircraft maintenance, and civil engineering jobs.

The Offutt face-off is often cited as the service's most successful job competition. "There were no appeals or protests so that gives you a clue that the process was accepted by all as being fair," said Gasaway. Also, the winning bid by federal workers will cut annual costs of performing the work by \$46 million, mainly by cutting manpower by 58 percent. Air Force officials had hoped for 40 percent savings, but federal employees were able to beat that goal by consolidating many operations, including combining the base's transportation and supply dispatch centers.

However, other Air Force competitions have run into problems. The General Accounting Office reversed an Air Force decision to award to federal employees a contract for \$198 million in base operations work at Maxwell AFB, Ala. The government gave the contract to DynCorp after finding cost comparisons used in the competition

The White House has threatened to veto any Congressional bills that banned their competitive sourcing effort.

unfairly favored the in-house workers.

The best-known failed competition centered on a \$352 million proposal to outsource work at Lackland AFB, Tex. The Air Force initially awarded the work to a private contractor, a joint venture of Computer Sciences Corp., Del-Jen, and Tecom, but federal workers appealed the decision. USAF overturned the award. Then, the contractor group appealed to the Congressional watchdog agency, GAO, which told the service it should have stuck with its first decision.

Two DOD investigations followed, more appeals were made, and the Texas Congressional delegation got involved. "Lackland was one that just fell apart," said Gasaway, who said both sides were confused about what work was supposed to be covered by the contract. Ultimately, the competition was canceled. Gasaway said a new one will likely be held in the next couple of years.

New Rules

By then, new rules governing the execution of competitions should be fully implemented. In May 2003, the Bush Administration announced sweeping revisions to the Office of Management and Budget Circular A-76, the federal policy that outlines the rules governing job competitions. Those changes followed an exhaustive review a year earlier by a Congressionally mandated panel, which included members from federal agencies, federal contractors, federal unions, and academia. The panel called for overhauling job competition rules, which were panned as too cumbersome and time-consuming.

Among the changes called for by OMB were: requiring that most competitions be completed in 12 months (often competitions were lasting two years); requiring competition winners, either government or contractor, to set and meet work performance standards; for the first time, requiring federal workers to compete for their work after winning it (in some cases, in as little as three

years after a competition); and allowing agencies to select winners based on factors other than cost alone, a competition method known as "best value." Also, in a bow to federal unions, OMB scrapped a proposal that would have allowed agencies to outsource any federal function with fewer than 65 jobs to contractors without holding a competition, but won the ire of labor by eliminating rules that gave federal workers an automatic 10 percent cost advantage in competitions.

The Bush Administration and lawmakers have clashed over the rule changes. The House has pushed for prohibiting competitions until the provision that would require employees to re-compete for their jobs is eliminated. The Senate has pushed for annual reports for some nondefense agencies on the scope and cost of their outsourcing efforts. In response, the White House has threatened to veto any Congressional bills that banned their competitive sourcing effort. The Bush Administration's decision this summer to hold fewer competitions and scrap specific time frames was due in part to pressure from Congress, as well as a realization that it would take much longer than expected to decide what work could be competed.

Gasaway said the recent changes in A-76 rules would take some time to implement but should ultimately lead to better competitions. In order to meet the 12-month deadline for finishing competition, he said, the Air Force will have to do more preliminary planning. In other cases, rules that will appoint a single person to review private sector and in-house bids should eliminate the confusion that plagued the Lackland and Maxwell competitions. The Air Force is working with the Defense Acquisition University, DOD's internal school for educating procurement managers and contracting officers, to come up with a course that will teach them how to carry out the new competitions. "It's a change, and people will have to go through a re-education process and that will take some time," Gasaway said. ■

George Cahlink is a military correspondent with Government Executive Magazine in Washington, D.C. His most recent article for Air Force Magazine, "Masters of Surge," appeared in the April 2003 issue.



Twenty-five years ago this month,
the F-16 began to transform USAF's fighter forces.

The Viper Revolution

By Peter Grier

IN THE beginning, critics complained that the airplane was too small and too slow and didn't have the two engines necessary for flight safety. Pilots would never like it, they said. The Air Force would never buy it, they said. Long-range air-to-air missiles would render its agility moot, they said. The era of dogfighters was definitely over.

"They" were wrong.

Twenty-five years ago, the first production F-16s began rolling into the Air Force inventory. Since then, the lightweight, multirole fighter has more than lived up to the prediction of its designers that it would prove to be a revolutionary weapons system.

Over the years, the F-16 has shown that cutting-edge technology does not always have to bring with it exorbitant cost, that bigger is not always better, and that a good basic design, with proper upgrades, can serve many roles. It has pioneered high G cockpits, fly-by-wire controls, "relaxed stability"

An F-16CJ from the 23rd Fighter Squadron, Spanghdalem AB, Germany, is outfitted to hunt surface-to-air missile sites.



The “fighter mafia” pushed for consideration of a small, lightweight fighter. A competition pitted the General Dynamics YF-16 prototype against Northrop’s YF-17. USAF selected the GD entry.

aerodynamics, and other features now common in newer aircraft models.

The F-16 has an official name—Fighting Falcon—that nobody uses. To those who fly, arm, or maintain it, it is “the Viper.” It has been the most popular fighter of its time, with some 4,100 F-16s delivered to more than 20 countries. It has flown more than 200,000 combat sorties. Its air combat record: 71-to-zero.

“We consider the F-16 to be the most versatile fighter in the world,” said John L. Bean, Lockheed Martin vice president in charge of F-16 operations.

For all that, the F-16’s original proponents were something of an underground cell. Their association dated from an evening in the mid-1960s when a General Dynamics engineer named Harry Hillaker was sitting in the Officers’ Club at Eglin AFB, Fla., having an after-dinner drink. Hillaker’s host introduced him to a tall, blustery pilot named John R. Boyd, who immediately launched a frontal attack on GD’s F-111 fighter. Hillaker was annoyed but bantered back.

A few days later, he received a call—Boyd had been impressed by Hillaker’s grasp of aircraft conceptual design and wanted to know if Hillaker was interested in more-organized meetings.

Thus was born a group that others in the Air Force later dubbed the “fighter mafia.” Their basic belief was that fighters did not need to

overwhelm opponents with speed and size. Experience in Vietnam against nimble Soviet-built MiGs had convinced them that technology had not yet completely turned air-to-air combat into a long-range shoot-out.

As a tactics instructor at Nellis AFB, Nev., Boyd had devoted much time to analyzing the relative positions and speed of aircraft in dogfights. He developed what he called a theory of energy maneuverability, which held that a pilot lost advantage in combat when he allowed his aircraft’s potential en-

ergy to decay to less than that of his opponent.

“Winning required the proper management of energy available at the conditions existing at any point during a combat engagement,” wrote Hillaker in 1997.

The fighter mafia’s premise was that an aircraft that was superior in acceleration and turning radius would also prove superior in combat. The theory was not popular with the rest of the Air Force. Other fighter theorists emphasized top speed and weapons capability. Many were also put off by Boyd’s personality, which was blunt to the point of brutal.

The Air Force had gone for decades without a new fighter, and top officials were solid in their support of development and production of the dual-engine F-15. Some perceived the underground push for a lightweight dogfighter to be a threat, according to Hillaker, who was later honored as the father of the F-16.

Critics viewed the notion of a lightweight fighter in the context of the Air Force’s experience with the F-104, a hot airplane that was popular with pilots but had little range and little capability. It was not bought in large quantities by the US Air Force.

The fighter mafia felt just as strongly that there were quantifiable advantages to their approach. A small aircraft would enjoy a high thrust-to-weight ratio. Small aircraft have less drag—the original F-16 design had about one-third the drag of an F-4 in

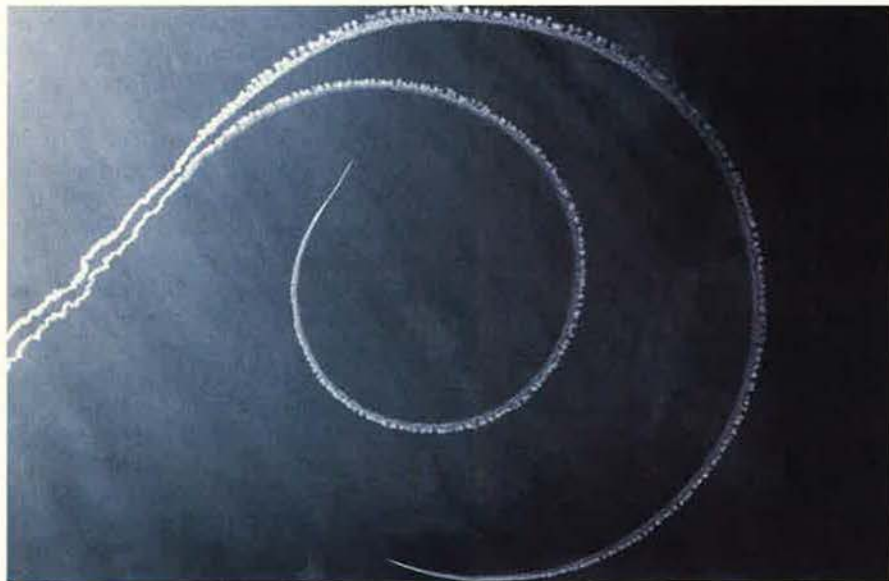


Among the many F-16 variants was the delta-wing F-16XL. Compared to the standard F-16, it could carry more fuel and ordnance, but USAF went with the F-15E Strike Eagle for the deep interdiction role.

level flight and one-fifteenth the drag of an F-4 at a high angle of attack.

Small aircraft might also be the way to break the ever-rising unit cost of fighters, thought Hillaker, Boyd, and a few others. They plotted flyaway costs of successive aircraft, beginning with the P-51, and discovered that cost-per-pound increased at the same rate as the overall cost. (This ended up being true for the F-16 as well—its cost-per-pound was significantly higher than previous models, but, since it was much smaller, overall cost was kept down.)

Eventually, the Air Force gave General Dynamics and Northrop small contracts to study the trade-offs inherent in maneuverable aircraft. GD's conclusion: It was possible to pro-



In January 1979, an F-16 of the 388th Fighter Wing, Hill AFB, Utah (at top) became the first operational F-16. Above, an F-16 demonstrates its remarkably tight turning radius against an F-4E.

duce a fighter that was twice as maneuverable as an F-4D and had twice its mission radius, yet weighed 17,000 pounds instead of the 29,000 pounds of the F-4D.

This caught the attention of Deputy Secretary of Defense David A. Packard, among others. Put off by the results of the procurement of the F-111, Packard wanted to experiment with a return to prototyping. A lightweight fighter technology program, he felt, might be a good way to start.

"The rest is history," said Hillaker.

The new lightweight fighter technology effort was formally launched in January 1972. Five firms responded with proposals. In April, the military

chose two to proceed: the General Dynamics YF-16 and Northrop's YF-17.

First rollout of the YF-16 came just 20 months later, on Dec. 13, 1973.

First flight took place at Edwards AFB, Calif., on Jan. 20, 1974—inadvertently. During high-speed taxi tests the aircraft became unstable—so much that its wingtips were hitting off the runway and throwing off sparks. General Dynamics test pilot Phil Oestricher decided that the safest thing to do was take to the air. He did one circuit and then landed.

The problem turned out to be the aircraft's electronic fly-by-wire con-

trol system, which was too sensitive to the pilot's touch. After re-tuning, the prototype made a straightforward formal first flight on Feb. 2.

In April 1974, the stakes of the competition were raised when Secretary of Defense James R. Schlesinger announced that the winner would go into full-scale development and production. This new "Air Combat Fighter" program was supposed to produce a no-frills daylight and good weather aircraft that could be purchased in large quantities to supplement smaller buys of the more expensive F-15.

Throughout 1974, the YF-16 and YF-17 went through batteries of tests and air combat trials against everything from F-106 Delta Darts and F-4 Phantoms to clandestinely obtained Soviet MiGs. In close air combat, the YF-16 appeared clearly superior. At one point, a YF-16 prototype took three straight engagements against an F-4, which then had to land to refuel. Still airborne, the YF-16 then bested a second Phantom sent up to resume the fight.

The YF-16 also had an advantage over the YF-17 in that the GD aircraft was powered by a single F100 engine—the main power plant for the F-15. USAF officials knew that, with two aircraft using the same type engine, unit costs might go down and logistics would be simplified.

The Winner

In January 1975, Air Force Secretary John L. McLucas formally declared the General Dynamics YF-16



Over the years, F-16 equipment and armament have changed to keep pace with the threat. This New York Air National Guard F-16 flying over Afghanistan has a targeting pod and 500-pound laser guided bombs.

the winner of the competition.

Initial plans called for a buy of 650 aircraft at a cost of \$4.35 billion. The fighter might well prove popular on the foreign market, Lucas suggested at the time. He predicted that it might eventually sell as many as 3,000 units.

GD delivered the first production F-16 to the Air Force on Aug. 18, 1978. The 388th Tactical Fighter Wing, Hill AFB, Utah, received the first operational F-16 on Jan. 6, 1979, 25 years ago this month.

Foreign sales of the new fighter began at almost at the same time, with the first going to the Belgian Air Force and others to the Royal Netherlands Air Force not long afterward.

The F-16's now-familiar, shark-like visage, with stubby cropped delta wings and large tail, is a highly integrated aerodynamic configuration. The wings and main fuselage are blended together in three dimensions, creating a shape that improves lift at high angles of attack.

The airframe is conventional, composed of 80 percent aluminum alloys, eight percent steel, and the rest composites and exotic metals. There are so many access panels—228 in the original design—that the aircraft looks unfinished when a large number are opened.

Fuel capacity is surprisingly large for a small aircraft, so much so that fuel accounts for about one-third of the aircraft's fully loaded weight.

With current power plants (either the Pratt and Whitney F100 or the General Electric F110), the aircraft can reach Mach 2 at high altitude. Its ceiling is above 50,000 feet, and its ferry range is more than 2,000 miles.

Standard armament includes an internally mounted 20 mm cannon with 500 rounds. Modern Block 50 versions can carry up to 22,000 pounds of weapons, electronic countermeasures, sensor pods, or fuel tanks on 11 external stations.

Pilots sit up high, in a 30-degree reclining seat whose position helps them pull up to nine Gs in a turn. The

frameless canopy provides excellent vision. Overall the impression is almost of riding outside the aircraft, rather than in it. It's like being in a glass bubble with a clear view in all directions.

A sidestick controller is mounted on the pilot's right. Originally the stick was simply pressure sensitive, not moveable like a joystick, but it was later modified to move slightly so as to improve pilot feel.

The "Electric Jet"

That the stick could be fixed was possible only because of one of the F-16's revolutionary advances: fly-by-wire technology. As the first Air Force fighter to completely replace mechanical controls with electronic ones, the airplane was sometimes called the "Electric Jet." That nickname faded away as fly-by-wire controls became more common.

In turn, fly-by-wire made possible another of the F-16's advances: relaxed stability. With a computer sensing directional deviations and helping control the airplane, the F-16 can safely fly with its center of gravity behind its center of pressure. This makes the aircraft inherently unstable—but also highly responsive.

Over the last quarter-century, the F-16 has proved to be a mainstay for more than just the US Air Force. It is the most international fighter in the world, serving currently in the air arms of some 20 countries. Four



Norway is one of more than 20 countries that fly the F-16. This Norwegian Viper is escorting US C-130s operating in Southwest Asia. The F-16 has amassed some 200,000 combat flying hours.

more—the United Arab Emirates, Chile, Oman, and Poland—will take delivery of F-16s over the next three years, pushing total airframe production over the 4,400 mark.

Unlike many sophisticated US weapons systems, the F-16 was available for foreign military sales from the beginning. Under an unusual agreement for the time, a consortium of four NATO nations—Belgium, Denmark, the Netherlands, and Norway—jointly produced F-16s with the US starting in 1979. The aircraft used components made in all five countries, with final assembly lines in Belgium and the Netherlands.

The benefits of this arrangement were mutual: The Europeans supported employment at home and got a relatively inexpensive upgrade in military capability; the US Air Force saved money via lower unit costs, while supporting allied interoperability.

The F-16 is also the primary strike aircraft of the Israeli Defense Force. Deliveries to Israel began in July 1980. The first 75 Israeli F-16s were Block 10/15 models originally ordered by the Shah of Iran. His overthrow put the airplanes back on the market.

Into Combat

The combat debut of the F-16 occurred on April 28, 1981, when Israeli Defense Force F-16s shot down two Syrian Mi-8 helicopters over Lebanon. Less than two weeks later, eight IDF F-16s destroyed Iraq's Osirak nuclear reactor during a famous and daring raid. Because of the high accuracy of the F-16's bombing computer, the Israelis were able to strike Osirak with conventional dumb bombs, instead of laser guided munitions.

Overall, the Israeli use of F-16s has been highly successful. During Israel's incursion into Lebanon in the early 1980s, IDF F-16s had a record of 44-to-zero in air battles with Syrian MiGs.

The second nation to use the F-16 in combat was Pakistan, which began taking delivery of A/B models in October 1982. During the chaos



Lockheed Martin photo by Nick Alvarado

This is the newest Viper—the Block 60 version. It was designated F-16E/F and was destined for the United Arab Emirates this year. The first combat use of an F-16 came in 1981 by a foreign air force, the Israeli Defense Force.

of the Soviet experience in neighboring Afghanistan, Pakistani F-16s tangled with Afghan Air Force intruders on a number of occasions. At least eight Afghan airplanes were shot down. During an encounter on April 29, 1987, a Pakistani F-16 was also shot down. Subsequent investigation revealed that that the airplane probably was a casualty of friendly fire from another F-16.

Other nations that have bought F-16s in quantity are Egypt, Turkey (which built its own final assembly line), Greece, and South Korea.

The basic F-16 airframe has been produced in a bewildering array of models, mods, and blocks during the last quarter-century. Lockheed Martin, which bought the former General Dynamics assembly line in 1992, now counts more than 110 different F-16 versions.

The exterior look of the aircraft may remain the same, but the interior has changed dramatically. There have been six major block changes, four generations of core avionics, five engine versions, five radar versions, five electronic warfare suites, and at least two versions of most other subsystems. The main F-16 computer of today has 2,000 times the memory of that in the 1978 F-16.

Though conceived as a simple dayfighter, the F-16 quickly became something more. Since November 1981, all delivered aircraft have had built-in wiring and structural provisions for precision strike, night attack, and beyond-visual-range interception missions.

And the dogfighting role envisioned by the fighter mafia 25 years ago did not play out in the combat debut of USAF's F-16. Instead, on Dec. 27, 1992, an F-16D faced down an Iraqi MiG-25 with a single AIM-120A Advanced Medium-Range Air-to-Air Missile fired at a range of about three miles. Two USAF F-16s were patrolling the no-fly zone over southern Iraq when they spotted the MiGs repeatedly breaching the zone. After ignoring warnings, one was shot down by the AMRAAM in the first USAF air-to-air kill credited to the F-16.

The F-16 constitutes more than 50 percent of USAF fighter strength through at least 2010, when its replacement, the F-35 Joint Strike Fighter, begins to enter the inventory. Current projections call for F-16s to remain in the US inventory for at least a decade after that and until at least 2030 for other nations.

"We expect the F-16 to remain a significant portion of our business for many years," said Dain M. Hancock, president of Lockheed Martin Aeronautics, in a statement issued to commemorate the 25th anniversary of global production. ■

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, "Lighter Footprint, Longer Reach," appeared in the October 2003 issue.

Physical fitness is no longer a "nice to have."
It is now a factor in combat readiness.

Jumper to Airmen: "Get in Shape"

By Bruce D. Callander

LAST summer, the Air Force Chief of Staff praised his service's combat record in Iraq and overall performance but found weakness in one area.

"All of us can agree that we were disappointed with the [physical] fitness standards we found when we came into the operational Air Force," said Gen. John P. Jumper. "We expected to be required to sustain the standards required in basic training, the Air Force Academy, ROTC, or Officer Training School."

Then, the Chief made his point. "Let's not disappoint ourselves any longer."

True to his word, Jumper was soon releasing a new fitness program, one that gets back to the basics of running, sit-ups, and push-ups.

The new approach comprises:

- A tougher daily physical fitness regimen for basic trainees.

- New fitness tests for all members of the force.

- New demands on commanders and senior NCOs to make sure the members of their units meet the new standards.

The more demanding training took effect at Lackland AFB, Tex., last

October. Plans called for USAF to launch a new fitness test for the rest of the force this month. It will be phased in over a number of months.

The drive to improve fitness stems, at least in part, from harsh physical demands of recent operations.

"We deploy to all regions of the world," said Jumper. Airmen are "living in tent cities and working on flight lines in extremes of temperatures. Some of our airmen today are operating from inside Iraq, subject to attack, and could be called upon to help defend the base, a trend that will surely increase in the growing expeditionary nature of our business. The amount of energy we devote to our fitness programs is not consistent with the growing demands of our warrior culture."

"Physical Readiness"

Maj. Lisa Schmidt, the Air Force surgeon general's chief of health promotion operations, noted how increased fitness will help airmen cope with extreme conditions. "It's just one of the benefits of exercise," she said. "Temperature-extremes tolerance, fatigue tolerance, preventing back injuries, preventing illness,

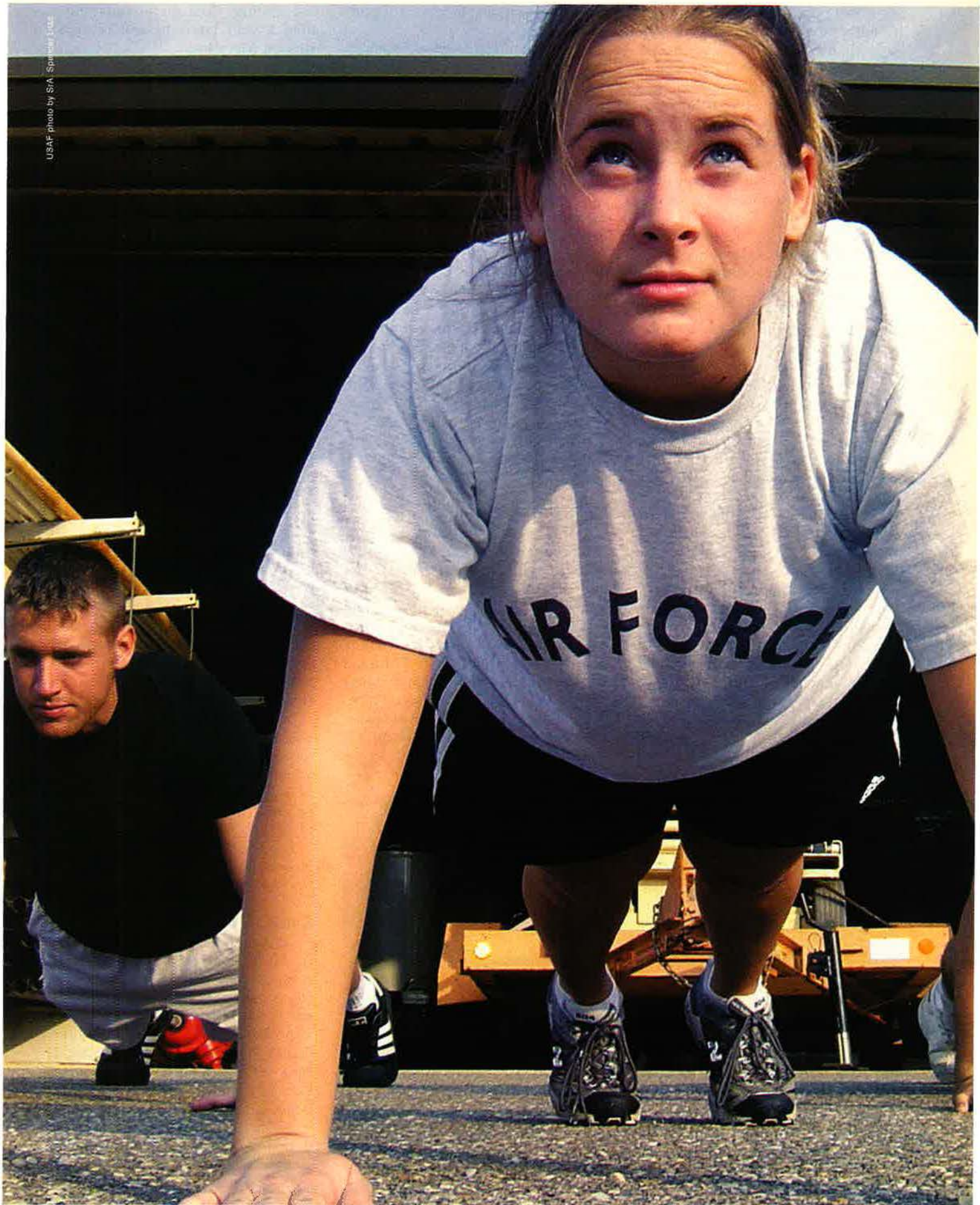
... even something such as coming down with a simple cold that can take you out of the work site for a day or two. You're just more resistant to that, because you've built up that immunity."

At Lackland, the old physical conditioning program for basic trainees has been renamed "physical readiness training."

The new curriculum follows the general outline of the old one but adds a second confidence-course run, a 2.5-mile formation run for graduating airmen, monthly fitness competitions among training squadrons, and special recognition of the most physically fit airmen in each graduating class.

The weekly regimen includes three days of aerobic running and three days of muscular endurance training. The runs involve 40-minute sessions of group-paced running, self-paced running, and six 30-second-sprint interval runs separated by brisk walking. Each week, trainees are timed on a two-mile run.

The endurance training lasts 48 minutes and includes a circuit of crunches, leg lifts, push-ups, flutter kicks, and pull-ups, all designed to



improve upper body and abdominal strength. (Crunches are like sit-ups but with the knees bent to the chest.)

The new fitness test for the general Air Force population also will merge new elements with old. Schmidt said there are four components—a 1.5-mile run, a body composition measurement, a one-minute push-up test, and a one-minute crunch test. Those who participate are scored from zero to 100.

Although the new program restores the 1.5-mile run for most members, there will be provision for excusing some, Schmidt said, basically for safety reasons. The Air Force is especially concerned about persons with cardiac problems.

How members do on the test will determine what they must do next. Those who score poorly, said Schmidt, will go to the health and wellness center and get more work. Some will be sent to take a "healthy living" workshop, focused on changing diet and other behavior patterns. Those who score below 70, however, also will get more individualized fitness prescriptions that address their specific needs.

Health and wellness centers are under base medical group commanders and staffed by medical personnel. Fitness centers have evolved from the old base gyms into conditioning facilities that rely heavily on mechanical bodybuilding machines. The centers are staffed through the Air Force Services Agency. The two

may be colocated or in separate buildings.

Fitness training has gone through a succession of changes, not all of them for the better. During World War II, members received heavy doses of conditioning when they were in basic training or cadet status. After that, however, units often did little more than provide sports equipment and urge members to exercise on their own. Since most members were in their teens or barely beyond them and were in only for the duration of the war, there was little attention given to long-term fitness training.

As USAF matured, it took more interest in physical conditioning. It was particularly concerned about aircrew members handling aircraft that flew progressively longer, higher, and faster. Periodically, leaders would worry, too, about overweight and out-of-shape NCOs in operations support skills and call for more rigorous exercise.

Cooper's Revolution

In the late 1950s, a medical officer had an experience that would influence his approach to fitness and change the habits of millions of Americans. Flight Surgeon Kenneth H. Cooper was still under 30 when he experienced an irregular heartbeat while waterskiing. Although he had run track in college, Cooper had been relatively inactive since. He was overweight and out of shape. He took himself in hand and, within

six months, lost 40 pounds. Less than a year later, he ran his first Boston Marathon.

Assigned to the Aerospace Medical Laboratory at Brooks AFB, Tex., Cooper helped develop a conditioning program for NASA astronauts. He also became convinced of the importance of fitness in preventing and treating heart disease. He developed exercises to promote better health. In the late 1960s, he coined the term "aerobics" and used it in the title for his first book. Two years later, he left service as a lieutenant colonel and founded what has become the sprawling Cooper Aerobics Center and Cooper Institute in Dallas.

The Air Force incorporated into its fitness testing program many elements of aerobics, including the annual 1.5-mile run. By the early 1990s, however, several airmen had suffered heart attacks or injuries during the annual test, and the service switched to the safer cycle ergometry test.

Over the years, the mission of improving fitness also has changed. "Up until the early 1990s, the fitness test was part of the personnel program, much like the weight management program," noted Schmidt. "It has just been in the more recent years that the surgeon general has taken ownership of the actual instruction."

In announcing the new tests, Jumper said it was time to change the attitude that was costing the service valuable manpower. "Every year," he said, "we muster out about 400 people from our Air Force because of fitness issues."

Jumper added that fitness should also be an area of concern for Air Force civilian employees.

Battle of the Bulge

Of the four elements in the new fitness test, the measurement of body composition may be the toughest for some members because it will require the most work to show any improvement. The actual measurement is deceptively simple. Schmidt said, "It's a single abdominal measurement with a tape measure, independent of height or age."

The test is based on the recommendations of the National Institutes of Health, which maintains that males with an abdominal circumference

USAF photo by SSGT Dawn Finniss



Airmen in Southwest Asia begin a group fitness run on Oct. 29. Deployments to regions of extreme temperatures are one reason USAF has instituted a tougher physical fitness program.

greater than 40 inches are at a high health risk and at 35.5 inches, they are at a moderate health risk. For females, 32.5 inches is the moderate risk point and more than 35 inches is high risk.

"If you are over those," remarked Schmidt, "then you go to that body-composition improvement program."

The actual scoring of body composition and other factors will be on a numerical scale. The aerobic fitness component includes the 1.5-mile run. (The run time, based on research from Cooper Clinic, also can be equated to the VO-2 score from the bicycle test.)

On the aerobic fitness test, one can score between zero and 50 points. Scores on body composition can range from zero to 30 points. One can get up to 10 points, each, for push-ups and crunches.

"You will notice that 50 points go to aerobics fitness, because we know that's the best single indicator for overall fitness," said Schmidt.

In contrast, there is little research to help the Air Force determine the fitness component of push-ups and crunches.

USAF has published separate charts for males and females, dividing them into five-year age increments. A male under 25, for example, will have to complete the run in 9.36 minutes or score at least 54 on the bike test to earn the maximum of 50 points. To gain top points on the other components, he will have to have an abdominal circumference of 32.5 inches or less, do 62 or more push-ups in one minute, and do 55 or more crunches in a minute.

A male over 55 still will have to have a 32.5-inch waist. However, he is allowed more than 11 minutes for the run and can score as low as 47 on the bike for a top aerobics score. He can max the other scores with only 35 push-ups and 41 crunches in one-minute periods.

Women are allowed more time for the run than men in the same age brackets and are required to do fewer push-ups and crunches to win the same number of points. In the body composition component, however, women of all ages must have smaller measurements. A waist circumfer-



USAF photo by SrA. Cal Trombley

Two airmen at Kunsan AB, South Korea, wear bomb suits during a PT session designed to test their ability to work in the suits as well as their fitness. They also ran the 1.5-mile portion of the new fitness test in the 65-pound suits.

ence of 29.5 inches or less is needed for top points.

Can You Compensate?

If a person's body composition measurement is too high, will it be possible to make up for it by scoring well on the rest of the factors and still pass?

Schmidt has doubts.

"You would probably have to do very well in all the fitness components once you go over the 40 inches," she said. "But let's say you have a 38-inch waist. As long as you do well on the fitness components, you could get a good score. So there are ways that those borderline people could do it, but once they get over that 40, it's going to be a lot more difficult unless they are very fit. We haven't yet seen where there was a very fit male who had a waist over 40 inches. You can just see that their fitness scores are as low as their waistlines are high."

Another major change in USAF's approach to fitness will be how it holds members to account. In the past, the service laid down guidelines but left it pretty much up to the member to follow them. As Schmidt said, "Our Air Force instruction said that you should have 30 minutes of cardio training or aerobic fitness

training to include such things as jogging, biking, swimming. So there are some examples there. And the instruction said that it should include strength training, either machine-based or calisthenics-based type muscular fitness and flexibility. That was in there, but it was up to the individual what he or she did."

Now, however, unit commanders will be held responsible for their troops. Jumper said, "We are planning ... to put responsibility for PT in the chain of command, not with the medical community or the commander's support staff. I expect this effort to be led from the top, starting with commanders and senior NCOs, and I expect those who have trouble meeting the standards to be helped by others in their units until they do meet the standard."

The Chief gave this example: "While we have weight and body fat standards that we must meet, there will be some, weightlifters in particular, who may be perfectly fit but not meet these standards. This is where I expect commanders to step in and make a decision. Everyone will have to pass the commander's eyeball test about how fit we are to wear the uniform."

The testing and the remedial efforts will be demanding, but Schmidt said she thinks that supervisors won't begrudge the time members have to take off to comply.

"I haven't really heard a lot of talk about the duty time," she said. ■

Bruce D. Callander is a contributing editor of Air Force Magazine. He served tours of active duty during World War II and the Korean War and was editor of Air Force Times from 1972 to 1986. His most recent article for Air Force Magazine, "A Short History of Medals," appeared in the December 2003 issue.

The legendary scientist used every available means to push the Air Force into the future.

Von Karman's Way

By Walter J. Boyne

HUNGARIAN-BORN Theodore von Karman is considered one of the great aeronautical scientists of the 20th century. Yet, his organizational achievements were no less important than his technical eminence. In all the history of aviation there has never been a more productive alliance than that of von Karman and Gen. Henry H. "Hap" Arnold. The results of their efforts did much to bring the United States Air Force to its current state of unmatched capability and power.

Von Karman could interpret Arnold's visions of the future, which were not always clearly stated. He gave Arnold new ideas and suggestions even as he established a strong liaison between military leaders, scientists, and academics. Arnold in turn gave von Karman the resources, facilities, contracts, methodology, and approval on a vastly larger scale than would otherwise have been possible. In addition, Arnold gave von Karman the broadest charter with which to shape future military aeronautical requirements and even military organization. This allowed von Karman to make full use of his gigantic talents to guide the Air Force to conform to Arnold's inspired perception.

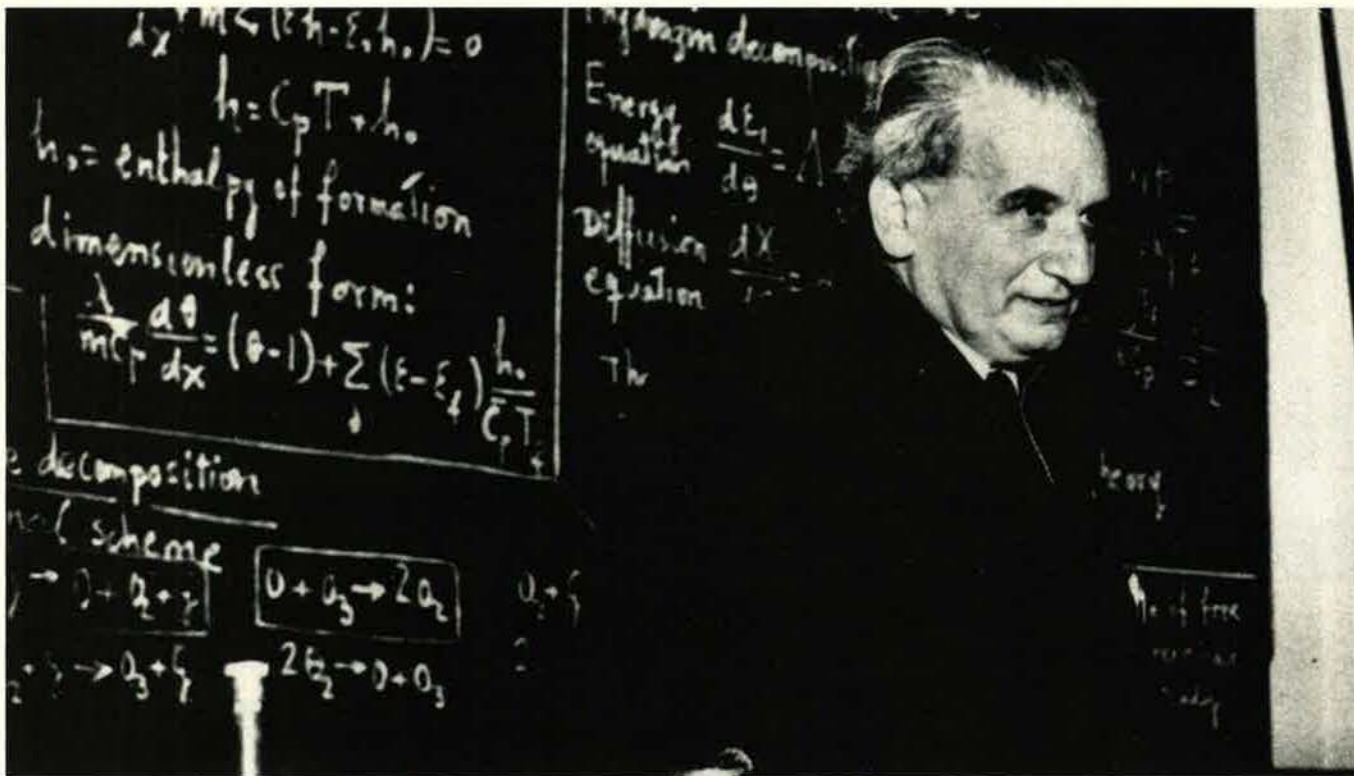
The two men had vastly different

backgrounds and personalities. Many were surprised that they not only hit it off but also worked well together. Where the irascible Arnold often was direct to the point of rudeness, von Karman was always indirect, persuading rather than commanding others to do his will. Arnold was a big, bluff man who was impatient with subordinates not working swiftly enough to suit him. Von Karman was not self-effacing, but certainly was never belligerent. More than anything else, they differed in what would today be called their "operational tempo." While Arnold was always going full speed, driving his aides to do more and more, faster and faster, von Karman mixed business and pleasure constantly.

While many of his colleagues held themselves out as pure scientists, von Karman did not stop at the level of theory. He also engaged in practical matters across the entire spectrum of flight. He worked with and contributed to the practical design of helicopters, Zeppelins, and all manner of aircraft, from gliders to rocket-powered airplanes. An early advocate of wind tunnels, he improved their design and saw to it that they were available when needed at the institutions he supported.

Although his persona and his normal method of operation were not

Theodore von Karman was a theorist and more—much more. His impact on the Air Force is still felt.



overly dynamic, he was a great organizer and administrator, a leader who seemed to dispense with paperwork but who nonetheless had in his mind at all times the budget figures of every department under his control.

Four factors produced von Karman's ability to foster aeronautical progress. His technical genius was revealed early and confirmed in the many discoveries and hundreds of papers produced throughout his long life. He had a vision of the future that surpassed that of his contemporaries and largely came to fruition during his lifetime. He was able to provide counsel to people at many levels—from military leaders to students. Finally, he had a gift for leadership that was most often exercised without giving orders.

A Prodigy

Theodore von Karman was a third son, born to a middle-class Jewish family in Budapest on May 11, 1881. His father, Maurice von Karman, was a distinguished professor of philosophy and education at the Peter Pazmany University in Budapest. Theodore's mother, Helen, came from a long line of scholars and was herself a brilliant and cultured woman.

Theodore first displayed his mathematical brilliance at the age of six by easily multiplying six-figure numbers in his head far more swiftly

than the adults he was entertaining could do on paper. For fear that his technical ability would overwhelm his educational development in other areas such as history and literature, his father banned high-level mathematical training until he was older.

Curiously, von Karman got off to a comparatively slow start in his career, partly because of the nature of European academe at the time, partly because of the adverse effects of his rivalry with Ludwig Prandtl (who for many years was deemed the dean of aerodynamics), and partly because of his required military service.

Von Karman in 1902 graduated with distinction from the Royal Joseph University of Polytechnics and Economics in Budapest. His first published paper dealt with a mathematical formula used to calculate the mass needed to prevent valve clatter in a piston engine. Von Karman had a faculty for sensing the basic physical elements of an abstract process, then analyzing these with relatively simple mathematics. He next tested the results in the laboratory and then followed through with an application to the real engineering problem.

He was called into the Royal Austro-Hungarian Army and served for a year in the artillery, leaving in

1903 with a reserve commission and returning to Budapest to become an assistant professor at Royal Joseph. In 1906, he produced his first internationally recognized paper, "The Theory of Buckling and Compression Tests on Long Slender Columns." It proved invaluable for engineers designing bridges, buildings, and aircraft.

Later that year, he received a fellowship to the University of Göttingen in Germany, where he began his long rivalry with Prandtl. Prandtl observed in later years that von Karman tended to reap the fame associated with discoveries without spending the conventional amounts of time in the trenches of basic research. It did not help matters that von Karman published the paper "On the Mechanism of the Resistance That a Moving Body Experiences in a Fluid"—a subject that Prandtl had been investigating.

At the beginning, Prandtl was von Karman's teacher and gave freely of his knowledge. Von Karman's reputation began to grow as a result of a series of well-received papers. Prandtl, through jealousy or indifference, then would do nothing to foster von Karman's career.

Long Wait

It was six years before a position opened for von Karman. He arrived



at the Aerodynamics Institute of Aachen, Germany, as director in February 1913 and immediately set about trying to make it a premier center for aerodynamic research. He became friends of the German industrialist Hugo Junkers, who gave von Karman contacts and contracts. His first achievement was to transform the Aachen wind tunnel, from a traditional open-ended system into the more modern closed circulating system. The new tunnel tested basic designs that led to the successful series of Junkers all-metal, cantilever-wing aircraft.

When World War I broke out in August 1914, von Karman was recalled to active duty. In February 1915, he designed gun emplacements for the defense of Budapest. In August 1915, he was made director of research for the Austro-Hungarian Aviation Corps and given extensive facilities and staff. It was an ideal assignment, and he converted a Zeppelin hangar into a laboratory that investigated a host of ideas, including self-sealing fuel tanks and machine gun synchronizers.

He emphasized development of the PKZ 1 helicopter, called the *Schraubenfesselflieger* ("rotor-driven tethered aircraft"). It was intended to substitute for the dangerously flammable observation balloons used in artillery spotting. Powered by an Austro-Daimler electric motor, it had a rotor speed of 700 rpm and made at least four flights. Von Karman's colleague, Engineer Lieutenant Wilhelm Zurovec, continued

ing members from nations that had opposed each other in the war.

Prophetic Decision

In 1926, von Karman made the most important decision of his life. Against the advice of his mother, he agreed to come to the United States to accept an offer to consult for the Guggenheim Aeronautical Laboratory at the California Institute of Technology in Pasadena, Calif. Noted physicist Robert A. Millikan, who was chairman of Cal Tech's executive council, had persuaded von Karman to come in the hope that, once he experienced the California climate, handsome salary (some three times his earnings in Aachen), new facilities, and opportunity to create



At top, the JATO-laden Ercoupe takes off from March Field, Calif. Above, von Karman (center) sketches a plan on the wing. His team, from left: Clark Millikan, Martin Summerfield, Frank Malina, and Capt. Homer Boushey.

the design with the PZK 2, which employed three 100 hp Gnome rotary engines and featured counter-rotating rotors.

When the war ended in victory for the Allies, restrictions were placed on foreign travel for enemy officers, so von Karman remained in Budapest, serving as his father had in the Ministry of Education. In 1919, he returned to Aachen, which he turned into the pre-eminent aeronautical institution.

The Hungarian expatriate gained fame with his sponsorship of the 1922 International Congress on Aerodynamics and Hydrodynamics in Innsbruck, Austria. He broke precedent by invit-

a new aeronautical center, he would agree to stay.

Stay he did, although he did not make a formal decision until October 1929. By then, he had seen many things, including the rise of a Nazi movement in Germany that foreshadowed oppression for the country's Jews.

In Pasadena, von Karman achieved the same scientific, organizational, pedagogical, administrative, and public relations success as in Aachen. He developed a close working relationship with the Douglas Aircraft Co., which initially provided instructors for the institute's airplane design courses. The institute completed construction of the laboratory, in-

cluding, as its major research facility, a 200 mph wind tunnel. The tunnel was soon operating full time and was available to other aircraft manufacturers. Just as Millikan had hoped, Southern California was becoming a magnet for aviation.

Although Cal Tech did not graduate many students, those it did were outstanding and all benefitted from a close relationship with von Karman, who became a US citizen in 1936. It was von Karman who recognized the genius in such students as Frank J. Malina, even though Malina's interest in rocketry was foreign to him. (Malina went on to help found NASA's Jet Propulsion Lab and was instrumental in rocket science development.)

With students such as Malina and many achievements in the industry, von Karman in 10 years had raised the Guggenheim lab to the level of Goettingen, where his old rival, Prandtl, still held sway. In addition, von Karman reached a peak in his own field with the presentation of a paper entitled "Mechanical Similarity and Turbulence" and had the pleasure of presenting it to the Goettingen Scientific Society. When von Karman verified the works experimentally, and published the results in the *Journal of the Institute of Aeronautical Sciences*, Prandtl had to acknowledge his pre-eminence.

Far from being of mere academic interest, von Karman's law of turbulence affected almost every aspect of aviation, from the declining field of airships to the barely explored field of rocketry and the supersonic aircraft of the future.

Oddly enough, von Karman's long and fertile association with Hap Arnold began with rocketry, a field in which neither man had a strong interest. Von Karman, placing his confidence more in Malina and his associates than in rocketry itself, allowed what became known on campus as the "Suicide Club" to carry on experiments that ultimately led to the first work with jet-assisted takeoffs (JATO). Von Karman, with his sense of public relations, used the term "jet" rather than "rocket" because the latter was denigrated by many scientists as being "Buck Rogers-ish."

Meeting Arnold

Millikan and Arnold were friends from World War I, and Arnold often visited Cal Tech, where Millikan introduced Arnold to von Karman. De-

spite their differences in appearance and outlook, they became friends. Von Karman, who remembered his days as a junior officer, was pleased that Arnold, obviously a rising star in the Army Air Corps, treated him with respect.

On a visit in May 1938, Arnold became aware of the rocketry experiments at Cal Tech and saw their potential for assisting heavyweight takeoffs. Reuben H. Fleet of Consolidated Aircraft was also interested, and, as a result, a contract was let for a JATO feasibility report. It took months of experimentation, but the combination of von Karman's theoretical equations and Malina's experimentation proved successful. On Aug. 12, 1941, Capt. Homer A. Boushey, a Cal Tech graduate, made the first successful US JATO takeoff, piloting an Ercoupe, a small civilian airplane, at March Field, Calif.

From this point on, the association between Arnold and von Karman—and between science and the Air Corps—became ever closer. Arnold, who had become Chief of Air Corps in September 1938, realized the Army Air Corps desperately needed to pursue aeronautical research and development to bring it on a par with European air forces.

As Arnold became busier, so did von Karman. In addition to his Cal Tech duties, von Karman in March 1942 began supervising the newly founded Aerojet Engineering Corp.

to build JATO units for the military.

In mid-1943, the US Army Air Forces became aware of the existence of the large German rockets that would ultimately be known as the V-2. Arnold asked von Karman to comment on the probability of the success of such a rocket. Drawing on the talents of his Suicide Club disciples, von Karman rendered an opinion that such a rocket was feasible and could strike Great Britain from the Continent.

As a result, he was asked to begin immediate, large-scale rocket experiments, commencing with a one-year, \$3 million contract. To execute the contract, von Karman on Nov. 1, 1944, set up at Cal Tech what later became known as the Jet Propulsion Laboratory. Thus, within less than three years, he had founded two organizations that would have enormous influence on the future of American aeronautics and aerospace.

Arnold and von Karman were both workhorses and both neglected their health. In September 1944, Arnold was suffering from a heart condition, and von Karman was recovering from surgery. They met at LaGuardia Field, N.Y., conducting their talks in Arnold's staff car. In essence, Arnold told von Karman that the war was won and that the future was his biggest concern. He asked his old friend to form a group of the best, most practical scientists to determine the effect on airpower of jet propulsion, atomic energy, electron-



Von Karman (left) inspects a model used in wind tunnel research at the Arnold Engineering Development Center. The occasion was the 1959 opening of the Von Karman Gas Dynamics Facility. With him are (l-r) Lt. Gen. Bernard Schriever, Hugh Dryden, J.V. Charyk, and Maj. Gen. Troup Miller Jr.



Von Karman (left) meets with another airpower legend, Alexander de Seversky, and Capt. James Jabara, who would become a leading ace of the Korean War, at the 1951 Air Force Association National Convention in Los Angeles.

ics, and all of the developments that had occurred during World War II.

Charting the Future

Von Karman chose four key associates: Hugh L. Dryden, George S. Schairer, Frank Wattendorf, and Vladimir Zworykin. They, in turn, selected an elite group to form what would be known as the Scientific Advisory Group (later the Scientific Advisory Board). The group was the key to charting the future of an independent Air Force, although von Karman later had to fight to maintain its influence.

Arnold, his health failing and his time as Commanding General of the AAF growing short, tasked von Karman to make a survey of advances in aeronautics by the Axis powers and compile a report.

Von Karman did so with his customary gusto. In the process, he interviewed Prandtl, who was still director at Goettingen and unembarrassed by his support of the Nazi regime.

The report came to Arnold in two parts. The first, *Where We Stand*, was submitted on Aug. 22, 1945. It predicted, among other things, supersonic flight, intercontinental ballistic missiles armed with nuclear warheads, surface-to-air missiles, vastly improved communications, more capable electronics, and in-flight refueling.

Even more powerful was the second part, *Toward New Horizons*. It was the work of an outstanding group

of 25 scientists, who produced 33 monographs, arranged in 11 volumes. In these, the scientists pointed out the basic scientific potential that could change the future of airpower.

Von Karman wrote the first volume himself, calling it *Science, the Key to Air Supremacy*, and presented it to Arnold on Dec. 15, 1945. In it, he warned of the danger of a future atomic exchange and called on the United States to spend the necessary research and development funds to erect a defense of its territory. In passages that have eerie application to today's conditions, he advocated a powerful air attack that could reach remote targets quickly and would allow the immediate establishment of air superiority.

Von Karman extended his opening volume to include advice on improving the interaction of both the military and industry with civilian scientific organizations, universities, and laboratories.

After Arnold retired in June 1946, he was succeeded by Gen. Carl A. Spaatz, who believed in research and development but did not have Arnold's

visceral interest in the matter. To compensate, von Karman recruited younger officers such as Donald L. Putt (who would lead Air Research and Development Command and serve as military director of the Scientific Advisory Board) and Bernard A. Schriever (who is known as the architect of the Air Force's ICBM and space programs) and called on veterans such as Jimmy Doolittle to back his cause. His efforts carried the day.

Honors began to flood in from all over the world. Britain's prestigious Royal Society made von Karman a member. He received the Presidential Medal of Merit and eight honorary doctorates. When he received the Air Force Association's Science Trophy, the citation read, "It is virtually impossible to find a branch of aeronautics in which Dr. von Karman has not taken a major, active interest."

Almost singlehandedly, and against military opposition in many North Atlantic Treaty Organization countries, von Karman succeeded in creating the NATO Advisory Group for Aeronautical Research and Development. He overcame problems in funding, personnel, and mission specification to establish what corresponded to USAF's Scientific Advisory Board for NATO's newly emerging air forces.

In his later years, von Karman continued his whirlwind pace, accumulating more honors and writing still more papers. In 1961, his 80th birthday was celebrated in the Washington, D.C., Sheraton Park Hotel, and attendees included Vice President Lyndon B. Johnson and senior scientists and military men from the United States and other nations. His last, and perhaps most satisfying, honor came on Feb. 18, 1963, in the Rose Garden of the White House. There, President John F. Kennedy presented him with the first National Medal of Science, recognizing all that von Karman had done for aeronautics and the new age of space.

Theodore von Karman died on May 7, 1963. ■

Walter J. Boyne, former director of the National Air and Space Museum, is a retired Air Force colonel and author. During 2003, he published five new books and edited six more. They include his latest, Operation Iraqi Freedom: What Went Right, What Went Wrong, and Why; as well as Dawn Over Kitty Hawk: The Novel of the Wright Brothers; The Influence of Air Power Upon History; The Chronicle of Flight; and Rising Tide: The Untold Story of the Russian Submarines That Fought the Cold War (with Gary E. Weir). His most recent article for Air Force Magazine, "The Tactical School," appeared in the September 2003 issue.

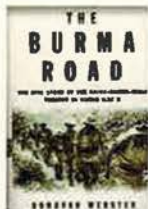
Books

Compiled by Chequita Wood, Editorial Associate

The 44th Bomb Group in World War II: The "Flying Eight-Balls" Over Europe in the B-24. Ron Mackay and Steve Adams. Schiffer Publishing, Ltd., Atglen, PA (610-593-1777). 272 pages. \$59.95.



The Burma Road: The Epic Story of the China-Burma-India Theater in World War II. Donovan Webster. Farrar, Straus, and Giroux, New York (888-330-8477). 370 pages. \$25.00.



Operation Iraqi Freedom: What Went Right, What Went Wrong, and Why. Col. Walter J. Boyne, USAF (Ret.). Forge Books, New York (212-388-0100). 304 pages. \$25.95.



Aerospace Design: Aircraft, Spacecraft, and the Art of Modern Flight. Anthony M. Springer, ed. Merrell Publishers, Chatham, NY (800-343-4499). 192 pages. \$49.95.



Combat Legend: Mitsubishi Zero. Robert Jackson. Stackpole Books, Mechanicsburg, PA (800-732-3669). 96 pages. \$14.95.



The Royal Air Force in Texas: Training British Pilots in Terrell During World War II. Tom Killebrew. University of North Texas Press, Denton, TX (800-826-8911). 182 pages. \$26.95.

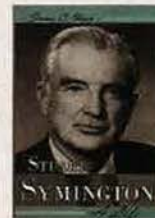
American Fighter-Bombers in World War II: USAAF Jabos in the MTO and ETO. William Wolf. Schiffer Publishing, Ltd., Atglen, PA (610-593-1777). 391 pages. \$59.95.



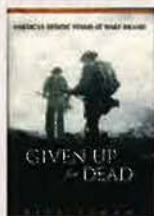
Genda's Blade: Japan's Squadron of Aces, 343 Kokutai. Henry Sakaida and Koji Takaki. Specialty Press Publishers and Wholesalers, North Branch, MN (800-895-4585). 208 pages. \$49.95.



Stuart Symington: A Life. James C. Olson. University of Missouri Press, Columbia, MO (800-828-1894). 550 pages. \$39.95.



And If I Perish: Frontline US Army Nurses in World War II. Evelyn M. Monahan and Rosemary Neidel-Greenlee. Alfred A. Knopf, New York (800-733-3000). 514 pages. \$30.00.



Given Up for Dead: America's Heroic Stand at Wake Island. Bill Sloan. Bantam Books, New York (800-733-3000). 412 pages. \$24.95.



Transformation Under Fire: Revolutionizing How America Fights. Douglas A. Macgregor. Praeger Publishers, Westport, CT (800-225-5800). 300 pages. \$34.95.

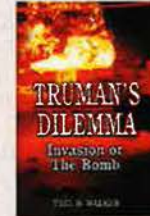
The Bird Is on the Wing: Aerodynamics and the Progress of the American Airplane. James R. Hansen. Texas A&M University Press, College Station, TX (300-826-8911). 273 pages. \$24.95.



The Iraq War: Strategy, Tactics, and Military Lessons. Anthony H. Cordesman. Center for Strategic and International Studies, Washington, DC (202-887-0200). 572 pages. \$25.00.



Truman's Dilemma: Invasion or the Bomb. Paul D. Walker. Pelican Publishing, Gretna, LA (800-843-1724). 267 pages. \$23.00.



Brave Men, Gentle Heroes: American Fathers and Sons in World War II and Vietnam. Michael Takiff. William Morrow, New York (212-207-7000). 552 pages. \$25.95.



Medal of Honor: Portraits of Valor Beyond the Call of Duty. Peter Collier. Workman Publishing, New York (212-254-5900). 253 pages. \$40.00.



US Airborne Forces of the Cold War. Leroy Thompson. Stackpole Books, Mechanicsburg, PA (800-732-3669). 72 pages. \$14.95.

By Frances McKenney, Assistant Managing Editor

AFA Observes Veterans Day

Air Force Association Chairman of the Board John J. Politi observed Veterans Day in Washington, D.C., attending a White House breakfast that morning and a later ceremony at Arlington National Cemetery.

During the reception for the White House breakfast, which honored US military veterans, Politi met President Bush. Among the Cabinet officials at the gathering were Secretary of Defense Donald H. Rumsfeld, Secretary of State Colin Powell, Secretary of Homeland Security Tom Ridge, and Attorney General John Ashcroft.

The AFA Board Chairman then traveled across the Potomac River to the Veterans Day ceremony at the open-air amphitheater in Arlington National Cemetery. A 21-gun salute noted President Bush's arrival for this 11 a.m. ceremony on the 11th day of the 11th month, marking the 85th anniversary of the armistice for World War I.

The President spoke about the service and sacrifice of US military members and their families, then laid a wreath at the Tomb of the Unknowns, near the amphitheater.

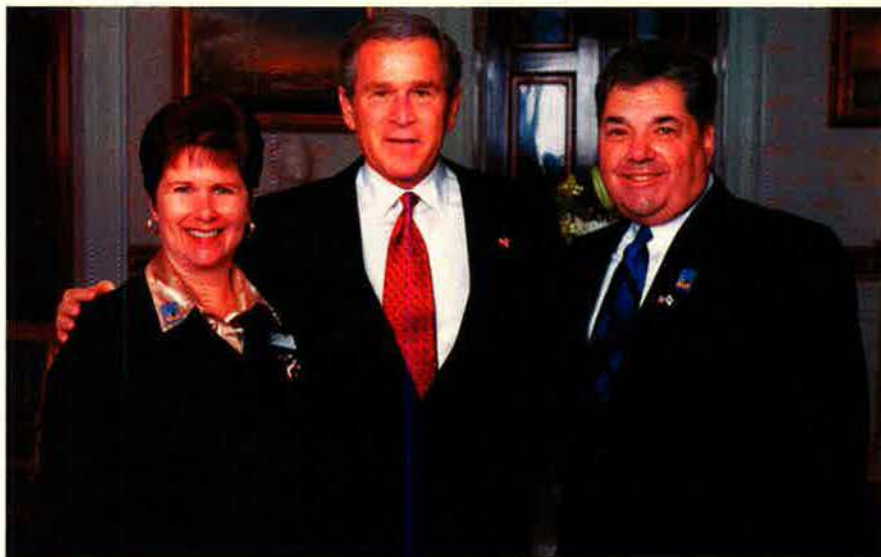
Politi, who was introduced to the audience as the AFA representative, later set an AFA wreath at the tomb, in a formal presentation. He was assisted by a member of the Army honor guard that stands watch over the white marble sarcophagus 24 hours a day, year round. The tomb contains the unidentified remains of a World War I soldier. White marble slabs set into the ground next to it honor the unknowns from World War II, Korea, and Vietnam.

Testing the Future

AFA National President Stephen P. "Pat" Condon visited Arnold Engineering Development Center at Arnold AFB, Tenn., in November.

AEDC enables researchers to simulate flight, via wind tunnels, from subsonic to hypersonic speeds at altitudes from sea level to space. The center comprises the nation's largest complex of flight simulation test facilities—some 58 sites, including a hypervelocity tunnel in Maryland.

AEDC was familiar territory for



White House by Paul Morse

President Bush met with AFA Board Chairman John Politi and Terri Politi at a White House breakfast on Veterans Day. The chairman and the President discussed AFA's mission and its role in the passage of the Military Family Tax Relief Act and concurrent receipt.

Condon, who was the center's commander from 1986 to 1989. In his re-orientation this fall, he looked over upgrades to the center's propulsion wind tunnel, several test cells for jet engines, and the hypersonic test facility being updated to test ramjets at high Mach numbers.

While in the Tullahoma area, Condon met with the AFA Tennessee state officers and the presidents of the state's five units: the **Chattanooga, Everett R. Cook, Gen. Bruce K. Holloway, H.H. Arnold Memorial, and Maj. Gen. Dan F. Callahan Chapters.**

He later spoke at a dinner meeting of the Arnold Memorial Chapter, headed by Chapter President Claude S. Morse. In his remarks to this gathering at the all-ranks Arnold Lakeside Club, Condon talked about the dedication of service members, highlighting the sacrifices of those who served in World War II, as well as today's military members.

New Jersey to Oman

It started when Mary F. Lower, chapter secretary for the **Highpoint Chap-**

ter (N.J.), read a newspaper article about a Navy pilot's visit to Carmela Catizone's fourth-grade classroom.

Lower figured that Catizone was precisely the kind of teacher who could fit Visions of Exploration into her curriculum. (Visions is a joint program of *USA Today* newspaper and the Aerospace Education Foundation. It encourages youngsters in grades four through eight to study math, science, and technology.) So Lower visited the Durban Avenue School in Hopatcong, N.J., and offered to have the chapter sponsor Catizone's classroom in the Visions program. Catizone and another Durban Avenue teacher, Rick Scherr, agreed to participate.

That school year, nearly 1,400 classrooms nationwide signed up for Visions of Exploration. Teachers received 18 weeks of lesson plans for selected math, science, and technology articles previously published in the newspaper, and the classrooms received 30 copies of *USA Today* one day a week for that period, along with a lesson plan for activities tied to the news.

Catizone said the newspapers got her students interested in current events, just as the US prepared for war with Iraq. With backing from her principal, permission from parents, and help from three enlisted USAF members—including her brother, SSgt. Clifford Giampietro—deployed to Thumrait, Oman, Catizone arranged for her students to become pen pals with airmen overseas. They called their project Operation Patriotic Adventure.

Catizone's classroom "adopted" about 16 pen pals. Through word of mouth, the program spread to other classrooms in New Jersey, New York, and Massachusetts, eventually involving correspondence with more than 300 airmen. Catizone said her classroom functioned as "main headquarters" as Patriotic Adventure grew.

At one point, her students sent 16 copies of *Charlie and the Chocolate Factory* to their Thumrait pen pals. Then they all discussed the book through e-mail. The youngsters also mailed off bubble gum, candy bars, cookies, and photographs to their overseas friends.

The airmen, in turn, sent back mementos and items that turned out to have great educational value. Catizone said a staff sergeant from Davis-Monthan AFB, Ariz., recorded a CD on which he recited the 50 states in alphabetical order, in 22 seconds. Catizone's students took this as a challenge to learn the states—and beat his time. One tech sergeant wrote a letter on what the US flag meant to him. It was read to all students over the public address system and became part of the school's 9/11 memorial service.

Catizone's former students—and

AFA In Action

The Air Force Association works closely with lawmakers on Capitol Hill, bringing to their attention issues of importance to the Air Force and its people.

- Lawmakers included a provision in the Fiscal 2004 National Defense Authorization Act for a more balanced approach between the environment and military training. Gaining some relief from environmental restrictions placed on military ranges and other training facilities was a key initiative for AFA and spawned a letter campaign last August as House and Senate authorizers were working to finalize the defense budget. (See "AFA in Action," October, p. 75.) The letters emphasized the need to preserve military readiness and debunked some of the myths about military training impacts on the environment.

- The AFA team helped **Rep. Martin Frost** (D-Tex.) in his effort to make the naturalization process easier for military service members who want to become US citizens. Executive Director Donald L. Peterson sent a letter expressing AFA's support to the Congressman for inclusion in his news release highlighting the issue. Portions of Frost's legislation on the issue were included in the Fiscal 2004 defense authorization bill.

- AFA's "Contact Congress" page on the association Web site (www.afa.org) enabled hundreds of AFA members to signal their Congressmen of their support for full concurrent receipt. Association leaders have worked for years to encourage lawmakers to allow military retirees to receive both their military retired pay and VA disability compensation, and that effort paid off to a large extent in the 2004 defense budget. (See "Action in Congress," p. 20.) The "Contact Congress" page provided an avenue for AFAers to follow the issue and learn of recent votes, as well as a direct e-mail to their representatives.

her current fourth-graders—took up the project again after the summer break. "Not a day goes by that we don't send out or receive e-mails," she said.

Flying Tiger in Fairbanks

Flying Tiger Dick Rossi was a keynote luncheon speaker for Aviation North Expo 2003, a four-day event for general aviation pilots, held in Fairbanks, Alaska. After his presen-

tation to the expo attendees, Rossi spent the afternoon talking to visitors at an AFA booth set up by the **Fairbanks Midnight Sun Chapter**.

Just before the US entered World War II, John Richard Rossi resigned his commission as a Navy pilot and by November 1941 was in Rangoon, Burma, training on P-40s with Claire Lee Chennault's American Volunteer Group. The group earned the nickname Flying Tigers as they helped the Nationalist Chinese fight the Japanese.

Rossi was a flight leader in the Flying Tigers' 1st Squadron. After the Flying Tigers disbanded in July 1942, he joined the China National Aviation Corp., flying supplies from India over "The Hump" into China. He went on to fly for Chennault's China Air Transport line and helped found Flying Tiger Line.

Chapter member William F. McDonald set up the expo's AFA booth to provide an appropriate setting for Rossi. McDonald collects vintage American, Japanese, and German military memorabilia, as well as documents, art, and music to illustrate a particular era. His display for Rossi focused on Flying Tiger photos and books, such as *A Flying Tiger's Diary*, autographed by Charles R. Bond Jr., and *God Is My Copilot* by Robert L. Scott. There were also AAF flight helmets, flight suits, and uniforms, as



Capt. Troy Christensen briefs AFA National President Pat Condon at Arnold Engineering Development Center, Tenn. See "Testing the Future," p. 80.

USAF photo by David Housch

AFA & You...side by side.



Air Force Association
1-800-727-3337

Join Today.

Working together for aerospace power, for the Air Force, and for Air Force people—active, Guard, Reserve, civilian. . . . On Capitol Hill, in the power centers of Washington, with the news media, in the nation's classrooms, and in 300 communities and bases worldwide.

Members receive AFA's journal, Air Force Magazine, every month, and our famous USAF Almanac issue each May.

www.afa.org



At Thumrait, Oman, airmen express their appreciation to schoolchildren in New Jersey. AEF's Visions of Exploration program inspired the youngsters to correspond with them. See "New Jersey to Oman," p. 80.

well as aviation cadet yearbooks and some rarely seen hats worn by aviation cadet instructors and trainees.

Teaching the Teachers

The **Hurlburt Chapter (Fla.)** joined Rep. Jeff Miller (R-Fla.) and several corporations and county organizations in sponsoring a workshop to introduce teachers to the aerospace education resources in the area.

The first Northwest Florida Aerospace Education Teachers' Workshop took place Nov. 1 at the USAF Special Operations School at Hurlburt Field. Forty-nine teachers, representing three school districts, gave up a Saturday to take in a full day of information sessions.

Richard Schaller, chapter president, and Col. Michael C. Damron, who is a chapter member as well as commandant of the school, opened the workshop.

L. Boyd Anderson, AEF board chairman, and Mary Anne Thompson, AEF president, were among the presenters. Other roundtables and information sessions covered AEF's Visions of Exploration, Civil Air Patrol, resources such as the Emerald Coast Science Center, competitions such as the Panhandle Science Fair, and aerospace education curriculum development and initiatives such as an aviation and space camp for local students.

But it wasn't all classroom lectures. The teachers checked out a flight-line static display of an AC-130H gunship, an MC-130H Combat Talon II, and an MH-53M Pave Low IV. The 16th Special Operations Wing aircrews and

maintenance personnel had set up the aircraft, and they stood by to field questions. The 19th Special Operations Squadron opened their training facility to the teachers, too, with Lockheed Martin simulator instructors and technicians demonstrating several weapons system trainers.

Workshop attendees included officers from several AFA area chapters: Sandra S. Wood, secretary, and Ronald H. Byrd, treasurer, from the **Eglin Chapter**; TSgt. Michael A. Taylor, president, and SSgt. Haylee L. James, treasurer, from the **Pensacola Chapter**; and James Connors, VP from the Hurlburt Chapter.

Primary organizers for the workshop were Hurlburt Chapter's Jeri Ann Martin, the 2003 recipient of AEF's George D. Hardy Memorial Award; fellow chapter members Glenn Rutland and Angelica Jackson; and Tildon Chavers.

Bet on It

A horse named "Baked Azalea" beat "Laser Bomb," "Chocolot Charmaine," and "Wildridge Cathie" in the second harness racing event sponsored by the **Steel Valley Chapter (Ohio)** at the Mahoning County Fair in Canfield, Ohio, in August. The event put the AFA name in front of some 86,000 fair visitors.

The race was described as a "home talent colt stakes" for three-year-old fillies. Afterward, Baked Azalea posed in front of the grandstand, covered in one of her prize winnings—a blue and red blanket emblazoned with "AFA Steel Valley Chapter 371."

Jack L. Ventling, then chapter president, said the chapter got involved in harness racing because Amy Cervone, chapter treasurer, owns a horse farm and made the necessary contacts.

Good Shot!

A skeet and trap shoot competition at Sheppard AFB, Tex., in October raised nearly \$300 for the aerospace education fund of the **Gen. Charles L. Donnelly Jr. Chapter (Tex.)**.

MSgt. Don W. Mabee, a chapter member from the 383rd Training Squadron at Sheppard, took "top gun honors," reported Lt. Col. Jeffery S. Snell, the chapter's aerospace education VP.

Mabee outscored competitors who included AFA members Maj. Gen. John F. Regni, 2nd Air Force commander, visiting from Keesler AFB, Miss.; Brig. Gen. Arthur J. Rooney Jr., commander of Sheppard's 82nd Training Wing; and Col. H.D. Polumbo, who commands the 80th Flying Training Wing on base.

Along with firing 12-gauge shotguns at clay targets, the fund-raiser included a cookout sponsored by a chapter Community Partner.

The shooting range at Sheppard has five experienced instructors on hand, according to the base newspaper, and everyone receives a safety briefing at what they call the "Shootin' Shack."

Role Model

When the **Harry S. Truman Chapter (Mo.)** held its annual Salute to Youth dinner, homegrown talent turned out to be an exceptional hit with the audience.

Guest speaker for the evening was Lt. Col. Kelley A. Brown, commander of the 375th Mission Support Squadron at Scott AFB, Ill. She is the daughter of the chapter's VP, Jerome E. Hughes. Brown spoke to the group—which included many AFJROTC cadets—about the leadership principles that have been important to her during her Air Force career. Brown is married to Air Force Academy graduate Terry Brown, a former KC-135 pilot now flying for Southwest Airlines, so she drew from a broad base of knowledge as she talked to the audience.

Chapter President Patricia J. Snyder said that after Brown finished her presentation, the young cadets just "swamped her with questions."

The chapter's Salute to Youth serves to recognize cadets sent by the chapter each summer to the American Legion's Boys State and Girls State programs. Boys State and Girls State

events teach youngsters the fundamentals of citizenship and give them an opportunity to learn how government works. The chapter sponsored seven cadets this year.

Regional Workshop

The **Lt. Col. Philip Colman Chapter (Ga.)** hosted the Southeast Region workshop, held at Ft. Gordon, Ga., in October.

Joseph E. Sutter, chairman of AFA's Long-Range Planning Committee and a member of the **Gen. Bruce K. Holloway Chapter (Tenn.)**, reviewed the association's strategic plan from a tactical level and a chapter perspective. Also on the agenda: a presentation by Jack H. Steed from the **Carl Vinson Memorial Chapter (Ga.)**. He is chairman of the AFA Membership Committee.

The president of the Southeast Region, Robert E. Largent, spoke to the more than 30 attendees about performance goals for this year. Victoria W. Hunnicutt, an AEF trustee from the Carl Vinson Chapter, talked about AEF chapter programs, and Jeanne Fetner, a national account manager for *USA Today*, spoke on Visions of Exploration.

Among those at the workshop were Vivian P. Dennis, a national director from the Carl Vinson Chapter; Stanley V. Hood, a national director from the **Columbia Palmetto Chapter (S.C.)**; Rodgers K. Greenawalt, former Southeast Region president; Arthur D. Bosshart, Georgia state president; William D. Duncan Jr., North Carolina state president from the **Blue Ridge Chapter (N.C.)**; David T. Hanson, South Carolina state president from the **Swamp Fox Chapter**; and Gerald V. West, North Carolina state leadership development VP from the **Cape Fear Chapter**.

Applause!

The **Leigh Wade Chapter (Va.)** awards dinner in October called for applause—and lots of it.

The chapter celebrated some 15 awards, including three AFA national-level awards, as listed in the November 2003 issue. In addition, Chapter Secretary Edward R. Martin received the chapter's Member of the Year honor for 2003, as well as a regional-level award for continuous service. Vincent Hughes, a teacher at Manchester Middle School in Richmond, Va., was awarded an AEF certificate as the chapter's Teacher of the Year.

Other awardees included Chapter Treasurer George Aguirre, Early Hartley, Sylvester L. Vaeth, and Chapter


President Julie Bowles, who collected national, regional, state, and chapter honors.

During the evening, several of the chapter's 24 Community Partners received recognition for their longtime support of the chapter. Their participation in the program has made it possible for the chapter to earn an AFA Community Partner Gold Award for six consecutive years, Bowles pointed out.

James M. Crawford, 1931-2003

CMSgt. James M. Crawford, USAF (Ret.), the immediate past region president for AFA's North Central Region, died Nov. 25 in a car accident near Alexandria, Minn. Chief Crawford was 72 years old.

Born in Fresno, Calif., he entered the military at Camp San Luis Obispo, Calif., in 1950 and served as a gunner on B-29s during 30 combat mis-



**"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





This Is the Aerospace Education Foundation

As of Jan. 1, 2004

Chairman of the Board
L. Boyd Anderson

President
Mary Anne Thompson

Secretary-Treasurer
David R. Cummock

Executive Director
Donald L. Peterson

Managing Director
Danny D. Marrs

AEF Trustees
Bonnie B. Callahan
Stephen P. "Pat" Condon
William D. Croom Jr.
Angela Dupont
Victoria W. Hunnicutt
Terry Hamilton
John J. Politi
Coleman Rader Jr.
Sanford Schlitt
Paul Schowalter
E. Robert Skloss
Robert G. Stein
Max J. Stitzer
Jerry White

Executive Directors Emeritus
Russell E. Dougherty
John O. Gray
Monroe W. Hatch Jr.

Trustees Emeritus
John R. Alison
David L. Blankenship
John G. Brosky
George H. Chabbott
George M. Douglas
Michael J. Dugan
Don C. Garrison
Jack B. Gross
Gerald V. Hasler
Leonard W. Isabelle
James M. Keck
Hans Mark
Robert T. Marsh
William V. McBride
Thomas J. McKee
Jack C. Price
Walter E. Scott
Sherman W. Wilkins

AFA's National Committees for 2003-04

Executive Committee. John J. Politi (*Chairman*), Stephen P. "Pat" Condon, Roy A. Boudreaux, W. Ron Goerges, Thomas J. Kemp, Charles A. Nelson, Michael J. Peters, Julie E. Petrina, Michael E. Ryan, L. Boyd Anderson, *ex officio*, Mary Anne Thompson, *ex officio*, Donald L. Peterson, *ex officio*.

Finance Committee. Charles A. Nelson (*Chairman*), David R. Cummock, Mark J. Dierlam, Stephen Dillenburg, Steven R. Lundgren, Jack G. Powell, Coleman Rader Jr., John J. Politi, *ex officio*.

Audit Committee. Richard L. Jones (*Chairman*), Billy M. Boyd, Julie E. Petrina, Brad Sutton, Carl R. Willert, Mark J. Worrick, John J. Politi, *ex officio*.

Membership Committee. Jack H. Steed (*Chairman*), Michael Cooper, MSgt. Maria Cornelia, Dennis R. Davoren, Vivian P. Dennis, Bruce E. Marshall, Brian P. McLaughlin, John P. Nauseef, Thomas J. Stark, Stephen P. "Pat" Condon, *ex officio*.

Constitution Committee. W. Ron Goerges (*Chairman*), Joan Blankenship, David T. Buckwalter, Judy K. Church, Edward W. Garland, Tommy G. Harrison, Joseph Price, John J. Politi, *ex officio*.

Long-Range Planning Committee. Joseph E. Sutter (*Chairman*), Craig E. Allen, Kathleen Clemence, Robert Largent, William D. McGuth, John C. Moore, Steve J. Negron, Robert C. Rutledge, William A. "Skip" Williams, Stephen P. "Pat" Condon, *ex officio*.

Force Capabilities Committee. Richard E. Hawley (*Chairman*), George T. Babbitt Jr., Michael J. Dugan, Rebecca Grant, Monroe W. Hatch Jr., Lester L. Lyles, Thomas S. Moorman Jr., Lloyd W. Newton, John A. Shaud, Lawrence A. Skantze, John J. Politi, *ex officio*.

sions in the Korean War. His 22 years on active duty included two tours in Southeast Asia, and he earned a Bronze Star, among many awards, before retiring in 1973 as the base sergeant major at Minot AFB, N.D.

In his civilian career, Chief Crawford was a manager and general contractor with Mackley Construction in Minot and had recently retired as the company's secretary-treasurer. He also volunteered with many military and community service organizations, from the Retirees Affairs Office at Minot to Habitat for Humanity.

He had held all offices in the **Gen. David C. Jones Chapter (N.D.)**, as well as the offices of AFA North Dakota state president, vice president, and secretary. He was North Central Region president from 2001 until this past September.

More AFA/AEF News

■ AFA Board Chairman Politi was in Colorado Springs, Colo., in November and attended a dinner hosted by George M. Douglas, an AFA national director emeritus from the **Lance P. Sijan Chapter (Colo.)**. Guests included David Thomson, state president; Joan Sell, state vice president;

and Gayle C. White, Sijan Chapter president.

■ Also in Colorado, Col. L.C. Williams, a **Mile High Chapter** member, accepted a donation on behalf of the Tuskegee Airmen Association from Colorado state's Aerospace Education Foundation. The Mile High Chapter had requested that CAEF make the donation to aid the Tuskegee Airmen's aerospace education program. Chapter officials on hand for the presentation were Barbara Baldivia Flores, president; MSgt. Tiffany Turcotte, aerospace education VP; TSgt. Kenneth Bowens, membership VP; and A1C Justin Wheeler, treasurer. The Tuskegee Airmen are African American fighter pilots who trained at Tuskegee, Ala., before serving in World War II.

■ At a drill meet held in Deltona, Fla., Capt. Peter Trzop, president of **Brig. Gen. James R. McCarthy Chapter (Fla.)**, presented the overall best team trophy to AFJROTC cadets from Sandalwood High School in Jacksonville, Fla. The Sandalwood cadets also took home trophies for best drill team and best color guard. Twenty AFJROTC units competed in the annual event, reported Richard A. Ortega, state aerospace educa-

tion VP and a member of the **Central Florida Chapter**.

■ In Warner Robins, Ga., a new Community Partner of the **Carl Vinson Chapter** helps publicize the association by displaying AFA decals. The National Exterminating Co., which knocks out pests in 25 Georgia counties, placed 30 "Wee Wings" AFA decals on windows of its trucks, according to chapter member Jack H. Steed.

■ **Carl Vinson Chapter** President Lynn Morley recently presented \$500 scholarships to five airmen from Robins AFB, Ga.: Capt. Max Weems, 330th Combat Training Squadron; SSgt. Aaron Black and SSgt. Ramsey Smith, 116th Maintenance Squadron; SSgt. Amy McNeal, 93rd Maintenance Squadron; and A1C Brian Wazilenko, 116th Computer Support Squadron. The scholarships are named for the late Sherrill Stafford, a former chapter president. ■

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.

Unit Reunions

reunions@afa.org

1st Strategic Air Depot Assn, Honington-Troston, UK (1942-46). May 20-23 at the Radisson Hotel in Schaumburg, IL. **Contact:** Warren Stanley, 390 N. Winchester 5-1-G, Santa Clara, CA 95050 (408-248-8627) (wstanley@neteze.com).

22nd Military Airlift Sq, Tachikawa AB, Japan. May 5-8 at the Howard Johnson Hotel in Branson, MO. **Contact:** Muriel Wright, 428 Normac Dr., Camdenton, MO 65020 (573-346-7153).

50th FBW, including members from Clovis AFB, N.M., through the F-100 era at Hahn AB, Germany. June 10-12 at the Marriott Hotel in Ogden, UT. **Contact:** Jack Lowrey, 2829 Country Oaks Dr., Layton, UT 84040 (801-544-0315) (jumpnjact@aol.com).

351st BG Assn, Polebrook, UK (WWII). May 27-30 at the Sheraton Hotel in Reston, VA. **Contact:** Clint Hammond, PO Box 281, Mechanicsburg, PA 17055 (717-766-1489).

445th FIS, Wurtsmith AFB, MI. May 18-20 at the Holiday Inn in East Tawas, MI. **Contacts:** Bill Shelton, 8913 Finney Point Dr., Ooltewah, TN 37362 (423-396-3950). (billshelton@mindspring.com) or Bob Stamm, 19012 Saratoga Trl., Strongsville, OH 44136 (440-268-9739) (acornrgrp@adelphia.net).

646th AC&W Sq, Highlands AFS, NJ (1949-59). April 18-22 in Las Vegas. **Contacts:** Bill

Rountree, 3630 N. Tanuri Dr., Tucson, AZ 85750 (520-298-7598) (hwrootree@prodigy.net) or Ed Bell, 410 Radar Rd., Coos Bay, OR 97420 (541-888-6191) (edjeanbell@aol.com).

862nd Engineers Aviation Battalion (1942-56). May 12-16 at the Embassy Suites Airport Hotel in St. Louis. **Contact:** Sherl Hasler, R.R. 7, Box 1111, Bloomfield, IN 47424 (812-384-4666).

3576th Pilot Tng Sq, Vance AFB, OK (1957-59). March 10-12 in Phoenix. **Contact:** Thayne Kraus (623-975-1332) (tkraus5628@aol.com).

A-10 aircraft reunion. Jan. 6 at the Eccles Conference Center in Ogden, UT. **Contact:** Terry Enriquez (801-586-3208) (terry.enriquez@hill.af.mil).

AFROTC Dets. 420 and 930, University of Minnesota Duluth and University of Wisconsin Superior. Oct. 8-9. **Contact:** Helen Sandwick, AFROTC Det. 420, University of MN Duluth, 1229 University Dr., Duluth, MN 55812 (212-726-8159) (air@d.umn.edu) (www.d.umn.edu/air).

Class 44-D, multiengine advanced, Blackland AAF, TX. April 15 in Lakeland, FL. **Contact:** Frank Nash, 3716 Pepper Ridge Dr., Mobile, AL 36693 (251-660-2921).

F-104 Starfighter pilots. May 22 at the Pueblo Weisbrod Aircraft Museum in Pueblo, CO. **Contact:** Jason Unwin, 31001 Magnuson Ave., Pueblo, CO 81001-4822 (719-948-9219) (jbu@piopc.net).

Pilot Class 45-B, all commands. April 1-4 in Huntsville, AL. **Contact:** Paul Wildes, 714 River Haven Cir., Hoover, AL 35244 (205-682-0467) (prdvwildes@aol.com).

Pilot Tng Class 55-S. April 30-May 2 at the Lackland Red Roof Inn in San Antonio. **Contact:** Marv Craig, 737 Kimball Rd., Fort Collins, CO 80521 (970-493-0842) (mrcraig@pilottraining55s.org) (www.pilottraining55s.org).

Veterans of Underage Military Service. April 22-25 at the Lodge of the Ozarks in Branson, MO. **Contact:** R. Thorpe, 6616 E. Buss Rd., Clinton, WI 53525 (608-676-4925).

Seeking members of the **61st Troop Carrier Sq, 314th Troop Carrier Gp**, for a reunion in spring 2004 at Little Rock AFB in Jacksonville, AR. **Contact:** Ben Hendrickson (479-582-9436) (sirben@vfw-online.com).

Seeking personnel who served or trained at **Sampson AFB, NY** (1950-56) for a reunion, including basic trainees, permanent party, Women in the Air Force, and special-school personnel. **Contact:** Chip Phillips, PO Box 331, Williamsville, NY 14231-0331 (chip34@aol.com). ■

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.

AFA on the Green...

Umbrella
Extra large 62" white and blue fabric with the AFA logo printed in white. Fiberglass shaft. \$25

Pro-Style Cap
100% cotton. AFA embroidered on front; full color AFA logo on back. Adjustable. Dark blue. \$20

Lightweight Jacket
60/40 cotton/poly blend. Available in white or tan, both with dark blue collar. Sizes: M, L, XL. \$45

Golf Club Covers
Dark blue furry headcovers. Interior lining protects and provides secure club fit. Order with "Wee wings" or full AFA logo. \$20

Golf Balls
Titanium Top Flight balls by Wilson. Full color AFA logo. Sleeve of 3. \$8.50

Zippo Money Clip
Brushed steel money clip includes ball markers and greenskeeper. \$13

To order call Toll Free 1-800-727-3337 or visit www.afa.org

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 Pacentia, 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, 3243 Ridge Dr., Beale AFB, CA 95903-2139 (530) 788-7676.

HAWAII: Jack DeTour, 98-1108 Malualua 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) 291-8440.

MAINE: Eric P. Taylor, 17 Foxglove Ct., Nashua, NH 03062-1492 (603) 883-6573.

MASSACHUSETTS: Donald B. Warmuth, 136 Rice Ave., Northborough, MA 01532-1510 (508) 393-2193.

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 Giester, 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 Nunamann, 73 Phillips Rd., Branchville, NJ 07826-4123 (973) 334-7800, ext. 520.

NEW YORK: Fred Di Fabio, 8 Dimplin 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., Mountain 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: Kevin Sluss, 122 Alabama Dr., Jacksonville, AR 72076-1000 (501) 987-3983.

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 Liano 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

Every Piece Tells a Story



The United States Air Force Museum at Wright-Patterson AFB, Ohio, preserves thousands of military aviation artifacts. In addition to historic airplanes, the museum's collection includes military uniforms dating to 1916 and personal mementos from aviation pioneers and modern day airmen. Above, examples of what visitors may find: a World War I

airman's battered leather flight jacket; a set of Atlas Missile manuals from the Cold War era; and the flight suit of Lt. Col. Fred Swan, who, along with his crew, received the Distinguished Flying Cross for striking a target of opportunity believed to be a meeting of senior Iraqi leaders on April 7 in Baghdad. Every item tells a story pertinent to the United

States Air Force and the heroic men and women who have served throughout its history.

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.

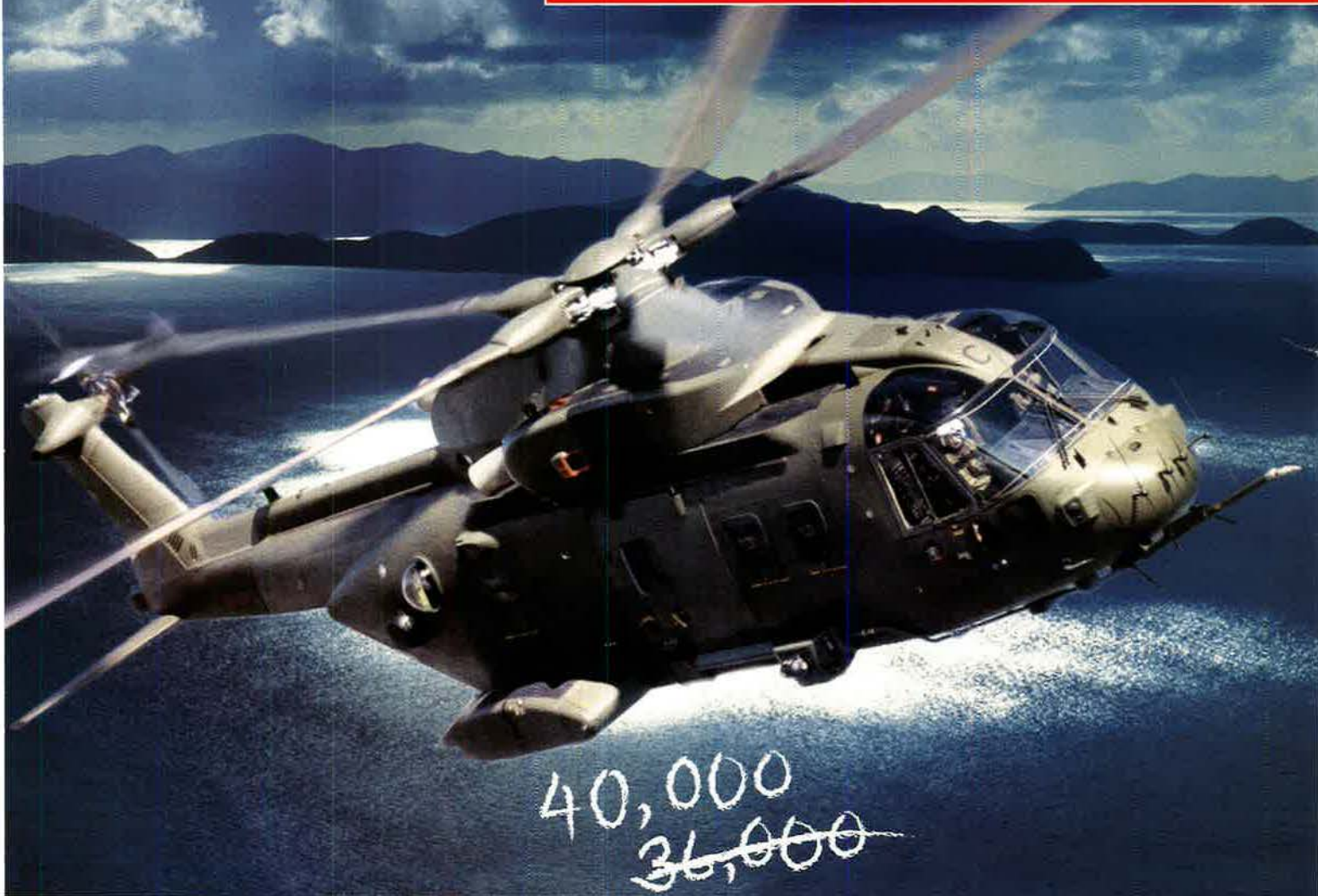
www.northropgrumman.com
www.dsd.es.northropgrumman.com

© 2014 Northrop Grumman Corporation

NORTHROP GRUMMAN DEFINING THE FUTURE™

Electronic Systems

US101



40,000
~~36,000~~

MISSION DRIVEN ~~36,000~~ HOURS.

The only mission-proven choice, from Combat Search and Rescue to Executive Transport.

- Mission-proven worldwide: 40,000 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