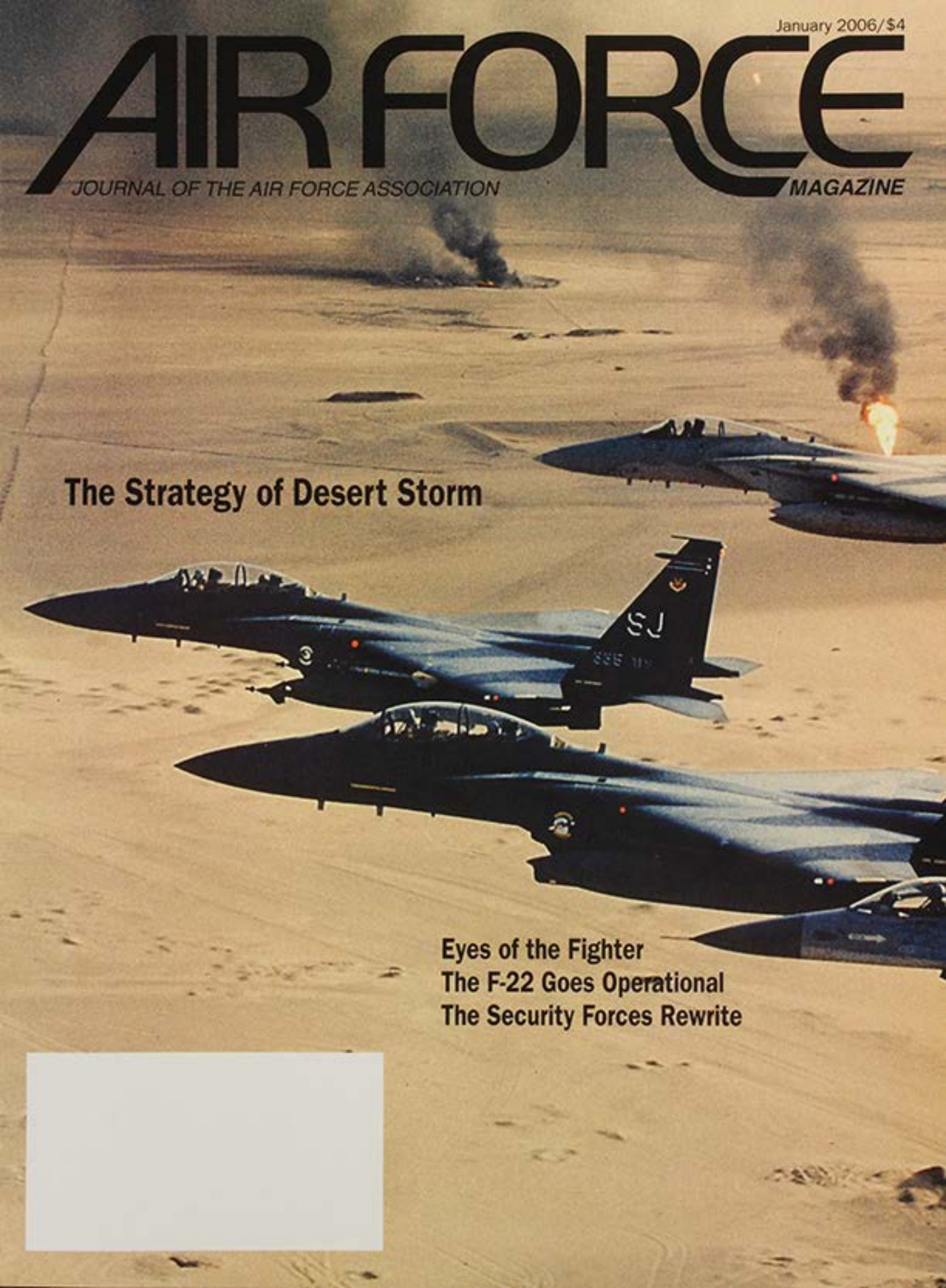


January 2006/\$4

# AIR FORCE

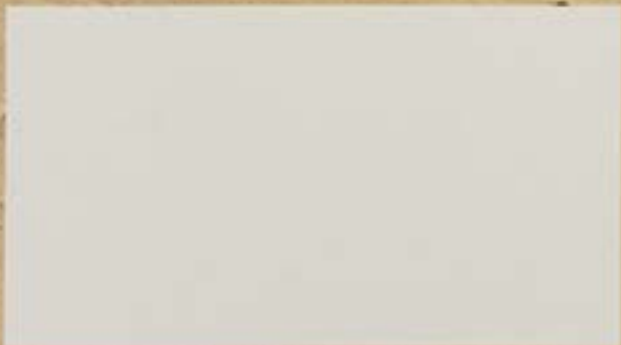
JOURNAL OF THE AIR FORCE ASSOCIATION

MAGAZINE



## The Strategy of Desert Storm

Eyes of the Fighter  
The F-22 Goes Operational  
The Security Forces Rewrite





**TO TAKE THE AOC WEAPON SYSTEM INTO THE FUTURE,  
LOOK TO THE EXPERIENCED TEAM YOU TRUST TODAY.**



U.S. Air Force photo by Tech. Sgt. Ben Bloker

Warfighters know that behind every successful mission are trusted, experienced partners. For over a decade, Lockheed Martin has been providing the innovative technologies and integrated solutions that power the AOC. Bringing today's AOC into the future requires a visionary integrator. One who sees the AOC as a true weapons system. Capabilities-based, and sharply focused on net-centric battlespace management. And above all, one who will deliver a system that will help ensure warfighter success, now and in the future. That integrator is Lockheed Martin's Team AOC. Forward thinking. New technologies. Unprecedented experience.

**LOCKHEED MARTIN**

**RAYTHEON SAIC CSC DYNAMICS RESEARCH GESTALT IBM ISS L3 COMMUNICATIONS**



# AIR FORCE

JOURNAL OF THE AIR FORCE ASSOCIATION MAGAZINE

January 2006, Vol. 89, No. 1

[www.afa.org](http://www.afa.org)

- 4 Letters
- 11 The Chart Page
- 12 Aerospace World
- 18 Senior Staff Changes
- 22 Index to Advertisers
- 24 Action in Congress
- 59 Verbatim
- 76 AFA/AEF National Report
- 78 Unit Reunions
- 80 Pieces of History

**2 Editorial: Battle Damage From the QDR**

By Robert S. Dudley  
*The upshot is that the Air Force of future years will be smaller and less capable than it otherwise would be.*

**8 Washington Watch**

By John A. Tirpak  
*Keeping a Full-Service USAF; Scoping Out the Mobility Requirement; The Japan Card ....*

**26 The Strategy of Desert Storm**

By John T. Correll  
*Fifteen years ago this month, the Gulf War upset prevailing assumptions about airpower and its relationship to the "Air-Land Battle."*

**34 High Anxiety**

By Adam J. Hebert  
*At AFA's Los Angeles symposium, USAF leaders wondered: What happens if our space capabilities are ever compromised?*

**40 Eyes of the Fighter**

By John A. Tirpak  
*Aircraft targeting pods—Litening, Sniper, LANTIRN—are turning the fighter force into an all-seeing eye.*

**46 Meet the New Boss**

Photography by Rick Llinares  
*F-22 operations at Langley mark a transition away from the F-15 and toward a new heavyweight champ.*



46

**54 The Security Forces Rewrite**

By Rebecca Grant  
*Wherein expeditionary air bases are considered maneuver elements in their own right.*

**60 Up to Basics**

By Bruce D. Callander  
*New officers leave USAF's Air and Space Basic Course as dedicated air-power advocates.*

**64 Leaner Meaner Depots**

By George Cahlink  
*USAF's air logistics centers are now faster, more efficient providers of combat power.*

**68 A Complex and Changing Air War**

By Marc V. Schanz  
*The top airman in Southwest Asia discusses air operations over Iraq and Afghanistan.*

**70 The Converging Paths of Whittle and von Ohain**

By Walter J. Boyne  
*They approached the jet engine problem in different ways, but they both solved it.*



**About the cover:** F-15s and F-16s fly over a burning oil field in Kuwait. See "The Strategy of Desert Storm," p. 26. USAF photo by TSgt. Fernando Serna.



54

AIR FORCE Magazine (ISSN 0730-6784) January 2006 (Vol. 89, 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 2006 by Air Force Association.



By Robert S. Dudley, Editor in Chief

## Battle Damage From the QDR

WASHINGTON, D.C. DEC. 19, 2005

SOME months before the 1991 Gulf War, a contemptuous Saddam Hussein said of his prospective foe, "The United States relies on the Air Force, and the Air Force has never been the decisive factor in the history of war." It was, to say no more, a gross error in judgment.

US airpower, 79 percent of it from USAF, would soon eviscerate Iraq's military force. (See "The Strategy of Desert Storm," by John T. Correll, p. 26.) And the Gulf War was just the start; airpower would later prove to be a—and perhaps *the*—decisive factor in combat from Serbia to Afghanistan, from Bosnia to Baghdad.

Given such recent success, it is surprising that the Pentagon itself would undervalue airpower, but it does. Is it the equal of other types of force, or has the war on terror now made "boots on the ground" more important? Fifteen years after Desert Storm, airpower seems to have slipped in DOD's estimation.

Lest you think this is being excessively negative, note the direction of the Pentagon's Quadrennial Defense Review of defense programs, strategy, and policies. As we go to press, officials seem to have decided some key QDR issues, and not to the Air Force's advantage.

■ USAF will be prohibited from acquiring more than about 183 F-22A fighters, the aircraft USAF considers the heart of future aerial combat. That is about half of the 381 Raptors needed for the minimum deployment of one squadron for each of the service's 10 air expeditionary forces. The decision kills plans for building an FB-22 bomber, too. In effect, DOD reaffirmed last year's sudden program cut, though it extended production to 2010.

■ The Air Force's next generation ISR platform—the E-10—is a goner. DOD said no to a multi-aircraft effort; the Air Force will be allowed to build a single E-10 to test new radars and other technologies. Some suggest USAF will have to hitch a ride on the Navy's new multimission maritime reconnaissance aircraft and otherwise make do with its venerable AWACS and Joint STARS.

■ C-17 transport production will end

at 180 aircraft, despite the fact that service officials have long claimed the Air Force needs at least 222 of these advanced airlifters. The Pentagon now says a recent mobility study determined that 180 is "adequate." One idea is that commercial aircraft could be called in to close any future capabilities gap.

■ The Air Force probably won't get to acquire a "pure" aerial tanker to replace its old KC-135s. Instead, USAF probably

**The upshot is that the Air Force of future years will be smaller and less capable than it otherwise would be.**

will address this need by developing a hybrid tanker/airliner aircraft. The idea is that such an aircraft, produced in limited numbers, would "swing" from one mission to the other when required. Many of the Eisenhower-era KC-135s might be given new engines and kept around for many years more.

■ USAF's F-35A fighter variant gets only lukewarm—and possibly temporary—approval. DOD tried to kill it and force the Air Force to use a heavier Navy version, but DOD backed off when it saw there were little or no near-term savings to be had. The issue likely will come up again as part of a new tactical air "optimization" study that will go on this year. USAF is certain to buy far fewer than its planned 1,763 aircraft.

These program decisions, while highly significant, are not the most painful of the QDR's outcomes. In order to meet new fiscal guidelines, Air Force officials concluded they had no choice but to cut personnel in a big way.

The personnel accounts were seen as a logical place to seek savings, given that weapons programs already had been cut to the bone and recent pay, bonus, and benefit increases have brought about dramatic increases in manpower costs. However, the future reductions could force off the rolls as many as 40,000 active, reserve, and civilian Air Force members.

The upshot of the QDR, then, is that the Air Force of future years will be smaller and less capable than it otherwise would be. The Pentagon viewed the course correction as unavoidable, in light of the need to find billions of dollars to fund a major expansion of Army and Marine Corps ground troops and special operations forces to fight terrorists overseas—and to do so without increasing the federal deficit, raising taxes, or touching entitlement spending.

Plans called for the Pentagon to go final with its QDR report early in January, so there was still time for last-minute shifts and surprises—which, from USAF's point of view, could be either positive or negative.

Restoration of any major Air Force priorities, however, is unlikely to come from Secretary of Defense Donald H. Rumsfeld and his aides. Pressure for change is far more likely to come from Capitol Hill, where signs of concern are evident.

The House Armed Services Committee, for example, opened its own review this fall. Its chairman, Rep. Duncan Hunter (R-Calif.), suspected that the Pentagon's QDR effort would not produce a realistic defense program but one designed to fit a precooked budget figure.

Signs of unease are evident on the Senate side, too. Sen. Jim Talent (R-Mo.) noted in a Nov. 18 speech that defense spending today, measured as a percent of GDP, is less than it was in Jimmy Carter's presidency. "The Quadrennial Defense Review needs to be military-driven, not budget-driven," he warned.

The QDR report will be delivered to Congress next month, and it will be used as the basis for discussion of Pentagon budgets for the period of Fiscal 2008-13. That means lawmakers will have plenty of time to take the measure of Rumsfeld's work and make independent decisions about its merit.

We believe it would be a very good idea for Congress to take a long and hard look at the product, and then take steps to repair some of the battle damage this QDR threatens to inflict on the Air Force. ■





## THERE'S TOO MUCH AT RISK FOR HIGH RISK.

When lives are on the line, you can't afford the risk of unproven capabilities. That's why the HH-47 is the logical choice for the U.S. Air Force combat search and rescue program. Fully mission-compliant now with terrain following/avoidance radar and aerial refueling capability, the HH-47 is the low-risk, no-compromise solution. Everything required to be a true lifesaver.

**Honeywell**

**Rockwell  
Collins**

 **BOEING**



**Publisher**

Donald L. Peterson

**Editor in Chief**

Robert S. Dudley

**Editorial**

afmag@afa.org

**Editor**

Suzann Chapman

**Executive Editor**

John A. Tirpak

**Senior Editor**

Adam J. Hebert

**Associate Editors**

Tamar A. Mehuron

Marc V. Schanz

Breanne Wagner

**Contributors**

John T. Correll

Bruce D. Callander

Rebecca Grant

Peter Grier

Tom Philpott

**Production**

afmag@afa.org

**Managing Editor**

Juliette Kelsey Chagnon

**Assistant Managing Editor**

Frances McKenney

**Editorial Associate**

Chequita Wood

**Senior Designer**

Heather Lewis

**Designer**

Darcy N. Harris

**Photo Editor**

Zaur Eylanbekov

**Production Manager**

Butch Ramsey

**Research Librarian**

Pearlie M. Draughn

**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**

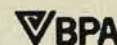
Patricia Teevan • 703/247-5800

**US and European Sales Manager**

William Farrell • 847/295-2305

Lake Forest, Ill.

e-mail: BFarr80708@aol.com



Circulation audited by  
Business Publication Audit

**The Khobar Towers Issue**

Thank you for your editorial in the November 2005 issue [*"The Shadow of Khobar Towers,"* p. 2]. Generals Fogleman and Schwalier are and will always remain examples of extraordinary military leadership. They may not remember me, but I remember them.

Maj. Christian M. Rubacha,  
USAF (Ret.)  
Phoenix

Several years ago, I attended a meeting at the Museum of Flight in Seattle. A young Air Force brigadier general, Terry J. Schwalier, was the guest speaker. He gave a presentation about the raid on the Khobar barracks. He had been the commander and was sacked (my words) for the blame. His father, a retired Air Force colonel, was present.

The presentation was detailed with photographs projected, and a full account was given. I left the meeting with a deep feeling of sadness that a horrible event, perpetrated by [terrorists], had brought the career of a promising young Air Force general to a conclusion.

This event has remained unaddressed in the passing years. I had hoped that somewhere along the way a fair treatment of the subject would be [rendered] and justice served at the hand of a different "Commander in Chief." Your article gives me hope that this may yet take place.

Maj. Philip G. Mack Jr.,  
USAFR (Ret.)  
Renton, Wash.

The editorial was extremely interesting until I got to the final paragraph only to find that your editor suffers from faulty math skills. He states, "To sum up: The Khobar Towers attack cost the Air Force 19 dedicated airmen, a talented commander, and a principled Chief of Staff." What he failed to add in were the hundreds of injured personnel and the thousands of affected family members. What a slap in the face!

I was a resident of building 133

that evening. My suite was on the top floor and faced the parking lot. The scene following the blast was horrific. Changed forever are the lives of the people we helped out of that building. Their wounds were so severe I often wonder if they are even able to lead normal lives today. Luckily, my wounds pale by comparison.

To read that the only things Khobar cost us were 19 airmen, a fine commander, and a great Chief of Staff causes a deep welling of resentment in myself and most likely all those affected. Yes, Generals Schwalier and Fogleman were fine officers but what is more important here? The answer of course is very obvious to those of us who were directly involved. The frustration we feel at our government's inability to bring to justice those responsible only adds to the hurt and resentment. After reading the editorial again, I get the feeling he feels these two officers were (and still are) more important than the injured troops and their families.

Do your math next time and maybe you won't alienate so many enlisted members.

SMSgt. Michael A. David,  
USAF (Ret.)  
Eagle River, Alaska

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



■ *The editorial did state that the Khobar Towers blast was responsible for "not only killing 19 but also wounding hundreds, many severely."*—THE EDITORS

Finally a definitive statement and position on the Clinton Administration's shameful mishandling of the terrorist attack on the Khobar Towers. The disgraceful abuse of a fine officer, General Schwalier, resulted in his premature retirement and deprived the United States Air Force and our country of a much-valued leader. Shame on then-Secretary of Defense Cohen.

Brig. Gen. Ronald G. Severs,  
USAF (Ret.)  
Destin, Fla.

Mr. Dudney's editorial is on target! From early 1998 to early 2001, I had the privilege of teaching case studies to all wing and group commanders attending their respective courses at Maxwell AFB, Ala. I read the numerous official reports available on the Khobar Towers tragedy, held interviews with key personnel, developed a two-hour briefing to present the facts, and had the presentation reviewed by leaders who were there.

The two-hour case study concluded with "lessons learned"—two of which

align nicely with Mr. Dudney's editorial (the others deal with areas not addressed by Mr. Dudney). First, it doesn't matter how well you've done as a commander or how many accolades you receive from experts or your supervisors, at the end of the day you may be martyred for political reasons. Second, always do the right things for the right reasons—that way you'll be able to look yourself in the mirror every morning for the rest of your life! I know General Schwalier has no problem looking himself in the mirror every morning, nor does General Fogleman. It is beyond me how Mr. Cohen could possibly look at himself.

Col. Henry W. Horton,  
USAF (Ret.)  
Fort Worth, Tex.

This is one of the most outstanding editorials that I have ever read. I thank you for this overall exposure. As you said, we lost 19 airmen, a talented commander being promoted, and cut short an outstanding Chief of Staff—all [because of] sick political work in our system.

You can never go back and correct mistakes like this, but the world should be constantly on the watch for the actions of former President Clinton, even today. Cohen, I pray he never

darkens the door of any political office again. I thank you for this outstanding exposure.

Maj. Ray Roberts,  
USAF (Ret.)  
Denton, Tex.

Your editorial brought back some bitter memories. I was a colonel on the Air Staff at the time of the inquiries into the Khobar Towers attack. In fact, I headed a vice chief's working group tasked to compile information for senior Air Force leaders to use in briefings and meetings on this subject. It was clear that Brigadier General Schwalier had taken a very proactive approach to improve force protection and, considering the perceived threat at the time, had done all that a reasonable commander should have been expected to do, and then some. Unfortunately, it was also clear that there was enormous political pressure in Washington to find someone "at fault" for the casualties. It was a sad day when the Downing Commission dutifully handed the SECDEF General Schwalier's head on a platter, and a gross miscarriage of justice. Downing's (and subsequently the SECDEF's) conclusions were weak and unsupported by the facts and good military judgment.



Pre-Op Shelter



U.S. Air Force Theater Hospital in Balad, Iraq

## BALAD HOSPITAL TRANSFORMATION.

**CAMSS IS THERE.**

The largest theater hospital in the world recently underwent a major transformation. Over a period of 10 days, military personnel replaced over 35,000 square feet of TEMPER tents with CAMSS20EX shelters. The upgrade creates a brighter and safer environment for patients and providers. The hard work and meticulous coordination by many military personnel enabled the hospital to maintain full operation, providing top quality health care to military personnel.

**CELEBRATING 20 YEARS.**



800.984.7678 • [www.camss.com](http://www.camss.com)



As it turns out, Khobar Towers was one of the early salvos in what we today call the Global War on Terror. Fortunately, others have not followed the precedent set by Khobar Towers. Subsequent attacks on two US embassies in Africa and the attack on the USS *Cole* did not result in the ambassadors or commander being similarly railroaded, even though they had the lessons of Khobar Towers to guide them. Today, had we followed Cohen's logic, we'd be relieving commanders from their posts every time an attack on a facility kills a soldier in Iraq.

It was unfortunate for the Air Force, but understandable, when General Fogleman apparently got disgusted with the whole mess and left. It's been equally unfortunate for the country that we took our eye off the ball when it comes to who the proven state sponsor of terrorism really is. It is Iran and never was Iraq.

Brig. Gen. Scott Van Cleef,  
USAF (Ret.)  
Fincastle, Va.

Thank you, Mr. Dudley, for your editorial on the Khobar Towers bombing and specifically the public support for Brig. Gen. Terry Schwalier. Those close to the events knew then what you have so accurately stated—that Terry Schwalier, despite all his skill and action in force protection, lost a promising career by being in the wrong place at the wrong time. Actually, for the Khobar Towers residents and USAF, he was probably in the right place at the right time. I'll explain.

As chief of support plans at 9th Air Force, my last official act on duty was to stand up and man the crisis action center at Shaw AFB, S.C., in response to the Khobar Towers bombing. In that capacity (from August 1991 till my retirement in August 1996), I had the opportunity to brief all the commanders of the 4404th Composite Wing and to aid and assist in their force protection measures. It is ironic that Terry Schwalier implemented more force protection measures than any of his predecessors (who all were serious and arduous in fulfilling their responsibilities for their six-month stint as commanders).

My own security police staff officer was serving as General Schwalier's SP chief when the bombing occurred. He briefed me regularly on the force protection plans and actions taken by the wing commander and his staff. I believe that without those documented actions and particularly the responses of the security personnel who were

posted that evening and warned the residents, there would likely have been more than 19 deaths that night.

General Schwalier's vigilance and accountability were rewarded with a career-ending assignment of blame from the SECDEF. General Fogleman, a tough, principled officer, did all that he could and then resigned his position early. Terry Schwalier is no "woe is me" commander, but were I in his shoes, having my Chief of Staff support me the way General Fogleman did him would help to offset the pain of being dealt with the way he was. And I imagine that his anguish would not have been from losing his job so much as being told formally that he was responsible for the deaths of 19 comrades.

Col. George G. Giddens,  
USAF (Ret.)  
Fredericksburg, Va.

#### Ho Chi Minh Trail

The authoritative article "The Ho Chi Minh Trail" [November, p. 62] is long overdue. It is must reading for anyone who "wants the facts" about the Vietnam War. In the interests of preserving history, a detail on p. 65, which appears to say that the AC-47 was not used after 1966, deserves correction.

I was commander of the hospital at Udorn AB, Thailand, from July 1969 to July 1970. As a flight surgeon, I flew on a number of AC-47 Spooky missions over Laos during that time. I believe that most of our missions were in support of ground combat units, rather than truck interdiction on the trail. However, the aircraft and crews should be recognized for their important contribution during that time.

Col. Paul A. Stagg,  
USAF (Ret.)  
Cambridge, Md.

As an AC-130 Spectre aircraft commander at Ubon in the first half of 1972, I resent the intimation that truck kills were exaggerated. The only trucks we could claim were those we captured on tape actually burning or exploding. When the 105 mm weapon was introduced, it took 7th Air Force a while to count trucks hit by it because they did not explode or burn, they just disappeared.

Lt. Col. Robert A. Nagle,  
USAF (Ret.)  
Tucson, Ariz.

Compliments to *Air Force Magazine* and John T. Correll for the well-documented article "The Ho Chi Minh Trail." It brought back many historical memo-



## 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](mailto:fldsvcs@afa.org)  
 Government Relations..... [grl@afa.org](mailto:grl@afa.org)  
 Industry Relations ..... [irl@afa.org](mailto:irl@afa.org)  
 Information ..... [information@afa.org](mailto:information@afa.org)  
 Member Services ..... [service@afa.org](mailto:service@afa.org)  
 Policy & Communications (news media).....  
 ..... [polcom@afa.org](mailto:polcom@afa.org)

### Magazine

Advertising..... [adv@afa.org](mailto:adv@afa.org)  
 AFA/AEF Report..... [afa-aef@afa.org](mailto:afa-aef@afa.org)  
 Editorial Offices..... [afmag@afa.org](mailto:afmag@afa.org)  
 Letters to Editor Column.. [letters@afa.org](mailto:letters@afa.org)

Aerospace Education  
 Foundation ..... [aestaff@aef.org](mailto:aestaff@aef.org)  
 Eaker Institute ..... [eaker@aef.org](mailto:eaker@aef.org)  
 Air Force Memorial Foundation .. [afmf@afa.org](mailto:afmf@afa.org)

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

### AFA's Mission

*To educate the public about the critical role of aerospace power in the defense of our nation.*

*To advocate aerospace power and a strong national defense.*

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



ries for me, as I was assigned to the Defense Analysis Division of the 7th Air Force Intelligence Directorate in Saigon, South Vietnam, all of 1966.

At that time, our job was not only to track enemy defensive weapons systems on the ground but also to analyze the bomb damage assessment (BDA) of targets that were struck. Determining the damage to targets in the Rolling Thunder area was fairly easy because the enemy SAM and AAA sites were fixed, and the poststrike photography clearly indicated what damage was done to the target.

However, keeping track of enemy defensive positions and assessing the damage in the Barrel Roll and Steel Tiger Operations was quite a different matter. Targets were difficult to find and the enemy AAA guns were all mobile. [The discussion in the article on] keeping track of the "truck kills" was right on! The problem was continuous, in the morning, but mostly at night. The bombing and strafing of trucks was like trying to kill thousands of ants pouring out of an anthill.

Moreover, it was quite possible that not only did we have a difficult time keeping track of the trucks damaged or destroyed, but also in all probability there were multiple hits by different aircrews on the same convoy of trucks. Everyone needs to understand that when aircrews are being shot at, it is difficult to remember just how many trucks had been strafed or killed at the end of each mission, especially at night on the trail.

I remember thinking to myself then, that, with our sophisticated high-performance aircraft and expensive high-tech munitions, we wished we could have reported more lucrative target kills than trucks. It did not surprise me that critics in Washington disparaged the numbers of trucks reported damaged or destroyed by the Air Force. The kill counts fluctuated continuously.

Lt. Col. Tom Burke,  
USAF (Ret.)  
Daytona Beach, Fla.

I was the executive officer of the National Photo Interpretation Center group responsible for interpreting all the tactical, strategic, U-2, SR-71, drones, and satellite photography. I signed off on all the briefing boards made from these systems. It was very evident that the bombings were not stopping the movement of supplies to the South, and we made numerous briefing boards to that effect.

While McNamara in his "Light at the End of the Tunnel" briefings would show the bomb craters on the trail taken from high-altitude missions, he did not show the photos of what

happened afterwards. On the tactical missions about dusk, we would spot the North Vietnamese troops—singly, and in groups or in columns, pushing bicycles loaded with up to 500 pounds of ammunition and supplies, threading their way through the bomb craters. We also saw pack animals carrying large loads, along with individuals carrying loads on their backs. What McNamara also didn't relate in those briefings was that within a week, most of the bomb craters would be easily filled in and the trucks were rolling again.

Dino A. Brugioni  
Hartwood, Va.

#### Remembering Gabby

What a wonderful article on one of the Air Force's greatest icons! I'm retired Army, but have always wondered why great combat leaders such as Gabreski, Hub Zemke, and Donald Blakeslee were denied promotions to star rank. I can only figure that it was jealousy between the "planners" in Washington and the "operators" in the war zones.

William W. Dubbs  
Southern Pines, N.C.

#### Rebutting Superpower Standoff

Major General Russell's comments under the heading "The Superpower Standoff" ["Letters," November, p. 5] contain several errors.

The Thor IRBMs in England were carefully excluded from the negotiations with the Soviets by agreement between President Kennedy and Prime Minister Harold Macmillan. The British Prime Minister offered up the missiles to Kennedy, but, as the transcripts of their telephone conversations reveal, Kennedy excluded them from the discussions. Further, those missiles were not "all under control of SAC." The Thor missiles had been formally transferred to the Royal Air Force and were owned by Great Britain. Their (American) warheads were under joint control.

The missiles in Italy were Jupiter IRBMs, not Thor missiles. There was no "missile base planning" for Italy, as those missiles had already been installed and became operational in April 1961, more than a year before the Cuban Missile Crisis.

The United States agreed (1) not to invade Cuba and (2) to remove the Jupiters from Italy and Turkey (the first of which became operational in November 1962) in return for the Soviets removing from Cuba their ballistic missiles and Il-28 Beagle tactical bombers (six of which could carry nuclear bombs). Significantly, the agreements did not cover removal of the 90 Soviet nuclear warheads in Cuba nor the 68 aboard a merchant ship moored in a Cuban

**The songs you sang  
about  
Your Planes  
Your People  
The wars you fought  
— Your Legacy —**

**18 CDs with 285 songs**

and, 4 Song books with 1188 songs

**Includes**

**5 New CDs**

"Live at Leeuwarden"

"Come and Join the Air Force"

"Passing the Flame"

"Headhunters"

"Fast and Low"

Dick Jonas, Irv LeVine, Toby Hughes,  
Chip Dockery, the Juvat Boys Choir,  
Dos Gringos, Fresh Out of the Box

**EROSONIC**

Dept A  
PO Box 1226  
Chino Valley AZ 86323  
866-810-7750

dickjonas@erosonic.com

**www.erosonic.com**

also available at amazon.com



port—because the United States had no knowledge that nuclear warheads were actually in Cuba.

Norman Polmar  
Alexandria, Va.

#### Thanks for the Memories

In reading the article "Spirits of Guam" [November, p. 44], I was very surprised to see the picture of Tibbets, the grandson of Brig. Gen. Paul W. Tibbets Jr. Paul Jr. and I graduated from flying school together in the class of 38-A. This brings back a lot of memories. Paul and I performed many of our flying duties as teammates.

The last time I saw him was at a class reunion in San Antonio. So many of our classmates have passed on that we do not have reunions anymore. I have managed to make it to 93. Wherever Paul is, I would like to wish him many healthy years.

I, too, have a grandson who just graduated from flying school. He was pinned with the second lieutenant bars I got in 1938. He is assigned as a crew member on an AC-130.

Lt. Col. Jesse A. Tobler,  
USAF (Ret.)  
Shelton, Wash.



# Washington Watch

By John A. Tirpak, Executive Editor

## Keeping a Full-Service USAF; Scoping Out the Mobility Requirement; The Japan Card ....

### "Big-Airplane Air Force" Put on Hold

A Quadrennial Defense Review concept which threatened to dramatically restructure and weaken the Air Force seems to have been beaten down—at least for now.

Pentagon officials say that the notion called for taking virtually all fighter aviation from the Air Force and giving it to a consolidated Navy-Marine Corps air arm, leaving USAF with responsibility for all the "heavies"—bombers, airlifters, tankers, intelligence-surveillance-reconnaissance aircraft—and space systems. The idea was called, by some, "the big-airplane Air Force."

The concept was not part of the original terms of reference ground rules for the QDR but was introduced last summer by lieutenants of acting Deputy Defense Secretary Gordon R. England. (See "On Rumsfeld's 'Terms,'" June 2005, p. 50.) The idea was justified as one of many "what-if" scenarios, intended to stimulate thinking on ways to eliminate service redundancies. It was seen by its proponents as a natural follow-up to England's earlier consolidation of Navy and Marine Corps fighter forces.

There were no proponents of the concept within the Air Force, service officials said. The Marine Corps thought the idea had merit, though. Throughout the QDR, the Marine Corps has had its eye on funds intended for the F/A-22 program, said defense officials.

"They want that money right now—preferably yesterday—to expand the Corps in the near term," a Pentagon official said in early November. Once in possession of the fighter account, the Marine Corps could kill the F/A-22, shift all fighters to close air support, and use the savings for other purposes. However, "they have been frustrated in that effort so far," he added.

Nevertheless, the concept was still considered active as late as mid-November, on the eve of final deliberations on the defense budgetary actions driven by QDR results.

In the wake of the top-level QDR budget drill, however,



USAF photo by SSgt. Eric T. Shelton

*The Raptor, evidently, will make it.*

the "big-airplane" concept seemed to have been dropped because it would not provide any significant near-term savings for the war effort and would provoke ferocious controversy on Capitol Hill. Such a fundamental change would require the acquiescence of at least four Congressional committees—two in each chamber. Moreover, it would likely spur months of hearings and community interventions not unlike those that attended the recent Base Realignment and Closure process.

The shift also would take some time to execute, and its full effect would not be felt for several years. By then, operations in Iraq presumably would be over or declining, but problems with North Korea, Iran, and China could be on the rise.

Pentagon officials said there was no companion discussion of merging Navy and Marine Corps fighters into the Air Force or putting them under USAF control.

### Season of Heavy Lifting

The Pentagon began releasing a slew of long-awaited military lift analyses in November. The first one out was from a task force of the Defense Science Board. It found that the US should keep open the option of buying more C-17s, start replacing its aerial tanker fleet, and develop a short takeoff C-130 replacement as soon as possible.

The DSB task force, which started working last February, also said the Defense Department should make bigger investments in its en route infrastructure, do more floating pre-positioning, and get busy developing a high-speed surface vessel that can deploy heavy forces far more rapidly than is now possible.

Speedy deployment of heavy forces will be "critical" in future wars, the panel found, and rapid power projection will be essential to fulfilling the US military strategy of being able to fight in two major contingencies at once. The 15-member group was chaired by retired Army Gen. William G.T. Tuttle Jr. and included former Pentagon acquisition chief Paul G.



USAF photo by TSgt. Robert Jensen

*DOD still playing around with these.*



Kaminski and former USAF Chief of Staff retired Gen. Larry D. Welch.

The DSB unit reported out just a few weeks shy of the expected release of the Mobility Capabilities Study, conducted by the Joint Staff, and the Tanker Analysis of Alternatives, run by RAND.

The Joint Staff study found that airlift assets on hand are "adequate" to the needs of the US military.

Adm. Edmund P. Giambastiani Jr., vice chairman of the Joint Chiefs of Staff, offered a little preview of the MCS findings on Nov. 15, when he told reporters at the Pentagon that the current fleet of C-5s, C-17s, and C-130s is "very substantial" and that "if we maintain those fleets and the programs that we

in the past "has not been as critical to campaign success and the achievement of US national security objectives as it is today," and the Defense Department will need to figure out how to move large and heavy material at a much faster rate.

Toward that end, the task force put the highest priority on "investments now in intermediate staging bases; more and improved force and sustainment pre-positioning; and high-speed, intratheater vessels capable of austere port access." These improvements could "add significant new capabilities" to enable the movement of sizable land forces, the panel found.

Such spending should be "complemented by incremental investments in aerial tankers and possibly in strategic airlift," it added.

While the panel took briefings on souped-up C-17s and blended-wing body advanced strategic transports, it felt that big advances would be needed in many areas to make those concepts a reality within a reasonable time frame. The Pentagon should keep its options open to buy more than 180 C-17s, but with extended range, the task force said. Such an aircraft could relieve the pressure on the aerial refueling fleet.

The task force discounted the idea of huge, lighter-than-air transports, dryly noting that their "survivability ... in a hostile environment is open to question." It recommended that the C-5 fleet be given a planned avionics modernization and re-engining and reliability improvements. Although these won't add any new capability, the panel said, they will allow the C-5s to fly "for the next 30 to 35 years."

Noting that "at present, three US passenger carriers are in bankruptcy," the task force said the Defense Department should do more to ensure business for participants in the Civil Reserve Air Fleet, calling CRAF "a cost-effective addition to the organic [airlift] fleet." Providing a reliable stream of business would help ensure that the CRAF is available "at the onset of a crisis."

The infrastructure improvements should include adopting some of the "sea-basing" concepts put forward by the Navy that call for massive at-sea logistics support for forces engaged ashore. Those ideas include supersize offshore floating platforms able to accommodate aircraft such as a C-130. Such a sea-based capability should be able to accommodate either a Marine expeditionary brigade or a medium Army brigade.

The panel wants DOD to "support the Air Force's AMC-X program to develop a supershort takeoff and landing aircraft" that will replace the C-130 and "become a primary connector for sea-base operations." It should be able to operate from a carrier-sized vessel "without an island," the term for the superstructure that rises above the flight deck. While advances

DOD photo by R.D. Ward



*Giambastiani on C-17: We're still thinking.*

currently have funded throughout our future year defense plan, ... we have a very capable and adequate airlift fleet."

He called the MCS "comprehensive" but added that "some of these systems, including the C-17s, are still in play right now," meaning that final decisions about whether to continue buying the aircraft had not, by mid-November, been resolved.

Boeing has said that the C-17 line will soon begin shutting down if more of the airlifters are not ordered in the upcoming Fiscal 2007 budget. (See "Washington Watch: The Cost of Being Late," November 2005, p. 14.)

The new chief of US Transportation Command, Air Force Gen. Norton A. Schwartz, echoed Giambastiani's remarks on Nov. 30, when he told reporters at a logistics conference that, with regard to the existing airlift fleet of C-5s, C-17s, C-130s, and commercial augments, "overall, we have about the right capacity."

Another tip as to the findings of the MCS came from Michael W. Wynne, the new Secretary of the Air Force, who told Bloomberg.com in a November interview that the next aerial tanker will likely be a combination tanker-airlifter, switching roles as needed, depending on the requirements of any particular contingency. The aircraft also will serve as a communications node and relay in the sky, given that it will typically fly in just the right place to facilitate communications among combat and support platforms and ground-based command centers.

Pentagon and industry officials said the RAND study was expected to enumerate a range of options available for replacement of the KC-135 fleet—and their costs—but not recommend a specific plan of action. It also was expected to be a relatively thin document, since the manufacturing, cost, and pricing data within it is proprietary to Boeing and Airbus—the two principal potential competitors to supply the aircraft—and is not releasable.

#### **Our Survey Says ...**

The DSB mobility panel said the speed of deployment



USAF photo by A1C Franklin J. Perkins

*Big C-5s will be around for awhile.*



will be needed on many fronts, the DSB panel found “no technological showstoppers” to such an aircraft.

“Given the military mobility value of such a capability, the effort should be worth the price,” the group said.

Vertical or short takeoff and vertical landing aircraft also will become more important in the future, the panel found. In an apparent nod to aircraft such as the V-22 tilt-rotor, it wants the Pentagon to aggressively develop new helicopters or STOVL aircraft “to increase unrefueled range, payload, and reliability.”

“As part of its modernization effort, the department should undertake a vigorous R&D program to evaluate the feasibility of fielding a 25-ton vertical-lift capability with an unrefueled range of 250 to 500 nautical miles to enable more options for operational maneuver,” the report added.

The panel also wants the Pentagon to develop an “affordable high-speed vessel” for transporting heavy armor and other heavy gear and to give US Transportation Command total process authority over deployments.

### Save C-17, Says Senate

The Senate in November sent a resounding message to the Pentagon: You should think hard about buying at least another 42 C-17 airlifters.

That was the gist of an amendment to the defense spending bill passed by the Senate in November.

The bipartisan amendment to the defense authorization bill, co-sponsored by Sens. Joseph I. Lieberman (D-Conn.) and Jim Talent (R-Mo.), urged the Air Force to raise the C-17 inventory to 222 aircraft, a figure promoted by the former head of Air Mobility Command and US Transportation Command, retired Gen. John W. Handy. The amendment passed, 89-to-eight. However, the amendment was nonbinding and wouldn't oblige the Defense Department to buy any more of the airlifters, nor did it authorize additional funds for the buy. It did, however, encourage the Air Force to negotiate another multiyear buy of the aircraft.

The *Los Angeles Times* quoted Sen. John W. Warner (R-Va.), the chairman of the Senate Armed Services Committee, as saying the amendment “comes at a critical time, expressing the desires of Congress.” However, the House defense spending bill did not contain such an amendment, and it went onto the list of issues to resolve in conference.

Boeing has said that it must have money in the next defense budget to continue producing C-17s, or the long-lead suppliers on the aircraft will begin shutting down production, as they are now completing the manufacture of parts for the 180th aircraft. Extending production to 222 aircraft would keep the line open until 2012.

### Co-Defense Sphere

A US-Japan joint military operations center is one of the many new initiatives coming out of a deal in October in which the two countries dramatically overhauled and strengthened their long-standing mutual defense agreements. The moves seem geared to countering a buildup of Chinese military power in the region.

The new arrangements also call for the departure of 7,000 marines from Okinawa, permission for the US to station a nuclear aircraft carrier in Japan, joint use of Kadena Air Base, and closer coordination on issues ranging from missile defense to unmanned aircraft.

The US-Japan military relationship is “evolving to remain strong and relevant,” Defense Secretary Donald H. Rumsfeld told reporters at a news conference following meetings with top Japanese foreign and defense ministers in Japan. Secretary of State Condoleezza Rice also took part in the talks.

The new joint operations center will be located at Yokota



AP photo by Kevin Wolf

Rumsfeld and Ono, two of a kind.

Air Base and is intended to “ensure constant connectivity, coordination, and interoperability among US forces in Japan” and the Japanese self-defense forces, according to a joint communiqué from the two countries.

Japan's existing Air Defense Command at Fuchu will move to Yokota. The joint setup should improve missile defense, early warning, and the sharing of sensor data obtained from both US and Japanese reconnaissance and surveillance platforms. The two countries agreed to share such data much more broadly than they have done in the past. They also agreed to do more intensive joint planning for contingencies that may arise in the region and increase the number and size of exercises they conduct together, both in Japan and elsewhere.

Language in the communiqué points to Japan taking over a greater responsibility for defending and monitoring the region around the Japanese islands. Japan agreed to improve its missile defenses, aided by the deployment of a US X-band radar system and Patriot missiles on its soil, and to develop more capabilities against possible invasion of some of its remote islands.

The Marine garrison on Okinawa has been a continuing point of tension in the US-Japanese relationship. A seedy district has developed around the base, and there have been high-profile incidents of misconduct by US troops stationed there. The US agreed to reduce the number of marines on the island from 18,000 to 11,000 over the next six years. The departing marines will move to facilities on Guam, and the activities of Marine Corps Air Station Futenma on Okinawa will relocate north to Camp Schwab. Further reductions are to be studied.

The two countries will jointly operate from Kadena Air Base, also on Okinawa. Kadena hosts E-3 AWACS, F-15C, and HH-60 rescue helicopter operations. Pentagon officials said the base may soon see Japanese F-15Js and 767 AWACS aircraft operating from the installation as well.

Not part of the communiqué, but announced shortly after its release was that the US will be permitted to homeport a nuclear-powered, Nimitz-class aircraft carrier in Japan. Previously, Japan would only permit conventionally powered carriers, given national sensitivities about nuclear power. The agreement also calls for the relocation of the Navy carrier air wing from Atsugi air base to Iwakuni air station, to deal with encroachment issues. More Japan Air Self-Defense Force bases will be available for US aircraft use, and the US will permit JASDF units to train at its ranges in Guam.

Japanese Defense Minister Yoshinori Ono said the broad new arrangements represent a “fresh start” and a “new era” in US-Japan mutual defense. ■

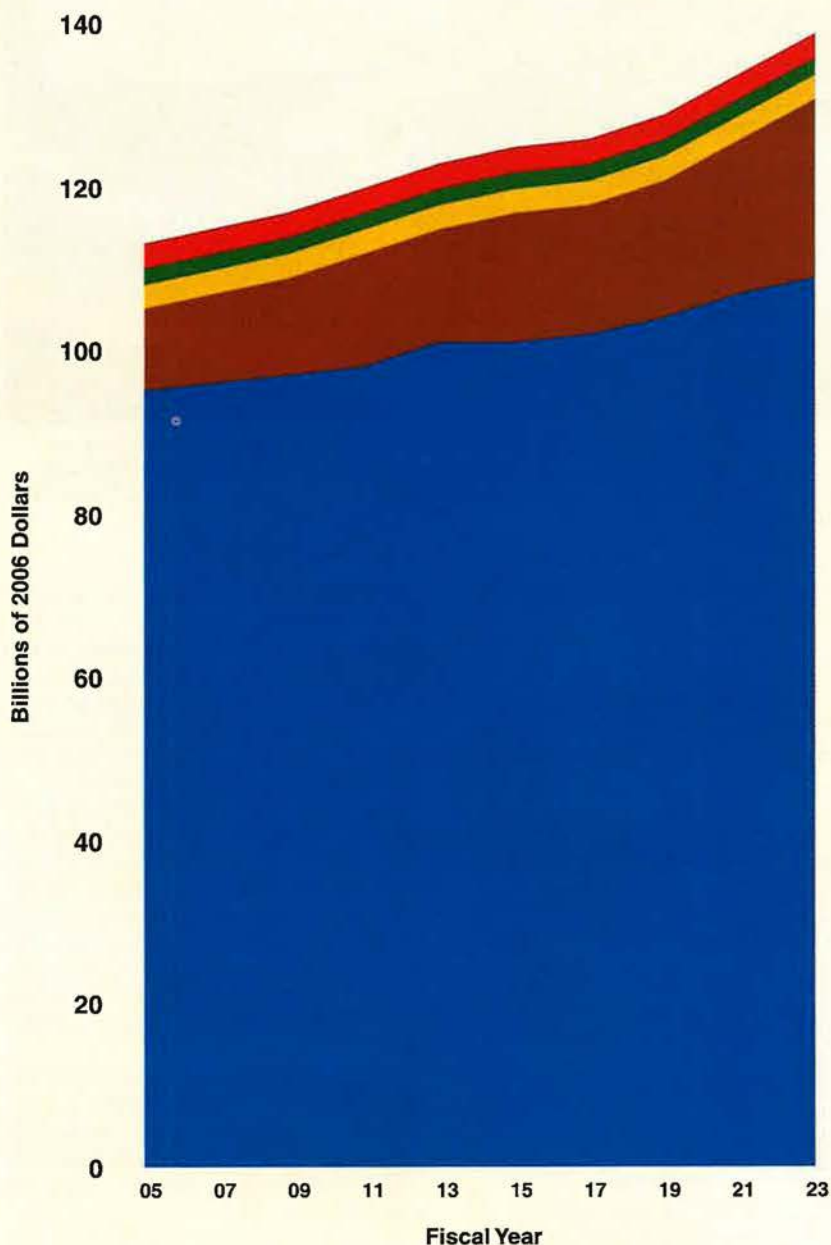


# The Chart Page

By Tamar A. Mehuron, Associate Editor

## Growing Personnel Costs

**Projected cost of existing military personnel commitments plus new benefits provided since 1999 to military retirees and their families**



Bush Administration officials have taken Congress to task for boosting military health care and retirement spending. They say a host of new personnel benefits for retirees and their family members are pushing costs through the roof. According to the Congressional Budget Office chart at left, the accrual costs attributed to the four most expensive measures have added billions to military personnel spending each year, with more increases on the way. Rep. Duncan Hunter (R-Calif.), chairman of the House Armed Services Committee, does not dispute the rising cost, but he says such costs are "here to stay." Others would add that they are necessary and justified.

Source: Congressional Budget Office, "The Long-Term Implications of Current Defense Plans and Alternatives: Summary Update for Fiscal Year 2006," October 2005.



By Breanne Wagner, Associate Editor

## Wynne Is New SECAF

Michael W. Wynne was sworn in as Secretary of the Air Force on Nov. 3 at an Air Force Academy ceremony attended by 4,200 cadets. He had been confirmed by the Senate on Oct. 28.

Wynne took over from acting Secretary Pete Geren. The Air Force had been without a Senate-confirmed Secretary for nearly a year. James G. Roche left the post in January 2005.

Wynne has worked in the Defense Department since 2001, having served as principal deputy undersecretary of defense for acquisition, technology, and logistics and as acting undersecretary of defense for acquisition, technology, and logistics. In those roles, he worked as an advisor to Defense Secretary Donald H. Rumsfeld for Base Realignment and Closure matters.

Wynne wanted to take the oath at the academy because his brother, a 1963 graduate who was killed in Vietnam, is buried there. Wynne himself is a West Point graduate, but accepted a commission in the Air Force and served seven years. His last military assignment was at the academy, where he taught astronautics.

Subsequently, he served in the aerospace industry, working primarily on launch vehicles and the F-16 program. He retired in 1999 from General Dynamics as a vice president.



USAF photo by TSgt. Andrew F. Hammonds Jr.

*Capt. Joey Hemphill, guided by TSgt. Barry Snokhous, taxis his F-15 to a parking spot after a practice flight in preparation for the Dubai Air Show in the United Arab Emirates. This aircraft and crew are part of the West Coast Demonstration Team. The air show ran from Nov. 20 to 24.*

After that, he worked with a venture capital group.

## Cope India Wraps Up

Cope India 2006, an exercise staged by USAF and the Indian Air Force, ended on Nov. 20. The two-week event

pitted USAF F-16s against various Indian fighters, including its new Su-30MKI aircraft—a derivative of the Russian-designed Su-27 Flanker.

The two aircraft flew against each other in a mock air-combat engagement, the first between the two fighters. The results weren't announced.

In another scenario, the Indian fighters were vectored by Air Force E-3 AWACS aircraft to engage the F-16s, playing the role of an aggressor force. The exercises were meant to build military-to-military relationships with India as well as enhance interoperability between the two air arms. (See "Full-Contact Training," October 2004, p. 40.)

Approximately 250 airmen from Misawa, Kadena, and Yokota ABs, Japan; Hickam AFB, Hawaii; and Andersen AFB, Guam, deployed to Kalaikunda Air Station in West Bengal, India, for the exercise.

## Minot Bombers Set Record

Air Combat Command's bombers at Minot AFB, N.D., broke the record for B-52 reliability in October. The bomb-

## The Pentagon's Unseen Unconventional Arms Race

The Department of Defense, with one of the largest computer networks in the world, has been facing an arms race with an elusive adversary—computer hackers, according to Army Col. Carl W. Hunt.

In a press briefing on cyber-security in Washington in November, three panelists discussed the complexities of "cyber-terrorism," a new form of warfare that in recent years has threatened the security of the Defense Department cyber-world.

The Air Force, in June, was targeted in a cyber-attack that apparently exposed the identities of 33,000 airmen, mostly officers. No identity theft has been reported, although the incident remains under investigation.

Tom Kellermann, chief knowledge officer of Cybrinth, an e-security and data consulting firm, asserted that 56 million Americans have lost their identities to hackers. Americans' heavy reliance on technology has left them vulnerable to foreign hackers, who represent 80 percent of hack attacks, according to Kellermann.

Both Hunt and Kellermann stressed the importance of developing self-healing or self-maintaining computers to monitor all foreign and domestic activities, a technology currently being researched by Microsoft, SunSystems, and Hewlett Packard, among others.



ers logged a 90.8 percent mission capable rate for the month, meaning that more than 90 percent of the B-52s were ready to perform their primary missions at any given time.

The records for the 40-year old aircraft are proving short lived. September had also been a record, when the BUFFs set a new standard with an 89.4 percent MC rate. The wing's bombers were on pace to set another record with 93.4 percent mission capability for the first half of November.

The bombers, which belong to the 5th Bomb Wing, flew 800 sorties in 2005, racking up a total of 7,955 flying hours. Because of deployments, Minot maintainers worked to keep the venerable aircraft flying at three different operating locations during the year. Base maintainers were awarded two ACC maintenance effectiveness awards for their efforts.

### Senate Passes Defense Bill

The Senate unanimously passed a \$491.6 billion defense authorization bill on Nov. 15.

Provisions in the bill included a 3.1 percent pay raise for uniformed personnel, as well as an increase in benefits for families of troops killed in the line of duty.

The Republican-led Senate passed a nonbinding resolution calling for Iraq to take control of its own security to ensure a phased withdrawal of US troops beginning next year. The Bush Administration adamantly opposes a timetable for US troop withdrawal.

Lawmakers approved a second continuing resolution to keep DOD and

**SSgt. Michael Johnson from the 30th Security Forces Squadron launches by hand a Raven unmanned aircraft at Vandenberg AFB, Calif. The system weighs four-and-a-half pounds and can turn in up to 60 minutes of "eye-in-the-sky" flight time.**



USAF photo by MSgt. Timothy Griggs

other agencies running until they could complete work on 2006 budget bills.

### Titan Fades to Black

The last Titan IVB rocket was launched from Vandenberg AFB, Calif., on Oct. 19, carrying a classified National Reconnaissance Office payload

into orbit. It marked the end of the Titan program, started in 1955.

The Titan began life as one of the early Air Force ICBMs. More than 100 were placed on alert throughout the nation in the 1960s, 1970s, and 1980s. When the last operational Titan was withdrawn in 1987, the missiles in the inventory were either retired or used to launch satellites into orbit.

Titans provided the ride into space for all of the Gemini astronauts.

The venerable rocket is being replaced by the space boosters developed by the Air Force's evolved expendable launch vehicle program.

Titan IV was developed in the late 1980s as an alternative to the space shuttle and was essential in maintaining access to space after the Challenger accident grounded the shuttle for more than two years.

### \$2.9 Billion Goes to the F-22

The Air Force awarded Lockheed Martin a \$2.9 billion contract in November for production of 24 new F-22 Raptors. The contract covers Lot 5, authorized in the Fiscal 2005 budget.

The award raises the total number of Raptors under contract to 107. As of mid-November, Lockheed had completed assembly of 66 F-22s. The Air Force had taken delivery of 53.

Lockheed Martin pledged to continue reducing the aircraft's cost, which came



USAF photo by SSgt. Karen J. Tomaskik

**Each year, airmen from Yokota AB, Japan and Andersen AB, Guam, airlift Christmas supplies to the more than 50 islands of Micronesia. Here, Maj. Matt Wehner, a pilot with the 36th Airlift Squadron from Yokota, looks out over the Island of Agrihan after dropping a pallet of supplies. November's drop marked the 53rd anniversary of the event.**



## The War on Terrorism

**Operation Iraqi Freedom—Iraq****Casualties**

By Dec. 1, a total of 2,114 Americans had died in Operation Iraqi Freedom. This total includes 2,109 troops and five Defense Department civilians. Of those fatalities, 1,657 were killed in action by enemy attack, and 457 died in noncombat incidents.

There have been 15,881 troops wounded in action during OIF. This includes 8,468 who returned to duty within 72 hours and 7,413 who were unable to quickly return to action.

**USAF Strikes Insurgents in Steel Curtain**

Air Force F-15s, F-16s, unmanned Predator aircraft, and British Royal Air Force GR-4s carried out a major offensive against anti-regime Iraqi forces on Nov. 14 in support of Operation Steel Curtain.

The operation was aimed at stopping border crossings by foreign insurgents from Syria into Iraq and destroying insurgent facilities in and around the Al Qaim region.

The F-15s dropped precision guided munitions, and Predators fired Hellfire missiles in the vicinity of Karabilah, Iraq. Air Force F-16s released at least one PGM near Balad AB, Iraq, on the same day.

The air strikes killed approximately 30 terrorists, bringing the total to nearly 80 killed on Nov. 14 and 15. Steel Curtain began Nov. 5.

Nearly 40 weapons caches were discovered and destroyed during the operation, and 107 IEDs and mines were found. Approximately 150 terrorists were detained in the course of the offensive.

Steel Curtain was part of the larger Operation Sayaid (Hunter), designed to prevent al Qaeda from operating in the Euphrates River Valley and the Al Anbar province, according to the Air Force. US forces also sought to develop a permanent Iraqi Army presence in the Al Qaim region.

**Operation Enduring Freedom—Afghanistan****Casualties**

By Dec. 1, a total of 250 Americans had died in Operation Enduring Freedom, primarily in and around Afghanistan. The total includes one DOD civilian. Killed in action were 126 troops, and 123 died in nonhostile incidents such as accidents.

A total of 654 troops have been wounded in Enduring Freedom. They include 258 who were able to return to duty in three days and 396 who were not.

**Bagram Airfield Gets New Passenger Terminal**

Twenty-four engineers from the 1st Expeditionary RED HORSE Group, deployed from Nellis AFB, Nev., are building a new passenger terminal at Bagram AB, Afghanistan.

The new 7,750-square-foot facility will accommodate expanded operations at the base. It will be "better designed for the potential flow of more than 300 people traveling through Afghanistan's busiest hub at any one time," said 1st Lt. Megan Leitch, construction project officer.

The new terminal will offer a secure waiting area and will allow administrators to better coordinate flights in and out of the country.

Once the terminal is complete, engineers will begin building a cargo ramp this summer, according to Leitch.

Construction of the \$932,000 terminal is scheduled to be completed early this year.

down more than 10 percent in Lot 4. "We understand our nation's and the Air Force's need for the F-22 and have worked diligently to reduce production costs without sacrificing any capabilities of this airplane," said Larry Lawson, F-22 program manager.

The Raptor on Dec. 15 achieved

initial operational capability at Langley AFB, Va.

**Hobbins In at USAFE**

Gen. William T. Hobbins replaced Gen. Robert H. Foglesong as commander of US Air Forces in Europe in a Dec. 6 change of command. Foglesong

will officially retire Feb. 1, the service announced in November.

Hobbins, who was serving as deputy chief of staff for warfighting integration, was confirmed by the Senate on Oct. 28.

The USAFE commander is also commander of NATO's Allied Air Component Command Ramstein, Germany; air component commander of US European Command (also at Ramstein Air Base); and director of the Multinational Joint Air Power Competence Center in Kalkar, Germany.

Foglesong took command of USAFE in August 2003.

**Rumsfeld Goes to China**

Donald H. Rumsfeld made his first visit to China as Defense Secretary in October. There he urged his hosts to be more open about their rapidly growing military spending and arms buildup.

The Pentagon estimates that China's military spending adds up to about \$90 billion a year, about three times the amount China claims. Rumsfeld questioned such a high level of spending in a speech at one of China's top military schools.

"To the extent that defense expenditures are considerably higher than what is published, neighbors understandably wonder what the reason might be for the disparity between reality and public statement," Rumsfeld remarked, according to the Washington Times.

The trip marked an effort to warm military relations that chilled in April 2001 when a Chinese fighter collided with a US Navy EP-3 reconnaissance aircraft. The Chinese pilot died, and the EP-3 crew—forced down on Hainan Island—was detained for 11 days. The damaged EP-3 was eventually returned in crates. (See "Aerospace World: China Got Classified Info From EP-3," November 2003, p. 17.)

**Air Force Meets Recruiting Goals**

The Air Force beat its Fiscal 2005 enlisted recruiting goal and met its Officer Training School enrollment goal, the service announced in October.

A total of 19,222 men and women were enlisted in USAF, versus a target of 18,900.

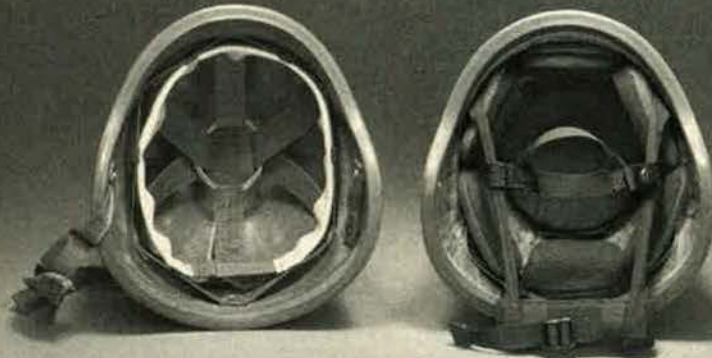
However, the service fell short in medical field recruiting, finding only 753 health professionals out of its 1,123-person requirement.

The fiscal year began with an overall goal of bringing on 24,465, toward meeting an end strength goal of 359,700 airmen, as mandated by the Congress. That was down from the previous year. The recruiting goal was



## Brain Bucket

## Think Tank



**PASGT Standard      PASGT with Oregon Aero® BLSS™ Kit**

We knew there had to be a better way. So we developed the painless, safer BLSS™ Kit (**B**allistic **H**elmet **L**iner & **S**uspension **S**ystem). Now the technology developed for Special Ops is the must-have upgrade for all personnel. Used by some 500,000 active military.

**Features:** pain-free, waterproof, stable (with/without mounted equipment), reduces shock loads to below injury level, \*air permeable, self-wicking, positively buoyant, easy to install.

When you think of protecting your brain, don't think Bucket. Get the BLSS™ Kit and Think Tank.

**Oregon Aero, Inc.**  
800-888-6910  
www.OregonAero.com



**Average impact performance at 3m/sec (~10 ft/sec)**



\*Independent impact tests conducted according to ANSI Z90.1-92 specifications @ 10 ft/sec. • GSA Schedule #GS-07F-5489R

the largest in the US military establishment, oversees transformation, experimentation, joint training, interoperability, and force provision for the unified commands.

The NATO organization oversees the upgrade of the alliance's military capabilities and operations.

Since October 2003, Smith had been serving as deputy commander of US Central Command at MacDill AFB, Fla., with responsibility for combat operations in Iraq and Afghanistan.

He previously served as deputy commander, United Nations Command; deputy commander, US Forces Korea; commander, Air Component Command, Republic of Korea and US Combined Forces Command; and commander, 7th Air Force, Pacific Air Forces, Osan AB, South Korea.

### Services Get J-UCAS

The Joint Unmanned Combat Air System program, intended to develop large unmanned aircraft for attack and reconnaissance missions, is under new management. Previously run by the Defense Advanced Research Projects Agency, J-UCAS was transferred formally to joint Air Force-Navy leadership effective Nov. 1.

The new joint program is headed by Navy Capt. Ralph N. Alderson, previously DARPA's program manager for the X-45 aircraft. Alderson will report to an Air Force program executive officer who had not been named by late November. The program is now headquartered at Wright-Patterson AFB, Ohio.

once again reduced in January 2005 to 18,900 recruits.

The Air Force also beat by seven its goal of recruiting 720 people for Officer Training School and got four more chaplains to join up than the 31 it wanted.

Goals for Fiscal 2006 are 30,750 new enlisted recruits and a reduced goal of 485 OTS candidates.

### \$1.9 Billion Medical Deal Awarded

Responding in part to the difficulty in recruiting medical professionals, the Air Force awarded a contract of up to \$10 billion to American Hospital Service Group, Exton, Pa.; Godwin Corp., Langley Park, Md.; The Healing Staff, San Antonio; RLM Services, Miami; and TerraHealth, San Antonio, to recruit, qualify, and retain civilian health care workers at Air Force medical treatment facilities.

The contract runs through November 2010 and will provide for health care professionals at 63 treatment facilities in 58 locations. They include physicians, dentists, nurses, and pharmacists.

### General Smith Commands JFCOM

USAF Gen. Lance L. Smith on Nov. 10 became commander of US Joint Forces Command and NATO's Allied Command Transformation. Both are based in Norfolk, Va.

Smith succeeds Adm. Edmund P.

Giambastiani Jr., who left the job to become vice chairman of the Joint Chiefs of Staff.

US Joint Forces Command, one of

*Members of a USAF rapid reaction fire rescue team take cover during a 107 mm rocket attack on Camp Carlson in Afghanistan on Nov. 18. Despite five rockets striking the camp, there were no serious casualties. The six-man team is the only one of its kind deployed to Afghanistan for Operation Enduring Freedom.*



USAF photo by MSGT Kevin Riehlle



USAF photo by SSgt. Nathan Bevier



**A-10 Thunderbolts from Pope AFB, N.C. (above), shut down their engines on the line at Shaw AFB, S.C., after flying a mission for Operation Dynamic Weasel. The exercise simulates combat operations in Southeast Asia.**

Program leadership will mimic that of the Joint Strike Fighter, swapping management authority on a rotating basis. When the program manager is a Navy officer, his deputy will be a USAF officer, and vice versa.

The change resulted from Congressional concerns that DARPA hadn't effectively coordinated the program with the Air Force and Navy, and the lawmakers were worried that the program was not sufficiently focused on producing a platform that met combat requirements.

Funding shifted from DARPA to the joint program in December.

### Transformation Czar Cebrowski Dies

Retired Vice Adm. Arthur K. Cebrowski, the first head of the Pentagon's Office of Force Transformation, died Nov. 12 at the National Naval Medical Center in Bethesda, Md., at the age of 63.

Cebrowski was picked by Defense Secretary Donald H. Rumsfeld to head the new in-house think tank tasked with aiding the military with more effectively confronting terrorists and speeding the development and embedding of information technologies in US military systems. Cebrowski's concept of "network-centric warfare," intended to quickly unite ships, aircraft, satellites, and ground forces in combat, became a driver of Pentagon thinking.

Previously, Cebrowski was president of the Naval War College from 1998 to 2001. A highly decorated Naval aviator, he flew 154 combat missions during the Vietnam War and commanded the aircraft carrier *Midway* during the first Gulf War.

### MDA Cut by \$1 Billion

In response to an Oct. 19 directive from Gordon R. England, the acting deputy secretary of defense, the Missile Defense Agency will cut \$1 billion from its five-year budget plan, MDA announced in October.

England's memo directed agencies to cut \$32.1 billion from Fiscal Years 2007-11 and signaled that more cuts could be on the way.

The MDA plans to cut \$290 million for 2007 by delaying the construction of a European ground-based site and delaying development of the Space Tracking and Surveillance System (STSS), according to DefenseNews.com.

The STSS program, consisting of satellites that track ballistic missiles, will again be trimmed in 2008, saving the MDA \$130 million.

Plans for reductions in 2010-11 include delaying plans to construct a space-based test bed intended to shoot

down enemy missiles. The delay would save the agency \$312 million.

### Pakistan Suspends F-16 Buy

Pakistan's President, Gen. Pervez Musharraf, announced he would suspend the purchase of new Lockheed Martin F-16s to save funds for earthquake relief. (See "Aerospace World: US To Ship F-16s to Pakistan," October 2005, p. 24.)

The 7.6-magnitude earthquake that hit Muzaffarabad in October killed nearly 80,000 Pakistanis and prompted an international relief effort.

Musharraf postponed the order for some 77 F-16 fighters, but made no move to cancel the program outright. Pakistani officials estimated the cost of earthquake recovery at \$5 billion, roughly that of the F-16 purchase.

The Nov. 4 announcement was a blow to Lockheed Martin; it had been counting on the order to keep its Fort

USAF photo by TSgt. Demetrius Lester



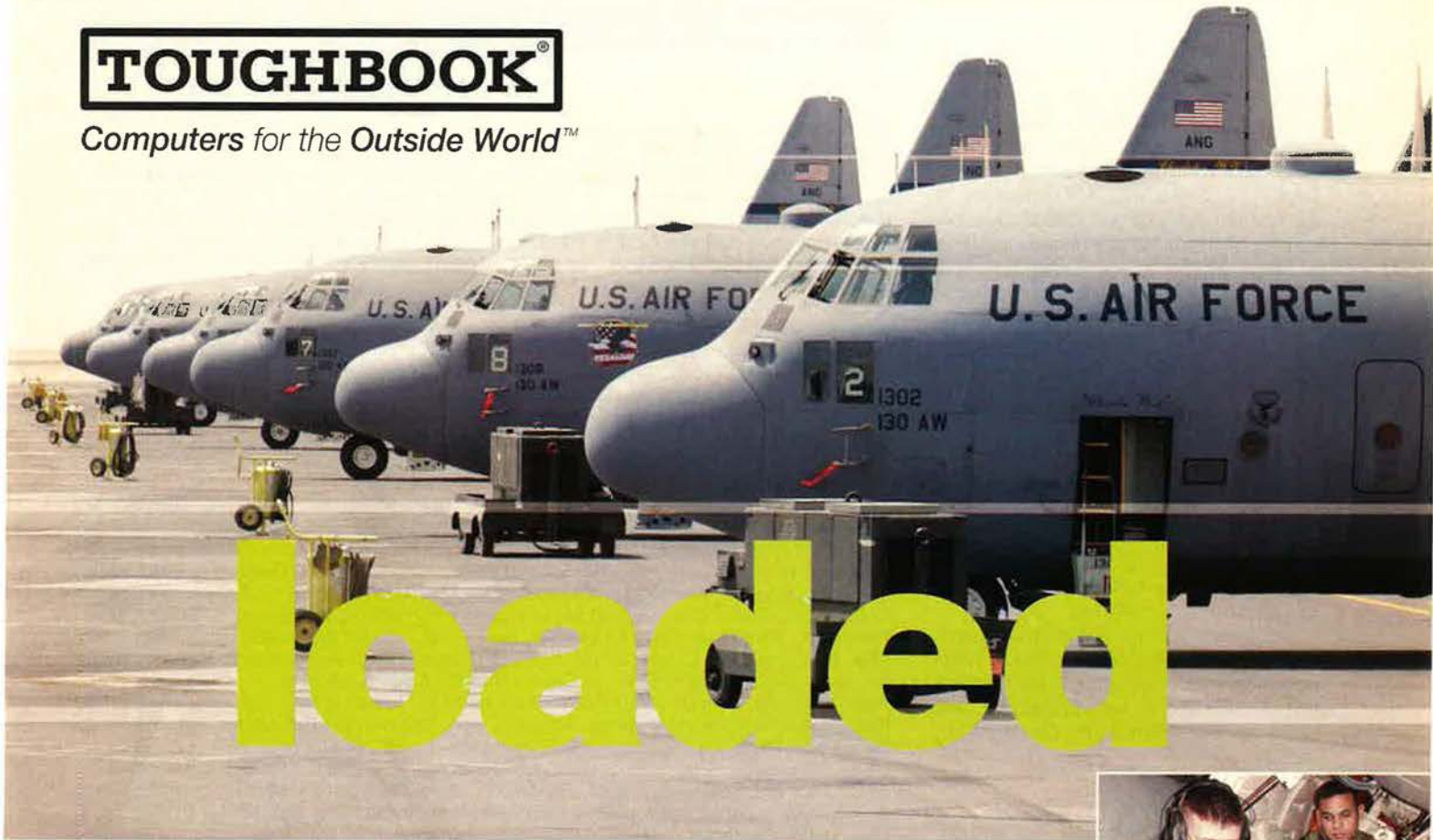
**An F-22 (top), an F-4 Phantom II (right), and a P-51 Mustang fly a "heritage" flyover during the Aviation Nation 2005 air show at Nellis AFB, Nev. This year, the popular exhibition event was held Nov. 12-13 and was dedicated to Vietnam War veterans.**



Panasonic recommends Microsoft® Windows® XP Professional for Government

# TOUGHBOOK®

Computers for the Outside World™



### Toughbook 29



Starting at \$3,600

- Intel® Pentium® M Processor LV 738 (2MB L2 cache, Processor speed 1.40GHz, 400MHz FSB)
- Microsoft® Windows® XP Professional SP2
- MIL-STD-810F-compliant
- 13.3" XGA Non-Touch LCD (Touch LCD option)
- 60GB shock-mounted, removable HDD, 256MB SDRAM (exp. 1.25GB)
- Optional DVD-ROM/CD-RW
- Optional CAC reader
- Optional GPS or backlit keyboard
- 802.11a/b/g wireless LAN

### Toughbook 18



Starting at \$3,350

- Intel® Pentium® M Processor ULV 733 (2MB L2 cache, Processor speed 1.10GHz, 400MHz FSB)
- Microsoft® Windows® XP Professional SP2 or Microsoft® Windows® XP Tablet PC Edition 2005
- MIL-STD-810F-compliant
- 10.4" XGA LCD (Touch or Digitized Input)
- 40GB shock-mounted, removable HDD, 256MB SDRAM (exp. 1.25GB)
- Optional ext. DVD-ROM/CD-RW
- Optional CAC reader
- 802.11a/b/g wireless LAN
- Optional GPS or backlit keyboard
- 4.5 lbs. tablet/convertible\*

### SOAR WITH THE WIRELESS COMPUTING FREEDOM AND FLEXIBILITY OF RUGGED PANASONIC TOUGHBOOKS.

From extreme heat to swirling sandstorms, weatherproof Panasonic Toughbooks® are built US Air Force-tough. Consider the fully-rugged Toughbook 29 and Toughbook 18, both equipped with Intel® Centrino™ Mobile Technology for portable connectivity anytime, anywhere. They also boast high-resolution, outdoor-viewable color LCDs that are ideal for detailed flightline maintenance and sophisticated mission planning. Plus, with premium services and an industry-leading warranty enhanced by Tobyhanna in southwest Asia, Toughbooks provide unrivaled support. For the world's highest-quality mobile computing solutions, trust Panasonic Toughbooks.

The CF-18 is a 2004 *BusinessWeek* "IDEA Silver Award" winner for design excellence.



Use fully-rugged Toughbooks to identify flight routes and radar predictions.



MOBILE TECHNOLOGY

## Panasonic ideas for life

1.800.662.3537, option 3  
Buy Now at [panasonic.com/toughbook/federal](http://panasonic.com/toughbook/federal)

Intel, Intel logo, Intel Centrino, Intel Centrino logo, Intel Inside, Intel Inside logo and Pentium are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries. Toughbook notebook PCs are covered by a 3-year limited warranty, parts and labor. \*Preloaded Microsoft® Windows® XP Tablet PC Edition OS required for handwriting functionality. Please consult your Panasonic representative prior to purchase. Main photo credit: Master Sgt. Terry L. Blevins, courtesy of U.S. Air Force, ©2005 Panasonic Computer Solutions Company, Unit of Panasonic Corporation of North America. All rights reserved. Topflight\_V\_FY05-4



Worth, Tex., F-16 plant running.

Lockheed hoped that a 40-airplane order from Greece would sustain the plant, which employs a total of 15,100 workers, 4,000 of them solely on the F-16 line. However, Greek officials in November were balking at confirming the deal. The Greek buy was estimated at \$3.1 billion; it would go to the production of one of the most advanced versions of the F-16.

#### First TH-1H Delivered

The first TH-1H training helicopter was delivered to the Air Force on Nov. 5. The aircraft was the first of 24 to be delivered over the next four years to support USAF helicopter training at Ft. Rucker, Ala.

The TH-1H is a modification of the venerable Bell UH-1H "Huey." The aircraft have been upgraded with a more powerful engine, new nose and tailboom, digital cockpit, crashworthy seats, and total rewiring.

Lockheed Martin is the prime contractor for the helicopter, and US Helicopter, as subcontractor, is performing the modifications, refurbishment, and test of the aircraft at its Ozark, Ala., facility.

#### IED Czar Appointed

Secretary of Defense Donald H. Rumsfeld on Dec. 5 appointed retired Army Gen. Montgomery C. Meigs as the Pentagon's manager for projects aimed at countering roadside bombs and other improvised explosive devices.

Such devices were used in a growing number of attacks in Iraq last year, claiming many US casualties.

Meigs commanded US Army forces in Europe and NATO's peacekeeping force in Bosnia.

Top level officials in Iraq, including US Central Command chief Army Gen. John P. Abizaid, had signaled the need for a more effective effort to counter the threat.

The previous Pentagon IED task force, headed by Army Brig. Gen. Joseph Votel and charged with combating roadside bombings since 2004, had been unable to find a solution to the growing problem, despite a \$1.5 billion budget.

In a related measure, Eglin AFB, Fla., stood up the Advanced Improvised Explosive Device Training Facility on Nov. 3, as part of the school that trains bomb disposal experts. Students will receive instruction on IEDs and will train in realistic scenarios to prepare them for what they will see in Iraq and Afghanistan.

#### Israel Is Back in JSF Game

The US will again permit Israel to

## Senior Staff Changes

**RETIREMENTS:** Brig. Gen. Bradley S. Baker, Lt. Gen. William Welser III.

**PROMOTIONS:** To **Brigadier General:** Daniel R. Eagle. To **ANG Major General:** Larita A. Aragon, Tod M. Bunting, Craig E. Campbell, William R. Cotney, R. Anthony Haynes, Charles V. Ickes II, Robert A. Knauff, James R. Marshall, Terry L. Scherling, Michael J. Shira, Emmett R. Titshaw Jr. To **ANG Brigadier General:** David S. Angle, Thomas M. Botchie, Richard W. Burris, Garry C. Dean, Michael J. Dornbush, Kathleen E. Fick, Edward R. Flora, James H. Gwin, Scott B. Harrison, David M. Hopper, Howard P. Hunt III, Cynthia N. Kirkland, John M. Motley Jr., Gerald C. Olesen, Alan W. Palmer, Michael L. Peplinski, Esther A. Rada, Alex D. Roberts.

**NOMINATIONS:** To be **Brigadier General:** Gregory A. Biscione, Edward L. Bolton Jr., Joseph D. Brown IV, Gregory L. Brundidge, Timothy A. Byers, Michael W. Callan, David S. Fadok, Craig A. Franklin, David L. Goldfein, Francis L. Hendricks, John W. Hesterman III, James W. Hyatt, John E. Hyten, Michelle D. Johnson, Richard C. Johnston, Joseph A. Lanni, Kenneth D. Merchant, Michael R. Moeller, Harry D. Polumbo, John D. Posner, James O. Poss, Mark F. Ransch, Mark O. Schissler, Charles K. Shugg, Marvin T. Smoot Jr., Alfred J. Stewart, Everett H. Thomas, William W. Uhle Jr., Dartanian Warr, Brett T. Williams, Tod D. Wolters.

**CHANGES:** Brig. Gen. C.D. Alston, from Dir., Strategic Comm., MNF-Iraq, CENTCOM, Baghdad, Iraq, to Dir., Air & Space Ops., AFSPC, Peterson AFB, Colo. ... Brig. Gen. Michael J. Basla, from Dep. Dir., Operational Spt. Modernization, Warfighting Integration and CIO, Pentagon, to Dir., C4, TRANSCOM, Scott AFB, Ill. ... Brig. Gen. (sel.) Gregory L. Brundidge, from Chief, Capital Planning & Investments, Warfighting Integration and CIO, OSAF, Pentagon, to Dep. Dir., Operational Support Modernization, Warfighting Integration and CIO, OSAF, Pentagon ... Brig. Gen. Gary S. Connor, from Cmdr., C2ISR Wg., ESC, AFMC, Hanscom AFB, Mass., to DCS, Computer Info. Sys., MNF-Iraq ... Maj. Gen. James A. Hawkins, from Dir., Ops., AMC, Scott AFB, Ill., to Cmdr., 18th AF, AMC, Scott AFB, Ill. ... Brig. Gen. (sel.) Frank J. Kisner, from Dir., P&P, PACAF, Hickam AFB, Hawaii, to Dep. Dir., Strat. Planning & Policy, PACOM, Camp H.M. Smith, Hawaii ... Brig. Gen. Ronald R. Ladnier, from Dir., Log. Readiness, DCS, Instl. & Log., USAF, Pentagon, to Dir., Resources, DCS, Instl. & Log., USAF, Pentagon ... Brig. Gen. Erwin F. Lessel III, from Dir., P&P, AFMC, Wright-Patterson AFB, Ohio, to Dir., Comm., OSAF, Pentagon ... Brig. Gen. Gary T. McCoy, from Dir., Log. & Sustainment, AFMC, Wright-Patterson AFB, Ohio, to Dir., Log. Readiness, DCS, Instl. & Log., USAF, Pentagon ... Maj. Gen. Craig R. McKinley, from Dir., Mobilization & Reserve Component Affairs, EUCOM, Stuttgart-Vaihingen, Germany, to Asst. DCS, P&P, USAF, Pentagon ... Maj. Gen. Arthur B. Morrill III, from Dir., Resources, DCS, Instl. & Log., USAF, Pentagon, to Dir., Log. & Sustainment, AFMC, Wright-Patterson AFB, Ohio ... Maj. Gen. Michael W. Peterson, from Dir., Info., Svcs., & Integration, OSAF, Warfighting Integration & CIO, Pentagon, to Chief, Warfighting Integration and CIO, OSAF, Pentagon ... Maj. Gen. Quentin L. Peterson, from Vice Cmdr., 18th AF, AMC, Scott AFB, Ill., to Dir., Ops., AMC, Scott AFB, Ill. ... Maj. Gen. Teresa M. Peterson, from Dir., Ops. & Tng., DCS, Air & Space Ops., USAF, Pentagon, to Commandant, Natl. War College, NDU, Ft. McNair, D.C. ... Brig. Gen. Paul G. Schafer, from Spec. Asst. to DCS, Air & Space Ops., USAF, Pentagon, to Dir., Special Programs, USD (Acq., Tech., & Log.), Pentagon ... Maj. Gen. Darryl A. Scott, from Cmdr., Defense Contract Mgmt. Agency, Alexandria, Va., to Cmdr., Jt. Contracting Command, MNF-Iraq ... Brig. Gen. David M. Snyder, from Dep. Dir., Strat. Planning & Policy, PACOM, Camp H.M. Smith, Hawaii, to Dir., P&P, PACAF, Hickam AFB, Hawaii ... Brig. Gen. Thomas E. Stickford, from Dir., Weather, DCS, Air & Space Ops., USAF, Pentagon, to Vice Cmdr., 18th AF, AMC, Scott AFB, Ill. ... Brig. Gen. Richard E. Webber, from Cmdr., 21st SW, AFSPC, Peterson AFB, Colo., to Dir., Mission Spt., AFSPC, Peterson AFB, Colo.

**SENIOR EXECUTIVE SERVICE RETIREMENTS:** Carl P. McCullough, Mark K. Wilson.

**SES CHANGES:** Russell B. Howard, to Dir., Engineering, Oklahoma City ALC, AFMC, Tinker AFB, Okla. ... Charles D. Metcalf, to Dir., Natl. Museum of USAF, AFMC, Wright-Patterson AFB, Ohio ... Gerald F. Pease Jr., to Dep. for Ops. & Tng., Airspace, Ranges, and Airfield Ops., DCS, Air & Space Ops., Pentagon ... Judith L. Simon, to Asst. Auditor General, Financial & Systems Audits Directorate, AFAA, March ARB, Calif. ... Rob C. Thomas II, to Executive Dir., AFPC, Randolph AFB, Tex. ... David Tillotson III, to Deputy Chief, Warfighting Integration, and Deputy CIO, OSAF, Pentagon ... Kenneth H. Watman, to Dep. Dir., Strat. Planning, DCS, P&P, USAF, Pentagon.

participate in the F-35 Joint Strike Fighter program.

The two nations had been at odds over Israel's sale of military technology to China, but they have worked out their differences, said Israeli Defense Minister Shaul Mofaz in November.

In April, the Pentagon suspended Israel's participation in the program because of concerns that Israel would provide sensitive US military technology to China in a sale of Harpy killer drones.

"All the controversial questions have





# Know before you go.

## Unparalleled C4ISR Expertise

General Dynamics AOC Alliance is recognized throughout the industry for designing world-class operations centers. Using low-risk, high quality processes, we integrate command and control applications into a collaborative common operating picture with the flexibility required to ensure faster information flow and speed of decision-making. Our customers rely on the trusted performance of these systems to ensure mission success at all levels, in any environment. With the AOC Alliance on board...you'll know before you go.

**GENERAL DYNAMICS**  
C4 Systems

[www.gdc4s.com/aoc](http://www.gdc4s.com/aoc)



## News Notes

■ Retired Air Force Gen. Richard B. Myers received the Presidential Medal of Freedom from President Bush on Nov. 9. Myers received the award—the highest civilian decoration given by the US—for his role in transforming the American military to deal with new threats. Myers became Chairman of the Joint Chiefs of Staff less than a month after the Sept. 11 attacks and headed the armed forces through the wars in Afghanistan and Iraq. He retired on Oct. 1, 2005.

■ The C-130J, the newest version of the Air Force's venerable tactical airlifter, did well in combat testing at Little Rock AFB, Ark., last fall. Testers said the aircraft was "outstanding" in the second phase of operational test and evaluation, including combat airdrops. Yet to be completed are 24-hour surge operations and interoperability testing with Army personnel and equipment, then cold weather testing at Eielson AFB, Alaska.

■ Service personnel returning from deployments will get an extra health screening—physical and mental—between three and four months after they get back, according to the Defense Department. The Pentagon is recognizing that some health problems resulting from deployment may not be immediately obvious. The screening program starts this month.

■ About 750 pilots and air battle managers have an extra incentive to stay with USAF when their obligations are fulfilled. Eligible pilots can get a \$25,000 pretax aviator continuation pay bonus, while air battle managers can qualify for \$15,000. The bonuses

are not available to navigators this year. Pilots must have at least nine years in the cockpit and meet other eligibility requirements. Air battle managers need to have six years' experience in the field.

■ Russia will have access to bases in Uzbekistan—and vice versa—under an agreement reached in November. The agreement calls for mutual defense in the event either country is attacked. Uzbekistan recently expelled the US from bases that had been used since 2001 to support operations in Afghanistan. Uzbekistan was unhappy with payments it received from Washington and US criticism of its human rights abuses. (See "Aerospace World: US Out of Uzbekistan," September 2005, p. 30.)

■ The Air Force is testing a new program that aims to reduce personnel action paperwork by 85 percent. Called Personnel Services Delivery, it allows USAF service members to complete basic personnel actions online. The new system is being tested at McConnell AFB, Kan., through April. Personnel shops also will be reorganizing to streamline the process of career management actions.

■ The 2004 Cheney Award, recognizing an airman for an act of valor or self-sacrifice, has been given to Maj. John M. Groves. An MH-53 Pave Low pilot, Groves circled through enemy fire in April 2004 to retrieve the crew of another MH-53 that had been shot down. Groves, his crew, and two Special Forces soldiers on board his helicopter are credited with saving the lives of the nine troops, in the downed

Pave Low, who were under constant enemy fire.

■ The lights went out at the equipment room of Satellite Operations Center-52, Onizuka AFS, Calif., for the last time on Nov. 4. SOC-52 had operated for 36 years, supporting all types of USAF and civil space operations. Its functions transferred to Schriever AFB, Colo., in 2004, to be collocated with similar functions performed by Air Force Space Command. The "blue cube" building, nicknamed for its color and shape, has housed much of the space control effort. It is a landmark on the installation. The station was named for Lt. Col. Ellison Onizuka, an Air Force astronaut who died in the *Challenger* space shuttle accident in 1986.

■ The Air Force has won a 2005 Green Power Leadership Award. The awards are given to organizations that make a dedicated effort to use renewable sources of energy. The Oct. 24 award cited the fact that both Dyess AFB, Tex., and Fairchild AFB, Wash., receive 100 percent of their electric power from wind or other alternative energy sources. The prize is sponsored by the US Environmental Protection Agency, Department of Energy, and the Center for Resource Solutions.

■ Lockheed Martin received a \$98 million contract Nov. 10 for work on the C-5 Avionics Modification Program. The program updates the electronics of the C-5 Galaxy, the largest transport in USAF service. The contract runs through November 2010.

■ Instant Messenger services now allow USAF personnel deployed overseas to have online real-time chats with

*Continued on p. 22*

## World War II Airmen Identified

The remains of three World War II Army Air Forces airmen missing in action since 1941 have been identified, DOD announced in October.

The airmen are 2nd Lt. Augustus J. Allen of Myrtle Springs, Tex.; SSgt. James D. Cartwright of Los Angeles; and Cpl. Paul R. Stubbs of Haverhill, Mass.

Allen, Cartwright, and Stubbs were flying in an O-47A observation aircraft from France Field, Panama, to Rio Hato, Panama, on June 8, 1941. When they didn't arrive, a search was begun. No wreckage was found and the men were listed as missing in action.

In April 1999, a Panamanian hunter discovered aircraft wreckage and notified his government. Panama contacted the Joint POW/MIA Accounting Command (JPAC) at Hickam AFB, Hawaii. The crash site was excavated in February 2002; crew remains, artifacts, and aircraft wreckage were recovered.

The Armed Forces DNA Identification Lab and JPAC used the mitochondrial DNA method to identify the three airmen.

The remains of all three servicemen were returned to their families for burial with full military honors.

been answered," Mofaz told an Israeli news service after a meeting in Washington with Defense Secretary Donald H. Rumsfeld. Israel wants to buy about 100 F-35s.

Israel agreed to consult with Washington on future arms transfers that might be of concern.

The Harpy deal was the third Israel arms sale to China in five years that Washington vetoed after the fact. In 2000, Israel had to pay China \$350 million after renegeing on a deal to supply Phalcon airborne radar systems aircraft to Beijing.

Last fall, the US halted a \$100 million Israeli project to upgrade F-16s



Actionable Intelligence



We don't control the weather.  
We turn it into an advantage.

At Raytheon, we don't control the weather, but we can harness its power. Our unmatched understanding of weather data and software engineering, coupled with our proven ability to lead fully integrated mission systems, enables customers to enhance battlespace awareness by providing actionable environmental intelligence. So no matter what the forecast calls for, the warfighter has a decided advantage through information superiority.

[www.raytheon.com](http://www.raytheon.com)

**Raytheon**

*Customer Success Is Our Mission*



Continued from p. 20

friends and family back home through the Air Force portal, according to Electronic Systems Center. Originally, the instant messaging function was available only for official business, but has been expanded to boost morale at forward operating locations.

■ A partnership of the Defense Commissary Agency and the Fisher House Foundation will offer at least one \$1,500 college scholarship at each of the agency's 268 commissaries worldwide. Unmarried children under 21 years old—or up to 23 years old if they are enrolled in school—of active duty, Guard, Reserve, or retired

military members are eligible. The application process ends Feb. 22. The application can be found on the Internet at [www.commissaries.com](http://www.commissaries.com) or [www.militaryscholar.org](http://www.militaryscholar.org).

■ Oracle Corp. has received an \$89 million USAF contract for software that will replace more than 500 Air Force logistics systems now in use. The new software will automate the gathering of logistics data in real-time, simplifying and improving decisions made by commanders at all levels in the logistics chain. The new system is to be in place by December 2011.

■ A Defense Department Web site

answering questions about a potential influenza pandemic and avian flu was inaugurated Nov. 7. The site, <http://www.deploymentlink.osd.mil>, has information on the risk for service members overseas, the military role in dealing with avian flu, and preventive measures.

■ Northrop Grumman received a \$60 million Air Force contract on Nov. 7 to start construction on the next five RQ-4B Global Hawk unmanned reconnaissance and surveillance systems. The contract covers long-lead parts and the integrated sensor suites that would be carried on the vehicles. The contract also buys one mission-control and one launch-and-recovery element. Global Hawk can take off, fly, and land autonomously and dwell over an area of interest for up to 24 hours.

■ The Air Force has begun testing a truck powered by a hybrid engine, to save fuel. The vehicle is designated R-11 and has a diesel engine, electric motor, and battery pack to enhance its fuel efficiency. The \$1.2 million prototype uses the regenerative braking system to capture kinetic energy—highly effective in stop-and-go operations. The testing is being done at Robins AFB, Ga., and is expected to reduce truck fuel consumption by 20 percent.

■ MITRE Corp. on Nov. 3 received a USAF contract worth \$355 million for in house engineering services at Electronic Systems Center, Mass. The contract also supports foreign military sales with Saudi Arabia, France, the UK, and Japan. The work would be completed in October. ■

USAF photo by Lt. Nathan D. Broshoar



**Capt. Ryan McGuire, an F-16 pilot with the 150th Fighter Wing (ANG), is seated at a MIG-29 simulator flying an "enemy" mission as part of Virtual Flag 06 on Nov. 3. McGuire's aircraft was displayed on the screens of simulators across the country as USAF aircrews "flew" missions while remaining at their home bases.**

operated by Venezuela, with which the US has had a falling out.

**\$10 Billion for USAF Support**

The Air Force on Nov. 8 awarded a

10-year contract for up to \$10 billion for natural disaster relief, logistics support, and engineering services.

The recipients were: Bechtel National, Frederick, Md.; CH2M Hill Global

Services, Englewood, Colo.; DynCorp International, Fort Worth, Tex.; Readiness Management Support, Panama City, Fla.; URS Berger/JV, Washington, D.C.; and Washington Group International, Denver.

The contract was awarded under the Air Force Contract Augmentation Program III which provides a global response to meet a wide range of support activities, including contingency skills, deployment support, and military force sustainment, according to the Air Force.

The companies can be called on quickly to design and build bases, provide logistics support, and assist the service with natural disasters such as hurricane recovery.

Each company will receive its share of the mammoth contract as determined by the amount and scope of work they perform over the 10-year period. ■

**Index to Advertisers**

Boeing .....	Cover IV, 3
CAMSS.....	5
CIA.....	Cover III
Erosonic.....	6
General Atomics.....	45
General Dynamics.....	19
Lockheed Martin .....	Cover II
Northrop Grumman .....	23, 39
Oregon Aero.....	15
Panasonic.....	17
Raytheon .....	21
AFA Membership .....	63
Air Warfare Symposium.....	75
New at AFA .....	79



# KC-30

The total air mobility solution.



For nearly a century Northrop Grumman has been creating and leveraging innovative technologies to secure America's defense. We've brought you revolutions in stealth aircraft, unmanned systems and airborne battle management. Now our world-class team is focused on delivering a total air mobility solution for the U.S. Air Force's next generation tanker — a cost-effective system, based on EADS' commercially successful A330, with greater capability and higher performance. Northrop Grumman. Defining the future in aerial refueling.

[www.northropgrumman.com](http://www.northropgrumman.com)

©2015 Northrop Grumman Corporation

**NORTHROP GRUMMAN**

DEFINING THE FUTURE™



# Action in Congress

By Tom Philpott, Contributing Editor

## VA Backs Off Review; The "Duke" No One Knew; VSOs Up in Arms; Last Minute Budget Wrangling ....

### VA Cancels PTSD Review

Under pressure from lawmakers and disabled veterans, the Department of Veterans Affairs canceled plans to review the paperwork of 72,000 disability cases involving awards for post-traumatic stress disorder.

"The problems with these files appear to be administrative in nature, such as missing documents, and not fraud," said R. James Nicholson, secretary of veterans affairs. "In the absence of evidence of fraud, we're not going to put our veterans through the anxiety of a widespread review of their disability claims."

Nicholson vowed instead to improve VA personnel training and to toughen administrative oversight of the PTSD claims process.

The VA had announced plans to review PTSD cases after its inspector general examined 2,100 randomly selected case files and found that a quarter of them lacked records to justify the claim. (See "Action in Congress: More Oppose PTSD Review," December 2005, p. 25.)

Lawmakers and veterans groups hailed the decision to cancel the review.

### Cunningham Resigns in Disgrace

Rep. Randy "Duke" Cunningham (R-Calif.) on Nov. 28 resigned from Congress after pleading guilty to accepting more than \$2 million in bribes from defense contractors in return for steering contracts their way.

Cunningham had been a member of the House Appropriations defense subcommittee.

Cunningham, a retired naval aviator and Vietnam War ace, said he had violated the trust of friends, family, and colleagues and he knew that he had lost all respect.

As he announced his resignation from the House, in the middle of his eighth term, Cunningham said it was time to "face the consequences" of his actions. Those consequences could include up to 10 years in prison on charges of bribery, fraud, and tax evasion.



Duke in disgrace.

### Empowered ... or Muzzled?

Rep. Steve Buyer (R-Ind.), chairman of the House Veterans' Affairs Committee, announced a new hearing schedule for veterans' service organizations (VSOs) to comment on VA's proposed budgets and priorities.

Hearings should occur soon after the budget arrives on Capitol Hill in February, Buyer argues, but the American Legion and Veterans of Foreign Wars say the opposite is true.

These organizations contend Buyer wants to dampen their influence by eliminating the traditional presentation of veteran groups before a joint hearing of the House and Senate VA committees.

"I am extremely disappointed in Chairman Buyer's latest effort to ignore the veterans service organizations," said Thomas L. Bock, American Legion national commander. The VFW called Buyer's plan "an absolute abhorrent idea" that will "drast cally" limit the amount of time Congress and the Administration have to review recommendations.

### Drug Prices

Veterans service organizations in November blasted a decision by the

VA to charge veterans \$8, rather than \$7, for each prescription filled by the VA for health conditions not linked to their time in service.

The \$1 hike in co-payments for a 30-day supply of medicines prescribed through VA medical facilities begins Jan. 1. The 14 percent increase is the first change in VA drug prices in four years.

The VFW said the \$1 increase in drug co-payments "came as a complete shock to America's largest organization of combat veterans" and was "totally unacceptable."

"A one dollar increase doesn't sound like a lot of money, but it could be devastating if you're elderly and living on a fixed income and have 20 or more prescription refills every month," said the VFW in a statement.

VA said the increase is required by law, based on changes in the Medical Consumer Price Index for prescription drugs. Annual out-of-pocket expenses for VA medicine will remain capped. The new cap will rise to \$960 per year, up \$120 from the previous level.

### Where's the Money?

Rep. John McHugh (R-N.Y.), chairman of the House Armed Services military personnel subcommittee, said the Senate ignored budget rules as it voted for a host of unfunded military personnel initiatives.

McHugh said more than a dozen benefit improvements approved as floor amendments during the Senate's final work on its defense authorization bill lacked funding. The Senate amendments would add "tens of billions of dollars" in spending to the budget's 10-year horizon, he said, yet Senators don't have "one cent" applied to the cost.

### Where Congress Agrees ...

As House-Senate conferees negotiated a final defense authorization bill this winter, they agreed on a handful of major personnel provisions that were included in both versions of the bill and were expected to pass into law. These included:

- A 3.1 percent military pay raise in calendar 2006.



- An increase in the Basic Allowance for Housing (BAH).

- A provision to equalize BAH so that Guard and Reserve members mobilized for 30 to 140 days receive housing allowances on par with their active duty counterparts.

- A change to the Uniform Code of Military Justice clarifying that no statute of limitations applies to crimes of murder or rape.

- Other UCMJ changes widening the time window for prosecution of child abuse and establishing stalking as a UCMJ offense.

### ... And Where It Disagrees

The negotiators labored in December to reconcile House-Senate differences over long-sought benefit gains for disabled retirees, survivors, and Guard and Reserve members.

Here is a rundown of the Senate initiatives that the House chose not to match in its own version of the bill:

- **Paid-Up SBP.** The effective date of the premium "paid-up" rule for the military's Survivor Benefit Plan would be moved up three years, from 2008 to Oct. 1, 2005. Premiums thus would end immediately for retirees who have paid them for 30 years or until age 70, whichever is later.

- **SBP-DIC Offset.** This provision would end a dollar-for-dollar reduction in military survivor benefits that occurs when surviving spouses begin to draw VA Dependency and Indemnity Compensation. DIC, set at \$993 a month in 2005, is paid if a member died on active duty or as a result of service-connected conditions. The estimated cost of the two SBP changes above, both offered by Sen. Bill Nelson (D-Fla.), is \$9.2 billion over the first 10 years.

- **Accelerated Concurrent Receipt.** This would accelerate the planned



AP photo by Linda Spillers, Scientific American

Durbin (right) proposes protection worth \$295 million.

restoration of full retired pay for 28,000 retirees with 20 or more years' service and drawing VA compensation at the 100 percent level. A 10-year phased plan to restore retired pay would be replaced with full retired pay dating to January 2005. (The House voted to ease the 10-year plan by restoring full retired pay in 2009 rather than 2014.) The Senate plan, pushed by Sen. Harry Reid (D-Nev.), would cost an extra \$900 million over 10 years.

- **Reserve Tricare.** The new Tricare Reserve Select program would be open to any drilling Reservist or National Guard member willing to pay monthly premiums of \$75 for member-only coverage or \$233 for family coverage. TRS is open to reserve component members who were mobilized, on the condition that they remain in drill status and available for recall. The cost would be \$3.8 billion over five years.

- **Reserve Retirement.** This provision would allow earlier reserve retirement as a reward for service in contingency operations since 9/11. The start of reserve annuities, now set for age 60, would be moved up by three months for every 90 days of active duty served. No reservist could retire before age 50.

- **Retroactive SGLI Hike.** The Senate would give \$150,000 in retroactive payments to survivors of 1,200 service members who died on active duty between Oct. 7, 2001, and May 11, 2005, in noncombat incidents. These families were excluded from a previous retroactive increase in coverage under Servicemembers' Group Life Insurance.

### Income Protection Issue

Authorization lawmakers also have to resolve the income protection issue for reserve component troops. Under a

Senate plan, Reservists and National Guard members who are involuntarily mobilized and see a drop in pay from their civilian salaries would receive an income differential. Payments would occur if mobilized for more than 180 days of continuous active duty, or for 24 months out of the last 60, or if involuntarily mobilized less than six months after a previous mobilization.

The House passed a provision to allow income replacement if a reservist spent 18 months on continuous active duty. The House provision would be paid to very few reservists, said Sen. Richard Durbin (D-Ill.), sponsor of the Senate substitute.

Durbin's proposal would cost an additional \$295 million over five years.

### Eleventh-Hour Amendments

House-Senate authorization conferees also have to iron out a series of 11th-hour amendments that Senators adopted in their version of the 2006 defense authorization bill. These amendments would authorize:

- An increase in the ceiling on assignment incentive pay, offered by the services to persons with highly critical skills.

- New recruiting and retention incentives.

- A fund to reimburse service and family members for purchase of protective gear used by troops in combat zones.

- New protections from predatory lenders for service members.

- Consumer education for service members and their families on insurance and other financial services.

- Better transition assistance for Guard and Reserve members and families.



AP photo by Steven Mitchell

Nelson wants more for survivors.



# The Strategy of

Fifteen years ago this month, the Gulf War upset prevailing assumptions about airpower and its relationship to the "AirLand Battle."



*A lineup of active duty and Air National Guard F-15s and F-16s flies over the burning oil fields of Kuwait. Airpower smashed Iraqi forces, disrupted Iraqi command and control, and destroyed Iraq's ability to mount further aggression.*



# f Desert Storm

By John T. Correll

**I**n the summer of 1990, Iraq was the best-armed state in the Arab world. Despite the increasingly bellicose behavior of the Iraqi leader, Saddam Hussein, the Pentagon, the State Department, and the Central Intelligence Agency did not see Iraq as an urgent problem.

Intelligence reports said that Iraq was “weary” from its long war in the 1980s with Iran and was not likely to attack its neighbors in Kuwait or Saudi Arabia. The assessment did not change appreciably when Saddam, in a televised speech on July 17, threatened to take military action against Kuwait.

In late July, US Central Command featured Iraq—thinly disguised as “a country from the north”—in a command post wargame called Internal Look. The scenario was an Iraqi invasion of the Arabian peninsula. State Department officials complained on the grounds that Iraq was not an enemy.

The oil crises of the 1970s had demonstrated the importance of the Middle East, but US defense strategy regarded it as a military theater of secondary importance, after Europe and the Pacific.

US armed forces were focused on the end of the Cold War. The Berlin Wall had fallen in 1989, and both the Warsaw Pact and the Soviet Union were tottering. The defense budget and force structure had been cut deeply, and there were demands for further reductions. A sarcastic headline in the *New York Daily News* said, “Pentagon Needs a Few Good Enemies.”

The future looked particularly uncertain for the Air Force. Since its founding as a separate service in 1947, the Air Force’s prime mission had been to deter and counter the Soviet Union in

the Cold War. For most of its history, the service had been dominated by Strategic Air Command. Within two years, SAC would cease to exist.

In the minds of many, the role of the tactical air forces was to support the Army in the “AirLand Battle.” In the Heritage Foundation’s Policy Review, Jeffrey Record, a noted defense analyst, asked whether the nation still needed an independent Air Force. His treatise was entitled, “Into the Wild Blue Yonder: Should We Abolish the Air Force?”

Bucking the trend, the Office of the Secretary of the Air Force in June 1990 published a white paper, “Global Reach-Global Power.” It described the maturation of “a truly revolutionary set of technologies” and said the United States had become “an aerospace nation.”

Sometimes, the white paper said, the Air Force would function in a subordinate role, but “to meet the needs of the joint force commander, we conduct independent, parallel, and supporting operations in conjunction with other service components.” It predicted that the “use of military forces will be primarily in sharp, powerful, short duration operations,” with airpower playing a strong and early part.

## Desert Shield

Saddam invaded Kuwait on Aug. 2, 1990. It was not clear that he was going to stop there. Iraq had 63 ground divisions, 27 of them already in Kuwait and positioned to move south. He also had about 750 combat aircraft. If he could seize the adjacent Eastern Province of Saudi Arabia, he would, with his other holdings, control more than half of the



USAF photo by T.Sgt. Fernando Sierra





**President George H.W. Bush's Secretary of Defense, Richard Cheney, talks with a marine before the shooting starts. After the war was over, Cheney declared, "The air campaign was decisive."**

world's oil. Saudi defense forces were not sufficient to stop him.

In Washington, President Bush said the invasion of Kuwait "will not stand" and demanded that Iraq withdraw from Kuwait. On Aug. 6, Saudi King Fahd accepted a US offer of assistance. On Aug. 8, the Gulf saw the arrival of the first US forces—a USAF C-141 carrying an airlift control element, closely followed by F-15s from Langley AFB, Va., and elements of the US Army's 82nd Airborne Division.

The Pentagon announced that the name of the operation was Desert Shield. It would be conducted by US Central Command, which had grown out of the old Rapid Deployment Joint Task Force, formed in the wake of the Iranian hostage crisis and Soviet invasion of Afghanistan. CENTCOM's area of responsibility was the Middle East, Southwest Asia, and Horn of Africa. It did not, however, include Israel, Lebanon, or Syria, which were watched over by the more prestigious US European Command.

The commander of CENTCOM was Army Gen. H. Norman Schwarzkopf. As a theater commander, he was empowered by the Goldwater-Nichols Act of 1986 to organize and employ his force as he saw fit, but the command had no forces of its own. On a day-to-day basis, CENTCOM consisted of a headquarters and planning staff in Tampa, Fla.

Schwarzkopf drew his Air Force component from 9th Air Force, headquartered at Shaw AFB, S.C. The commander, Lt. Gen. Charles A. Horner, was a hard-nosed fighter pilot who got along well with Schwarzkopf. Ninth Air Force was part of Tactical

Air Command, but when Horner was acting in his capacity as commander of the CENTCOM Air Force component, he answered to Schwarzkopf, not to the Air Force.

Secretary of Defense Richard B. Cheney and Schwarzkopf went to Saudi Arabia to confer with King Fahd, taking along Horner and the Army component commander, Lt. Gen. John J. Yeosock of 3rd Army. When Cheney and Schwarzkopf came home, Horner and Yeosock remained in Riyadh.

Horner, as the senior officer, was designated as commander of CENTCOM Forward. That was one of several singular events that put the Gulf War on a different course than it might otherwise have taken.

Before Schwarzkopf departed from Saudi Arabia, he told Horner he was going to ask the Pentagon to help plan a "strategic air campaign." Horner was "furious" about this, Schwarzkopf recalled in his memoirs; the airman insisted that such planning was his job. However, Schwarzkopf noted, "I'd reminded him that, as my forward commander in Riyadh, he had his hands full and promised he could take over once the preliminary work was done."

### AirLand Battle

The relationship of force components was supposedly settled in 1943, after the success of airpower in North Africa, when *Army Field Manual 100-20* said that "land power and airpower are co-equal and interdependent forces; neither is an auxiliary of the other."

However, Army ground forces never accepted that decision, and, in the 1980s, their side of the argument gained new strength with the AirLand Battle doctrine.

AirLand Battle acknowledged that the Army could not win without the Air Force, but said that airpower was fire support—always support—for the ground force. Tactical Air Command agreed.

Gen. Robert D. Russ, commander of TAC and acknowledged leader of Air Force fighter and attack forces, said, "Tactical aviators have two primary jobs—to provide air defense for the North American continent and support the Army in achieving its battlefield objectives."

Air Force doctrine officials protested



**Gen. Colin Powell, Chairman of the Joint Chiefs of Staff, confers with Gen. H. Norman Schwarzkopf, the coalition commander in chief. Schwarzkopf, an Army officer, displayed an unusually strong willingness to trust the capability of airpower.**



that AirLand Battle was Army, not Air Force, doctrine. Their objections, however, were trumped by the differing opinion and enormous prestige of Bob Russ. Most of the fighter community shared his view.

OPLAN 1002, the off-the-shelf plan that CENTCOM used for the Internal Look exercise in 1990, was consistent with the AirLand Battle concept. In the scenario, airpower responded quickly to the invasion by the “country to the north,” but its task was to trade space for time and hold back the invaders until CENTCOM ground forces could get there to regain the initiative.

At the bottom of an Internal Look briefing slide, Horner had written, “Build a hose and point it where the ground commander sees that it’s needed.”

The plan did provide for “cross border” air strikes, but they were the final element of the campaign (rather than the first element, as would be the case in the actual Gulf War of 1991). CENTCOM would not have gone to war with a canned OPLAN, but it was an indication of the command’s emphasis on the ground battle.

Schwarzkopf’s August 1990 interest in a strategic air campaign was prompted not so much by his belief in airpower as by the paucity of ground force options. It would be almost two months before Schwarzkopf could be confident that his ground force could stop an enemy attack, much less drive the Iraqis from Kuwait.

Horner disliked talking about “strategic” and “tactical” operations. It was more useful, he believed, to think about offensive and defensive operations. Besides, said Tom Clancy—the co-author (with Horner) of the 1999 book *Every Man a Tiger*—a “strategic air campaign” was “Air Force code for use of airpower aimed at the heart of the enemy and not at his ground forces.” What Schwarzkopf wanted was an offensive air campaign.

Early plans in Desert Shield allocated Schwarzkopf one Army corps. His combat analysis group said that an offensive could succeed with a single corps only if an air campaign first inflicted 50 percent attrition on the enemy. (That attrition objective did not change when Schwarzkopf gained an additional corps in November. By then, Intelligence was reporting a larger Iraqi force.)

### Instant Thunder

“I called Colin Powell [Chairman of

the Joint Chiefs of Staff] and asked that the Air Force put planners to work on a strategic bombing campaign, aimed at Iraq’s military, which would provide the retaliatory options we needed,” Schwarzkopf said.

Schwarzkopf then called the Air Force. The Chief of Staff, Gen. Michael J. Dugan, was out of town, so he spoke with the vice chief, Gen. John Michael Loh, who said the Air Force would be glad to help. Loh notified Russ at TAC. According to interviews conducted later, Russ did not believe that Schwarzkopf was really that interested in Air Staff assistance, and he sent word to Chuck Horner that people in Washington were mucking about in his business.

Loh next called Air Force Plans and Operations. Here again, circumstances took a strong hand in events. Lt. Gen. Jimmie V. Adams, the deputy chief of staff for plans and operations, was on leave. Adams agreed with Russ’ views on airpower and on Air Staff planning of field operations.

Thus as it happened, the tasking from Loh went to the last person that Russ and Adams wanted to see involved: Col. John A. Warden III in the “Checkmate” planning division.

Warden did not subscribe to AirLand Battle. In 1988, he wrote a book, *The Air Campaign*, a treatise on the use of airpower at the operational level of war, where it could be either the primary or the supporting element in the strategy. Dugan, at the time the deputy chief of staff for plans and operations, had copies distributed to every officer on the Air Staff.

Not everyone shared Dugan’s enthusiasm for Warden and his theories. Warden’s detractors acknowledged that he was brilliant, but they also saw him as arrogant, headstrong, and inflexible.

Warden’s team moved fast. They pulled in extra hands, among them Lt. Col. David A. Deptula. Deptula, who was working in the Office of the Secretary of the Air Force, had been the principal author of “Global Reach-Global Power.” With Loh’s help, Warden also tapped rich sources of information in Air Force Intelligence and elsewhere in Washington.

Within days, Checkmate had sketched out a plan named Instant Thunder, under which Saddam Hussein’s forces supposedly would suffer “strategic paralysis.” Ground forces did not figure prominently in the plan. It basically prescribed a massive attack by 500 combat aircraft that would, in

## Chronology

### 1990

Aug. 2. Iraq invades Kuwait.

Aug. 6. King Fahd gives permission to base US forces in Saudi Arabia.

Aug. 7. USAF F-15 squadrons depart for Gulf. USS *Independence* carrier battle group arrives in Gulf of Oman, south of Persian Gulf.

Aug. 8. F-15s from 1st TFW and elements of 82nd Airborne Division arrive.

Nov. 8. US sends 200,000 more troops for “offensive option.”

Nov. 29. UN authorizes force to eject Iraq from Kuwait.

### 1991

Jan. 12. Congress approves offensive use of US troops.

Jan. 15. UN deadline for Iraqi withdrawal passes.

Jan. 17. D-Day. Coalition warplanes strike massive blow against numerous Iraqi targets.

Jan. 18. Iraq launches Scuds at Israel, Saudi Arabia.

Jan. 25. USAF opens attacks on Iraqi aircraft shelters.

Jan. 26. Iraqi aircraft begin fleeing to Iran.

Jan. 29-31. Airpower destroys Iraqi force in Battle of Khafji.

Feb. 24. G-Day. Start of 100-hour ground battle in Kuwait and Iraq.

Feb. 26. Fleeing Iraqi forces struck by airpower on the “Highway of Death.”

Feb. 28. Cease-fire becomes effective at 8 a.m. (Kuwait time).





**Lt. Gen. Charles Horner, coalition air commander, briefs reporters. Horner pushed to replace the early strategic air campaign with one that also would simultaneously hammer Iraqi ground units throughout Iraq and Kuwait.**

six to nine days, destroy Saddam's ability to wage war. The Iraqi Army in Kuwait would not be struck unless it attempted to move forward.

Warden briefed his plan to Schwarzkopf on Aug. 10 and to Powell on Aug. 11. Both of them liked it, although they wanted it revised to give more attention to the Iraqi field Army. As Powell described it later in his memoirs, Warden proposed to "attack deep inside Iraq, knock out their command and control installations, transportation systems, production and storage facilities, and air defense networks." Powell said he did not want Saddam to withdraw the invasion force. He wanted the invasion force destroyed.

The Air Staff kept TAC informed, but, at the direction of both Schwarzkopf and Dugan, it sought neither coordination with nor approval from TAC. Russ and his planners offered a different approach anyway: Instead of sending a massive attack, send Saddam a message with a warning attack against selected targets, and then escalate only if that did not work. Adams had returned to Washington, but neither he nor Russ was able to deflect the Instant Thunder express.

On Aug. 17, Warden again briefed Schwarzkopf, who told him to take the plan to Horner in Riyadh, which he did on Aug. 20. The presentation in Riyadh, however, did not go well.

Warden's briefing began with a presentation on history and philosophy. Horner, who had studied the Middle East for years, found the lecture pa-

tronizing and told Warden to move on. "I was getting a university academic teaching a 101 class," Horner said in *Every Man a Tiger*. "At every question I asked that dealt with the Iraqi ground forces, he would dismiss my concerns as unimportant."

Horner thought Warden had brought "outstanding targeting materials and attack options" but that his plan—focused on the deep-strike aspect of the air campaign—was too narrow for actual conduct of the war.

Horner sent Warden, who seemed certain Horner was "too stupid to grasp [Warden's] central concept,"

back to Washington, but asked other members of the Checkmate team to stay. Notable among those kept in Riyadh was Dave Deptula.

### The Black Hole

Schwarzkopf arrived in Riyadh on Aug. 29 to take charge in person. Horner was thereafter free to concentrate on being the joint force air component commander, or JFACC, responsible for all of the airpower under the control of Central Command.

Horner recruited Brig. Gen. Buster C. Glosson as his chief planner and told him to "take the Checkmate effort and build an executable air campaign." Glosson set up shop in the basement of the Royal Saudi Air Force headquarters building. This area came to be known as the "Black Hole," both because of the secrecy and because the working hours were so long that people went in and were seldom seen coming out. Deptula was in charge of the entire offensive plan, including targets in and around Baghdad.

The Black Hole got regular inputs from Checkmate, which continued to tap valuable intelligence and information sources in Washington.

As noted by the *Gulf War Air Power Survey* after the war, there was no single document called the "air campaign plan." It consisted of a general expression of purposes and expectations, the identification of four phases of action, and a detailed air tasking order.

On Aug. 25, Schwarzkopf briefed Powell on four sequential phases of the



**Brig. Gen. Buster Glosson (seated at back) pictured inside the "Black Hole," so named because staffers rarely left the windowless strategy center. With Glosson is (l-r) Maj. Ernie Norsworthy, Col. Tony Tolin (standing), and Lt. Col. David Deptula.**



plan for Desert Storm, which would eject the Iraqis from Kuwait:

1. Instant Thunder. For the time being, Schwarzkopf kept Warden's term for the strategic air campaign.

2. Suppression of enemy air defenses.

3. Attrition of enemy forces by 50 percent, an enormous task, expected to be achieved by airpower.

4. The ground attack.

"It took weeks to build the first offensive air campaign plan," Horner said. "Much of Warden's work was in it, but it went far, far beyond his work."

The original Instant Thunder plan had 84 targets. The air tasking order of Jan. 15, 1991, had 476 targets. As the war went on, targets were numbered in the thousands. Such a campaign would take longer, of course, than the six to nine days that had been estimated for Instant Thunder. Glosson's plan also differed from Warden's in that the Iraqi ground forces were hit the first day and every day thereafter until the end of the war.

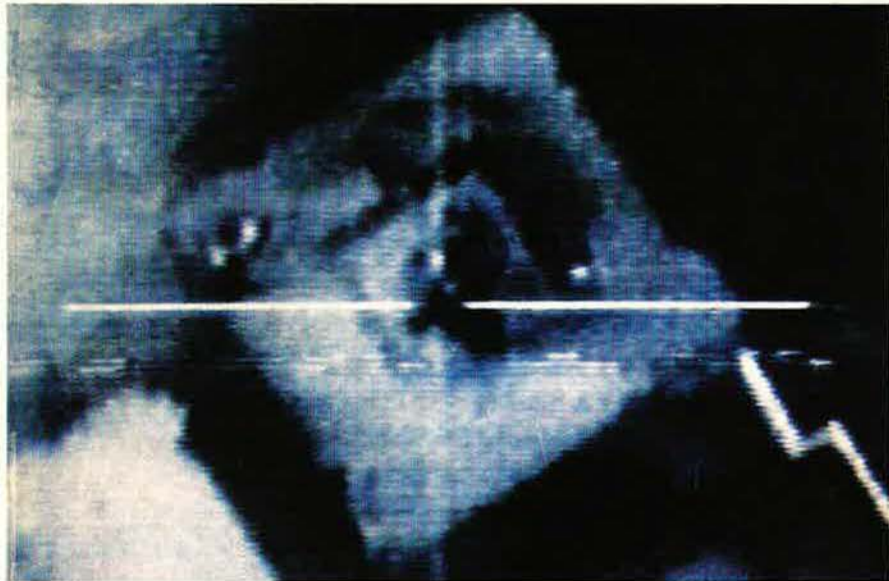
Nevertheless, Instant Thunder had a strong and beneficial influence on the plan for Desert Storm. It bore no resemblance to AirLand Battle or Internal Look, in which air operations were subordinated to the ground force.

Glosson "had expanded the retaliatory scheme of the Pentagon Air Staff into the best air campaign I'd ever seen," Schwarzkopf said. "It gave us a broad range of attack options and could be conducted as a stand-alone operation or as part of a larger war." (Although Glosson led the effort, the architect of the air campaign was Deptula, who created both the attack strategy and the specific plan.)

Centralized control of airpower had been attempted in previous wars. It worked a little better in the Gulf, in part because of Horner's leadership abilities. He cultivated a rough-and-ready image, but it was quickly obvious that he was smart, well-informed, and keenly attuned to building trust and teamwork.

As JFACC, Horner exercised his authority through the air tasking order, which was prepared by the crew in the Black Hole. Navy integration into the ATO was limited, mostly for technical reasons, and the Marine Corps resisted integration of air assets. The Marines referred to the JFACC as the joint force "air coordinator" instead of the "air component commander."

Of the US combat aircraft in Desert Storm, 58 percent were from the Air



DOD image

*A target—in this case, the elevator shaft of an Iraqi headquarters building—is seen through the nose of a laser guided bomb. Images of such extreme bombing precision became iconic of the Gulf War.*

Force, 27 percent from the Navy, and 15 percent from the Marine Corps.

As usual in war, the ground force commanders wanted more strikes on the enemy force directly in front of them, and they blamed Horner for not getting them. Actually, Horner was following directions from Schwarzkopf, who wanted the bombing emphasis on the elite Republic Guard units rather than on the regular Iraqi units strung out along the border. As he had demonstrated during the Instant Thunder briefings, Schwarzkopf also appreciated the need for strategic air strikes.

What the ground commanders wanted was AirLand Battle, but they were not going to get it.

### **A Line in the Sand**

Later, after the war was over, the Iraqi forces were depicted as an easy mark, no real challenge for the superior US and coalition forces. That was not how Powell and many other planners saw it; they expected a violent clash of armies. Some prewar casualty estimates were as high as 45,000. Schwarzkopf himself predicted 5,000 casualties.

Iraq had the world's sixth largest air force and fourth largest army. Some equipment was obsolete, but Iraq's inventory also included such modern aircraft as Mirage F-1 fighters, Su-24 strike aircraft, and MiG-29 interceptors. The Soviet-built Scud surface-to-surface missiles were old but not without effect. The armored divisions had Soviet T72 tanks. The integrated Kari air defense system was formidable. ("Kari" was

Iraq spelled backwards in French. The system was French-built.)

By January 1991, Saddam was face to face with a formidable international coalition. The United States and 38 other nations provided ground forces, and a total of 13 nations provided combat aircraft. The coalition had more than 1,000 fixed wing attack aircraft, 800 air defense fighters, and about 540,000 ground troops.

Saddam Hussein underestimated airpower. "The US relies on the Air Force," he said. "The Air Force has never been the decisive factor in the history of war."

What Saddam wanted to do was lure the coalition into a ground war, where he was at less of a disadvantage. "If there is war, the coming battle will be the mother of all battles," Saddam declared. "This battle has been ordained by God. ... And the great battle has been initiated, the mother of all battles, between the triumphant truth with the support of God and the evil pushed by Satan, which will be beaten eventually, God willing."

The coalition's strength was airpower. For a while, it was only airpower. In a telephone conference Oct. 6, Schwarzkopf told Powell that "as far as a ground offensive is concerned, we've still got nothing."

Studying the deployment of the Iraqi Army, however, Schwarzkopf had an inspiration. The "Saddam Line" extended from the Persian Gulf west along the border of Kuwait and another 40 miles along the border of Iraq, about 175





**An F-15C patrols skies over Kuwait. US air dominance drove Iraq's own air activity down to nothing in days, freeing the skies for US aircraft to watch and attack Iraqi ground units at will. All US aircraft losses stemmed from ground-fired missile attacks.**

miles in all. Saddam and his generals apparently had not noticed that their western flank was exposed and largely unguarded.

On Oct. 15, Schwarzkopf told the CENTCOM staff to plan a flanking movement in which US forces would swing far to the west and turn the Iraqi right flank in a classic military envelopment.

To do this, Schwarzkopf needed more ground forces, which he soon got. The "Left Hook" plan depended on airpower in several respects. To avoid discovery, Schwarzkopf would not be able to begin his shift to the west until airpower had shut off Iraqi surveillance. A substantial part of the forces and equipment would be moved by Air Force C-130s. And the flanking attack would not start until airpower had cut the Iraqi force down to size.

### Desert Storm

In the early morning hours of Jan. 17, local time (it was Jan. 16 in the United States), Operation Desert Storm began. The results are widely known. By sunrise, Saddam's command and control network no longer existed, and his ability to mount a coherent military response was gone.

Schwarzkopf's ground forces were free to begin shifting west that evening.

The threat from Iraq's Air Force was eliminated when the Iraqi aircraft that had not been destroyed outright fled to Iran. Saddam attempted to bring on the "mother of all battles" at Khafji

Jan. 29, but his attacking tank force was destroyed by airpower. After that, the Iraqi Army did not again take the initiative.

The air campaign rolled on for 38 days. According to the original plan, the attack was supposed to unfold in phases, first the strategic sorties, then air defense suppression, and finally strikes on the Iraqi field Army. Instead, the phases ran concurrently. The Iraqi Army was struck the first day, as were air defenses.

As Deptula explained, it was "parallel warfare," hitting the enemy everywhere at once, making it impossible for him to adjust or adapt. About 150 individual target sets were attacked on Jan. 17. Saddam never recovered.

In the first 38 days, airpower destroyed 39 percent of the Iraqi tanks, 32 percent of the armored personnel carriers, and 47 percent of the artillery. In the aggregate, airpower met the goal of 50 percent attrition of Saddam's ground force. Between 50 and 75 percent of the front two Iraqi echelons in Kuwait were either casualties or taken prisoner, although attrition was lower for the Republican Guard divisions.

The air campaign was not perfect. The biggest disappointment was the air component's inability to find and wipe out the mobile Scuds, which came out of hiding to shoot, then hid again. The actual military value of the Scuds was small, but the casualties they inflicted in Saudi Arabia and Israel had great psychological and emotional impact.

"Airpower is the decisive arm so far,

and I expect it to be the decisive arm into the end of the campaign, even if ground forces and amphibious forces are added to the equation," Powell told the Senate Armed Services Committee, Feb. 21. "If anything, I expect airpower to be even more decisive in the days and weeks ahead."

Airpower could have ground the Iraqi force down further, but pressure had built to launch the ground phase of the war.

### The Final Push

H-Hour for the ground offensive was 4 a.m., local time, on Feb. 24. Coalition ground forces struck powerfully, especially on the western flank in the Iraqi desert. Air strikes continued. Within a day, the Iraqis were in general retreat. Following their instructions from Schwarzkopf, though, soldiers and airmen continued to destroy as many enemy tanks as possible so they could not be used in some future conflict.

In a 45-minute battle on Feb. 27, the day before the cease-fire, US armor struck a Republican Guard division at Medina Ridge and destroyed 60 Iraqi T72 tanks.

The same day, some Republican Guard units escaped because a US Army corps commander set the fire support coordination line too far forward. To prevent accidental attack on his forces, the ground commander decided where to draw this line. Inside of it, all fires—including air strikes—required ground force approval. On Feb. 27, the corps commander extended the FSCL north of the Euphrates in Iraq, far beyond the reach of his artillery or his need for ground force protection. For many hours, the Air Force was not permitted to strike the Iraqi convoys headed toward Baghdad.

It seemed at the time that none of this mattered too much. The outcome of the war was not in doubt, and the White House and the Pentagon were getting nervous about news reports of the so-called "turkey shoot" on the "Highway of Death" leading out of Kuwait.

Powell had not wanted the invasion force to escape, but television coverage, he said, made it look "as if we were engaged in slaughter for slaughter's sake." Perhaps it was time to stop.

US forces could have completed the destruction, but the coalition had formed to liberate Kuwait, not for regime change in Iraq, and the United States was not prepared to continue the war alone.

John H. Sununu, the White House



chief of staff, suggested that the cease-fire take effect at 5 a.m. on Feb. 28. Stopping at that precise moment, he said, would make it possible to call the conflict "The Hundred Hour War." Powell agreed. He talked with Schwarzkopf, who pointed out that it would also make it a "Five Day War." Powell liked it. That, he said in his memoirs, "chipped one day off the famous victory of the Israelis over the Arab states in 1967."

Thus, even before the war ended, people had begun to characterize it in ways that were greatly flawed. "The war did not last 100 hours," Horner said. "The duration of the war—from mid-January to the end of February—was closer to a thousand hours." The misconception was "maddening to coalition airmen, who bore such a large part of the burden of winning this war."

forces to throw the Iraqi Army from Kuwait in four days, how could airpower again be relegated to the second string in the AirLand Battle?

President Bush declared, "Lesson No. 1 from the Gulf War is the value of airpower." Secretary of Defense Cheney said, "The air campaign was decisive."

The Army was not about to concede any change.

"Behind-the-scenes sniping continued, for the confrontation between the Army field commanders and the Air Force was not so much about the performance of airpower as the Army's inability to control it," wrote Michael R. Gordon and Bernard E. Trainor in their 1995 book, *The Generals' War*. "As the Air Force saw it, the Gulf War was a model for future conflicts.

sen, former commander in chief of US Army, Europe. "The recent air campaign against Iraqi forces gained not a single one of the US or UN objectives in the Persian Gulf War," said Kroesen. "Four days of land combat—aided immeasurably by the air campaign—achieved every goal and victory."

The Association of the US Army said, "As the leading element of the [Gulf War] coalition, the United States Army decisively defeated the fourth largest field army in the world. ... It was the land force that provided the essential muscle to lead America's coalition partners in the liberation of Kuwait, the decisive defeat of the Iraqi Army, and the restoration of stability in the Persian Gulf."

For the next 15 years, the ground power lobby skipped no opportunity to accuse the Air Force of claiming too much credit for Desert Storm. However, the Army itself was not shy in making claims. For example, Army Vision 2010 said that land power made permanent "the otherwise transitory advantages achieved by air and naval forces."

Regional wars in ensuing years generally followed the Gulf War pattern. Some theater commanders used airpower better than others, but none of them resurrected the AirLand Battle option. Operation Allied Force in 1999, which induced the surrender of the Milosevic regime in Serbia, was almost completely an airpower action. No ground forces were engaged.

The influence of the ground forces in Pentagon politics continued. For reasons that sometimes included practicality as well as conviction, most Air Force leaders have been restrained in their advocacy of airpower. In recent years, it has been fashionable to emphasize the Air Force's commitment to supporting the nation's ground forces.

In time of crisis, however, it has usually turned out that "Global Reach-Global Power" had it right. Airpower can be the supporting force in war. It can also be the supported force, or it can act independently. *Field Manual 100-20* had it right, too. Airpower is not an auxiliary of land power.

The understanding of that is the strategic legacy of Desert Storm. ■

AP photo by Laurent Rebours



At left is the "Highway of Death." Powell worried that the aerial destruction of fleeing Iraqi forces looked like a wanton slaughter and recommended a stop to the attacks. Many thought the war ended prematurely.

The cease-fire was at 8 a.m. local time Feb. 28. The ground operation had lasted four days and four hours, somewhat short of the "Five Day War" formulation by Powell and Schwarzkopf.

Casualties had not reached the level of 45,000, or even of Schwarzkopf's 5,000. The totals for the US forces were 148 dead and 467 wounded. The coalition allies had 99 dead, 434 wounded.

### A New Balance

What to make of it? Given a 38-day air campaign that enabled the ground

But neither the Army nor the Marines wanted to go to war that way again."

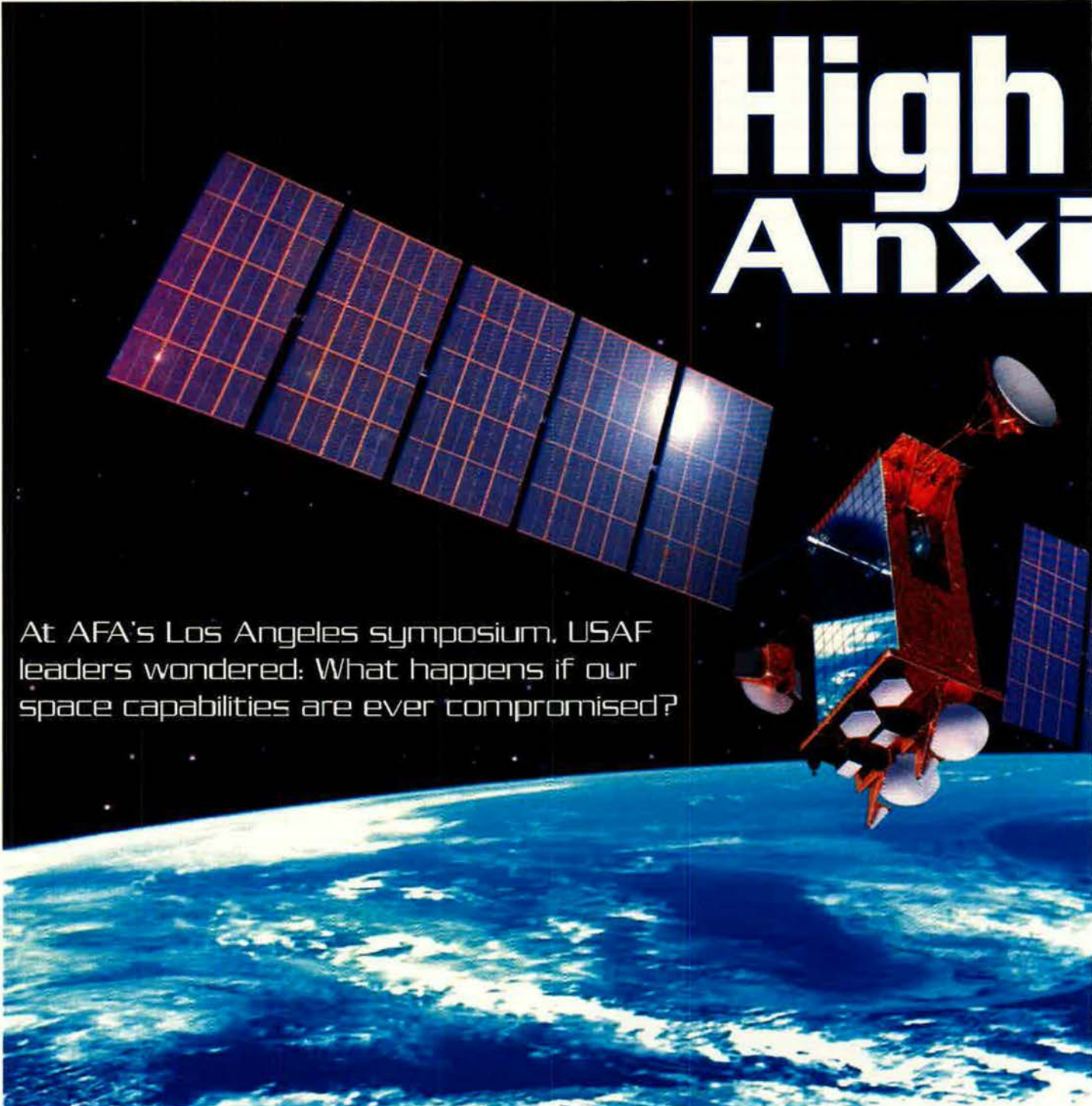
The debunkers of airpower might have pitched the argument that Desert Storm was an exception in the conduct of war, not a new precedent. Instead, they chose to deny what had happened.

One of the prominent deniers was retired Army Gen. Frederick J. Kroe-

*John T. Correll was editor in chief of Air Force Magazine for 18 years and is now a contributing editor. His most recent article, "The Strength of Bud Day," appeared in the December 2005 issue.*



# High Anxi



At AFA's Los Angeles symposium, USAF leaders wondered: What happens if our space capabilities are ever compromised?

**T**he nation's military space capabilities may be stronger today than they have ever been. Effects generated by space-based systems are thoroughly integrated into combat plans. On-orbit systems are healthy and potent. Significant modernization plans are in place. The Air Force has fired off a record 44 straight successful space launches.

Will this happy situation last forever? The simple answer is: probably not. A

host of dangers is already visible. USAF Gen. Lance W. Lord, commander of Air Force Space Command, argues that military leaders must think of space as a battleground. Indeed, the combat capabilities provided by advanced orbital systems increasingly are at risk.

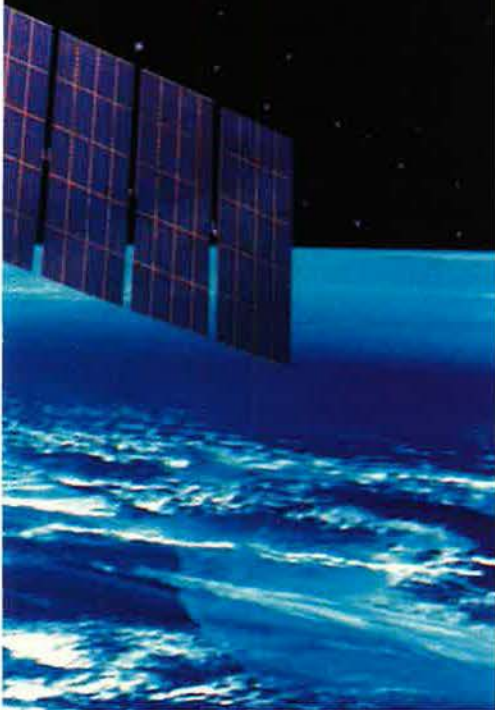
"Some would say that we're not threatened in space," Lord observed. "I want to disabuse everybody of that argument."

Lord delivered his warning at the

By Adam J. Hebert, Senior Editor



# ety



Above is an artist's conception of the Advanced Extremely High Frequency Satellite Communications System.

Air Force Association's annual National Symposium, held Nov. 18 in Los Angeles. The space commander said Pentagon officials cannot "assume that space is benign and that we'll never be challenged in that environment." He added, "We're sometimes our own worst enemies about being complacent."

Defense officials point out that space capabilities allow the US military to fight on its own terms. Advanced, space-based satellites underpin reliable precision weapons, highly accurate surface navigation, swift and secure worldwide communication, timely intelligence-surveillance-reconnaissance data, and more.

"What happens if our space capabilities become compromised by our adversaries, or we lose them completely?" asked Gen. Bruce Carlson, chief of Air Force Materiel Command. The question was purely rhetorical. The American way of war would be, compared to today, slower, less accurate, more wantonly destructive, and deadlier for US troops.

Carlson said US officials must focus on the threat. Recounting the terrorist bombings in Madrid in 2004, London in 2005, and more recently in Amman, Jordan, Carlson said each of those attacks included complex planning, precise timing, and, sometimes, use of advanced technologies.

America's terrorist enemy is "ruthless," Carlson said, and will use "any tactics necessary" to kill Americans and reduce Western influence. This enemy realizes that the US military employs space capabilities "as an integral part of our warfighting capabilities all across the battlespace."

### The Year Was 1957

Lord reminded the AFA attendees that the US was caught by surprise in space once before—with the Soviet Union's October 1957 launch of Sputnik, the first man-made satellite. Before that shattering event, Gen. Bernard A. Schriever, founder of the Air Force's space and missile effort, "wanted to talk about space superiority," Lord said, and, "in fact, he made a couple of speeches about it." Schriever was immediately censored.

Needless to say, once Sputnik went up, Schriever's advice and insight were in high demand. "We don't want to have to play catch-up in this business," Lord said.

The Space Command chief reminded listeners of how warfare was conducted

before it was revolutionized by space systems.

Lord's Nov. 18 speech was on the anniversary of a 1944 raid by Fifteenth Air Force against oil refineries in Austria and airfields in Italy. That mission required 680 bombers, with 186 P-51 Mustangs for escort. He said that, although thousands of airmen were put in harm's way, "on the ground, most of those bombs didn't find their intended targets."

Today, a B-2 stealth bomber powered by space assets can accomplish these sorts of missions with pinpoint accuracy.

For example, in a 1999 Operation Allied Force mission over Serbia, a single B-2 from Whiteman AFB, Mo., took off with 16 satellite guided Joint Direct Attack Munitions. The mission: Destroy the Novi Sad railway highway bridge.

"Attacking during the night to minimize collateral damage, and using only five of those JDAMs, the bridge was destroyed," Lord recounted. It was not just the bridge spans that were dropped—each of the bridge abutments also was destroyed.

The effects were clearly better, but the general said space offers much more. "Think of those bombs that were not dropped, the broader destruction that did not have to occur," and the large number of people who did not have to risk their lives to accomplish the mission.

Space capabilities also are helping rescues of downed aircrews. On April 3, 2003, two crewmen aboard a Navy F-14D, "Junker 13," ejected over Southwest Iraq into hostile territory. Rescue teams "picked up the crew from Junker 13 after only 100 minutes from the time they ejected," Lord said. Col. George E. "Bud" Day, Medal of Honor recipient shot down over Vietnam, was in prison for nearly three million minutes, Lord observed.

### "R," Not "SAR"

Day lacked the "luxury" of space-enhanced search and rescue teams. The Global Positioning System and other capabilities from space take the "search" out of search and rescue," Lord said.

The Air Force is working now to ensure it can field the next generation of orbital capabilities. In the military space field in the 1990s, cost replaced mission success as the top priority—with disastrous results.

"We saw a good part of \$11 billion





*The 1990s saw billions of dollars in military space systems go up in smoke because of launch failures. Constellation modernization, such as through this 2004 successful Global Positioning System satellite launch on a Delta II, is now back on track.*

in space assets literally go up in smoke due to successive launch failures," said Lord. Space Command is now focusing on mission success because failure is always much more expensive.

Joanne Maguire of Lockheed Martin's Space Systems Co. noted that another set of launch failures could have major long-term consequences. She pointed to the pioneering Corona reconnaissance satellites that began with a "string of 12 consecutive [launch] failures before achieving mission success."

Speaking during an industry panel, Maguire wondered aloud whether the American public would "have the tolerance to stand by such a program today."

"Sustained commitment to the mission" is the single most important thing the government can do to help ensure that space programs are developed successfully. Programs cannot be allowed to "twist in the wind" or "be competed at every turn," she cautioned.

The service is still paying the price for some of the policies from a decade ago. The developmental Space Based Infrared System High recently had its fourth "Nunn-McCurdy breach," meaning it had gone significantly off schedule or over budget again.

These types of problems were "born during an era where we were operating more on a case of hope" about costs and schedules, said Lt. Gen. Michael

A. Hamel, commander of the Space and Missile Systems Center at Los Angeles AFB, Calif. Blind faith in "faster, cheaper, better techniques" proved unfounded. The space environment and launches are "very unforgiving," he said.

On the whole, however, the Air Force officials were upbeat on the state of the industry. "We don't have a lot to

apologize for in terms of the capabilities we've delivered," said Hamel. DOD has its healthiest orbital constellation ever, and space systems are integrated into joint war plans like never before, he said.

More tangibly, the Air Force has now had 44 straight space launches without a failure, dating back to May 1999. This run broke the old record for successful launches that ended in 1971. During this period, officials note that the final Titan II and Titan IV boosters were launched, and the first 10 evolved expendable launch vehicles went up without a hitch.

Assuming historical failure rates of about 10 percent, this string of successful launches saved taxpayers at least \$3 billion—a remarkable turnaround after the failures of the 1990s.

### Next Generation

Officials are working to ensure a next generation of military space technicians is on hand to develop future systems. Carlson said AFMC's Air Force Research Laboratory supports an expanding Space Scholars Program that brings in collegiate science and engineering students to work with Air Force technicians. Students are paired with researchers who serve as mentors and show the value of careers in Air Force science and engineering.

The work is practical. Carlson said space scholar research is being con-

### Employed, Though Not Deployed

Airmen supporting missions such as the search and rescue operation that recovered the crew of Navy F-14D "Junker 13" in the early days of the Iraq War often work from their home stations or at operations centers outside the immediate combat zone.

The Air Force's 19,000 airmen deployed to the US Central Command area of responsibility represent less than 10 percent of the 196,000 troops in the CENTCOM AOR.

Maj. Gen. Roger W. Burg, director of strategic security on the Air Staff, noted that this results in frequent, unjustified criticism of the Air Force.

"Some would have you believe that if you're not deployed, then you don't count," said Burg at the Air Force Association's National Symposium on Nov. 18. "I'm here to tell you that that's absolutely wrong. ... We need to dispel the myth that contributions to the fight are only made if you are deployed."

For example, satellite systems controlled from the United States "allow commanders and units half a world away to view real-time Predator video or to [receive warning] of incoming dangers like tactical ballistic missiles," said Burg.

The other services have come to appreciate what space power offers. The Air Force is routinely called on to operate in or over denied territory, he said, and "space systems provide the ultimate anti-access capability, with their ability to look down into denied airspace in any part of the world."

Air Force space is a growth area, and the Army, Navy, and Marine Corps are making ever-greater use of military space capabilities. Burg said Air Force spending on capabilities used by all the military services has increased from 33 percent in the 1960s to 45 percent today.

"The really striking trend," said Burg, is that "soon roughly half of the Air Force budget will be going to joint enablers." These are the capabilities that the Air Force purchases and operates, but whose primary users are the other military services—of which space assets are a prime example.



ducted in areas such as improving computer power, composite materials for space, increased solar power efficiency, passive and active sensor development, propulsion, and flight dynamics.

Participation continues to increase. For 2005, the program had 41 students—28 of them graduate level—from 33 universities. All are highs for the program.

Carlson noted, however, that the service has had difficulty converting space scholars into Air Force scientists—typically only one or two have been hired per year. The service is “working on a program to ... make sure we can hire them in at the right grade,” he said, because under the current hiring rules, “industry has been successful in outbidding us.”

AFMC also is working with the Air Force Academy, where it has an assurance that the cadets will give the service something in return. An ongoing program has physics and aeronautics cadets building space-qualified hardware for USAF’s FalconSAT program. The cadet-built FalconSAT-2 microsatellite was scheduled to fly by the end of 2005.

One of the academy cadets working on the program explained to Carlson that FalconSAT-2 “investigates low-latitude ionospheric plasma depletions and their effects on radio waves.” In layman’s terms, the 43-pound satellite

## What To Look For

Participants in the Air Force Association’s National Symposium industry panel were asked to name a small number of revolutionary technologies or capabilities that need to be developed for military space use.

Northrop Grumman’s Alexis Livanos cited a need for very large structures in space, high-data rate communications systems, and the development of nanotechnology, to allow for more capability in a smaller and lighter package.

Lockheed Martin’s Joanne Maguire said radiation-hardened microelectronics are essential, as are more efficient power systems, and lightweight precision structures that can be put into space more easily.

Boeing’s George Muellner called for new networking technologies to truly enable machine-to-machine and horizontal integration and for the development of more responsive space launch capabilities.

Muellner concluded by saying, “Space acquisition is not off track.” The Air Force has a running record for successful launches, and space-based capabilities are fully ingrained in defense planning.

“We’ve got to put things in perspective,” he said. The Air Force and its contractors are developing complex machines, and “the environment that we put [systems] into is very hostile and unforgiving—and we only have one shot” to get it right.

is designed to study interference with GPS communications signals.

Numerous speakers cited the need for stability and accountability to ensure program success. Industry leaders want steady funding, program developers seek stable requirements, and everyone wants management to remain in place.

According to Hamel, the biggest challenge SMC faces at the moment is revitalizing its workforce. During the decade of “acquisition reform,” he said, the Air Force became passive in overseeing its space programs. That fact taught “bad behavior.”

Hamel said SMC will ensure that

accountability returns to all levels of management. Developers must have a stake in the outcome, he said, “all the way down to individual project engineers.” That way, officials have personal accountability “for their particular part or subsystem.”

AFSPC is emphasizing longer tours for its system program office directors. “We want to have them as long as we can,” said Lord, “Not program managers for life, but a minimum of four-year tours in that business.” Frequent program manager turnover has been cited as a factor in program instability, as each arriving SPO manager must relearn what the previous director already knew.

Improved professional development also should help build stable management, Lord said. Space acquisition schooling is “further reinforcing solid systems engineering, cost analysis, and program management” skills.

## Future Requirements

The space community has a clear understanding of the capabilities it must develop. The Air Force wants to be able to replenish satellites in days and respond to new missions rapidly by shortening development and prelaunch checkout times.

The need for reliable battlefield communications was cited by several speakers as a top priority. Lord said the Air Force will pursue a combination of commercial access and dedicated military systems to meet future communications demands.

“If you look at the size of the commercial space business and how it’s booming” relative to military space, the Air Force is “going to have to take

USAF photo by Carlleton Bullie



*A Delta IV lifts off from Cape Canaveral AFS, Fla. The Air Force has put together a record 44 consecutive successful space launches dating to 1999. The streak used up the final Titan II and Titan IV boosters and has seen successful firings of the first 10 Delta IV and Atlas V launch vehicles.*





**Accurate, satellite guided weapons kill targets and keep airmen out of harm's way. GPS guided bombs are being integrated with a growing number of Air Force platforms. Here, an F/A-22 Raptor at supersonic speed drops a JDAM.**

advantage" of commercial capabilities, Lord said.

Work on protected military systems, such as the Transformational Satellite Communications System, will continue in parallel. "There are things we need protected military communications for," said Lord. For many missions, troops need "low probability of intercept, low probability of detection."

Maj. Gen. Roger W. Burg, Air Force director of strategic security, said changes in land combat units are driving much of the demand for communications capability. "Today's satellite communication architecture was designed for large stationary units," said Burg.

Furthermore, on-orbit intelligence-surveillance-reconnaissance systems "have predictable overflight times and are designed to provide a strategic look for the nation," Burg explained. For the next generation, "tactical space ISR capabilities could and should be dedicated to the theater commander."

The smaller, more mobile ground combat units today have vastly increased demand, as they "require instant access to a myriad of different sources," said Burg.

This is a change industry fully appreciates. George K. Muellner, Boeing vice president for Air Force space systems, said military users are, in most cases, bandwidth constrained. Mobile users are the disadvantaged users under the current setup, he said,

because they have limited access to communications systems while "on the roll."

With the Army moving toward a more modular combat system featuring independently acting brigade combat

Further, units were almost totally dependent on information from the organic sensors they brought with them, such as unmanned aerial systems. Troops are "not getting the current information" that is almost always available at the command posts, Muellner said.

In the future, mobile forces need to be "pushed" the all-source intelligence that they need through a system that automatically routes the information through whichever communications system is available at the time.

Alexis Livanos, Northrop Grumman vice president for space technology, said the United States faces increasing competition in the ability to develop and field these future space capabilities. "A recent study by the National Academies reports that China is graduating 600,000 engineers a year, India is graduating 350,000 engineers a year, and we are graduating 70,000 a year," a fact that could threaten US technological dominance in the long term.

Working to America's advantage is that developing nations generally lack the diverse, global workforces, like those in the United States, that foster innovation.

Therefore, "it is self-defeating to be



USAF photo by MSgt. Val Gemplis

**Troops depend on space-based capabilities for secure communications. Here, A1C Greg Reyes, SATCOM technician at Camp Zama, Japan, inspects racks of multiplexer equipment.**

teams, the need for tactical intelligence could increase exponentially.

Troops in motion are not getting timely information, Muellner said. A Marine Corps commander operating in Southwest Asia told him mobile combat units typically received intelligence that was a day-and-a-half old.

cutting off the flow of international workers and students that is the lifeblood of our high-tech [industry]," said Livanos. "We recognize that post-9/11 security concerns must not be compromised, but [security] must be balanced against the long-term needs of the nation." ■





**OPERATIONAL CAPABILITY**

**AOC WSI**



**MISSION READINESS**

## **BRINGING IT ALL TOGETHER**

The Air Operation Center is at the heart of every conflict. To prepare today's AOC for tomorrow's combat mission requires an award winning Weapon System Integrator that can reduce total ownership cost, enhance mission readiness, and reduce program risks. By partnering with the government and by utilizing leading AOC program service providers, we are structured to produce results. And results speak louder than words, including the 2004 USAF/ESC Systems Engineering Award and the 2004 James G. Roche Weapon Systems Support Award. Northrop Grumman. Partnering to bring it all together.

**L-3 TITAN GROUP | DRAPER | ZELTECH**

[www.northropgrumman.com](http://www.northropgrumman.com)

©2005 Northrop Grumman Corporation

***NORTHROP GRUMMAN***



# Eyes of the Fighter



**Aircraft targeting pods—Litening, Sniper, LANTIRN—are turning the fighter force into an all-seeing eye.**

**By John A. Tirpak, Executive Editor**

**A**ir Force fighters in the skies over Afghanistan and Iraq are providing powerful backing to US ground forces, responding as they always have done with on-call air support when troops come into contact with the enemy. Increasingly, however, that support features not precision attack but delivery of video on demand.

Various targeting pods, developed to enhance bombing accuracy, have been pressed into service as part of the nation's intelligence-surveillance-

reconnaissance (ISR) network. These airborne sensors help generate instant situation updates, either automatically or via the pilot, to troops engaged in combat.

This new technique has vastly improved the ability to find and engage the enemy. Moreover, it has done so by taking advantage of capability already present, eliminating the need to conceive, finance, develop, and produce new systems.

The capability—known as “nonradi-

tional ISR,” or NTISR—also has vastly sped up the process of battle damage assessment, giving air commanders a faster read on whether targets have been hit and destroyed or need to be struck again. The power to do this is critical early in an air campaign against high-value objectives.

In both Southwest Asia theaters of operation, armed fighters fly high above the ground, ready to respond immediately to a call for air support from ground troops. When that call comes,





**Fitted with targeting pods, fighters such as this A-10 can offer full-motion video intelligence to troops on the ground.**

they can use their targeting pods—Litening, Sniper, or LANTIRN—to zoom in on a target and put ordnance precisely where it's needed.

### Eye in the Sky

However, while they are orbiting over their “kill boxes,” fighters can use the pods to watch the action below and provide useful “eye-in-the-sky” information to the ground commander in a fight or pursuit—before or after the action takes place. They also can use this

capability while moving to and from their assigned kill boxes, watching for suspicious activities along main roads, pipelines, and rail routes. When they detect suspect behavior, they can hand off the ISR target to one of the dedicated sensor platforms in the area for further investigation.

In fact, when dealing with ground controllers equipped with specially configured laptop computers, the fighters can beam down an image allowing friendly troops to see where the enemy is hiding or what escape route he may be using. The ground commander can have a real-time image of how many enemy combatants he's up against or be warned of, say, an explosive device up the road a mile or two.

In short, the targeting pods have integrated the fighters even more fully into the ground fight.

The capability is comparable to that provided by Predator unmanned aerial ISR systems, which perpetually are in high demand but short supply. The range of threats to be observed has expanded so much that, for most fighter aircraft, ISR taskings have taken priority over physical attack in the daily air tasking order.

“Initially, there was tremendous pushback from fighter pilots who resisted the notion of becoming ‘manned Predators,’” noted Lt. Gen. Walter E. Buchanan III, commander of USAF's 9th Air Force and of US Central Command Air Forces.

However, he went on, “it was the right thing to do, and it demonstrated a real-time way ... to leverage a system in theater, which could also pick up valuable video intel.”

Buchanan credited the transformation to Brig. Gen. William J. Rew, former director of operations for CENTAF and 9th Air Force and former commander of 20th Fighter Wing. In 2002, Rew came up with the idea of substituting an F-16 with a Litening pod for U-2 reconnaissance aircraft flying over southern Iraq. At the time, U-2 imagery could be foiled by a low cloud deck, and, in any event, the aircraft were only flown on regular daily runs. The F-16s, on the other hand, were either already flying in the vicinity or could be dispatched more quickly than the U-2s and could record video imagery from their targeting pods. Rew is now commander of the 57th Wing at Nellis AFB, Nev.

Rew's suggestion came during the unfolding of Operation Southern Focus, the effort by CENTCOM to better map

defenses and other sites in the Iraqi southern no-fly zone, Buchanan explained. It was part of an effort toward “intelligence preparation of the battlefield over the entire south” of Iraq, he said.

Buchanan said that, when Operation Iraqi Freedom in 2003 shifted from a force-on-force battle with regular Iraqi forces to an anti-insurgent operation, he and his then-deputy, Maj. Gen. Robert J. Elder Jr., brought about a shift in the use of the fighter pod ISR capability.

### Over the “Crown Jewels”

On their way from bases outside Iraq to their kill boxes, fighter pilots were ordered to fly over what Buchanan called the “crown jewels” of Iraqi infrastructure—pipelines, railroad tracks, power lines, and the main roads radiating out of Baghdad like spokes from a hub. In a two-ship formation, one aircraft would fly low to observe the ground with the pod; the other would fly higher and clear for other air traffic.

If a pilot saw something “of interest,” he would turn on his camera and film it.

“Now, I've got the time [of the event], it's date-stamped, it tells me the coordinates on the screen, so I've got all the data, and I have the video,” Buchanan said. While LANTIRN (Low-Altitude Navigation and Targeting Infrared for Night) imagery was “quite a bit fuzzy” compared with that obtained from the U-2, “it was good enough to show them what they wanted to see.”

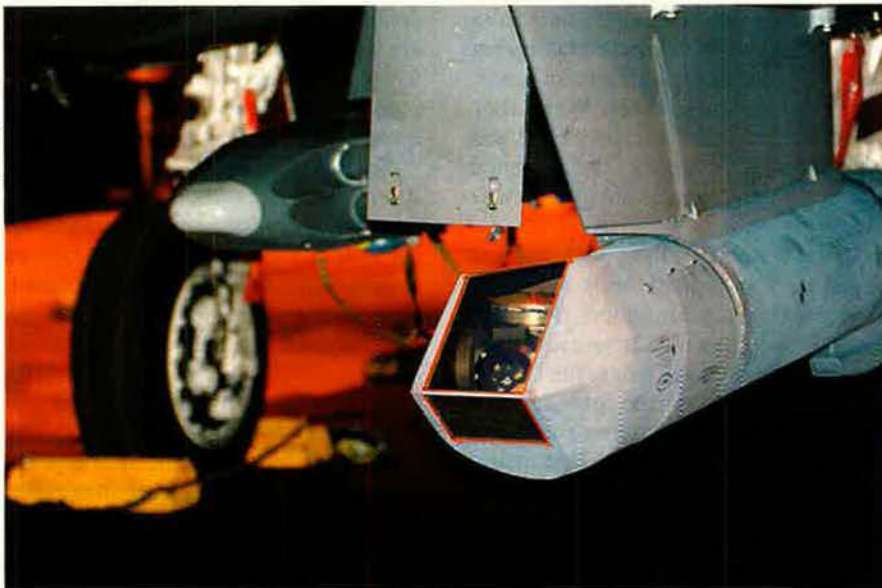
Using this capability freed up other ISR assets for higher-priority missions and provided the kind of detail and man-in-the-loop judgment not otherwise available. The clarity of the images also improved as more advanced versions of the pods became available.

It was also at this time that the initial take on lessons learned in OIF highlighted the lack of quick-response BDA. Again, the targeting pods were a solution at hand.

Buchanan noted that the targeting pods are not capable of performing the full process of BDA, assessing destruction, casualties, poststrike functionality of the target, and whether other desired effects were achieved. That process can take a long time. However, fighters coming along 10 minutes after a strike, when the smoke had cleared, could use their own pods to tell if there was, for example, a hole in the top of a hardened shelter.

An attacking fighter's gun camera footage would show whether correct





*Pictured are Sniper Advanced Targeting Pods on F-15Es from RAF Lakenheath, UK. Intended to offer greater precision in aiming laser guided bombs, the pods have provided bonus surveillance and bomb damage assessment functions now widely employed in Southwest Asia. The Sniper can "talk" directly to controllers on the ground.*

coordinates had been given. Even if "you never saw it hit, we've probably got an 85 percent" chance that the bomb went where it was supposed to go and "probably" inflicted the desired damage, Buchanan said.

By early 2004, targeting pods had become tools for both ISR and quick-look BDA. The adaptations didn't stop there, though.

In 2004, Buchanan began pushing to equip A-10 attack aircraft with targeting pods, which are used primarily to employ laser guided bombs. Buchanan concedes that the A-10 is not the ideal platform for the LGB. However, the podded A-10 had another value; in the rugged mountains of Afghanistan, the pods could provide pilots better situational awareness. They had infrared as well as daylight mode. Besides giving the pilots a better chance to avoid the terrain in the nearly blacked-out mountain regions, the pods allowed the pilots to zoom in on action on the ground, a feature not available otherwise.

"This is where NTISR begins to take another step," Buchanan explained. Up until that point, the pods had been drafted into a tactical reconnaissance role, he said, but now, with new radios and the imagery from the pods, A-10 pilots could begin "coordinating with the ground force." The A-10s could scout ahead of convoys, "looking for activity, ambushes, all those kinds of things," and talk down to ground units about the threats they were facing.

### Nice Rover

The next technological leap was the Remote Operations Video Enhanced Receiver. The ROVER is a special-built



laptop that allows a joint tactical air controller on the ground to see exactly what the targeting pod on the fighter above is seeing. This not only allows the JTAC to have a firsthand, aerial view of what's going on, it dramatically streamlines the JTAC-pilot discussion about what target to bomb.

Lt. Col. John Johansen, deputy director of the Air Force Intelligence Analysis Agency, said that the system brought dramatic gains in the speed of a "talk-or," the process where the air controller on the ground talks the pilot, landmark by landmark, to the specific enemy spot. According to Johansen, a Marine Corps commander reported that, with the ROVER, marines were able "to get talk-ons of under five minutes, which is an incredible statistic."

Johansen went on, "From the time the guy on the ground is reporting he's in deep mortal danger to the impact of weapons on the ground is less than five minutes," compared to a process that used to take 30 to 40 minutes.

The latest version, ROVER 3, will have new features, including what's called the "John Madden" display, named for the former coach and now NFL television analyst who popularized

the use of the telestrater to diagram plays visible on a television screen. The JTAC on the ground and the pilot in the air, both looking at a pod image, can diagram the route to the spot where the ground commander wants an air attack.

The use of pods is not an all-Air Force affair. Marine and Navy fighters, primarily using the Litening system, also have the ability to hook up with ground forces and use their pods for close air support, full-motion video, and BDA. However, it was the Air Force that took the initiative to broaden the application and coordinate it among the services.

All of the Air Force's ROVER-compatible pods are being used in Afghanistan, Buchanan noted.

"That's where I need it," he said.

In Afghanistan, special operations forces teams are traveling through the countryside with no armored vehicles or any close-at-hand support. Some, operating at mountain altitudes up to 12,000 feet, can't even take their full packs, given the lack of oxygen. Aside from personal small arms, said Buchanan, "airpower ... [is] their only firepower."

At first, the A-10 community balked at taking up the ISR mission. Warthog pilots worried the A-10 would be turned





*Capt. Keith Wolak checks out the Litening pod on his A-10 as he preflights a mission out of Bagram AB, Afghanistan. Targeting pods are a high priority in Afghanistan, offering precise air surveillance and fire support for troops in high-altitude mountainous terrain.*

into a manned Predator. However, Buchanan said, "I'm glad we did it, because we saved more than one person's life." In doing so, he got the wholehearted support of the then-USAF Chief of Staff, Gen. John P. Jumper, and the then-Secretary of the Air Force, James G. Roche.

### Seeing the Future

Today, the NTISR concept has advanced toward what's called predictive battlespace awareness.

Intelligence specialists, Buchanan said, do "a great job of analyzing when people shoot" mortars and other weapons toward coalition or civilian targets in Iraq and Afghanistan. They will frequently succeed in predicting when and where a group of insurgents will set up, and a fighter will be assigned to watch that space. If the predicted enemies show up, the pilot can quickly alert the ground commander, and a quick-reaction force can be dispatched to deal with them on the ground. Of course, the fighter is also carrying missiles and bombs that can be used if it becomes necessary.

In Iraq, Buchanan said, the fighters with pods also have been helping direct pursuits. The pilots tell Army or Marine Corps vehicle drivers what turns to take in the streets of a city to

head off fleeing insurgents. Buchanan likened it to police chases directed by an overhead helicopter, except that the aircraft can zoom away to another location.

Fighters with pods often are used as a kind of backup ground force, according to Maj. Gen. Norman R. Seip, assistant deputy chief of staff for air

and space operations. "The Sniper pod allows us to be part of some of the raids," said Seip, whose portfolio includes some of the battlefield ISR operations.

The fighters with the pods can respond "immediately ... if the troops get in trouble" but also can "watch the back door of a building" as coalition forces approach. The fighter can use the eye-safe laser designator to finger a specific person or group of suspects on the ground. Troops equipped with the right optical gear, said Seip, "can see who we're pointing at, and they can go round up folks."

Seip added, "Not only are you an ISR platform, but you're a little bit of a command and control network up there. ... You can assist the ground forces in keeping track of what's going on."

Seip said the fighter can stand off "a couple of miles ... so that the noise of the airplane doesn't tip anyone on the ground that something's about to happen to them." With the high-resolution zoom optics, the standoff distance doesn't affect clarity, he said.

The daily ATO, Johanson said, usually specifies NTISR as a fighter's principal tasking "until that lethal capability is required." In that sense, the advent of the NTISR concept, he said, has eliminated the condition of fighter pilots "waiting for things to happen."

Coordinating the use of fighter pods in the combined air operations center and putting the pod surveillance mis-



*Two F-15Es from Mountain Home AFB, Idaho, are pictured on a practice bombing mission. Some of the "nontraditional ISR" mission can be carried out by the old LANTIRN unit, but backseaters prize the high resolution of the advanced pods.*





**A LANTIRN view is projected on an F-15E pilot's head-up display. Advanced pods offer far greater detail, in both daylight and, with infrared imaging, at night. With the laser designator, aircrews can finger a specific enemy on the ground.**

sions on the ATO means that Predators, the "preferred" provider of video to ground forces, can be apportioned to where their long dwell time can be used to maximum effect.

### In Layers

"It's all part of a layered approach" to persistence, Seip noted. He added that the CAOC coordination is essential, because it will sometimes divert a fighter to an area of interest for surveillance, but must first make sure it is not being pulled away from a higher-priority mission. The dynamic retasking of fighters for both ISR and weapons functions is "an art and a science," he said.

The Air Force plans to expand its success by investing in more pods, to provide both better strike accuracy and, as a by-product, additional ISR coverage. It's the service's plan to acquire an advanced targeting pod for all fighters over the next few years. That plan was temporarily delayed last year, when pod money was shifted to pay for some fighter communication modifications, and many pods landed on USAF's unfunded priorities list. The pod plan is back on track for Fiscal 2007, Air Force officials reported.

For now, if possible, every fighter two-ship that goes out is apportioned a Litening or Sniper pod, with an older-generation LANTIRN as the spare.

Seip praised Air Combat Command for making judicious use of its pods, using only the bare minimum needed for training and only just in time to

spin up units that are deploying into the theater. He also noted that pilots new to the theater usually have as much as a 90-minute "drive" to their kill box, allowing plenty of time for "hands-on" practice along the way.

As more pods are acquired, it will be possible to devote more time to training at home station. Such may result in devising even more applications of the versatile pods, which cost about \$2 million apiece.

If there is a drawback to the use of fighter ISR, it's the bugaboo of bandwidth.

Seip said that bandwidth management is a constant struggle, as the appetite for full-motion video is "insatiable" among commanders of every stripe.

Dealing with the demand means "in some cases ... prioritization," he said. "In other cases, we've had to turn to commercial enterprise to rent space."

Technological efforts are under way, as well, to compress the signals or "take the available bandwidth and put more data in it" with burst methods or dividing communications "pipes" into "smaller pipes," he said.

Seip noted that the evolution of fighter ISR is very much a product of the unique circumstances in the two theaters over the last few years and may not be a blueprint for different kinds of wars.

"The moons aligned correctly, in that you had counterinsurgency warfare, you had the technology evolving, you had the fact that we as an Air Force are very much a supporting component to

the ground commander, and we wanted to look for ways to assist that soldier or marine in the foxhole," he said.

### A Luxury

Fighter ISR "really is, right now, a luxury," Johanson noted. Out of the many fighters launched every day, "some—maybe none—of them will drop ordnance." In a medium- or high-intensity conflict, however, the emphasis would be to revert to using combat aircraft for mostly attack and kinetic combat, not ISR.

"At that point, NTISR is kind of out the window," Seip asserted.

Nevertheless, the rapid pace of trying out the idea of fighter ISR and adapting it to fill an important role in the fight is "a testament to the flexibility of airpower," Johanson observed. It shows "that we do not, as a service, treat our weapon systems canonically. ... We leave it to the smart young men and women to come up with the ... solution to the problem set in front of them." The attitude, he said is "that's cool, let's give it a shot. Worse that will happen is, we won't do it again tomorrow."

Buchanan didn't go as far, observing that the BDA mission with pods will probably continue to be performed, even in a high-optempo campaign.

He also noted that the mission of using a dedicated, high-resolution tactical aerial reconnaissance system, or TARS pod, is still very much alive. The pod can be carried on F-16s and is used by two Air National Guard units. The high-resolution reconnaissance imagery it captures can be electronically downloaded to a ground station, but it isn't moving pictures. The TARS pod went home with the two Air Guard units when they rotated Stateside, but "we liked it so much, I lobbied to get it back. And now we have TARS forward in the AOR again. And it is a very good system," Buchanan noted.

With regard to NTISR, Buchanan said he thinks enemy forces in Iraq and Afghanistan are aware of it.

"These guys aren't dummies," he said. "They read all the technical journals." The use of NTISR has "been talked about, and it would be very hard to disguise it."

Actually, he's hoping the word spreads throughout the insurgent community. As Buchanan put it, "I'd like them to think that every single airplane they see in the sky has got a targeting pod on it and is looking right at them." That will, he said, "keep them on their best behavior." ■

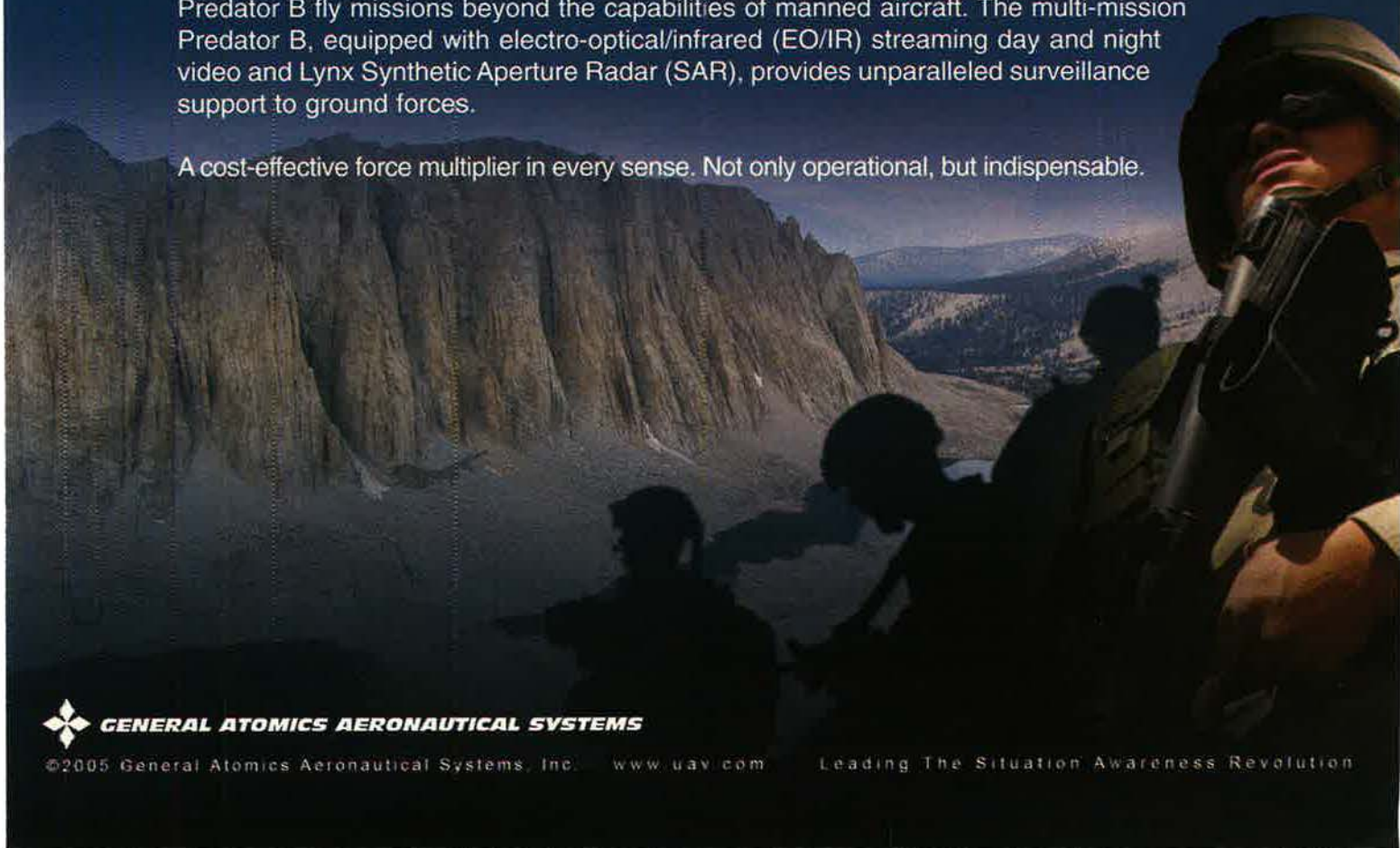


# persistent awareness.



Remotely operated aircraft systems produced by General Atomics Aeronautical Systems are routinely operated over world trouble spots. With the precision capability to detect, identify, track, and even strike time-sensitive targets instantly, the USAF Predator and Predator B fly missions beyond the capabilities of manned aircraft. The multi-mission Predator B, equipped with electro-optical/infrared (EO/IR) streaming day and night video and Lynx Synthetic Aperture Radar (SAR), provides unparalleled surveillance support to ground forces.

A cost-effective force multiplier in every sense. Not only operational, but indispensable.





# Meet



**F-22 operations at Langley mark a transition away from the F-15 and toward a new heavyweight champ.**

*Two F-22 Raptors of the 27th FS tuck in behind a tanker on a mission off the Virginia coastline. The F-22 on December 15 formally achieved initial operational capability, meaning the 27th was certified as having enough aircraft, qualified pilots and ground crews, and support gear to go to war.*



# the New Boss



Photography by Rick Linares



**W**ith the arrival of the F-22s, USAF's 1st Fighter Wing at Langley AFB, Va., has an embarrassment of riches—two world-class air-combat machines. The F-15 (right) has been a fixture on the ramp at Langley for nearly 30 years and will continue to operate from the base until enough F-22s are delivered to thoroughly replace all three of the 1st FW's squadrons of aircraft. The F-15's mission has always been air-to-air combat, but the arrival of the Raptor signals a possible broadening of the Eagle's repertoire to include more air-to-ground operations.

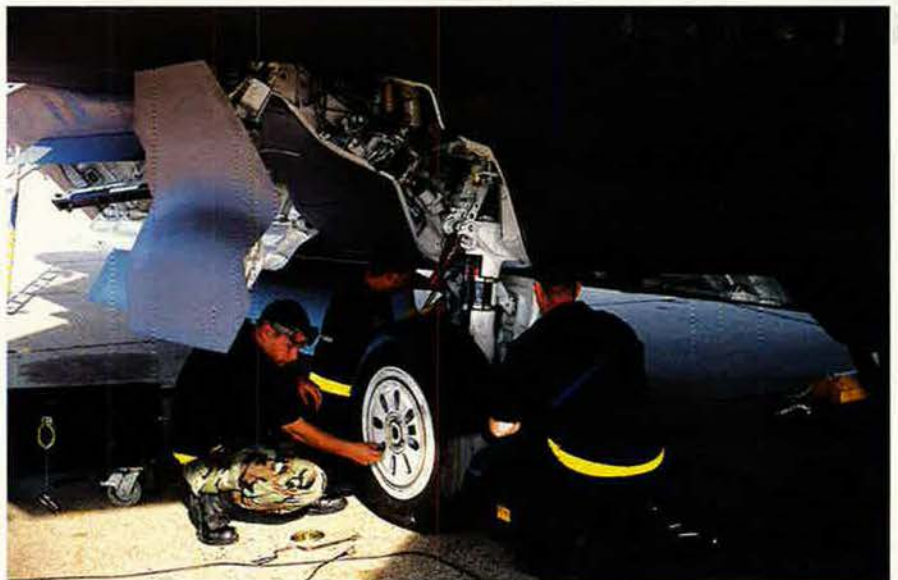


Photos by Rick Linares



The Eagle (two of which are shown at left) is regarded as the heavyweight champion of the world in air combat, having achieved more than 100 air-to-air victories without a single loss. It has only consistently been defeated by one opponent: the Raptor, in mock combat. In operational tests, the F-22 routinely swept the skies of Eagles, usually outnumbered two-to-one.

While similar to the F-15 in size and shape, the F-22 sits on shorter, stubbier landing gear, shown at right. This is on purpose: the aircraft's closeness to the ground leaves more panels and equipment available to ground crews that formerly used ladders or awkward postures when performing maintenance. The Raptor requires fewer maintainers to keep it in tune and fewer transports to ferry its gear on a deployment.







The Raptor's gold-tinted canopy (left) deflects radar energy, reducing its radar signature. It usually flies "clean"—meaning without external stores. The Air Force may employ external fuel tanks for ferry operations or, in a future war, after air superiority has been achieved.

Below, TSgt. Dave Brault consults a laptop-like device that holds electronic versions of the F-22's technical manuals. The aircraft's self-diagnostic system will be capable of calling ahead to home base and, on its own, informing maintenance that it needs a check or spare parts.



At right, the 1st FW's F-15 "wing bird"—carrying the colors of the wing, usually with the name of its commander painted on the side—comes in for a landing at Langley. At far right, an F-22 ready for operational service stands ready for its next mission.



The 27th Fighter Squadron at Langley is the oldest fighter squadron in the Air Force, so it is fitting that it operates the very best machine in the service inventory. The unit began flying cloth-covered Spads and Sopwith Camels in 1917 and was the first to acquire the Eagle in 1976.



The only drawback to the Raptor's low-slung stance is that pilots have to crouch lower to check munitions inside the weapons bays. The Raptor has four: two belly bays that can accommodate up to six radar guided Advanced Medium-Range Air-to-Air Missiles or four 1,000-pound Joint Direct Attack Munitions and two cheek bays reserved for air-to-air Sidewinder heat-seeking missiles.



Photos by Rick Limares



At left, two Langley F-15s are shown on an over-ocean training mission. The Raptor cockpit is about the same size as the much-admired F-15 "front office" and offers a comparable view of the surrounding airspace. Unlike the center-stick Eagle, the F-22 has a sidestick controller, put there to make room for a display between the pilot's knees.

The F-22's shape (below) is pure functionality. Gray leading edges on the radome, wings, intakes, and stabilizers indicate the presence of radar-absorbent material. The mottled camouflage disrupts infrared detectors and prevents them from getting an accurate lock on the aircraft's shape. However, since the Raptor will be typically operating above 50,000 feet, few will ever see a Raptor's colors in combat.



Langley houses its Raptors in immaculate hangars (above), where they are well-tended, but the aircraft was designed for deployment and will have no trouble spending days and nights in hostile weather.







At left, SSgt. Reubien Flores performs routine maintenance on a Raptor's cockpit. One of Langley's Raptors is a nonflying maintenance trainer. Langley is slated to have about 140 maintenance people designated to work on the F-22.



Plans call for Langley to have 26 F-22s with 32 pilots in the wing. The Raptor will be able to fly more missions in a day than the F-15 can, and the aircraft will be assigned a higher crew ratio than the Eagle. About two Raptors are arriving monthly.



While some of USAF's best young pilots will fly the Raptor, other weapon systems such as the A-10, F-15, and F-16 will be in service for decades to come. Those communities need their "fast burners" as well. The Langley unit also didn't want the blowback from units losing too many pilots to the F-22. At left is a four-ship of F-15s consisting of the flagship Eagle for the wing and its three squadrons.



A pilot's first flight in the F-22 is also his first solo: There are no two-seaters. However, Raptor simulators are of such high fidelity that few pilots can feel a difference between the sim experience and the real thing. Pilots report being "comfortable" on that first flight—their biggest worry being that they will cause a scratch on one of the Air Force's most valuable aircraft.



It will probably be at least another 18 months before the wing allows Raptors to fly at air shows. With so few available, they will be busy with more pressing duties. At left, two factory-fresh Langley F-22s maneuver near Hampton Roads, Va. In actual combat, a two-ship of Raptors would be separated by many miles and operate in virtual radio silence.



Above, a Raptor prepares to touch down after a training sortie.

At right, air-to-air missiles await loading. The F-15 and the F-22 have their weapons in common; both carry AMPAAM, Sidewinder, and a cannon. However, Raptor pilots readily admit that if they ever resort to using the gun—intended for close-in fights—they will have done a poor job of exploiting the F-22's long-range capabilities.







At left, Capt. Stephen Da Suta checks six before executing a turn in his Eagle. A huge difference between flying the F-15 and the F-22 is that the various sensors and displays on the Eagle must be correlated inside the pilot's head, even as he maneuvers the aircraft, while the Raptor does that work for the pilot, allowing him to spend his time employing the aircraft to its full advantage. Below, a four-ship of Eagles heads for home.



At right, an F-22 flashes an AIM-9M Sidewinder in the cheek weapons bay. The full capabilities of the F-22 go well beyond dogfighting and ground attack. The aircraft will be a critical node in future reconnaissance and command and control of the battlefield, as it will be able to operate deep in enemy territory, surreptitiously feeding data to the entire network of US forces.



The Raptor has been a long time coming. The YF-22 prototype flew in 1990 and development has stretched 15 years through countless reviews, funding cuts, and delays. Without question, the end result has been worth the wait. ■



Wherein expeditionary air bases are considered maneuver elements in their own right.

# The Security Forces Rewrite

By Rebecca Grant



USAF photo by 2nd Lt. Kristy Rochon

*SSgt. Lamar Bacon, a security forces airman with the 88th Security Forces Squadron, demonstrates rifle fighting maneuvers to airmen attending the air expeditionary combat skills training classes at Wright-Patterson AFB, Ohio.*

**A**irmen need secure airfields to project power. No one knows that better than a member of USAF's security forces.

More than 30,000 airmen serve in SF, but the field is in flux. An upsurge in expeditionary air operations is shaking up a mission that was once tightly focused on defending established bases at home or abroad. Today, security forces are part of a new warfighting concept. In operations from Tuzla to Thumrait, airmen of the security forces have been among those "first in" to set up major operating bases in the so-called "non-linear" battlespace.

Experiences in Afghanistan and Iraq are changing the way airmen secure their

bases. It is no longer enough merely to guard a perimeter. Mortar fire that has rained down on Balad Air Base in Iraq provides just one example of the modern threats to base security. Future joint concepts of operation—like forcible entry and vertical envelopment—will take airmen and their air bases deep into dangerous territory.

That's why Air Force security forces are in the midst of a transformation all their own. "This is an outstanding force as it is right now," said Brig. Gen. Robert H. Holmes, the director of security forces and force protection. However, he added, "Security forces, in our mind, must change to be a relevant warfighting capability."

Indeed, they are taking on a formal role as a force that can command joint offensive and defensive operations at expeditionary sites.

## "Installation Security"

Lingering Cold War policies have kept security forces tied to outdated measures of merit and what Holmes called "installation security"—that familiar job of guarding the base and patrolling a flight line. Policy, regulations, and evaluations all reflected traditional tasking, not the warfighting tasks security forces were facing.

Holmes saw this problem as being a headquarters issue. He set out to change planning and programming for active



and reserve component security forces in the US and worldwide. "A lot of folks take issue with [the change], saying, 'Well, you're not giving yourselves credit, because you're doing a great job in the war right now,'" Holmes went on. "Well, they are doing a great job ... in spite of the institutional validation that we've given them."

It was a problem that had to be fixed. A complete re-examination of the missions and operating concepts for Air Force security forces began in late 2004. "We're about a year into it," Holmes reported. "We've gone through a fairly hefty analysis phase."

The security forces leaders have determined that SF has two major mission areas: that of security operations and of air provost. Security operations are active and passive measures taken to protect, defend, and fight from an air base, whether at home or abroad, said Holmes. The air provost mission is defined by Holmes as "those activities that are associated with police services, law enforcement, and administrative security activities to provide the installation operating support."

This is not the first time the Air Force has rethought security operations. Over the years, the service has moved back and forth in its conception of what security operations should be. It started with the act of protecting flying operations overseas—pure expeditionary operations.

Watching German and Japanese forces attack and overrun airfields early in World War II convinced planners that airpower needed ground protection. In November 1941, Gen. H.H. "Hap" Arnold authorized the Army Air Forces' first air police units and established the air provost marshal in the early 1940s. Air base security battalions were formed in 1942 with the mission of protecting advanced fighter bases.

They were trained in defensive infantry tactics. Each unit was equipped with four M2 half-track vehicles, 12 M3 armored cars fitted with .50-caliber machine guns, four self-propelled 75 mm guns, and 12 additional .30-caliber heavy machine guns. Airpower analyst Price T. Bingham, writing in the summer 1987 issue of *Aerospace Power Journal*, noted that early plans called for 296 air base security battalions, but, "by 1943, the threat had failed to materialize (except in China in 1944-45)."

Wars in Korea and Vietnam plunged

security forces into active combat. The security operations concept centered on base defense with a very active concept for security forces.

### The Tet Example

In Vietnam, for example, Tan Son Nhut Air Base was home to 7th Air Force headquarters and the powerful Military Assistance Command Vietnam. During the early 1968 Tet Offensive, the Air Force's 377th Security Squadron at Tan Son Nhut faced off against a night attack supported by three battalions of Viet Cong forces. Lead Viet Cong elements pierced the defenses of the air base, but the 377th stood as the main holding force until the next morning, when Army reinforcements arrived. Around the bunker where security forces made their stand were hundreds of Viet Cong dead.

The Vietnam experience actually tightened the focus on air base defense as a function of fortifications and layered perimeter defenses, with the enemy trying to cross a defended line.

Air base survivability got even more complex through the 1970s and 1980s, when the threat of air attack seemed to grow in scope and magnitude. Analysts first pointed to Israeli air attacks on Egyptian bases in the June 1967 Arab-Israeli War as an example of what could happen if bases were knocked out. Then the Soviets posed yet more challenges. Neutralizing air bases in the NATO nations of Europe was a big objective. All believed Warsaw Pact forces would attack with everything from Soviet surface-to-surface missiles to undercover Spetsnaz trained to infiltrate and kill. Debate swirled around how difficult it would be for Soviet attackers to crater runways—and for NATO to repair them.

The late Cold War concern about how to keep airpower in operation crested with Salty Demo, an exercise run at Spangdahlem AB, West Germany, over a five-week period in 1985. The goal was to test the ability of a typical tactical fighter base to keep operating.

Active defense and base recovery after attack were the watchwords. The security operations concept centered on security police in an active defense role, restoring tactical command and control, and making combat repairs for base recovery after attack. Dealing with potential nuclear and chemical attacks was another vital task.

With threats such as these, defending

the base—installation security—was the guiding focus.

In the 1990s, terrorism brought to the forefront a very different set of threats. The 1991 Gulf War's blanket of American air superiority and the collapse of the Soviet Union brought the old Cold War certitudes to an end. Gone were the discussions about cratered runways and hardened aircraft shelters. Suddenly the new focus was on guarding the base's perimeter and the people within. An early danger sign was the Oct. 23, 1983, Beirut bombing that claimed 241 US servicemen. However, it took the June 25, 1996, Khobar Towers disaster to put force protection at the top of security concerns.

Holmes' personal experience in the 1990s made him aware of the need to expand the security operations concept. During that time, Holmes was a combat controller, serving in a variety of special operations forces special tactics assignments. Part of the job entailed personnel recovery missions.

### Not Integrated

Those who carried out these missions—the Air Force's small special tactics teams of pararescuemen and combat controllers—also needed a security force and a quick reaction force, but, as Holmes recalled, "We often had to piecemeal the security force from whomever might be part of the joint task force." It worked, but it "was not necessarily an integrated or organic security capability."

In the special tactics community several years ago, Holmes continued, "we began to ask the question: ... If we've got Air Force security folks, why can't we train and equip them to be organically part of personnel recovery [and] to put that firepower on the objective when you're doing a very critical and select mission to go into deep battlespace to retrieve a person or precious cargo?"

What finally blew up the old ways of doing business, however, was the Global War on Terrorism. The war in Afghanistan—Operation Enduring Freedom—became the first major example of how airpower worked in a nonlinear-battlespace campaign.

Scattered around that huge country were airmen on the ground, directing coalition fighters and bombers to fleeting and emerging targets. No battle lines existed, as in Desert Storm; key battles of late 2001 erupted across Afghanistan.





**SSgt. Jonathan Geren, a member of the 10th Security Forces Squadron, patrols with his working dog on the streets of Mosul, Iraq. New concepts of operations are taking security forces airmen deeper into dangerous territory.**

Airmen made the most of precision weapons, targeting, and improved tactical and operational communications links. They ended up with a new way of warfare.

During this period in Afghanistan, Holmes was deputy commander of Task Force K-Bar, and he brought with him to USAF's security forces his direct knowledge of this new battlespace. He took over the SF directorate in 2004. By then, operations in Afghanistan and Iraq had put the spotlight on new requirements for security operations. Bagram Air Base in Afghanistan in its early days was deemed by one A-10 pilot to be "the scariest place on the planet." During major combat operations in Operation Iraqi Freedom, airmen opened up Tallil Air Base (now called Ali Air Base) as a forward operating site within hours after the US Army seized it from Iraqi forces.

The need for change became obvious. One who saw it was then-Lt. Gen. T. Michael Moseley, the head of coalition air forces in the Afghanistan and Iraq wars. Moseley moved from that job to become USAF's vice chief of staff and now Chief of Staff.

"If you joined the Air Force not long ago and became a security forces person, you would have spent a lot of your time guarding missile silos, guarding bombers, alert fighters, guarding gates, or at least being at a gate," he told an American Enterprise Institute (AEI) audience in October. "After we stood up 50 expeditionary bases in [Southwest Asia] and after we've had attacks on

the bases, after we have had rockets and mortar attacks on the bases, after we've had aircraft hit on arrival and departure with surface-to-air missiles and small-arms fire, and after we've looked at what does it take to secure an airfield in an expeditionary sense, this security force business takes on a whole different light."

Post-combat stability operations underlined the need for change. Locations such as Balad Air Base remained a prime target of insurgent forces. Balad was significant in another way, too. Next to it was a main logistics support area for the Army, known as Camp Anaconda. Balad, said Gen. John P. Abizaid, US

Central Command commander, was becoming a primary air "hub" in the region.

### Not Keeping Pace

From Holmes' perspective, policy and regulations for security forces were not keeping pace with real-world needs. "As I came to this job, I asked a lot of questions," said Holmes. "That's when I began to understand that our validation was against Cold War, fixed-base installations."

In the drive for transformation, USAF security forces risked being left out as missions changed, said Holmes.

Now the centerpiece is creating a security force that can take over joint command and control, plus conduct offensive and defensive operations around the expeditionary air site. "What we'd like to be is the enterprise leader for security operations for a deployed joint commander," explained Holmes.

It's a dramatic doctrinal and operational change. Previous base defense concepts even for contested areas hooked Air Force security personnel to perimeter defense while counting on Army or Marine Corps units in theater to defend the zone beyond the perimeter. Typically, the air base was at a hinge point between ground sectors.

Under the old procedures, the commander had to coordinate with three different maneuver elements such as brigade combat teams (BCTs) or Marine expeditionary units (MEUs). That left base commanders having to beg forces from maneuver elements. Other US forces or coalition partners might be



**Security forces no longer simply protect established bases—they're often among those first in to set up expeditionary bases in unfamiliar and threatening terrain. Here, SrA Pamela Bolton guards an entry control point at Balad AB, Iraq.**





**Securing an expeditionary airfield in the modern battlespace requires a set of skills that is different from what was required of security forces members just a few years ago. At left, TSgt. Robert Rose of the 586th Expeditionary Security Forces Squadron based at Camp Bucca, Iraq, checks road-side culverts for improvised explosive devices.**

6.2 miles, approximately the range of stand-off threats such as mortars and man-portable missiles.

Holmes says these joint operating areas are going to be relatively fluid. Many future battlefields could look a lot like the early days of Afghanistan, with its multiple joint operating areas that did not touch geographically. USAF security forces must be ready to take an active defense or even offensive role centered on the air base, and the boundary of the operating area may expand.

It's possible to envision, in forcible entry or other deep operations of the future, a nonlinear battle where the operating area will be carved out as a joint operating area, with security forces having the same responsibilities as a brigade combat team or an MEU. That is at the heart of why the security operations concept must change.

In the past, said Holmes, SF leaders thought this BCT or this MEU would handle a base's external threat because they were adjacent to the base. The fluid nonlinear battlespace erases the old lines. Now the base is an "autonomous joint operating area" and may not have joint ground forces linked to it.

Under the new security operations concept, that's just fine because the air base in its operating area requests help or fires just as would any other maneuver element—be that a small SOF team or a larger ground force. It calls the joint force commander, and response decisions are made at the operational command center.

That's how the battlespace works today. Plans call for USAF security forces to be trained, equipped, and prepared to be full members of it. Moseley at AEI

willing to help, but it was not a priority for them. These forces might not even be near the base perimeter at all times.

The solution? Treat the air base as a maneuver element in its own right. Granted, the runway doesn't physically move. Yet a new status as a maneuver element gives the air base and its security zone a clear and recognized place in joint terminology. It emphasizes the air base as a fighting position plugged in to the joint command and control network for the battlespace.

"This is not checking IDs at a gate," said Moseley. "This is not walking around a perimeter, around an alert site. ... Get outside the wire ... and begin to think about what's a threat to this airfield, what do we have to do to defend it so we can operate 24 hours a day, seven days a week?"

Treating the forward air base as a maneuver element will become the leading mission for security forces. "We operationally will begin to align ourselves with a warfighting construct of training and alerting, deploying, and reconstituting, much like you'd see if you look at our sister service capability," said Holmes. USAF security forces will add more combat skills, and their mission will be organized around expeditionary warfighting as the top priority.

"Right now, we don't do that with our security force," Holmes said. "There's no institutional rigor or integrity sys-

tematically of preparing, training, and deploying our force."

To Holmes, it's no longer the right framework. The goal of expeditionary combat, not base security, will shape the security forces under this new concept. Base security remains an essential mission but loses its status as the force-sizing metric.

#### Six Miles Wide

All maneuver elements have a specified area for operations. For now, that base security zone will include the base and a boundary out to perhaps

### Operation Desert Safeside at Balad

Security forces tested their outside-the-wire skills during an innovative operation at Balad AB, Iraq, from January through March 2005. Balad, a former Iraqi fighter base, had a 10,000-foot runway perfect for C-17s, F-16s, Predators, and other major weapons systems. Balad also was home to the Army logistics support area called Camp Anaconda. It fell within an Army security sector, but the base was surrounded by hostile areas. As a result, Balad regularly took rocket and mortar fire from insurgents and former regime elements—four attacks in one day in July 2004. "The unusual thing was, once we went five whole days without an attack," one Air Force officer told the *Christian Science Monitor* at the time.

The risk to airmen, soldiers, and major weapons systems was just too great. In late 2004, then-CFACC Lt. Gen. Walter E. Buchanan III approved plans for a mission by a composite group of highly trained security forces to conduct more day and night dismounted patrols in the sensitive areas north of the base. With just a month to train, the mission pulled together everything from military working dogs to Ranger-trained security forces under the name Task Force 1041.

It was a success. They captured insurgents, improved relationships with local residents, developed new intelligence sources, and most important, had no casualties during the operation. "You guys stayed aggressive with your patrolling and made a difference," an Army unit told them when it was over. Operation Desert Safeside was named to reflect a Vietnam-era base defense mission, but it will serve as a template for future security forces operations in the nonlinear battlespace.





**Security forces airmen provide convoy protection. Here, Amn. Eric Kreuser gets final instructions before departing Camp Bucca. Kreuser is with the 586th Expeditionary Security Forces Squadron.**

described the new security forces mission as tackling security “in a true joint sense, and in a true combatant sense, so that there’s no threats to this airfield that we haven’t thought about.”

“What we’re not trying to do is build an infantry battalion,” explained Holmes. “There will be tasks that will require us to understand infantry [tactics, techniques, and procedures],” he said, but the emphasis on net-centric operations, C4ISR, and control of fires will ensure the end result is airmen’s work.

Holmes does not plan to increase manpower. At present, he has about 24,000 active duty security forces and another 9,000 SF in the reserve components. After Sept. 11, the new identified requirement soared to 41,000 slots. On paper that left a gap of about 8,000 spaces.

#### Drawing a Line

To Holmes, adding manpower is not the long-term solution. Piling on more personnel slots would not solve the underlying problem of transforming security forces into an organization structured first and foremost for expeditionary operations. “Our answer forever has been more manpower,” he said. “I’m drawing the line to say, no, we’re going to be a lighter, leaner force.”

Why this is possible becomes clear after a closer look at the maneuver element concept.

The new security operations concept will use improved sensor technology for threat intercept and command and control. The team of the future will be interconnected so they can draw on Predator with a Hellfire or an A-10 or an

F-16, said Holmes, much the way early operations functioned at Ali and Kirkuk during the first weeks of OIF.

Next comes greater sensor coverage of the base boundary and zones beyond. Eventually “four fclks may do the work of 13,” said Holmes.

They’ll get some help from unmanned systems such as the Desert Hawk miniature UAS. According to SMSgt. Tim Poland, superintendent of tactical automated sensor systems at the Force Protection Battle Lab, Desert Hawk is treated just like any other aircraft—even though its wingspan is four feet and it’s made out of polypropylene and Kevlar. A pilot and copilot team from security forces sends the UAS out for hour-long missions. Desert Hawk searches for threats such as suspicious vehicles, man-portable missiles, or insurgents with mortars or IEDs up to 6.2 miles beyond the base perimeter.

“This is a really great system,” said SrA. JoAnn Bonzi, deployed to Iraq with the 407th Expeditionary Security Forces Squadron and flying Desert Hawk. “It allows us to cover a lot of territory that would be hard, if not impossible, to keep an eye on properly any other way.”

The full vision also includes having the air base operations center—or whatever it may be called in the future—serving as a command center for all joint forces in the area. That’s a logical extension of the net-centric

capabilities security forces will bring to the battlespace.

Over time, the security forces field will reflect the change in its career paths, too. Plans call for new members to start out learning expeditionary combat skills and then move toward police services. Over a career, members could move between the two fields.

The new security operations concept will be an essential component of what the Air Force brings to future joint warfighting. Moseley has set the broader framework for security forces with his advocacy of smart “interdependence.”

Joint doctrine is changing, too. The Cold War rear operations doctrine has been in rewrite for several years. It will take the new name of “security operations.” Joint Publication 3-10 is still a work in progress, but there is top-level consensus emerging, and USAF’s new security operations concept fits right in.

Working the joint aspect is important. Said Holmes: “If you ask an Army officer, What is Balad? he will tell you it’s an LSA [logistics support area]. If you ask an airman, ‘It’s our fighting position.’ Both are true.”

The Air Force remains engaged with its major weapons systems during stability operations. “I think the airman has a greater stake,” Holmes said. The land component moves on, but airmen “are still pounding the pavement with our major weapons systems” and doing the tasks of shaping and dominating the battlespace, alongside support for stability operations. The Air Force still operates at a high tempo and with major combat systems—be it airlift, fighters, bombers, or tankers.

In theater, said Holmes, security forces are “beginning to operate under a construct of what we see emerging in the joint doctrine working groups and the draft JP 3-10 to do security operations.” It’s overriding “the old way of thinking.”

Expeditionary combat, not just base security, will now shape the security forces. Said Holmes: “We wear uniforms, we carry ID cards that tell us we’re combatants, so we need to be a capability based on what our service says our fight is going to be.” ■

*Rebecca Grant is a contributing editor of Air Force Magazine. She is president of iRIS Independent Research in Washington, D.C., and has worked for RAND, the Secretary of the Air Force, and the Chief of Staff of the Air Force. Grant is a fellow of the Eaker Institute for Aerospace Concepts, the public policy and research arm of the Air Force Association’s Aerospace Education Foundation. Her most recent article, “Eaker’s Way,” appeared in the December 2005 issue.*



By John T. Correll, Contributing Editor

## Long May He Wave

"The ramparts of Washington are littered with the bleached bones of people who said Donald Rumsfeld was not going to survive."—**Pentagon spokesman Lawrence Di Rita about tenure of the Secretary of Defense, Washington Post Magazine, Nov. 13.**

## The Mission

"I see the mission of the Air Force as: Deliver sovereign options for the defense of the United States of America and its global interests—in air, space, and cyberspace."—**Michael W. Wynne, in a "Letter to Airmen" during his first days as Secretary of the Air Force, Nov. 3.**

## Air and Ground

"The US Army is incapable of surviving, much less prevailing, without overhead cover provided by the Air Force. It is myopic to think that money spent to control airspace somehow detracts from Army effectiveness. It makes Army effectiveness possible."—**Loren B. Thompson, Lexington Institute, House Armed Services Committee, Oct. 26.**

## Don't Hold Your Breath

"Odds of a big change coming from the QDR is about eight-to-one against."—**Andrew F. Krepinevich, Center for Strategic and Budgetary Assessments, on the forthcoming Quadrennial Defense Review, Defense News, Nov. 7.**

## The Final Solution

"The establishment of the Zionist regime was a move by the world oppressor against the Islamic world. The skirmishes in the occupied land are part of a war of destiny. The outcome of hundreds of years of war will be defined in Palestinian land. As the Imam said, Israel must be wiped off the map."—**President Mahmoud Ahmadinejad of Iran, Aljazeera.net, Oct. 26.**

## Global Duty

"Terrorism is a sick and cross-border phenomenon. Therefore, eradicating it is the whole world's responsibility."—**King Abdullah II of Jordan after al Qaeda bombings in Amman, Reuters, Nov. 13.**

## Torture in Vietnam

"For me, the alleged prison scandals reported to have occurred in Iraq, in Afghanistan, and at Guantanamo Bay have been a disturbing reminder of the mistreatment of our own POWs by North Vietnam. The conditions in our current prison camps are nowhere near as horrific as they were at the 'Hanoi Hilton,' but that is no reason to pat ourselves on the back. The minute we begin to deport prisoners to other nations where they can legally be tortured, when we hold people without charges or trial, when we move prisoners around to avoid the prying inspections of the Red Cross, when prisoners die inexplicably on our watch, we are on a slippery slope toward the inhumanity that we deplore."—**Melvin Laird, Secretary of Defense 1969-73, Foreign Affairs, November/December.**

## Speak No Evil

"I didn't think that calling the Soviet Union the 'evil empire' got anybody anywhere."—**Brent Scowcroft, national security advisor to President George H. W. Bush, The New Yorker, Oct. 31.**

## Notions of Democracy

"I believe that you cannot with one sweep of the hand or the mind cast off thousands of years of history. This notion that inside every human being is the burning desire for freedom and liberty, much less democracy, is probably not the case."—**Scowcroft, The New Yorker, Oct. 31.**

## US Misled Itself

"I've never maintained that the [Bush] Administration deliberately misled [the public]. I think they misled themselves, that we can see. And then they misled the world."—**Hans Blix, former UN weapons inspector, Boston Globe, Oct. 22.**

## Shared Conviction

"More than a hundred Democrats in the House and Senate—who had access to the same intelligence—voted to support removing Saddam Hussein from power."—**President Bush on allegations that the White House manipulated intelligence prior to**

**war in Iraq, speech at Tobyhanna Army Depot, Nov. 11.**

## US Would Lose

"Suppose the US and China engage in a war. The US would be defeated because the Chinese do not care about the loss of human life. There is no other country in history that has killed so many of its own people."—**Shintaro Ishihara, governor of Tokyo, Washington Post, Nov. 13.**

## Sniper Pod

"With the infrared sensor, the pilot can see the bad guys, day or night, in all types of weather. That includes people, trucks, anything. It's almost like looking through a pair of binoculars."—**Jim Barrow, program manager for the extended-range advanced targeting pod, called the "sniper pod," Robins AFB, Ga., Macon Telegraph, Oct. 22.**

## Settle and Withdraw

"The way forward in Iraq is not to pull out precipitously or merely promise to stay 'as long as it takes.' We must instead simultaneously pursue both a political settlement and the withdrawal of American combat forces."—**Sen. John F. Kerry (D-Mass.), Washington Post, Oct. 27.**

## After the Cold War

"Russia tests Topol-M missile to subdue USA's \$50 billion air defense; The unpredictable flight trajectory of the Russian missile makes it immune to destruction."—**Pravda headline, Nov. 2.**

## Audit the Pentagon

"Those who argue that the Department of Defense, because of its enormity and complexity, is incapable of establishing sound internal financial controls are guilty of using inverted logic. Indeed, the opposite is true: It is because the Department of Defense's budget is so big—and its mission to our national security so critical—that it can no longer forgo an independent financial audit."—**Dan L. Crippen, director of Congressional Budget Office, 1999-2003, citing 15-year-old Congressional requirement for audit of federal agencies, Washington Times, Nov. 3.**



New officers leave USAF's Air and Space Basic Course as dedicated airpower advocates.

# UP TO BASICS



USAF photo by Carl Bergquist

*Students from the Air and Space Basic Course and the Senior Noncommissioned Officer Academy scale a wall in an exercise meant to build teamwork.*

**I**n the months after they are commissioned, new Air Force lieutenants begin to find out what it really means to be an officer, an airman, and a warrior. The service now provides formal training to help them develop the proper foundation.

Until a few years ago, a second lieutenant's professional development was left to a combination of on-the-job experience and pure chance. With luck, the new lieutenant was assigned to an astute commander, developed close ties with his peers, and came under the tutelage of experienced and helpful noncommissioned officers. Many, however, were not lucky.

Today, USAF makes a conscious and concerted effort to broaden the horizon of new officers by sending them to Maxwell AFB, Ala., for the Air and Space Basic Course. This six-week program gives new officers the big picture of Air Force life before they focus in on their individual specialties.

For many lieutenants, the course provides their first meaningful contact with other young officers and knowledgeable noncommissioned officers. In the past, many did not receive their first taste of formal professional military training until they reached Squadron Officer School—as late as their seventh year of service.

**By Bruce D. Callander**

Precommissioning training provided some insight into service life, but the level of training received by these officer candidates varied greatly. Preparation ranged from four years of intensive curriculum at the Air Force Academy, to part-time study in college ROTC, to 12 weeks of Officer Training School.

ASBC is overseen by Air University at Maxwell. There, new classes enter the course about every two months. Graduation comes after 30 training days.

The commandant of the course, Col. Mark E. Ware, welcomes students with the admonition that they should leave the course as airpower advocates and warriors.



Officers "must fully understand how the Air Force supports our national security strategy," said Ware. "Without that understanding, you cannot fully serve this nation as an Air Force officer. ... Take the lessons learned here, go back into the field, and practice what you have learned."

The addition of this new course has not lessened the need for traditional professional military education (PME) of the type found in Squadron Officer School, said Lt. Col. Scott Cilley, commander of a student ASBC squadron. "We have tried to eliminate any redundancy between the two courses," he said. "The focus of ASBC is on the profession of arms and the study of doctrine."

Since 2003, the basic course has brought the officer students of ASBC together with noncommissioned officers attending Air University's Senior NCO Academy for a week of intensive joint training.

At that time, the first 623 officers and 342 senior NCOs were placed in the same flights to discuss their respective roles and work together on team exercises. It was a resounding success. The goal of the initiative now is to increase appreciation of the unique talents officers and enlisted airmen bring to the fight.

### Rapid Buildup

The idea of a formal training course for incoming officers began to take shape in 1996, after a Corona meeting of Air Force leadership. Senior Air Force leaders felt newly commissioned airmen lacked the spirit evident in the young officers of the other services.

This has been a concern for years. During his time in uniform, ending in 1990, retired Gen. Michael J. Dugan, former Air Force Chief of Staff, found that many Air Force leaders "thought of themselves, in many cases, as heavy equipment operators."

In 1999, Dugan said, "Their linkages to the larger whole, to the longer term, however, were frequently invisible, and sometimes they were invisible to the heavy equipment operators." It was a theme that was later taken up by Gen. John P. Jumper, Chief of Staff from 2001 to 2005.

"The idea was that a lot of our Air Force officers had lost the idea of what it meant to be an Air Force officer," said Cilley. They tended to put their specialties ahead of being officers. "By contrast, a marine knows he's a marine and an Army troop knows that he is a soldier."

A study evaluating ASBC put the issue more bluntly. "Part of the problem was that USAF officers had strayed away from the fundamental principles of the value of airpower," it concluded. Airmen were "increasingly favoring their own careers and interests over that of the Air Force mission or institution. ... Officers thought of themselves first in terms of their specific specialties," rather than thinking of themselves as airmen.

In 1998, Air University made a trial run of the concept with 13 new second lieutenants as students. The curriculum included instruction on and practice of Air Force core values, core competencies, the importance of teamwork, and studies in air and space power history.

After this test run, USAF leaders approved what has become the Air Force's largest in-residence officer PME course. The first class was conducted at Maxwell in 1999. (See "To Be an Airman," October 1999, p. 50.) In 2001, the Chief of Staff called for 100 percent line officer attendance, beginning the next year.

Originally called the Aerospace Basic Course, the training was renamed in 2001 to become the Air and Space Basic Course.

The curriculum includes seminars, presentations by distinguished speakers, participation in computer-based wargames, team-building exercises, and physical fitness.

The training also exploits the latest technology, including simulation software. This multiplayer application helps students understand the complex spatial relationships that underlie air and space power. An interactive application, it has given curriculum developers the ability to construct and run scenarios of historical, present-day, or hypothetical air conflicts.

A high point of the course is Operation Blue Thunder, a three-day simulation where officers plan and then fight an imaginary war. The exercise has students simulate the five divisions of an air operations center, set up a master air plan, and develop the tasking orders needed to carry it out.

In a combination of computer simulation and lifelike field conditions, the exercise helps students grasp what air and space power bring to the fight. When Blue Thunder is over, the opponents are debriefed, explain their strategies, and are critiqued by staff members from ASBC, the Squadron Officer College, and Air University.

Officials say ASBC and Blue Thunder are offered so soon after commissioning because there is no time to waste. It takes many years of education, training, and experience to cultivate a general or great military leader.

The physical structure of the course is designed to match that of an Air Force unit. Trainees are assigned to six student squadrons, each with its own insignia and lineage. For example, the 38th Student Squadron, "Mustangs," commanded by Cilley, traces its origin to a unit deactivated in 1975.

### Combined Operations Training

The student body of ASBC is drawn from all commissioning sources. About half are ROTC, with the remainder evenly split between academy and OTS graduates. A sprinkling are direct commissions in the medical and legal fields. A small number of reservists and DOD civilians also attend.

Thousands of airmen attend ASBC annually, officials say. Many are new officers, and the senior NCOs participating in the combined training segment average 18 years in the Air Force.

Combined Operations Week brings new officers in contact with the veteran enlisted members in ways that many would not otherwise experience until well into their careers. For the final week of training, ASBC classes are combined with those of the Senior NCO Academy.

The lieutenants and NCOs work together for classroom and field exercises.

This element of the training is the vision of Jumper, the previous Chief of Staff. His idea was to develop a relationship between the young officers and the senior noncoms who have extensive experience working on teams, supervising troops, and taking part in deployments.

The curriculum for the combined training draws on lessons taught in both schools. In the classroom, officer-NCO teams participate in guided discussions, warfighting scenarios, and lectures. In the field, they cooperate in exercises centered on team building.

While linking young officers with noncoms almost a generation older may seem an odd arrangement, officials say it institutionalizes what has always been military tradition. Historically, senior NCOs have served as mentors to junior officers.

For junior officers, a major benefit of the combined training comes, oddly





**MSgt. Zachary Edison (left), a production specialist with the 437th Aircraft Maintenance Squadron at Charleston AFB, S.C., shares his experiences and knowledge with a class of second lieutenants and senior NCOs.**

enough, from improved writing skills, said Capt. Todd Wheeler.

Wheeler, a combined course flight commander, said lieutenants in ASBC write quarterly award packages for NCOs, and the sergeants then critique the writing in an open setting. "That part of the education, which makes students better writers, is the type of training that gets people promoted," he said.

Many general officers still give enormous credit to the noncommissioned officers who helped steer them when the generals were newly minted.

"The NCOs have witnessed a variety of effective and ineffective commanders," said Cilley, "so they can provide a unique perspective to our new officers on how to lead, mentor, motivate, and even discipline our enlisted corps."

This "introduces mentoring between young company grade officers and seasoned NCOs," said Lt. Col. Larry Ellis, ASBC vice commander. The combined training "better equips lieutenants to understand and advocate the enlisted corps."

Many young officers have never worked with enlisted members at all, yet within their first year on active duty, many are in leadership positions, Cilley observed. Both officers and NCOs are enthusiastic about the combined training, officials say. Typical lessons in the combined operations curriculum are aimed at getting officers and the NCOs to:

- Explore the complexity of develop-

ing base operations in an expeditionary environment.

- Learn the basic concepts of force protection, base set up, sortie generation, and medical readiness.

- Familiarize themselves with the supply, maintenance, and operational support issues vital to combat aircraft sortie generation.

- Master the principles of team building by watching staged group behaviors and seeing how they can help or hinder the group's ability to function.

- Study team leadership so officers will understand their roles as leaders of the enlisted corps and the senior noncoms will appreciate their roles as mentors.

Officials say the teamwork benefits both the officers and NCOs.

Former ASBC student 2nd Lt. Katherine Portillo said many NCOs hold the stereotype that second lieutenants are naïve. Being prior-enlisted, Portillo admitted that she held that stereotype herself, but the course's interaction allows the senior enlisted members to see the lieutenant's perspective and observe what the company grade officers have learned in their other training.

### Mental and Physical

Air and Space Basic Course also

includes a heavy dose of physical conditioning. On the third training day, officers must run a mile-and-a-half course in 15 minutes, as a safety screening test for later activities. Students who fail the test twice can be removed from ASBC.

"This requirement is based on the fact that we are an expeditionary Air Force," said Cilley. "These lieutenants are going to be deployed. Physical fitness has become extremely important, especially when we are going to be operating from remote locations and [in] austere conditions."

The rest of the physical training is even more demanding. Despite the stiff physical requirements of the training, however, officials say that few students are eliminated for failing the fitness standards.

The same is true of academic failures. The standards are difficult, but the numbers of airmen who are boarded out is very small. The students are brought in to learn, and the joint training shows the young officers how NCOs can help them right off the bat.

Wheeler observed that to solve problems the young officers typically analyze the situation, while NCOs use personal experience—and normally act more quickly.

The interplay of differing academic and experiential approaches create "incredible ideas and solutions," said Wheeler.

The course also stresses the "warrior ethos," even to officers whose specialties would seem to make it unlikely they would see combat.


Cilley says young officers must understand that the Air Force is engaged in a Global War on Terrorism, and operating tempo is high. "If we can establish this airman-warrior ethos in them, we are showing them that this is the reality, and they have to be prepared because they are going to deploy," he said.

"One of the things we do during our graduation ceremony is to show the names and pictures of our people who have been killed or paid the ultimate sacrifice during the six weeks that the students have been at ASBC," said Cilley. "This is a pretty poignant reminder to them of the seriousness of what we are involved with." ■

*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, "Force Development Hits Its Stride," appeared in the October 2005 issue.*



# Where Can You Get...



*luxury vacation accommodations at \$264 a week*

*mortgages with no origination fees and savings on closing costs*

*higher interest rates on savings and free bill paying*

*lower group rates on insurance*

*discounts on Apple and Dell electronics*

*a lead on finding an old Air Force buddy*

*tuition discounts for online degree programs*

*low interest rate platinum credit card*

*the highly acclaimed AIR FORCE Magazine every month*

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

*savings on cruises and tours with award-winning service*

*real discounts on rental cars*

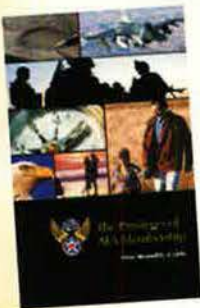
*low cost stock trading online at [sharebuilder.com](http://sharebuilder.com)*

*professional assistance with your resumé and job search*

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

## ...Closer Than You Think.

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



Visit [www.afa.org](http://www.afa.org) and click Member Benefits

Call toll free  
1-800-727-3337

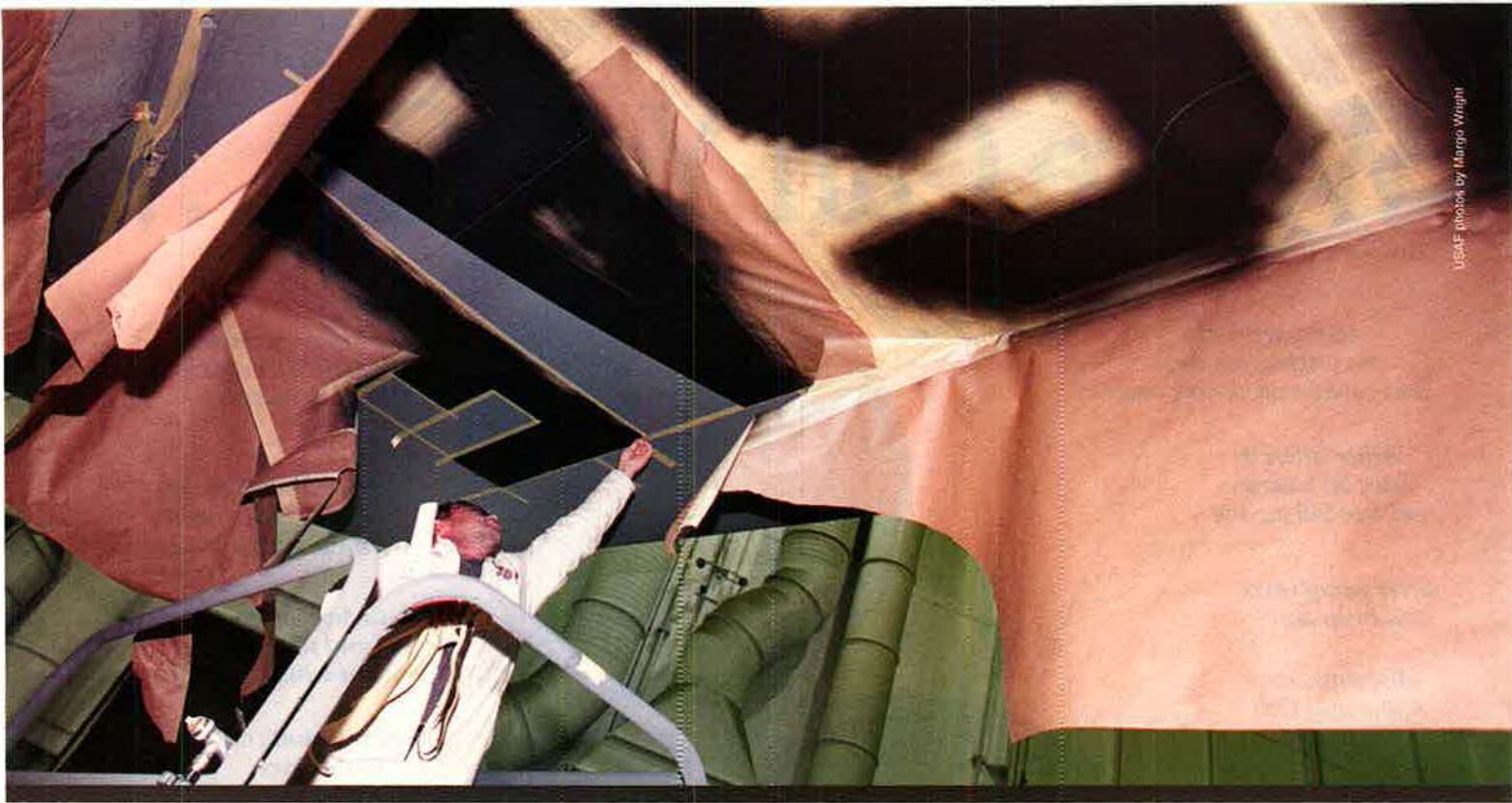
weekdays 8:30 AM to 5:00 PM ET

E-mail  
[service@afa.org](mailto:service@afa.org)

### USE YOUR AFA MEMBER BENEFITS OFTEN!

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





# LEANER, MEANER D





USAF's air logistics centers are now faster, more efficient providers of combat power.

---

# EPOTS

---

By George Cahlink

*Air Force depots have largely recovered from their 40 percent downsizing. At top of the opposite page, Gerald Spurgion removes the "USAF" masking on a KC-135 at Oklahoma City Air Logistics Center. At left, Michelle Henn overhauls Stratotanker refueling booms.*

**L**ast January, Air Force Special Operations Command called Warner Robins Air Logistics Center in Georgia, with an urgent request. Iraqi elections were being held at the end of the month, and the air commandos needed as many AC-130 gunships as possible operating in the Middle East, safeguarding polling sites. One of those aircraft was down for repairs at the depot, and commanders wanted to know if depot workers could have it ready a few weeks early, in time for the key vote.

Depot managers asked workers to put in some overtime and cut out unnecessary steps in the repair process. By the end of the month, that AC-130 was flying in Iraq.

War has proved a powerful motivator for workers to have aircraft ready on a tight schedule, but the depot's rapid response would not have been possible without a host of changes that have occurred at Air Force depots, the service's in-house aircraft and equipment overhaul centers.

In danger of being put out of operation a decade ago, Air Force depots have embraced a new mind-set that has allowed them to better meet combat needs. The depots have become an unlikely model for Defense Department transformation.

"There was clearly an element that thought we should privatize air logistics centers, and I think [in conjunction with depot closings] it really created a lot of turmoil," said Lt. Gen. Donald J. Wetekam, deputy chief of staff for installations and logistics, at the Pentagon. On the other hand, "when people see their livelihood threatened" it is also a great motivator. USAF has been able to "leverage that, to really work some significant improvements in air logistics centers over the last five years," he said.

A decade ago, the Air Force had five depots. Today the service has three: Ogden ALC at Hill AFB, Utah; Oklahoma City ALC at Tinker AFB, Okla.; and Warner Robins ALC at Robins AFB, Ga.

In 1995, the independent Base Realignment and Closure Commission surprised the Air Force by calling for the Sacramento ALC at McClellan AFB, Calif., and the San Antonio ALC at Kelly AFB, Tex., to be shut down by 2001.

The five Air Force depots were no longer efficient and were only operating at about 70 percent capacity. The

BRAC panel believed that by combining the work at three depots and outsourcing additional work to contractors, the service would save money.

Unfortunately, moving 40 percent of the Air Force's depot work to new facilities across the country proved far more complicated than first expected.

## A Difficult Decade

"It's been extremely difficult moving major workloads. We did not come near the projected targets in terms of the people we moved, so we had to build expertise for the weapons that transferred," said Wetekam. "You have a new workload coming in, and you have [an] inexperienced workforce when it came to that workload." That created many growing pains.

The Air Force turned to contractors under "bridge contracts" to take on some logistics work that depots temporarily could not complete because they were moving equipment and personnel around the country.

The contracts proved effective but raised the ire of Congress for violating a federal law (known as the 50/50 requirement) that prohibits military depots from contracting out more than half their maintenance work. Beginning in 2000, as the Sacramento and San Antonio ALCs shut down, work "gaps" led to increased Air Force reliance on contractors for overhaul work, and the service violated the 50/50 rule. (See "Loggies vs. Contractors," January 2001, p. 70.)

Ultimately, lawmakers granted the Air Force a waiver to the 50/50 requirement in 2001 and 2002 but only after depot commanders spent a lot of time convincing Congress that the Air Force was not permanently privatizing the work.

"We depended on bridge contracts with many of our vendors to get us through some tough times," said Wetekam.

The Air Force closed the Sacramento and San Antonio depots on time, but it took a few years before workers fully adapted to a changed operating environment.

Kenneth I. Percell, executive director of Warner Robins ALC, said the closings made for some "strange bedfellows." He said depot managers and workers who had long competed against each other to stay open were now working together. Meanwhile, contractors were no longer rivals but partners.

The depots were struggling to get out



## The Depot Master Plan

In October 2003, the Air Force published a long-term strategy for its depots. The "United States Air Force Depot Maintenance Master Plan Fiscal Years 2004-2020" laid out a concept guaranteeing a core workload to these logistic centers.

The plan also called for investing hundreds of millions of dollars to train depot workers and overhaul facilities.

In exchange for the funding infusion, the depots were told they must form more partnerships with industry and adopt commercial business practices.

"The Air Force is committed to maintain a ready and responsive 'world class' organic depot infrastructure with technologically advanced facilities and equipment and a highly qualified workforce," stated the master plan.

The master plan also included a 20-year roadmap for depots that for the first time stressed the need for early planning on how weapons will be sustained.

As a result, the Air Force has already begun discussing with industry how it will take care of systems, such as the F/A-22 aircraft, years before they are fielded.

Additionally, the Air Force has attempted to predict when systems will be retired and no longer need depot work.

Every two years, the Air Force reviews its weapons support work and determines what work the depots should perform. Oftentimes, those decisions are made based on whether there's a commercial market for the work.

For example, the depots do nearly all the overhaul and repair work for highly specialized fighter jet engines—but commercial firms do the work on widely available turbofan engines.

Over the next several years, the Air Force is investing an average of \$150 million annually in upgrading depot facilities, buying new equipment, and providing specialized training for its workforce.

The additional dollars will put the depot infrastructure spending on par with commercial manufacturers, which on average spend about six percent of annual revenue on infrastructure improvements.

of BRAC "survival mode" in the early part of the decade. Maj. Gen. Kevin J. Sullivan, commander of the Ogden ALC, was blunt. "There was not a whole lot of innovation or excitement," Sullivan said. "The emphasis was not on support—it was on survival."

Depot managers say two key factors have helped the depots emerge from their survival mode over the past three years into modern business operations that now compete with contractors for work. Those factors are: (1) war and (2) the Air Force's decision to publish a long-term strategy for depot maintenance.

Throughout the 1990s, Air Force depots often operated in a near surge mode to support air operations in the Balkans and Iraqi no-fly zones. "The Air Force is not in the same situation as the Army. The Army has had a tremendous spike in their workload since 9/11," said Wetekam. Air Force depots learned to operate in surge modes over the past decade, and that has helped the service respond to workload spikes brought on by the current wars.

For example, Warner Robins technicians worked 12-hour shifts, seven days a week, from September 2001 to December 2001, to overhaul radar systems used by fighter aircraft. Prior to Sept. 11, work on those radar systems was a low priority. After the attacks,

hundreds were needed—almost immediately—in Afghanistan.

### Private Sector Influence

M. Scott Reynolds, deputy director for maintenance at Air Combat Command, one of the largest depot customers, said Air Force depots have become "more business like" and responsive to warfighter needs. While

quick to point out that ACC does not favor either depots or logistics vendors for maintenance work, Reynolds said depots offer a big advantage by not requiring contract modifications every time the work changes.

Perhaps the biggest changes at the depots have resulted from adopting the new practices that revolutionized commercial industry in the 1980s and 1990s. The most important practice, known as *leaning*, eliminates wasteful or unnecessary steps from manufacturing, logistics, and administrative processes to improve efficiency and effectiveness.

For the depots, that has meant looking at every step in their complex processes to speed up the time spent overhauling aircraft, engines, weapons, and key subsystems. Steps are being cut wherever possible.

Depots have been pushed toward *leaning* by simple Air Force economics. By the end of the decade, the average Air Force aircraft will be about 30 years old and will likely require more complex maintenance and overhaul work. Mounting modernization bills and war costs, however, mean the service has few extra dollars for depot work.

"We are not going to get a lot more money," said Sullivan. "We are going to have to change."

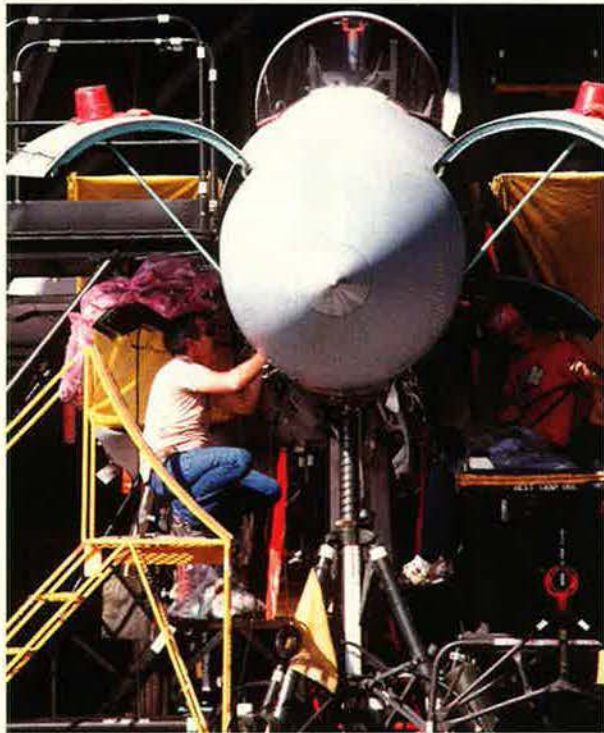
Additionally, the Air Force has set a goal of improving aircraft availability by 20 percent and cutting logistics cost by 10 percent over the 2006-11 budget cycle.

The workforce is already lean. Lo-



Wars in Afghanistan and Iraq have provided a powerful motivation for depot workers to get their work done right and on schedule. Here, technicians at Ogden ALC, Utah, repair an F-16.





*Civilians at Warner Robins ALC, Ga., perform most F-15 depot work. In late 2001, these workers went to 12-hour shifts, seven days a week, to ensure that the Air Force had a sufficient number of radars ready for fighter aircraft headed to Afghanistan.*

gisticians have to make the necessary changes with fewer people: In 1998 there were 24,834 people working at the Air Force depots. Today there are 22,612, but the amount of work has held steady.

Ross E. Marshall, deputy director for the 309th Maintenance Wing at Ogden ALC, says the bottom line is simple: The Air Force should pay less but get more for its money.

The changes also are necessary for forming partnerships with defense contractors. "When I deal with the Boeings and the Lockheeds, they want to know that the air logistics centers are going to be good partners, competitive, and that they will continue to improve their process and performance," Wetekam said.

Increasingly, the work is shared between depots and industry through private-public partnerships. "Workload isn't handed to the air logistics centers lock, stock, and barrel anymore," said Wetekam.

At Tinker, Pratt & Whitney provides management and parts for engine overhauls, while the depot provides the labor for F119 aircraft engine overhauls. As part of the deal, the depot invested \$13 million in its in-house engine repair facilities.

Expanding partnerships have forced the Air Force to more closely monitor its 50/50 workload requirement. After breaching the requirement in 2001 and 2002, the Air Force has established a

goal of having 52 percent of the work performed by the depots, to provide a cushion for unforeseen work that might have to be pushed to the private sector.

Since 2002, the Air Force has not missed the mark and expects to be well within the margin through 2007. By 2008 and 2009, the Air Force expects to be closer to an even split and will likely move some additional work to depots.

### **A Combat Advantage**

Wetekam believes the ongoing improvements will improve Air Force readiness.

At Ogden, logisticians have cut the time it takes to overhaul F-16 fighters. What used to require 145 days now takes just 120 days. That, officials say, translates into one extra squadron of aircraft being available for combat. (See "Aerospace World: Ogden Sets Record Repair Rate," October 2004, p. 20.)

Managers sped up the process by scrapping a long-standing practice of parking aircraft and having logisticians work on them at preset times. Now, Ogden has established cells for various stages of F-16 repair, and aircraft are moved from one area to another as soon as work is finished—rather than waiting for workers to come.

Under the old schedule, aircraft went to a parking stall, people came to that place and did a task, but there was a firm schedule, said Marshall. If work does not expeditiously happen today, "you bottle up the whole system."

Other leaning improvements at Ogden were just a matter of common sense. Workers have cut times by creating tool kits they could keep at the workstations, rather than wasting time walking back and forth to and from the tool cabinets.

Garry B. Ritchey, executive director at Tinker, says leaning at the Oklahoma depot has allowed back orders to be reduced from five million to 1.5 million hours. For example, overhauls on KC-135 tanker aircraft were cut from more than 400 days to 193 days. The number of tankers undergoing repairs at any one time was cut from 37 to 22—meaning that there are 15 more KC-135s out in the fleet, ready to perform their primary missions.

"I think people have always been trying to do a good job; we are just more organized in how we approach it," Ritchey said. "Improvements in one area have led to improvements in other areas."

Warner Robins managers say streamlining the C-5 repair process has cut the number of days needed to overhaul the cargo aircraft from 339 days to 171. Currently, 100 percent of the C-5 aircraft are being finished on time. Only 40 percent finished on schedule before improvements were applied to the line.

Depot managers say the initial focus of leaning has been on cutting repair times, not saving money. "We have not focused as much on cost reduction as we need," said Sullivan, so managers will "focus next year on cost reduction."

The improved processes may have saved hundreds of millions of dollars at depots in recent years. "You save money because you save time," Wetekam said. "You save money because people are more efficient. You save money because you have better control of material and less inventory. You save money because you have better quality, and that leads to less rework. ... All those things can add up."

For the first time in years, Air Force depot workers can say with confidence that they have a future. ■

*George Cahlink is a military correspondent with Government Executive Magazine in Washington, D.C. His most recent article for Air Force Magazine, "New Day for Defense Civilians," appeared in the February 2005 issue.*



The top airman in Southwest Asia discusses air operations over Iraq and Afghanistan.

# A Complex and Changing Air War

By Marc V. Schanz, Associate Editor

---

## Lt. Gen. Walter E. Buchanan III,

*commander of USAF's 9th Air Force and US Central Command Air Forces, met on Oct. 27, 2005, with the Defense Writers Group in Washington, D.C. What follows are excerpts of his remarks about unmanned aerial systems, air support for urban combat operations (especially the November 2004 fight for Fallujah), and ways of performing new missions in the war on terror.*

---

### You've Come a Long Way

"In March of 2002, the mission briefings over Southern Iraq at that time, the mission commander would get up and he'd say, 'OK, we're going to have the F-15Cs fly here, the 16s are going to fly here, the A-6s are going to fly here, tankers are going to be here today.' Then they would say, 'And oh by the way, way over here is going to be the Predator.' We don't go over there, and he's not going to come over here and bother us. ... It was almost like nobody wanted to talk to them. ... It wasn't too long before ... people were incorporating the Predator into the mission plan as part of your 'gorilla package'."

### Evolution of the Predator

"It gives me the ability to put a persistent stare overhead. That's where I talk about the target development piece. Other airframes don't have the loiter time to be able to quietly stay, hang overhead for hours at a time if necessary, and develop this target. Quite honestly in this insurgent environment, that's been one of the real values of that. A long loiter UAV, especially with the reachback that the Predator provides."

### Electronic Fratricide

"Part of the issue is, we have such a proliferation across the field, all well-intentioned, of jammers and systems to keep our soldiers and marines safe—the right thing to do, but they have unintended consequences. If you had a soldier in here today, he would tell you that we have systems that we give him to keep him safe and to provide some cover against electronically detonated IEDs, that when they're on, he cannot use his radio. For him to make a radio call, he has got to turn it off so he can transmit or receive. That's not perfect.

But then again, too, if I create a notch in his jammer to allow him to transmit on that frequency and the insurgent learns where that frequency is and he's then smart enough to move to that notch— ... It's a hard problem. People overstate how easy this is."

### Fighters vs. UASes

"Right now, I'm taking the Litening AT and the Sniper, [the] latest generation targeting pods on an F-16 or an F-15E or an F-18, and I can put that overhead a target, and I can provide the same kind of coverage as I could potentially with the Predator now. Right now, the Predator video can be beamed down to the [controller] on the ground. I have that capability in some of my advanced targeting pods but not most of them yet. ... With the Predator, I have the ability to beam that video not only down to the ground but also to higher echelons of command, depending on the importance of the target and what's happening. I can't do that with a targeting pod. ... The nontraditional ISR mission [has] been very, very effective in making things happen."

### UAV Crowding

"Here's the problem we're getting to: ... I anecdotally understand we have over 1,000 UAVs on the ground, in the [area of responsibility], with the majority of those flying below 3,000 feet. That is a very thick environment. We have in fact had occasions where they have run into helicopters. Fortunately, to my knowledge, we have not hurt anybody yet. We have damaged airplanes and knocked them down, but we've not injured anybody. ... My fear is, the day will come where we will have a C-130 full of troops and ... a Scan Eagle, a Shadow, a Pioneer, whatever, is going to come through the cockpit and take out a C-130 because we did not deconflict. ... Above 3,000 feet, we deconflict via altitude. I deconflict via space. I deconflict via time. ... But folks have got to play by those rules, and I will tell you not everybody who's flying UAVs in the AOR is a rated pilot that understands that and that deconfliction piece."

### Airpower: The Fallujah Model

"Prior to the actual [Fallujah] operation itself on the



ground, there were a number of what were referred to as shaping operations. It was a very, very joint fight [as] most of those bombs that were dropped during that time frame were in fact Air Force and Navy as we went essentially down in the industrial section of Fallujah, down in the southeastern section. ... While it was in the Marine AO, ... it truly was a joint operation. ... During the actual assault phase going in, ... a majority of the air that was used during that time frame was in fact the Marines. And part of that was by design. ... They wanted to use their organic air. I have no problem with that."

### **Deterrence, Iraq Style**

"The bigger piece was there was a very clear intelligence signal that the insurgents, once we put pressure on Fallujah, were going to try and cause a fight somewhere else. Mosul was an area of concern and so was Al Qaim. So, if you go back and check, you would find that during that period everyone surged, and I had the carrier and the assets, my own assets, and then we were actually providing increased coverage in the north over Mosul and then over on the western edge waiting to see if the insurgents erupted. It turns out they were not able to effectively do so, so there wasn't that much of a fight to see in that regard."

### **No, That Brown Roof**

"One of the things we found ... hard was when you're dealing with an urban environment; we're looking from the ground, looking down. It was very, very hard sometimes to quickly get the pilot's eyes exactly on the target that the JTAC and the ground commander were talking about. In all honesty, if you took an overhead picture of Fallujah and looked down, it's a town full of literally flat brown roofs and a couple of mosques here and there. ... There's one instance I can speak of in Fallujah where from the ground I looked up and I saw three different buildings. From the air, the roofs were all connected."

### **Map Reading 101**

"We went into this fight with everybody having the exact same map all the way down to the company commander up to the folks in the airplanes, and so now, believe it or not, it got to the point where people would say, 'OK, do you see the 'L' in 'Fallujah' on the map? Go two blocks south from that, and that's where I want to start from.' Because the first Fallujah going in, you may remember, we had to use the crossroads to the east [of the city as] the starting point. 'You see the highway crossroads to the east? Yep. OK, now going from there, going west'—and you kind of follow yourself in and count streets and all that kind of thing. We were much better at it."

### **Precision Rules**

"If you go back and you count the numbers in Fallujah, what you will find is that as long as you count strafe and rockets, as ... semi-[precision guided munitions], ... every weapon dropped in Fallujah during that time frame was a PGM. They were either laser guided Maverick, Hellfire, or they were laser guided GBU-12s, 500-pound weapons, or they were in fact GPS guided weapons. So as you and I count forward from Desert Storm, Allied Force, marching our way forward, we're to a point now where in this kind of a tight urban environment we were essentially precision guided. That was the name of the game, to make things happen."

### **Not LD/HD by Choice**

"Know that [assets] are not low-density, high-demand because we want them to be that way. We'd all love to have more. Unfortunately these systems, as we go through our force structure, we just don't have the numbers. ... Things like U-2s, Rivet Joints, [Joint Surveillance Target Attack Radar System and AWACS aircraft] are in that category, although right now I'm not using AWACS, and you could make a case that Predator's in the same boat in making that happen."

### **Intel Sustainment**

"This kind of fight, an insurgent fight, ... [is] intel intensive, and so any kind of sensor system that I have that will allow me to put a persistent surveillance over the battlefield is better. The problem is trying to sustain that fight. There's a magical balance between the requirement and sustainment. ... If one is good, two must be better, and three must be really much better. You have to be very careful. [CENTCOM commander Army Gen. John P. Abizaid] warned us all to make sure that we pay attention to the ability to sustain this fight because ... this is not something that's going to be over with in just a couple of months. ... We need to make sure that we pace ourselves and we can sustain it."

### **Old Platforms, New War**

"A very good case in point ... is the JSTARS—a tremendously valuable system, designed principally and obviously to fight the Fulda Gap tank war during the Cold War, but has during Desert Storm and since come to be [an] invaluable asset in Iraq, especially now as we begin controlling, looking at some of the borders in the wide open western desert spaces, its GMT radar being able to pick up obviously vehicles that are moving, and then our ability to cue that with other systems."

### **Retaining Airmen**

"I worry about AWACS, I worry about Predator [crews]. Predators have been in combat now for over a thousand days straight. ... We have some high stress career fields—security forces right at the top of the list, [explosive ordnance disposal], civil engineers. ... The issue is, our force structure was not designed for this kind of a fight, and we are also being asked to do things with our security force airmen that we're not trained for."

### **Maintaining Forward**

"My legacy airplanes forward are actually doing very, very well, and I'm flying them at a higher use rate than I would back in the States. And I'm doing all the normal maintenance things. I'm doing phased maintenance, your major time overhauls, if you will, on an airplane, and I'm doing them in some expeditionary environments. At Kandahar you'll see A-10s and EA-6s [in] expeditionary tents, if you will, and the kids are doing well."

### **Old Things Break**

"At the same time I will also tell you that we're finding that with the tempo and the age of some of the systems, we are in fact planning some new and unique breaks. The best example, probably, is the C-130 fleet, and I'm sure you're probably well aware that we've found some cracks in the airframes that have caused us to restrict ... the loads they can carry. We began to see those, then we had to re-evaluate. [The cracks] were beginning to show up sooner." ■



They approached the jet engine problem in different ways, but they both solved it.

# The Converging Paths Whittle and von Ohain

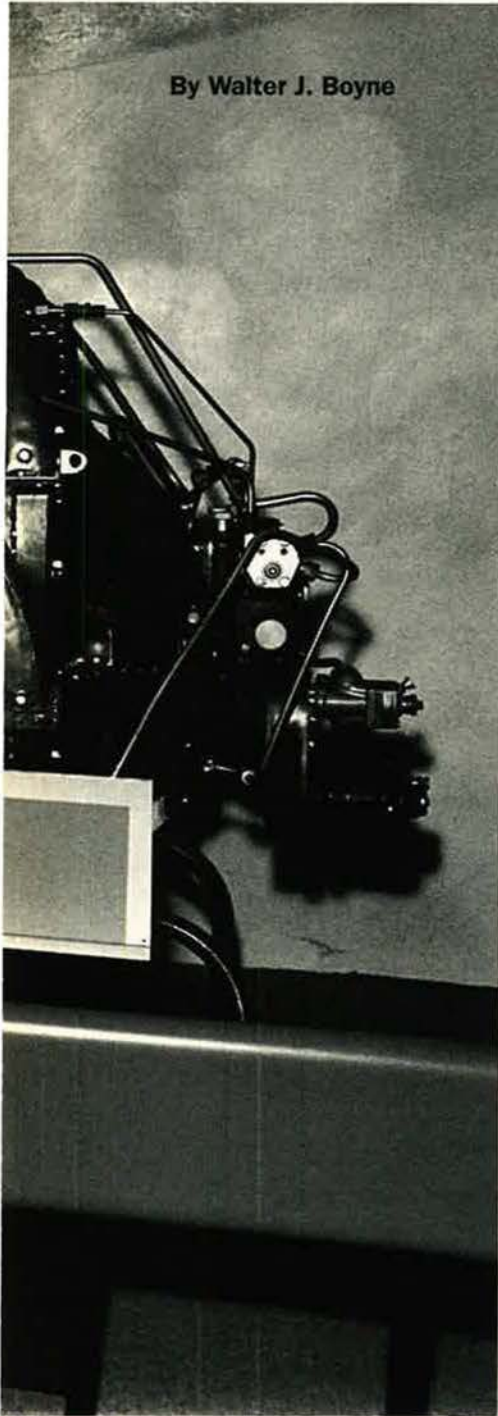


*Pictured in 1987 is Frank Whittle and the Whittle W1X, the engine he designed. The engine is on display in the jet gallery at the National Air and Space Museum in Washington, D.C.*



of

By Walter J. Boyne



**N**o one who witnessed the first flight by a jet aircraft had any idea of the revolution that the jet engine would bring. The secret flight in Germany of the Heinkel He-178 on Aug. 27, 1939, led to revolutions in aviation, warfare, transportation, politics, and the world economy.

A functioning jet engine was realized at about the same time by two independent inventors, British Frank Whittle and German Hans Pabst von Ohain. They could not have differed more in personality.

Whittle, an extremely proficient Royal Air Force pilot, was quick tempered and acerbic, and he did not suffer fools gladly.

Von Ohain, an academic, was much younger, only recently graduated from his university, and possessed of a warm, engaging personality enhanced by a natural diffidence.

They approached the problem of creating a jet engine differently as well. Whittle totally immersed himself in the hands-on work, subcontracting out only those elements that were too complex for him to build. He was constantly applying theory to, and deriving theory from, the engine as it progressed.

In contrast, von Ohain was not a mechanic and taught himself to be an engineer only after he had received his doctorate. He hired a skilled mechanic to create the original model engine and then worked within the framework of a large aircraft company to bring the engine to fruition.

Whittle was totally unaware of von Ohain's work. Von Ohain was conscious of other efforts to patent a jet engine, but did not draw upon any of the available knowledge. His preferred operating style was to work out his own ideas first, then see what others had done.

The two men had three things in common: initial governmental failure to recognize the immense potential of their experiments; totally inadequate rewards for their great invention; and extravagant exploitation of their efforts by others.

#### **Out of the Midlands**

Frank Whittle was born in Coventry, England, in 1907 to a working class family. His father was an inventive mechanic who, despite his lack of a technical education, provided Frank with the incentive to excel technically. Young Whittle fulfilled a dream by joining the Royal Air Force as an

apprentice at the age of 16. His goal was to become a pilot.

Hugh Trenchard, Marshal of the Royal Air Force, made many important contributions to the RAF, but none more so than his concept of apprentice training. Trenchard insisted that his enlisted and noncommissioned personnel have a sound education. Then he wanted his average RAF airman to have three years' training as an apprentice before entering service as a mechanic or other skilled worker.

Trenchard believed that only educated and well-trained men could become professional airmen. To sweeten the pot, he further stipulated the top five apprentices in each class could become cadets and receive flight training.

Whittle was rejected on his first attempt to join the Boy Apprentice Training program for poor physical fitness, but followed a diet and exercise regime that allowed him to pass his next attempt. He reported for training in September 1923. It was the best investment in personnel the RAF would ever make.

Whittle performed well enough to be selected for pilot training and was a natural pilot. He graduated second in his class despite some crashes, nonregulation low flying, and a few disciplinary problems.

Whittle earned his high class ranking by excelling in his studies—in spite of his reluctance to engage in team sports. He was troubled by a sharp temper that would affect his dealings with others for much of his life.

At the RAF College at Cranwell, he wrote a groundbreaking paper, "Future Developments in Aircraft Design." It postulated that speeds of 500 mph or more could only be achieved in the stratosphere and that a new form of propulsion—rocket or gas turbine—would be required.

On graduation, Pilot Officer Whittle was posted to No. 111 Squadron at Hornchurch, flying the Armstrong-Whitworth Siskin IIIA. In September 1929, he was posted to the famed Central Flying School at Wittering to learn how to become an instructor pilot.

His distress at leaving the atmosphere of an operational squadron was offset by additional free time. More important, he met others who believed in his idea of a gas turbine. One of these was Flight Officer W.E.P. Johnson, who had been a patent agent in civil life. Whittle settled on a new type of gas turbine,



## A Concise History of Jet Propulsion

Jet propulsion is an application of Isaac Newton's 1697 Third Law of Motion: For every action there is an equal and opposite reaction. Thrust cut the back moves the aircraft forward.

A turbine was patented by John Barber in England in 1791.

In 1884, Charles A. Parson designed a turbine intended to convert the power of steam directly into electricity.

In 1903, Norwegian Aegidius Elling built the first turbine that sustained itself in running.

Romanian inventor Henri Coanda attempted to fly a primitive jet aircraft in 1910, using a four-cylinder internal combustion engine to drive a compressor at 4,000 revolutions per minute. It was equipped with what today might be called an afterburner, producing an estimated 500 pounds of thrust. Countless loyal Coanda fans insist that the airplane flew. Others say it merely crashed.

In 1918, General Electric established a gas turbine division. There, Sanford A. Moss moved closer to the true jet engine with his GE turbosupercharger that used hot exhaust gases to turn a turbine that drove a centrifugal compressor used for supercharging. The device was critical to the success of the B-17, B-24, P-38, and many other airplanes.

In later life, Moss would laughingly remark that he did not know how close he came to inventing the jet engine.

By 1920, Alan A. Griffith developed a theory of turbine design, based on gas flow past airfoils rather than through passages. Later he was a proponent of the turboprop engine—and an opponent of Whittle.

There were other experimenters contemporary with Frank Whittle and Hans von Ohain. American Nathan Price developed a 3,500-pound-thrust engine, and Clarence "Kelly" Johnson designed an advanced fighter to use it, but the Army Air Corps considered it so advanced that it was unlikely to be completed before World War II was over. The Army Air Corps therefore rejected it.

one using neither a piston engine nor a propeller.

Johnson smoothed the way for Whittle to present his ideas to the British Air Ministry. There, Whittle ran into the bureaucratic opposition that would delay the development of his engine by five critical years. The agonizing process would also do much to wreck his health.

Under the guidance of Alan A. Griffith, the Air Ministry's position was that the materials needed to endure the heat and stress implicit in a gas turbine were not available. The ministry also felt that the gas turbine would require too much fuel to be practical.

Unfortunately for both Whittle and the United Kingdom, Griffith had a basic conflict of interest, favored piston engines, and had a proprietary interest in the subject.

Whittle persisted, and a patent was granted in 1930.

In 1936, Whittle and two former RAF pilots, J.C.B. Tinling and Rolf Dudley-Williams formed a new company, Power Jets Limited, to act on behalf of Whittle and to raise money for developing his invention. Whittle, scrupulous about any possible conflict of interest, informed the government, which allowed him to proceed on the basis that it not interfere with his normal duties.

### On Paper, Anything Is Possible

On paper, Whittle seemed to have

solved the problem of jet propulsion. In practice, he was challenging the limits of everything known about compressors, turbines, metals at high temperatures, and the physics of compressed air flow.

Whittle learned how to build a jet engine by building one.

Power Jets always lacked money, but Whittle's persistence and frugality kept it alive through many lean years.

The critical initial experiments in combustion did not begin until Octo-

ber 1936. Some preliminary testing of Whittle's engine took place in March 1937, the same month that Griffith furnished an official Air Ministry report that essentially declared the jet engine noncompetitive with conventional power plants. The "WU" (for Whittle Unit) was fired for the first time on April 12, 1937.

The initial firing of the jet engine was a near disaster. The engine ran away, reaching a then-incredible 8,000 revolutions per minute before Whittle was able to shut it down.

There followed a series of nerve-racking trials, each one fraught with the possibility of a catastrophic explosion. Whittle's life was often in danger as he stayed with the engine, trying to control it—and sometimes succeeding.

The combination of financial and developmental problems undermined Whittle's health. He was now on the RAF special duty list, able to devote his full time to the redesign and manufacture of his engine.

Testing on the new engine began in April 1938. Results were mixed. For a while, sustained runs of more than an hour were being made, but the engine eventually broke down and was redesigned and rebuilt.

It was not until the summer of 1939 that the Whittle engine began running at sustained speeds of up to 16,000 RPM.

The declaration of war on Germany on Sept. 3, 1939, at last induced the British Air Ministry to pursue the advantages



This 1942 photo, taken at the Heinkel works in Rostock, Germany, shows Heinkel employees (from top left to right) Hans Antz, von Ohain, Fritz Shafer (in cockpit), Gotthold Peter, and two unidentified crew members (on wing).





**Von Ohain was working on his Ph.D. in physics in Germany when he conceived his version of a turbojet. His concept was patented in 1935. Shown here is the He-178, the world's first jet aircraft.**

of an aircraft engine that weighed less, cost less to manufacture, and could use almost any sort of fuel.

Power Jets was given a contract to deliver a flight-worthy engine, and on Feb. 3, 1940, Gloster Aircraft Co. was given a contract for two prototype jets. The aircraft were designated the E.28/39.

#### **Meanwhile, Back in Germany ...**

Hans-Joachim Pabst von Ohain grew up in an atmosphere of noble affluence. His father, Wolf Pabst von Ohain, was a military officer who married twice into the same wealthy family. His first wife died, and after a suitable interval he married her sister Katherina Louise, who gave birth to Hans in 1911.

Hans von Ohain's childhood was idyllic, with plenty of vacations and no lack of funds. In 1930, he entered the Georg August University at Göttingen, a prestigious technical school. There he studied aerodynamics and thermodynamics under world famous instructors.

Von Ohain experimented briefly with gliding but stopped when participation required him to be a Nazi. His interest in aircraft propulsion was kindled in 1931, when he took a flight in a Junkers Ju-52 and found that the noise and vibration ruined the beauty of flight.

He decided to make flying as beautiful as gliding was to him—and to do it as simply as possible. In 1933, he began pondering jet propulsion. His first concepts involved no moving parts whatsoever, but he soon shifted to the idea of using a compressor and a turbine.

Von Ohain continued working on his ideas, even as he completed seven

years of doctoral work in four years. He received a patent for his jet engine concept on Nov. 10, 1935—nine days after receiving his doctorate in physics.

He also had the good fortune to work with Max Hahn, a mechanic with a knack for building things of metal. He took von Ohain's drawings, analyzed them, and agreed to build a model of the device.

While the test model ran only with assistance from an electric motor, its compressor did pump, its combustor burned, and the turbine rotated. This indicated that von Ohain was on the right track.

Building the engine was beyond his resources, so von Ohain sought out financing and backing. One of his mentors wrote a letter of introduction for him to Ernst Heinkel, who immediately agreed to meet in March 1936.

Heinkel was an important manufacturer, supplying a wide range of

aircraft to the Luftwaffe. He wanted to manufacture engines, but knew his company would not be allowed the time or resources to develop piston engines, as his arch rival Junkers had done. Thus the idea of a revolutionary new engine was attractive.

Heinkel already had Walter and Siegfried Günter working for him on a rocket plane, the He-176. Heinkel knew that the Günters would be able to design an experimental airframe to test von Ohain's jet engine.

Von Ohain's position was now better than Whittle's had ever been. Hahn was hired with him, and a special workshop was set aside for his use.

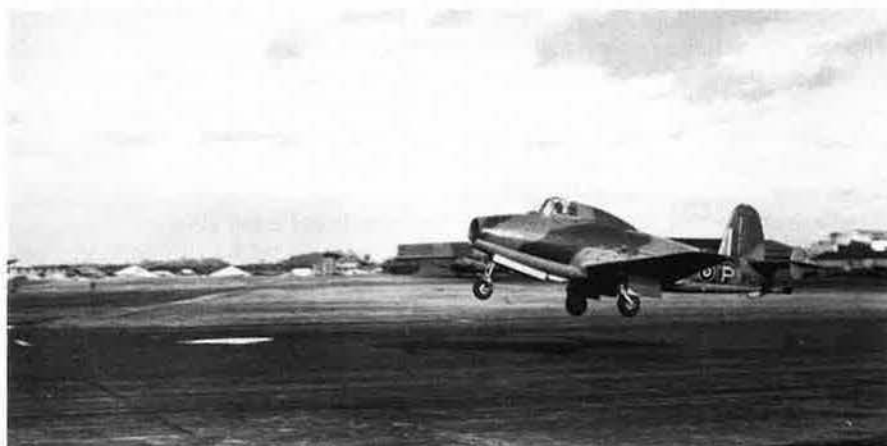
In addition he had access to Heinkel's equipment, engineering team, and finances. Von Ohain and Hahn began their work at Heinkel in April 1936, unaware that Frank Whittle was immersed in building his first test engine.

The Germans sidestepped the enormous problems Whittle was encountering with combustion by designing their test engine to run on hydrogen gas. It was placed in a test rig in March 1937 and ran successfully. A few months later, design work began on the airframe, the Heinkel He-178.

Heinkel was pleased by von Ohain's success and demanded a flight-worthy engine as soon as possible. Much needed to be done to make a jet engine that would function on conventional fuel. Two prototype engines were built.

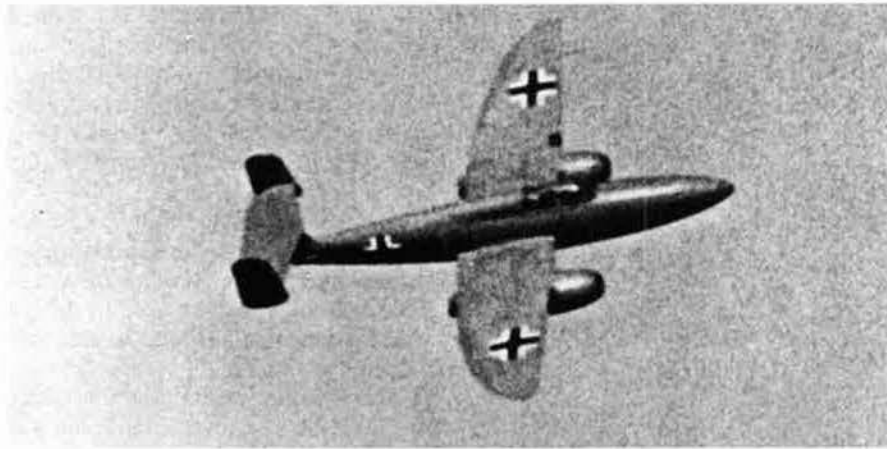
The first prototype, the HeS 3A, was capable of producing 992 pounds of static thrust by March 1939. This was tested in the air, slung beneath the fuselage of a Heinkel He-118.

The second prototype engine, the HeS 3B, was modified by the flight-



**Whittle's Gloster E.28/39 was configured much like the He-178. The Gloster shown here on takeoff from Britain's Farnborough Testing and Evaluation Center is model # W4041/G. The G indicated that the aircraft was to be kept under armed guard at all times.**





**Von Ohain kept working for Heinkel after the success of the He-178. His next engine design, the HeS 8A, was installed in the world's first twin-engine jet fighter, the Heinkel He-280 (pictured here).**

test experience and was available for installation in the brand-new He-178 in August 1939.

In an eerie forecast of a future hazard to jet aircraft, flight testing of the He-178 was delayed when a bird was sucked into the air intake during taxi tests. The engine was cleaned and repaired, and on the morning of Aug. 27, 1939, Flugkapitän Erich Warsitz made history with the He-178.

It was the first turbojet aircraft ever to fly.

This was a remarkable run for von Ohain, who had gone from a vague concept to a successful flight in about three years. Unfortunately for von Ohain, in the future, things would not go quite so well for his engine.

### Back in Great Britain ...

Squadron Leader Frank Whittle continued at his same furious pace. He was in a constant series of disagreements with the Air Ministry, which was determined to take his work and turn it over to other companies for development.

Whittle had developed a functioning jet engine on a ludicrously small budget—less than \$60,000—but lacked the confidence of the Air Ministry.

Whittle worked closely with Gloster in creating the E.28/39, which (except for its tricycle landing gear) happened to have the same low-wing monoplane configuration used by the He-178. After preliminary taxi tests, Gloster's chief test pilot, P.E.G. Sayer, made the first flight on May 15, 1941.

The combination of stress, overwork, and lack of appreciation continued to sap Whittle's health. It did not help that he smoked and drank too much.

Once the British government realized how important his work was, it elected

to provide information on the jet engine to Rover, Rolls Royce, Metropolitan-Vickers, and de Havilland, literally putting them in business on the back of Frank Whittle.

The information also was shared with the United States, where General Electric was tasked with developing the engine. Whittle gladly came over to help.

There followed a long series of business events that saw Power Jets nationalized—at great economic and personal cost to Whittle.

Promoted to air commodore, Whittle soldiered on. He received a grant of £100,000 from the Royal Commission on Awards for Inventors in May 1948, a pittance in light of the billion dollar industry that developed from his invention.

In July 1948, he was knighted. Sir Frank became sick on a lecture tour in the United States and retired from the RAF on the basis of ill health in August 1948.

Whittle continued to consult and lecture as his health permitted and eventually immigrated to the United States in 1976, where he became a research professor at the US Naval Academy in Annapolis, Md. Honors were heaped on him over the years until his death on Aug. 9, 1996.

### Operation Paper Clip

Von Ohain continued his developmental work for Heinkel, and his new engine, the HeS 8A, powered the world's first jet fighter, the Heinkel He-280. There were

difficulties with this engine—its thrust was low and its diameter was too large. The He-280 program was canceled in favor of the new Messerschmitt Me-262 that also used a Junkers engine.

The war ended before another engine designed by von Ohain became operational.

In terms of monetary reward, von Ohain had received moderate pay increases, and about three months after the war ended he received a check for several hundred thousand now-worthless Reichsmarks from the Heinkel Co.

In 1947, the United States swept von Ohain up along with hundreds of other German scientists in Operation Paper Clip. He went to work as a research scientist at Wright-Patterson AFB, Ohio. Von Ohain continued to distinguish himself, becoming chief scientist of the Aero Propulsion Laboratory in 1975. He continued publishing and patenting until retiring in 1979.

In his retirement years, von Ohain remained active as a consultant and was selected as the Charles Lindbergh Professor at the National Air and Space Museum in 1985. Like Whittle, von Ohain received many honors recognizing his work. He died on March 13, 1998.

Whittle and von Ohain met many times in the United States, often when they were jointly receiving some prestigious honor, such as the 1991 Charles Stark Draper Prize. When they were together, von Ohain deferred graciously to Sir Frank.

Of all their meetings, the most significant took place at Wright-Patterson in May 1978. Col. Philippe O. Bouchard, commander of the Aero Propulsion Laboratory, hosted a two-day session where Whittle and von Ohain spoke freely of their experiences and answered a barrage of questions from the captivated audience.

The two men clearly enjoyed themselves, for this was recognition by people who understood the immensity of their challenge and the talent that it took to meet it.

Perhaps more important, it was perfectly obvious to Whittle and von Ohain that, at last, each man truly recognized and applauded the achievements of the other. ■

---

*Walter J. Boyne, former director of the National Air and Space Museum in Washington, is a retired Air Force colonel and author. He has written more than 400 articles about aviation topics and 40 books, the most recent of which is Roaring Thunder. His most recent article for Air Force Magazine, "Gabreski," appeared in the November 2005 issue.*



*AIR FORCE ASSOCIATION PRESENTS*

# The 22nd Annual Air Warfare Symposium

## “Forging the Interdependent Force: The Path Ahead”

### **BUENA VISTA PALACE HOTEL LAKE BUENA VISTA, FLA.**

INVITED SPEAKERS AT THE SYMPOSIUM INCLUDE THE TOP LEADERS OF THE US AIR FORCE.

The Air Force flies and fights as a member of a joint team. Whether it's GPS provided by a spacecraft in geosynchronous orbit; intelligence, surveillance, and reconnaissance courtesy of the Predator; close air support in the nick of time from an A-10 in Afghanistan or Iraq; or fuel from a tanker crew over the top of the United States in Operation Noble Eagle, joint warfighters know they can count on the service to do its part in a rapidly changing world.

#### **SYMPOSIUM REGISTRATION FEES**

The symposium registration fee is \$775.

Reduced registration rate of \$675 for individual AFA members and representatives from AFA Industrial Associate companies who register prior to Jan. 24.

#### **GOLF TOURNAMENT**

The Central Florida Chapter of AFA will sponsor a golf outing on Wednesday, Feb. 1, at Walt Disney World's Magnolia Palm Courses.

#### **GALA**

The Central Florida Chapter of AFA will sponsor their 22nd annual black-tie Gala on Friday, Feb. 3, at the Buena Vista Palace Hotel.



**We hope you join us!**

**February 2-3, 2006**

**FOR ADDITIONAL INFORMATION, PLEASE CONTACT:**

Barbara Coffey regarding Military/DOD/Industry inquiries, at (703) 247-5805 or [bcoffey@afa.org](mailto:bcoffey@afa.org)

Jim DeRose regarding the Golf Tournament at (407) 356-0461 or [james.l.derose@lmco.com](mailto:james.l.derose@lmco.com)

Tommy Harrison regarding the Gala at (407) 886-1922 or [tgharrison@aol.com](mailto:tgharrison@aol.com)

**Please visit the Air Force Association website at [www.afa.org](http://www.afa.org) for additional information and to register.**



By Frances McKenney, Assistant Managing Editor

## Good Morning, Mr. President

Air Force Association Chairman of the Board Stephen P. "Pat" Condon attended a White House breakfast on Veterans Day, joining President Bush, Cabinet officials, US military leaders, and veterans organizations in observing the 87th anniversary of the armistice for World War I.

During the breakfast, Condon and his wife, Judy, had an opportunity to talk to several Cabinet members: Department of Homeland Security Secretary Michael Chertoff, Transportation Secretary Norman Y. Mineta, and Veterans Affairs Secretary R. James Nicholson. The Condons met Sen. Ted Stevens (R-Alaska), the Senate president pro tempore for whom an AFA leadership national award has been established, and Rep. Cliff Stearns (R-Fla.), co-founder and co-chairman of the Congressional Air Force Caucus and an AFA national director.

Before greeting the President at a reception in the Blue Room, the Condons spoke with Marine Corps Gen. Peter Pace, Chairman of the Joint Chiefs of Staff, Air Force Secretary Michael W. Wynne, and Gen. John D.W. Corley, the Air Force vice chief of staff.

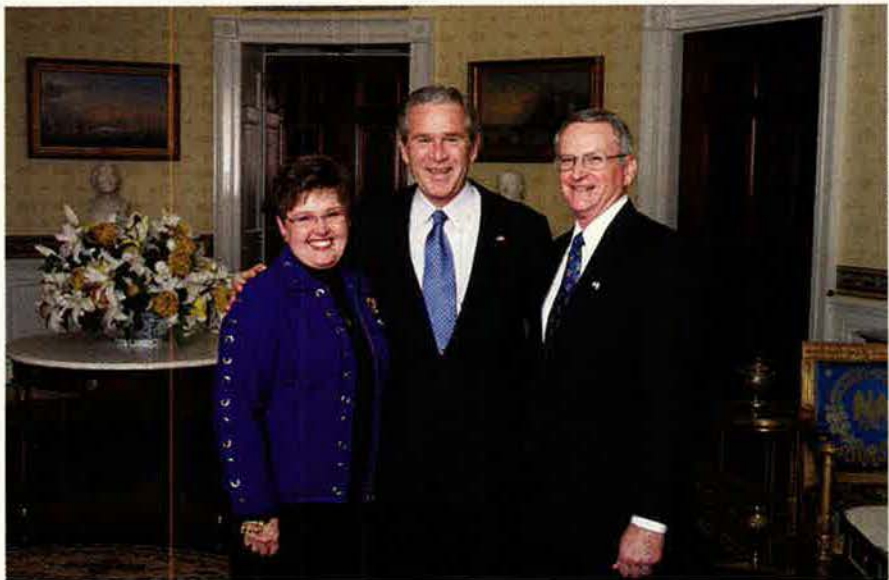
Veterans Day observances continued that morning across the Potomac River at Arlington National Cemetery, where Vice President Richard B. Cheney laid a wreath at the Tomb of the Unknowns. Pat Condon set a wreath, also, on behalf of AFA.

An 11 a.m. ceremony on the 11th day of the 11th month followed at the adjacent amphitheater. C-Span broadcast the event live and included a close-up of Condon among the dignitaries. The Air Force Association and its board chairman were named by the master of ceremonies as a sponsor of this Veterans Day remembrance of those who have served in the US military.

## The Four Be's

AFA region presidents and state presidents spent two days in Arlington, Va., in October, in a comprehensive orientation on the association's operations and on their responsibilities as field leaders and how to carry them out.

Board Chairman Condon summarized his charge to the group by listing



White House photo by Eric Draper

*President Bush welcomed AFA Chairman of the Board Pat Condon and his wife, Judy, to a Veterans Day reception at the White House. Condon also met several Cabinet members at the event. See "Good Morning, Mr. President," this page.*

the "Four Be's." Be informed, he said. He noted that one method is to read *Air Force Magazine's* "Daily Report," an online news summary produced every business day by the magazine staff and posted on the AFA Web site.

Be communicative, Condon said. Keep people informed about everything from chapter activities on up to national defense issues. Be a mentor, he continued: "All of you have a responsibility in leadership development." His final point was, "Be advocates."

AFA's Government Relations department head, Kenneth Goss, echoed the last Be. The association's work on Capitol Hill is based on building a presence and establishing credibility, he explained. AFA's membership of volunteers—the "grassroots," he called them—"are our best advocate."

AFA National President Robert E. "Bob" Largent encouraged the attendees to meet regularly with their Congressional delegation both in D.C. and at their local offices. "One on one for an hour—it makes all the difference," he said. He noted that in his visits to Capitol Hill, for example, he discovered that members of Congress are "actually eager" to join the Air Force Caucus.

During their second day of AFA orientation activities, the region and state presidents participated in workshops and received practical how-to information in sessions conducted by Mary Anne Thompson, the Aerospace Education Foundation President; Craig E. Allen, chairman of AFA's Strategic Planning Committee and a member of the **Northern Utah Chapter**; Elizabeth Burris, a new AFA national director and a **Carl Vinson Memorial Chapter (Ga.)** member; and Eric P. Taylor, former New England Region president and a member of the **Brig. Gen. Harrison R. Thyng Chapter (N.H.)**.

## Hollywood and the F-22

A casual conversation between National President Largent and Lt. Col. Stephen D. Clutter at Hickam AFB, Hawaii, last May resulted in Hollywood meeting the Air Force's newest fighter aircraft, the F-22.

In November, some two dozen directors, producers, writers, and special-effects artists traveled from Los Angeles across the US to learn about the Raptor from the factory to the flight line. First, they visited the test site at Edwards AFB, Calif. Next stop: Marietta, Ga.,





**AFA's Northwest Region was well-represented at the region and state presidents meeting in October. Left to right are Gary Hoff, Northwest region president; Tom Stevenson, Oregon state president; Karen Washburn, Alaska state president; and Laird Hansen, Washington state president. Eleven region and 34 state presidents attended the combined meeting. (See "The Four Be's," p. 76.)**

where Lockheed Martin assembles the stealthy fighter. Then it was on to Tyndall AFB, Fla., where F-22 crew training began in 2003.

The 940th Air Refueling Wing (AFRC), Beale AFB, Calif., provided a KC-135 for the trip. Among those on board were "Catwoman" director Jean-Christophe Comar and Lloyd A. Silverman, producer of the 1999 movie "Snow Falling on Cedars."

Clutter said the entertainment industry representatives not only learned about the foremost fighter aircraft, they also met some of the Air Force's finest—airmen and civilians who build, test, maintain, and fly the aircraft.

Clutter is director, Secretary of the Air Force Entertainment Liaison Office, in Los Angeles and a member of the **Gen. B.A. Schriever Los Angeles Chapter (Calif.)**. As the Pacific Air Forces public affairs officer last spring, he met Largent when the AFA official was on a PACAF orientation. The two chatted about Clutter's upcoming move from Hawaii to Los Angeles and about how to bring the F-22 to the attention of people who could incorporate it into movies, TV shows, and other venues to reach a mass audience. Clutter said, "The light bulb went on," and the F-22 Awareness Tour, as he called it, was born.

Lt. Col. Christian Geisel, USAF deputy director of public affairs and a member of the **Donald W. Steele Sr. Memorial Chapter (Va.)**, escorted the Hollywood artists on the tour.

#### **Gift of a Simulator**

A donation from the **Enid Chapter**

and the 8th and 33rd Flying Training Squadrons at Vance AFB, Okla., has brought a T-37 aircraft simulator to a children's museum in Enid, Okla.

Used for decades as a primary trainer for undergraduate pilots and navigators, the twin-engine Tweet aircraft is being replaced by the T-6A Texan II. Thus the Vance T-37 simulator became federal and then state government surplus last year. The state, in turn, donated it to Leonardo's Discovery Warehouse and Adventure Quest, a hands-on arts and sciences museum in downtown Enid.

The Enid Chapter and the two Vance squadrons gave \$1,000 to cover costs associated with moving and reinstalling the simulator, said Lisa Merritt, chapter president.

In a feature article, a local newspaper reported that the last T-37 aircraft will leave Vance in December and noted that, through the simulator, the Enid Chapter has helped preserve part of the trainer's history at Vance.

#### **Four in One**

A multipurpose gathering in Cincinnati in November combined an area conclave of the Arnold Air Society cadets and Silver Wings members, with AFA's Great Lakes Region meeting, with several AFA state meetings, all hosted by the **Gen. Joseph W. Ralston Chapter**.

AFA National President Largent and Lt. Gen. John L. Hudson, commander of Aeronautical Systems Center at Wright-Patterson AFB, Ohio, were guest speakers.

AEF President Thompson presented the 2004-05 State Teacher of the Year

award to Kathleen S. Carpenter, an Ada (Ohio) Senior High School teacher for the talented and gifted. Carpenter then spoke to the audience about the aerospace education programs she has sponsored and implemented.

At the evening's formal awards banquet, Kent Owsley, vice president of the **Wright Memorial Chapter**, was honored as the state Man of the Year. **Steel Valley Chapter** President Fred Kubli Jr. was named an AEF fellow.

The Arnold Air Society is an AFA affiliate, and Silver Wings is an auxiliary of AAS. Ron Thompson, Ohio state president, suggested that this AFA-AAS joint meeting might inspire other chapters to combine events. At the awards banquet, Robert Brewster, president of the host Ralston Chapter and coordinator of the day's four-in-one meeting, received a national-level Exceptional Service Award for the kind of leadership it took to organize it all.

#### **CAOC in Qatar**

Later in November, members of the **Gen. Joseph W. Ralston Chapter (Ohio)** learned about the mission and organization of a combined air operations center from the former head of manpower and personnel for US Central Command Air Forces.

Lt. Col. Todd Emmert, now head of AFROTC Det. 665 at the University of Cincinnati, was stationed in Qatar before being reassigned to Ohio. At the Southwest Asia CAOC, one of his challenges was to find enough qualified Air Force personnel for the high-turnover job of Army convoy duty.

Emmert described the range of missions CENTCOM carries out in a vast area of responsibility and mentioned problem areas and success stories.

Chapter President Robert Brewster said one anecdote concerned a pilot who flew such a long mission that he had to be lifted out of the cockpit afterward because he was so stiff. Emmert contrasted that with the tale of how a Predator unmanned aerial system—able to remain on station for 16 hours—prevented an enemy mortar attack.

#### **Volunteers**

In August, the **Mel Harmon Chapter (Colo.)** co-sponsored a dinner with the Pueblo Historical Aircraft Society to mark the Pueblo Weisbrod Aircraft Museum's 20 years of operation.

The PHAS manages the museum, located at Pueblo Memorial Airport, with Harmon Chapter volunteers helping on every front, from keeping the books to "janitorial aid," as Robert Blake, chapter secretary, put it.

Blake said several chapter members, such as retired fighter pilot Vincent P.



## 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.

### Blackbird to UAS

At a Capitol Hill reception in November, the Air Force Association highlighted lessons learned and future challenges faced by the aerial intelligence-surveillance-reconnaissance (ISR) community.

AFA and the Air Force Office of Legislative Liaison invited Capitol Hill staff members to meet retired Maj. Gen. Robert F. Behler and retired Lt. Col. Blair Bozek, both former SR-71 crew members; Lt. Col. Michele Cook, the Global Hawk unmanned aerial system functional manager; and Maj. Larry Gurgainous, Predator UAS functional manager.

Behler, who retired in 2003 as commander of the Air Force Command and Control and ISR Center, Langley AFB, Va., and Bozek discussed past operations of the SR-71 Blackbird.

Capitol Hill staffers at the gathering included Lee Arnold from the office of Rep. Tom Feeney (R-Fla.); Barb Calligan and Lisa Wright of Maryland Republican Rep. Roscoe Bartlett's office; Creighton Greene of the Senate Armed Services Committee; Otto Heck and Wayne Warf from the office of Rep. Mike Sodrel (R-Ind.); Dan Hilton from the office of Rep. Walter Jones Jr. (R-N.C.); Shawn Jones from the office of Rep. Jon C. Porter (R-Nev.); Joe Laird, representing Missouri Republican Rep. Todd Akin; Ryan McKeon of Rep. G.K. Butterfield's office (D-N.C.); Jeff McNichols from the office of Rep. John Kline (R-Minn.); Blair Milligan of Rep. Mike McIntyre's office (D-N.C.); Jamie Moran of the Senate Budget Committee; Brendan Wheeler from the office of Del. Madeleine Z. Bordallo (D-Guam); and Miriam Wolff of the House Armed Services Committee.

Gordon, are docents. Chapter President Russell K. Darr Jr. helps man the gift shop. R.J. Schultz organizes special events, including major fund-raisers. Chapter VP Stephen Csogi, a World War II and Korean War veteran, runs food services, literally doing the cooking. Jason Unwin, the aerospace education VP, runs several educational activities at the museum, including model rocket building and launching sessions for students. Blake helps out in the accounting department.

He said about 50 guests celebrated two decades of hand-in-hand partnership at the anniversary dinner, held at the museum.

### More AFA/AEF News

■ AFROTC cadets from Det. 215, Indiana University, Bloomington, presented an "after-action report" to the September meeting of the Southern Indiana Chapter. The nine cadets described their experiences, training at Air Force facilities last summer. This orientation to active duty Air Force life gives the cadets a chance to do everything from work in a base hospital to fly a sailplane. The cadets' commander, Lt. Col. Lori M. Bass, is a member of the chapter.

■ A survivor of Stalag Luft 1 in World War II Germany spoke to the Columbus-Bakalar Chapter (Ind.) about his wartime experiences at the group's November meeting. John E. Walker, a P-38 pilot, was stationed in Wormingford, England, with the 343rd Fighter Squadron, 55th Fighter Group. While strafing a train in France in July 1944, his airplane was hit by flak, and Walker bailed out, landing in a field. He joined more than 7,000 American POWs in the huge camp in Barth, Germany, on the Baltic Sea.

■ The Donald W. Steele Sr. Memorial Chapter (Va.) hosted a luncheon in October at the Officers' Club, Ft. Myer, Va., for active duty and civilian personnel in the Office of the Chief of Warfighting Integration and Chief Information Officer. Then-Lt. Gen. William T. Hobbins, director of the office, was special guest at this Salute to SAF/XC. A huge turnout of more than 150 guests, including representatives from more than 34 defense contractors, honored Lt. Col. David Hunninghake, Lt. Col. Charles F. Thompson, Maj. William Sturgis, Capt. Andrew J. Steffen, Canadian Forces Capt. Sebastien Drouin, MSgt. Roger Kamrowski, Geoff Gipson, James Greene, and Jimmy Nguyen.

■ A lucky 13 AFROTC cadets from Det. 159, University of Central Florida in Orlando, received \$10,000 in scholarships from the Central Florida Chapter at a dining-out for the cadets in November. Chapter President John Timothy Brock and Lt. Col. Timothy D. Wieck, detachment commander and a chapter member, made the presentations. ■

### 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. Digital images submitted for consideration should have a minimum pixel count of 900 by 1,500 pixels.

## Reunions

reunions@afa.org

**6 Gp Bomber Command, RCAF.** June 1-4 in York, UK. Contact: Ron Butcher, 85-7583 Central Saanich Rd., Saanichton, BC, Canada V8M 2B6 (exsqn408rcaf@shaw.ca).

**19th Tactical Recon Sq.** April 9-11 in Fredericksburg, TX. Contact: Rodney Cox, 152 Great Frontier, Georgetown, TX 78628 (512-868-2111) (brodcox@aol.com).

**69th Depot Repair Sq.** 14th AF. March 29-April 2 at the Fairfield Inn in San Antonio. Contact: Marty Oxenbun, 1109 Valley Glen Rd., Elkins Park, PA 19027-1750 (stevens025@comcast.net).

**505th BG,** 313th BW (WWII). May 14-21 in King of Prussia, PA. Contact: Samantha Kemp (800-367-2577).

**556th Recon Sq and 6091st Recon Sq.** April 18-21 at the Gold Coast Hotel & Casino in Las Vegas. Contact: Buck Buchanan, 330 Vine St., Vacaville, CA 95688-8703 (707-446-2825).

**Pilot Class 43-D,** all commands. May 31-June 3 at the Best Western in Burlington, VT. Contact: Frank Dutko, 316 Florida Ave., Gulf Breeze, FL 32561-4242 (phone/fax: 850-932-3467) (duke43d@hotmail.com).

**Pilot Training Class 56-I.** June 7-11 in Dayton, Ohio. Contact: R.L. Taylor (614-766-6420) (rltaylor5498@earthlink.net).

**Veterans of Underage Military Service.** April 27-30 in Rock Island, IL. Contact: Robert Thorpe, 6616 E. Buss Rd., Clinton, WI 53525 (608-676-4925). ■

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's National Committees for 2005-06

**Executive Committee.** Stephen P. "Pat" Condon (*Chairman*), David T. Buckwalter, Frederick J. Finch, Thomas J. Kemp, Robert E. Largent, Steven R. Lundgren, Lester L. Lyles, Joseph E. Sutter, Richard C. Taubinger, L. Boyd Anderson, *ex officio*, Mary Anne Thompson, *ex officio*, Donald L. Peterson, *ex officio*.

**Finance Committee.** Steven R. Lundgren (*Chairman*), David R. Cummock, Mark J. Dierlam, Stephen Dillenburg, John J. Murphy, Jack G. Powell, Carol Wolosz, Stephen P. "Pat" Condon, *ex officio*.

**Membership Committee.** Charles P. Zimkas Jr. (*Chairman*), Elizabeth Burris, Maria Cornelia, Vivian P. Dennis, Richard Schaller, James Simons, Marvin Tooman, Robert E. Largent, *ex officio*.

**Constitution Committee.** David T. Buckwalter (*Chairman*), Joan Blankenship, Michael J. Bolton, Judy K. Church, William D. Croom Jr., Tommy G. Harrison, Timothy Kern, Sanford Schlitt, Stephen P. "Pat" Condon, *ex officio*.

**Strategic Planning Committee.** Craig E. Allen (*Chairman*), Tom Cavalli, James T. Hannam, Rick Hartle, Gary A. Hoff, Julie Petrina, Eric P. Taylor, Robert E. Largent, *ex officio*.

**Audit Committee.** Brad Sutton (*Chairman*), Angela Dupont, Wayne R. Kauffman, Michelle Ryan, William G. Stratemeier Jr., Mark J. Worrick, Stephen P. "Pat" Condon, *ex officio*.

**Force Capabilities Committee.** Richard E. Hawley (*Chairman*), George T. Babbitt Jr., William J. Begert, Michael J. Dugan, Rebecca Grant, Monroe W. Hatch Jr., Lester L. Lyles, Gregory S. Martin, Thomas S. Moorman Jr., Lloyd W. Newton, Michael E. Ryan, John A. Shaud, Lawrence A. Skantze, Stephen P. "Pat" Condon, *ex officio*.

**Senior Leadership Advisory Group.** John R. Alison, David L. Blankenship, John G. Brosky, O.R. "Ollie" Crawford, Russell E. Dougherty, George M. Douglas, John O. Gray, Jack B. Gross, Martin H. Harris, Gerald V. Hasler, Monroe W. Hatch Jr., John P. Henebry, Victor R. Kregel, Robert E. Largent, Doyle E. Larson, William V. McBride, James M. McCoy, Thomas J. McKee, John J. Politi, Jack C. Price, John A. Shaud, R.E. "Gene" Smith, William W. Spruance, Donald L. Peterson.



## This Is the Aerospace Education Foundation

As of Jan. 1, 2006

### Chairman of the Board

L. Boyd Anderson

### President

Mary Anne Thompson

### Secretary-Treasurer

David R. Cummock

### Executive Director

Donald L. Peterson

### Deputy Executive Director and

### Managing Director

Danny D. Marrs

### AEF Trustees

Stephen P. "Pat" Condon

William D. Croom Jr.

Angela Dupont

Anne T. "Terry" Hamilton

Robert E. Largent

Jodi Lunt

Jeri Ann Martin

Julie Petrina

Joseph Price

Sanford Schlitt

Paul W. Schowalter

E. Robert Skloss

Robert G. Stein

Jerry E. 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

Samuel M. Gardner

Don C. Garrison

Richard B. Goetze Jr.

Emlyn I. Griffith

Jack B. Gross

Martin H. Harris

Gerald V. Hasler

Leonard W. Isabelle

James M. Keck

Hans Mark

Robert T. Marsh

Nathan H. Mazer

William V. McBride

Thomas J. McKee

Jack C. Price

Walter E. Scott

John A. Shaud

Loren J. Spencer

William W. Spruance

Charles P. Zimkas Jr.

# New at AFA!





**Pro Style Cap.** 100% cotton by Port Authority. With embroidered AFA logo in circle. Adjustable strap size and available in Tan and White. **\$20**



**New AFA V-Neck Golf Sweater.** Cozy 100% cotton vest features a comfortable rib knit trim around the neck, armholes and waistband. Available in Dark Blue and Ash Gray. Available in Unisex sizes S, M, L, XL. (Women should order S for 4-8, M for 10-12, L for 14-16 and XL for 18-20) **\$35**



**Classic Polo with Pocket.** Short Sleeved 100% cotton Pique Polo with hemmed sleeves and straight bottom hem with full color AFA Embroidered logo in circle. Available in Tan or White. Unisex sizes M, L, XL, XXL, and XXXL. **\$35**



**Vertical Stripe AFA Polo.** Beautifully designed knit 100% hearty cotton mesh fabric. Taped seams and side vents with full color embroidered AFA logo. Available in 2 colors, blue with black stripe or gray with black stripe. Unisex sizes M, L, XL, XXL, and XXXL. **\$45**

**Order TOLL FREE!**  
**1-800-727-3337**  
 Add \$3.95 per order for shipping and handling. OR shop online at [www.afa.org/benefits](http://www.afa.org/benefits)



# Pieces of History

Photography by Paul Kennedy

## Miller's Legacy



For the Army Air Forces of World War II, music had a certain mystique, created largely by Maj. Glenn Miller. The renowned band leader of the 1940s, who joined up in 1942, formed "The Major Glenn Miller Army Air Force Band" and promptly turned it into what was probably the greatest dance band of all time. This band was the seedbed of USAF's rich musical heritage, part of it glimpsed in these artifacts at the National Museum of the US Air Force at

Wright-Patterson AFB, Ohio. They include a wheel hat with Air Force Band insignia, a ceremonial uniform of the 1980s, patches, and a collection of vinyl records, cassettes, and CDs. Note the rerelease of Miller's classic "Army Air Force Band" record, cut in 1943-44 in New York. Among its tracks: "Stormy Weather," "In the Mood," and "It Must Be Jelly ('Cause Jam Don't Shake Like That)."





Possibly, the most  
**challenging job** in the world.

## CLANDESTINE SERVICE CAREERS

The CIA's Clandestine Service is searching for qualified applicants to serve in the US and abroad. These exciting careers offer fast-paced, high-impact challenges in worldwide intelligence collection efforts on issues of US foreign policy interest and national security concern. Applicants should possess a high degree of integrity, strong interpersonal skills, excellent written and oral communication skills, and the desire to be part of something vital that makes a difference for family, friends and country.

Qualified applicants should possess a minimum of a bachelor's degree with a GPA of at least 3.0, an interest in international affairs and national security, and be willing to relocate to the

Washington, DC area. Foreign travel opportunities exist for all positions and some require relocation abroad for 2-3 year tours of duty. All applicants for Clandestine Service positions must successfully undergo several personal interviews, medical and psychological exams, aptitude testing, a polygraph interview, and an extensive background investigation. Following entry on duty, candidates will undergo lengthy and thorough training.

US citizenship is required.

For more information and to apply, visit:

[www.cia.gov](http://www.cia.gov)

An equal opportunity employer and  
a drug-free work force.



THE WORK OF A NATION.  
THE CENTER OF INTELLIGENCE.



## POINTING THE WAY FOR GPS.

As the GPS needs of the global user community expand, Boeing is there providing system solutions. Today, with the advanced capabilities of GPS IIF and tomorrow, leveraging that expertise to maximize the potential of GPS IIIA. For our customers that means a GPS partnership that's pointing straight to the future.

 **BOEING**  
Forever New Frontiers