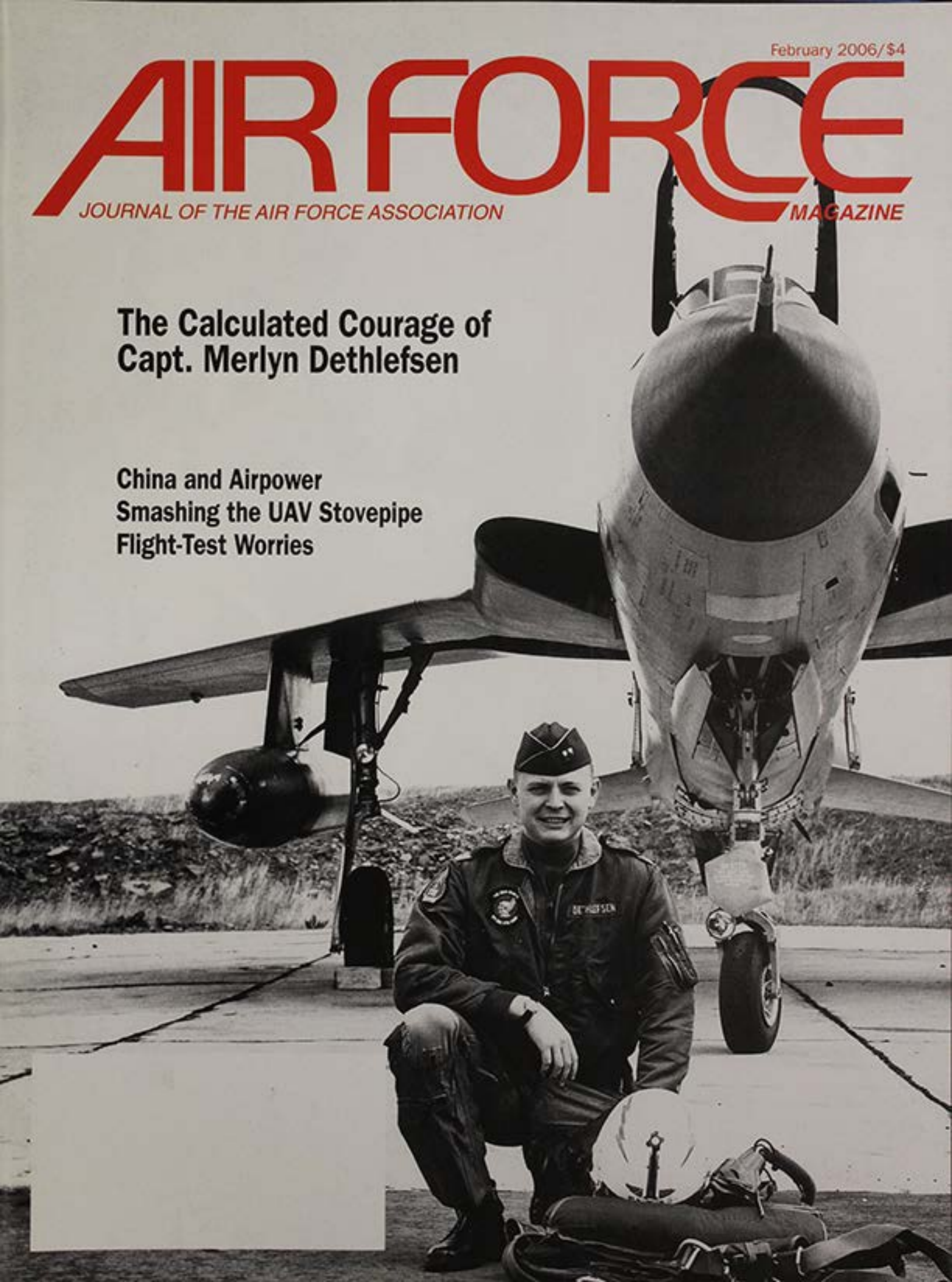
February 2006/$4

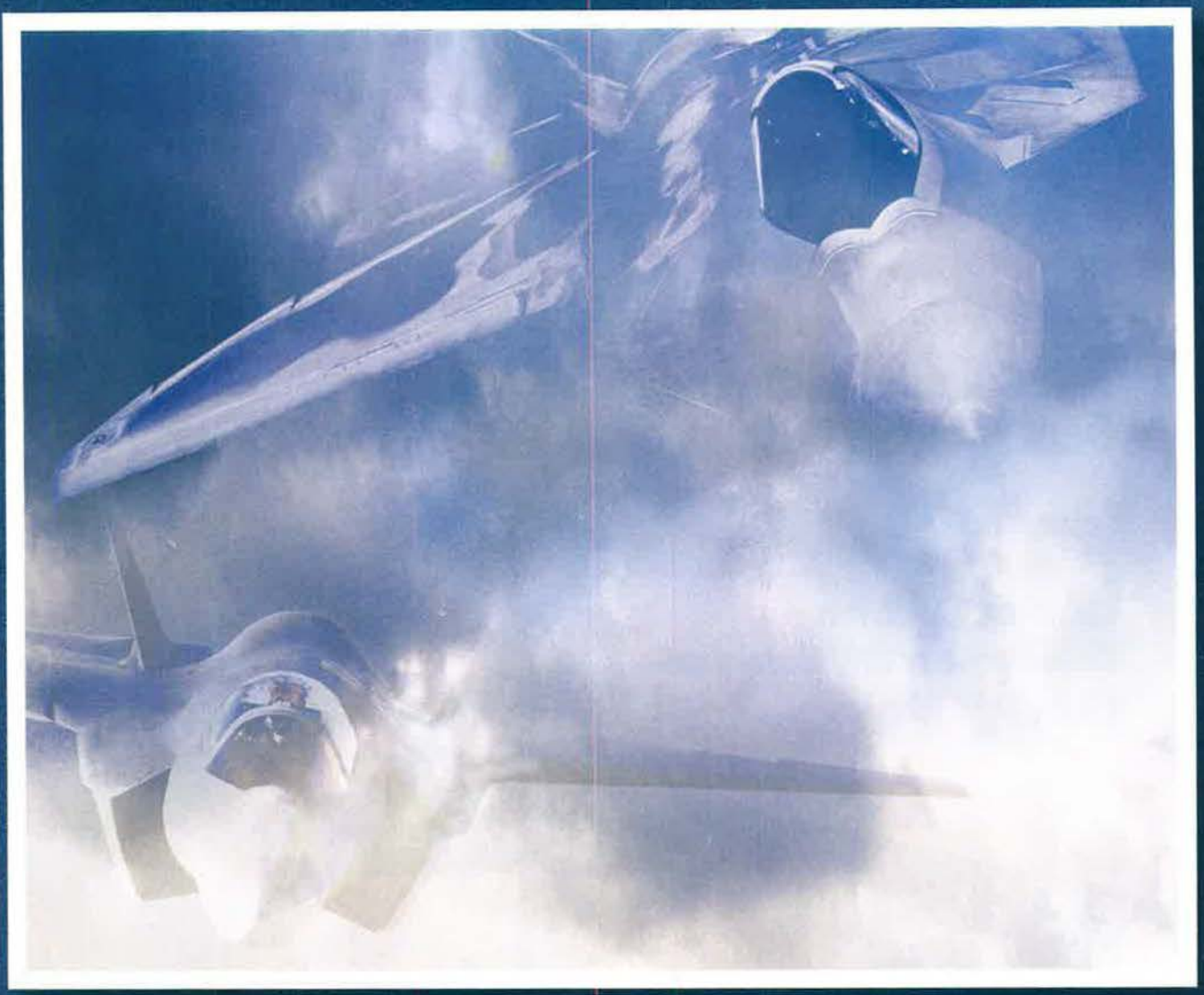
AIR FORCE MAGAZINE

JOURNAL OF THE AIR FORCE ASSOCIATION

The Calculated Courage of Capt. Merlyn Dethlefsen

China and Airpower
Smashing the UAV Stovepipe
Flight-Test Worries





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February 2006, Vol. 89, No. 2

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About the cover: Capt. Merlyn Dethlefsen, Medal of Honor recipient. See "Calculated Courage at Thai Nguyen," p. 68. Photo via Jeff Dethlefsen.

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Editorial

By Robert S. Dudney, Editor in Chief

What It Means To Be No. 1

"APPARENTLY, the US spends more per year [on defense] than the next 15 countries combined," Donald H. Rumsfeld wrote on Jan. 3.

In a memo to his top aides, the evidently surprised Defense Secretary noted that the US last year devoted $456 billion to the military, while the nations ranked No. 2 (China) through 16 (Israel) together shelled out only $454 billion.

Rumsfeld wasn't necessarily unhappy to learn that the US was so dominant. Yet he cautioned, "It is useful to keep this in mind."

If senior US officials spend any time at all worrying about this kind of thing, that will become a problem in itself.

The nation is engaged in two simultaneous struggles. It is now fighting to defeat a collection of vicious enemies abroad. At the same time, it is working to keep up a modern, well-trained force able to counter big-power threats of the future.

Americans don't have the option of choosing one over the other. They must attend to both.

The Pentagon's latest budget proposal, out this month, seeks expenditures of about $443 billion in 2007, not counting the expense of war in Iraq and Afghanistan. When that cost is added in later this year, the budget will hover at about $500 billion.

These amounts stir political sensitivities at a time of huge budget deficits. A recent poll for the Pew Research Center found 42 percent of Americans gave "top priority" to reducing the $319 billion deficit. Thirty-six percent wanted to do so by cutting defense spending.

Right on cue, the *New York Times* chimed in, "After the Pentagon's spending orgy over the past five years, there is plenty of scope for cutting."

Clearly, meeting US military needs will be hard enough without high-ranking insiders raising irrelevant budgetary points.

And Rumsfeld's point—made over and over by defense critics before he ever took it up—is indeed irrelevant. One wonders why he mentioned it at all. US defense spending *does* exceed that of the next 15 nations. The obvious question is: So what?

The 15 countries in question—China, Russia, France, Britain, Japan, Germany, Italy, Saudi Arabia, India, South Korea, Spain, Australia, Canada, Turkey, and Israel—have small economies, compared to us. As a group, their GDP totals $17 trillion. The United States GDP, by itself, is nearly as great—approaching $13 trillion. One would expect comparable defense spending levels.

There are other, more significant factors that make the United States the No. 1 spender.

The United States, unlike any other nation, is a global power with worldwide interests, responsibilities, and allies.

Start with the obvious strategic considerations. The United States, unlike any other nation, is a global power with worldwide interests, responsibilities, and allies. No other nation would be called on to extend its deterrent power around the world or would even want to. None have the power to fight and win two major regional wars at a time. Only Washington can do that.

Indeed, the scale of US military might enables some other major nations—Germany, say, or Japan—to be relaxed about their own defenses.

Another factor to consider: Americans have decided that, if war comes, it will be waged far from US shores. That decision imposes certain military demands, all of them expensive.

Fighting far from home requires lots and lots of transport—especially airlift—to haul bullets, beans, parts, and troops. It also requires costly overseas bases. Because every war they fight is an "away game" in an enemy's backyard, US combat forces can't be just a little stronger; they must be much stronger—in the air, on land, or at sea—and that requires high-technology weapons.

It also requires a huge amount of combat support. At present, about 50 percent of USAF's budget goes to so-called "joint force enablers"—tankers, satellites, and surveillance aircraft.

Much of today's defense costs flow from the kind of force to which we Americans have committed ourselves psychologically. It is an all-volunteer force, not conscripted. Attracting and keeping high-quality personnel costs a fortune—$111 billion a year just for pay—and grows more expensive each year. Health care costs and other benefits have been soaring.

Such a professional combat force, in turn, requires extensive, realistic training, which pushes up outlays on fuel, spare parts, repairs, and depot labor. The US military spends $150 billion a year on these accounts, twice as much as it spends on weapons.

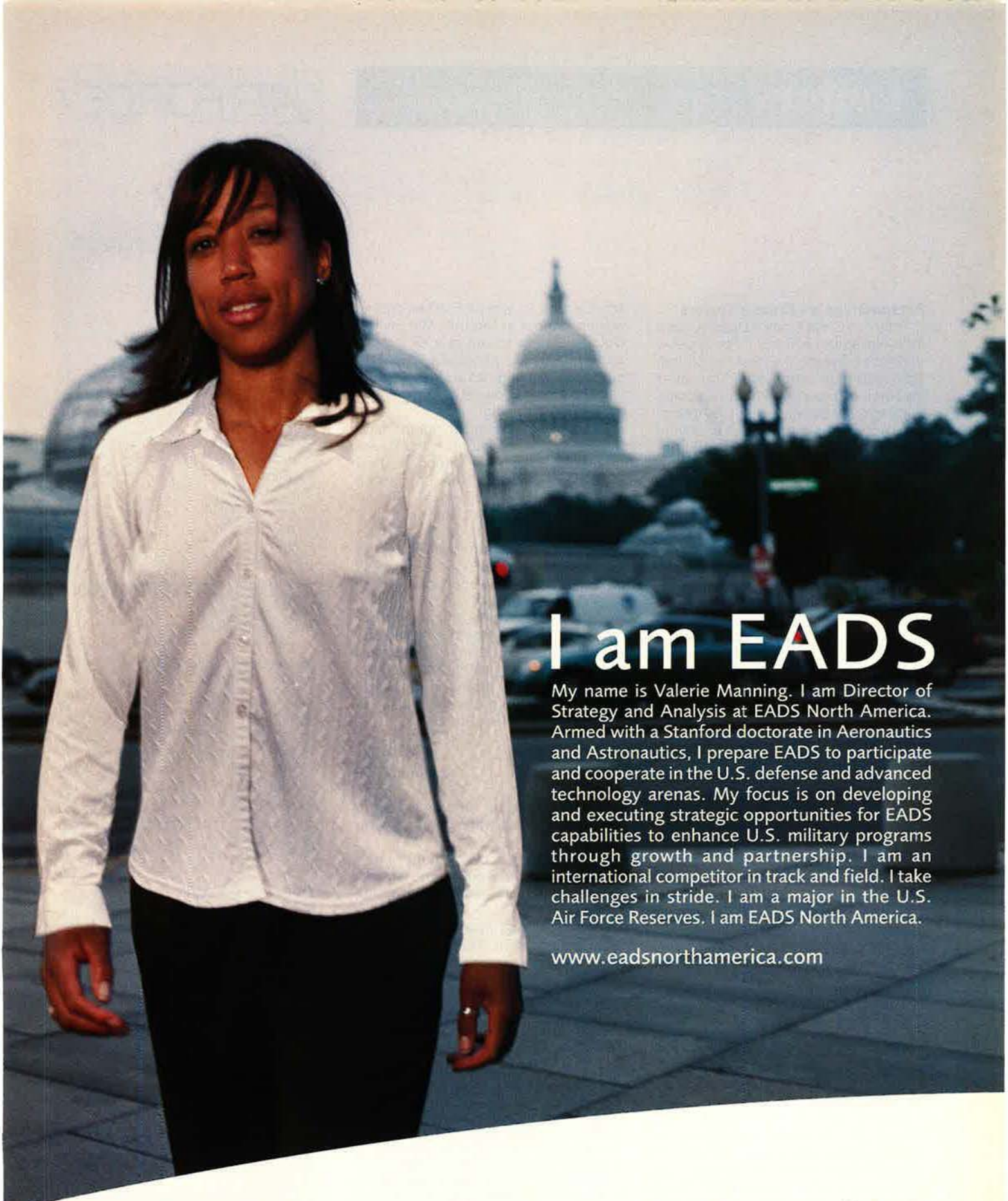
US defense spending also is shaped by two nonsystemic factors. First, the US is at war. In a paper published Jan. 4, Steven Kosiak of the Center for Strategic and Budgetary Assessments reports that Congress has approved $302 billion for operations in Iraq and Afghanistan. (The costs of the Korean and Vietnam Wars were $445 billion and $635 billion, respectively.)

Second, the US took a "procurement holiday" in the 1990s, deferring acquisition of new systems, so weapons are now wearing out all at once and are in urgent need of replacement.

A bigger point to make is this: Even today's relatively high level of defense spending imposes no undue burden on Americans or their economy. The best measure of "affordability" is not the amount of dollars spent, but rather the percent of GDP that a nation devotes to its military equipment and operations, and that figure is near a historic low.

In a Nov. 21 memo, Adm. Edmund P. Giambastiani Jr., vice chairman of the JCS, raised that issue with Rumsfeld. "A common comparison of defense spending cited in the press is that, in absolute terms, the US spends more than the next 'X' countries combined," he wrote. He pointed out that, at 3.8 percent of GDP, the US ranked no better than 29th.

In other words, we stand just behind Belarus (3.9), just ahead of Morocco (3.7), and dead even with Tanzania. As Rumsfeld himself might say, it is useful to keep this in mind. ■



I am EADS

My name is Valerie Manning. I am Director of Strategy and Analysis at EADS North America. Armed with a Stanford doctorate in Aeronautics and Astronautics, I prepare EADS to participate and cooperate in the U.S. defense and advanced technology arenas. My focus is on developing and executing strategic opportunities for EADS capabilities to enhance U.S. military programs through growth and partnership. I am an international competitor in track and field. I take challenges in stride. I am a major in the U.S. Air Force Reserves. I am EADS North America.

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Letters

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Perspectives on Khobar Towers

Editor in Chief Robert Dudney says in his November editorial *["The Shadow of Khobar Towers," p. 2]* that the Clinton Administration "appeased" Iran after the Khobar Towers bombing. But doing nothing is not appeasement. By definition, appeasement requires pacifying a country by giving in to specific demands—you know, such as when the Reagan Administration sold arms to Iran in exchange for hostages. Some of those arms undoubtedly ended up in the hands of Iranian terrorists. That means US troops were put in direct danger from weapons sold to the enemy by our own Reagan White House. I'm sure that situation wasn't lost on the troops, either. In fact, I'm surprised the arms-for-hostages scandal wasn't the first thing Dudney thought of when he went to write an editorial about the dangers of appeasing Iran.

Scott Kraus
Pocatello, Idaho

Thank you for this editorial. I am in complete agreement with you, and I suspect that [more than] 90 percent of all Air Force officers also agree. General Fogleman and Brigadier General Schwalier were two outstanding officers, and it is unfortunate that the President Clinton-Secretary Cohen spineless style of management caused us to lose them. It is probably politically incorrect for you to speak your mind on this and, therefore, your having the courage to do so is a breath of fresh air.

I feel a renewed commitment to the Air Force Association.

Col. Roy Miller,
USAFR (Ret.)
Phoenix

More on Bud Day

Thank you for your outstanding article, "The Strength of Bud Day," in the December 2005 issue *[p. 50]*. It brought back many memories of a flight with Colonel Day on an F-4 Wild Weasel training sortie at Clark AB, Philippines, on Oct. 27, 1989. I was the commander of the 90th Tactical Fighter Squadron and Colonel Day's son, George Jr., was an F-4G electronic warfare officer in the unit. We invited Colonel Day to speak at a dining-out and were able to persuade PACAF to authorize him to fly a two-ship tactical mission to the Crow Valley range with his son on our wing.

Day's 4,500 hours of fighter time (he called the cockpit his office) were readily apparent after takeoff. He flew most of the sortie from the rear cockpit of the F-4E, flew down initial, pitched out, and landed the jet. He was truly a fighter pilot's fighter pilot. Day said the chance to fly with his son was one of the high points of his life. He was extremely proud of George Jr. (George later went to pilot training and the F-16.)

Colonel Day's presentation at our dining-out was an inspiration to all present. I'll always remember him saying, "I wasn't a hero; I was just doing my job." He certainly changed the way I looked at life and our responsibility to this great nation of ours.

Col. Bill Walters,
USAF (Ret.)
Maitland, Fla.

Just received my December issue and was thrilled with the article on Bud Day.

As a Misty, [I know that] the entire group holds our Bud in the highest esteem. He is a genuine American hero.

I first met Bud in a barbershop in Morocco back in 1959, just a few months after he punched out of an F-84 and his chute failed to open, but he survived the fall into a hedgerow—a

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little-known aspect of his remarkable career in fighters.

Lt. Col. Jack Doub,
USAF (Ret.)
Valdosta, Ga.

Red Tails

Regarding "The Red Tail of Courage" in the December issue *[p. 76]*, I've always had a soft spot for those heroes, the Tuskegee fighter pilots who served so honorably in the Italian Theater, as I did. My 61 missions as a pilot of B-25s were in the year of 1944.

I note that you named Capt. Roscoe Brown who shot down two enemy planes in early 1945. It would be nice to mention the other fighter pilots who shot down the other 109 German planes, perhaps by name and the number of kills.

Henry D. Moore
Grand Rapids, Mich.

Ho Chi Minh Trail: Take Two

John Correll's piece "The Ho Chi Minh Trail" (November, p. 62) brought back graphic memories for me as an AC-130 gunship pilot in Southeast Asia during the 1970-72 time frame. I witnessed several higher headquarters staff visits to our AC-130 squadron for the purpose of challenging gunship truck kill claims and to dispute the capabilities of the AC-130 weapon system. These weapons experts simply could not accept the fact that lumbering old C-130/C-119 transports, equipped with side-firing cannons and unique sensor systems, could detect enemy truck convoys transiting the myriad of road networks in Laos, let alone, with pinpoint accuracy, reduce them to scrap metal in a matter of minutes. Once these skeptics saw the airplane and viewed combat videotapes depicting spectacular battle damage to enemy vehicular traffic, they became reluctant believers. Although most doubters were convinced that gunships were detecting and attacking legitimate truck targets, there still was ongoing debate as to the numbers destroyed vs. damaged.

Mr. Correll points out the Air Force reported 46,000 trucks destroyed or damaged over the four-year period of Commando Hunt campaigns from 1968 to 1972, of which a large percentage were attributed to gunships. Without North Vietnamese transportation officials' verification as to how many trucks they had and the number actually lost, to include how many their mechanics restored to service, the Air Force reported numbers remain the official record. The more relevant question for those who continue to disparage gunship [bomb damage assessment] numbers should be to assess to what degree gunship interdiction missions helped deter the enemy's ability to move men and war materials into South Vietnam. Arguably, Washington critics became obsessed with a truck kill bean count and disregarded the obvious—that being, regardless whether trucks were destroyed or damaged, in either case those vehicles were prevented from moving war supplies south at the time.

At the outset of the 1971-72 Commando Hunt campaign, 7th Air Force published clear and concise criteria to evaluate gunship BDA. For a truck to be considered destroyed by either 40 mm or 20 mm ordnance, it must either blow up or incur a sustained fire. The AC-130 unit had its own facility where BDA videotapes of each mission were reviewed and evaluated to ensure aircrew claims met the destroyed or damaged criteria. The damaged or destroyed issue became somewhat of a moot point during this time as well with the introduction of the 105 mm howitzer on newer model AC-130s. Used as a direct fire weapon, the 105 produced devastating results on trucks and armor which ended the haggling over BDA.

The bottom line is that gunships were a major factor at interdicting NVN infiltration activity. But trying to stop literally thousands of enemy trucks from transiting the myriad of road networks in Laos was an effort in futility. Gunships teamed with fighter escorts went out night after night and made the NVN pay dearly for moving war supplies south. We all knew those trucks should have been destroyed on the very ships that delivered them to Haiphong Harbor.

The "Fabulous Four Engine Fighter" of the Vietnam era, re-equipped with state-of-the-art weaponry, remains a vital element in supporting our ground forces engaged in combat worldwide.

Jim Kyle
Honolulu

More on Allocating Guard Assets

Continuing the thoughts of Lt. Col. John Walmsley in the December 2005 issue of *Air Force* Magazine *[See "Letters: Differing Total Force Views," p. 4.]:* The idea of "state-based/controlled" strategic air combat and mobility units makes no sense anymore, if it ever did. Governors arguing over assets like A-10s, F-16s, KC-135s, and C-141s is incredible—they can't use them. I would even argue that Tacair is problematic at the state level. What they can use are more US Army assets—military police, helicopter-based rescue and recovery teams, and supply and transportation units—as they have been. The idea of the National Guard should not extend to Air Force assets, which I think belong in the AFRC. I watched the Air Guard leaders making their case in regards

to BRAC, and how hard it is to relocate Guard people, which of course is true but the wrong argument. I agree with Walmsley and that we should seriously consider making them a part of the AFRC and be the direct resources of ACC and AMC. We can provide governors what they truly need of the Guard (and USAR) in times of great need, as well as provide additional units and training for what DOD seems likely to have great need of in the future. This doesn't preclude, of course, Air Force assets being provided to work a disaster. It's always been a team effort.

Col. Robert E. Smith Jr., USAFR (Ret.)
Highlands, N.C.

Many members of the Air National Guard (ANG) agree with your editorial "Battle Damage From the QDR" *[January, p. 2]*. You continue to overlook a source of funds for airpower, for which you make such a strong case.The "battle damage" from BRAC on the ANG has turned intended savings into actual loss of airpower and high future costs. Further it has reduced the state-community-Congress based linkage, thereby demising the Congressional funding for personnel and equipment for the Total Force, so effective in the past and supported by the Air Force Association.

Brig. Gen. William W. Spruance, USAF (Ret.)
Las Vegas

Why F-22s Are Necessary

D.W. Roberts clearly shows a lack of knowledge of air warfare. *[See "Letters: Negative on New Fighters," December, p. 5.]* I need only refer him to (1) Recent training exercises with the Air Force of India with their Russian Su-27. Our F-15[s] could barely manage a one-to-one "kill" ratio. (2) In the first few months of World War II, the Japanese "Zero" killed hundreds of our well-trained pilots in planes that were no match for the Zero. With today's long lead time for new fighters, Mr. Roberts should reconsider his position, or once again our pilots may pay for this error in judgment.

Bill E. Powell
Surprise, Ariz.

Examples of Leadership

Thanks for printing General Fogleman's 1997 farewell statement. *[See "The Keeper File: Fogleman's Farewell," December, p. 8.]* He was a class act in every respect, including his decision to step aside quietly. I was a member of the AMC staff when Fogleman took command. It would be fair to say that the coming of another fighter general to take over the mobility force was viewed with some concern. The concerns were unfounded, as we learned during a meeting on the afternoon of his first day in command. He'd done his homework, told us some things we didn't know about ourselves, and quickly earned the respect that only a real leader gets from this subordinates. He became Chief of Staff at a time of unprecedented change in the Air Force and did a tremendous job of sorting things out. He represented the very best of what an Air Force senior leader should be. I hope you'll be able to do an in-depth article on General Fogleman in a future issue. His approach to leadership is worthy of study.

Col. Michael R. Gallagher, USAF (Ret.)
Sacramento, Calif.

Airplane Snatchers

[In reference to the] December issue, p. 46, "Flashback: The Airplane Snatchers," the civilian contractor partner on the project to pick up airplanes was All American Engineering Co. (AAE) of Wilmington, Del. As a matter of fact, AAE designed the Model 80C winch used and performed the installation in the B-17.

This particular "pick-up" project was one of many based upon the "Air Mail Pick-up" system developed by AAE in the late 1930s and 1940s. The systems were based on using "cable" (or "line") dynamics and especially designed energy attenuating winches to reduce the initial loads when picking up an object using an aircraft in flight.

This same type of system utilizing AAE designed winches, and in most cases aircraft installations, was used to snatch CG-4 gliders into the air in World War II and is the basis for the air-to air recovery systems in the JC130B parachute recovery system (Corona Project), the HC130H Air Recovery System (Air Rescue Service), and the CH3-C Mid-Air Recovery Systems (MARS) used to recover reconnaissance drones in Vietnam and elsewhere!

It has been estimated that over 30,000 aerial recoveries were made by the JC130B system from 1961 until 1986, and the same amount by the CH3-C systems from 1965 until 1986.

So although the "Airplane Snatcher" system didn't advance, the concept did!

G. Robert Veazey Sr.
Former Manager of Aerial Recovery Systems
All American Engineering Co.
Wilmington, Del.

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The Keeper File

Schlesinger's Limited Nuclear Options

A massive Soviet ICBM buildup had fatally undercut the nuclear policy of "assured destruction," and Washington needed options "other than suicide or surrender." So wrote Secretary of Defense James R. Schlesinger in a famous Cold War declaration. He reported that DOD was creating "selective and discriminating options" for responding to a limited attack—options lying somewhere between "doing nothing" (surrender) or launching a massive second strike that would plunge the superpowers into general war (suicide).

This change was highly controversial. Dovish critics claimed it made the unthinkable—nuclear war—dangerously thinkable. The consensus today, however, is that Schlesinger actually strengthened deterrence by adding credibility to the US threat of retaliation. Schlesinger hinted at the "limited options" idea in a January 1974 speech, but its full force was driven home in his DOD annual report, in which four lucid sections explained the change.

"Strategic Forces"

James R. Schlesinger
Annual Defense Department Report
Washington, D.C.
March 4, 1974

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

During the early 1960s, it was stated quite clearly by President Kennedy ... that the United States needed alternatives other than suicide or surrender, that it needed options which did not imply immediate escalation to major nuclear war. If anything, the need for options other than suicide or surrender, and other than escalation to all-out nuclear war, is more important for us today ... because of the growth of the capabilities possessed by other powers. ...

The Soviet Union now has the capability in its missile forces to undertake selective attacks against targets other than cities. This poses for us an obligation, if we are to ensure the credibility of our strategic deterrent, to be certain that we have a comparable capability in our strategic systems and in our targeting doctrine. ...

The war plans provide the National Command Authorities—the President and his advisors—with well-thought-out, detailed sets of options. In the past, most of those options—whether the principal targets were cities, industrial facilities, or military installations—have involved relatively massive responses. Rather than massive options, we now want to provide the President with a wider set of much more selective targeting options. Through possession of such a visible capability, we hope to reinforce deterrence by removing the temptation for an adversary to consider any kind of nuclear attack. Therefore, the changes we are making in our strategic planning this year are specifically intended to shore up deterrence across the entire spectrum of risk. ...

If, for whatever reason, deterrence should fail, we want to have the planning flexibility to be able to respond selectively to the attack in such a way as to (1) limit the chances of uncontrolled escalation, and (2) hit meaningful targets with a sufficient accuracy-yield combination to destroy only the intended target and to avoid widespread collateral damage. ... In order to protect American cities and the cities of our allies, we shall rely into the wartime period upon reserving our "assured destruction" force and persuading, through intrawar deterrence, any potential foe not to attack cities. ...

This adjustment in strategic policy does not imply major new strategic weapon systems and expenditures. We are simply ensuring that, in our doctrine, our plans, and our command and control, we have—and are seen to have—the selectivity and flexibility to respond to aggression in an appropriate manner. We do not intend that the Soviet Union should have a wider range of options than we do. ...

[The Soviet ICBM buildup could give Moscow] a major one-sided counterforce capability against the United States ICBM force. This is impermissible from our point of view. There must be essential equivalence between the strategic forces of the United States and the USSR. ...

President Nixon underlined the drawbacks to sole reliance on assured destruction in 1970, when he asked: "Should a President, in the event of a nuclear attack, be left with the single option of ordering the mass destruction of enemy civilians, in the face of the certainty that it would be followed by the mass slaughter of Americans? Should the concept of assured destruction be narrowly defined, and should it be the only measure of our ability to deter the variety of threats we may face?"...

Since we ourselves find it difficult to believe that we would actually implement the threat of assured destruction in response to a limited attack on military targets that caused relatively few civilian casualties, there can be no certainty that, in a crisis, prospective opponents would be deterred from testing our resolve. ...

Today, such a massive retaliation against cities, in response to anything less than an all-out attack on the US and its cities, appears less and less credible. ... What we need is a series of measured responses to aggression which bear some relation to the provocation, have prospects of terminating hostilities before general nuclear war breaks out, and leave some possibility for restoring deterrence. It has been this problem of not having sufficient options between massive response and doing nothing, as the Soviets built up their strategic forces, that has prompted the President's concerns and those of our allies. ...

We are determined ... to have credible responses at hand for any nuclear contingency that might arise and to maintain the clear ability to prevent any potential enemy from achieving objectives against us that he might consider meaningful. The availability of carefully tailored, preplanned options will contribute to that end. They do not invite nuclear war; they discourage it.


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Verbatim

By John T. Correll, Contributing Editor

Rumsfeld's Operational Focus

"I think if I had to pull out one lesson that we've learned over the past four or five years, it would be that in the 21st century we're going to have to stop thinking about things, numbers of things, and mass, and think also and maybe even first about speed and agility and precision."***—Secretary of Defense Donald H. Rumsfeld, Q&A session at Johns Hopkins University, Dec. 5.***

They're Up There

"They may be overhead of us right now, flying between San Diego and Los Angeles just to be prepared. Of course, folks will say there haven't been attacks since the 11th of September. That's kind of the point. We hope the terrorists don't know where we're flying and don't know when we're flying, but they just know we're up there. More importantly, we are on alert."***—Adm. Timothy J. Keating, commander of NORAD and Northern Command,*** **San Diego Union-Tribune,** ***Dec. 11.***

People vs. Forces

"Either you're not going to have combat-ready forces, or you're not going to pay people."***—Cindy Williams, MIT researcher who has studied the Pentagon's "personnel cost problem," Newhouse News Service, Nov. 21.***

Impatience Inside the Beltway

"It's not hard to deal with patience in the Middle East. Everyone is patient. The only problem that there appears to be a patience problem is within the Beltway. ... When I talk to civilian audiences, I don't get the same sense of impatience that I detect here in the Beltway."***—Army Gen. John P. Abizaid, commander, US Central Command, on Washington criticism of war in Iraq,*** **Washington Times,** ***Nov. 22.***

USAF Struggle for Identity

"Air Force leaders are constantly struggling to symbolically sustain and justify the independent service identity of the Air Force and to create and protect a unique Air Force culture comparable to those of the other services. This mainly manifests itself in the focus on technology in the Air Force, which is seen as setting the Air Force above the less-technological traditional services."***—George R. Mastroianni, professor at the Air Force Academy (and a lieutenant colonel in the Army Reserve), US Army War College*** **Parameters,** ***Winter 2005-06.***

Not Afghanistan, Not Iraq ...

"Our principal victory in our overall war on terrorism was demonstrating to [Indonesians] that we want to be in partnership with them, an element for good in the world."***—Ryan Henry, principal deputy undersecretary of defense for policy, about US tsunami relief in Asia in 2004, InsideDefense.com, Dec. 9.***

As Important as Combat

"Stability operations are a core US military mission that the Department of Defense shall be prepared to conduct and support. They shall be given priority comparable to combat operations."***—Gordon R. England, then acting deputy Secretary of Defense, policy directive, Nov. 28.***

Failing Grade

"We believe that the terrorists will strike again. If they do, and these reforms that might have prevented such an attack have not been implemented, what will our excuses be?"***—Thomas H. Kean, chairman of the Sept. 11 commission,*** **Washington Post,** ***Dec. 6.***

Like the 1940s

"I'm absolutely convinced that some day, 50 or 60 years from now, an American President will be speaking to an audience saying, 'Thank goodness a generation of Americans rose to the challenge and helped people be liberated from tyranny. Democracy spread and the world is more peaceful for it.'"***—President George Bush, comparing circumstances in Iraq to the democratization of Japan after World War II,*** **New York Times,** ***Dec. 10.***

Forget About Victory

"The idea that we're going to win the war in Iraq is an idea which is just plain wrong."***—Democratic National Committee Chairman Howard Dean, WOAI radio, San Antonio, Dec. 5.***

Undermining the President

"It's time for Democrats who distrust President Bush to acknowledge he'll be Commander in Chief for three more years. We undermine the President's credibility at our nation's peril."***—Sen. Joseph I. Lieberman, (D-Conn.),*** **Hartford Courant,** ***Dec. 6.***

Defending Criticism

"The Bush Administration must understand that each American has a right to question our policies in Iraq and should not be demonized for disagreeing with them."***—Sen. Chuck Hagel (R-Neb.),*** **Washington Post,** ***Nov. 16.***

Shift to Airpower

"A key element of the drawdown plans, not mentioned in the President's public statements, is that the departing American troops will be replaced by American airpower. Quick, deadly strikes by US warplanes are seen as a way to improve dramatically the combat capability of even the weakest Iraqi combat units."***—Seymour M. Hersh, citing "a high-level Pentagon war planner" and other "military experts,*** **The New Yorker,** ***Dec. 5.***

How Much?

"If the contractor can't tell us what it's going to cost, then they shouldn't be seeking a contract."***—Sen. John McCain (R-Ariz.) on open-ended Pentagon contracts,*** **Wall Street Journal,** ***Nov. 15.***

Still Missing

"Thirty years after the return of our American troops, nearly 1,400 remain unaccounted for in Vietnam."***—Rep. Christopher H. Smith (R-N.J.), in Hanoi on a fact-finding trip, Associated Press, Dec. 2.***

NATO Weakens Russia

"Attempts are being observed to weaken the commonwealth through recruitment of CIS [the Russian-led Commonwealth of Independent States] states into NATO. Russia will defend its interests."***—Gen. Yury Baluyevsky, chief of the Russian armed forces general staff,*** **Moscow Times,** ***Dec. 2.***

Attack the Oil Facilities

"I call on the holy warriors to concentrate their campaigns on the stolen oil of the Muslims, most of the revenues of which go to the enemies of Islam."***—Ayman al-Zawahri, al Qaeda deputy leader, videotape telecast by Al-Jazeera, Dec. 7.***

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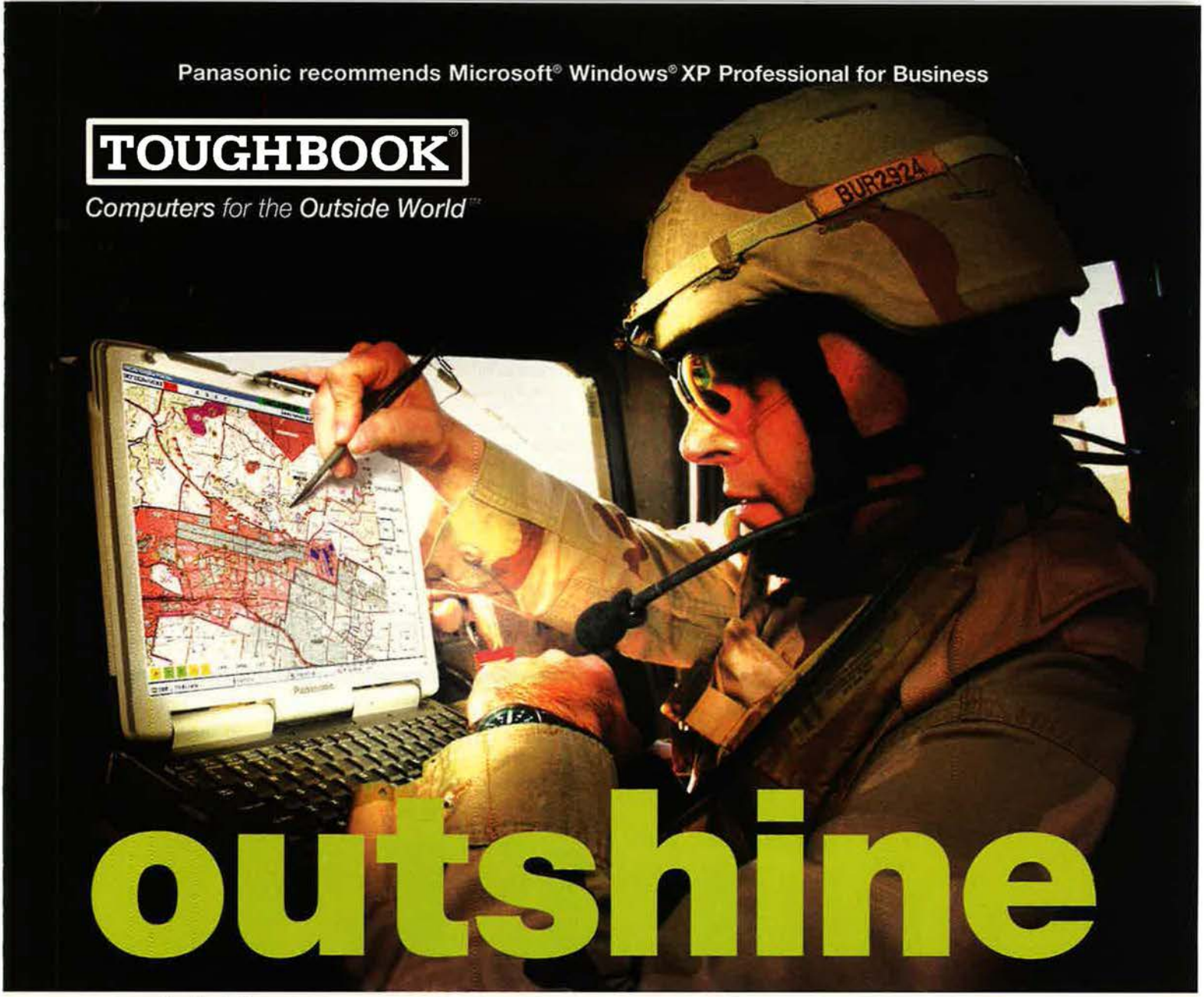

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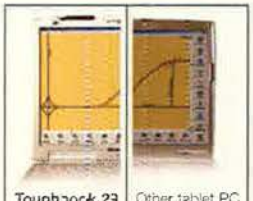

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The Chart Page

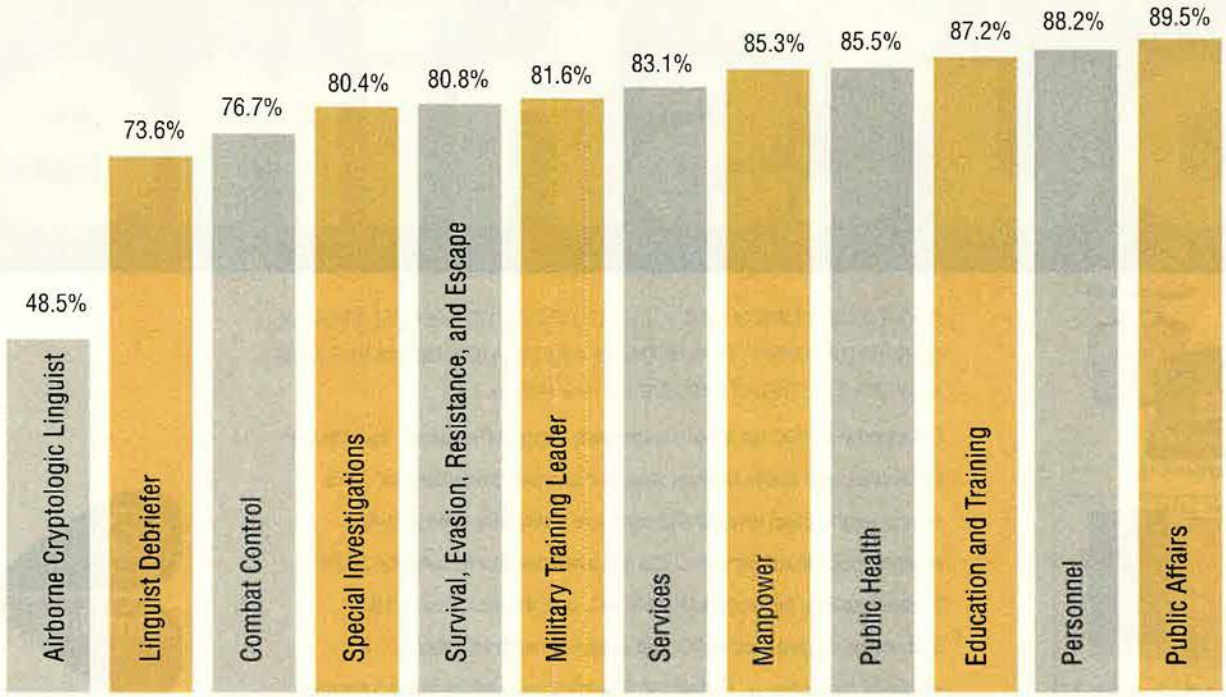
By Tamar A. Mehuron, Associate Editor

USAF Jobs That Go Begging

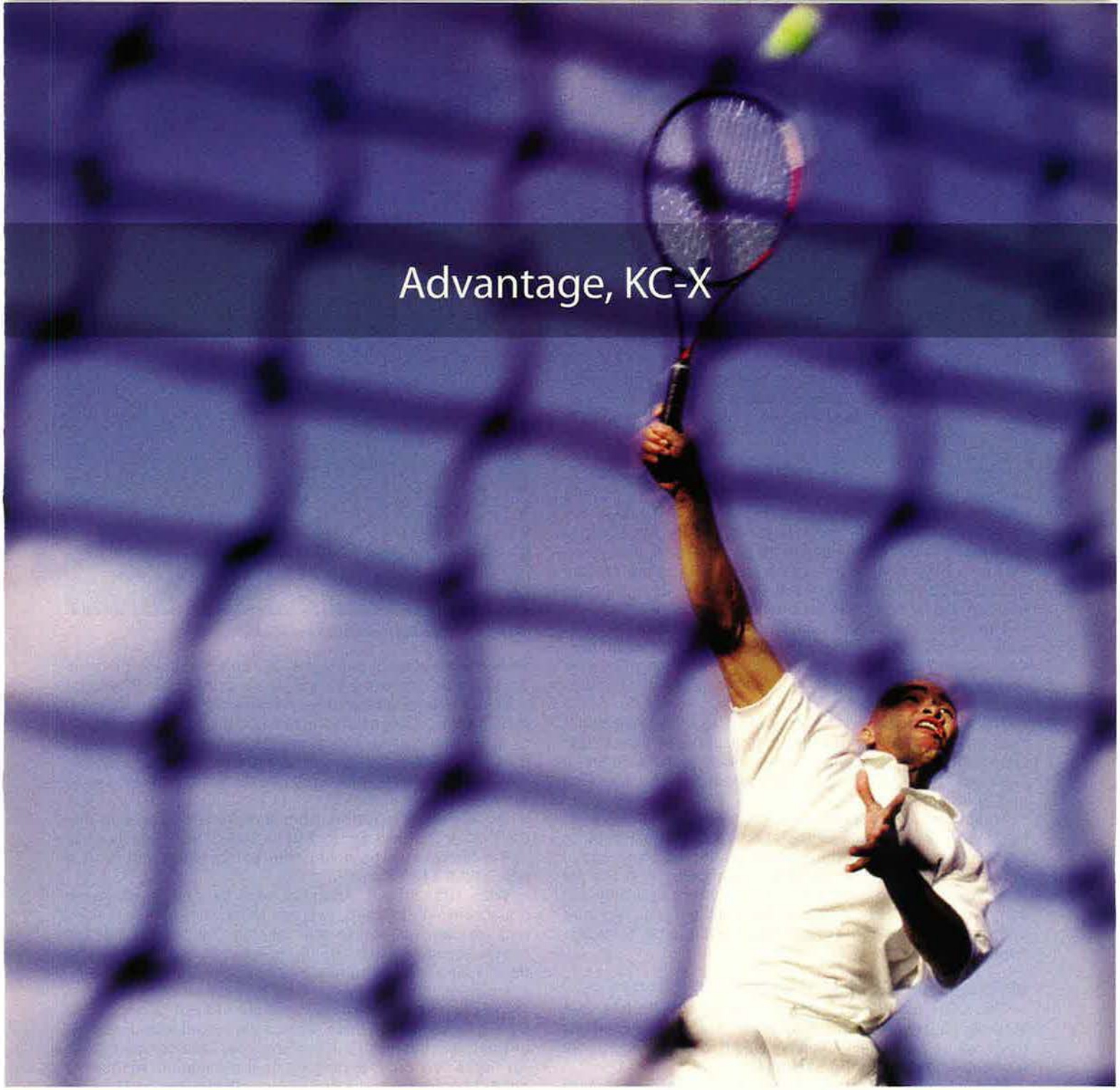
Though USAF almost always achieves annual end strength targets, it struggles to fill certain occupational specialties. Which jobs are hardest to man? The chart below shows that, in 2005, there were 12 Air Force enlisted occupations (active, Guard, and Reserve) manned at less than 90 percent of authorized strength. In virtually all cases, the problem is chronic, that is, resistant to bonuses and other enticements over several years. The toughest spot to fill, evidently, is the job of airborne cryptologic linguist, language specialists who fly in RC-135 Rivet Joint aircraft, operate signals intelligence gear, and translate intercepted communications. They even have to be able to type at a rate of 25 words per minute. For 2005, the Air Force needed 1,110 of these specialists, but attracted only 538—less than 50 percent of its goal.

Air Force's Consistently Underfilled Occupational Specialties

Percent of Goal in Fiscal 2005



Source: Government Accountability Office, "Military Personnel: DOD Needs Action Plan To Address Enlisted Personnel Recruitment and Retention Challenges," November 2005.



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Washington Watch

By John A. Tirpak, Executive Editor

Another QDR, Another Cut; Why an F-22 Stretch Out?; The UAV Factor ....

Accommodating the QDR

The Air Force has lost its battle to get 381 F-22A Raptors from the Bush Administration and will have to drop 40,000 personnel by 2011 to afford its overall procurement program. These are among the principal budgetary effects of the Pentagon's Quadrennial Defense Review, set for public disclosure this month.

In their first joint press conference, new Air Force Secretary Michael W. Wynne and the new Chief of Staff, Gen. T. Michael Moseley, said in mid-December that they will live with the Administration's imposed cap of 183 F-22As—renamed from F/A-22s—by extending the service lives of other fighters and depending more on advanced unmanned systems. However, they feel they won an important victory by persuading the Pentagon to extend the F-22A production line two years, until F-35 production is under way.

The personnel cuts will be absorbed as much as possible through reduced accessions and normal attrition, they said, adding that some of the cuts were coming anyway, due to the reduced support needs of the service's modern systems.

The Air Force also will no longer fight to win a larger airlift fleet, because it believes that the cargo aircraft of today, supplemented by some new aerial tankers and a substantial C-5 upgrade, will be adequate to the tasks ahead, Moseley and Wynne asserted.

The two top USAF leaders spoke to reporters shortly after the conclusion of QDR deliberations and the issuance of program budget directives regarding affected programs.

"We're going to have to take into account that the Air Force that we had planned on a few years ago may not come to fruition," Wynne said, "but I will tell you, that has been a fact of life in the Department of Defense for some time now."

Clipping the Raptor

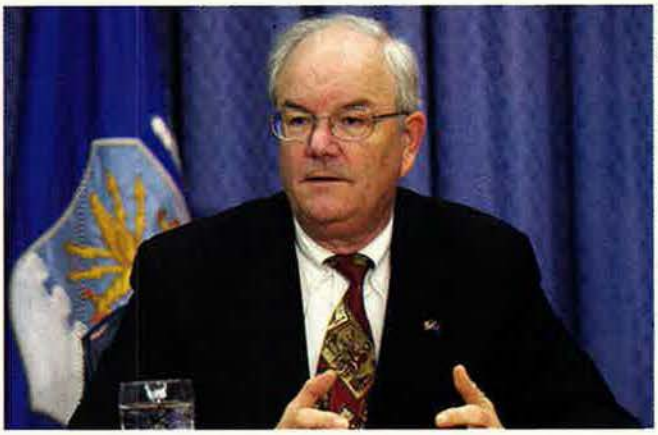
The QDR will allow funding for about 179 F-22As, but Moseley said that freezing the design at its present configuration will reduce costs, allowing USAF to get an additional four airplanes due to the savings.

Most importantly, though, the restructuring of the program will extend production from 2008 to at least 2010, a step Wynne described as critical.

"I think it's a national imperative that we continue to have a fifth generation fighter line warm until we get a second fifth generation fighter line," Wynne asserted. He defined a "fifth generation fighter" as one combining modern attributes such as stealth, speed, and modern avionics.

He said that it appeared that the message about keeping a modern stealth fighter production line going had gotten through to senior Pentagon leadership. While it was not at that point a final decision, Wynne said he expected the F-22A production rate "will diminish so as to allow an extension."

Air Force officials had suggested previously that the production rate would drop from 24 a year to 20, versus a maximum efficient rate of 32. The reduction in rate would stretch production by two years. Not coincidentally, the move also pushes decisions on the final number of F-22A to be built into another presidential administration. The Bush Administration has consistently blocked the Air Force's efforts to build what the service has maintained is the minimum fleet size needed: 381 aircraft. Service leaders said privately that the extension offers a chance to make the F-22's case with a new administration.



USAF photo by MSgt. Jim Varhegyi

Wynne sees more judicious use of airlift.

Moseley told reporters after the press conference that the F-22's cost will go up, but he thinks the flyaway price of the aircraft can be held under $150 million a copy. It is now about $130 million a copy.

With 183 aircraft, Moseley said he can "field seven squadrons." With them, "we can get at the theater tasking and we can respond to that tasking." He added that the seven squadrons are "full-up, combat-coded" aircraft and don't include training units.

However, it would take changes in the size of squadrons to get seven combat-coded units out of the 183 aircraft. At 24 airplanes each, seven squadrons would add up to 168 aircraft, leaving just 15 in training, test, and servicing. The Air Force has been touting 60 as the minimum number of aircraft needed to conduct training with the Raptor. Moseley did not speak to the discrepancy.

The Unmanned Option

Obliquely addressing USAF's acceptance of the smaller F-22 buy, Moseley noted that "another part of this ... that we didn't have 10 years ago is the J-UCAS and the UCAVs and the ability to get into some really interesting unmanned systems."

Unmanned combat aircraft are adaptable and flexible, having risen to every challenge so far, Moseley asserted.

"We know how to do unmanned vehicles in combat," he said, adding that technology advances in the unmanned arena create "another set of opportunities that were unforeseen 10 years ago." He suggested that such aircraft could affect the mix of combat aircraft in the future. They were "not in that equation a few years ago."

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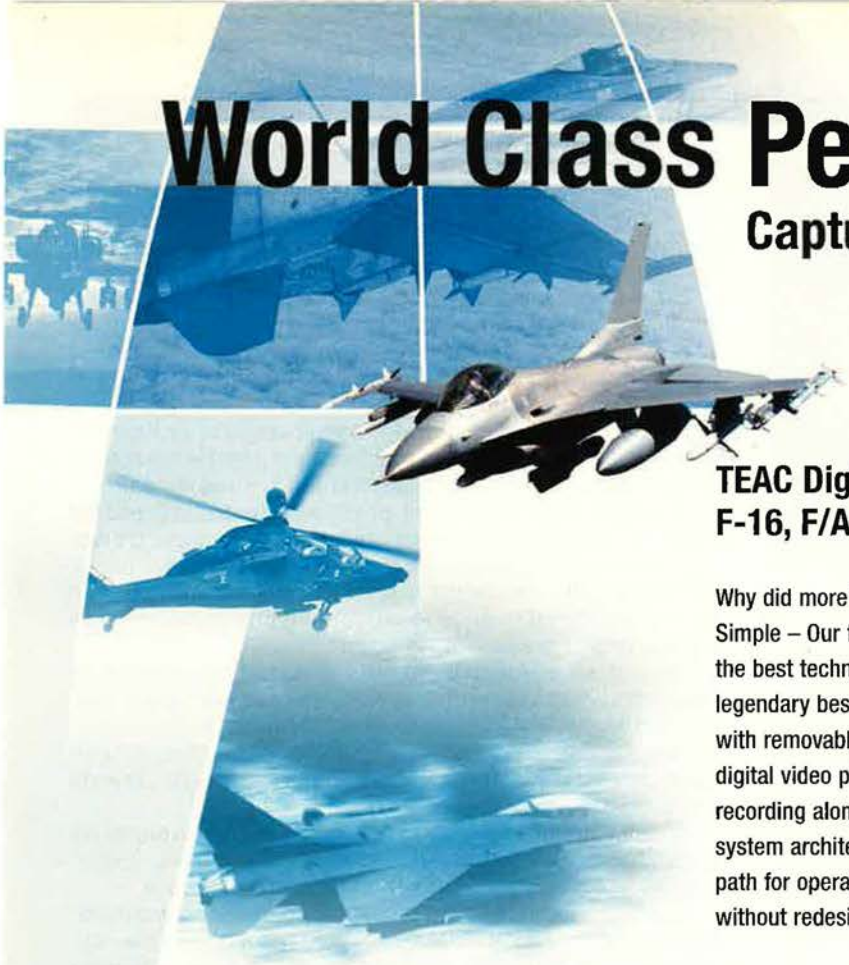

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USAF photo by TSgt. Ben Bloker

The Raptor production line will be extended.

Such a perspective on unmanned systems is consistent with the views expressed in a recent Pentagon report suggesting that drones capable of dogfighting as well as a human being could be available in 15 years or so. (See "Will We Have an Unmanned Armada?" November 2005, p. 54.)

Moseley also explained that the Air Force is reverting to the designation F-22A to underscore the fact that the configuration is being held steady and that future improvements are being kept in development for the time being. He also said the "F" designator is in keeping with Air Force heritage; the service has no history of using the "F/A" nomenclature the Navy adopted for the F/A-18 Hornet.

Former Air Force Secretary James G. Roche designated the Raptor the F/A-22 in 2002 to emphasize its attack capabilities. The move was aimed at some in the Pentagon leadership who believed the aircraft was limited to dogfighting, instead of the multimission tasks actually envisioned.

The redesignation also is meant as a signal "to the program manager" and anyone who would keep adding missions and requirements to the F-22, Wynne said.

The Air Force wants to "tamp down any enthusiasm for change," he noted.

"We want to make sure that we have an airplane that we can reproduce. It is the finest fighter, and it has exceeded our expectations in test, and right now what we want to do is just repeat it over and over. ... So we are holding configuration relatively constant, except for safety changes."

Moseley noted that the F-22's intelligence, surveillance, and reconnaissance capabilities are well advanced, and he said the fighter's avionics make it "equally capable" as an RC-135 Rivet Joint or EC-130 Compass Call. It was the first time the scope of the Raptor's ISR capabilities had been described in any way by a senior USAF official.

Initial operational capability of the F-22 was only a few days off when Moseley and Wynne spoke (see "Aerospace World: Raptor Declared Operational," p. 20.), and Moseley admitted that the F-22 would likely not be sent to Iraq or Afghanistan, where its capabilities are not really needed right now.

However, "the more urgent need is to get them into joint and combined exercises to be able to demonstrate [the F-22's capabilities] to our joint partners, and to be able to exercise in a more robust manner to get the logistics base down." Moseley anticipated a Pacific Theater deployment later this year.

Wynne said the QDR put the F-35 Joint Strike Fighter program "through tremendous analysis, as it should have, because it is a very large, high dollar program." He said that, again, the outcome was not final, but "it appears to me ... that the Joint Strike Fighter program will stay intact."

Bleeding Blue

The cut of 40,000 personnel will come out of the Air Force over the course of six years, Wynne said. "We're talking ... 6,700 to 6,800 a year," which he described as "manageable."

To the maximum extent possible, the cuts will be achieved through attrition and voluntary departure. If involuntary separations are needed, "we have a very ... structured plan, and a good one, to try to minimize any disruption in people's lives."

The Air Force has begun to look at ways to reduce accessions such that no preventable shortages are created in any particular field years down the road, Moseley said.

He noted that 13 percent of officer specialties and 20 percent of enlisted specialties are "stressed," meaning there are not enough people to go around in those career fields. His first priority, before involuntarily separating people, will be to give them a chance to cross-train into some of those undermanned areas.

Second, he wants to try to get separated people into the Guard and Reserve, and then he wants to offer "opportunities to move into Air Force civilian billets."

The Air Force doesn't want people it has trained and cultivated to "leave with a bad feeling in their heart," Wynne interjected.

Moseley added that, if there's no place for an involuntarily separated person in the range of Air Force careers, opportunities will be made to switch to a different service.

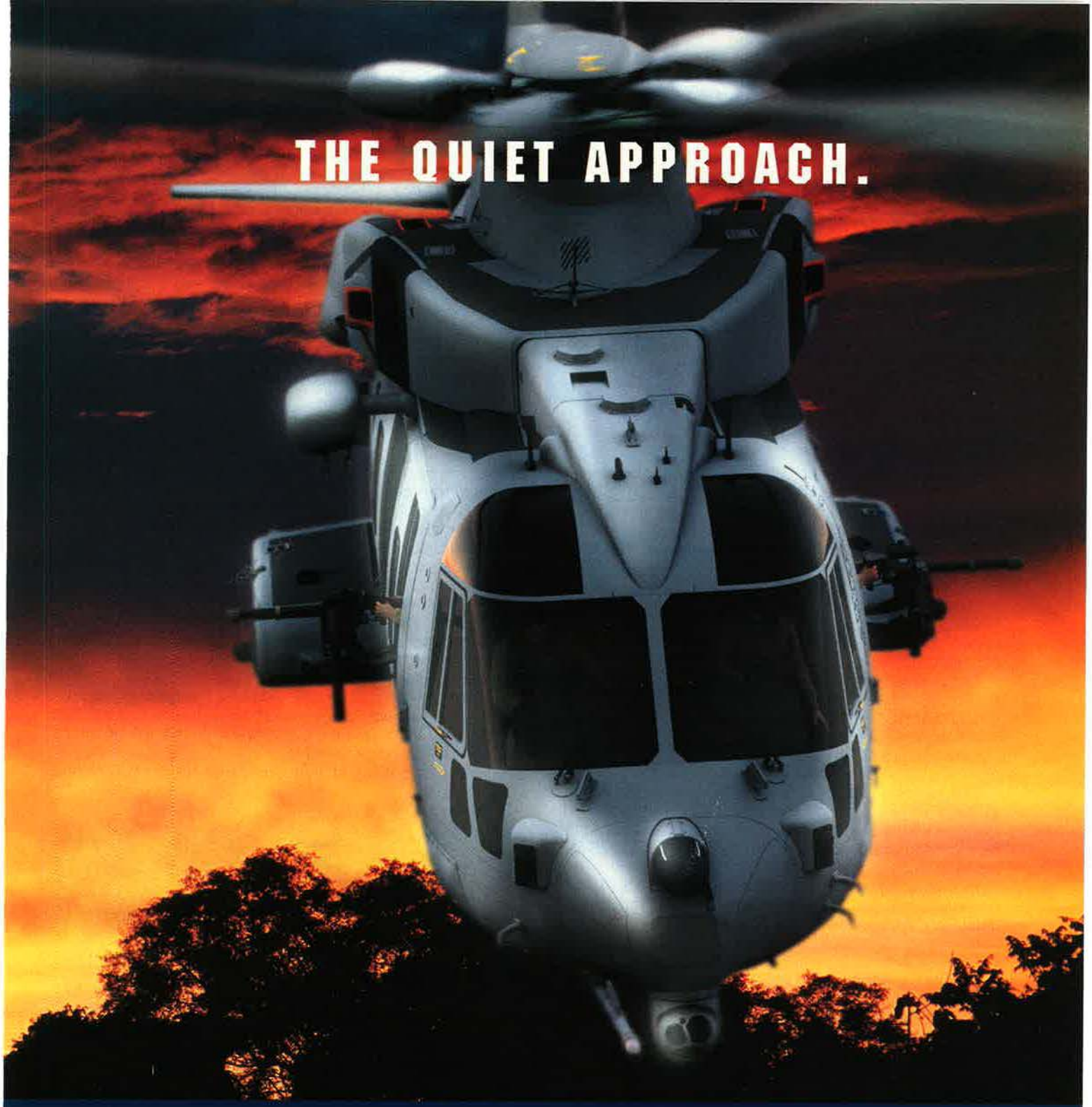
The cuts in manpower stem from "lessons learned," Wynne said. The Air Force can "better manage" the "application of lean principles," meaning doing more with fewer people, thanks to streamlined processes and new equipment that is less manpower intensive.

Normally, manpower goals for six years out would not be part of the budgeting process, he said. However, in conjunction with all the other QDR-driven changes, Wynne said he "wanted to establish firm goals" so commanders would keep sharpening their efforts to be more efficient.

"We believe that it is time for us to modernize into [less] manpower-intensive equipment," Wynne noted. There will be a huge reduction in the people needed to repair an F-35 vs. an F-16, which he called "a pretty highly reliable airplane." The reason, he said, will be because few actual repairs will be needed. Components that break will be pulled and sent back to the factory and a new one plugged in. Just as people can no longer fix their own cars, neither will flight-line technicians do much actual repairing of aircraft, he said.

USAF photo by MSgt. Scott Wagers

There will be 40,000 fewer of these.



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Moseley expects more and more unmanned systems.

Living With the Elderly

"We have an aging fleet," Wynne observed. "We are ... on the fourth step of a '12-step program,' recognizing that we are going to have an aging fleet for the rest of our careers, if you will."

He said that it would take an annual buy of 180 aircraft to keep the Air Force at its present inventory age, but the service is only buying 80 or so.

"There is no doubt that what we have to do is learn to live with an aging fleet," which will require advances in understanding how you do maintenance "better and less expensively."

The process of facing up to the advanced age of many Air Force systems has been "an eye opener," Wynne said, noting that USAF has never retired an aircraft because of age before; always it has been because of obsolescence. He will have to establish criteria for retiring aircraft due to age.

The retention of older aircraft means "what we need to do is re-engine some," Wynne said. "Fortunately, the Congress also sees it that same way, so we may get to re-engine aircraft like AWACS and perhaps some JSTARS along the way."

Incorporating new engine technology could extend ranges and mission times. "This would change things fairly dramatically," Wynne observed.

As for Mobility ...

"We've accepted pretty much the output of the Mobility Capability Study," Wynne said. As long as the Air Force gets a C-5 upgrade and a new aerial tanker—which will be a combination cargo carrier/tanker—then "we're feeling not uncomfortable," he asserted.

The MCS looked at every mobility asset and "scored it for the likelihood of usage," he explained. For a broad range of contingencies, the bulk of equipment will travel by surface, and the people will go by air. Using the MCS logic, "it became really obvious that we had an overage, a margin" in airlift, Wynne said. By not curtailing the lift fleet, keeping the Civil Reserve Air Fleet healthy, and by adding the versatility of dual-use tanker, the US will have a "sufficient margin" in lift, he said.

Wynne said no firm numbers on how many of a notional new tanker will be needed.

"We're still examining that," Wynne said. The reason no decision has been made is "we've done some business case analysis that shows that re-engining [of KC-135s] will actually reduce the quantity of tankers that we [need]."

Of a new combi tanker, he said, "I'm convinced ... it's going to be more than 100, but I have a feeling it's going to be far less than 500."

That conclusion means the Air Force will stop buying C-17s after the 180th aircraft has been delivered. Wynne said this was not the same kind of issue as maintaining a fighter assembly line, however, and that there's no need to keep the C-17 line going to preserve the option to buy more.

Boeing, the builder of the C-17, "is a company that actually has large airplanes in [its] inventory. They have the engineering talent" to design a new big airlifter if one is required, Wynne argued.

"It isn't quite the same as ... closing down a fighter line with no available engineering support."

Moseley also noted that newer systems need less airlift support, and this helps drive down the need for cargo aircraft.

To deploy an F-15 squadron, "it's about 15 C-17s. For an F-22, it's going to end up being about seven. ... The modernization of the inventory reduces the amount of airlift that you need," he said.

The Army has been moving toward smaller vehicles and units in the last few years and has stated expressly that it is sizing itself to be movable by air. The Stryker vehicle, for example, was designed specifically to fit inside a C-130 tactical transport.

Wynne and Moseley said that's all to the good, but the Army will still have to do most of its big deployments by surface. The Air Force, with the C-130 and the C-17, will retain enough airlift to do special missions, such as the transport of people and tanks to northern Iraq during Operation Iraqi Freedom, but such moves will be the exception, not the norm.

"You're not going to launch 180 C-17s with one tank aboard," Moseley asserted. "You will move what the Army needs. ... In terms of moving heavy armor, ... we can do that, but [airlift is] not the best way to do that."

Moseley also said the Air Force is "partnering" with the Army on a new light cargo aircraft, roughly akin to the C-123 Provider of the Vietnam era, that will support far-flung troops well away from large airfields.

"We are looking at how we can help them," Wynne said.

USAF photo by SSgt. James Wilkinson

Much hinges on an upgraded C-5.

Moseley said it hasn't been decided yet if the aircraft will be fixed-wing, a helicopter, or some hybrid such as a tilt-rotor.

He also said that while such an aircraft would be eminently useful in current operations, and in hurricane relief efforts last year, there's no way to know if it will still be useful "20 years from now" after a long design and development cycle. "It might."

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Aerospace World

By Breanne Wagner, Associate Editor

Raptor Declared Operational ...

The F-22A Raptor was officially declared operational on Dec. 15, meeting a target set years ago. Gen. Ronald E. Keys, head of Air Combat Command, certified that he has enough aircraft, maintenance crews, spares, and pilots to take the F-22A to war if needed.

The 27th Fighter Squadron at Langley AFB, Va., had 21 Raptors by the end of December and will have a full complement of 24 by spring.

In June, a dozen of the aircraft will participate in Northern Edge exercises in Alaska, and Keys said he expects to send the squadron on a road trip through the Pacific sometime soon afterward. A second unit, the 94th FS, is expected to be fully equipped in October.

USAF photo by TSgt. Ben Bloker

SSgt. Adam Murtishaw, a crew chief with the 27th Aircraft Maintenance Unit at Langley AFB, Va., marshals an F-22 into its parking space after a Dec. 14 mission. USAF declared the Raptor operational on Dec. 15. (See item at left.)

... And Is Renamed—Again

The Air Force has again changed the Raptor's designation, making it—for now, at least—the F-22A.

It formerly had been known as the F/A-22. And before that, just F-22.

The plain old F-22 Raptor had become the F/A-22 in 2002, when it was given that designation by then-Secretary of the Air Force James G. Roche. The F stood for fighter, and the A stood for attack. Roche wanted to emphasize that the Raptor was not just a hot new air-to-air system but also a ground-attack weapon.

Roche evidently thought emphasizing the double mission would generate stronger political support for the aircraft.

The switch back—which was announced on Dec. 13—was a nod to the "lineage" of USAF nomenclature, according to Chief of Staff Gen. T. Michael Moseley. (See "Washington Watch," p. 14.)

In this formulation, the A does not denote attack but rather signifies the A model of the fighter.

4,000 USAF Officers To Go

The Air Force this year will shrink by 4,000 officers because strong retention is pushing USAF above its allowed end strength.

The move precedes an overall force reduction of 40,000 active duty, Guard, Reserve, and civilian USAF personnel, a reduction stemming from decisions made in the Pentagon's Quadrennial Defense Review.

The personnel cuts, say USAF officials, reflect the lower manning requirements of modern systems and the Air Force's sharp political need to achieve budget goals. QDR results are to be published this month.

Air Force Magazine Launches "Airpower Classics"

Only rarely does *Air Force* Magazine change its "back page" feature. The popular Bob Stevens cartoon, "There I Was... ," first appeared in December 1965 and occupied the back page for 335 straight issues. Photographer Paul Kennedy's "Pieces of History" began in January 1994 and held the spot for 145 consecutive issues—until last month, when it was honorably retired.

In this issue, we mark only the second such change in 40 years with the inauguration of "Airpower Classics." Each month, this page will spotlight an important military aircraft, such as the B-17 bomber that leads off the series on p. 96. In most cases, the subject will be an Air Force aircraft, though we'll also present some that served in other US and foreign armed services.

The centerpiece of each page will be original artwork, produced by our staff's Zaur Eylanbekov. These remarkable illustrations are created entirely on a computer with painting programs. They are not computer-generated, but are created in the same way as traditional art, starting with an empty "canvas." It's just that, in Eylanbekov's case, the "canvas" is a computer screen. Each piece of art gives an exact portrait of a specific airplane at a specific point in time, reconstructed with the aid of crew members, old photos, documents, and so forth.

Over the years, our readers became fervently loyal to "There I Was" and 'Pieces of History." We believe "Airpower Classics" will prove to be equally popular. There have been lots of warplanes, and everyone seems to have his or her favorite. You may see yours turn up on our back page.

—Robert S. Dudney, Editor in Chief

Most of this year's 4,000-person cut will come from voluntary exits and normal attrition. However, the reduction will encompass about 1,700 lieutenants commissioned in 2002 and 2003, and a significant number of those will be forced out.

Most Officer Fields Are Vulnerable

In the upcoming round of force cuts, lieutenants who are pilots, navigators, missileers, and satellite specialists will be exempted, but all other fields will see sharp reductions in the ranks of lieutenants.

They will have until March 1 to volunteer for release before an April board recommends cuts.

Affected Air Force Academy graduates won't have to repay their college debt, which usually amounts to about $142,000 if they quit before their time of duty is complete.

The service hopes the released officers will stay connected to USAF through the Guard and Reserve.

USAF photo by CMSgt. David L. Stuppy

An A-10 Thunderbolt II takes off from Bagram AB, Afghanistan. Between Sept. 15 and Dec. 28, 2005, A-10s at Bagram flew more than 1,700 combat sorties, totaling more than 6,000 combat hours, for Operation Enduring Freedom.

Wynne Elevates Cyber-war

The Air Force's new mission statement for the first time rates cyberspace as being on a par with air and space in the USAF pantheon of operational arenas.

Secretary of the Air Force Michael W. Wynne released the new mission statement in December. It says USAF must "fly and fight in air, space, and cyberspace."

Wynne told Reuters he wants to expand US capabilities to shut down enemy electronic networks.

The new Air Force civilian leader said cyber-warfare flows naturally from the Air Force's traditional missions, which entail a need to download data from platforms in space.

The Air Force provides cyber-war resources to US Strategic Command, which blends them with other combat resources.

The Air Force has a combat record in the cyber-world, having jammed Serbia's computer networks in Operation Allied Force.

Singapore Buys More F-15s

Singapore will buy 12 F-15SG fighters, with an option for eight additional aircraft in the future, Boeing announced in December.

The aircraft, slated to be delivered in 2008 and 2009, will replace Singapore's A-4SU Skyhawks.

"They will be equipped with sophisticated avionics and weapons systems and will give the Republic of Singapore Air Force significantly better system-level capability," Singapore's Ministry of Defense said, according to Bloomberg News.

Neither Singapore's defense ministry nor Boeing disclosed the value of the contract.

Singapore, which has the largest defense budget in Southeast Asia, is the fifth foreign country to purchase the F-15, after Japan, Israel, Saudi Arabia, and South Korea.

Greek Deal Extends F-16 Line

Greece will go ahead with a purchase of 30 or more F-16s from Lockheed Martin, closing a potential gap in production of the multirole fighter, the company said in December.

The contract involves 30 advanced F-16 Block 52s, with an option for 10 more, and is worth about $2 billion. Lockheed Martin would get $1.2 billion, the company said.

The order was a relief to Lockheed officials, who feared a break in Fighting Falcon production at their Fort Worth, Tex., factory. Pakistan recently postponed an order for 80 of the aircraft because it needs the cash for earthquake relief. (See "Aerospace World: Pakistan Suspends F-16 Buy," January, p. 16.) With the firm order there is now enough F-16 work to carry the company through 2009, just short of the launch of F-35 Joint Strike Fighter production in the same facility.

Pakistan is expected to consider again the F-16 buy early next year, according to Air Force Lt. Gen. Jeffrey B. Kohler, head of the Defense Security Cooperation Agency.

The Hellenic Air Force is slated to receive its new aircraft in *2009.*

Army Gets USAF Interrogators

A group of more than 90 airmen stood alongside their soldier colleagues as the first blue-suit gradu-

Note to Readers: Orlando Symposium Goes Online

The Air Force Association's acclaimed Air Warfare Symposium has a new feature this year—hour-by-hour news coverage by the staff of *Air Force* Magazine, available online through our new Web-based "Daily Report."

Plans call for regular posting of important news from the Feb. 2-3 event in Orlando, Fla., one of the premier events in the world of airpower and national defense.

Updates of speeches and events appear on the Daily Report, accessible at AFA's Web site. Go to our home page at www.afa.org and click on "Daily Report" at the top of the page.

Air Force Magazine wants to make it as easy for you, our readers, to obtain up-to-the-minute news and information about the Air Force. With the Daily Report, you have this kind of information at your fingertips every working day.

The 22nd annual Orlando symposium will feature presentations by the Air Force's most senior leaders. Scheduled to speak are: Michael W. Wynne, Secretary of the Air Force; Gen. T. Michael Moseley, Chief of Staff; Gen. Ronald E. Keys, Air Combat Command; Gen. William T. Hobbins, US Air Forces in Europe; Gen. Paul V. Hester, Pacific Air Forces; and Gen. Lance W. Lord, Air Force Space Command.

USAF photo by TSgt. Richard T. Kaminsky

Seventeen C-17s assigned to the 437th and 315th Airlift Wings, Charleston AFB, S.C., flew in a one-of-a-kind training mission on Dec. 22, 2005. The group was the largest formation of C-17s ever to fly from a single base.

ates from the US Army Intelligence Center's interrogator school at Ft. Huachuca, Ariz., USAF announced in December.

The airmen volunteered for the job when the Army asked the Air Force to help meet its need for qualified interrogators.

The Air Force has already said more airmen will be recruited next year to fulfill the Army mission. The Air Force Personnel Center and the Air and Space Expeditionary Center will post information on how to volunteer. The service will consider senior airmen and above.

The collaboration is yet another area where the Air Force is backing up missions traditionally performed by the Army. Airmen have recently taken the Basic Combat Convoy Course to support soldiers in Iraq as combat convoy drivers, gunners, and security forces.

Joint STARS To Get Major Upgrade

Northrop Grumman will upgrade the E-8C Joint STARS surveillance aircraft under a $532 million Air Force contract.

The contract covers engineering, design, development, integration, test, and delivery of various enhancements and upgrades, according to the company. The effort also will include technical orders, support equipment, training, and procurement of retrofit kits.

Work on the contract is scheduled to be completed in December 2011.

Joint STARS is the most advanced airborne ground surveillance, targeting, and battle management system, working to detect and target enemy ground movements while transferring

Airman MIA From Vietnam War Identified

An Air Force sergeant carried as missing in action since the Vietnam War was identified in December, and his remains were returned to his family for burial with full military honors.

TSgt. Patrick L. Shannon of Owasso, Okla., along with 18 other servicemen, operated a radar site known as Lima Site 85 on Pha Thi mountain, Houaphan Province, Laos. The site came under attack on March 11, 1968, by North Vietnamese commandos, who scaled the mountain and overtook American forces.

On learning of the assault, USAF dispatched aircraft to attack the enemy and extract the site personnel. Eight of the 19 Americans there were rescued, although one died en route to Thailand. The others had attempted to escape down the mountain, but several were killed, according to survivor accounts.

In 1994, the Joint MIA/POW Accounting Command began interviewing witnesses in Laos and Vietnam. In 2002, an enemy soldier told investigators that the NVA troops had thrown the bodies of the Americans off the mountain after the attack. JPAC specialists scaled the cliffs, finding remains and personal items which belonged to Shannon. JPAC and the Armed Forces DNA Identification Laboratory identified Shannon's remains using mitochondrial DNA.

real-time information to Air Force and Army command posts.

ORIs Tailored for Combat Zones

Operational readiness inspections have been changed to better prepare airmen headed to combat deployments in Iraq and Afghanistan, Air Combat Command announced in late November.

The old style of generate-and-fly-sorties ORIs has given way to emphasizing modern combat scenarios. They test combat capabilities to deal with new threats such as improvised explosive devices and mortar, rocket, and chemical attacks. Airmen also will be better prepared for stressful situations such as wearing chemical suits or working much longer hours than their predecessors did.

"We want to make sure that ... wartime skills being practiced during Operations Enduring Freedom and Iraqi Freedom are evaluated here before our airmen deploy," said Col. Tom Jones, ACC inspector general.

Boeing Gives USAF Two Options in CSAR-X Competition

Boeing is offering two ways for the Air Force to buy its HH-47 Chinook helicopter for the combat search and rescue helicopter replacement, called the CSAR-X, but won't be offering the CV-22 tilt-rotor.

Other competitors for the rescue chopper contract include Lockheed, offering the Eurocopter US-101, and Sikorsky, with its S-92, an enlarged version of the UH-60 Blackhawk.

Under one scheme, the Air Force would buy outright 141 HH-47s designated Block 0, at an agreed procurement price. However, the Air Force would then have to award a second contract later to upgrade the aircraft to a Block 10 version, with a new rotor blade system, air-to-air and air-to-surface weapons, and other upgrades which the service wants.

Under a second scheme, USAF would buy a mix of some Block 0s now and switch to Block 10s as they become available. The initial price would be somewhat higher, but USAF would eventually get all the aircraft brought up to Block 10 configuration at a considerable savings, according to Robert Sobey, Boeing's Chinook program director. The advantage would be that USAF would get the Block 10s earlier and for less money overall.

Sobey declined to say what the program cost would be, or how the upgrades would be priced, but the CSAR-X program is valued at about $10 billion. A contract award is expected in the spring.

Boeing withdrew the CV-22 from the CSAR-X program because the company decided the aircraft offered more capability than the Air Force wanted or could afford for the mission.

The CSAR-X program is aimed at replacing USAF's fleet of aging HH-60G Pave Hawk choppers.

The HH-47 is a version of the MH-47 helicopter now in use with Army special operations forces. Boeing completed MH-47G demonstration flights at Nellis AFB, Nev., in December.

UK Frowns Over JSF Tech Transfer

If Britain can't get satisfaction on technology transfer issues pertaining to the F-35 Joint Strike Fighter program, it may pull out of the project, the *Sunday Times* of London reported in December.

Britain is the largest international partner with the US on the F-35 and is relying on the aircraft to equip two new aircraft carriers. However, it feels it is not reaping the full technology benefit of its $2 billion investment in the program.

To give teeth to its threat to pull out, Britain is considering a navalized version of the Eurofighter Typhoon. Government officials told the *Times* that the US would not take the negotiations seriously un-

Moody Crews Awarded Mackay Trophy

The crews of two HH-60G Pave Hawk helicopters received the prestigious Mackay Trophy in December, awarded for the 2004 rescue of five soldiers in Iraq.

The Mackay Trophy, first given in 1912 and now awarded jointly by the Air Force and National Aeronautic Association, recognizes the "most meritorious flight of the year." It was presented in Washington on Dec. 5.

On April 16, 2004, a sandstorm forced one of three Army CH-47s in a formation to put down near Kharbut, Iraq. On setting down, the right landing gear collapsed, causing the Chinook to roll over on its side.

Two HH-60G crews were sent to the rescue, but the sandstorm rendered their night vision goggles useless, forcing them to fly using only instruments. After finding and recovering the soldiers, the Pave Hawk crews were attacked with surface-to-air missiles and small-arms fire on the way back to friendly territory.

The honored airmen from the 41st and 38th Rescue Squadrons, Moody AFB, Ga., are: Maj. Joseph Galletti; Capts. Bryan Creel, Gregory Rockwood, and Robert Wrinkle; MSgt. Paul Silver; TSgts. Matt Leigh, Michael Preston, and Thomas Ringheimer; SSgts. Vincent J. Eckert, John Griffin, Patrick Ledbetter, and Michael Rubio; and SrA. Edward Ha.

less Britain had a legitimate alternative choice.

At issue is the touchy subject of source codes for JSF software, which is proprietary to Lockheed Martin. The two countries have haggled over the issue since last summer.

Britain also is concerned about cost increases on the project. However, the F-35 seems to have come out of the Quadrennial Defense Review intact, making further big increases less likely.

Raptor Drops Guided JDAM

An F-22A Raptor flying supersonic at Edwards AFB, Calif., demonstrated its air-to-ground capability in December by releasing a guided version of the 1,000-pound Joint Direct Attack Munition. It was the first time a guided JDAM had been released from a Raptor.

The Raptor began flying JDAM supersonic separation test missions in July. The supersonic JDAM capability will be tested further at Edwards from higher altitudes and faster speeds, the Air Force said.

The Raptor is to begin testing with the Small Diameter Bomb this year.

KC-767 Gets Link 16

Boeing's KC-767, currently being tested for the Italian Air Force, will become the first tanker equipped with a Link 16 data system, providing command and control and increased situational awareness to the aircrew.

Italy has purchased four KC-767s, one of which has been built and is undergoing testing. The aircraft is slated to be delivered to the Italian Air Force in 2006. Japan also has bought four of the aircraft, one of which is being modified in Wichita, Kan., and is expected to be delivered at the end of this year.

Airlifters May Get "All-Seeing" Landing Technology

Air Force Research Laboratory is developing new technology to give mobility aircraft "all-seeing eyes" in adverse weather conditions, allowing the aircraft to land in fog, rain, snow, or blowing sand without the help of ground-based navigation systems.

AFRL's Air Vehicles, Human Effectiveness, and Sensors Directorates are working on two technologies: Autonomous Approach and Landing Capability (AALC), in conjunction with BAE Systems, and the Opportune Landing System (OLS) in conjunction with Boeing.

The AALC will provide clear images of the runway approach via a sensor-based, head-up display that uses imaging radar and near real-time video. The image will appear as if the pilot were landing in the daytime during normal weather conditions.

The OLS system is being developed to analyze satellite imagery to assess an austere area's suitability—dimensions, flatness, and obstructions—for a landing.

"Currently, air transport crews are being denied clearance for missions if the weather is bad enough and there is no instrument landing capability at the destination," said James McDowell, AALC program manager. "Getting AALC's capabilities demonstrated is a high priority."

Officials plan to flight test the AALC with its present two-dimensional radar between October 2006 and February 2007 and a 3-D capability in 2007. Plans call for Air Mobility Command to get the technology in 2010.

Both Italy and Japan will pay for this unique capability that was not originally intended for the program.

Japanese and Italian boom operators will be able to use Link 16 to keep track of aircraft approaching for refueling instead of visually searching the sky.

Link 16 will give aircrews better situational awareness and allow real-time mission planning changes, particularly to deal with priority changes.

Tuskegee Airmen Award Endorsed

Secretary of Defense Donald H. Rumsfeld endorsed a measure to honor the Tuskegee Airmen with the Congressional Gold Medal.

Rumsfeld reported his decision in a December letter to Rep. Charles B. Rangel (D-N.Y.), a sponsor of the proposal.

Rumsfeld and Rangel, who have frequently tangled on policy issues, put aside their differences to honor the Tuskegee Airmen, a group of 1,000 African-American fliers who were the first to break the color line in flying units. (See "Tuskegee Airmen," March 1996, p. 52.)

The Tuskegee Airmen comprised pilots and ground crew members of fighter and bomber units.

In the letter to Rangel, Rumsfeld said, "This group of American heroes significantly contributed to victory in Europe during World War II and helped break down racial barriers in our armed forces."

The bill had already passed in the Senate.

Pakistan Earthquake Relief Airmen Come Home

Airmen from the 818th Contingency Response Group came home to McGuire AFB, N.J., in early December

The War on Terrorism

Operation Iraqi Freedom—Iraq

Iraq Casualties

By Jan. 6, a total of 2,189 Americans had died in Operation Iraqi Freedom. This total includes 2,184 troops and five Defense Department civilians. Of those fatalities, 1,720 were killed in action by enemy attack, and 469 died in noncombat incidents.

There have been 16,329 troops wounded in action during OIF. This includes 8,747 who returned to duty within 72 hours and 7,582 who were unable to quickly return to action.

All-Iraqi Aircrew Flies Solo

An all-Iraqi aircrew flew its first solo mission aboard a C-130E on Nov. 28, according to US military officials.

The nine-member aircrew, part of the 23rd Iraqi Squadron, flew from Ali Air Base near Nasiriyah in southeast Iraq to New Al Muthana Air Base. Once at New Al Muthana, the airmen practiced an engine-running onload, a method of loading the aircraft as quickly as possible, before returning to Ali.

"The flight marked a major milestone achievement by showing Iraq's capability of providing its own military transport," said Air Force Capt. Jerry Ruiz, forward operations executive officer at New Al Muthana Air Base.

The Iraqi squadron was to move to New Al Muthana in January.

Operation Enduring Freedom—Afghanistan

Afghanistan Casualties

By Jan. 6, a total of 255 Americans had died in Operation Enduring Freedom, primarily in and around Afghanistan. The total includes 129 troops and one DOD civilian killed in action and 125 who died in nonhostile incidents such as accidents.

A total of 675 troops have been wounded in Enduring Freedom. They include 274 who were able to return to duty in three days and 401 who were not.

US Reduces Military Force in Afghanistan

Defense Secretary Donald H. Rumsfeld signed orders Dec. 19 that would reduce US forces in Afghanistan this spring from 19,000 to 16,000.

The troop reduction will be seen in the 4th Brigade of the 10th Mountain Division, based in Ft. Polk, La., which will send 1,300 soldiers instead of 4,000, according to the *New York Times*.

Pentagon spokesman Larry DiRita said that the move was in response to recommendations from Army Lt. Gen. Karl Eikenberry, the senior American commander in Afghanistan, and Army Gen. John P. Abizaid, CENTCOM commander.

Troop levels have been expected to decrease since NATO agreed to assume more control in southern Afghanistan this year. The organization already has soldiers in that country for security and reconstruction missions.

US forces will still have the main responsibility for counterterrorism missions. Afghan security forces will take on additional security duties.

Lockheedd Martin photo

Lacking only its engine and radome, the first F-35A was lifted from its assembly station to a new spot on Lockheed Martin's Fort Worth, Tex., production line in January. After final assembly and check out, first flight is scheduled for the fall.

after more than two months in Pakistan, where they were designated the 24th Air Expeditionary Group and assisted with earthquake relief at Chaklala Air Base.

The airmen had unloaded 263 aircraft containing 14.6 million pounds of relief supplies. The group also sent airfield survey teams to five Pakistani airports, and its combat control team conducted 108 drop zone surveys, ultimately calling in the only three airdrops allowed by Pakistan, said Col. Richard Walberg, 818th commander.

USAF continued relief operations in Pakistan after the McGuire airmen returned home. As of Dec. 16, the Air Force still deployed between 65 and 70 personnel in direct support of humanitarian relief efforts in Pakistan, the service said. They included pararescuemen, combat cameramen and various support personnel in areas such as communications and civil engineering.

Basing Deal Signed With Romania

The US will be permitted to temporarily base troops in Romania, under an agreement signed by the two countries Dec. 6. It marks the first time the US has been allowed military basing rights in a former Warsaw Pact nation.

The new bases will be limited, austere training sites, not large permanent facilities such as those in Germany, Defense Secretary Donald H. Rumsfeld said at a December press conference in Washington. Rumsfeld was trying to reassure Russia, which had expressed concern that the agreement might violate the 1990 Conventional Armed Forces in Europe Treaty.

The US will use air training ranges in Romania and establish an Eastern

Iran Buys Russian SAMs

Russia and Iran on Dec. 2 signed a new $1 billion arms agreement, one in which Moscow pledges to supply anti-aircraft missiles and upgrades to Iran's Russian-made Sukhoi and MiG fighters.

Senior Air Force officials have argued that only a fast and stealthy aircraft such as the Raptor will be able to survive in a battlespace dominated by Russian "double-digit" SAMs and front-line aircraft.

The SAMs are SA-15 Gauntlets, which are deployed on tracked vehicles and can bring down aircraft or cruise missiles flying at altitudes of up to 20,000 feet at a range of seven miles. The weapons may be deployed to protect Iran's Bushehr nuclear power plant.

Russian and Western news reports estimated Russia would sell 29 missile systems to Iran at a value of more than $700 million.

The sale coincided with a visit to Moscow by R. Nicholas Burns, US undersecretary of state for political affairs, who charged that Iran has engaged in terrorism against the US for 25 years. "You can understand why we wouldn't favor any country selling arms to a country like that," he added, in an interview on Ekho Moskvy Radio.

European Task Force (EETAF) at an air base near Constanta on the Romanian Black Sea coast. Some 1,500 Americans might be located in Romania.

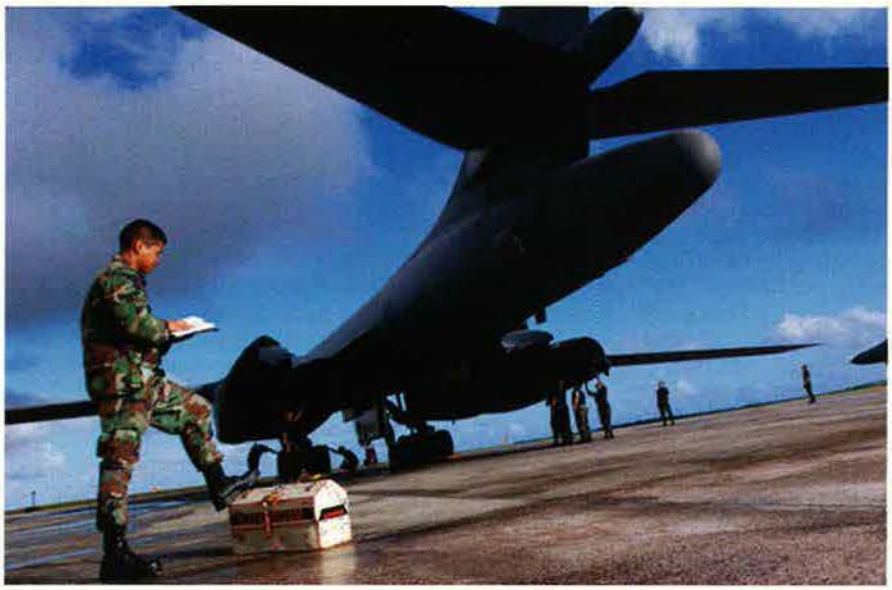
Ramstein Agreement Updated

US Air Forces in Europe and German leaders met at Ramstein Air Base on Dec. 1 to sign an updated agreement for a German support unit there.

The previous agreement was signed in May 1988, and since then, major changes have occurred in the US-German military relationship. NATO's Component Command-Air Headquarters Ramstein is located at the base.

The new deal irons out long-standing ambiguities affecting housing, work space, and other support issues for a German support unit on the US installation.

The new agreement will set the tone for future such arrangements and also will serve as a model for new NATO members which may make their own support agreements with the US, according to USAFE officials.



USAF photo by MSgt. Val Gempis

Airmen from the 28th Aircraft Maintenance Squadron, Ellsworth AFB, S.D., do a final check on one of their B-1Bs at Andersen AFB, Guam, in January. Bombers are routinely deployed to Guam now to enhance US presence in the Pacific Theater.

Pentagon To Restructure SBIRS Program

The Pentagon will again restructure the $11 billion Lockheed Martin Space Based Infrared System program. The move came after the program experienced another program cost increase of more than 25 percent, triggering a fourth Nunn-McCurdy breach.

The SBIRS program, whose satellites will be positioned in geosynchronous orbit to detect enemy ICBMs, will receive funds for two satellites, instead of the four originally planned.

Pentagon acquisition, technology, and logistics chief Kenneth J. Krieg, in a December letter to Congress obtained by Dow Jones Newswires, said he wants to develop a new satellite program to compete with the troubled SBIRS program, hoping to generate competition and exploit new technologies. Krieg proposed a satellite he dubbed the Overhead Nonimaging Infrared system as a competitor to SBIRS. Krieg hopes competition will lower costs.

Krieg was required to certify to Congress that SBIRS remains an indispensable program after the program cost breach. Without the AT&L chief's certification that the program is vital to national security and, in the words of the Nunn-McCurdy amendment, "there are no alternatives ... which will provide equal or greater military capability at less cost," SBIRS would, under the law, be canceled.

Dynamic Weasel Unfolds at Shaw

Exercise Operation Dynamic Weasel, intended to test the abilities of aircraft using the Link 16 "Internet in the sky" data network and to prepare for combat operations overseas, began Dec. 2 at Shaw AFB, S.C.

The exercise included 33 aircraft from nine Air Force bases and featured widespread use of Link 16. The exercise gave aircrews experience with sharing data and allowed them to develop new tactics using it.

Dynamic Weasel also was the first operational evaluation of the Fighter Aircraft Command and Control Enhancement pods on the Block 50 F-16s,

News Notes

■ The Air Force in December began operating a new Minuteman Minimum Essential Emergency Communications Network Program, an EHF system providing secure links—via Milstar satellites—between the President, Secretary of Defense, and ICBM launch crews. It replaced 1970s-era radio links. The upgrade took seven years to complete.

■ The remains of two airmen frozen in a glacier for nearly 37 years were buried with full military honors at Arlington National Cemetery on Dec. 7. Col. Wilfred B. Crutchfield and Lt. Col. Ivan E. O'Dell, were flying to McChord AFB, Wash., on April 15, 1968, when their T-33 trainer crashed into Mount Rainer. Their remains were not recovered until October 2004 due to weather conditions on the glacier, and were not fully recovered until September 2005.

■ Little Rock AFB, Ark., witnessed the arrival of its fifth C-130J Hercules on Dec. 6. Plans called for the base, which is the schoolhouse for the C-130, to receive two more aircraft within the month, for a total of seven.

■ Eligible airmen in combat control and pararescue are being offered a re-enlistment bonus of up to $150,000, as well as the opportunity to re-enlist anytime until Dec. 31, 2007. The program is open to technical sergeants and above who have at least 19 years of service, but no more than 24, and requires a two- to six-year commitment.

■ The Pentagon's Missile Defense Agency on Dec. 8 awarded Lockheed Martin a $149.2 million contract to build a prototype High Altitude Airship to detect enemy ballistic missile launches. The massive, unmanned craft would carry 500 pounds of sensors and be able to hold station for one month at an altitude of 60,000 feet. Work is scheduled to be completed by November 2010.

■ Donated items weighing more than 20 tons were air-dropped to Pacific Islanders in the 53rd annual Operation Christmas Drop. Air Force C-130s dropped the cargo to the most remote locations on 55 islands throughout Micronesia Dec. 4-6. The donated items included first-aid kits, garden tools, toys, school supplies, fishing gear, snorkeling equipment, hygiene products, canned and nonperishable foods, and used clothing, according to *Stars and Stripes*.

■ Paperless medical record keeping for the Department of Defense took a step closer to reality with the Nov. 21 rollout of a new $1.2 billion electronic database. The Armed Forces Health Longitudinal Technology Application (AHLTA) is a global electronic record keeping system intended to serve nine million service members, retirees, and their families by January 2007. It will streamline electronic storage of records.

■ Air Force senior enlisted leaders will now receive joint professional military education, much as officers have received for years, the service announced in December. New classes will address national military capabilities and organization from a joint persepective. Two joint PME programs will be offered.

■ USAF awarded Air Transport International, Little Rock, Ark., a contract for up to $75 million for charter combination passenger-cargo international airlift services. Work is to be completed by September 2006.

■ The Air Force and Hawaii Air National Guard opened a new maintenance facility for C-17 airlifters at Hickam AFB, Hawaii, in late November. The facility was set up in anticipation of the arrival at Hickam of eight C-17s beginning in February.

■ Raytheon was awarded a subcontract—for an undisclosed amount—to make ground segments for Northrop Grumman's RQ-4A/B Global Hawk unmanned aerial system. The contract will provide for the launch and recovery element, the mission control element, and ground communication equipment for the ground segment.

■ DOD on Dec. 1 launched traumatic injury protection insurance under the Servicemembers' Group Life Insurance program. Called TSGLI, the policy will provide, for a monthly premium of $1, coverage of up to $100,000 to service members recovering from a serious traumatic injury.

■ Military spouses were encouraged to participate in a 30-minute online survey—one for active duty and one for Guard and Reserve families—intended

to assess services for military families, DOD officials said in December. The survey focused on deployment issues and challenges faced by military families. The results will directly influence policy, according to American Forces Press News.

- USAF's Aerospace Maintenance and Regeneration Center—more commonly known as "the boneyard"—received DOD's 2005 Maintenance Symposium Recognition of Air Force Units for Lean Continuous Process Improvement. The Davis-Monthan AFB, Ariz., facility reclaimed nearly 42,000 aircraft parts during Fiscal Years 2004 and 2005, saving DOD $1.25 billion.
- A new cargo pallet will save US Transportation Command roughly $1.3 million. The new "intermodal" pallet will sit atop the old one, called the 463L pallet, which will be retained and reused. The 463L costs $1,700 apiece, versus the new one, with a unit price of $400.
- New guidelines for the physical training uniform go into effect Oct. 1, the Air Force Uniform Board announced. As of that date, members must wear the PTU for unit physical fitness activities. The board also released guidance on wear of the PTU during personal workouts. Airmen may wear the PTU jacket with civilian clothes, white socks with small trademarks, hats that meet "military image," and black or navy blue leggings under the PTU shorts.

allowing enhanced communications with a satellite phone and a receiver and transmitter.

Participating units included Whiteman AFB, Mo.-based B-2 bombers; F-16s from McEntire ANGS, S.C.; F-15s from Seymour Johnson AFB, N.C.; A-10s from Pope AFB, N.C.; B-1s from Dyess AFB, Tex.; KC-10s from McGuire AFB, N.J.; RC-135s from Offutt AFB, Neb.; and an E-3 AWACS from Tinker AFB, Okla.

Due to the success of the exercise, a second Dynamic Weasel was scheduled for this summer. It could become a semi-annual or quarterly event, Shaw officials said.

Iraqi Civilian Deaths Estimated

President Bush estimated the Iraqi civilian death toll at 30,000 since the American-led invasion in 2003. In a Dec. 12 speech in Philadelphia, he said further casualties are to be expected, although he believes 2005 will mark a "turning point" in Iraqi history, owing to its successful elections and its adoption of a new, democratic constitution.

Bush did not cite a source for his estimate, but White House officials subsequently said he was quoting public estimates reported in the media, rather than an official government figure. The Pentagon does not maintain an estimate of Iraqi civilian deaths.

A frequently cited source for Iraqi deaths is Iraq Body Count, a British volunteer group. By Dec. 13, the group estimated that up to 30,892 Iraqi civilians had died, not counting Iraqi troops or insurgents.

ElBaradei Gives Warning

Mohamed ElBaradei, head of the UN's International Atomic Energy Agency, warned that 30 countries could have nuclear weapons in the next 10 to 20 years if nonproliferation efforts fail.

He did not name any candidate countries. Seven nations—Britain, China, France, India, Pakistan, Russia, and the US—have declared nuclear arsenals, while Israel and North Korea are seen by many as undeclared nuclear powers.

Several advanced nations such as Japan, Germany, and Sweden could easily go nuclear but refrain from doing so for political and diplomatic reasons. Aside from them, there are many nations such as Argentina, Brazil, Iran, South Korea, and Taiwan, which, under the right circumstances, would have an incentive and the wherewithal to acquire nuclear arms.

In a Dec. 13 speech to students at Uppsala University in Sweden, ElBaradei encouraged disarmament and remarked that the only alternative to a global nuclear arms buildup is a halt to the development and production of nuclear weapons.

Pentagon Emphasizes Stability Ops

The bureaucratic status of post-combat "stability operations" has been elevated to the same level of major combat operations, the Pentagon announced in December.

Pentagon Directive No. 3000 orders US military commanders to include

Senior Staff Changes

RETIREMENTS: Maj. Gen. Robert W. **Chedister,** Gen. Robert H. **Foglesong.**

PROMOTION: To Major General: Philip M. **Breedlove.**

NOMINATIONS: To be Lieutenant General: Ronald F. **Sams. To be ANG Brigadier General:** Steven **Westgate. To be AFRC Major General:** David L. **Frostman,** James W. **Graves,** Linda S. **Hemminger,** John M. **Howlett,** Harold L. **Mitchell,** Hanferd J. **Moen Jr.,** William M. **Rajczak,** David N. **Senty,** Erika C. **Steuterman. To be AFRC Brigadier General:** John M. **Allen,** Robert E. **Bailey Jr.,** Eric W. **Crabtree,** Dean J. **Despinoy,** Wallace W. **Farris Jr.,** John C. **Fobian,** Thomas W. **Hartmann,** James R. **Hogue,** Mark A. **Kyle,** Carol A. **Lee,** Jon R. **Shasteen,** Robert O. **Tarter,** Howard N. **Thompson,** Christine M. **Turner,** Paul M. **Van Sickle.**

CHANGES: Maj. Gen. Ted F. **Bowlds,** from Dep. PEO & Vice Cmdr., ASC, AFMC, Wright-Patterson AFB, Ohio, to Cmdr., AFRL, AFMC, Wright-Patterson AFB, Ohio ... Maj. Gen. John T. **Brennan,** from US Security Coordinator, Office of Security Cooperation-Afghanistan, CENTCOM, Kabul, Afghanistan, to Assoc. Dir., Central Intel. for Mil. Spt., CIA, Washington, D.C. ... Brig. Gen. David J. **Eichhorn,** from Dep. for Spt. & Vice Cmdr., ESC, AFMC, Hanscom AFB, Mass., to Dep. PEO & Vice Cmdr., ASC, AFMC, Wright-Patterson AFB, Ohio ... Brig. Gen. David W. **Eidsaune,** from Dir., Air Component Coordination Element, MNF-Iraq, ACC, Baghdad, Iraq, to Cmdr., AF Security Assistance Center, AFMC, Wright-Patterson AFB, Ohio ... Maj. Gen. John H. **Folkerts,** from Vice Cmdr., AFSOC, SOCOM, Hurlburt Field, Fla., to Dir., P&P, AFMC, Wright-Patterson AFB, Ohio ... Brig. Gen. (sel.) Peter F. **Hoene,** from Spec. Asst., BRAC, AFMC, Wright-Patterson AFB, Ohio, to Cmdr., C2ISR Wg., ESC, AFMC, Hanscom AFB, Mass. ... Brig. Gen. Stephen L. **Hoog,** from Cmdr., Air & Space Expeditionary Force Center, ACC, Langley AFB, Va., to Dir., Air Component Coordination Element, MNF-Iraq, ACC, Baghdad, Iraq ... Maj. Gen. Perry L. **Lamy,** from Cmdr., AFRL, AFMC, Wright-Patterson AFB, Ohio, to Spec. Asst. to Vice Cmdr., AFMC, Wright-Patterson AFB, Ohio ... Brig. Gen. (sel.) Kenneth D. **Merchant,** from Cmdr., Battle Mgmt. Sys. Wg., ESC, AFMC, Hanscom AFB, Mass., to Vice Cmdr., Ogden ALC, AFMC, Hill AFB, Utah ... Maj. Gen. Arthur J. **Rooney Jr.,** from Cmdr., AF Security Assistance Center, AFMC, Wright-Patterson AFB, Ohio, to Vice Cmdr., ESC, AFMC, Hanscom AFB, Mass. ... Brig. Gen. (sel.) Dartanian **Warr,** from Dir. of Staff, AFMC, Wright-Patterson AFB, Ohio, to Cmdr., Battle Mgmt. Sys. Wg., ESC, AFMC, Hanscom AFB, Mass. ... Brig. Gen. (sel.) Brett T. **Williams,** from Cmdr., 33rd FW, ACC, Eglin AFB, Fla., to Cmdr., Air & Space Expeditionary Force Center, ACC, Langley AFB, Va. ... Maj. Gen. Donald C. **Wurster,** from Dir., Spec. Ops. Center for Networks & Comm., SOCOM, MacDill AFB, Fla., to Vice Cmdr., AFSOC, SOCOM, Hurlburt Field, Fla.

SENIOR EXECUTIVE SERVICE RETIREMENTS: David J. **Carstairs,** Gregory W. **Denherder.**

SES CHANGES: Richard W. **Lombardi,** to Assoc. Dep. Asst. Secy., Acq. Integration, Asst. SECAF (Acq.), Pentagon ... Douglas L. **Loverro,** to Assoc. Dir., Imagery Sys. Acq. & Ops., NRO, SECAF, Chantilly, Va.

Index to Advertisers

stability missions in every war plan, according to the *Washington Times.*

Gordon R. England, then acting deputy defense secretary, signed the missive titled "Military Support for Stability, Security, Transition, and Reconstruction Operations" on Nov. 28.

Defense Secretary Donald H. Rumsfeld called for such a move more than a year-and-a-half ago, in an attempt to restore security quickly after major combat operations end. No such goal was in the war plans for Iraq.

Previously, stability operations were considered an afterthought because the main focus was defeating the enemy and securing territory.

Directive 3000 includes instructions to rebuild security forces, prisons, and judicial systems, "revive or build the private sector," and "develop representative governmental institutions."

Bockscar Crewman Dies

Retired Vice Adm. Frederick L. Ashworth, the weaponeer aboard the second B-29 to drop an atomic bomb on Japan, died Dec. 3 in Phoenix at the age of 93.

Ashworth was aboard *Bockscar* and was responsible for arming the "Fat Man" atomic bomb that destroyed Nagasaki on Aug. 9, 1945. The attack, which came three days after the atomic bombing of Hiroshima, prompted Japan's unconditional surrender.

Speaking to a Los Alamos, N.M., historical group in August, Ashworth said the mission encountered a number of problems, including the need to change targets from Kokura to Nagasaki due to thick cloud cover.

Once the bomb was dropped, the crew aboard *Bockscar* heard a radio report suggesting that the Japanese were talking with Switzerland about a possible surrender. The Japanese surrendered unconditionally on Aug. 15, 1945.

Ashworth was a 1933 US Naval Academy graduate. After the war, he served as commander of the Navy's 6th Fleet and did military liaison work with the Atomic Energy Commission.

World War II Ace Dies

Retired Lt. Col. Norman J. "Bud" Fortier, a World War II fighter ace who also participated in the Berlin Airlift, died Nov. 20 in Gilford, N.H., at the age of 83.

Fortier flew 113 combat sorties and destroyed 5.83 German aircraft during the war. He left the service as a major, only to be recalled for the Berlin operation. He flew 38 missions in the Berlin Airlift and retired from the Air Force in 1964.

After retiring from the service, Fortier was a school principal and teacher. ■

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Action in Congress

By Tom Philpott, Contributing Editor

Unexpected Gains; Items In the $441.5 Billion Budget; Boosting Tricare's Fees ....

Pleasant Surprises

Congress in late December passed the 2006 defense authorization containing a raft of personnel initiatives designed to improve recruiting and force management. Some were unexpected.

Surprises in the Fiscal 2006 bill included a provision opening Tricare Reserve Select, a watered-down version of Tricare Standard, to all drilling reservists and their families. Coverage comes with higher premiums, the steepest of which are for Reservists and Guard members who have other health insurance options. (More on this below.)

Among unexpected new authorities to reshape the force is a voluntary separation incentive that the Navy and Air Force intend to use to entice some midcareer officers in overstaffed specialties to leave active duty.

Another surprise is a provision that extends last year's gains in death benefits to survivors of any service member who dies on active duty. This step eliminates a requirement that deaths be combat-related for a survivor to qualify for the higher amounts.

Survivors of other service members or retirees who died of service-related causes also were affected. Congress opted not to reduce a dollar-for-dollar reduction in survivor benefits when surviving spouses qualify for Dependency and Indemnity Compensation (DIC) from the Department of Veterans Affairs.

Pay and Benefits

The defense bill authorizes new spending of $441.5 billion in 2006—3.1 percent more than in 2005. Nearly $109 billion of that is for military personnel.

Most of the pay and benefit gains in the authorization bill were seen as enhancing force readiness. Proposals that would continue to raise entitlements for retirees, reservists, or survivors, most of which the Senate cleared, were tossed out or reduced in effect by House-Senate conferees.

Here are highlights of initiatives endorsed or rejected:

DOD photo by MSgt. John E. Lasky

Guardsmen, Reservists to get new benefits.

■ Reserve Tricare—Eligibility for the Tricare Reserve Select program will expand to all drilling reservists. Premiums will depend on personal circumstance. TRS at current premiums is open only to Reservists and National Guard members who complete post-9/11 deployments. For 2006, they will pay $81 a month for individual and $253 for family coverage, enough to cover 28 percent of TRS costs. All TRS users also pay Tricare Standard deductibles and office visit co-payments.

Two premium tiers will be open to any drilling reservist willing to pay more. The first of two higher-tiered premiums will be for reservists who lack alternative health insurance either because they are unemployed, self-employed, or work for a company that has no health insurance plan. These categories of reservists can enroll in TRS if they agree to pay 50 percent of program costs in premiums, about $145 monthly for individual coverage and $452 for family.

Another tier will apply to Reservists who do have alternative health insurance. They will be able to enroll in TRS for premiums set at 85 percent of TRS costs, roughly $245 a month for individual coverage and $768 for family.

■ Death Benefits—The bill authorizes the services to pay survivors of any service member who dies on active duty a $100,000 death gratuity versus the current gratuity for noncombat deaths of $12,400. The gratuity is retroactive for survivors of all troops that died on active duty since Oct. 7, 2001.

■ Income Replacement—The bill authorizes a limited income-loss protection plan for reservists involuntarily activated and kept on continuous active duty longer than 18 months. If such individuals show an income loss, they can receive up to $3,000 a month in replacement income, beginning in the 19th month they are mobilized. Not many reservists will qualify.

■ IU and Concurrent Receipt—The bill accepts the House plan to make modest changes in the concurrent receipt law for military retirees who are deemed "unemployable" by the Department of Veterans Affairs. These 28,000 IU retirees draw VA disability compensation at the 100 percent level. They were excluded from a provision last year that lifted the ban on concurrent receipt of VA compensation and

military retirement for 100 percent disabled retirees. Conferees approved a House plan to fully restore military retired pay of IU retirees in 2009 instead of 2014.

■ Voluntary Separation Initiative—Sought by the Navy and Air Force, this authority allows the services to offer lump-sum cash incentives for officers in overpopulated job specialties to leave active duty. Eligible officers will be those with six years to 12 years of duty. The VSI amount would double the current involuntary separation incentive. Involuntary separation pay for officers is set at 10 percent of basic pay for each year of active duty served when separation occurs.

■ SBP Initiatives Sidelined—Not included in the defense bill were two Senate-approved proposals to improve the military's Survivor Benefit Plan. One would have ended the dollar-for-dollar offset of survivor benefits that occurs when they receive VA Dependency and Indemnity Compensation. Another would have moved up by three years the 2008 effective date of the SBP premium paid-up rule for participants who paid premiums for at least 30 years and reached age 70.

Other Personnel Initiatives

The final 2006 defense bill also:

■ Raises the ceiling on hardship duty pay from $300 a month to $750.

■ Doubles the enlistment bonus ceiling to $40,000.

■ Raises the top re-enlistment bonus authority to $90,000.

■ Allows the services to pay up to $430 per month to service members during rehabilitation from combat-related wounds or illnesses

■ Authorizes 20 different types of force-shaping bonuses and special pays.

■ Increases active duty end strength for the Army by 10,000 soldiers and for the Marine Corps by 1,000 marines. (There was no change in Air Force end strength.)

■ Authorizes an interservice transfer bonus of up to $2,500 for active and reserve troops that agree to move to another service where they are needed more.

■ Authorizes a critical skills retention bonus of up to $100,000 (over a career) for qualified drilling reservists.

■ Approves payment of full Basic Allowance for Housing to reservists ordered to active duty for more than 30 days. Under current rules, reservists don't receive full BAH pay until after 140 days of mobilization.

■ Increases Tricare benefits for the surviving children of service members who die on active duty.

■ Authorizes up to 21 days of leave for military members adopting a child.

USAF photo by MSgt. Stefanie Doner

Drilling reservists get TRS.

Tricare Hikes?

The Joint Chiefs of Staff, led by Marine Corps Gen. Peter Pace, the Chairman, will testify if necessary to support upcoming Pentagon budget proposals to increase Tricare fees. The Tricare price hikes would affect under-65 military retirees and their families, according to a senior military officer.

The Tricare proposals are expected to be unveiled officially when the department delivers its Fiscal 2007 budget request to Congress in early February. Changes would raise enrollment fees and deductibles sharply over the next three years, for three million beneficiaries.

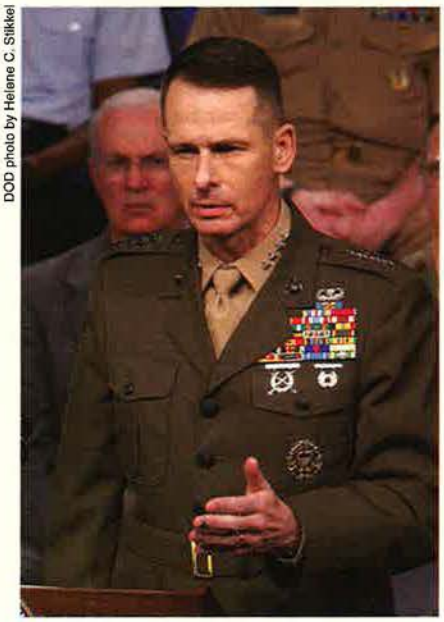
Draft department plans show that annual enrollment fees for Tricare Prime, the military's managed care option, would triple by October 2008 for working-age retired officers. They would double for enlisted retirees.

Yearly deductibles for Tricare Standard, the fee-for-service health insurance option, would nearly double for officers and rise by nearly a third for enlisted. For the first time, retirees who use Tricare Standard would pay an enrollment fee in addition to their deductible.

Pharmacy co-payments also would climb for retirees and their families, regardless of age, if they use the retail drug network or the Tricare mail order program to buy brand-name drugs on the military formulary.

The intent of these initiatives is to slow a projected sharp rise in military health care costs through Fiscal 2015. The cost growth would be slowed by having working-age retirees either pay a greater share of Tricare costs or switch to employer-provided health insurance.

Defense officials have expressed alarm over an on-going migration of retirees into Tricare and away from employer-provided health insurance. William J. Winkenwerder Jr., assistant secretary of defense for health affairs, has said some civilian employers and even state governments are offering cash incentives to retired military workers in order to entice them to use Tricare rather than company- or government-provided insurance. (See "Action in Congress: Rising Health Care Costs ... And Ways to Curb Them," December 2005, p. 24.)



DOD photo by Helene C. Stikkel

Pace and Chiefs support hikes.

High Tide?

A senior Capitol Hill staff member predicted that 2005 may represent the "high tide" of Congress expanding entitlements for military retirees, reservists, and survivors. Lawmakers this past year voted to phase out the reduction in SBP benefits that occurs when survivors turn 62 and become eligible for Social Security.

Congress is "improving the benefit without any change in premium, without any change in the overall contribution from the retiree," said the staffer. Lawmakers have enhanced the benefit in ways that have enormous legacy costs over time, he said. "These are costs that have to be looked at." ■

There is hard power, soft power, and airpower, and the greatest of these may be airpower.

The Chinese

By Rebecca Grant

Though Pentagon strategists are loath to discuss it publicly, they worry about China. It is the most powerful of the world's so-called "near-peer" military competitors. (Russia, for some reason, is still counted as a "peer.") China, Iran, and North Korea dominate Pentagon analyses of high-threat environments for airpower and other joint military forces. War over the Taiwan Strait is viewed as among the most plausible and dangerous of future conflict scenarios.

Top Pentagon strategists spend plenty of time trying to analyze China's military operations and defense budgets. Defense Secretary Donald H. Rumsfeld himself recently questioned the purpose of China's escalating military investment.

"Since no nation threatens China," said Rumsfeld, "one must wonder: Why this growing investment? Why these continuing large and expanding arms purchases?"

Beijing responded to Rumsfeld's words with a rhetorical question of its own. Asked Zhang Bijan, the senior foreign policy advisor to President Hu Jintao, "With other countries spending so much more than us on defense, shouldn't we improve ourselves?"

Don't be fooled by this bland response. When it comes to international security arrangements, China is engaged in quite a lot more than some innocent "self-improvement" effort. The Middle Kingdom has made a detailed study of hard power, soft power, and airpower. All signs are that China wants to develop each and every one of them to Chinese advantage.

Rumsfeld's remarks came as the Pentagon released its Congressionally mandated report under the title, "The Military Power of the People's Republic of China." This 2005 document postulated that China's armed forces were planning to move beyond the narrow Taiwan issue and become the arbiter of maritime security in the Western Pacific.

It also laid out a litany of military arms developments aimed at giving China dominance in its region.

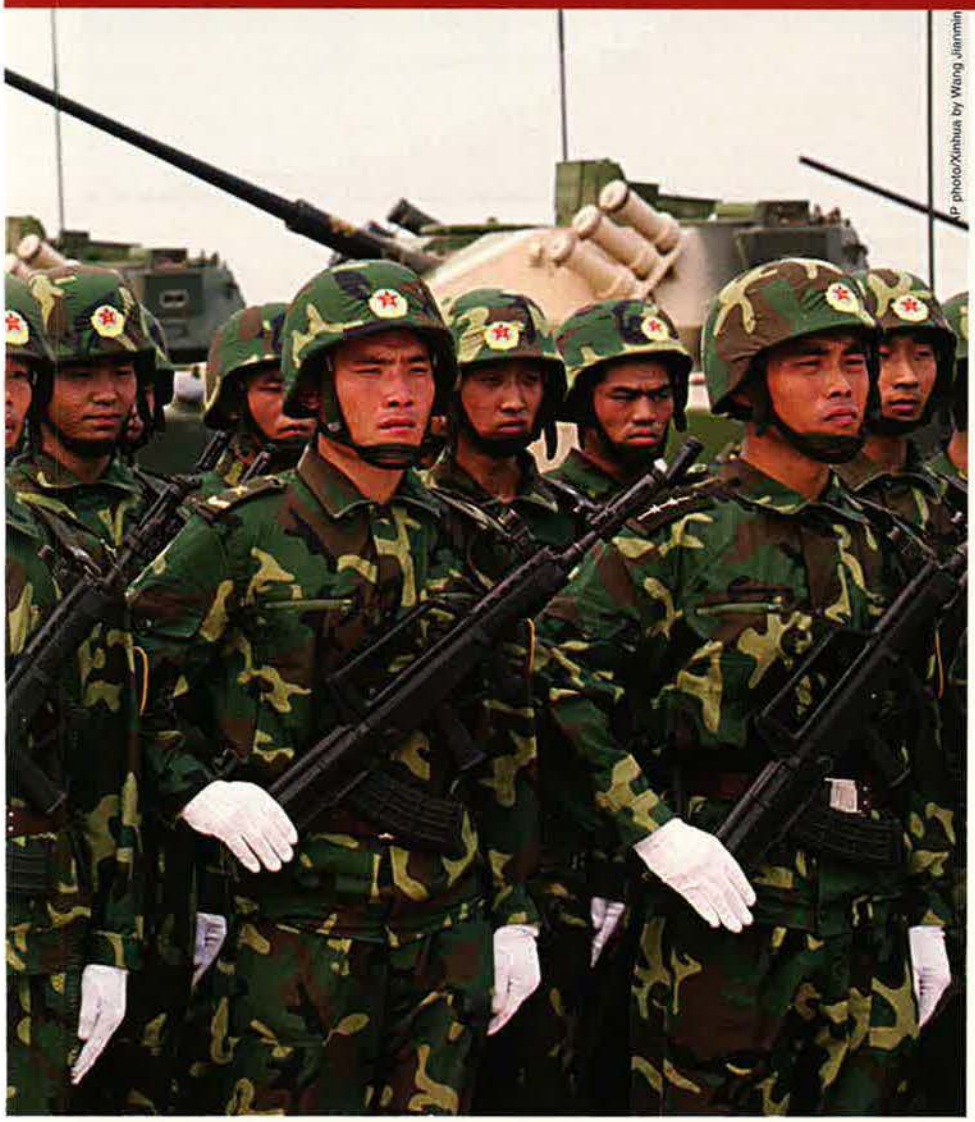
Problems for Airmen

For US airmen, this Pentagon study contained much cause for concern. It reported that China has deployed 700 fighters on sovereign Chinese soil in places from which they could cover the Taiwan Strait without aerial refueling.

In addition, China now is taking deliveries of advanced Russian surface-

"It is the age of airpo[w]
[positional] advantag[e]
help any longer."—Lt.

Calculus



AP photo/Xinhua by Wang Jianmin

China is moving toward a higher-quality military that de-emphasizes sheer numbers of troops and focuses on high-tech capabilities, especially airpower.

r today, and all of the s we have would not Gen. Liu Yazhou

to-air missiles (SAMs) with advertised ranges of more than 120 miles. Already, hundreds of SAM batteries dot the Chinese coast.

These systems, in the aggregate, create the conditions for a potentially dangerous "lockout" scenario—that is, a situation where Chinese military impediments would preclude the entrance into the fight of US military forces.

It is exactly this scenario that Air Force officials regarded as a major justification for the procurement of a large number of "fifth generation" F-22 stealth fighters. In the Air Force's view, the United States would not be able to foil such a lockout campaign without the unique combat power of many F-22s and contributions from numerous other forces. Normal "fourth generation" fighters, such as the F-15 and F-16, would face grave difficulties evading sophisticated SAM attacks. At present, the Pentagon plans to halt F-22 production at 183 fighters.

China also is seeking to improve the capabilities of its tactical air force. In 2004, it deployed its Chinese-built F-10 fighter, and it has continued purchases of the advanced Soviet-designed Su-30 to go with advanced Su-27s that it already had acquired. China's Su-27s and Su-30s give the communist nation a significant capability to attack American naval forces operating in the narrow Taiwan Strait.

CIA Director Porter J. Goss recently told Congress that China's buildup "could tilt the balance of power in the Taiwan Strait" and "threaten US forces" in Asia.

Beijing more or less openly acknowledges that its buildup is being undertaken with a close eye on US military power.

China intently observed the major combat operations in Afghanistan in 2001 and Iraq in 2003, both of which showcased the Pentagon's ultrahigh technology and advanced concepts of operations. "The Iraqi war has exerted a far-reaching influence on the international and regional security situations," noted China's 2004 White Paper on defense.

Today's assertive China wants to catch this wave, to put it mildly. As Zhang noted, "Global military technology and equipment has been undergoing a revolutionary change." China's White Paper cited "the technological gap resulting from RMA" (the Revolution in Military Affairs) and today's strategic "unipolarity"—read: US world dominance—as top strategic challenges.

Zhang laid responsibility for China's arms and technology quests right at

AP photo by Elizabeth Dalziel

An impressive buildup of advanced fighters is under way in China. Chinese military literature is highly complimentary of US airpower and touts it as America's singular advantage. China's air arm is modeling itself after the US Air Force.

America's door. "This isn't driven by China," he argued, but by Washington. America's "level of sophistication is so high that China can't compete with that," said Zhang.

"Soft Power"

For all that, it is clear that China wants to do more than simply improve its "hard" military capabilities. Beijing leaders also want to acquire substantial amounts of soft power.

Soft power is a vague concept, but its essence is use of national cultural influences, foreign assistance, economic ties, "correct" international values and behavior, and other nonmilitary tools to create a sense of legitimacy about a nation's international goals. A key proponent of the soft power concept, former Clinton Administration official Joseph S. Nye Jr., defines it simply as "co-opting people rather than coercing them."

China's soft power campaign started in late 2002, when Beijing went through a change in leadership. Jiang Zemin stepped aside, and Hu Jintao became President and Communist Party head.

Hu's administration soon unveiled a new doctrine it called "peaceful rise." That doctrine called for China to become a great power by focusing on economic development, integration into the global community, and regional leadership without direct military conflict—with the United States or anyone else.

Under the banner of peaceful rise—sometimes also translated as "peaceful ascendancy"—China professes that it will not seek great power status in the old 20th century way—through aggression, force of arms, and power politics. Instead, Chinese leaders say they want an interdependent, multipolar world, and they expect to spend the next few decades improving standards of living within China and transitioning from an industrial-age to information-age economy.

China's drive for regional dominance reflects economic necessity as much as anything else. In a recent issue of *Foreign Affairs,* analyst David Zweig argued that "an unprecedented need for resources is now driving China's foreign policy."

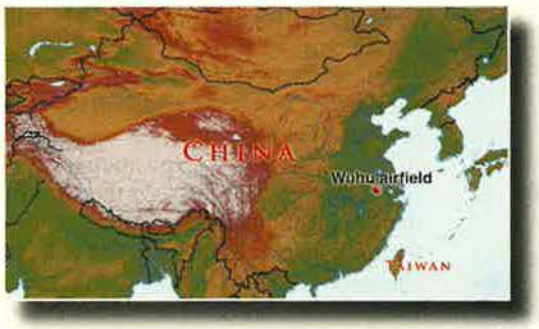
High on the list of needs are oil, certain types of minerals, and foreign capital. Along with the historic issue of Taiwan, these needs keep open the possibility of military tensions and even conflict with China's neighbors.

There is also this: Though the peaceful rise concept started out as a soft power component, it has now ended up with a clear military dimension. This part of the concept had a bumpy start; the military role was debated openly, and backers of ex-President Jiang, who kept his leadership of the powerful Central Military Commission until 2004, forced debate over the major security issues of Taiwan and Japan. The outcome was a political compromise, one that grafted a strong military backbone onto the notion of peaceful rise.

As Zhang Bijan said in December 2005, "We are a big country with 1.3 billion people and a long border. Our desire to upgrade our basic defense abilities is very natural, particularly

AP photo/Xinhua by Li Gang

A Chinese "Flanker" shoots rockets during a joint exercise with Russia last August. With its modern surface-to-air-missiles and advanced fighters, China already has a strong capability to challenge the US in any conflict over Taiwan.



China's Lengthening Reach

At right, a satellite image of China shows Wuhu airfield. This airfield is home to several versions of Russian-made Sukhoi heavy fighters. Some aircraft are capable of reaching Taiwan from this base without refueling. The image below shows a section of the flight line playing host to both old and new versions of the F-7 fighter as well as Su-27/30 "Flankers."

Satellite images by DigitalGlobe

AP/Xinhua photos by Zha Chunming

Though touted as an "anti-terrorism" exercise, the China-Russia wargames last summer practiced paratroop drops, amphibious assault, and other techniques suited to a Taiwan invasion. Combined arms was a prominent theme.

when global military technology is changing so rapidly."

Unimpressed

Many in the West are unimpressed with China's proclaimed sincerity. In a recent editorial, the *Washington Post* had this to say: "Mr. Hu's idea of 'peaceful' so far has included the blunt suppression of democracy in Hong Kong; outreach to rogue regimes around the world, such as Iran and Sudan; double-digit annual increases in defense spending; adoption of a law committing China to a war of aggression against democratic Taiwan if it fails to satisfy Beijing's demands; and ... the crude use of nationalist sentiment to intimidate Japan."

Rumsfeld has indicated that the soft power initiatives raise questions just as China's military spending does. In a 2005 speech in China, delivered to the prestigious Central Party School, he said, "China's pursuit of regional institutions that exclude other Pacific nations such as the United States also lead others to wonder about China's intentions."

In at least one area, however, China's intentions could not be clearer. Airpower is gaining prominence in China's strategic calculus, and preparation for traditional ground combat may well be on its way out.

Evidence of this shift abounds. However, its clearest expression comes from the writings of one of China's prominent military theorists, Lt. Gen. Liu Yazhou of China's People's Liberation Army Air Force. His broad message is that America's current global military dominance stems from its airpower, and China would do well to follow suit.

"I believe that airpower was the decisive force for the Iraqi war, though the US sent massive ground forces as well," said Liu. "Airpower has played a decisive role in all America's recent wars: the first Gulf War, the Kosovo war, the war in Afghanistan, and the Iraqi war."

Liu is an active duty general who once taught at Stanford University. He is no rogue. His family ties are among the best. He married the daughter of Li Xiannian, a veteran of the Long March and one of the Eight Immortals who, along with Mao Zedong, defeated Chiang Kai-shek's forces in 1949 and founded the People's Republic.

There is envy in Liu's remark that "airpower has already become a sharp lance for the United States." As he put it, the US can "look down upon the rest of the world proudly with the help of this 'lance.'" To strengthen its ability to call the shots in its own region, Liu suggested, China must seek to build a sharp lance of its own.

Liu's comments were made in a lengthy interview with a Chinese military journalist published last year in translation by *Heartland: The Eurasian Review of Geopolitics*. By Chinese standards, he's royalty—a "princeling," to use the term coined by China scholars to describe rising party leaders who also have elite family ties within the Communist Central Party.

Prominent Themes

It should be emphasized, however, that Liu is no isolated voice in the wilderness. Similar themes also were on prominent display in China's 2004 defense White Paper, which described how the People's Liberation Army Air Force is pushing for a broad range of improvements.

According to that paper, the PLA Air Force is responsible for safeguarding China's airspace security and maintaining a stable air defense posture nationwide. To meet the requirements of modern air operations, the PLAAF has gradually shifted from a stance of territorial air defense to one of both offensive and defensive operations.

Development of new fighters, air

Sailors of the Chinese Navy gather for the joint China-Russia military exercise. Chinese military leaders say the country can no longer afford to limit its war concepts to reliance on heavy ground forces.

AP photo/Xinhua by Li Gang

China's aggressive naval modernization program underscores its rapidly increasing reliance on imports of raw materials and oil. China is aiming at a full-spectrum "blue water navy" able to project power far abroad.

defense and anti-missile weapons, information operations, and automated command systems are being emphasized.

Chinese interdisciplinary training is being accelerated. Combined arms and multitype aircraft combat training is being intensified. The goal is to improve capabilities in operations such as air strikes, air defense, information warfare countermeasures, early warning, reconnaissance, and strategic mobility.

In its White Paper, China declared that it is emphasizing a defensive air force, appropriate in size, sound in organization and structure, and advanced in weaponry and equipment.

Behind that stilted official language, the message is clear enough: China is unwilling to concede permanent strategic superiority to the United States. Understanding US airpower and its strategic importance is part of figuring out how to counter that perceived hegemony.

In China's view, the task entails, in part, refocusing the vast Chinese military beyond ground power. That process has been under way for several years, with major ground force reductions.

Communist China's revered founder, Mao, made the PLA a dominant force, and the People's Republic was built on its achievements. The Eight Immortals were all PLA generals. For generations, political power in China depended on strong ties to the PLA.

Shaking up the PLA, therefore, is no small task.

Generational change is playing a role. In recent years, the cadre of military professionals in the PLA has grown stronger as ties to the pre-1949 generation have loosened. Today a professional class is evolving in the PLA, and with it comes doctrinal debate.

Another cause of Chinese ferment is the recent example of US airpower. Liu is the most vigorous agitator.

One of his prime concerns was that the PLA—which he dutifully refers to as "a glorious and invincible army"—would fall behind other nations in conceptual development unless it shook off its ground-combat mind-set and took a fresh look at modern military trends.

"It is the age of airpower today, and all of the [positional] advantages we have would not help any longer," Liu warned. He went on to declare that China must develop an "offensive consciousness" and should "first possess a powerful counterattack capability rather than a defensive capability." He concluded, "We'll only stop war by way of conducting counterattacks."

Whither "Boots on the Ground"

Liu's remarks are emblematic of a deeper Chinese strategic reappraisal that has big consequences for the PLA.

Liu used two US examples as justification for de-emphasizing land warfare. He said that the US learned from the Korean War and Vietnam War that "ground campaigns by large-scale mechanized corps had too many disadvantages" and therefore put emphasis on airpower. In Liu's view, it was high time for China to do the same—despite the past glories of the People's Liberation Army. "We cannot limit our war concepts [to] the ground any longer," concluded Liu.

He went on to say that the US wars in Afghanistan and Iraq demonstrated the dominance of airpower for all to see. "In a word, it was an air war," remarked Liu. Airpower was the only way for the US to execute its global aims. The US armed forces had to "fight long-distance wars, to be able to be deployed promptly, strike precisely, and maintain absolute mastery of the sky," as Liu put it.

He still believed in boots on the ground, though he ascribed to it a lesser significance. He likened airpower to "both arms of a person; you can use [them] to wreck other people's windows or door planks. But, if you want to occupy their houses and protect the property

AP photo/Xinhua by Wang Jianmin

A prominent Chinese general opines that the swift US victory in Afghanistan, accomplished chiefly through airpower, exemplified Sun Tzu's lesson that sparing use of force is the epitome of the military arts.

AP photo via RTR Russian Channel

A Chinese officer aims his missile launcher during Peace Mission 2005. While it is determined to upgrade its air and naval branches, China is not ignoring the Army. It will be smaller but field higher technology.

from further seizure, you'll have to use your feet—ground forces—to enter the house."

Liu was firm that airpower was the essence of modern military capability, especially that of the United States. These views dovetailed with China's White Paper, which said, "The Army is streamlined by reducing the ordinary troops that are technologically backward, while the Navy, Air Force, and Second Artillery Force are strengthened."

Moreover, Chinese air and naval officers are gaining prominence with more appointments to senior military councils. A more assertive strategy in the Taiwan Strait or beyond will demand air and naval leadership within the PLA itself.

Liu evidently was bothered greatly by a remark from Adm. Dennis C. Blair, who formerly served as commander of US Pacific Command in Hawaii. According to Liu, Blair said: We respect the authority of the People's Liberation Army in their mainland, yet the US must make China understand that the ocean and sky are ours.

Liu huffed, "Basically, we do not have any problems on our land, [but] our ocean territory has been invaded severely."

The challenge for the PLA is to stiffen its power in the Taiwan Strait and other areas of global competition, such as the East China Sea, with its major oil deposits, and the Straits of Malacca, the maritime passage for growing Chinese oil imports.

Liu spoke for many Chinese military men when he applauded reductions in the size of the PLA and urged a focus on developing true talent in the ranks. He also thought it was a good idea to copy the entrepreneurial spirit of China's businessmen.

China must "study how the people's war could be fought in current situations." Preparing just to defend the Chinese mainland would mean enemy victory "without even firing a shot" because China would be contained, according to Liu.

The Highest Military Art

Operation Enduring Freedom in 2001 clearly made a big impression on Liu. He was amazed at the rapid victory. Liu said the US "dismantled the Taliban forces in just 61 days with only 16 deaths among the US troops, of whom none were killed in action." The victory, he said, was a stark demonstration of Sun Tzu's maxim that sparing use of force marks the highest application of military art.

Liu also appears to have enjoyed watching Soviet military doctrine and systems come apart under the American hammer. After five decades of Cold War competition, the wars in Afghanistan and Iraq capped off the debate over which system was superior.

What's the next step for China? Again, one could do worse than to use Liu as a guide. He has advocated Chinese development of a powerful information warfare capability and believes that Chinese moves into space are natural, inevitable, and absolutely necessary.

"The information war is now laying the foundation of the world's new empire," said Liu. For any nation that fails to see this, the long-term result will be "terrifying."

Internal change in China is leading to more controversy and debate that sometimes flares into public view. Example: Liu's verbal jousting with another Chinese "princeling," Maj. Gen. Zhu Chenghu.

In July, Zhu told the *Financial Times:* "If the Americans draw their missiles and position guided ammunition onto the target zone on China's territory, I think we will have to respond with nuclear weapons." Liu openly disagreed with Zhu in October 2005 at a prestigious forum attended by major Chinese leaders.

As the July 2005 DOD report complained: "Direct insights into China's national strategies are difficult to acquire." Liu's broadsides have come during a time of transition. China remains a one-party system with close-knit military and party ties, but is no longer the monolith it once was.

That is what makes Liu's hints and insights so intriguing. By making sure Chinese leaders are aware of the dominance of air and space power, Liu, at least, gives a voice to thinkers who want to push away from China's traditional military concepts. The question is how far—and how fast—China will go.

And the answer is critical. In a recent article in *The Atlantic Monthly,* author Robert D. Kaplan raised this warning flag: "Whenever great powers have emerged or re-emerged on the scene (Germany and Japan in the early decades of the 20th century, to cite two recent examples), they have tended to be particularly assertive—and therefore have thrown international affairs into violent turmoil."

Kaplan added: "China will be no exception." ■

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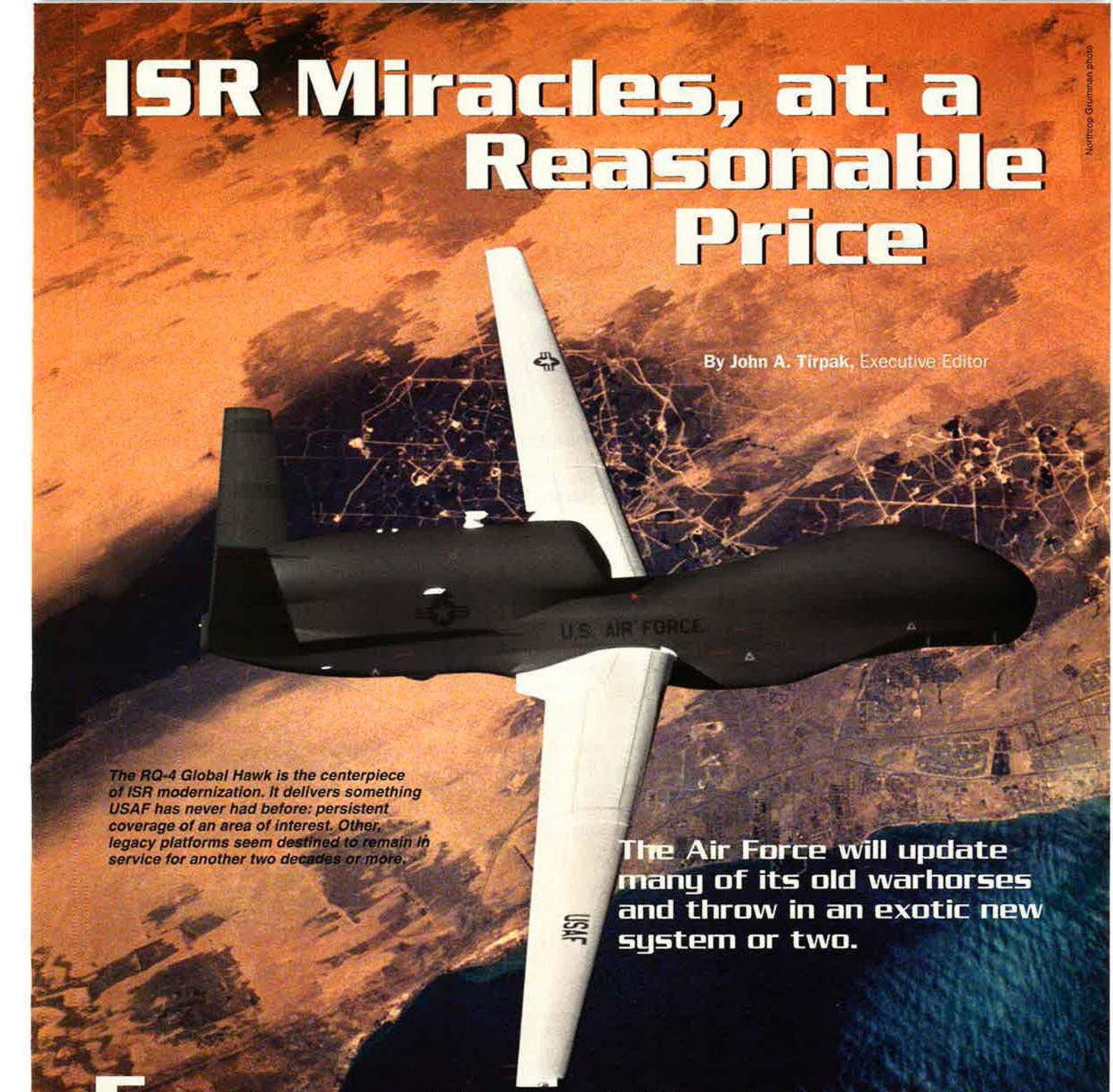
ISR Miracles, at a Reasonable Price

By John A. Tirpak, Executive Editor



Northrop Grumman photo

The RQ-4 Global Hawk is the centerpiece of ISR modernization. It delivers something USAF has never had before: persistent coverage of an area of interest. Other, legacy platforms seem destined to remain in service for another two decades or more.

The Air Force will update many of its old warhorses and throw in an exotic new system or two.

For USAF's intelligence-surveillance-reconnaissance systems, the coming decades will be a time of evolution—not revolution.

Fiscal austerity and the need to pace ISR fleet operations will impose new restrictions and drive USAF to pursue incremental advances in ISR capabilities. Plans call for most types of ISR aircraft—the E-3 Airborne Warning and Control System, E-8 Joint STARS, RC-135 Rivet Joint, and the like—to get selected upgrades and keep on operating until 2025, perhaps beyond.

In the next few years, the Air Force will enhance its ISR capabilities by bringing on increasing numbers of Global Hawk and Predator unmanned aerial systems. These aircraft will offer USAF something it has never had: persistent and uninterrupted overwatch of specific areas of interest.

For broader-area coverage, the E-3 AWACS and E-8 Joint STARS, which track air and ground targets, respectively, will get progressively newer internal systems, as will the fleet of RC-135 Rivet Joint signals intelligence aircraft. Their planned successor, the E-10 airborne command and control sensor platform, has run afoul of tight budgets and has been relegated to the status of a research project for now.

The Air Force will probably part with its venerable fleet of high-flying manned U-2 reconnaissance airplanes but not until Global Hawk demonstrates that it can, as expected, take over the mission with capability to spare.

Predator and its derivatives also signal the arrival of a new wrinkle in the ISR mission: a surveillance platform that

USAF photo by TSgt. Robert J. Horstman

The RC-135 Rivet Joint is in high demand in Iraq, where it makes tactical communications intercepts and passes them along to troops engaged with the enemy on the ground. The RJ fleet is meticulously maintained and frequently improved.

also can deliver precision attack. In fact, the most recent versions of Predator are regarded as hunter-killer aircraft, with strike as their primary mission, rather than as reconnaissance airplanes that happen to be armed in case they discover a target of opportunity.

"Big Sensors" Get Old

The advanced age of much of the ISR fleet of "big sensor" aircraft—AWACS, Joint STARS, and Rivet Joint—seems not to be a serious handicap. If they are meticulously maintained, the aircraft are believed capable of lasting into the 2020s, by which time new technologies may replace them. However, significant investments will be needed—in the form of re-engining—to provide the aircraft with the power generation they require to keep current with the threat and the ever-expanding mission.

Reconnaissance aircraft now classified also are expected to be unveiled in the coming years. They reportedly will offer extremely stealthy unmanned entree into enemy airspace and also carry weapons. The F-22 Raptor, primarily a fighter and attack platform, also is intended to be a vast "vacuum cleaner" of battlefield information from its vantage point deep inside enemy airspace, passing data to the entire US military network. Its ISR capabilities, while described as considerable, are expected to remain secret for years to come.

All ISR platforms now in USAF service are considered to be low-density, high-demand systems, meaning there are never enough available to satisfy the needs of combatant commanders. Managing the operating tempo of the ISR fleet will pose a tough challenge indefinitely.

Lt. Gen. Walter E. Buchanan III, commander of 9th Air Force and air boss for US Central Command, said in October that he regards the size of the existing ISR fleet to be adequate for continuing operations in Iraq and Afghanistan.

"What we have right now is about right for this fight and our ability to sustain the fight," Buchanan told *Air Force* Magazine in an interview.

Buchanan noted that his boss, US Central Command chief Gen. John P. Abizaid, "said, while we could easily always make the case that more is better, if I can't sustain more, ... then I may need to ratchet back, because we're in this fight for the long haul."

All the ISR assets can be called out for a major combat operation, "and I will, because that's what we bought them for." For Operations Enduring Freedom and Iraqi Freedom, "we emptied the barn," Buchanan said, adding that, had there been enough concrete available in the region to park them on, the Air Force would have summoned even more ISR platforms to the fight.

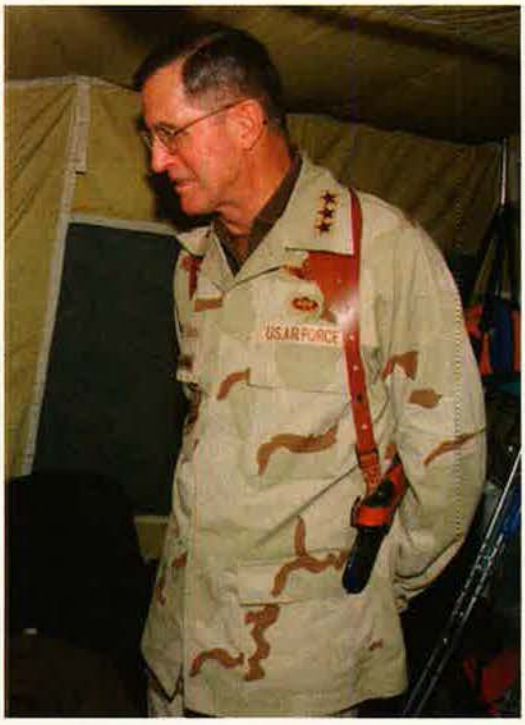
"We sent everything we could, used it, but then as soon as they were no longer needed, we pulled them back, because we knew we could not sustain it," Buchanan said.

"What I have forward right now ... is essentially a force that is sized to be sustained."

He noted that, in the mid-1990s, the AWACS fleet and all its personnel were "very, very tired," on near-constant deployment to CENTCOM and other theaters. As a result, depot maintenance, regular upgrades, and the crew training pipeline were all badly backlogged—so much so that AWACS specialists were "voting with their feet" and the Air Force had "a tough time" with retention.

Broken Force

"We broke it," Buchanan said flatly. Whether symptoms of a specialty under



USAF photo by TSgt. Marc Barnes

Lt. Gen. Walter Buchanan III says the Air Force ISR capabilities in the region were sized by what is "sustainable" for the long haul, not necessarily by commander requirements.

extreme stress or just bad luck piling on, the AWACS miscues that resulted in the shootdown of an Army Black Hawk helicopter in Iraq in 1994 and in the loss of an entire E-3 and its crew near Elmendorf AFB, Alaska, the next year did not help the situation. (See "Aerospace World: Seven Careers Damaged in Black Hawk Review Action," October 1995, p. 16, and "Aerospace World: Geese Caused AWACS Disaster," March 1996, p. 10.)

There was little letup until OIF, when the era of the Iraqi no-fly zones effectively ended and the AWACS' long mission concluded. After the wrap-up of major combat operations, it was possible to shift some of the AWACS airborne command and control mission to other platforms. The E-3 force was sent home, and "now, because the pressure is off of them, the AWACS community is very healthy," Buchanan reported.

The AWACS fleet and personnel were placed on a two-year "reconstitution period" during which the AWACS were relieved of most deployments, the depot backlog was worked off, upgrades were put in place, and crews were allowed time to do the training and upgrade schooling they needed.

The Air Force wants to make sure it does not repeat the AWACS experience with any other part of its ISR fleet, Buchanan said.

There is some danger in doing just that with the E-8 Joint STARS, however. The E-8 took over much of the airborne command and control function when AWACS left the theater, and its unique capabilities have been in high demand since.

Unlike the AWACS, which scans for aircraft in hundreds of miles of airspace with the "flying saucer" radar mounted atop the fuselage, the Joint STARS uses its under-fuselage radar to map the surface and watch for moving vehicles. It was conceived in the Cold War as a way to keep tabs on large columns of moving armored vehicles—something it did in the two Gulf Wars—but in the last few years has been narrowing its scope to watch for smaller groups of vehicles or even individual cars.

Buchanan said he would like to employ the Joint STARS to watch huge swaths of Iraqi desert for vehicles on the move, something it is uniquely equipped to do. However, besides watching for small numbers of vehicles in very specific areas—what operators call the "soda straw" approach to using the E-8's radar—the aircraft is being used heavily as a communications relay between ground troops and headquarters.

"We have people in Iraq who are very comfortable using the Joint STARS as a radio relay platform. That is a very inefficient way to use that tremendously capable system," Buchanan asserted, "that I would much rather use monitoring the borders and the open desert regions for which its radar is ideally suited."

However, because the Army is in charge, "I give up the initiative to the ground commander and the supported theater commander as to which of those things he considers to be the most important."

He added that "we're working ... to get them used better, but ... the supported ground commander has told me where he wants them. ... That's a tough call."

Blended Wing in Action

The entire fleet of 17 Joint STARS is operated by the Air Force's only blended active duty-Air National Guard unit, the 116th Air Control Wing at Robins AFB, Ga. The steady state of deployments is causing the Air Force to think hard about whether it can continue the way the E-8 is employed.

Part-time Air National Guard members who do the Joint STARS mission "are starting to see ... a dip in the retention levels," said Maj. Bill Gould, the Air Force's ANG program element monitor and Joint STARS programmer. It's not hard to see why, he said.

"The first time your employee goes off for a couple of months, OK. Second time, now it starts to be a problem. Third, fourth, fifth, now it starts to be a burden," Gould said.

While USAF is considering both higher crew ratios for Joint STARS as well as converting some part-time Guardsmen to full-time status, neither option is a cheap fix, Gould said.

"It's a discussion item," he said, "but it's a bill, and the Air Force has limited manpower and funds. So it's almost like you'd be taking from another mission to make this mission more robust."

It's good to have the discussion, though, Gould said, if only to draw attention to the fact that just because the Air Force has 17 E-8s—an 18th is a test aircraft not used operationally—it only has enough manning for 12. That's an important message to get out when the ISR-voracious planners of the combatant commanders want to know "why can't we get more of them on the road," Gould said.

Like most USAF systems now, the Joint STARS is on a "block" approach to upgrade. All the E-8Cs in service are Block 20 aircraft. The Block 30 upgrade, now in development, will add avionics improvements to comply with international Global Air Traffic Management regulations. These will allow the E-8Cs to operate in commercial air corridors and altitudes.

The Block 30 also will improve the machine-to-machine data transfer capability and add more modes to the ground-search radar.

The E-8 fleet was not bought new. Used Boeing 707s were acquired in the early 1990s and converted. The airplanes are well taken care of, though. Gould said, "The last assessment we've had ... [is that] beyond 2025 would be their life expectancy."

Even so, the aircraft have never performed to their original require-

USAF photo

The E-8 Joint STARS fleet, heavily tasked in Iraq, is not always used to its full capability. Some want to use Joint STARS for broad surveillance, but it is often used as a radio relay. The heavy pace of operations is taking a toll on crews.

USAF photo

The "front office" of the U-2S has been updated recently with glass cockpit displays. Engine and structural upgrades will make it capable of lasting another 10 years, when Global Hawk will start taking over the high-flying mission.

ments, chiefly because of the elderly (original) TF30 engines, that neither can get the aircraft swiftly to altitude nor keep it there long enough for the required mission. Moreover, as further capabilities are added, the power generation capacity of the engines, already maxed out, will be exceeded. In addition, the engines are having to come off the wing for maintenance more than twice as often as originally predicted.

The cost of those repairs has gone up 300 percent since Fiscal 2002, Gould reported.

High Cost

The Air Force is considering a re-engining program for the Joint STARS, but with 76 engines plus spares to buy, the bill is high, considering the other priorities the service is already cutting out of its acquisition plan.

Gould said it would be preferable to lease the engines, but said that the idea of leasing has fallen into disfavor due to the tanker lease fiasco of a few years ago.

Congress has shown some inclination to add funds to re-engine the Joint STARS, but no formal plan has yet been adopted.

The influx of the Global Hawk unmanned aerial systems will not, for a while at least, reduce the need for Joint STARS. The Global Hawks can do some of the ground moving target indicator (GMTI) mission, but Lt. Col. Chris Edling, Joint STARS functional area manager for the Air Staff, said they will only be complementary capabilities for the foreseeable future.

"There aren't many of those, and we don't rely on them," Edling said.

The Joint STARS was to give way to the E-10 Multisensor Command and Control Aircraft, or MC2A, sometime in the next decade. The Multiplatform Radar Technology Insertion Program (MP-RTIP), a radar upgrade for the Joint STARS, was to have been fitted to the E-10, along with other changes that would have made the E-10 a replacement for the AWACS and other ISR platforms as well. (See "Seeking a Triple-Threat Sensor," November 2002, p. 38.)

However, budget cuts made in December indicated that the E-10 program would yield only a single Boeing 767 fitted with the MP-RTIP, to be used for test and development of more E-8 upgrades. At least for the next five years, the Joint STARS will be the only large ground-mapping radar airplane in USAF service, supplemented by Global Hawk.

Air Force officials said that Defense Department planners would like to see the USAF partner with the Navy on the multimission maritime aircraft, using the MP-RTIP, but the talks are still in the preliminary stage.

For its part, AWACS is well caught up on its program of upgrades, having just completed the Radar System Improvement Program, undertaken in concert with the UK and NATO, which are also AWACS operators. The upgrade increased the detection range of the aircraft's main radar sensor to catch even smaller targets, although a program official said the E-3 is not yet configured to detect "stealthy" targets or cruise missiles. Such capabilities were to become available with the E-10.

The New AWACS

Now in development is the AWACS Block 40 version, which will convert the aircraft to what will be called the E-3G configuration. The upgrade will change out 1970s computers for modern ones with an open architecture, meaning the AWACS can accept new electronic devices more readily. The Block 40 also increases its network-centric capability by integrating the data from numerous sensors.

The upgrade program seems to have secure funding, and the first E-3G should roll off the conversion line in 2009, according to Col. John Maxwell, Air Staff AWACS functional area manager. He said the AWACS, given continued rigorous care and upgrades, is expected to last to about 2035.

However, "we have airframe issues, too," just like the E-8 and other 707-derived aircraft in USAF service, he said.

"Our dream list would include new engines, also," Maxwell noted, and keeping the AWACS in service to 2035 would probably require just that. Like the Joint STARS, the AWACS needs more generator power than its existing engines can deliver.

Air Force Secretary Michael W. Wynne said in mid-December that he believes a re-engining of both the AWACS and Joint STARS fleet may be necessary, and he believes there are enough members of Congress who also "see it that way."

A reliability and maintainability program is in place that is changing out components "prone to breakage" that keep the AWACS from being available at full capability.

There are 32 USAF E-3s, including four trainers and one test aircraft. Two are earmarked for the Pacific Theater, at Elmendorf AFB, Alaska, and at Kadena AB, Japan. All told, there are about 22 to 23 available airplanes.

The two-year reconstitution period following OIF concluded last spring and left AWACS "looking pretty good" with aircrews, and the maintenance backlog was worked off as well, Maxwell said.

Although the AWACS is no longer deployed to Iraq or Afghanistan, it does conduct Operation Noble Eagle missions flying air defense of the US and also is deployed to Ecuador for the counterdrug mission. The E-3s

also played a significant role in last summer's hurricane relief operations, deconflicting hundreds of rescue aircraft operating in a tight geographic area, enabling "a remarkable safety record" for the operation, Maxwell asserted.

The Air Force has about 24 U-2 aircraft available for use at any given time, out of an inventory of 34 airplanes. The service has just completed a substantial upgrade of the venerable reconnaissance airplane, early versions of which entered service in the 1950s. The upgraded aircraft have new engines, "glass" cockpits, and new wiring. New sensor packages are in development.

"The airframe itself is good well past 2025, maybe even as far [out] as 2040," said Bruce Nelson, senior technical advisor on surveillance and reconnaissance to the Air Staff. However, the Air Force wants to act as quickly as possible in moving the U-2's mission to the Global Hawk. The RQ-4 is able to remain on station for 24 hours and offers a wider variety of sensors.

"As Global Hawk matures, the Air Force will then look at phasing out the U-2 program. But there is no absolute date yet set for doing that," Nelson said. While the Air Force does not want to let go of any ISR capability until it has its replacement firmly in hand, budget perssures may intervene. The service has asked DOD for permission to retire the U-2 three years earlier than planned, in 2011 instead of 2014.

During the buildup of Global Hawk, the Air Force will actually enjoy adequate high-flying aerial reconnaissance capability, able to meet most COCOM requests.

Going Pro

For a system that has until only very recently been considered experimental, Global Hawk has already played a significant role in operations. Just one advanced concept technology demonstration aircraft was available for the last few years, but it was put to work in OIF and was important in tracking and targeting Iraqi armored vehicle movements through a March 2003 sandstorm. It has remained in service, making three deployments to the theater, providing a full 24-hour on-station presence about every third day.

The first production system was to be deployed in December, doubling the capability available in Southwest Asia. Buchanan said he would now be able to have a Global Hawk up over both Iraq and Afghanistan every other day.

Global Hawks, like every other ISR system, are now described in block numbers. The original version was the RQ-4A. A larger model, with bigger wings, is the RQ-4B configuration, now known as a Block 30. It's capable of lofting a 3,000-pound payload and keeping it at altitude for 24 hours in a row. The scope of area that Global Hawk can observe is classified, but it can watch regions obliquely as well as directly below.

The Air Force's current inventory objective is for 51 Global Hawk systems, including ground stations, launch and recovery gear, and other support equipment. Of those, 18 will be available at any given time for use, the others being in for training, test, or servicing.

Of the 51, USAF plans to equip 12 with the MP-RTIP, also installing a version on Joint STARS. These 12 will be Block 40 aircraft. Seven will be the Block 10 model (formerly RQ-4As). All but the seven early versions will be "multi-int" aircraft, able to simultaneously provide GMTI, synthetic aperture radar, and electro-optical and infrared imagery.

All the aircraft are scheduled to be procured by Fiscal 2011 and enter the inventory by 2013 to 2014.

Nelson said Global Hawk is considered the centerpiece of the Air Force's ISR program right now.

"The Air Force has made a significant investment to expand its ISR capability. Obviously, we have other projects—RC-135s and things that do other missions—but the Global Hawk is the primary development effort that we're pursuing right now," he said. The aircraft couples the capability of existing ISR platforms with "persistence and endurance," new capabilities for USAF, he said.

Space Radar Questions

It is not yet known whether the Space Radar—which would be a constellation of satellites providing GMTI radar—will offset requirements for Global Hawk and Joint STARS. Again, USAF officials said they do not wish to let go of existing capabilities before the successor system is well in hand. While Congress has been generally supportive of the Space Radar, it is unlikely that a minimal operational capability will be available before late in the 2010s. So far, the Air Force has not programmed any offsets in anticipation of Space Radar.

The RC-135 fleet was originally manufactured as C-135s in 1961, but has undergone a rigorous maintenance and upgrade program because of its rapidly changing onboard technology and the insatiable demand for the aircraft. The RC-135s do signals intelligence, intercepting phone and radio calls, as well as data traffic.

"We've re-engined the fleet entirely," Nelson said, and the Air Force also has given the type new glass cockpit instrumentation. The Air Force also puts each aircraft through a thorough programmed depot maintenance "every three to four years." It's necessary because the aircraft have a unique set of "appendages" in the form of antennas, fairings, and housings for sensors.

With that level of scrutiny, "all the structural issues ... are addressed, as well

USAF photo by SSgt. Prentice Colter

The unmanned Predator system occupies a new niche in the ISR fleet, adding a lethal capability. All future aircraft will be armed. Early Predators are "killer scouts," but later models will be "hunter-killers."

Boeing artist's conception

Air Force hopes of consolidating the AWACS, Joint STARS, and Rivet Joint functions on a single E-10—seen here in an artist's conception—seem to be dashed. Instead, USAF may re-engine the ISR "heavies."

as system modernization, both in its main sensors and its dissemination."

The reason for the fast revisits of Rivet Joint capability is the rapidly changing technology involved in communications. As computers, radios, and, for example, cell phones get more advanced, the Rivet Joints need to be able to keep up with the changes.

Without a major structural improvement, "these airframes are good past 2023," Nelson said. Among the advantages of the aircraft is its ability to carry 48 tons of gear.

"You have the ability to modify it fairly easily, and it has all the size, weight, and power to adapt it very quickly to the challenges that you face in the signals domain," Nelson noted.

The 15th, 16th, and 17th Rivet Joints were built in recent years, on airframes brought out of storage.

The Rivet Joint is often misunderstood, Nelson said.

He said, "It is primarily a tactical platform," directly apprising troops on the ground of enemy communications affecting them. The aircraft also have a role in supporting special operations, but much of their work is classified.

"It's been in surge for the last four years," Nelson said. "It is a workhorse over in CENTCOM today."

Predator the Popular

The Predator has been in constant demand since the midsize UASes were first deployed operationally in the 1990s. Like the Global Hawk, early experimental versions were pressed into service for real-world combat operations and did well. Since then, the type has been advanced in blocks.

The Predator A, able to carry capability for full-motion video relay in both normal and low-light conditions, was upgraded with a laser designator and then Hellfire missiles, just in case it spotted a fleeting target when no combat aircraft were nearby. That aircraft—called MQ-1—is now known in the Air Force as a "killer scout." It will be superceded by the MQ-9, a larger version with a slightly different configuration of wings and tail, and a bigger engine, able to carry more weapons. It's known as a hunter-killer and represents a new niche in ISR, Nelson said. Its main mission will be strike, with ISR as a secondary mission.

The MQ-9 also will pave the way for the Joint Unmanned Combat Air System, or J-UCAS, which will be a large, stealthy armed aircraft capable of doing deep tactical reconnaissance, but J-UCAS will not replace the MQ-9, Nelson noted. The ISR community has been developing the MQ-9 because it had experience with the Predator A. After the J-UCAS comes into service, the hunter-killers will still be used.

The Air Force wants to have about 10 Predator squadrons by 2011. The size of the squadrons will vary, depending on their location (See "Smashing the UAV Stovepipe," p. 50.)

Other, classified ISR platforms and capabilities are expected to be unveiled soon. Ralph Heath, Lockheed Martin Aeronautics chief, said his company expects to be allowed to talk about an unmanned ISR aircraft it is developing in the not-too-distant future, or at least "when the time is right." Little is known about the aircraft other than that it is stealthy.

The Air Force also has been cagey in describing the ISR capabilities of the F-22 fighter, which will have elaborate suites of onboard sensors for collecting and disseminating battlefield data from deep within enemy territory.

Gen. T. Michael Moseley, USAF Chief of Staff, said in mid-December that the F-22 will be "equally capable" to Rivet Joints and EC-130 Compass Call aircraft in terms of its ability to collect and distribute battlefield data. He did not elaborate.

John Paquet, director of F-22 mission systems and software at Lockheed Martin, said the Raptor's onboard sensor suite allows it "to gather information that no other platform has the ability to gather today" and that the capability is " 'bleeps' ahead of any sensors on any platform out there now." The capabilities are classified because an enemy, knowing what they are, could devise countermeasures, Paquet said.

"We'd love to ... tell you all the wonderful things that the [F-22] does, just like we'd like to tell a lot of people on [Capitol] Hill that need to know what it can do, but we're just not able to do that," he asserted.

Suffice to say, he added, that the F-22 "is out front, leading the charge into battle, and will be in a unique situation to gather that intel first, ... before anybody else is even close to the battlefield."

Over the past five years, USAF leadership has focused the ISR community on improving the sensor-to-shooter links, collapsing the time required from seeing a target to attacking it. Toward that end, leaders have emphasized the development of "machine-to-machine" links that will, as automatically as possible, designate targets and provide decision-makers with a wealth of data on each one.

Retired Gen. John P. Jumper, the Air Force Chief of Staff from 2001 to 2005, was "spot-on when he talked about the machine-to-machine interface," Buchanan said. The technology is still developing—Buchanan said "we're not there" yet—but the network connections, system to system, have been put in place.

"We are networked, airman-to-airman," Buchanan asserted. It may take a radio call or Secret Internet Protocol Router Network e-mail, but "everything we're doing now, we're doing in real or as close to real time as we can get it." He said that "while it may not be the machine that's talking to the machine—it may be the operator that's talking to the operator—we have established those links and we're cross-cuing. ... The effect is the same." ■

Electronic Warfare Systems

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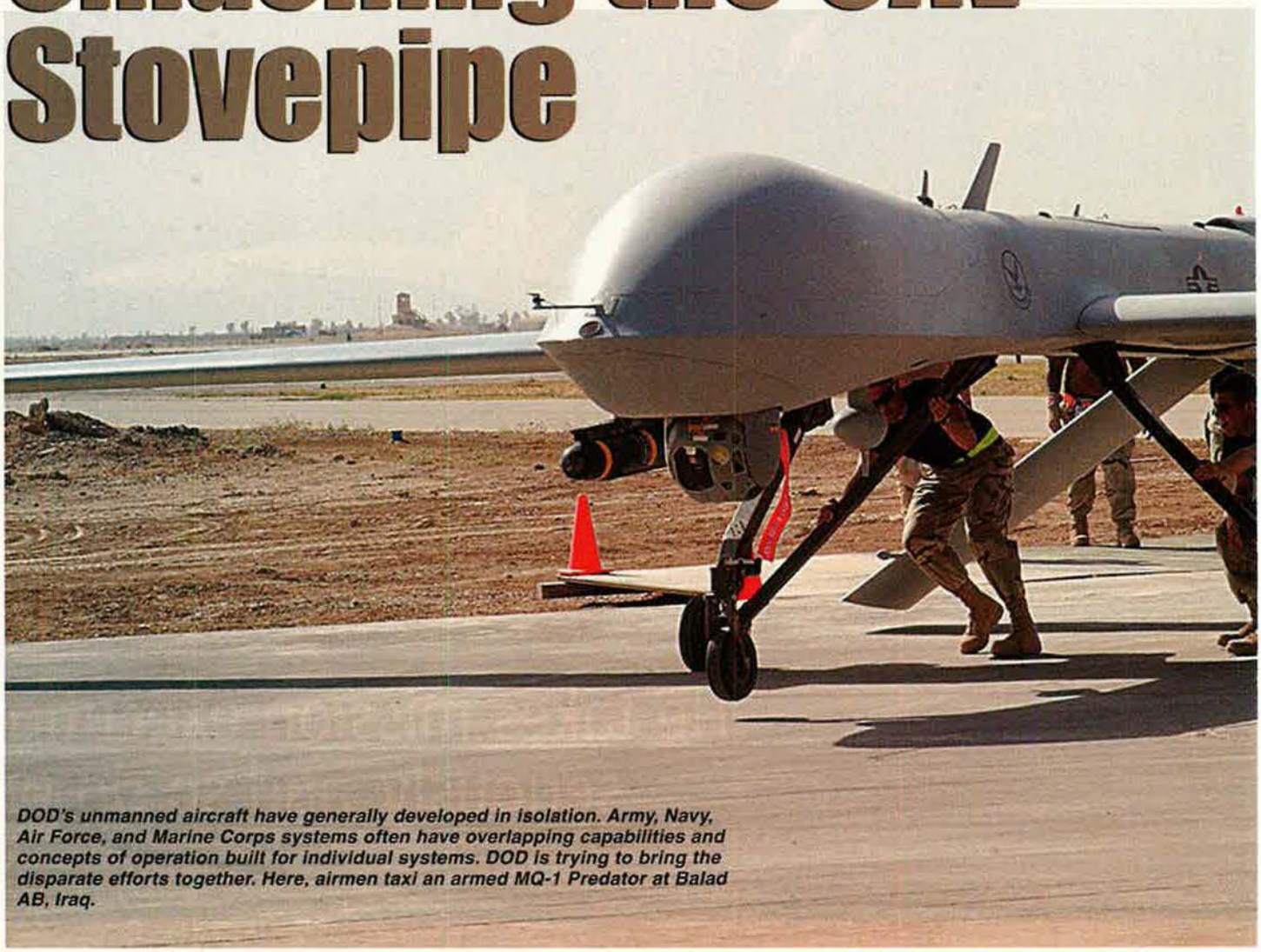
Smashing the UAV Stovepipe



DOD's unmanned aircraft have generally developed in isolation. Army, Navy, Air Force, and Marine Corps systems often have overlapping capabilities and concepts of operation built for individual systems. DOD is trying to bring the disparate efforts together. Here, airmen taxi an armed MQ-1 Predator at Balad AB, Iraq.

Early last year, the Air Force proposed that it become the Pentagon's executive agent for unmanned aerial vehicles. The move would have given USAF officials substantial influence over the development, planning, funding, and operational concepts of unmanned aircraft, DOD-wide.

The Joint Staff unceremoniously rejected the idea. Instead, it chose to hand off the coordination job to an all-service Joint UAS Center of Excellence at Creech AFB, Nev. (formerly Indian Springs Air Force Auxiliary Field). The Air Force already had launched such a center in Nevada. It didn't matter; the Pentagon decided to take it over. It put an Army general in charge.

So, over a period of just a few months, the Air Force saw its hopes for leading the UAV effort dashed and its UAV center of excellence taken over. The developments raised a question: Will the new arrangement be sufficient to meet the military's—and the Air Force's—burgeoning needs in this area?

Numerous interviews with those involved in the effort lead to this consensus answer: Yes, the arrangement should work. Air Force and DOD leaders believe that all-service coordination is essential for successful development of unmanned systems. To maximize the power and contribution of unmanned aircraft there must be a harmony of operational plans, acquisition strategies, and procedures. That

USAF photo by SrA. Colleen Wronek

By Adam J. Hebert, Senior Editor

has been notably absent as individual services pursued their own programs, largely in isolation.

"With Open Arms"

In March, when the Air Force launched its center of excellence, the operation was positioned under the USAF Warfare Center at Nellis AFB, Nev. At the time, the Air Force was trying to drum up support and participation from the other services.

"I don't care who gets [missions] done as long as the job gets done," said Maj. Gen. Stephen M. Goldfein, the Air Force Warfare Center commander, in March. "It would be immensely exciting to have the other services join in," he added.

Goldfein told *Air Force* Magazine in November that the new joint center should meet all of the Air Force's needs, "and then some."

Col. Terry New, warfare center vice commander, said unmanned aircraft operating procedures and development had gotten somewhat out of control, and he was welcoming the new joint center "with open arms."

The joint center is headed by Army Brig. Gen. Walter L. Davis, with Air Force Col. Larry L. Felder serving as the deputy commander. It became operational on Oct. 1. Driven by experience in Iraq—where vast numbers of UAVs are buzzing thick in the air—the first order of business was to create a joint concept of operations for UAV employment, said Davis. The center has a very broad charter to look at everything from tiny tactical UAVs to the high-altitude Global Hawk aircraft.

The center will grow from the cadre of 11 that existed in November to a team of 64 within a couple of years. Felder, for example, currently serves as deputy commander of the joint center as well as commander of the Air Force's UAV Battlelab, also located at Creech and just a few blocks away. Eventually, Felder said, the Air Force will name another colonel to serve as the deputy for the joint center.

The joint center was created—at least in part—because the military services employ unmanned aircraft differently. Some feared that giving the Air Force executive agency would lead to a lack of attention to Army, Navy, and Marine Corps needs.

The Army is a major player in unmanned aircraft operations. Because of the battlefield demands in Iraq, the Army in 2005 for the first time flew more unmanned aircraft flying hours than the Air Force did. The Army and Air Force also typically fly their aircraft in different ways.

Dyke Weatherington, deputy director of DOD's UAS planning task force at the Pentagon, said in an interview that the Army flies its unmanned aircraft at higher altitudes and prioritizes direct tactical support to the warfighter.

Under these circumstances, giving the Air Force executive agency over UAS development and priorities would "fly in the face" of operational experiences, he said. The Army is not expected to use its unmanned aircraft the way the Air Force does.

While the systems are being flown effectively in Iraq, coordination is still needed because the various UAV operators have inherited systems and tactics that were "invented on the fly," said Goldfein.

The Predator system, for example, began life as a Defense Advanced Research Projects Agency advanced concept technology demonstration. Remarkably, the MQ-1 just reached operational status in 2005. But the Predator went into use, as an ACTD, early and often and has been con-

Now You Know

For decades, certain kinds of remotely piloted aircraft have been called "unmanned aerial vehicles," or UAVs. Well, that is now officially old-think. The Defense Department has begun encouraging use of a new term, "Unmanned Aircraft System," or UAS, to denote those systems formerly known as UAVs. You may well ask, Why?

The Pentagon reasons that most mentions of a UAV were actually references to an entire system, comprising not only a flying aircraft but also ground control stations, satellite links, communications, and so forth. Hence the new, officially approved term, "UAS." The purging of incorrect thought doesn't stop there. It's no longer proper even to refer to the actual aircraft as a UAV. When referring solely to a Predator, Global Hawk, or Scan Eagle aircraft, the Pentagon wants you to say, "unmanned aircraft," or UA.

Please note that the Air Force has not yet fully embraced this concept. The service still maintains what it calls the UAV Battlelab at Creech AFB, Nev. Still, the politically preferred terminology encroaches; located nearby is DOD's Joint UAS Center of Excellence.

For the Air Force, Tests Ahead on the UAV Front

Air Force Predator and Global Hawk UAVs have been used for so long that one can forget that they are fledgling systems. At some point, USAF will have to take some steps demonstrating that UAVs are here to stay.

Take, for example, the situation with combat Predators. These systems are operated by airmen at the Air Force's Warfare Center at Nellis AFB, Nev. Yet the center is really in a different line of work. Most of the time, it certifies equipment for combat; evaluates tactics, techniques, and procedures; offers advanced training through the Air Force Weapons School and Red Flag exercises; runs two battlelabs; and operates the Thunderbirds aerial demonstration team.

In short, combat operations don't seem to fit. The Predators, flown by the 57th Wing at Nellis and nearby Creech Air Force Base, are there as a holdover from their days as a technology demonstration item.

Col. Terry New, USAF warfare center vice commander, noted that the MQ-1 Predator achieved initial operational capability only last year and, at some point, will probably move out from under control of the warfare center.

For the time being, the ability of Predator crews to train and operate together makes sense, said Maj. Gen. Stephen M. Goldfein, USAFWC commander. Creech and Nellis have "lots of room" on their ramps, and pilots have immediate access to training ranges, he said.

Eventually, however, the Air Force will want to have Predator operated like other combat systems, probably in a combat wing belonging to a numbered air force. Goldfein said it may be a few years before such a move occurs, and it is unknown whether the aircraft would stay at Nellis or move elsewhere. Plans already call for 15 Predator squadrons and at least 137 MQ-1 and larger MQ-9 aircraft.

The Air Force may also want to legitimize unmanned aircraft by giving them dedicated airmen. The service does not grow UAV operators the way it develops manned aircraft pilots from the time they are second lieutenants. Predator pilots are pulled from A-10, F-15, and KC-135 cockpits and placed in trailer-like ground control stations—a fact that may breed resentment among pilots used to more glamorous missions.

Given the central role that unmanned aircraft play in modern combat, "careful review of the current career field structure probably seems appropriate," said Dyke Weatherington, deputy director of DOD's UAS planning task force.

Some unmanned aircraft, like Predator, are remotely piloted, carry Hellfire missiles, and can kill. Others, like Global Hawk, generally operate autonomously and do not fire weapons. Goldfein said it is "certainly possible" to train UAV operators from Day 1, but this is a complex issue that will probably evolve in phases.

The Air Force already has navigators with commercial-pilot licenses trained as Predator operators, and over time dedicated "systems operators" may develop for other unmanned aircraft, Goldfein said.

tinuously enhanced through improved sensors and the addition of Hellfire missiles for strike missions.

Iraqi Stovepipe

The other services independently pursued their own unmanned aircraft plans, and the "stovepipes" have all come together in the crowded airspace over Iraq. Joint concepts of operation are still lacking, as plans were individually developed for each service-bred system.

Several incidents in which unmanned aircraft collided with the manned variety have highlighted the coordination problems.

Lt. Gen. Walter E. Buchanan III, chief of Central Command Air Forces, recently told reporters that there are 1,000 unmanned aircraft operating in CENTCOM's area, most of them flying below 3,000 feet.

The concern is that "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 [that] C-130 because we did not deconflict" the airspace, Buchanan said. "Folks have got to play by those rules, and I will tell you not everybody that's flying UAVs in the AOR is a rated pilot" who understands deconfliction, Buchanan said.

Unmanned vehicle operators are not the only ones needing joint operating concepts. A collision between a Raven unmanned aircraft and a Kiowa Warrior helicopter serves as a case in point.

That incident, Weatherington said, was the helicopter pilot's fault because "the manned aircraft was not where he was supposed to be, ... not procedurally where he should have been."

The joint UAS center is trying to solve the airspace issue. Longer term, the center is looking to develop and improve standards, to create "efficiencies of effort," said Davis. "Everybody is trying to do the same things," such as finding bandwidth and managing airspace. The office should be able to share knowledge of how others are solving similar problems.

With joint CONOPS, the goal is for commanders to know what manned and unmanned assets are available, what the strengths and limitations of each are, and which systems are where in the sky at any given time. The UAS center will attempt to ensure commanders know which systems should be used for what situations.

Some argue that the Shadow, Hunter, and Predator unmanned aircraft have "very similar capability," said Weatherington. All carry electro-optical and infrared sensors and can relay live video. There are significant differences, however.

The larger Air Force Predator has longer duration and is based at permanent

USN photo by FTCM (ss) Daniel J. Niclas

Unidentified Air Force special operations forces prepare to launch a Pointer UAV from the deck of USS Alabama during an exercise. A new Joint UAS Center of Excellence is pushing for defense-wide training and operating concepts.

airfields, meaning it can take longer to arrive on station than a Hunter or Shadow if there are no aircraft already in the air near a target location.

Roadmap to Where?

Weatherington added that, as the Office of the Secretary of Defense and the new joint offices encourage services to look for more common solutions, the number of unique unmanned aircraft systems may decline.

OSD completed a new UAS Roadmap in August, after plans for the joint UAS center were announced. The roadmap is guidance to the services to push into specific areas and avoid redundancy. (See "Will We Have an Unmanned Armada?" November 2005, p. 54.) The roadmap's goals were explicitly endorsed by Marine Corps Gen. Peter Pace, Chairman of the Joint Chiefs of Staff, DOD intelligence director Stephen A. Cambone, and other top officials.

Unmanned aircraft also need to coordinate effects. If a jammer is added to an unmanned aircraft, it may meet one service's requirements very well but have "significant detrimental effects to somebody else—because [jamming] hadn't been coordinated," observed Weatherington.

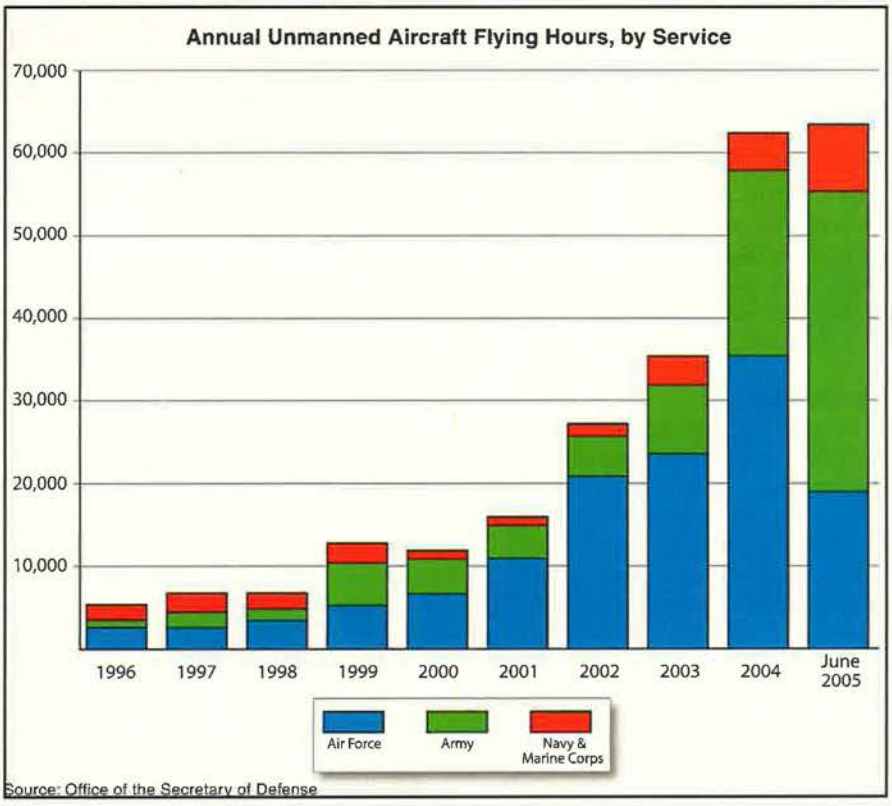
This "electronic fratricide" was also a concern to Buchanan. Citing a related problem, he noted that the jammers used in Iraq to defeat remotely triggered improvised explosive devices (IEDs) also disrupt the radios of the troops they are protecting.

The UAS Roadmap notes that unmanned aircraft links lost because of interference are "more often from friendly than hostile sources."

The joint UAS center is handling coordination and "nonmateriel" solutions to unmanned aircraft issues. The Joint Staff created another organization to guide acquisition. A Joint UAS Materiel Review Board, still in its formative stages, will promote common systems, components, and development recommendations to the Joint Staff. The center and the review board have "complementary but slightly different focuses," said Weatherington.

"The goal ought to be to find the best way to do the mission," and not to protect existing programs, he said. This means all the services need to move forward and find "the best possible solutions" to meeting current and future requirements.

As combat units take advantage of the ISR capabilities of unmanned aircraft, UAS flying hours have boomed. Above, SSgt. James Ellis adjusts the camera in a Desert Hawk surveillance aircraft. The chart below shows how unmanned aircraft use has exploded since 2003. The Army in 2005 surpassed the Air Force for the first time in total UAS flying hours.



USMC photo by Cpl. C. Alex Herron

The Air Force and DOD are still scrambling to catch up to the surging demand for unmanned capabilities. The warfare center's New noted that the Air Force only has enough Predators to meet about 30 percent of CENTCOM's thirst for its capability and that the MQ-1 is the command's "No. 1 in-demand system."

Over the past decade, DOD has invested more than $3 billion in UAS development, procurement, and operations; that figure is likely to be more than $4 billion over the next decade.

Weatherington said, "If you go out and ask CENTCOM, 'If you had one thing more, ... what would it be?'" unmanned aircraft would be high on the list.

Despite all the changes around it, the Air Force's UAV Battlelab remains focused on its traditional mission of developing quick solutions to combat requirements. Felder said the battlelab is "heavily involved" in war on terrorism needs, either by figuring out solutions to demonstrated needs or by seeing new technology and applying it to existing problems.

Convoy Escort

Convoy support is a major current initiative. Felder said the battlelab has demonstrated a possible solution to the twin problems of force protection and of IEDs blowing up convoys.

Flying over a convoy route, an acoustic tracking system called "shot spotter," linked to a Scan Eagle air vehicle, is able to track the sound of a shot back to the shooter and provide automatic target cueing. Meanwhile, a video imagery system provides route reconnaissance and can spot IEDs.

toughest nut to crack," Felder said. "If you don't transition, you're nothing but a hobby shop."

The UAV Battlelab has completed 32 initiatives since 1998; 13 of them have transitioned to the warfighter and 10 others have merged into other projects.

Fortunately, said Felder, "if you solve their problem, the money tends to appear."

The services have warmed to unmanned systems, Weatherington said. The Army has learned what the Air Force figured out several years ago—that unmanned aircraft perform well, with low financial cost and low risk. That is why OSD is pushing for them to take on the most difficult missions currently performed by manned aircraft, such as suppression of enemy air defenses.

USA photo by Spc. James B. Smith Jr.

A by-product of systems being developed in isolation is that many UASes have similar capabilities. At top, marines in Iraq prepare a Pioneer for flight. Above, a soldier pushes a Shadow unmanned aircraft, also in Iraq. Both Pioneer and Shadow offer imagery intelligence similar to USAF's Predator but not the MQ-1's endurance or firepower.

All this real-time video information can be relayed directly to security forces or a convoy commander. The battlelab is working to transition this capability to the field this spring.

The battlelab also is looking to solve the vexing problem of midair collisions. This has proved more difficult. "Sense-and-avoid" technology was recently deemed too immature for fielding, but Felder said officials will continue to look for inexpensive sense-and-avoid capabilities that could be added to Global Hawk or Predator.

The key for the battlelab is to address serious combat concerns, because transitioning the solutions into the acquisition system is always "the

"We need to focus on the highest risk missions that unmanned aircraft can make a contribution to," said Weatherington. "I would argue that SEAD and strike are exactly those missions. If DARPA hadn't pushed the envelope," by developing unmanned intelligence-surveillance-reconnaissance capabilities 10 years ago, "we'd never be doing ISR with unmanned aircraft today."

Unmanned aircraft are eminently sensible for the highest-risk missions where DOD is "very likely to incur losses of aircraft and crews," said Weatherington. ■

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

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A testing capability that was once the envy of the world has begun to suffer from the drift and sag of austerity.

Flight-Test Worries

By Otto Kreisher

The Air Force's aerospace testing establishment, long considered the world's most extensive and technically capable, is in the throes of a developing crisis.

Years of budget austerity have made it impossible for the service to fully modernize its old and out-of-date facilities. The Air Force has been unable to create the kind of testing centers that it should have to get the most out of systems such as the new F-22 fighter and advanced concepts such as hypersonic propulsion and network-centric warfare.

Though good, USAF's test facilities need updating. Pictured here is a B-52 inside the Benefield Anechoic Facility, used for electronic warfare, avionics, and communications tests, at Edwards AFB, Calif.

The problems stem mostly from the difficulties inherent in old infrastructure. This situation could worsen, according to some of the test community's senior commanders, unless something is done about festering budget woes.

"The reality is that budgets have been reduced, that infrastructure has continued to age, and the rate of recapitalization has not kept pace," said Maj. Gen. Jeffrey R. Riemer, who until recently was responsible for managing the funds for the aerospace test complexes.

USAF's testing facilities are located primarily at the Air Force Flight Test Center, at Edwards AFB, Calif., Arnold Engineering Development Center (AEDC), at Arnold AFB, Tenn., and the Air Armament Center (AAC), at Eglin AFB, Fla.

Officials say the Air Force's recapitalization rate falls short of what is needed by the test community. That creates a gap between the capabilities of existing facilities and the kinds of capabilities needed to handle "the business coming down the road," said Riemer, formerly director of operations at Air Force Materiel Command, Wright-Patterson AFB, Ohio, and now commander of AAC.

Emerging Problems

Maj. Gen. Curtis M. Bedke, Air Force Flight Test Center commander, also is worried about acquiring the resources needed to handle emerging technologies.

Brig. Gen. David L. Stringer, AEDC commander, said his facilities were adequately sustained and modernized under previous funding rules that required customers to pay for any new capability they needed for a test. But he was not sure what would happen under a new policy that requires the Air Force to pay for most of the resources necessary to support testing operations.

"Any time you change pricing mechanisms, you should be concerned," Stringer said.

Until last Oct. 1, the test community operated under a long-standing set of rules. When a program manager asked for certain tests, AFMC would evaluate the capability to do that testing, Riemer explained. If new infrastructure was needed to do the job, the requesting program would pay for it. When that program's tests were finished, the facilities remained in place.

"So the infrastructure has maintained itself and continued to be modernized at the expense of the customers who came along through time," Riemer said.

That was then. New laws only require customers to pay the direct cost of testing. The Air Force will have to fund the cost of maintaining and sustaining the infrastructure that existed before. Indirect costs associated with that infrastructure will "have to come out of a pot of money that we manage here at the [AFMC] headquarters," Riemer said.

Under the new law, the Air Force still is able to charge commercial customers for any new equipment necessary to conduct their tests, and because this system is new, Riemer was not sure if the new financing system would add to the funding problems.

Unfortunately, "the potential for that exists," he said.

The US military has been intensely involved in flight testing since the first Army and Navy fliers learned how to fly their primitive aircraft directly from the Wright brothers, Glenn H. Curtiss, or other designers. (See "The First Military Airplane," April 2004, p. 74.)

Anyone who flew in those revolutionary years was a de facto test pilot, and many early aviators paid with their lives to learn the limits and the flaws of the flimsy machines.

The military started to formalize and improve the experimentation in 1914, creating test units at what is now Naval Air Station North Island in California, then at several airfields near Dayton, Ohio, and in 1951 at Edwards.

Despite the vital importance of the test and evaluation process, the facilities and equipment at the three centers are being squeezed by stagnant defense budgets and the soaring cost of the war on terrorism.

67-Year Wait

The Air Force currently has a 67-year facilities replacement average. That may be fine for an office building, "but if it's a test facility, with unique specialized equipment in it that you have to maintain, a recapitalization rate of 67 years is not adequate," said Riemer. "Our biggest gap is in dealing with the future needs of test capabilities to meet the systems coming down the road."

Bedke said the funding shortages in the test community developed because,

USAF photo

The Air Force Flight Test Center at Edwards has a proud history of testing accomplishments. In 1953, the Bell X-1A (pictured) was flown by Maj. Chuck Yeager (in the cockpit) to nearly Mach 2.5. The next year, Maj. Arthur Murray (standing) took it above 90,400 feet, a record.

as money has gotten tight over the past few years, the Air Force has tended to put it into the current programs as opposed to long-term investments.

That happens because, "with a war going on, people tend to focus on getting things out to the warfighters," Bedke said. But without proper test facilities, the Air Force's ability to support troops with modernized equipment comes into peril.

Among the things Edwards "needs right now" for its test ranges, Bedke said, are new radars, communication links, optical cameras to track aircraft, and updated range support infrastructure such as roads and working and living facilities. Some of the things Edwards uses every day "should have been replaced a long time ago," he said.

Other facilities are becoming outdated as testing becomes more complicated. For example, the base's data communications systems need greater data-flow capability because "we track a lot more parameters on an airplane than we used to," Bedke said. Testers must have the means "to get data back to the control center, in real time," so the results can be properly monitored.

The Air Force's testing leadership is concerned that the facilities will not be able to keep up with new technologies and concepts. The test centers may be falling behind in the ability to properly evaluate systems in the face of rapid technological changes.

Of particular concern is the ability to handle what Bedke describes as "the five futures" of combat: electronic warfare, unmanned aircraft systems, directed energy weapons, hypersonic propulsion systems, and network-centric warfare.

Edwards' Avionics/Electronic Warfare Test Division has perhaps the world's best facilities for testing electronic combat capabilities. The division's resources include the Benefield Anechoic Facility, the world's largest electronically secure, or quiet, environment that realistically simulates an outdoor EW range. It can hold complete aircraft, as large as the B-52, to test electronic warfare capabilities, avionics, and related systems in an integrated manner.

Although Edwards has been working to develop electronic warfare for years, Bedke said, the field is becoming increasingly complex. So the ability to monitor more parameters, and "to do it more accurately, quicker, in real time, will be increasingly important."

The whole field of unmanned systems "is a big growth industry," he continued. Testers are still learning the "smart way" to test unmanned aircraft, "and we need facilities and infrastructure to be able to do that."

Edwards is testing a wide range of UASes, from the relatively small Predator to the long-endurance Global Hawk.

Brains in the Sky

The base completed testing Boeing's and Northrop Grumman's Unmanned Combat Air Vehicles in 2005. Edwards is now preparing to begin more complex trials with the two manufacturers' follow-on Joint Unmanned Combat Air

Lockhhed Martin

Work begins early on advanced systems such as the F-35 (concept demonstrator pictured flying over Edwards). Arnold Engineering Development Center, Tenn., is already testing F-35 aerodynamics in wind tunnels and engines on ground test stands.

A Combined Test Force's Independent Looks

Although the Air Force Flight Test Center at Edwards AFB, Calif., is primarily responsible for Air Force developmental testing, AFFTC regularly works with combined test forces (CTFs) that cover a broader range of testing.

Decades ago, contractors, developmental test crews, and operational evaluators each would test a new airplane separately, said center commander Maj. Gen. Curtis M. Bedke. The sequence would frequently repeat the same tests.

Now, a contractor's experts and Air Force development and operational test personnel are combined in a CTF so they can agree on what tests are needed and can do many of the trials only once.

Although personnel from the Air Force Operational Test and Evaluation Center (AFOTEC) detachment at Edwards are included in the CTFs, they are independent and make separate judgments on the operational effectiveness and suitability of systems, Bedke explained.

For example, because some of the required tests had not been completed in initial operational evaluation, the AFOTEC unit gave only conditional approval to the F-22 when it recently evaluated the airplane. This was despite the fact that the operational test pilots and aggressor pilots that the testing unit flew against raved about the Raptor's combat capabilities.

Edwards now is organizing its combined test force for the F-35 Joint Strike Fighter, in anticipation of receiving the first aircraft late this year.

The F-35 CTF will be different, Bedke said, because it will be joint and international, with Navy and Marine Corps personnel, representatives from Great Britain, and possibly other foreign partners.

The test community is already ramping up to support the massive F-35 program. Brig. Gen. David L. Stringer, Arnold Engineering Development Center commander, said AEDC is already conducting aerodynamic testing for the F-35 in its wind tunnels and is testing JSF engines on its ground test stands.

Systems for the J-UCAS program.

Although the J-UCAS testing will involve the airframe, flying qualities, and propulsion systems, Bedke said the real trick is "putting some really powerful computers—I call them the brains—into the sky."

The unmanned airplanes will be required to take off and fly missions together, deciding on their own how to respond to new threats or targets.

"We must be able to test to make sure that those two systems are talking to each other in real time," said George Ka'iliwai III, chief scientist at Edwards. For J-UCAS, that means ensuring the test center has the right frequencies and transmission capacity available to send all the data back to the control center.

Directed energy is another key future capability the community must be able to test, Bedke said. The biggest current program is the Airborne Laser, a proposed antiballistic missile weapon to be carried in a modified Boeing 747 freighter.

"That requires a whole bunch of things in infrastructure that we've just never had before," Bedke said. Edwards is "probably on the leading edge of that in some ways, ... but we need more."

Work on hypersonics—systems capable of speeds greater than Mach 5—will be important in several ways. There will be tests on hypersonic air vehicles—manned or unmanned airplanes or weapons such as cruise missiles.

Studying hypersonics also helps scientists to understand the dynamics of transition into and back from space.

Arnold's test center also contributes to the knowledge of hypersonics, by testing the ability of missiles and warheads to withstand the heat and shock of re-entry. This work is done in support of Air Force and Navy ballistic missile systems and NASA space programs.

AEDC has a hypervelocity wind tunnel capable of speeds up to Mach 20, facilities able to create the low pressure and temperature of high altitudes and space, and arc heaters to duplicate the effect of friction at hypervelocity.

The other future area Edwards must prepare for is "the one that ties everything together," said Bedke, network-centric operations. "We are not going to be the experts in conducting net-centric warfare. But we need to help the operators who are going to be the experts in this, so we can be sure we can test all those systems together."

Network-centric capabilities also will be important because, "if we can become netcentric ourselves, then we can test faster, more efficiently, more effectively," he said.

Ka'iliwai said Edwards' test capabilities also have declined as the aircraft used to support its test programs continue to age.

An annual evaluation of its support aircraft last April concluded that Edwards needed to replace 13 old F-16s with newer models and to replace virtually its entire force of T-38s, he explained.

"The flight test center still does its job," but the geriatric equipment is making things more difficult, Ka'iliwai said.

Air Force Test Strengths

Edwards Air Force Base is Air Force Materiel Command's focal point for test and evaluation of Air Force aero-

USAF photo

Officials hope to modernize their infrastructure to make the most of next generation equipment. This YAL-1A Airborne Laser aircraft flew over Edwards AFB, Calif., while being flight certified before a series of laser beam control system tests.

Boeing photos

The Flight Test Center supports advanced work on the developmental Joint Unmanned Combat Air System, J-UCAS. This requires improved communications capabilities to ensure the aircraft (left) communicate with each other and ground stations (below).

space systems. The base is home to the Air Force Test Pilot School, which also trains navigators and flight-test engineers to help define and expand the envelope for air-breathing and space systems. (See "In Yeager's Footsteps," September 2000, p. 46.)

Edwards hosts an independent operational test and evaluation squadron that takes the aerospace systems that Bedke's personnel have declared safe and effective and determines if they are ready for service in the operational forces. (See "A Combined Test Force's Independent Looks," p. 59.)

Gen. Henry H. "Hap" Arnold initiated creation of the Arnold Engineering Development Center after World War II to speed up the process of getting new systems into use and to avoid being surprised by superior enemy aircraft, Stringer said.

The center describes itself as "the most advanced and largest complex of flight-simulation test facilities in the world." The center boasts 58 aerodynamic and propulsion wind tunnels, rocket and turbine engine test cells, space environmental chambers, and other specialized test facilities. Of those, 14 are in some way unmatched anywhere else.

By testing the performance of new aircraft, propulsion systems, and munitions in its Earthbound facilities, either as scale models or full size, AEDC sharply reduces the time and expense—and most importantly, the human cost—of flight testing.

Arnold is able to test proposed aircraft and space vehicles in scale. The good news is, "with very few exceptions, ... the science is pretty scalable," Stringer said.

"So the theory of Arnold is: If I test it in scale and it doesn't work, it absolutely isn't going to work full size," he said. "On the other hand, just because you test it in scale doesn't mean that it's going to be trouble-free at the other end."

The flight testing is "all about risk reduction. I'm sure the test pilots appreciate that," Stringer said, especially during the early stages of development.

"What Arnold does is extremely important to us," said Bedke, a former test pilot. "Long before we ever take something into the air, those guys will make sure that when the test pilot climbs into the airplane the first time, we have some idea of how it's going to react and what the physics are."

The old practice of testing a new aircraft's performance for the first time in flight "killed a lot of great aviators of all the services," Stringer said, "particularly after World War II, when we started flying jets."

It is now unusual for Air Force pilots to die because of a testing mishap, though Maj. James A. Duricy of Eglin's 40th Flight Test Squadron was killed in 2002 when his F-15 broke apart during a test flight. (See "Aerospace World: F-15 Pilot Killed in Crash," June 2002, p. 18.)

Eglin initially focused on helping to develop and test airborne munitions and has added the same service for complex command and control and intelligence-surveillance-reconnaissance systems, such as the E-8 Joint Surveillance Target Attack Radar System and E-3 AWACS battle management aircraft.

The Air Force also benefits from AEDC's modeling and simulation capabilities and its wind tunnels. The systems can determine, with increasing accuracy, the interaction between an aircraft and a weapon during carriage and on release, which is of enormous benefit to the testers at Eglin.

Once Eglin declares a weapon effective and safe for release from some platforms, Edwards often takes over to test the weapon's compatibility with other airplanes, Bedke said. ■

Otto Kreisher is a Washington, D.C.–based military affairs reporter for Copley News Service and a regular contributor to Air Force *Magazine. His most recent article, "Operation Unified Assistance," appeared in the April 2005 issue.*

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Huey Goes Long

Photography by Ted Carlson

At USAF's 23rd Flying Training Squadron, chopper pilots will train on the new Huey II for another 20 years.

The Air Force has long operated several versions of the world-famous Bell UH-1 Iroquois "Huey" helicopter, but if you thought the Huey's days were numbered, think again. A newly rebuilt, refurbished, and upgraded version, the TH-1H Huey II, recently joined the Air Force with the 23rd Flying Training Squadron at Ft. Rucker, Ala.

The new chopper will be used to train USAF's incoming helicopter pilots. At left, the 23rd FTS begins to break in the first Huey II. The Air Force received the aircraft in November.

The 23rd FTS is based at Lowe Army Heliport at Ft. Rucker. The TH-1, wearing a striking overall glossy gray paint scheme, represents a major advance over its predecessors.

At left below are the Huey II's squadron marking and patch worn by crew members. By late November, the 23rd, commanded by Lt. Col. Robert Abernathy, had 30 flyable UH-1Hs on hand. Another 10 are on hand, serving as backup inventory.

There are three different UH-1H paint schemes. Some, such as the one below, retain Army markings and have orange-painted cabin doors and a trio of large white characters on the tail boom. The Army began phasing out its active duty UH-1H Hueys in the 1990s, and the Air Force picked up some as trainers. These older Hueys will be given new paint jobs.

The Air Force's venerable UH-1N fleet is a twin-engined variant used primarily by Air Force Space Command security forces.

At left, an exterior panel on the Huey II shows its serial number, which betrays this aircraft's construction in 1973, and its deep blue paint scheme. At right is an older Huey showcasing a weatherworn gray finish. Below, the first TH-1H lifts off from a clearing on the grounds of Ft. Rucker.

USAF has trained pilots at Ft. Rucker since 1972. In the early days of the program, the Air Force flew Army-owned helicopters such as the TH-55 and UH-1H. The Air Force unit stood down in 1991 because USAF felt the need for helicopters would diminish. That philosophy was short-lived, and in January 1994, the 23rd Flying Training Flight was reactivated at Ft. Rucker. (It was redesignated the 23rd Flying Training Squadron in 1999.)

The TH-1H has a more-modern engine, one that is more fuel efficient, giving the TH-1H superior range. The Huey II also has a beefier transmission and a new main mast with stabilizer bar. The main rotor blades are wider, and the helicopter has a larger diameter driveshaft, plus a brand-new tail boom assembly.

Shown above is a line of Bell Helicopter Textron tail boom assemblies that will be mated to old UH-1H fuselages, as part of the TH-1H conversion process.

About all that's left from a UH-1H is the forward fuselage. The Huey II, undergoing a preflight inspection at left, has a longer, sleeker nose with space for avionics growth.

All TH-1Hs will have identical equipment. The Air Force's UH-1Hs lack many of these upgraded items, and their instrumentation varies from airframe to airframe. In the TH-1H, students will know what to expect and will get the same configuration on every flight.

The Huey II comes equipped with crashworthy seats and sports a contemporary "glass" cockpit equipped with a trio of multifunction displays, as seen below left. The aircraft has a full suite of navigation aids. Cockpit lighting is now night compatible with night vision goggles.

The 23rd FTS graduates about 60 students a year, with each one undergoing instruction for about six months. Before students arrive, they will have completed six months of primary fixed-wing training in the T-6A Texan II or T-37B Tweet. The 23rd FTS has 16 active duty instructor pilots training 18 students at any given time. The unit also has 11 civilian contract pilots serving as trainers.

Training sorties feature two students and one instructor pilot. The IP sits in the left seat, a student in the right seat, and the other student in the jump seat. The students get to observe and learn from each other's mistakes. All students use night vision goggles through eight rides and a final NVG check ride. All student night flights are aided by NVGs.

At left, an older-model Huey prepares for a sortie. Note its stubby nose. "While the UH-1H is a great trainer, it is tired, and some of our airframes are approaching 13,000 hours," said Maj. Lee Collins, an instructor pilot.

At right, a Huey II undergoes an inspection. "We train our students here with a global mission emphasis," said Collins. "A few months after students graduate, they could find themselves abroad, flying something like an HH-60G" on a combat search and rescue mission over Iraq or Afghanistan.

The Air Force plans to modify all UH-1Hs into TH-1Hs, at the rate of four aircraft per quarter. All Huey IIs should be delivered by the end of 2007.

Support personnel at left are about to move the TH-1H from the taxiway, after a test flight. The tow tug will bring the Huey II back to the hangar area.

At right, Air Force helicopter pilots (l-r) Capt. Carey Johnson, 1st Lt. James McCue, and Capt. Randy Voas return after a training sortie. Behind them is a Vietnam-era UH-1H Huey. Eventually, this ramp will be filled with TH-1Hs as the 23rd FTS takes delivery of the rebuilt Huey IIs.

The Huey is "basic, easy to fly, rugged, reliable, and responds well to student inputs," said instructor pilot Collins. "It makes a great day/night [visual flight rules] trainer, and students are quick to grasp the Huey flying characteristics."

The rebuilt Hueys are expected to remain flying until at least 2025. From Ft. Rucker, students go to Kirtland AFB, N.M., for further training in their mission helicopters. ■

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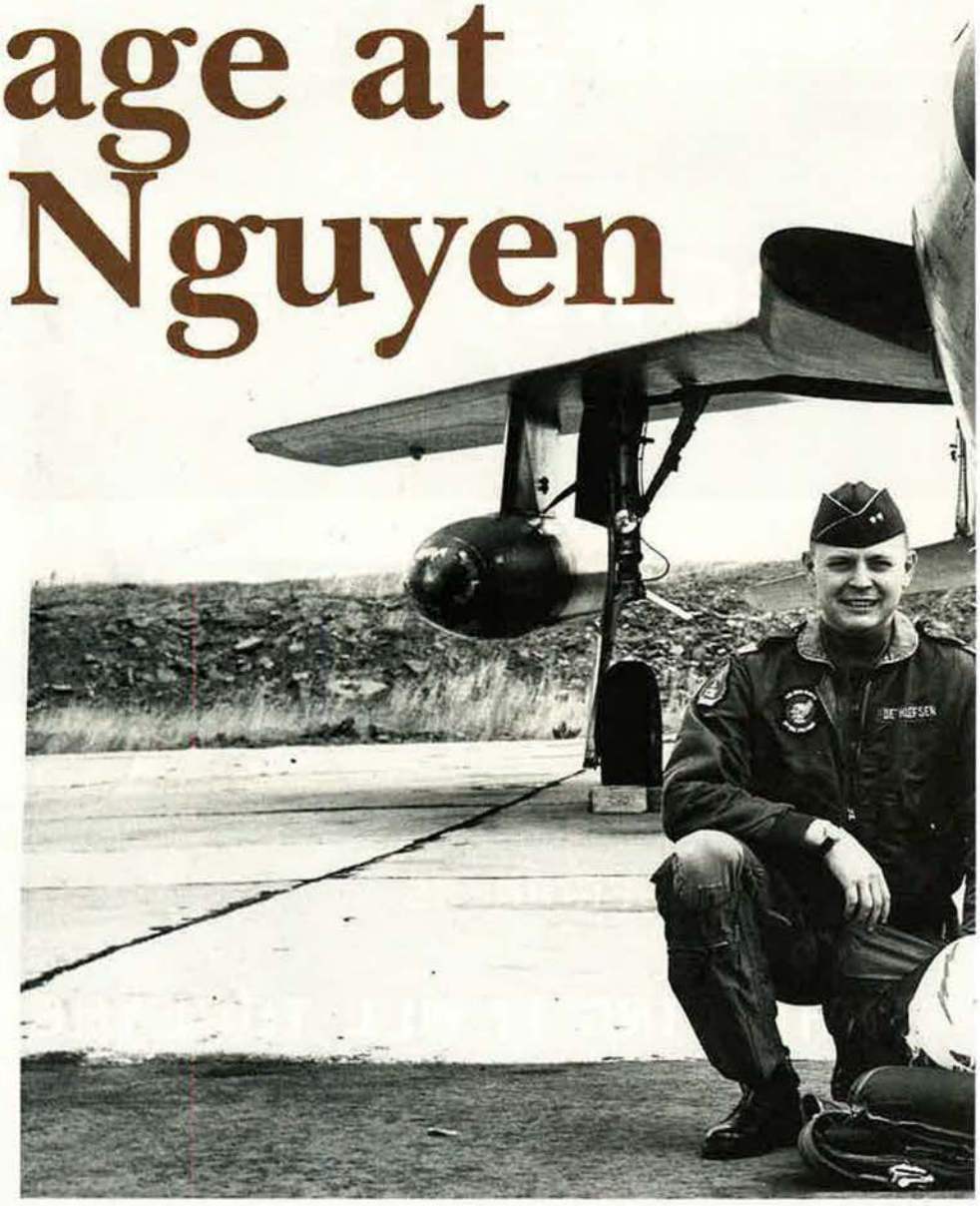
Merlyn Dethlefsen pressed the attack on the SAM sites through the heaviest flak ever seen in North Vietnam.

Calculated Courage at Thai Nguyen



The target on March 10, 1967, was the iron- and steelworks at Thai Nguyen in the Red River delta, 35 miles north of Hanoi. The Joint Chiefs of Staff listed it as their top industrial target in North Vietnam, but, because of constraints imposed by Washington on conduct of the Vietnam War, it had been off limits to air strikes until now.

The plant was located near the small town of Thai Nguyen. It was part of a sprawling industrial complex that occupied about two square miles. Earlier in the year, US aircraft had bombed the railroad marshaling yard and supply depot at Thai Nguyen, but the main industrial complex was left untouched.

The ironworks, built by China in the 1950s, was the pride of North Vietnamese industry. The country had two other foundries, both of them smaller. For some time, Thai Nguyen had been

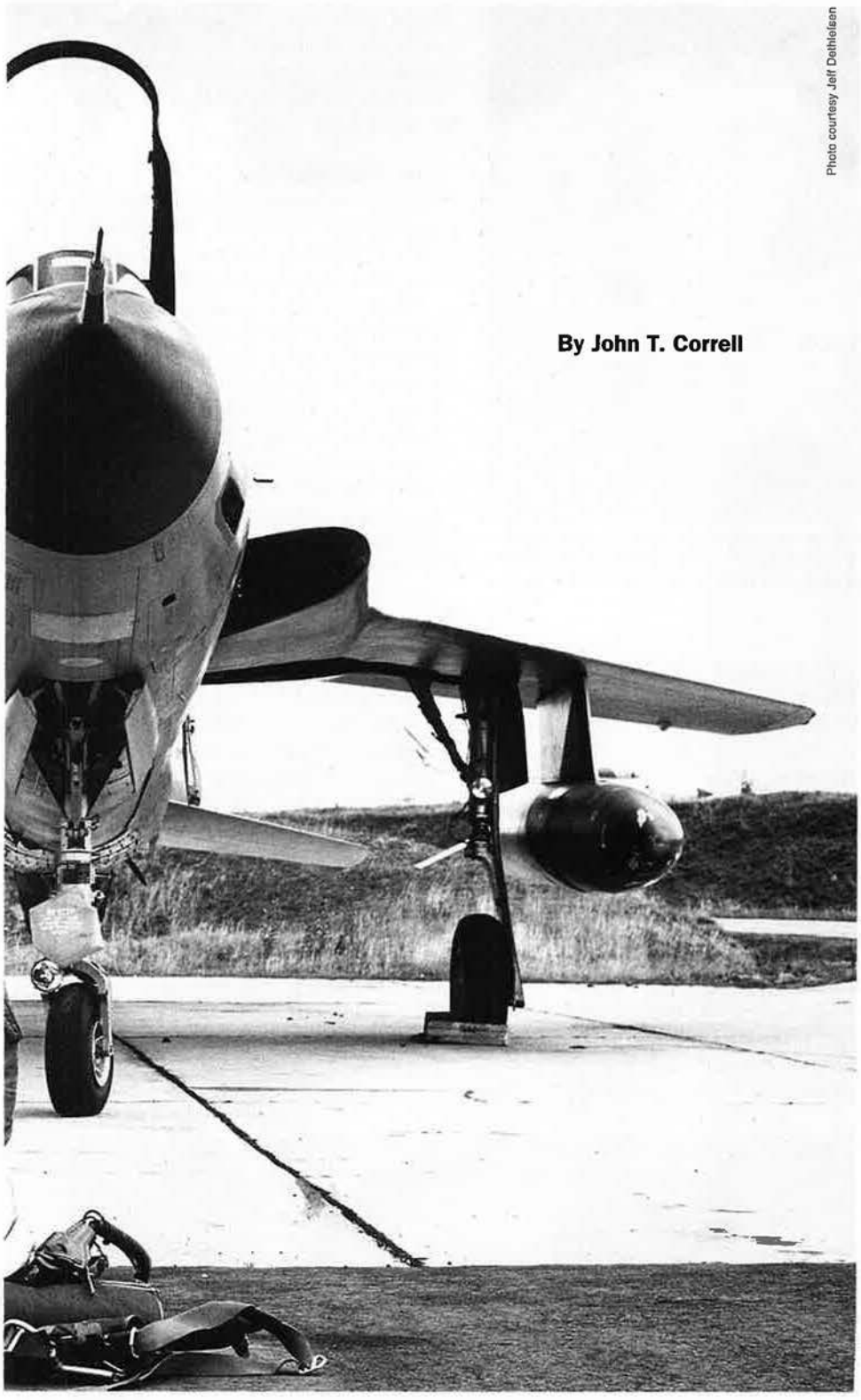


Photo courtesy Jeff Dethlefsen

By John T. Correll

Capt. Merlyn Dethlefsen in front of an F-105 Thunderchief in Vietnam. Dethlefsen received a Medal of Honor as a Wild Weasel pilot.

making products with imported steel. More recently, a steel mill—the only one in North Vietnam—had been built at Thai Nguyen.

In January 1967, Adm. U.S. Grant Sharp, commander in chief of US Pacific Command, requested permission for a series of air strikes "to systematically flatten North Vietnam's military and industrial base" with "the Thai Nguyen iron-and-steel plant at the head of the list."

President Johnson on Feb. 22 approved Thai Nguyen as a target, but Southeast Asia was in the middle of the wet season monsoon and the first strike was scrubbed eight times because of bad weather. The mission was on hold again the morning of March 10, but a break in the weather was forecast for later in the day. The strike force launched just before noon to be over the target at 3:30 p.m.

The strike force included 72 aircraft from three bases in Thailand. There were F-105s from the 388th Tactical Fighter Wing at Korat, which went in first, followed by F-105s from the 355th TFW, Takhli, and F-4 Phantoms from the 8th TFW at Ubon. In addition to carrying bombs, the F-4s were responsible for protecting the strike force from MiG interceptors.

The F-105—officially Thunderchief but known to all as the "Thud"—flew most of the bombing missions against North Vietnam. It was fast at low level but was at a disadvantage in a turning fight with MiGs. The F-4, newer and more agile, could handle any of the North Vietnamese fighters, including the MiG-21.

The strike force aircraft refueled in the air from tankers over Laos and entered North Vietnam. They crossed the Red River and flew down the back side of Thud Ridge, continuing on to Cho Moi before looping back toward Thai Nguyen.

Weasels

The air defenses were thick in the North Vietnamese heartland, and the gunners were ready and waiting. One of the pilots that day said the flak was the heaviest he had ever seen "except in World War II movies."

Thai Nguyen was ringed by 96 anti-aircraft artillery (AAA) sites, each with several guns. North Vietnam's main fighter base, Phuc Yen, lay nearby, between Thai Nguyen and Hanoi. US pilots were forbidden to attack the base, and the North Vietnamese knew it. The industrial complex also was protected by SA-2 surface-to-air missiles (SAMs).

The AAA was particularly effective at close range. US fighters could reduce their vulnerability by going to higher altitude, but that was where the SAMs were most lethal.

Painting by Edward Diffenderfer, via the Air Force Art Program

This painting from the Air Force art collection depicts Dethlefsen and Gilroy swooping in for another pass. Flying ahead of a strike package, dodging SAMs, AAA, and fighters, the team stayed in the fight long after they could have returned to base.

The Wild Weasels, flying specially equipped F-105Fs, had been created expressly to suppress the SAMs.

The March 10 strike force included two flights of Weasels, one from Korat and one from Takhli. The Weasels' tactic was to use themselves as bait. They "trolled" for SAMs, tempting them to turn on their Fan Song tracking radar or fire a missile. If they did, the Weasels would home on the signal and launch a Shrike antiradiation missile to follow the beam back to its source and destroy the radar. The site could then be finished off with guns or bombs.

The Takhli Weasels that day, call sign Lincoln, were several minutes in front of the rest of the 355th aircraft, allowing themselves time to work the SAMs before the strike flights got there.

Lincoln flight consisted of two elements of two airplanes each. The element leaders flew F-105Fs, two-seat models configured with electronics and other equipment to detect and destroy the SAM radars. They were armed with Shrike missiles, CBU-24 cluster bombs, and 20 mm Gatling guns. The Lincoln wingmen flew standard Thuds, F-105Ds, which had guns and a full load of bombs. On "Iron Hand" missions, the F-105Fs found and knocked out the SAM radars and the F-105Ds came in to demolish the site.

The flight commander was Maj. David A. Everson, Lincoln 01, with Capt. Donald A. Luna, the electronic warfare officer (EWO), in the back seat. Capt. Bill Hoeft was Lincoln 02. The leader of the second element was Capt. Merlyn Dethlefsen, Lincoln 03, with Capt. Kevin A. "Mike" Gilroy as his EWO. Flying on his wing was Maj. Kenneth H. Bell, Lincoln 04.

All six airmen in the Weasel flight had plenty of experience. Each of them had flown more than 50 combat missions and had been to North Vietnam many times.

"We were the eyes and ears of that strike force," Dethlefsen told *Airman* magazine in 1969. "That target was very important. It produced about 40 percent of the enemy's steel. The SAM sites were there to protect it from our air strikes. The strike force would be very vulnerable to the SAMs and anti-aircraft guns. Keeping them down was our job."

First Element Lost

If the defenders at Thai Nguyen needed any stirring up, the Korat F-105s in the first wave of the attack had done a proper job of it.

"After we turned south, there was absolutely no doubt about the target location," Bell said in his 1993 book, *100 Missions North,* published by Brassey's. "Thai Nguyen was ablaze with AAA fire and a large column of black smoke covered the area," Bell said. "The 388th was in the thick of it, and we were a minute away from the most intense barrage of ground fire I had ever seen. Several SAM sites were up and tracking us, but their threat paled in comparison to the guns. The defenses were ready and Thai Nguyen was a boiling mushroom of ugly black flak."

After the mission was over, Gilroy remembered how some of the flak rounds, reaching the end of their range and losing velocity, rattled like pea gravel off the bottom of the aircraft's wings.

Lincoln flight approached Thai Nguyen in combat spread formation, the four aircraft almost line abreast with Everson and Hoeft on the right and Dethlefsen and Bell on the left. Two miles out from the target, the Weasels detected a SAM radar tracking them.

Everson in Lincoln 01 attacked

Pardo's Push

The two F-4s from Ubon that were lost on March 10 logged another dramatic story from Thai Nguyen. Before the strike flight reached the target, ground fire hit and damaged Capt. Bob Aman's aircraft, but he and his backseater, 1st Lt. Bob Houghton, stayed with the formation. Over the target, they were hit again and began to leak fuel seriously.

Capt. Bob Pardo, with 1st Lt. Steve Wayne in the backseat, was hit as well. Pardo might have been able to reach a tanker, but Aman was going to run out of fuel before he could get to Laos, where he and Houghton could bail out with a reasonable chance of rescue. He was still over North Vietnam when he flamed out.

Pardo decided to push Aman to safer territory. He brought the nose of his F-4 into contact with Aman's aircraft, but that didn't work. He then told Aman to drop his tailhook. Pardo positioned the tailhook against his windscreen and pushed. Although the hook slipped frequently and had to be repositioned, that worked.

Aman's rate of descent slowed. Then Pardo's left engine caught fire. In any case, he was almost out of fuel himself. Both crews bailed out near the Laotian border and were rescued.

In the immediate aftermath of the incident, Pardo was in some trouble. Pilots were forbidden to attempt to push one airplane with another. However, the merit of it was recognized in the long run. In 1989, Pardo and Wayne were awarded the Silver Star for what had long since come to be known as "Pardo's Push." (See "Valor: Pardo's Push," October 1996, p. 8.)

Staff map by Zaur Eylanbekov

Thai Nguyen was the site of an iron- and steelworks that was the pride of North Vietnam. Though it was the top industrial target in the country, it had long been off-limits to US airpower. Phuc Yen was North Vietnam's main fighter base.

first. He swept wide to the right, dived through the flak, and launched a Shrike missile toward the SAM site. Seconds later, Lincoln 01 took a critical hit from the AAA. Chute beepers confirmed that Everson and Luna had bailed out. They reached the ground and were captured immediately. They spent the rest of the war as POWs, returning in the general repatriation in 1973.

Hoeft, Lincoln 02, followed Everson into the flak. He was also hit and put out of action. An 85 mm shell blew a four-foot hole in his left wing, just outboard of the landing gear. He was lucky to make it to Udorn Air Base in northern Thailand, where he recovered.

Dethlefsen Takes Over

That left Dethlefsen, Lincoln 03, in command of the two remaining Weasels. Merlyn Hans Dethlefsen, 32, was a former Iowa farm boy. He joined the Air Force as an enlisted man and earned his commission and navigator's wings through the aviation cadet program in 1955. He later went to pilot training, graduating in 1960. He flew F-100s at first, then moved into F-105s. He had come to Takhli in October 1966. This was his 78th combat mission.

The prevailing wisdom among fighter pilots was not to linger in situations where the air defenses were intensive. Making more than one pass was regarded as a high risk. Merlyn Dethlefsen would make five passes at Thai Nguyen. He also would stay in the target area for 10 minutes, which must have seemed an eternity.

"We were still ahead of the strike force and they were still vulnerable," Dethlefsen said. "We had fuel and missiles and guns and bombs, and the job wasn't done yet. Lincoln lead had seen the target and launched a missile, but it had missed. I decided we would stay. Coming around, I studied the flak pattern. It wasn't a matter of being able to avoid the flak but of finding the least intense areas."

On the first pass, Gilroy, operating the electronics in the back seat of Lincoln 03, got an approximate fix on the SAM site. The two Thuds emerged from the flak with numerous bullet holes. Dethlefsen, in the words of a subsequent nomination for the Medal of Honor, "was now the subject of three defensive systems—the MiGs, SAMs, and anti-aircraft artillery."

As Dethlefsen came around for the second pass, the F-105 strike flights arrived and began dropping bombs on the steel mill.

The signal from the SAM radar was strong. As Dethlefsen lined up to attack it, two MiG-21s pulled into shooting position behind Lincoln 03 and 04. Dethlefsen kept his concentration on the target. Just as one of the MiGs fired a missile, Dethlefsen launched a Shrike against the SAM site.

"I broke to the right, down through the flak," Dethlefsen said. "I figured that would give me the best chance of

Photo courtesy Jeff Dethlefsen

Dethlefsen (right) is congratulated by 355th vice commander Col. Jack Broughton after completing his 100th mission over North Vietnam. Dethlefsen broke the rules by continuing to fly combat missions after being nominated for the Medal of Honor.

Photos courtesy Jeff Dethlefsen

The 354th Fighter Squadron assembles for a group photo in March 1967. Dethlefsen and Gilroy are in the back row, fifth and sixth from left, respectively. Five farther to the right is Maj. Kenneth Bell.

evading both the heat-seeking missiles and the MiG's guns. Didn't think the MiGs would want to follow me through that stuff. They didn't."

The two Weasels had eluded the MiGs by going low, but that took them into the teeth of the AAA. Dethlefsen had taken several hits from the 57 mm guns and perhaps from the MiG cannon, but his engine and flight controls were still in good order.

Bell, in Lincoln 04, had sustained battle damage that was much more serious. "My right wing had been damaged," he said. "The right leading-edge flap was blown down, forcing the airplane into a left turn because of added lift from the right wing. I was able to hold the wings level with cross controls, but it added a difficult complication. ... I had to settle for cross controls and hope for turns to the left."

The Weasels could have left Thai Nguyen when the strike force did, but that wasn't the way Dethlefsen interpreted his duty.

"I could hear the strike force withdrawing," Dethlefsen said. "I had permission to stay there after they left. That steel mill with the related industry was a big target—too big to knock out with one strike. I knew those fighter-bombers would be back tomorrow. Same route, right over this area. My aircraft was working well enough to be effective. With the weather the way it was that day, I knew we would never have a better chance. So I made up my mind to stay until I got that SAM site or they got me."

As the Weasels turned back in to the defenses of Thai Nguyen, Dethlefsen saw a different SAM site dead ahead. He fired his second Shrike and the radar abruptly went off the air. Bell, holding close on Dethlefsen's wing with some difficulty because of the damaged flap, did not have a good angle but dropped his bombs on the site anyway.

On the next pass, Lincoln 03 and 04 came in low, looking for the original SAM site. Dethlefsen saw the radar van and pickled his CBU-24 fragmentation bombs onto it as they roared past. Turning, Dethlefsen and Bell came back across and strafed the site with their guns.

The Medal of Honor nomination continued, "As he completed the attack, a large part of the SAM site was engulfed in secondary fires. Only then did Captain Dethlefsen depart the area. Low on fuel and unable to reach his assigned base, he was forced to an emergency forward operating base where he successfully landed his battle-damaged aircraft."

Medal of Honor

Lt. Col. Phil Gast, who led the Takhli strike force that day, knew that the Weasel engagement at Thai Nguyen had been something special. He asked Maj. Hal Bingaman to look into the details of what happened.

Dethlefsen did not fit the stereotype of the flamboyant fighter pilot, Bingaman said. Dethlefsen and Gilroy explained to Bingaman that it had been a tough mission, but they did not embellish it. They were reluctant to depict their achievements as having been that dramatic or extraordinary.

"I had to drag it out of them," Bingaman said. He was struck by how well the pilot and EWO had worked together. "Without Mike Gilroy's instant inputs there'd not have been the timing there for even the first pass, much less the other four," Bingaman said.

The wing thought Dethlefsen's actions were worthy of the Medal of Honor and nominated him for it. Gilroy and Bell were put in for awards as well.

Pictured is Dethlefsen in his Medal of Honor portrait. The citation noted that he remained to keep fighting the enemy until defenses were thoroughly suppressed, his aircraft was damaged, and he was nearly out of fuel.

Dethlefsen enlisted in the Air Force and got his navigator wings through an aviation cadet program in 1955. Five years later, the former Iowa farm boy graduated from pilot training. Here, Dethlefsen is pictured with his Thud at Takhli AB, Thailand.

Meanwhile, operations against Thai Nguyen continued. It was the Air Force's leading target in North Vietnam for the next month and a half. By the end of April, air strikes had put the iron- and steelworks out of business.

Six aircraft were lost, all in the first two days. Lincoln 01 was lost on Day 1, as were two F-4s from Ubon. Three more F-105s from Takhli were shot down the next day. One of the F-105s was brought down by a SAM. AAA accounted for the other five.

Merlyn Dethlefsen finished his combat tour, 100 missions over North Vietnam, in May and returned to the States as a flight instructor at Vance AFB, Okla. Dethlefsen was there when he learned that he was to receive the Medal of Honor.

The presentation was made by President Lyndon B. Johnson at the White House on Feb. 1, 1968. Johnson noted that Dethlefsen's actions had not been a momentary impulse.

"He had plenty of time to think about the danger to himself, to figure the odds, even to turn away," Johnson said, "but his courage was calculated. It came not from desperation, but dedication. He answered a call far beyond duty."

Gilroy was awarded the Air Force Cross and Bell the Silver Star.

After his tour at Vance, Dethlefsen went to the Air War College at Maxwell AFB, Ala., and from there was assigned to the faculty at Army War College at Carlisle Barracks in Pennsylvania. In 1974, he went to Beale AFB, Calif., as assistant director of operations for the SR-71 wing. In 1975, he was assigned to Dyess AFB, Tex., as director of operations for the B-52 wing. He retired from there as a colonel in 1977.

He then relocated to Fort Worth, Tex., where he headed his own small business, Home Medical Equipment Co., until 1986. He died in 1987 and is buried at Arlington National Cemetery.

Doing His Job

When Merlyn Dethlefsen spoke of the events at Thai Nguyen, it was with understatement and a strong sense of duty.

"He was very modest and unassuming," said his son, Jeff Dethlefsen. "He always just felt that he had a job to do and did it the best he could. I don't think he ever thought of himself as anything special. When we talked about his Medal of Honor mission, he would kind of laugh and say it was just a routine mission. He always said there were other missions that were really tough."

"I didn't consider the mission extraordinary," Dethlefsen told *Airman* in 1969. "I had been up that way before, and I knew what to expect. I expected to get shot at a lot, and they shot at me a lot. I expected MiGs to be airborne and SAMs to be launched. And these things did occur. It was one of the more difficult of my 100 missions, and the ground fire was a little more intense.

"All I did was the job I was sent to do. It had been quite a while since we had been able to go to the Hanoi area. So while the weather held, we were able to do some pretty good work. It was a case of doing my job to the best of my ability. I think that is what we mean when we call ourselves professional airmen in the Air Force." ■

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 Strategy of Desert Storm," appeared in the January issue.*

Footholds for the F

The Air Force has perfected its techniques for getting the most out of remote air bases.

An F-16 prepares to launch from Aviano AB, Italy. USAF has used Aviano as a "forward operating base" since 1954, but more and more operations depend on "bare bases" in remote areas.

ghting Force

By Daniel L. Haulman

USAF photo by MSgt. John E. Lasky

"Where are the carriers?" That, supposedly, is the question quivering on every President's lips whenever America needs combat airpower in some distant corner of the world.

Seriously, though, land-based airpower, deployed far forward, more often than not surpasses carrier aviation for sheer combat punch and staying power. The Air Force has a long history of identifying, building, and sustaining such airfields to help the US make the most of all forms of airpower.

And these forward airfields are more important than ever. Modern mobility assets, pre-positioned equipment and supplies, and rapidly deployable engineering units have made it possible to operate from bare bases. Agreements permitting Washington to use foreign bases reduce the need to start from scratch. Forces are trained and equipped to fill craters, remove mines, and build up facilities, making it possible to use captured facilities.

In World War II, Korea, and Vietnam, military engineers perfected airfield construction techniques that allowed aircraft to operate close to the action. In Vietnam, Air Force Prime BEEF (Base Engineer Emergency Forces) and RED HORSE (Rapid Engineers Deployable Heavy Operations Repair Squadron, Engineers) units mastered the art of quickly building and repairing combat airfields.

Withdrawal of US military forces from Vietnam in 1973 did not end the need for forward bases. Acquisition and use of forward air bases in foreign countries is essential if the United States is to continue to exercise airpower as a diplomatic and military instrument. This has been repeatedly proved since Vietnam.

Without Footholds

What happens when the US lacks for-

USAF photo by SSgt. Jennifer Lindsey

At Bagram AB, Afghanistan, A-10s maneuver through revetments designed to shield aircraft from mortar attacks. The Air Force has become highly adept at deploying to austere fields and operating there for extended periods.

ward bases? Limited access has hindered airpower in a number of post-Vietnam situations. Take, for example, Operation Nickel Grass during the October 1973 Middle East war. (See "Nickel Grass," December 1998, p. 54.) The Air Force embarked on a major airlift to replenish Israeli ammunition and other war consumables. Allies in Europe, however, denied use of European airfields and airspace for this purpose. Consequently, USAF transports were forced to fly long missions between the United States and Israel, staging only at Lajes Field in the Azores. Flights as long as 28 hours heightened risk and increased aerial refueling requirements.

Something similar happened in 1986 in Operation El Dorado Canyon, the US raid on targets in Libya. (See "El Dorado Canyon," March 1999, p. 56.) Air Force F-111 pilots flying from Britain could not fly directly over France or Spain because those countries refused to grant overflight rights. Instead, the F-111s flew far south and west to circumvent those nations. It added almost 3,000 miles to the round-trip flights and greatly endangered operational security.

After the disastrous 1980 Desert One rescue attempt in Iran, Washington moved to shore up its access in the Middle East. The US and Egypt arranged biennial training exercises to practice the rapid deployment of fighter units to Egypt and the building of bare bases for operations.

As conflict between Iraq and Iran threatened Persian Gulf oil shipments during the 1980s, President Reagan and the Saudi government arranged for the construction and improvement of Arabian bases to accommodate USAF aircraft. This was not blind support: Saudi Arabia was beginning to purchase many of the same types of aircraft that the US wanted to bed down.

Among the facilities were King Faisal Air Base near Tabuk, and King Khalid Military City near Hafar al Batin. Certain sites on the Arabian Peninsula were partially developed in anticipation of their use in a future crisis.

By 1990, the Department of Defense had collected air-transportable equipment and supplies for making such bare bases operational. Harvest Falcon resources, such as shelters, tents, electrical power generators, and water, were pre-positioned for quick deployment by airlift from Europe to the Persian Gulf region.

The Saudi bases were put to use in Operation Desert Shield, after the Aug. 2, 1990, Iraqi invasion of Kuwait, when the United States led an international coalition to defend Saudi Arabia. Between that date and Jan. 17, 1991—the

USAF photo by SSgt. Shane Cuomo

National strategy puts heavy emphasis on use of so-called "lily pads," bases that can rapidly spool up to accommodate many aircraft. One key facility (shown here) is the Indian Ocean atoll of Diego Garcia, which has hosted dozens of bombers for operations in Southwest Asia.

start of the first Gulf War—nearly 2,000 US aircraft deployed to the theater. The Air Force sent a quarter of its combat inventory to the Persian Gulf, and nearly all of these aircraft bedded down at Saudi bases.

Saudi Arabia agreed to finance construction of facilities for the American and coalition forces on its territory. Air Force RED HORSE engineers, using equipment that had been pre-positioned at Aviano AB, Italy, completed more than 25 projects at 12 sites in the Arabian Peninsula. The largest Saudi base was developed by US and local contractors at al Kharj, just south of Riyadh. In a matter of weeks, it was hosting five fighter squadrons.

In neighboring Bahrain, Air Force RED HORSE and Prime BEEF team engineers constructed a parking ramp, taxiway, revetments, and a mission support area at Shaikh Isa Air Base to accommodate up to 36 fighter aircraft. It was one of the largest construction projects in RED HORSE history and set new records for concrete and asphalt placed in a single day.

In January 1991, Operation Desert Storm began. The forcible eviction of Saddam Hussein from Kuwait began with a weeks-long air campaign against Iraqi forces before the ground invasion that liberated Kuwait. At least 25 coalition air bases in the theater were active in the air campaign. Ten were in Saudi Arabia, seven in the United Arab Emirates, and three in Oman. Egypt, Qatar, Bahrain, and Turkey also hosted coalition aircraft.

Not all of the raids on Iraq came from forward airfields. In 1990, USAF B-52 bombers deployed to the British island of Diego Garcia in the middle of the Indian Ocean. From there, and other bomber bases in Britain and Spain, B-52s raided Iraq. The longest B-52 raids came from Barksdale AFB, La., almost halfway around the world.

The No-Fly Zones

The United States initiated Operation Provide Comfort in 1991 to protect and provide humanitarian aid to Kurds of northern Iraq. That operation later evolved into the enforcement of a no-fly zone over northern Iraq in an operation called Northern Watch. Incirlik Air Base, a NATO site in Turkey, served as the primary airfield for that operation.

In 1992, the United States established a new no-fly zone over southern Iraq. Most US forces in this operation, dubbed Southern Watch, were originally based at Dhahran and Riyadh in Saudi Arabia.

USAF photo by SSgt. Jason Gamble

Incirlik AB, Turkey, served as the primary airfield for fighter operations during Operation Northern Watch, which enforced the no-fly zone over northern Iraq. Here, an F-16 C/J from Shaw AFB, S.C., takes off from Incirlik.

In June 1996, terrorists bombed the Khobar Towers housing complex near King Abdul Aziz Air Base, in the Dhahran area. The terror attack left 19 airmen dead and injured hundreds more, many of them critically. That event, and the overall difficulty of providing force protection in an urban area, quickly persuaded Washington to move most of its forces from Dhahran and Riyadh to the secure but desolate facility at al Kharj. The Saudi government, US military engineers, and civilian contractors transformed the old bare base into Prince Sultan Air Base (PSAB).

Civilian contractors and units from the 819th and 823rd RED HORSE Squadrons labored on the immense project, which entailed the construction of temperature-controlled TEMPER (Tent, Extendable, Modular, Personnel) tents, roads, dining halls, a gymnasium, a recreation center, a library, and a pool. The Saudi government built a Friendly Forces Housing Complex nearby that could accommodate most of the 5,000 international forces that eventually worked at PSAB.

By the time the base complex was completed in 1999, it had cost the government of Saudi Arabia more than $1 billion and covered well over a hundred square miles. In late July 2001, Prince Sultan Air Base became the headquarters of the Combined Air Operations Center for Joint Task Force-Southwest Asia.

The Khobar Towers bombing also persuaded the US to move its forces to more secure locations in other nations. In Kuwait, airmen deployed from the capital's international airport to Ahmed al Jaber Air Base. In the United Arab Emirates, they moved from Abu Dhabi to al Dhafra Air Base.

The Balkans

In 1992, an ethnic civil war in Bosnia-Herzegovina inspired Operation Provide Promise, an airlift of emergency relief supplies to Sarajevo. For the relief effort, Air Force transports left Rhein-Main Air Base in Germany and staged at Zagreb, Croatia, and Aviano. Besides landing at the Sarajevo Airport, they also dropped supplies to refugees in the countryside.

In 1994, USAF engineers from the 823rd RED HORSE Squadron constructed tent cities at Tuzla AB, Hungary, to facilitate Operation Deny Flight, the NATO-enforced no-fly zone over Bosnia.

The next year, Air Force units began moving into Falconara AB, Italy, where NATO supplies destined for Sarajevo were stockpiled. That year, USAF forces at Aviano and other bases in Italy took part in Operation Deliberate Force, an intense NATO air campaign against Serb forces in Bosnia-Herzegovina that resulted in a December peace agreement. (See "Deliberate Force," October 1997, p. 37.)

Unfortunately, things would not stay quiet in the Balkans. In 1999, NATO began the Allied Force air campaign against Serbia. The 78-day air war compelled the Serbs to withdraw their

USAF photo

Cargo pallets are loaded at Incirlik AB, Turkey. US Transportation Command has made a sizable investment in en route infrastructure over the past decade, the better to feed dozens of "temporary" bases worldwide.

troops from Kosovo province, allow United Nations troops to replace them, and permit ethnic Albanians to return to their homes.

At the beginning of OAF, coalition forces used 10 bases in five European countries. By the end of Allied Force on June 10, coalition forces operated from 22 air bases in eight countries: six in Italy, four each in Germany and the United Kingdom, two each in France, Hungary, and Turkey, and one each in Spain and Greece.

The many bases gave NATO the ability to strike Serbia from all directions, around the clock.

In support of Allied Force, RED HORSE engineers constructed a taxiway almost 1,000 feet long, a C-17 ramp, aircraft parking and marshalling areas, a medical evacuation helicopter pad, and a tent city at Tirana, Albania.

Air Force engineers also constructed tent cities in Italy and Turkey. Teams from the 823rd RED HORSE Squadron repaired Taszar Air Base in Hungary and renovated dormitories at Birgi AB, Italy.

Allied Force proved the utility of having bases available for every potential contingency or combat theater, to shorten the time between crisis and response. The Air Force began to build an Employment Knowledge Base, a database of site surveys that would be useful for future contingencies.

At the end of the 20th century, the Pentagon reconsidered its overseas basing strategy. In 1999, the United States agreed with Germany to close Rhein-Main Air Base, once the most important USAF airlift hub in Europe, to allow for expansion of Frankfurt's airport.

Yet large, loaded transports were rarely flying more than 3,500 miles at a time, and staging bases remained important on long routes between the United States and Southwest Asia. To compensate for the loss of Rhein-Main, USAF engineers expanded and upgraded other German bases at Ramstein and Spangdahlem. Turkey's Incirlik also became an airlift hub.

Defense Department planners also considered new forward bases in Eastern Europe and Western Asia as alternatives to the Cold War bases.

Enduring Freedom

In October 2001, President Bush launched Operation Enduring Freedom against Taliban and al Qaeda forces in remote Afghanistan. As in earlier operations against Iraq and Serbia, OEF involved not only long-range air raids from the United States, but also a network of theater air bases.

RED HORSE elements deployed to Qatar to construct a major air base there from what was initially little more than a runway. Nicknamed "Camp Andy" after Air Force MSgt. Evander E. Andrews who died there in a forklift accident, the site began as a tent city and quickly grew into al Udeid Air Base.

Before long it boasted a 15,000-foot runway and enough paving to cover 18 football fields. Al Udeid soon became home to some two dozen KC-135 and KC-10 tankers that provided in-flight refueling for combat fighters and bombers on the way to Afghanistan.

At al Dhafra in the UAE, the 820th Expeditionary RED HORSE Squadron completed a concrete parking ramp covering more than a million square feet. The ramp was more than 44,000 square feet larger than a ramp at Phan Rang AB, Vietnam, the previous record holder. As of 2002, RED HORSE construction projects for OEF cost an estimated $90 million, the largest collection of military labor projects since Vietnam.

USAF photo by SMSgt. Keith Reed

To compensate for the loss of Rhein-Main AB, Germany, operations expanded at German bases at Spangdahlem (pictured) and Ramstein. TSgt. Ken Sanders is an A-10 crew chief with the 81st Aircraft Maintenance Unit at Spangdahlem.

USAF photo by MSgt. John E. Lasky

A long line of pallets is loaded aboard a C-5 Galaxy at Manas AB, Kyrgyzstan. USAF flies into nearly all nations, in all conditions, offering land-based airpower across most of the globe.

Despite the construction of these new air bases, the Air Force still lacked adequate staging bases for the airlift Enduring Freedom required. The demand was alleviated by a side effect of the breakup of the Soviet Union in the early 1990s.

Former Soviet republics in south central Asia offered the United States overflight, refueling, landing rights, and airfield facilities for operations against the Taliban. Former Soviet military bases and airports provided an existing air base infrastructure. The most important of these were Manas Air Base in Kyrgyzstan and Karshi-Khanabad (K-2) Air Base in Uzbekistan, both of which became USAF air hubs after extensive construction.

Military airfields and civilian airports within Afghanistan, some constructed by Soviet military forces in the 1980s, also became available to coalition air forces, after ground forces secured territory in-country.

Bagram, Kandahar, Kabul, Shindand, and Mazar-e-Sharif were among the new locations that have become part of the Air Force heritage. RED HORSE engineers improved and adapted the airfields to handle the influx of US personnel and military aircraft.

After the fall of the Taliban government, the Air Force maintained warplanes in Uzbekistan, Tajikistan, and Afghanistan because of lingering al Qaeda and Taliban resistance in the mountainous border region near Pakistan. The service also transferred a number of tankers from Germany to Bulgaria, nearer the midpoint of the long deployment route to central Asia.

B-1B bombers, meanwhile, moved from Diego Garcia to Oman, shortening the round-trip flight to southeastern Afghanistan by thousands of miles. From Oman, Lancers could conduct around-the-clock patrols over the remaining hostile areas.

Last year, the Uzbekistan government ordered US forces to leave K-2 because of a diplomatic dispute. The eviction increased USAF reliance on Manas and Bagram. At Bagram, RED HORSE engineers began replacing 60,000 square meters of ramp space with improved pavement.

Iraqi Freedom

Beginning in 2003, for Operation Iraqi Freedom the Air Force deployed nearly 55,000 personnel and 863 aircraft, including 293 fighters, 182 tankers, and 111 transports.

Before OIF began, US forces were already serving at bases in Saudi Arabia, Kuwait, the United Arab Emirates, Qatar, Bahrain, and Oman. The two most important air bases were PSAB in Saudi Arabia, where the CAOC was originally located, and al Udeid in Qatar, where the air operations center moved later in the year.

As in Desert Storm in 1991, Diego Garcia served as an important bomber and tanker base for operations against Baghdad, as it was less than a six-hour flight away. Both B-2s and B-52s were stationed there.

Among other significant airfields were al Jaber AB, Kuwait, and Shaikh Isa AB, Bahrain. At Thumrait Air Base in Oman, RED HORSE engineers in six months built a 47-acre parking ramp along with taxiways, lighting, and blast deflectors.

The large number of coalition airfields once again allowed coalition air forces to strike the enemy from multiple directions, around the clock.

As US and coalition forces advanced into enemy territory, airfields within Iraq became as important as those outside the country. Airborne RED HORSE teams landed at Iraqi airfields to clear obstacles, eliminate mines, repair damage, and install equipment. They also deployed to barren locations to prepare helicopter and airplane landing areas.

A Global Assessment Team opened newly acquired airfields, using 21 Harvest Falcon kits to develop bare bases. Air Force engineers recovered the airfield at Ali Base and cleared the runways at Baghdad Airport.

Friendly forces immediately used seized bases to leapfrog into Iraq. In the case of Ali, then called Tallil, flight operations began just four days after the first airman arrived, while hundreds of hungry wild dogs still roamed the compound.

In the Kurdish area of northern Iraq, USAF repaired three airfields for C-130 missions. Al Walid (H-3) airfield in western Iraq, with two 10,000-foot runways, became as important to the attackers as it had been to the defenders. Other new sites, such as Balad and Kirkuk, became even more important after Baghdad Airport reopened for commercial air traffic.

In the first half of 2005, the Air Force activated two contingency response wings and three contingency response groups. These units train and rapidly deploy the personnel needed to quickly open airfields in remote locations. If there is any sure thing in life, it is this: They will be busy—and soon. ■

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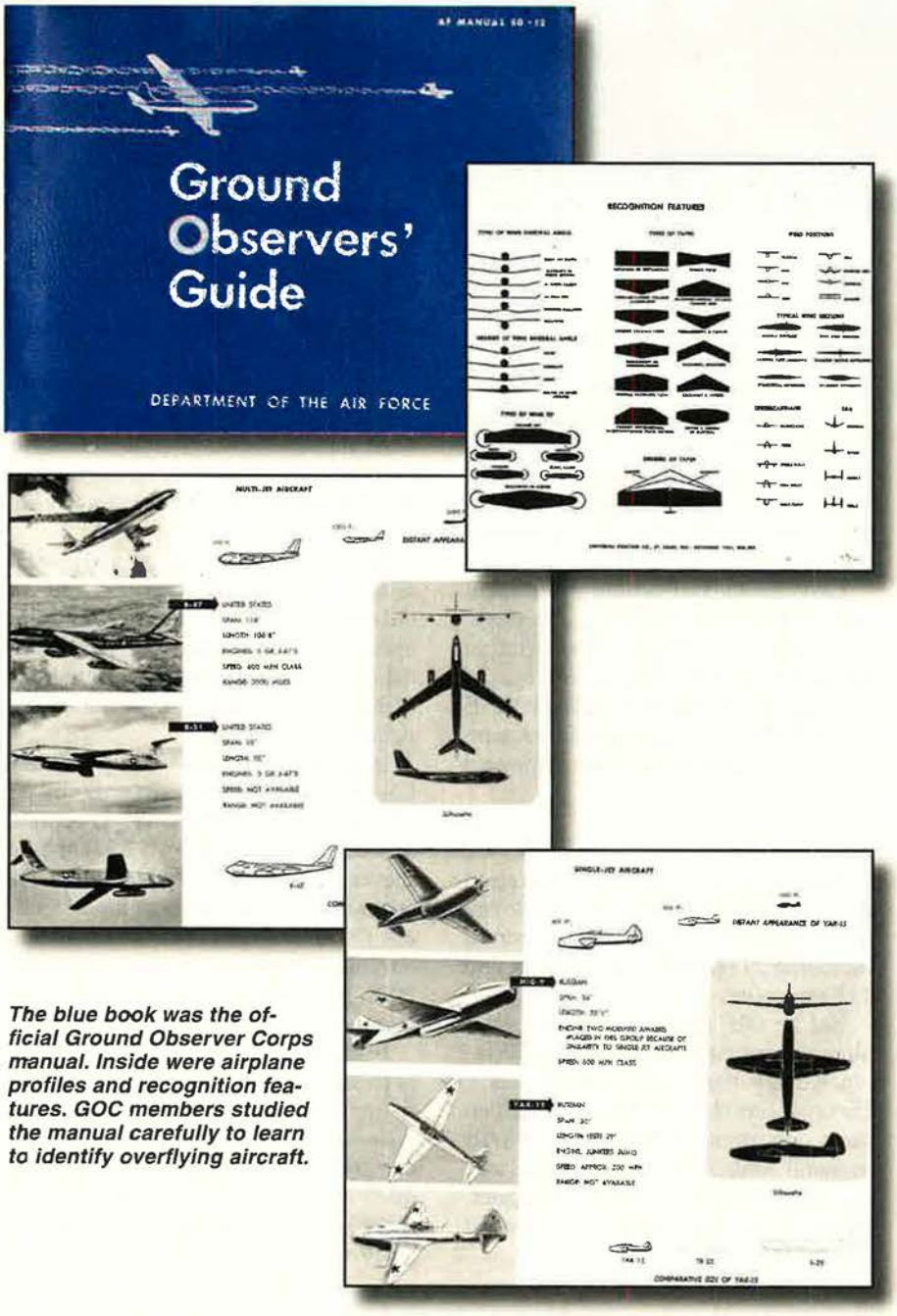
The Ground Observer

Some 800,000 volunteers at 16,000 observation posts scanned the sky for hostile aircraft.



All images courtesy of Radomes, Inc., www.radomes.org

The blue book was the official Ground Observer Corps manual. Inside were airplane profiles and recognition features. GOC members studied the manual carefully to learn to identify overflying aircraft.

Before electronic sensors guarded the approaches to North America, before satellite warning systems peered down from space, before air defense aircraft carried identification equipment, the US had the Ground Observer Corps.

In World War II, and then again during the early years of the Cold War, the nation's air warning system lay largely in the hands of the corps, a US military adjunct composed almost entirely of volunteers, intently studying wall charts and model airplanes to memorize the characteristics of "ours" and "theirs."

They were teenagers and housewives, manning search towers and bare rooftops, equipped only with binoculars. Through the war years and most of the 1950s, GOC members spotted and plotted the movements of potentially hostile aircraft. These almost always turned out to be friendly, but they might well have been intruders bent on mounting a surprise attack.

The observers worked from any site that offered a clear and unobstructed view of the sky.

In Hinsdale, Ill., it was atop the Community House. Code-named Coco-Metro-Zero-Four-Roger, the observation post was little more than an unroofed plywood pen about six feet square, unfurnished except for a telephone. When an observer saw an airplane, he logged it onto a clipboard and reported it to the Museum of Science and Industry in Chicago, the region's Air Force-operated filter center.

In Otsego County, N.Y., the volunteers operated from a shack set up in a field near the bus garage. It had a table, chair, and telephone hotline to the control facility in Syracuse.

In Scotts Valley, Calif., Papa-Hotel-Zero-Zero-Black was on a knoll near the local community center. Volunteers reported sightings to Hamilton Air Force Base.

And in Akron, Ohio, 15-year-old Fred Sutter pulled the Sunday morning shift, manning what looked like a greenhouse on the roof of the YMCA building.

Corps

By Bruce D. Callander

"We had a set of binoculars and a small space heater, because it did get cold in the wintertime," recalled Sutter, who later was a career Air Force officer. "We also had a telephone line to the center in Canton, Ohio, where they plotted the aircraft by directions and numbers."

Over the years of the Cold War, more than 800,000 volunteers stood alternating shifts at 16,000 observation posts and 73 filter centers.

Watching for What?

Looking back, the idea of a bomber hitting the US from Europe or Asia in the 1950s seems implausible, but this was a time when it seemed prudent to expect the worst.

It was the era when the Soviets acquired nuclear weapons. Like us, the Soviets had captured German scientists and had them working on intercontinental delivery systems. And who knew what kind of long-range aircraft the USSR had in operation?

There was also Red China, about which we knew even less. By the end of June 1950, we were at war in Korea, and, not long after that, Mao Zedong's China plunged into the war on the side of North Korea.

The US government and public took the threat seriously. Many built bomb shelters. Others stocked up on canned goods and checked out which local buildings were designated as public shelters. School children practiced the "duck and cover" technique and were warned to stay away from windows during an attack.

Sutter said, "When you think back about it, you think that the possibility of the Russians sending anything over at that time period was pretty slim. But the GOC was a low-cost alternative to radar. We didn't yet have the electronic sophistication that was necessary. We didn't have a DEW Line or the Pinetree Line, so it was a stop-gap measure, at fairly low cost, until those facilities were up and running."

Human sky watchers were not only inexpensive, they had a long history of dedicated service. The observation corps had its roots in World War I.

The first efforts at training ground observers to recognize and report airplanes by type had the practical purpose of reducing losses to friendly fire. Pursuit pilots and anti-aircraft gunners needed not only to see the aircraft but to be able to tell friend from foe.

Before long, Britain had another reason to keep a sharp eye on the skies. In 1915, Germany began to raid England, first with Zeppelins and later by fixed wing bombers.

Britain's Lesson

The British learned a major lesson from the air raids. German bombers had done what the Spanish Armada had failed to do. The English Channel no longer assured safety.

In the mid-1920s, the British began to refine the warning system. At first, the observer corps was run by county constables and volunteers. In 1941, the organization was renamed the Royal Observer Corps (ROC) and was under control of the Royal Air Force.

In the Second World War, the British air defense system was the model for the US. Large cities and small villages appointed air-raid wardens, trained volunteer ambulance drivers, put up blackout curtains, and recruited sky watchers for the new American version of the ROC, the Ground Observer Corps.

Observer posts were manned by volunteers, while the filter centers were run by the Army Air Forces and staffed by both military members and civilian volunteers. The Women's Army Auxiliary Corps (later the Women's Army Corps) provided many of the military plotters. Combined, the observation posts and filter centers were known as the Aircraft Warning Service, a loose alliance of the local civil defense authorities and the military.

It was not enough to spot aircraft, of

Pictured is a groundbreaking ceremony for a GOC observation post in New York state. GOC posts were constructed on top of existing buildings or on hilltops—any place with a clear, unobstructed view of the sky.

In this 1957 photo taken in Worcester, Vt., an unidentified Vermont state trooper and TSgt. Arthur Greenleaf of the Syracuse (N.Y.) GOC demonstrate the use of a GOC walkie-talkie to (l-r) Ed Maxim, Glendine van Kleef, and Harold Martin.

course, if you didn't know the difference between a fighter and a bomber and, more important, between an AAF airplane and an enemy one. For aircrews, anti-aircraft gunners, and GOC observers, aircraft recognition training was essential.

Initially, training emphasized the WEFT system of memorizing the shapes of the wings, engine, fuselage, and tail. Later, the service decided that learning an airplane's overall configuration was more effective.

The AAF produced all kinds of recognition training aids from silhouette posters to flash cards, photo slides, and movies. (See "Pieces of History: Watching the Skies," April 1997, p. 88.) One of the most effective was the scale model. Early in the war, the Comet Model Airplane & Supply Co. distributed plans to schools, and students began turning out facsimiles of Allied and Axis airplanes. As recognition programs grew in both the services and the observer corps, commercial manufacturers began to supply the models.

If the civil defense effort had a certain feeling of make-believe on the North American continent, one place where there was no question that enemy airplanes were a real threat was Hawaii. After the attack on Pearl Harbor, the Army beefed up its defenses there and broadened a radar network that had been little more than experimental on Dec. 7, 1941.

Because the war was draining the islands of manpower, the Army recruited local women and the wives of servicemen to help run a secret plotting room. It was atop a concrete warehouse, where reports from observers and radar operators were traced on a large horizontal map.

Known as the Women's Air Raid Defense (WARD), the workers were appointed to the civil service, paid $120 per month, and furnished quarters and officers' mess privileges at Ft. Shafter. They wore pale blue dress and fatigue uniforms similar to those of Red Cross volunteers and were issued World War I helmets and gas masks. They also wore armbands showing they were noncombatants in the active war zone.

The program was expanded to other islands, and, during the Battle of Midway, WARD observers helped vector crippled US bombers into blacked-out airfields. Other times, they spotted unidentified aircraft, and fighters were scrambled to do battle with them.

The WARDs served until a few weeks after V-J Day, when the unit was disbanded. The women were offered equivalent civil service jobs with the War Department in the islands.

The Drawdown

Stateside units began to phase out their observers earlier in the war. The 1944 edition of the *Guide to the Army Air Forces* noted that since Oct. 4, 1943, both GOC and filter center operations had been put on alert status to free the pool of military and civilian manpower for other war work. Both were activated occasionally for tests and training, but they no longer operated on a 24-hour basis.

As the operations were scaled back, Secretary of War Henry L. Stimson wrote to the volunteers thanking them for their service. "During your period of duty with the Aircraft Warning Service, you have learned many facts which, if made public, might be of service to the enemy," he wrote, underscoring the seriousness of the effort. "The War Department looks to you to maintain silence with respect to these matters of national security."

In the end, there was little enemy activity directed against the continental US. The Japanese did launch about 9,000 bomb-carrying balloons against the US, but fewer than 300 reached North America. They did little damage.

Barely five years after World War II ended, however, there was a new threat from the USSR. The US began to develop an electronic warning network, but it would take time.

In February 1950, Continental Air Command's Lt. Gen. Ennis C. Whitehead proposed the formation of a revised Ground Observer Corps with 160,000 civilian volunteers. They were to operate 8,000 observation posts spotted in gaps between the proposed radar network sites. By 1951, some 210,000 volunteers were recruited and 26 filter centers were operating. (See "The Rise of Air Defense," December 1999, p. 73.)

The setup was much like that of the wartime organization. Volunteers manned the observation posts and worked along with Air Force members in the filter centers. Sutter recalls that the training was minimal. "My mother was the coordinator for that part of Ohio, so I got the training pretty much

The Northern Observers

From 1938 through the end of World War II, the Canadian Air Detection Corps reported sightings of both German aircraft and surfaced German submarines. Although the group phased out at the end of the war, a new Ground Observer Corps (GObC) was formed by the Royal Canadian Air Force.

Beginning with a small group of officers, the GObC grew to 50,000 volunteers with observation posts manned around the clock across Canada. They, too, built observation towers on their own initiative and expense and equipped them with everything from listening devices to binoculars.

In 1955, two years before NORAD was founded, Strategic Air Command sent an "enemy" force over Canada to test the defenses. The first warning by the GObC came some three hours before other, more sophisticated, sources reported the "attack."

at home," he said. "We also had aircraft recognition charts to show the types of aircraft and that sort of thing."

For estimating aircraft altitude, the Air Force developed a gauge, a transparent piece of plastic with circles of various sizes. The observer was supposed to move it until the airplane seemed to fill one of the circles and read the altitude from that. Sutter said he was given such a device but found it difficult to use.

As with the wartime organization, the Cold War GOC tied local civil defense agencies together with the military service. In the early 1950s, new rules gave the operational responsibility of civil defense to state and local governments, with the federal government helping where appropriate. This focused the Air Force's attention more specifically on air defense, although it still relied on civil defense organizations to help recruit volunteers.

Homeland Defense, 1950s Style

Members of the Ground Observer Corps were nothing if not earnest about their reponsibilities. An official Army Air Forces training manual for the Ground Observer Corps noted, "The duties of the ground observer are often inconvenient, sometimes physically uncomfortable, [and] almost never glamorous."

It went on to say, "No man or woman should volunteer for service as a ground observer looking for an easy job or with the intention of making anything other than an all-out effort to perform his or her duties efficiently and on schedule. The Ground Observer Corps is a part of the Army Air Forces, and its personnel are expected to govern [themselves] accordingly."

The manual also made the point that the volunteer's function "is an essential part of active air defense—the destruction of enemy planes and their crews." In this sense, the AAF said, the warning service was in partnership with the nation's fighter interceptors, anti-aircraft artillery, searchlights, and barrage balloons.

These active defense measures were in contrast to the passive measures such as dispersion of aircraft, camouflage, blackouts, and other routine precautions.

In the early days, GOC used horizontal plotting boards, such as the one shown here at the Syracuse filter center. Models were moved manually around the board to indicate the position of an aircraft.

Additional Mission

In the spring of 1953, the GOC took on the added duty of helping intelligence forces. The Air Force had developed intelligence service squadrons to go to the sites of enemy aircraft crashes, interrogate enemy crews, and examine aircraft wreckage.

The trick was to find where an airplane crashed or where a parachutist landed. The unit asked GOC observers to keep eye out and report such things as airplane type, distance and direction, the time of the crash, the number of parachutists seen, and the condition of the wrecked airplane.

GOCs were warned not to try to capture the survivors or approach the wreckage. The filter centers were to handle such reports the way it did routine trackings but to pass the information to one of the Air Force intelligence squadrons.

By the late 1950s, the need for volunteer sky watchers was diminishing. In July 1957, the main Distant Early Warning (DEW) Line was declared technically ready. (See "A Line in the Ice," February 2004, p. 64.) That September, the North American Aerospace Defense Command (NORAD) was established.

By then, both the US and the Soviets had ICBMs capable of delivering atomic warheads to their adversaries' homelands. Volunteer sky watchers, trained to spot aircraft when there still was time to intercept them, would be of little use against such weapons.

In January 1958, the Ground Observer Corps was reduced from 24-hour to ready-reserve status. A year later, it was inactivated. That same month, the first Semiautomatic Ground Environment (SAGE) division became operational in Syracuse.

Fifty years later, the wings and badges of the GOC observers and the airplane models used to train them in recognition are collector's items enshrined in museums or sold on eBay. Many of the teenagers who helped man the ramshackle observation posts are drawing Social Security. Only a few of the towers from which they phoned their reports have survived as historic monuments.

Whether keeping watch on the skies helped to head off a fatal attack on the US is debatable. There is no way to tell how things would have been different if the watchers and plotters had not been there.

Like the GOC members of World War II, however, those who served in the Cold War leave another legacy. For a brief period, thousands responded to the perceived threat and served alongside the uniformed services in defense of the country.

"The Cold War was starting to crank up," noted Sutter. The Ground Observer Corps "had a feel-good element to it, where people felt they were doing something. Then, when word got out that there were actually people up there watching, it had a warm fuzzy feeling for other people who weren't participating but knew that it was going on."

The US has not experienced anything quite like that kind of nationwide public participation with the military since the GOC disbanded. ■

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, "Up to Basics," appeared in the January issue.*

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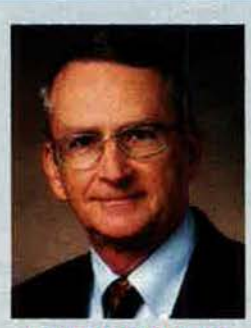

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Civilian workers will be put through tactical, operational, and strategic training programs.

Sharp Focus on Air Force Civilians

By George Cahlink

Over the past three decades, Roger M. Blanchard, the Air Force's civilian personnel chief, has seen lots of changes in how the service manages its employees, but he believes the recent changes have been the most important. Senior Air Force leaders, he said, have finally embraced the service's 150,000 civilian workers as part of the Total Air Force.

The leadership now understands "civilian elements of the force provide tremendous wealth and expertise," said Blanchard. "The Global War on Terrorism has sharpened everybody's focus about how we can use all of our assets to be successful."

Those 150,000 civilian employees, whose jobs range from repairing jet engines to managing complicated information systems, usually have taken a backseat to uniformed Air Force personnel. Civilians often have received less training than their uniformed active duty counterparts, have more frequently been targeted for force reductions, and have worked under a rigid personnel system.

Things now are beginning to change—and sometimes radically.

The Air Force is putting the finishing touches on its first comprehensive civilian force development training program. The Pentagon has called for turning thousands of military jobs over to civilians, rather than simply outsourcing them to the private sector. By February, the Defense Department likely will have abolished its archaic civil service personnel system in favor of new rules that promote pay for performance.

"The need to win and fight the Global War on Terrorism has caused all the services to sit up and take notice of their civilian workforces," Blanchard said.

A Military Model

In 2002, the Air Force announced a new initiative that changes and better coordinates how the service trains, educates, and assigns its active duty personnel. Under this leadership and force development effort, all military personnel will receive tactical, operational, and strategic training throughout their careers to prepare them for leadership positions. Air Force leaders say their underlying goal is to guarantee personnel are in the right jobs, with the right skills. (See "Force Development Hits Its Stride," October 2005, p. 66.)

Initially, force development efforts focused on military personnel, but last

AFA/AEF National Report

afa-aef@afa.org

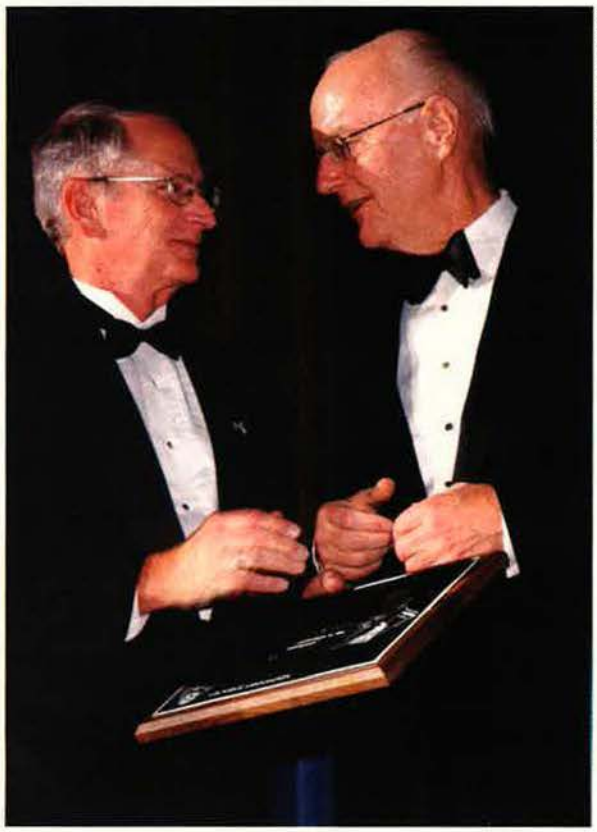
By Frances McKenney, Assistant Managing Editor

Los Angeles Ball

A "space statesman" received the prestigious Gen. Thomas D. White USAF Space Award at November's Air Force Ball in Los Angeles.

Peter B. Teets was honored at the 34th annual ball, held in conjunction with the Air Force Association's national symposium on space and hosted by the **Gen. B.A. Schriever Los Angeles Chapter.**

Teets served as acting Secretary of the Air Force in early 2005 and had been undersecretary for the service since 2001. During his tenure as a top civilian official, he held several positions simultaneously, including DOD executive agent for space, National Reconnaissance Office director, and the Air Force acquisition executive. In these roles, he was a constant advocate for space capabilities and provided leadership that "will pay dividends to the nation for decades to come," said the announcer at the ball.



USAF photo by Ron Hall

AFA Chairman of the Board Pat Condon (left) presents former acting Air Force Secretary Peter Teets with the Thomas D. White USAF Space Award at the Los Angeles Air Force Ball. See "Los Angeles Ball," this page.

More LA Honors

Also at the Air Force Ball, retired Lt. Gen. Brian A. Arnold was named an Aerospace Education Foundation Schriever Fellow. Arnold was, until last July, commander of Space and Missile Systems Center at Los Angeles AFB, Calif.

The ball's master of ceremonies, Raytheon Vice President of Communications Pat Coulter, led a tribute to the late Gen. Bernard A. Schriever, who is often called the father of the USAF space program. Schriever was an "extraordinary patriot and visionary," Coulter said.

Coulter later introduced VIPs in the audience, including Ronald M. Sega, the Air Force undersecretary; Gen. Bruce Carlson, head of Air Force Materiel Command; Gen. Lance W. Lord, commander of Air Force Space Command; and Lt. Gen. Michael A. Hamel, commander of SMC and the ball's military host.

Ronald D. Sugar, head of Northrop Grumman and the ball's general chairman, described for the audience some of AEF's programs. He told them that Visions of Exploration, co-sponsored by *USA Today* newspaper, reaches nearly 1,300 classrooms, in grades four through eight, encouraging students to study math, science, and aviation topics. He pointed out that the Schriever Chapter sponsors 100 Visions classrooms.

Sugar announced that the chapter's own education organization, the Schriever Foundation, had distributed more than $100,000 in scholarships and support to local Air Force personnel and AFROTC units in 2005. He then presented $70,000—the proceeds of the ball—to AEF Chairman of the Board L. Boyd Anderson and Bob Smith, Schriever Foundation chairman.

Along with corporate sponsors, the ball's AFA supporters include the **General Doolittle Los Angeles Area Chapter** and the **Orange County/Gen. Curtis E. LeMay Chapter.**

"Guest" of Iran

Inviting chapter members to a November dinner meeting, **Southern Indiana Chapter** President Marcus Oliphant told them that the speaker would be someone who had been "a 'guest' of the Iranian government for 444 days."

"This is a program not to be missed," Oliphant said. The guest speaker, retired Navy pilot Capt. Don Sharer, lived up to the billing.

A veteran of 32 years of service, Sharer talked about his military career—including the Vietnam War and Desert Storm—and about the 1979 Iran hostage crisis, when a crowd of militants seized the US embassy in Tehran on Nov. 4. They were protesting the deposed shah's admission into the US for medical treatment. Fifty-two people were held hostage. The shah's death, an oil embargo, the release of Iranian assets, and the election of a new US President all eventually led to the hostages' release on Jan. 20, 1981.

More than 40 people attended the chapter meeting to listen to Sharer, who now lives in Bedford, Ind., describe these events. They peppered him with

Walter E. Scott, 1932-2005

Retired CMSgt. Walter E. Scott, former Aerospace Education Foundation Chairman of the Board and President, died Dec. 26, 2005. He was 73 years old and had lived in Dixon, Calif.

He was the foundation's Board Chairman from 1994 to 1996 and its President from 1996 to 1998. At the time of his death, he was an emeritus board member of both the Air Force Association and AEF. Chief Scott also had served for many years as AEF's National Secretary, on several AFA and AEF national committees, and in AFA leadership positions.

Born on Oct. 17, 1932, Chief Scott served in the Air Force from 1948 to 1979, including combat tours in Korea and Vietnam. He helped develop, test, and refine a night flare illumination system, container delivery release system, and low-altitude parachute delivery airdrop for the C-123. This work, as well as his 63 combat support missions in the Vietnam War, was noted in *Air Force* Magazine's October 1996 photo story "Vietnam War Scrapbook."

Chief Scott was a C-5 loadmaster superintendent when he retired from the Air Force and had accumulated more than 13,000 flying hours in nearly all USAF cargo aircraft, from the C-47 to the Galaxy.

In his civilian career, he was CEO and owner of Dixon Travel and Winters Travel, both located in Dixon, southwest of Sacramento.

Among his many lasting contributions to AFA and AEF, Chief Scott established an AEF award, called the Scott Associate Fellowship, to recognize those who support the AFA and AEF missions.

questions ranging from his treatment as a prisoner to his opinion on today's situation in Iran and Iraq. At the end of his presentation, Sharer received a standing ovation—and membership in AFA.

A Uniformed Presence

Cathy Hutchinson was named Nebraska state Teacher of the Year, selected for her use of the Visions of Exploration program. She worked it into all subject areas in her fifth- and sixth-grade classes at St. Teresa Elementary School in Lincoln.

When the school announced this honor in its newsletter, it said, "A representative will be coming later this month to present this prestigious award."

The school seemed to be expecting a solitary person to show up for the presentation; instead, a bevy of AFA state and **Lincoln Chapter** leaders turned out for the award ceremony, held at a school assembly in October. William H. Ernst, Nebraska state president, headed the list of AFA officials. Others were Jerry Needham, state vice president, and Diane R. Bartels, state aerospace education VP, who organized the AFA participation.

Rounding out the contingent were AFROTC cadets, from Det. 465 at the University of Nebraska-Lincoln, who always help the chapter promote the Visions of Exploration program.

Several chapter leaders and cadets wore Air Force uniforms—a sight guaranteed to cause a buzz among the school kids. ANG Col. Robert A. Athan, the **Lincoln Chapter** president, wore a flight suit and brown leather jacket. ANG Lt. Col. Mary A. McGahan, chapter secretary, wore a uniform with the lightweight blue jacket having the Air Force logo on it. Cadets Anita Clark and Nessa Clark were in Class As.

Bartels said that having AFA visitors in uniform serves many purposes. "No matter where I go with these 'role models' in uniform," she said, "the students are always wanting to talk with them, have questions about the uniform and its medals, want to know what they do." She added, "The teachers themselves have little knowledge/connection to the military, so it serves as an educational message for them, also."

Ripple Effect

News that a 15-year-old Civil Air Patrol cadet would be guest speaker for the Virginia state AFA quarterly meeting gave AEF and the **Danville Chapter** publicity that began with a local newspaper and spread like a ripple, from Web site to Web site.

CAP cadet Kirsten Buslinger, from Danville, Va., was one of AEF's 50 Space Camp essay contest winners, selected to attend a week-long session last summer at the US Space and Rocket Center science museum in Huntsville, Ala.

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.

The Air Force Association and Air Force Legislative Liaison recently hosted a lunch briefing on Capitol Hill to discuss elements of the Air Force's undertakings in Iraq and Afghanistan.

Guest speakers were Maj. Jen **Short,** an A-10 pilot, and Capt. John **Traxler,** who works on the ground in Air Force special operations. Despite their vastly different roles, Short and Traxler represent an interdependent USAF team that works together to ensure success on the battlefield.

A number of Congressional staffers attended the briefing to hear the combat veterans discuss their unique experiences in flying and fight on the front lines in Southwest Asia. Attendees included Art **Crabal** from the office of Sen. Conrad **Burns** (R-Mont.), Amy **Auth** and Chris **Wall** of Rep. Virginia **Foxx's** office (R-N.C.), Jeff **Choudhry** and Ross **Groen** of Rep. Trent **Franks'** office (R-Ariz.), Mike **Conschafte** of Rep. Doc **Hastings'** office (R-Wash.), Jason **Edlar** and Allison **Waller** of Rep. Charles **Bass'** office (R-N.H.), Marcus **Friesen** of Rep. Tim **Ryan's** office (D-Ohio), Amy **Jones** of Rep. Joseph R. **Pitts'** office (R-Pa.), and David **Kush** of Rep. Christopher H. **Smith's** office (R-N.J.).

Others at the briefing included Ryan **McKeon** and Alex **Silbey** from the office of Rep. G.K. **Butterfield** (D-N.C.), Jeff **McNichols** of Rep. John **Kline's** office (R-Minn.), Silvia **Pavia** of Rep. Anne M. **Northup's** office (R-Ky.), Leo **Schwartz** of Rep. Tim **Holden's** office (D-Pa.), Bob **Siaril** of Rep. John M. **Spratt Jr.'s** office (D-S.C.), Aaron **Taliaferro** of Rep. Joe **Schwarz's** office (R-Mich.), Amanda Rogers **Thorpe** of Rep. C.A. **Ruppersberger's** office (D-Md.), and Wayne **Warf** of Rep. Mike **Sodrel's** office (R-Ind.).

Staff photo

Sen. Daniel Inouye (D-Hawaii) received AFA's Lifetime Achievement Award in a presentation on Capitol Hill in December. Presenting the award were AFA National President Bob Largent (right) and Executive Director Donald Peterson (left). An eight-term Senator, Inouye is a World War II veteran of the 442nd Regimental Combat Team, a Medal of Honor recipient, and the ranking Democrat on the Senate's Defense Appropriations Subcommittee.

Buslinger first gave the Danville Chapter a presentation in September on her Space Camp experiences. Then she was invited to speak at the state-level meeting in November hosted by the **Richmond Chapter.** The *Danville Register & Bee* picked up the story at that point. In a short feature article, it described Buslinger's favorite Space Camp activities, including underwater astronaut training, spinning in a gryro chair, and touring museums. It also covered the role of AFA and AEF in providing scholarships to Space Camp.

The newspaper story was linked by Web sites for Civil Air Patrol, the Space Camp, and for a couple of sites that publicize summer camps.

As for Buslinger's PowerPoint presentation to the Virginia AFA meeting: "She awed the audience," reported Danville Chapter President Gerald L. Hovatter. He said the cadet showed "a great deal of knowledge and poise far exceeding someone of her age."

Introducing the 505th

The **Hurlburt Chapter's** Community Partners received an introduction to one of USAF's newest wings at Hurlburt Field, Fla., in October.

The 505th Command and Control Wing was activated in March 2004 at Hurlburt. It had formerly been the Air Force Command and Control Training and Innovation Group.

"Most of our Community Partners are very familiar with the 16th SOW [the host special operations wing at Hurlburt], due to orientations they have held for us in the past," wrote Chapter President James B. Connors. But this, he continued, "was a chance to understand the mission of the 505th, the only command and control wing in the Air Force."

Wing Commander Col. Charles H. McGuirk Jr. and his staff conducted a mission briefing and orientation tour for the 15 chapter guests. The visitors toured an air operations center area, classrooms, and other facilities and learned that at Hurlburt the wing trains AOC personnel through classroom instruction and computer modeling and simulation.

Connors said one of the Community Partners commented, "When I was in Desert Storm, they trained folks when they showed up for air operations center duty. Now they can hit the ground running."

Also in October, the Hurlburt Chapter was among the AFA chapters leading the pack in new-membership recruitment. The chapter signed up 15 newcomers.

In the Wright Direction

Wright Flight, a program founded in Arizona by a **Tucson Chapter** member to motivate student achievement, got a publicity boost in Florida through a **Brig. Gen. James R. McCarthy Chapter** member.

In November, a newspaper in Daytona Beach highlighted David R. Cummock's years of volunteer work in Wright Flight. It noted that he teaches

aviation history, as well as good work habits and citizenship, to several students in the after-school program.

Wright Flight kids typically sign a contract, setting an academic or behavioral goal and promising to remain drug and alcohol free and to pass the aviation history course. When the students in Cummock's class meet their goals, pilots from the local Experimental Aircraft Association take them for a flight or two in a small airplane.

Tucson Chapter's Robin Stoddard, a former Reserve fighter pilot, founded Wright Flight in 1986 after noting that children were fascinated by aircraft. He decided to turn that interest into a motivational tool.

Cummock, who is also AEF's secretary-treasurer, founded the Florida Wright Flight program and one in Massachusetts. He said Wright Flight is the McCarthy Chapter's primary aerospace education outreach activity. Chapter Secretary Robert Perry and members Keith E. Phillips and Robert A. Terry are Wright Flight instructors, too, and other chapter volunteers fill various roles in the program. Together, they cover three middle schools and work with 55 students.

More AFA/AEF News

■ The **Prescott Chapter (Ariz.)** brought holiday cheer to the Depart-

Reunions

reunions@afa.org

49th and 4201st Test Sqs, Barksdale AFB, LA. May 5-6 at the Isle of Capri Hotel in Bossier City, LA. **Contact:** Doug Hardin (850-897-8600) (dlhard.n1@cox.net).

58th FS. March 2-5 at the Sandestin Golf & Beach Resort in Destin, FL. **Contact:** Bill Lee (850-729-1399) (http://members.cox.net/58fs).

100th BW, Pease AFB, NH. Sept. 28-Oct. 1 in Washington, DC. **Contact:** Denny d'Adelio, 4811 Woodland Way, Annandale, VA 22003 (703-425-1988) (dfd@100bw2006.com).

307th BW, Lincoln AFB, NE (1954-65). April 23-27 in Charleston, SC. **Contact:** Jarvis Latham, 1424 Woodlawn Ave., Columbia, SC 29209-1433 (803-776-4294) (k4jhl@earthlink.net).

494th BG, Seventh AF (WWII). May 17-21 at the Pere Marquette Hotel in Peoria, IL. **Contact:** Marshall Keller, 7412A Vassar Dr. E., West Bloomfield, MI 48322 (phone or fax: 248-626-3684).

623rd AC&W Assn, including the 624th and 851st Sqs, 529th Gp, 305th Fighter Cont. Sq, 51st FIW, 313th ADIV, and 2152nd Communications Sq. March 29-April 2 in San Antonio. **Contact:** David Cory, 10408 Wedd, Overland Park, KS 66212 (913-888-4874) (dbcory@earthlink.net).

AF Public Affairs Alumni Assn. May 4-6 at the Wyndham Baltimore-Inner Harbor Hotel in Baltimore. **Contact:** John Terino (730-350-7420) (terinocom@earthlink.net).

Air Weather Assn. May 10-14 in Omaha, NE. **Contact:** Kevin Lavin (434-296-2832) (airweaassn@aol.com).

Fairchild AFB, WA, all units. July 28-30 at the Coeur d'Alene Resort in Coeur d'Alene, ID. **Contact:** Guy Perham, 2820 E. Snowberry Ln., Spokane, WA 99223 (509-535-9865) (perhgd@ieway.com).

Pilot Class 51-A, Reese AFB, TX; Vance AFB, OK; and Williams AFB, AZ. April 4-6 in Winter Haven, FL. **Contact:** Joe Gyulavics (863-324-3342) (skybird343@aol.com).

USAF Navigator Class 54-06C. September in Sacramento, CA. **Contact:** Mort Jarvis (530-673-8402) (habumj@pacbell.net). ■

Mail unit reunion notices four months ahead of the event to "Unit Reunions," *Air Force* Magazine, 1501 Lee Highway, Arlington, VA 22209-1198. Please designate the unit holding the reunion, time, location, and a contact for more information. We reserve the right to condense notices.

Many Nebraska AFAers attended the state Teacher of the Year ceremony for Cathy Hutchinson (holding award). See "A Uniformed Presence," p. 92. Among those pictured are school principal Sister Mary Bernadette and Diane Bartels (in white jacket), who organized the AFA participation.

ment of Veterans Affairs Medical Center in Prescott in December, when chapter members joined AFROTC cadets in decorating the extended-care facility. Thomas E. Rowney, chapter president; Jim Turner, vice president; Paul Feirick, secretary; Pat Bledsoe, treasurer; and James E. Muehleisen helped two dozen Embry Riddle Aeronautical University students carry out this annual, joint project. Together, they assembled and decorated Christmas trees and hung lights, wreaths and garland through three wings, a lounge, and eating area.

■ The **Ute-Rocky Mountain Chapter (Utah)** hosted a holiday visit to a Veterans Affairs Medical Center in December. The chapter collected funds to provide gifts of socks, fruit, candy, phone cards, and Christmas cards to 340 veterans. "It's a very emotional experience for everyone involved," said Willis Cohu, the chapter's veterans affairs VP. Approximately 60 people participated in the visit, including JROTC cadets, Arnold Air Society cadets, and members of the **Salt Lake Chapter.**

■ More than 100 people braved winter storm warnings in Northern Virginia to attend a December luncheon meeting of the **D.W. Steele Sr. Memorial Chapter (Va.),** where Lt. Gen. Donald J. Hoffman spoke about Air Force acquisition. The military deputy in the Office of the Assistant Secretary of the Air Force for Acquisition, Hoffman said his priority is to restore confidence in the system. He said USAF has audited more than 72 acquisition programs, and he reviewed for the audience the top 10 programs that exceed $1 billion. According to Chapter President George DeFilippi, Hoffman said the Air Force wants industry to use solutions that allow interfacing across platforms or systems; to develop standards that work in concert with the government's; and to provide more transparency on costs.

■ A staff judge advocate in the California State Military Reserve spoke to the November meeting of the **Pasadena Area Chapter (Calif.).** Steve Bolinger described legal issues facing the US Army in Southwest Asia. Bolinger is a partner in a law firm and serves as a lieutenant colonel in the 40th Infantry Division Support Brigade of the California State Military Reserve. A volunteer state defense force, CA SMR supports the state National Guard.

■ The **Thomas W. Anthony Chapter (Md.)** received a Certificate of Appreciation from the Andrews Air Force Base community as thanks for the chapter's participation in the annual Joint Service Open House last May. ■

Have AFA/AEF News?

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Airpower Classics

Artwork by Zaur Eylanbekov

B-17 Flying Fortress

The B-17 Flying Fortress was the first mass-produced, four-engine US bomber in history. It may also have been the most famous bomber of World War II, becoming the symbol of the US Army Air Forces' daylight precision bombing campaign against Germany.

The Boeing-designed "Fort" was an airplane of legendary toughness, surviving with, as one author put it, "wings punctured and ablaze, tail surfaces shredded, with chunks of its graceful body gouged out by cannon fire, flak, or midair collision." Thousands returned to base torn apart by bullets, cannon shells, and flak. This characteristic gave the B-17 a certain mystique, and aircrews loved it.

The B-17 began as a kind of riverboat gamble; Boeing in the 1930s bet its own money and future on the four-engine "Model 299" aircraft. Air Corps leaders immediately recognized its long-range potential and succeeded in initiating production. The design went through six major changes, but the definitive version was the last—the B-17G, whose two-gun chin turret resolved a serious problem of head-on attack by enemy fighters. The B-17 is most closely associated with Europe, where Eighth Air Force bomber missions over Germany frequently featured hundreds of Forts in a single raid. However, the bombers served in all theaters of the war and were, in fact, the first to mount an offensive attack on Japanese forces in the Pacific.

Boeing, Douglas, and Lockheed-Vega built a grand total of 12,731, of which some 4,750 were lost in action. Following World War II, the B-17 was declared obsolete, but its fame only grew. Gen. Henry H. "Hap" Arnold, Commanding General of the US Army Air Forces, said the B-17 was critical to America's "worldwide aerial offensive."

This aircraft: B-17G #42-97976—*A Bit O' Lace*—as it looked in February 1945. Assigned to Eighth Air Force's 447th Bomb Group, it was seriously damaged by flak but was repaired and continued flying.

In Brief

Boeing design ★ built by Boeing, Douglas, Lockheed-Vega ★ first flight 1935 ★ crew of six to 10 ★ four radial engines ★ total number built 12,731 ★ ***Specific to B-17G:*** max speed 300 mph ★ cruise speed 180 mph ★ max range 2,000 miles (loaded) ★ armament 13 .50-cal machine guns ★ bomb load 6,000 lb ★ weight (normal loaded) 55,000 lb ★ span 103 ft 4 in ★ length 74 ft 9 in ★ height 19 ft 1 in.

Famous Fliers

Seventeen B-17 Medal of Honor recipients—Brig. Gen. Frederick Castle; 2nd Lt. Robert Femoyer; 1st Lt. Donald Gott; 2nd Lt. David Kingsley; 1st Lt. William Lawley Jr.; Sgt. Archibald Mathies; 1st Lt. Jack Mathis; 2nd Lt. William Metzger; 1st Lt. Edward Michael; 2nd Lt. John Morgan; Capt. Harl Pease Jr.; 2nd Lt. Joseph Sarnoski; Sgt. Maynard Smith; 2nd Lt. Walter Truemper; TSgt. Forrest Vosler; Brig. Gen. Kenneth Walker; and Maj. Jay Zeamer Jr. Lt. Col. Immanuel Klette set a record for heavy bomber pilots—91 missions and 663 combat hours.

Interesting Facts

Dropped more bombs than any US aircraft in World War II ★ flew first US bomb missions against Germany ★ flew first US bomb missions against Japanese forces ★ *Memphis Belle,* the most famous B-17, now at the National Museum of the United States Air Force ★ name "Flying Fortress" coined by Richard L. Williams of the *Seattle Times* on seeing first model ★ featured in famous Gregory Peck movie "Twelve O'Clock High."

Electro-optical image of a palace footing in northern Iraq taken by Global Hawk from above 60,000 feet.

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