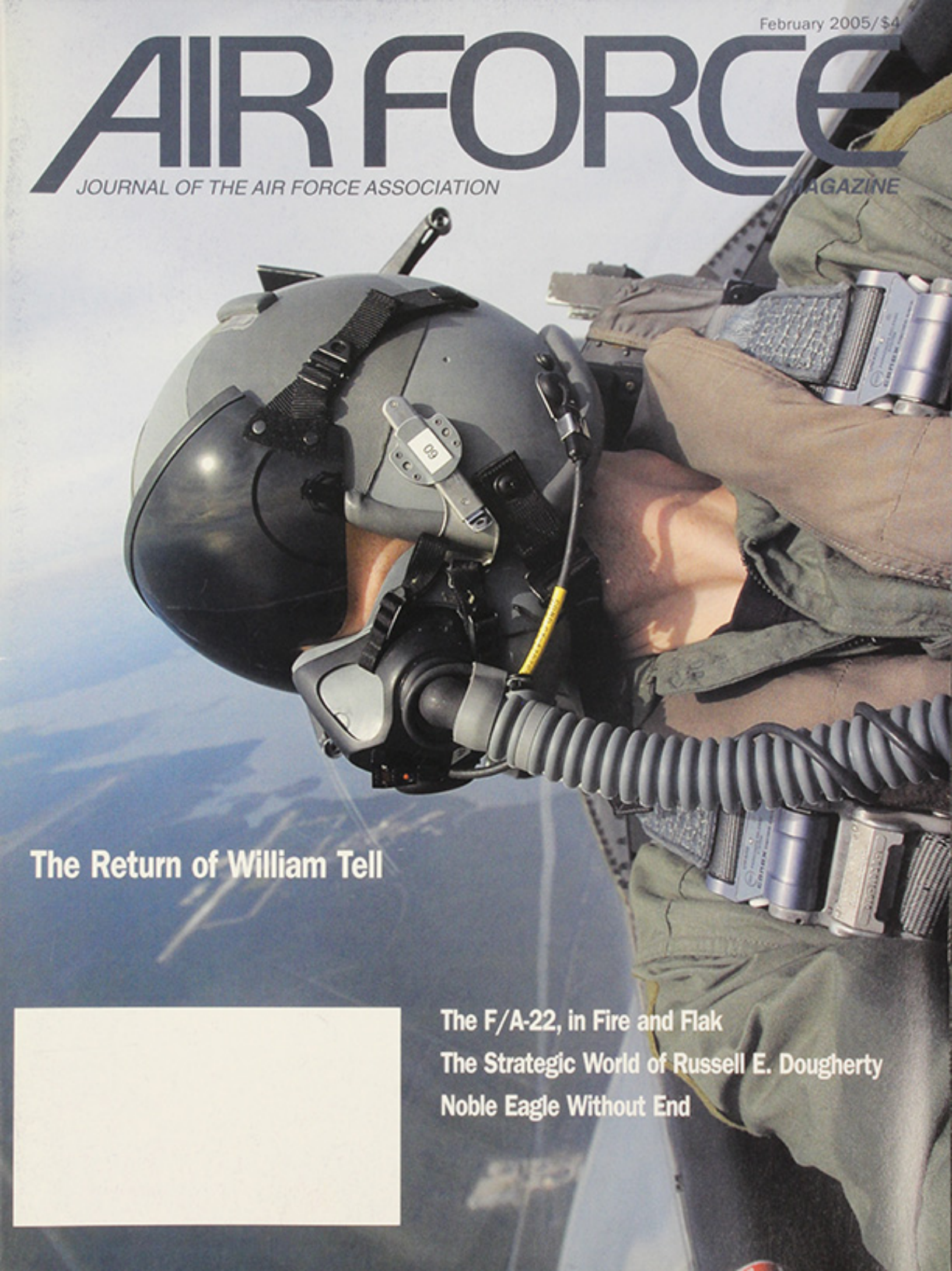


February 2005/\$4

AIR FORCE

JOURNAL OF THE AIR FORCE ASSOCIATION

MAGAZINE



The Return of William Tell

The F/A-22, in Fire and Flak
The Strategic World of Russell E. Dougherty
Noble Eagle Without End

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By Robert S. Dudney, Editor in Chief

The Fighter Force You Have

The F/A-22 fighter program recently swerved off the road again. Only one month into the year-long Quadrennial Defense Review, the Pentagon suddenly imposed a huge and unexpected cut.

The shake-up came in late December when Secretary of Defense Donald H. Rumsfeld ordered USAF to halt Raptor production in 2008 at 180 aircraft, cutting \$10 billion and about 100 fighters from the program. Previous Pentagon chiefs at least waited to finish their reviews before axing the F/A-22. Rumsfeld did not.

He handed down his decision on Dec. 23 in revisions to the Fiscal 2006 defense budget, providing no explanation or analysis.

DOD was, at least in part, responding to pressures to reduce the deficit—\$521 billion last year—and offset the costs of the wars in Iraq and Afghanistan, now running at about \$6 billion per month. The speed and stealth of the F/A-22 cut, however, suggested other motives.

Analysts noted that Rumsfeld's closest aides have for years sought to curtail or cancel the Raptor program, arguing it was a Cold War-era fighter built to battle a bygone Soviet enemy. Some speculated the aides used the budget pressure as a pretext for imposing their anti-Raptor views on the Air Force.

The service has not fielded a new air dominance fighter since the F-15 in 1974. The Eagle is probably still the world's top operational fighter, but its edge is eroding. USAF says the F-15 can't guarantee air superiority beyond 2010.

The F/A-22 is the centerpiece of the Air Force's long-term plans. It combines stealthiness with supercruise and a highly advanced sensor system. The first combat squadron will stand up this year. The Air Force believes the F/A-22 is the key to air dominance.

Obviously, influential DOD officials think otherwise. As airmen see it, F/A-22 critics are making at least three basic mistakes.

■ **Threats.** As the Pentagon sees it, the US faces no "peer" competitor.

Rumsfeld's most recent strategic guidance to the services de-emphasizes "traditional" conventional war in favor of preparing for "irregular," "catastrophic," and "disruptive" forms of conflict. Such a planning shift devalues the contributions of big weapons such as the F/A-22 fighter.

However, say airmen, this is a mistake. They argue that the US must be ready to conduct successful operations over the spectrum of con-

F/A-22 critics are making at least three basic mistakes.

flict, up to and including conventional war at the "high end." They note that the QDR is not about today, but about the period 2015-20. Decisions made today will determine how well-prepared we are for potential threats such as China, which will have a greatly expanded economy and access to Russian military technology.

■ **Capabilities.** Critics disparage the Raptor as a mere "dogfighter." While it may have been conceived as a pure air-to-air weapon, it is now far more than that. Modifications are turning it into a platform for precision attack, surveillance, electronic attack, and data collection for networked warfare. In fact, the F/A-22's power to "kick in the door" to defeat anti-access weapons and forces in a distant theater is a key part of USAF's developing concept of operations. The Raptor will be the only US aircraft capable of countering anti-access threats in all weather conditions, day or night. It will provide a vital capability for the joint force and is thus a national—rather than merely a service—program.

■ **Required numbers.** Some critics argue that USAF could get by with a "silver bullet" force—a relative handful of highly capable F/A-22s. To these analysts, a total of 180 Raptors would be more than sufficient to prevail in any combat scenario. True but irrelevant, say airmen, because that is not the basis for determining force structure. What is needed is a suffi-

cient number of F/A-22s to maintain an adequate "rotation base" and keep the operational tempo of the force within bounds.

USAF says the minimum requirement is one F/A-22 squadron (24 combat-coded Raptors) for each of its 10 Air and Space Expeditionary Forces. That would enable USAF to forward-deploy, at all times, two F/A-22 squadrons without breaking rotation cycles. According to Air Force officials, this requires a fleet of 381 Raptors—more than twice the 180 fighters now in the plan.

The December surprise was unwelcome. USAF already endured a "procurement holiday" in the 1990s, when Washington harvested a post-Cold War "peace dividend." Further delay of modernization would take a toll on the fighter fleet.

The latest move was all the more puzzling because there was an alternative to slashing the Raptor program. Gen. John P. Jumper, the Chief of Staff, said Dec. 14 that the service could defer some purchases of F-35 Joint Strike Fighters instead. The Pentagon rebuffed this idea.

What happens now? Air Force leaders plan to present a vigorous case for the F/A-22 in the QDR in hopes of reversing the cuts. The issue also moves to Congress, which must approve DOD's changes. The outcome is uncertain. Sen. Saxby Chambliss (R-Ga.) said 180 is "a totally inadequate number" and vows to fight for more.

Rumsfeld once declared, in the context of Iraq, "You go to war with the Army you have," not "the Army you might want or wish to have." His remark was controversial, but correct and applicable to the Air Force. The fighter force we have is a great one, but the one we need a decade hence must be able to defeat advanced aircraft, radars, and missiles by a decisive margin—and do it in distant theaters with little or no warning or backup.

To make sure we have *that* force, we need to restore the F/A-22 program and get on with acquiring it in adequate numbers. ■



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The Unified Air Force

I respectfully offer critical comments on your editorial "The Unified Air Force" published in January [p. 2]. You make a persuasive case for the Future Total Force (FTF) plan that includes integration of the Air Force Reserve and Air National Guard into the active duty Air Force. You imply that integrating the Reserve and the Guard are similar, which misses the key difference of "federal" forces versus "state" organizations such as the Guard. You cite a long list of savings but cite no costs to this integration plan. The major cost of the FTF will be the destruction of the Air National Guard.

For example, the blending of the Air National Guard unit at McEntire ANG, S.C., with the [active duty] units at nearby Shaw AFB, S.C., will destroy the South Carolina 169th "Swamp Fox" Fighter Wing as we know it. There is no question that blending the experienced personnel of the Guard into active duty units will help the Air Force in the short term. However, those Guard folks will resign or retire, and few recruits will take their places because there will be no Guard unit to join. At that point, the Air Force will be back to square one. This cost seems very high and not in the national interest.

Motivated airmen join the Air National Guard for different reasons than those who initially joined the active duty Air Force. Guard units have high experience, continuity, identity, and local leadership. Guardsmen are the modern-day citizen soldiers. Blending of the Guard into Air Force units will destroy the Air National Guard's strong sense of unit integrity, an intangible quality that binds fighting units and molds individuals into a cohesive, unique team.

Col. Harold Mills,
USAF (Ret.)
Columbia, S.C.

I take great umbrage in the paragraph that describes the world of the reserves that operate in "old, slower-paced ways." The Air National Guard and Air Force Reserve may have their unique ways of getting things done,

but they get done with a high degree of professionalism and dedication.

The majority of the personnel are made up of prior-service people. Quiz many of them as to why they left the active duty and a common response is [to find] a permanent home. Another factor is too many chiefs and not enough Indians in the active world.

Take a look at the fighter world from the mid-1980s on. Look at the aircraft competitions Gunsmoke and William Tell during their heyday years. The ANG and AFRC were walking away with top awards and trophies. This wasn't accomplished by being entrenched in their ho-hum ways and "cultural identities." Given the opportunity, the reserve components can keep pace with any challenge faced.

All of the 1990s active duty downsizing and right-sizing drove out a great deal of talented people. They found homes in the reserve components. So by initiating this Future Total Force plan, the active service is making an attempt to capture the expertise and knowledge it lost. Maybe the "cultural identities" will wear off to form a stronger force.

Dennis S. Nielsen
Phoenix

Electronics Is Nice

Most present day attack scenarios involve the possibilities of many different or combined modes. Electronics is nice and well represented, but it is only a small part of the total picture. [See "The New Way of Electron War," December 2004, p. 26.]

There are also much faster logic

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systems than digital that could be used. We are at the point that some serious pure research work would pay big dividends. Places like Sandia [National Laboratory] have similar needs. There is no reason not to put together a combined research team. Compartmentalization is killing a lot of available progress.

Hugh Coleman
Kelso, Wash.

Those "Red Devils"

As a member of the 431st Fighter-Interceptor Squadron, "The Red Devils," stationed in Libya and Spain in 1958-59, I was startled to see the Air National Guard's 107th Fighter Squadron F-16 carry that name on the tail. [See "Reconnaissance in Force," December 2004, p. 38.]

I know the 431st lineage began on May 14, 1943. I'm so glad to see that it has survived, as it brought back a lot of memories of my old F-86D days.

Richard Beltzhoover
Carmel, Ind.

■ Although not noted in the article, the 107th Fighter Squadron traces its heritage to the 107th Aero Squadron, activated in 1917, after which it went through various designation changes. Its emblem was a full-figure red devil holding a pitchfork. The emblem for the 431st Fighter Squadron (activated in 1943 as Mr. Beltzhoover points out) was a satan's head. Several other units also used variations on satan for their unit emblems, and some may have called themselves "devils."—THE EDITORS

Bad Juju

The December 2004 Bennett article was a very good read and serves to keep the faith with us forward air controllers. [See "Impossible Odds in SAM-7 Alley," p. 52.] So I and my FAC brethren will most likely forgive a couple of inaccuracies.

But to set the record straight, during most of the thousand hours I flew the O-2, it had two engines. There were a couple of times, though, where one of them quit working, but it was really supposed to run on both. If you

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lost the back one, that was a real problem.

Also, when I went through Air Ground Operation School at Hurlburt Field in 1968, a weapons professor briefed us on how to direct naval gunfire. During my tour as a Jade FAC working for the 1st Australian Task Force, I recall directing a number of fire missions with USS *Hobart* and other ships. In fact, the only Jade FAC ever shot down was hit by a five-inch "golden BB" round fired from the ship he was helping to direct. This made one hell of an object lesson for the rest of us—never get between the ship and the target. Lot of bad juju happens when you fly under the gun-target line.

Lt. Col. Dion W. Johnson,
USAF (Ret.)
Kingwood, Tex.

Having spent three great years flying the "Oscar Duce," I seem to recall a second engine, back behind me, between the tail booms. Thus, one nickname was "the Push me, Pull you." And although it flew well with only one engine, two made it a far more effective "bug smasher." Informative and moving article, though.

Lt. Col. Jim Burkholder Jr.,
USAF (Ret.)
Bonners Ferry, Idaho

More With Less?

It is apparent that there is a problem at McChord Air Force Base. [See "Aerospace World: Demobilization May Strain McChord," December 2004, p. 15.] It's most apparent since some of my least favorite airlift "buzzwords" appeared all together in your article. These include: "pick up the slack" and the need for "creative plans" and "smart scheduling."

It appears that despite increased airlift requirements, two Air Force Reserve airlift squadrons are going to

deactivate, thus putting a large dent in crew levels. That being the problem, no amount of "creative plans" or "smart scheduling" is going to solve them.

McChord must either take a mission cut or have the proper level of personnel and resources assigned. This could include charters, a move to allow shorter flights, and lesser crew requirements from staging areas not now used or in existence. If charters and rebasing would have cut crew requirements, why hasn't it been done already? Rather than create buzzwords, someone, at a high level, must "bite the bullet" and take leadership action to resolve the problem.

There appears to be a leadership lack here, which needed to be resolved earlier than the present crunch.

Bill Barry
Huntsville, Ala.

More on Igloo White

I was glad to see John Correll's article about the Igloo White project. [See "Igloo White," November, p. 56.] As one of my duties there was unit historian, I thought I'd add some memories.

"Task Force Alpha" was the official designation of the wing-level Air Force unit that operated the ISC [Infiltration Surveillance Center] and tasked the flying units that emplaced sensors and relayed sensor readouts. TFA's opponent was the NVA 559th Transportation Group, which developed, maintained, and operated the Ho Chi Minh Trail.

Initial air delivery of sensors along the trail was done by US Navy crews flying the OP-2 Neptune, which was already configured for sonobuoy drops. Large, slow, and not very maneuverable, the P-2s were hammered by enemy AAA, and one or two were lost with all hands. Air delivery was picked up by LORAN D-

Letters

equipped F-4s out of Ubon. One of the EC-121R "Batcats" was lost in an accident at Korat.

To say the sensors were "very effective in tracking the enemy at Khe Sanh" isn't the half of it. The newly operational ISC's efforts were redirected in spring 1968 as the enemy closed in on the isolated marines. Targeting information developed by Igloo White helped focus the historic air campaign that devastated the multidivision NVA force attempting to duplicate their decisive 1954 victory at Dien Bien Phu.

During the first Commando Hunt trail interdiction campaign, in fall 1968, air operations personnel joined TFA's intelligence and sensor operations staff, and the unit was given control of strike forces. This was an unprecedented direct operational connection between an all-source intelligence fusion center and air combat forces, an early effort to minimize the detection-targeting-strike-assessment cycle. For various reasons, probably including broader air operations control issues in Southeast Asia, the experiment was not renewed for subsequent dry season campaigns.

Navy A-6 attack bombers with advanced moving target indicator equipment were very effective partners for TFA during night and bad weather operations.

I think as the signal relay system matured, the ISC could monitor acoustic sensors "live." I distinctly recall sitting in the operations room one night, listening to enemy trucks operating in the A Shau Valley, as artillery was called in on them and flying debris clanked against the sensor.

The janitors' jobs were simplified by the fact that the ISC "building" (really one main structure and a series of joined construction trailers surrounded by a high revetment) was air-conditioned and dust-protected for the computers' sake. NKP's host unit was the 56th Special Operations Wing, so uniform of the day was jungle fatigues with the air commando hat. TFA permanent party had to have the lugs cut off their jungle boots to avoid tracking dirt into the ISC; everyone entering ran their footwear through a power brush. Those non-warlike working conditions, "the project's" isolation from the main cantonment area, and the fact that much of the TFA staff were nonrated "straphangers," while its commander outranked the host flying unit's CO, made for sometimes interesting relationships at NKP, which was loaded with conventional and unconventional forces and missions.

After its reincarnation as Hq. 7th Air Force, I believe the ISC facility was headquarters for teams beginning the search for MIA remains in Laos. The high-tech capabilities of the ISC, with its hugely expensive equipment cossetted in a large stationary structure and requiring a fair amount of contractor support, could now probably fit into a laptop computer that shrugs off field conditions. TFA members were among the smartest, and funniest, people I had the pleasure of serving with in my 22-year career. I sure hope someone preserved the operations room log-books. Or maybe not!

Lt. Col. Mark R. Foutch,
USAF (Ret.)
Olympia, Wash.

I was a member of the 21st Helicopter Squadron (later, the 21st Special Operations Squadron) at NKP. I'd like to make an identification and correct a small mistake. The first photo [p. 56] is of the flight engineer, Sgt. John Benefield, getting ready to toss a sensor out the crew door and was taken aboard a CH-3E (not an HH-3) Jolly Green helicopter. The 21st never had HH-3 helicopters assigned. HH-3s had in-flight refueling probes.

Helicopter #67-14703, located at the Museum of Aviation at Robins AFB, Ga., is a surviving aircraft from the 21st SOS and was restored to her original configuration for display. She is dedicated to the memory of all Air Force helicopter crew members lost during the war in Southeast Asia.

Jim Henthorn
Baltimore

Phantom B-25 Gunner Station

In reference to the January issue, p. 41 ["Stories in Stripes"], I wish I had had that tail gunner station on my B-25.

E.D. Picton
Fallbrook, Calif.

■ A production error led to identification of the B-52 tail-gunner station on exhibit at the Enlisted Heritage Hall as a B-25 gunner station.—THE EDITORS

Correction

A news item in January's "Action in Congress" that discussed the Class Act Group's work on the Keep Our Promise legislation should have said that it will benefit retirees who entered service on or before Dec. 7, 1956. The item said "on or after."



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Washington Watch

By John A. Tirpak, Executive Editor

Airlift Reduces Convoy Numbers; QDR and Tactical Aviation; Corrosion's True Cost

More Airlift, Fewer Convoys

The Air Force stepped up its use of tactical airlift in Iraq as a way to limit the need for ground convoys, which have been targeted successfully by insurgents. It costs more to ship cargo by air than by truck, but the reduced exposure of troops is considered worth it.

"Replacing good people is a lot more expensive" than flying airplanes, Chief of Staff Gen. John P. Jumper told *Air Force Magazine* in mid-December. After personally observing convoy operations on an inspection tour in November, Jumper said he launched "a big push to ... get these guys off the roads."

Convoy casualties, he said, amounted to about 100 per month before the shift to airlift began.

Jumper, meeting in December with Washington-based defense writers, said that on a visit to Southwest Asia in November he "had a little fit" when he discovered that commanders were not using USAF's tactical airlift capability to its full extent to help reduce the need for ground convoys. Without pointing a finger at any one party, Jumper said he left the area having helped create "a better way to converse between the joint force air component commander and the land commanders."

Since then, the Air Force increased flights of its tactical theater C-130s and added its strategic C-17 airlifter to the mix as well.

Jumper said airlift could get to soldiers and marines wherever there was a road to land on, but it turns out that most US ground forces are already positioned near an airfield of some kind.

"We have always been willing to do this," Jumper said, acknowledging that the solution was simply "getting the right people together."

When asked about increased cost, Jumper replied, "I am totally disinterested in cost" when it is possible to save lives by moving materiel by air.

According to US Central Command Air Forces, the air component of US Central Command, tactical airlift increased by about 100 tons per day after Nov. 9. USAF had been airlifting some 350 tons per day within the theater and increased that to 450 tons per day.

Overall, Jumper's initiative made it possible for the Army to keep 30 convoys a day off the road. These convoys would have traversed the most dangerous routes, he said. However, Jumper noted, some items, such as large parts for armored vehicles, cannot be sent practically by air and will still have to go by convoy.

About 30 percent of the cargo carried by truck is bottled water. The Pentagon is finding the means to get water purified locally, said Jumper, adding, "You can affect much more by doing that one little thing than you can by [using] C-130s."

Jumper said that the Air Force was aware that there would be increased risk of surface-to-air missile strikes on the airlifters used to replace ground convoys. However, he said, "we're not sending C-130s in there undefended. They have the right kind of equipment to go in there and defend themselves."

He added, "We know how to do this."

QDR 2005 and Tactical Aviation

A Pentagon budget document that leaked in late December portends problems for weapons such as the new F/A-22 tactical fighter. The document took aim at several major weapons, slashing their budgets to help meet Administration demands to lower the deficit. (See "Editorial: The Fighter Force You Have," p. 2, and "The F/A-22, in Fire and Flak," p. 30.)

It remains to be seen whether the Air Force can restore funding to its premier fighter during deliberations for the 2005 Quadrennial Defense Review, now fully under way. Before the program budget document (PBD) surfaced, analysts and defense officials viewed the QDR as the harbinger for a budget-cutting drill that would take aim at specific numbers of people and weapons. The big decisions about the kinds of forces needed and strategies for employing them appeared settled, at least for the near future.

USAF Gen. Charles F. Wald, deputy head of US European Command, said the QDR would focus on defining the proper mix of high-end-of-the-spectrum systems.

Air Force leaders had talked about reducing the service buy of F-35 Joint Strike Fighters, currently planned at 1,736. However, the PBD left the JSF program intact and cut the Raptor. USAF officials say the service has a legitimate requirement for more than the planned buy of 276 F/A-22s, not fewer.

Dov S. Zakheim, who was Pentagon comptroller until last spring and is now vice president of the consulting firm Booz Allen Hamilton, stated the tactical aviation situation bluntly in a December speech. He said the 2005 QDR, with its emphasis on the "importance of un-

USAF photo by SSgt. Matthew Hannen



C-17s will help limit use of ground convoys.



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conventional, asymmetric threats," will "prompt a very different approach to tactical aviation."

Zakheim explained that the Pentagon has defined those threats as catastrophic, disruptive, and irregular. (See "Editorial: Weathering the QDR," December 2004, p. 2.) A "catastrophic" threat might be terrorists wielding a weapon of mass destruction. The term "disruptive" refers to events such as an enemy's employment of information warfare. An "irregular" threat might arise from terrorism, an insurgency, or civil war.

All of these threats, said Zakheim, call for a "rather different investment pattern" than that of the past, when the Pentagon's main focus was establishing "superiority over any potential peer competitor."

He concluded—correctly—that the impact of this change of course would place the Air Force under "tremendous budgetary pressure." He said the Air Force will not have enough money in the future to fund all the programs it says it needs. He enumerated these as "a costly space program, an anticipated need to modernize lift, a requirement for more tanker support, and programs to expand the capabilities and numbers of unmanned aerial vehicles." All of these are "competing with two major tactical aviation programs," the F/A-22 fighter and F-35 fighter, he said. "Something will have to give," Zakheim said.

Zakheim said that the case is "weakest" for maintaining both the F/A-22 and F-35 programs at currently projected acquisition rates. While he didn't say that the QDR should set inventory goals for the F/A-22 and F-35, it would, he said, "force the [Air Force] to face up to the budgetary realities that confront it." He went on to say, "This is especially important, given a current and projected threat environment radically different from that which generated these two programs."

Some say the QDR will lead to an increase in ground forces, but Zakheim does not agree. He said that getting rid of some outmoded Army organizations—corps-sized units being his prime example—might free up enough forces to make unnecessary a major increase in Army end strength. According to Zakheim, the upcoming shift in the Army's overseas presence could "serve as a tool for mitigating pressures to increase force structure."

Zakheim does not believe there is a defined need to increase the number of special operations forces. Rather, he would ensure modernization efforts for this increasingly critical element "proceed apace."

Corrosion Cost: \$20 Billion?

The Defense Department isn't properly tracking corrosion of its equipment and could save billions if it considered corrosion at every step in the acquisition process, a Defense Science Board task force reported. Attention to the problem is urgently needed, the panel asserted.

In a report titled "Corrosion Control," the DSB task force said there's no way to know for sure how much corrosion costs DOD annually, but it agreed that a Government Accountability Office estimate of \$10 billion to \$20 billion a year is as good as any.

The DSB found it shocking that the Pentagon doesn't have an official charged with tracking or preventing corrosion and doesn't know, departmentwide, how much it costs to repair corrosion problems.

Corrosion is pervasive, attacking practically all military equipment and much of the military's infrastructure. It is the principal factor in the Air Force's push to modernize its fleet of KC-135 aerial refueling aircraft. Although this report did not deal with specific weapon



USAF photo

F/A-22 hits another downdraft.

systems, an earlier DSB report, "Aerial Refueling Requirements," released in summer 2004, cited the engine struts on USAF's older KC-135s, the E model, as a "prime example of the problems of aging and environment." It agreed with the Air Force plan to retire its KC-135Es. The report said that corrosion on the remaining KC-135s is a "challenging, yet manageable issue." However, it then said that the "sheer number" of these aged tankers "dictates a need to take action in the near term."

The latest report, with its focus on the overall military corrosion problem, found that the Pentagon's previous estimates of the true corrosion costs "are highly suspect and probably significantly understated." Left unattended, the problem will only get worse, "with even higher costs, in the future," it said.

The panel recommended that DOD devote \$50 million to a departmentwide effort to define the corrosion situation and put measures in place to help prevent or control it. The measures ranged from physical maintenance practices to policy initiatives affecting how systems and infrastructure are acquired.

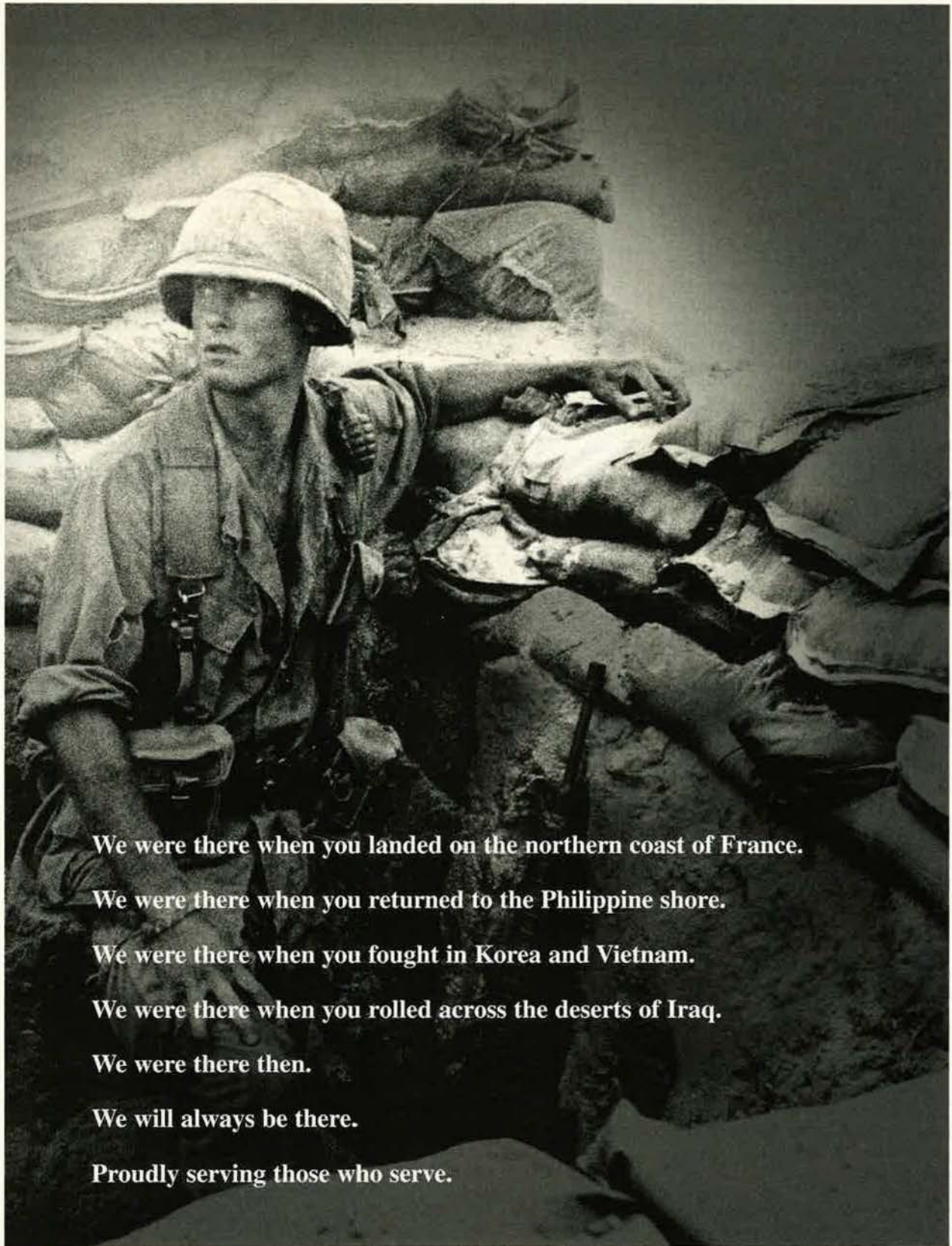
At the front end of system acquisition, the DSB found, there's little incentive to think about corrosion prevention. Corrosion control measures don't pay off for years, and many programs are focused on cutting the up-front purchase price of equipment rather than on reducing its long-term ownership cost. This has to change, the DSB report said.

The DSB panel recommended that DOD put in place an incentive system that rewards life-cycle corrosion cost avoidance during design and manufacturing. It noted, too, that the "most practical way to generally reduce the current cost of corrosion is to do more and/or better preventive maintenance."

Research into corrosion control methods, said the panel, is "small, fragmented," and usually funded through the wrong departments, such as those involved with encouraging small business research or as an aspect of environmental remediation. The task force wants corrosion to get a "steady, long-term" priority research line of funding through Pentagon science and technology accounts.

The DSB said that corrosion takes many forms and is poorly understood. The board wants a "science-based understanding" of system degradation due to the physical effects of age, weather, and stress.

Finally, the DSB said that a corrosion executive is "badly needed" in each military department. No such positions now exist. ■



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By Adam J. Hebert, Senior Editor

Jumper Praises Air Precision

Gen. John P. Jumper, Chief of Staff, said the Air Force used precision tactics—both old and new—to great effect during recent operations against targets in Fallujah. The urban battle heralded the return of strafing, among other effective and precise tactics. Jumper told defense reporters in Washington, D.C., Dec. 14.

"We're using a lot of strafe," Jumper said, adding that the situation "was a bit of a surprise to me, actually, but in order to get, again, precision, that's one of the things that's being called for." He went on to say, "As far as airpower in Fallujah goes, there was a lot." (See "The Fallujah Model," p. 48.)

The Air Force "had a significant number of airplanes ... working against individual buildings," sometimes with advanced Global Positioning System-guided munitions, he said, adding, "There are many accounts of our GPS-guided weapons plucking buildings out of the middle of very populated areas."

The Predator unmanned aerial vehicle also drew praise from the Chief. USAF used "a lot of the Hellfire missile capability off of our Predator UAVs to take out individual small targets, like snipers and the like, that were found by the ground forces," he said.

"Glitch" Foils Missile Test

The Dec. 15 ground-based defensive system flight test failed because of a "very minor software glitch," said Lt. Gen. Henry A. Obering III, Missile Defense Agency director.

Obering on Jan. 12 told reporters that the problem was "very rare" and could be corrected by fixing "one line of code." He said it would not affect upcoming tests.

During the December test, an interceptor missile at the Kwajalein Atoll in the Pacific failed to launch to intercept an incoming target missile. It was the second consecutive flight-test failure for the system, two years after the previous failed test. Four prior tests were all successful.

Obering said a mid-February test would proceed.



USAF photo by Isaac Gibson

Three new F/A-22 fighters on Jan. 7 taxi down the flight line at Tyndall AFB, Fla., after their flights from the Lockheed Martin production plant in Marietta, Ga. The Air Force faces cuts to its planned production buy. (See "Editorial: The Fighter Force You Have," p. 2, and "The F/A-22, in Fire and Flak," p. 30.)

USAF Moves Out of France

The last major USAF presence in France ceased operations Dec. 17. More than a decade after the Air Force's 774th Expeditionary Air Base Group set up shop at Istres Air Base, on the French Riviera, 107 airmen headed back to their primary units.

The Air Force began operating out of Istres in 1994, to support NATO military operations in the Balkans. With the European Union taking over peacekeeping operations in Bosnia and Herzegovina, the mission evaporated.

Thus ends "a proud chapter in the story of teamwork between two NATO allies," said Col. Joseph Abbott, commander of the 401st Air Expeditionary Wing. Istres housed KC-135 tankers since February 1994 and hosted U-2 reconnaissance aircraft from 1996 to 1999. Despite recent disagreements over Iraq, the US and France are "committed to each other and ... the fight against terrorism around the world," said Gen. Daniel Bastien, commander of France's southern air region.

Exchanges Face Shake Up

Military exchanges must get more efficient to offset a major reduction in earnings stemming primarily from projected overseas troop realignments, said the head of DOD's Unified Exchange Task Force.

Retired Air Force Maj. Gen. C.J. Wax told the American Forces Press Service that the majority of exchange system profits come from overseas stores. Out of nearly 500 main military exchanges, the 153 overseas stores provide 53 percent of the profit.

The reason, said Wax, is that the overseas facilities have a "unique market," with military personnel and their families usually living on or near bases and shopping where the items are familiar.

Stateside exchanges suffer, he said, because "at least 63 percent of our people will end up living closer to commercial retail entities than they do their exchanges."

The restructured global footprint not only will lead to closures of profitable large overseas stores but also will necessitate creating numerous

small stores at rudimentary facilities in southern Europe and Southwest Asia, which, Wax said, is "very expensive."

Adding to the exchange turmoil is the upcoming round of Stateside base closures, which Wax said "could be a two-edged sword." The base closure list could include facilities that have profitable exchanges as well as those with underperforming stores.

The task force initially considered combining the separate service exchange systems, but Wax said the group now favors simply consolidating business practices, such as finance and accounting, human resources, and information technology services. He said that private-sector retailers have made similar arrangements to reduce expenses.

Three USAF Offices To Combine

The Air Force is consolidating three information technology directorates at the Pentagon into a single entity. A Dec. 7 news release announced that the warfighting integration (XI), chief information officer (CIO), and communications operations offices will merge to form the Networks and Warfighting Integration-CIO Directorate.

Senior USAF leaders believe the consolidation will enable the service to more easily integrate current and emerging technologies with warfighting operations. The move reflects the Defense Department's growing dependence "on information generated and shared across worldwide networks," stated the release.

The director of networks and warfighting integration will be a lieutenant general, with a senior executive service civilian serving as deputy. The director also will serve as the service CIO. The new directorate will report to the Air Force Secretary.

Currently, Lt. Gen. William T. Hobins is deputy chief of staff for warfighting integration, while John M. Gilligan serves as Air Force CIO.

The Air Force Pentagon Communications Agency, which was subordinate to the Communications Operations Directorate, now will fall under the Air Force administrative assistant.

Bush Signs Intel Reform Bill

When President Bush on Dec. 17 signed into law the Intelligence Community reform act, he set the stage for a "more unified, coordinated, and effective" intelligence enterprise, he said. The legislation, which carries out many of the recommendations of the 9/11 Commission, cuts across 15 intelligence agencies, but is designed



USAF photo by SSgt. Shane A. Cuomo

Air Force pararescuemen set up communications equipment during a recent mission in Iraq. They are assigned to the 64th Expeditionary Rescue Squadron while deployed to Southwest Asia.

to ensure military officials keep their quick access to tactical intel.

"A key lesson of Sept. 11 is that America's intelligence agencies must work together as a single, unified enterprise," said Bush.

The legislation creates the position of director of national intelligence

(DNI), to whom the director of central intelligence will report.

"It will be the DNI's responsibility to determine the annual budgets of all national intelligence agencies and offices and to direct how [those] funds are spent," the President said. In addition to the all-important budget

Law Schools Win Round vs. Military Recruiters

A US appeals court late last year ruled that universities can ban military recruiters from their campuses without putting federal funding at risk.

The US Court of Appeals in Philadelphia ruled by a 2-1 vote that schools have a First Amendment right to ban recruiters as a way of protesting the military's "don't ask, don't tell" policy on homosexuals.

Armed with the court ruling, Harvard Law School promptly prohibited recruiters from coming to campus. Other schools were expected to follow suit. Several schools, including the Harvard and Yale law schools, had prohibited military recruiting until 2002.

At that time, the Pentagon informed the schools that they were violating the so-called Solomon Amendment and risked losing their federal funds. (See "The Recruiters and the Schools," October 2001, p. 62; "Aerospace World: Yale Opens Doors to Military Recruiters, Vowing To Challenge Pentagon," November 2002, p. 27.)

The judges wrote in the majority decision that the Solomon Amendment compels colleges and universities to "express a message that is incompatible" with the educational objectives of the schools.

E. Joshua Rosenkranz, head counsel for the group of law schools and professors that challenged the Solomon Amendment, was reported widely to have said, "Enlightened institutions have a First Amendment right to exclude bigots."

The irony of upholding the First Amendment by stifling the free speech of recruiters was not lost on observers.

"The schools offer a free-speech defense, but in reality they are suppressing free speech themselves by silencing others and preventing freedom of association," commentator John Leo observed in *US News & World Report*. "Law schools that respected students would allow military recruiters to speak. They would encourage those who disagree with armed forces policy to picket, boycott," and argue for new policies.

The dissenting appeals court judge said that the military's policy against homosexual activity has been deemed constitutional by a number of federal courts, and nothing in the Solomon Amendment banned criticism of the military's policies.

The Iraq Story Continues

Casualties

By Jan. 5, 2005, a total of 1,339 Americans had died in Operation Iraqi Freedom. The fatalities included 1,336 troops and three Defense Department civilian employees.

Of those casualties, 1,053 Americans were killed in action by enemy attack, including the three DOD civilians. There have been 286 troops killed in noncombat incidents, such as accidents.

The number of wounded climbed above 10,000. There have been 4,856 troops wounded in action that returned to duty and 5,396 wounded who were not returned to duty.

OIF Costs Pass \$100 Billion

Defense Department figures show that the cumulative cost of Operation Iraqi Freedom reached \$99.1 billion by August 2004, the last month for which figures were available. With war appropriations averaging roughly \$5 billion a month, the total war cost is now well beyond \$100 billion.

R.I. Guard First To Deploy With C-130J

Airmen with the Rhode Island Air National Guard's 143rd Airlift Squadron in December became the first to deploy with the C-130J airlifter on a wartime mission. The unit deployed to an undisclosed location in Southwest Asia.

An Air Force news release noted that the J-model Hercules can "climb faster and higher, fly farther at a higher cruise speed, and take off and land in shorter distances" than older C-130s. That should make the J model even more effective in a combat environment.

The squadron began receiving the newest Hercules transports in 2001 and now has four of the eight it expects to operate by the end of 2006.

authority, the DNI is authorized to order the collection of new intelligence.

Bush said the changes are made with "a single goal: to ensure that the people in government responsible for defending America have the best possible information" for their decisions.

(More detailed coverage of the intelligence reform issue will appear in the March issue.)

Vandy Gets Missile Interceptor

The first missile defense interceptor at Vandenberg AFB, Calif., was installed Dec. 10. It joined six interceptors already in the ground at Ft. Greeley, Alaska, as the initial units in the Missile Defense Agency's ground-based system for protection against ballistic missile attack.

When operational, interceptors at the two sites are expected to provide protection to all 50 states. The last time Vandenberg added an active weapons system was in 1959, when the Atlas-D ICBM came on line.

In the event of an enemy missile attack against the United States, defensive missiles from Vandenberg or Greeley are intended to intercept the

Continued on p. 16.

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DELIVERS THE HEAT

The Case for "Near Space"

Recent technological advances have made "near space" an area of enticing military possibilities, Air Force officials say. The "no man's land" between 65,000 feet (the operational "ceiling" for air-breathing craft) and 325,000 feet (low Earth orbit) has long been ignored, said Gen. John P. Jumper, Chief of Staff. The realm simply wasn't considered "cool" by either the air or the space communities, he said.

Jumper told the Defense Writers Group in December that the war in Iraq highlights the need for persistent intelligence-surveillance-reconnaissance capabilities. Near space, which could be inhabited by stealthy, lighter than air vehicles capable of staying airborne for weeks or months, promises persistence. One Air Force Space Command official noted that warfighters don't care where a capability comes from—what matters is the effect.

Jumper has given responsibility for the region to Air Force Space Command, where the Space Battlelab has ideas on how to make the most of the territory. The battlelab and the Defense Advanced Research Projects Agency are already trying to prove the battlespace awareness potential of the realm.

According to the Space Battlelab's Lt. Col. Ed Tomme, near space is attractive for ISR capabilities because it is a low-threat, high-payoff environment. The platforms themselves, he said in an interview, could be acquired for as little as a million dollars apiece—a far cry from a new satellite.

Near space vehicles would be able to operate as inexpensive "trucks," he noted, with the cost driven primarily by the sensors. The Air Force is considering both maneuverable vehicles and less expensive "free floaters."

Near space is the realm where weather balloons operate, but Tomme stressed that these are not blimps or aerostats. Military vehicles would be above the weather, have "inherently low [infrared] and radar cross sections," and operate beyond the range of almost all conceivable threats. But they would still be 20 times closer to the ground than LEO satellites, offering large coverage areas, Tomme said.

One battlelab initiative is a "Near Space Maneuvering Vehicle," which could notionally launch, fly 200 miles at an altitude of 120,000 feet, loiter on station for 120 hours, and return to its launch point. The Air Force plans to demonstrate the "military utility" of the concept this year.

Tomme acknowledged that some near space capabilities have been "oversold" and that current efforts are trying to validate concepts and reduce risk.

Maneuverable vehicles could be available soon, with a development investment of roughly \$10 million. By comparison, it cost more than \$16 million simply to weaponize the Predator UAV, he said.



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A USAF MC-130 Combat Talon II delivers a Spanish Red Cross vehicle to Banda Aceh, Indonesia.

Air Force Aids Urgent Tsunami Relief Effort

The massive earthquake and resulting tsunamis that devastated portions of South Asia late last year required an unprecedented relief effort. The need to cross thousands of miles to bring relief into areas where little infrastructure remained gave the Air Force a key role aiding victims of the catastrophe.

The aid mission is "expected to be one of the largest humanitarian relief operations since the Berlin Airlift," an Air Force news release stated.

The Dec. 26 earthquake off the coast of Indonesia created devastating tsunami waves that came ashore as far away as Africa. "The carnage is of a scale that defies comprehension," said President Bush.

By early January, it was feared that more than 150,000 died in the hardest-hit nations of Indonesia, Thailand, Sri Lanka, and India. Eight other nations were also affected.

One of the humanitarian concerns was getting relief supplies to remote areas where roads were wiped out. Air Force C-5s and C-17s flew equipment, supplies, and personnel to major airports in the region.

In one example, four C-17s delivered 40 airmen, six HH-60 rescue helicopters, and 111 tons of supplies from Kadena AB, Japan, to Colombo, Sri Lanka. Defense Department helicopters proved especially valuable in bringing relief to remote areas.

From the hub locations, supplies and equipment were offloaded to helicopters and C-130 airlifters for transport to "small, damaged airfields with minimum to no support facilities," explained a Pacific Air Forces news release. A single C-130 Hercules can deliver more than five tons of drinking water.

One of the Defense Department's immediate missions was to assess the damage and determine how to get aid where it was needed. To that end, Joint Task Force 536, led by Marine Corps Lt. Gen. Robert R. Blackman, deployed to coordinate and plan the distribution of food, drinking water, medical supplies, and other critical materiel. "The amount of devastation is like none anyone has ever seen," said Col. Douglas E. Kreulen, vice commander of the 374th Airlift Wing at Yokota AB, Japan.

The Air Force was a key cog in a joint service, multi-agency, international relief effort. Air Force aircraft also used U Tapao, Thailand, as an airlift hub, and units from across the Pacific sent forces. "We've sent out every cargo aircraft we have to support humanitarian relief operations," said Col. Mark O. Schissler, commander of Yokota's 374th AW.

Continued from p. 14.

incoming warheads. Plans call for a total of 40 interceptors at the two sites.

Board Faults ANG Pilot

An Air Force accident investigation board determined in December that pilot error and a poorly designed component led to November's incident where 20 mm shells from an Air National Guard F-16 rained down on a New Jersey school.

Part of the problem was a "poorly designed pilot-vehicle interface," according to a news release. The D.C. Guard F-16, flying out of Andrews AFB, Md., was on a nighttime training mission. At the Warren Grove Weapons Range in New Jersey, Maj. Roberto Balzano's gun accidentally discharged.

The pilot's F-16 used the same trigger for both the laser target marker and the gun. While lining up for a strafing run, Balzano "pulled the trigger to laser mark his intended target," the report explained.

This was deemed pilot error, because Balzano had been warned not to use the laser marker during his preflight briefing. He "lost awareness that the aircraft's gun was selected and armed," the investigation determined.

Eight rounds hit a school four miles away. Five penetrated the roof. No students were in the school at the time, and no one was injured. (See "Aerospace World: F-16 Shells Hit School," January, p. 18.)

The investigation also found that "using the same trigger for both laser marking and firing the aircraft's gun significantly increases the risk of human error."


In response, aircraft software will be modified to prevent repeats, and the Air Force is changing the tactics used at the Warren Grove range.

"Aircraft at the range will be restricted as to when they can arm weapons, and flight plans will be altered to point weapons toward unpopulated areas," the release stated.

Peacekeeper LCC Closes

The Air Force on Dec. 7 deactivated the first of five Peacekeeper ICBM launch control centers (LCCs). The "Sierra" LCC is the first control center to be closed since Air Force Space Command began shutting down the Peacekeeper system in October 2002.

Each LCC controls 10 ICBMs. USAF plans to deactivate all 50 Peacekeepers by the fall. As each 10 warhead-capable missile is pulled



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from its launch silo, it goes through a 17-day disassembly and storage process. The warheads are being put away for safekeeping, and portions of the missile bodies and propulsion systems are being reused.

According to an Air Force news release, "several of the crew members pulling the last alerts for Sierra will also be [among] the first members to retrain into the Minuteman III ICBM system." The retraining began in January.

The Peacekeepers are being retrained as part of the Administration's Nuclear Posture Review plans. The NPR calls for major reductions in the numbers of deployed nuclear warheads. The Air Force's Minuteman III ICBMs will remain in service and are being modernized and upgraded.

668 Airmen Must Retrain

The Air Force announced in December that it would retrain involuntarily 668 active duty airmen to help boost understaffed career fields. The service had notified some 3,000 airmen in overstuffed fields that they were vulnerable under the Fiscal 2005 noncommissioned officer retraining program.

Most of those 3,000 either volunteered to retrain or opted to separate.

The 668 airmen will be put into a new specialty "chosen for them by the Air Force Personnel Center," stated a Dec. 7 news release.

The retraining is necessary "to help meet the needs of the Air Force by putting airmen where they are needed most," said TSgt. Catina Johnson-

Roscoe, NCO in charge of enlisted retraining.

DOD Reinforces Ethics Rules

The Defense Department recently announced that it has tightened its ethics regulations to ensure that DOD personnel understand and abide by "revolving door" statutes when they leave federal service for the private sector.

Deputy Defense Secretary Paul D. Wolfowitz ordered three ethics policy changes, according to a Dec. 20 news release.

First, senior military and civilian officials must annually certify that they understand the revolving door statutes and that they have not violated them.

Second, information about post-

Leadership, Confidentiality Issues Fueled Problem

Defense Department and Air Force investigations into the sexual assault problem at the Air Force Academy found a wide range of factors that allowed the situation to go unchecked for years. Separate investigations by the DOD and Air Force inspectors general found leadership failures to be the "root cause" of the problems.

The DOD IG determined that "successive chains of command over the last 10 years" failed to understand and acknowledge the scale of the sexual assault problem at the academy. It blamed eight officers for leadership failure. Their names were not released in the public version of the report.

This finding stands in stark contrast to an earlier investigation by the Air Force general counsel. That report exonerated military leaders at both the academy and Pentagon. (For additional background on this issue, see "Aerospace World: IG Faults Academy Leaders," January, p. 12; and "Upheaval at the Academy," January 2004, p. 56.)

The DOD and Air Force IG findings were released at a Dec. 7 press conference.

In a letter to Defense Secretary Donald H. Rumsfeld, DOD IG Joseph E. Schmitz said he and Air Force Secretary James G. Roche share "concerns" about reporting procedures.

The Air Force IG investigation found confidentiality to be a problem. The confidentiality program at the academy was put in place in 1993, to encourage assault victims to come forward without fear of retribution from their fellow cadets. But the program differs from sexual assault requirements for the rest of DOD, which requires assaults be reported. The confidential program may have hindered prosecutions and prevented a full appreciation for the scope of the problem, according to the USAF IG.

"Deficiencies in mandatory sexual assault reporting resulted in [higher ranking] commanders being left unaware of the numbers and kinds of sexual assaults," the Air Force IG determined. Victims could report details at their discretion, but "fear of reporting" limited the Air Force Office of Special Investigations' ability to gather evidence.

Further, reports often came in too late for OSI to gather

"perishable" evidence. One official explained that an OSI representative now meets with academy assault victims immediately, to inform them of their rights and of the importance of prosecuting the alleged assailants.

Schmitz wrote that he and Roche have "concerns about ensuring that the policies and command climate encourage reporting, confidentiality, victim protection, and effective law enforcement." DOD does not favor changes in confidentiality procedures "without simultaneously ensuring timely and effective involvement by law enforcement."

David S.C. Chu, DOD personnel chief, stated at the press conference that although the IG targeted the confidentiality policy at the academy, DOD would have a "strong confidentiality policy." He said that confidentiality will increase the probability a victim will report a sexual assault. "We want to sustain good order and discipline by holding those who assault their fellow service members accountable for their actions, but first and foremost we want victims to come forward for help," said Chu.

Gen. T. Michael Moseley, USAF vice chief of staff, speaking at the news conference, noted that USAF had not waited for the IG reports before instituting changes at the academy. The service replaced top leadership at the academy and, through its "agenda for change" issued in May 2003, began pushing cultural changes among the cadets and providing sexual assault prevention training for cadets, faculty, and staff.

Moseley said that the Air Force accepted 13 of the 14 recommendations made by the IG. The one not accepted dealt with the confidentiality rule. The Air Force, said Moseley, had been "working with Dr. Chu to address" that issue.

The Pentagon on Jan. 4 announced that officials had delivered to Congress, as directed, its new sexual assault prevention policy; however it did not include specifics about the issue of confidentiality.

At a special press briefing, Chu re-emphasized the Pentagon's commitment to confidential reporting, saying that "final details" were being put together. He noted, however, that "there is a legal issue yet to be resolved as to whether one of the things we wish to do may contravene current statutes, and if so, we'll seek the necessary statutory change from the Congress."

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Capt. John Stratton signs a movie poster at the film's premier.

USAF-Supported "Fighter Pilot" Film Opens at NASM

"Fighter Pilot: Operation Red Flag," a new large-format Imax film produced with the Air Force's assistance, opened in December.

A visual spectacle that captures the essence of Red Flag training, "Fighter Pilot" is expected to become the flagship film at the Smithsonian's National Air and Space Museum Steven F. Udvar-Hazy Center, in Chantilly, Va.

The 45-minute film portrays a stylized version of Red Flag, focusing on two real F-15 pilots. Capt. John C. Stratton is the lead character in the film, and Maj. Robert G. Novotny portrays the air boss aboard an E-3 AWACS.

Although director Stephen Low and cinematographer Clay Lacy used artistic license to create a stimulating film (such as by filming formations of tightly bunched aircraft racing through valleys), realism was also a goal.

Maj. Sam P. Morgan, an A-10 pilot, was on hand as the Air Force's technical advisor for the film. His job was to ensure the film did not stray too far into the territory of the movie "Top Gun." In "Fighter Pilot," nobody goes into combat with their oxygen mask dangling from their helmet.

The purpose of Red Flag is to give airmen realistic combat training. Experience showed that pilots were much more likely to survive if they could make it through their first few combat missions—Red Flag simulates those missions.

The film gives due time to all the airmen who make a Red Flag possible. Crew chiefs, firemen, rescue forces, and weapons loaders all receive time on camera.

Edwards To Test Hypersonics?

A draft environmental assessment (EA) has identified two flight corridors that end at Edwards AFB, Calif., as the ideal locations for future hypersonic air vehicle testing. One 460-mile corridor would extend north from Edwards to central Nevada; the other would extend northeast, passing north of Las Vegas into southwest Utah.

The Air Force Flight Test Center at Edwards, in conjunction with NASA's co-located Dryden Flight Research Center, needs "to identify suitable hypersonic corridors for air-launched, hypersonic vehicles," the draft EA stated.

Edwards' long runways, remote location, and testing infrastructure have made it the ideal site for these types of test operations.

"Facilities at Edwards Air Force Base provide the support facilities and flight-test capabilities necessary to most effectively meet the projected test requirements for landing of an air-launched hypersonic vehicle," the draft assessment determined.

USAF Demotes Top Lawyer

In early January, Air Force leaders decided to reduce the rank of the service's former judge advocate general from major general to colonel upon his retirement Feb. 1.

Maj. Gen. Thomas J. Fiscus on Dec. 21 had been given a reprimand and ordered to forfeit pay for conduct unbecoming an officer, fraternization, obstruction of justice, and violating a general regulation.

Over the past decade, according to an Air Force inspector general investigation, Fiscus, who is married, had improper, though appar-

Continued on p. 24.

government employment restrictions is to be included in DOD's annual ethics training program for all personnel.

Finally, Wolfowitz established a requirement that all DOD personnel leaving federal service for private sector work "receive guidance on the restrictions that will affect them during and after their transition."

The importance of the regulations was highlighted by the recent conviction of former Air Force procurement official Darleen A. Druyon. She pleaded guilty last year to illegally favoring Boeing for contract awards, while she was negotiating for a job with Boeing and still employed by the Air Force.

Senior Staff Changes

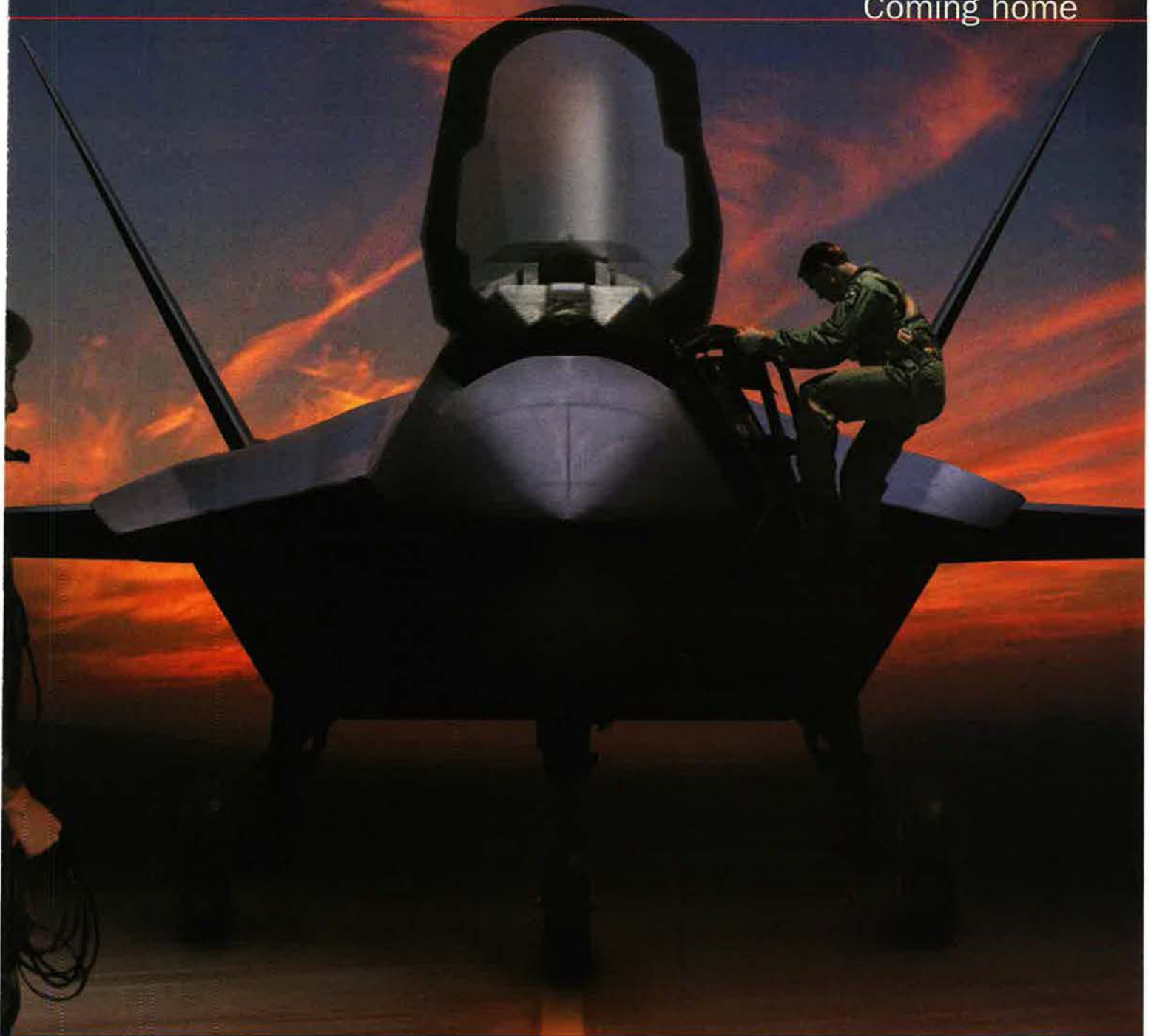
RETIREMENT: Brig. Gen. David A. Brubaker.

CHANGES: Brig. Gen. Paul A. Dettmer, from Dep. Dir., ISR, DCS, Air & Space Ops., USAF, Pentagon, to Vice Dir., Intel., Jt. Staff, Pentagon ... Brig. Gen. David J. Eichhorn, from Dep. Dir., P&P, AFMC, Wright-Patterson AFB, Ohio, to Dep. for Spt., ESC, AFMC, Hanscom AFB, Mass. ... Brig. Gen. Kevin J. Kennedy, from Dir., Strike Warfare, STRATCOM, Offutt AFB, Neb., to Dep. Dir., ISR, DCS, Air & Space Ops., USAF, Pentagon ... Brig. Gen. Katherine E. Roberts, from Dep. Cmdr., C4ISR Enterprise Integration, AFMC, Hanscom AFB, Mass., to Principal Dir. for Forces Policy, Dep. Asst. SECDEF for Forces Policy, Washington, D.C. ... Brig. Gen. Marshall K. Sabol, from Dep. Dir., P&P, AMC, Scott AFB, Ill., to Dir., Manpower & Orgn., DCS, Personnel, USAF, Pentagon ... Brig. Gen. David M. Snyder, from Cmdr., 6th AMW, AMC, MacDill AFB, Fla., to Dep. Dir., Strat. Planning & Policy, PACOM, Camp H.M. Smith, Hawaii.

SENIOR EXECUTIVE SERVICE RETIREMENT: William M. Brown.

SES CHANGES: Steven F. Butler, to Dir., Engineering & Technical Mgmt., AFMC, Wright-Patterson AFB, Ohio ... James B. Culpepper, to Chief, Aircraft/Missile Spt. Div., DCS, Instl. & Log., USAF, Pentagon.

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News Notes

By Tamar A. Mehuron, Associate Editor

■ Eight USAF bases will participate in the first phase of the conversion process to the new flexible National Security Personnel System, DOD officials said Dec. 15. The bases are: Eglin AFB, Fla., Ellsworth AFB, S.D., Lackland AFB, Tex., March ARB, Calif., McConnell AFB, Kan., Moody AFB, Ga., Patrick AFB, Fla., and Tinker AFB, Okla. The Pentagon plans to implement the National Security Personnel System in phases, or spirals, the first of which is slated to start in July and last 18 months. (See "New Day for Defense Civilians," p. 74.)

■ The Air Force on Nov. 18 at a ceremony at Laughlin AFB, Tex., fully retired the pilot training base's T-37 fleet. Laughlin is the first USAF base to completely transition to the new T-6A Texan II trainer. The base had trained more than 12,000 student pilots since it first began using the T-37 in 1961.

■ In an effort to improve computer network security and save money, USAF recently consolidated its software and support service contracts into one umbrella contract with Microsoft and Dell Computer Corp. The move affects more than half a million computers. USAF estimates a savings of \$100 million for the life of the contract and also expects to save on manpower no longer needed for manual installations of computer updates.

■ Near real-time intelligence from U-2 reconnaissance flights is now available to analysts at Langley AFB, Va., and Beale AFB, Calif., thanks to a new satellite communications system, the Transportable Medium Earth Terminal II. The system, which became operational Nov. 30, features four times greater bandwidth than its predecessor. Analysts use its information for targeting, battle damage assessment, and force protection.

■ With the retirement of C-9 medevac aircraft and C-141 airlifters, the Air Force has spread the workload to various other airframes, including the KC-135 tankers of the 351st Air Refueling Squadron, RAF Mildenhall, UK. Officials there said the KC-135 can fly patients nonstop for in-theater flights, contributing to patient stability, in contrast to the C-9, which needed refueling stops en route to European destinations. An average day, they said, will feature one airlift mission, either cargo or medevac,

and six or seven traditional refueling sorties.

■ Boeing received a USAF contract Dec. 15 worth \$209 million for Joint Direct Attack Munition work. The work is scheduled to be completed by December 2009.

■ USAF awarded Business Technologies and Solutions, Beavercreek, Ohio, and COLSA Corp., Huntsville, Ala., a \$190 million contract for engineering, technical, and acquisition support services to the Air Armament Center, Eglin AFB, Fla. The work is scheduled to be completed by April 2010.

■ Textron Systems Corp., Wilmington, Mass., received a \$115 million contract for 341 Sensor Fuzed Weapons. Work is scheduled to be completed by March 2007.

■ USAF awarded Lockheed Martin in December a contract worth more than \$112 million to produce another 288 Joint Air-to-Surface Standoff Missiles.

■ Air Force accident investigation officials Dec. 7 released their findings concerning the May 19 F-16 crash in Arizona in which Singaporean Air Force 2nd Lt. Kwang Han Loo was killed. The report determined that either a G-induced loss of consciousness or spatial disorientation or both caused the pilot to crash. The pilot, who was assigned to the 425th Fighter Squadron, a foreign military training squadron, at Luke AFB, Ariz., did not attempt to eject. The aircraft hit the ground in a nearly vertical dive.

■ Students who complete the survival, evasion, resistance, and escape specialist technical school for instructors, conducted at Fairchild AFB, Wash., now are authorized to wear the new SERE pewter-green beret with the specialist device.

■ C-17 aircrews flying in combat zones now have the benefit of an improved missile warning system that recently became operational, the result of intensified test efforts by engineers at Edwards AFB, Calif. The engineers cut a normal three-month test period for the warning system down to barely three weeks. The improvement helps pilots better recognize potential missile threat warnings.

■ US Central Command Air Forces began using a computer-based system to handle post-deployment health assessments theaterwide. The change

means that an airman can complete an assessment on the computer, which then sends the information immediately to the central database at Brooks City Base, Tex. Previously, the process was done on paper, slowing the reintegration of an individual at his home station.

■ Airmen who opted for a switch to the reserves through Palace Chase or the Army through "Blue to Green" after Dec. 1, 2004, will not have to repay education costs or unearned portions of enlistment bonuses. The Air Force announced this financial boon Dec. 8. "Our airmen who choose to transition from the active Air Force ... should be given every opportunity to do so without incurring financial obligations," said Lt. Gen. Roger A. Brady, deputy chief of staff for personnel. More information is available at: <http://www.afpc.randolph.af.mil/retsep/shape2.htm>.

■ "Homes For Our Troops," a non-profit organization focused on adapting houses for severely disabled troops returning home, broke ground for its first custom-adapted home in Middleboro, Mass., for National Guardsman Sgt. Peter Damon and his family. Damon lost his right arm above the elbow and his left hand and wrist. The organization can build new homes, or modify existing homes, with ramps, wider doorways, and lower sinks and counters.

■ To mark the 75th anniversary of Adm. Richard E. Byrd's flight to the South Pole, the crew of LC-130 Skier 94 retraced the explorer's route on Nov. 29. Starting from McMurdo Station, Antarctica, the members of New York Air National Guard's 109th Airlift Wing used manual controls, followed his path using his coordinates, and navigated with a sextant, as Byrd did, to deliver supplies and fuel to the US Antarctic Program station.

■ The last remaining horse stable used to house World War II troops, including the 506th Parachute Infantry Regiment—the famous Band of Brothers—was dismantled and transported Dec. 10 from England to Camp Toccoa, Ga., by an Air National Guard C-17 crew from the 172nd Airlift Wing, Allen C. Thompson Field, Miss. Horse stables on British farms were used as last-resort housing for some of the 1.5 million American troops that gathered in south England for the 1944 Normandy invasion. Camp Toccoa was the training site for the 506th. The stable will be reassembled and preserved there as part of a historical exhibit by the Stephens County Historical Society in Toccoa.

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NASA photo by Tom Techida



The NASA B-52B mother ship takes off for one of its final missions.

NASA's B-52B Mother Ship Retires

NASA in December retired its venerable B-52B mother ship after nearly 50 years in service. A "new" B-52H, on permanent loan from the Air Force, is now ready to take over as NASA's carriage aircraft.

At the time of the B-52B's retirement on Dec. 17, the replacement BUFF had been run through depot, prepped, and given its new paint job, a NASA spokeswoman said. The B-52H had not yet flown any NASA missions, however.

Tentative plans call for the retired mother ship to be displayed at Edwards AFB, Calif., where NASA's Dryden Flight Research Center is also located.

"At retirement, the air-launch and research aircraft holds the distinction of being NASA's oldest aircraft [and] the oldest B-52 still flyable," a NASA press release noted. The B-52B mother ship first flew in June 1955 and bears NASA tail No. 008.

Ironically, the ancient B-52B also had the fewest flying hours of any B-52 in service. Before retirement, it was officially transferred from NASA back to the Air Force for final disposition. The mother ship began life as an Air Force test vehicle and was transferred to the space administration in 1959.

The B-52B's final mission launched NASA's X-43A hypersonic test vehicle on its record-breaking flight Nov. 16. (See "Aerospace World: X-43 Scramjet Nears Mach 10," January, p. 15.)

the officials overseeing judge advocate professional rules of conduct and USAF lawyer certification.

Then-Air Force Secretary James G. Roche reviewed the IG report and considered not only Cook's recommendations but those of Gen. John P. Jumper, Chief of Staff, and a panel of three lieutenant generals before making his decision.

Air Force officials said the reduction in grade carried a "substantial financial penalty" but left Fiscus some benefits for his otherwise distinguished career of more than 32 years. They estimated his pay loss to be close to \$900,000 over his lifetime.

Fiscus had been relieved of his position on Sept. 22, 2004, at his own request, pending the IG investigation. He had served as the service's top lawyer since Feb. 25, 2002.

Bush Moves To Protect GPS

President Bush directed DOD officials to prepare emergency plans to prevent a potential terrorist attack on the US network of global positioning system satellites and to prevent their use by terrorists, reported the Associated Press on Dec. 16.

An unnamed Administration official told reporters that the GPS system could be shut down inside the US, but it would be done "under only the most remarkable circumstances." DOD would limit disruption to the system, which is vital not only to the military but to civil and commercial aviation and shipping, by disabling parts of the GPS network.

The official said there is no plan to reinstate what is termed "selective availability," a practice abandoned under the Clinton Administration. ■

Continued from p. 20.

ently consensual, relationships with 13 women, some of them subordinates. The IG report substantiated several allegations against Fiscus, including unprofessional relationships with officer and enlisted female subordinates, inappropriate sexual advances toward female subordinates, and improper relationships with female civilians.

The presiding officer for the nonjudicial Article 15 hearing, Gen. Donald G. Cook, levied the maximum monetary forfeiture—a full month's pay, in this case \$10,600—allowable under an Article 15. In addition to these punishments, Cook recommended that Fiscus be retired at a lower grade and face "appropriate action" from

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Action in Congress

By Tom Philpott, Contributing Editor

Putting Congress on Notice; DOD Implements SSBP Change; Lawmakers Push Vet Benefits; Housing Allowances Rise; Anytime TSP

Brown-Bag Project

Supporters of legislation to restore free lifetime health care to older generations of military retirees, by exempting them from paying Medicare Part B premiums, are raising Congressional awareness of their cause with thousands of letters to Capitol Hill written on brown paper bags.

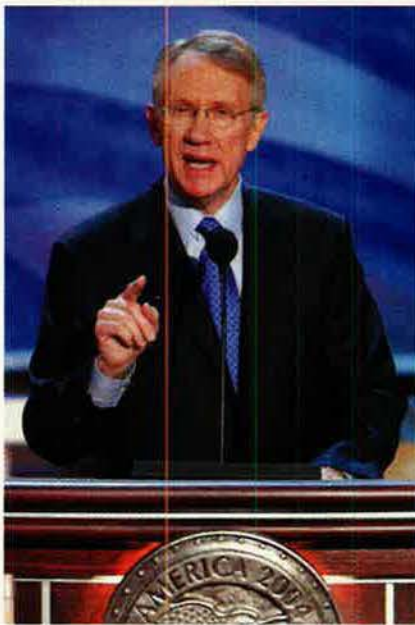
The "Brown-Bag Project" is the brainchild of retiree Thomas Gould. He suggested it to retiree health care crusader Floyd Sears who presented it to the Class Act Group, headed by retired Air Force Col. George E. "Bud" Day, a lawyer and Medal of Honor recipient. Day has fought in the courts and in the halls of Congress to restore free lifetime health care to retirees who first entered service on or before Dec. 7, 1956, the date Public Law 569 took effect, limiting retiree access to health care in military facilities.

The Keep Our Promise to America's Military Retirees Act, if passed by the 109th Congress, would, among other things, waive Medicare Part B premiums to retirees who first entered service before lawmakers made free retiree health care conditional, based on the space available in military treatment facilities.

The Class Act Group and the Military Retirees Grass Roots Group kicked off the formal Brown-Bag effort in late fall. Project managers are urging retirees who could gain from "Keep the Promise" legislation to send a brown-bag letter to Congress each week. As of Jan. 10, more than 12,000 brown-bag letters had been mailed.

It's a gimmick to focus attention of lawmakers, said retired Army Col. Harry Riley, with the Class Act Group. Retirees are asked to rip off a piece of bag, write a quick note to a lawmaker about the broken promise to older military retirees of free lifetime health care, stuff it in an envelope, and mail it.

"Every week, just about every member of Congress is going to be getting these pieces of brown bag," said Riley. News reporters and TV



AP photo by Ron Edmonds

Reid urges veterans' program fixes.

news programs soon will begin doing stories, he added.

"There is no cheaper way to do this with as much force," said Riley.

The brown bag symbolizes the government's broken promise to the "Greatest Generation," treating them like "used bags" by forcing them to pay for a portion of their health care, he explained.

These same retirees acknowledge that Congress made significant progress on retiree health care in 2000 with passage of Tricare for Life, the military's health insurance supplement to Medicare. But some older retirees maintain they shouldn't have to pay any health care costs, given promises of free lifetime care made during their careers.

More Help for Vets

Three senior Senators banded together to entreat President Bush to support upcoming legislation to improve veterans' programs.

The new Senate Democratic leader, Harry Reid (Nev.), Sen. Daniel Akaka (D-Hawaii), and Sen. Barbara Mikulski (D-Md.) sent a letter to the President outlining a 2006 budget for the

Department of Veterans Affairs that would allow major gains in veterans' health care, education, and transition benefits for troops returning from the war on terror. Among their recommendations were:

- Fully fund VA health care and reopening the system to new "Priority 8" veterans, those who have no service-connected disabilities and have incomes above poverty-level thresholds. The cost would be a few billion dollars a year.

- Ensure "seamless transition from active duty to veteran status" with guarantees of timely access to VA health care and greater reliance on computerized transfer of service and medical records. (They said VA and DOD had made progress on coordinating records but should do more to relieve the administrative burden on veterans.)

- Eliminate backlogs of 338,000 VA compensation claims and 132,000 appeals by adding claim adjudicators.

- Increase GI Bill education benefits to match rising college and technical school costs.

The Senators advised Bush that they will introduce legislation early in the 109th Congress "to correct many of the injustices currently endured by America's veterans" and urged his support.

Anytime Thrift Savings

Both the House and Senate unanimously passed legislation that will allow military and federal civilian employees to start or change contributions to the Thrift Savings Plan at any time instead of having to wait for twice-yearly "open seasons."

In the final session of the 108th Congress, the lawmakers approved the Thrift Savings Plan Open Elections Act of 2004 (H.R. 4324), a bill sponsored by Rep. Thomas M. Davis III (R-Va.), to allow anytime changes in TSP contributions. Davis said the passage marked "a great day for federal employees."

President Bush on Dec. 21 signed the bill, making it Public Law No. 108-469.

In 2005, military members can con-

tribute up to 10 percent of basic pay, not to exceed an IRS limit on annual tax-deferred investments of \$14,000, into the TSP. They also can invest all or part of bonuses or special pay. Members serving in tax-free combat zones are allowed up to \$41,000 in annual contributions.

Davis said that the "work is not finished." Davis expects to make "additional improvements to the TSP program in the near future."

One of those improvements, he said, would be to remove the inequity that exists concerning when employees begin to receive matching federal funds; it still is tied to open-season dates. Under current provisions, some employees receive matching funds after seven months, while others have to wait nearly 12 months, depending on when they entered federal service during the year.

Housing Allowances Go Up

Lawmakers authorized a boost of about 20 percent in spending for 2005 Stateside housing allowances. The total of \$12.3 billion is about \$2.5 billion more than was paid in 2004.

A portion of that increase stems from the mobilization of large numbers of Guard and Reserve members and the move to privatize more military housing units. The increase also reflects the final phase of the housing increase Congress authorized to reduce out-of-pocket expenses for military members who live off base.

The initiative would eliminate the more than 20 percent disparity between the average allowance paid to a service member and the average cost of off-base housing. The gap was narrowed each year to reach 3.5 percent in 2004 and zero in 2005, based on local median cost for housing deemed appropriate to a particular pay grade, said Tim Fowlkes, director of basic allowance for housing (BAH).

The housing allowance is being paid this year to 910,000 service members living off base in the States. That is 90,000 more than qualified for BAH last year, a consequence of wartime activations and more service members moving into privatized housing. The move to privatized housing is enabling DOD to eliminate old, costly, and substandard base housing. Members are charged, by agreement between the services and developers, set monthly rents equal to the member's monthly BAH.

BAH for 2005 shows an average rise of eight percent for an individual with dependents, but the rise in BAH rates



Davis: More work needed on TSP.

varies widely, based on rank, dependency status, and assignment area.

Supplemental SBP

Paychecks for 12,000 military retirees who elected to take Supplemental Survivor Benefit Plan coverage should have risen on Dec. 1, 2004, when DOD stopped charging them for the cost of supplemental coverage. The coverage itself was to remain in force until early 2008.

Typically, those retirees bought the additional coverage to protect surviving spouses from the standard drop, known as the "widow's tax," that occurred in SBP benefits when the spouse reached age 62. Con-



Mobilizations add to housing cost.

gress overturned the widow's tax in the Fiscal 2005 National Defense Authorization Act, ushering in a four-year phaseout of the SBP benefit reduction. A little noticed feature of SBP reform was the end of supplemental charges. (See "Action in Congress: SBP Reform Tops Personnel Gains," December 2004, p. 22.)

The Defense Finance and Accounting Service said it stopped deducting costs for SSBP effective Nov. 1. This would first show up in Dec. 1 paychecks. The retirees affected should have received by now an account statement showing lowered SBP costs, adjusted taxable income, adjusted federal income tax withholding, and a net increase in retired pay.

Typical SBP benefits dropped at age 62 from 55 percent of covered retired pay down as low as 35 percent. The age-62 reduction in SBP made the supplement an attractive option for some retirees, despite its high premiums. Congress called for a staged phaseout to be completed in 2008.

Under the new law, in October, benefits for most survivors 62 and older will increase to 40 percent and another five percent each year until April 2008, when it will be fully restored to 55 percent. That will eliminate the need for a supplement to SBP.

DFAS officials said service members who retire on or after Oct. 28, 2004, the date the new law was signed, and who elect full SBP coverage for a spouse or former spouse or receive automatic SBP spouse coverage, also will receive automatic supplemental coverage until April 2008.

Contractual Investments

With Congress moving to ban sale of "contractual" investment products to military personnel, the leading brokerage firm offering them, First Command Financial Planning Inc. of Fort Worth, Tex., stopped marketing the products in December.

First Command also agreed to pay \$12 million to settle charges brought by the Securities and Exchange Commission and the National Association of Securities Dealers, the primary private-sector regulator of the US securities industry. According to a Dec. 15, 2004, SEC news release, the money will be used, in part, for restitution to certain investors and investor education programs for military members and their families.

First Command accepted the censure and fine, but a company news release did not admit to or deny the allegations or findings. It said that First Command life insurance and banking services were not involved in this action. ■

USAF photo by SSGT. P. J. Farlin

Verbatim

By John T. Correll, Contributing Editor

The Madonna Doctrine

"Global terror is down the street, around the block. Global terror is in California. There's global terror everywhere, and it's absurd to think you can get it by going to one country and dropping tons of bombs on innocent people."—*Pop star Madonna, BBC radio interview, quoted by Newsweek, Nov. 22.*

Not Real Volunteers

"These young people are not 'volunteers.' They're not there because they're patriotic. They're there [because] they need the money."—*Rep. Charles Rangel (D-N.Y.), advocate of a return to the military draft, on the all-volunteer force, Boston Globe, Nov. 29.*

Diversions in Iraq and Vietnam

"The parallels between Iraq and Vietnam have been overblown, because we were in Vietnam for a decade and it cost us 58,000 troops. We've been in Iraq for 19 months and we're still under 1,200 killed. But there is one sense in which the parallel with Vietnam is valid. The American people were told that to win the Cold War we had to win Vietnam. But we now know that Vietnam was not only a diversion from winning the Cold War but probably delayed our winning it and made it cost more to win. Iraq is a diversion to the war on terror in exactly the same way Vietnam was a diversion to the Cold War."—*Retired Gen. Merrill A. McPeak, former Air Force Chief of Staff, Rolling Stone, Nov. 25.*

Low Appeal

"The federal government is no longer seen as the secure, lifetime employer it once was and often cannot match private sector employers with respect to competitive salaries for many occupations, rapid job offers, and sometimes work benefits."—*Merit Systems Protection Board survey, cited by Washington Post, Dec. 1.*

Russian Nuclear Security

"At some of these facilities, guards keep their weapons unloaded (to prevent misfiring, they say); intrusion detectors are turned off (because false alarms are 'annoying,' guards say); and supposedly secured doors are

propped open (to ease passage, guards say). Drunken fights and shootings among security personnel are not uncommon."—*Report on Russian facilities housing plutonium and weapons-grade uranium, Atlantic Monthly, December.*

The Army You Have

"I [asked] about the pace at which the [Army's Humvees] are being armored. ... I think it's something like 400 a month are being done. And it's essentially a matter of physics. It isn't a matter of money. It isn't a matter, on the part of the Army, of desire. It's a matter of production and capability of doing it. As you know, you go to war with the Army you have. They're not the Army you might want or wish to have at a later time. Since the Iraq conflict began, the Army has been pressing ahead to produce the armor necessary at a rate that they believe ... is the rate that is all that can be accomplished at this moment."—*Secretary of Defense Donald H. Rumsfeld, town hall meeting in Kuwait, answering a soldier's question about the lack of armor on Humvees used in Iraq, Dec. 8.*

War and Obligation

"When Secretary of Defense Donald Rumsfeld recently told American troops that 'You go to war with the Army you have, ... not the Army you might want or wish to have,' he got it exactly wrong. When an administration chooses war, its primary obligation is to provide forces adequate to the task."—*Military analyst Andrew J. Bacevich, Wall Street Journal, Dec. 10.*

Stormin' Norman Takes Issue

"I was very, very disappointed—let me put it stronger—I was angry about the words of the Secretary of Defense when he laid it all on the Army. I mean, as if he, as the Secretary of Defense, didn't have anything to do with the Army, [as] if the Army was over there doing it themselves screwing up."—*Gen. H. Norman Schwarzkopf, USA (Ret.), commander in Desert Storm, on Rumsfeld's "Army you have" statement, MSNBC "Hardball," Dec. 13.*

Security Council Knows Best

"If there are good arguments for preventive military action, with good evidence to support them, they should be put to the Security Council. [But] in a world full of perceived potential threats, the risk of the global order ... is simply too great for the legality of unilateral preventive action ... to be accepted."—*Report of special panel appointed by UN Secretary General Kofi Annan, released Nov. 29.*

Canadian Commitment

"We must defend this continent, secure its borders, guard its ports, and Canada is absolutely committed to doing whatever needs to be done."—*Canadian Prime Minister Paul Martin, Washington Post, Dec. 2.*

Hope

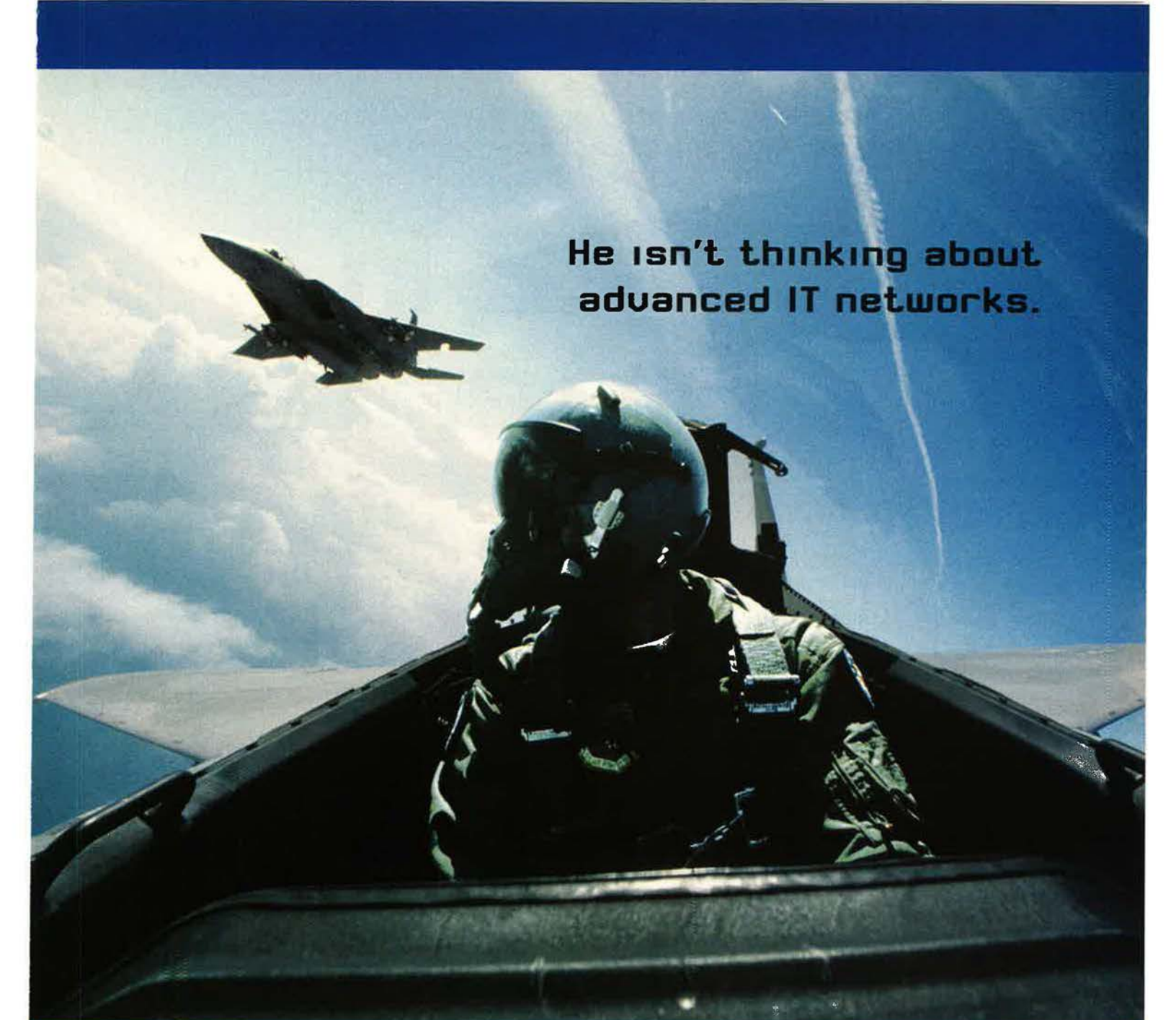
"Let's say I hope it's true."—*President Bush on Iran's claim to have halted its uranium enrichment program, USA Today, Nov. 23.*

Future Wars

"If we've ever learned the truth of the 21st century, we should have learned that back in the '90s, but seemed not to, and that is that we're likely to be engaged, not with these large armies, navies, and air forces and long multiyear long conventional conflicts. We're more likely to be involved in the kinds of things we've been involved in now for the past 15 years, ... things that don't last a year; they last maybe a matter of months, like Kosovo or Bosnia, in terms of the conflict part. And then there's a post-stabilization part that lasts a longer period."—*Rumsfeld, news briefing en route to Kuwait, Dec. 6.*

Underwhelming

"The primary reason for getting the CIA out of the paramilitary business is that it isn't very good at it. The secret war in Laos didn't work out so well. Neither did the Bay of Pigs. CIA paramilitary operatives in Afghanistan performed well, but no better than Special Forces, from whose ranks most of the CIA operatives had come."—*Jack Kelly, newspaper columnist and former deputy assistant secretary of the Air Force, Pittsburgh Post-Gazette, Dec. 5.*



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advanced IT networks.

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The Raptor had an excellent year, but budget cutters saw it as a fat target. Now, a new struggle is under way.

The F/A-22, in Fire and Flak

AFTER a year in which the F/A-22's technical and manufacturing problems were fixed, and in which the fighter proved it could perform as advertised, the Defense Department in late December moved to halt the program when it has produced fewer than half the aircraft the Air Force insists the service needs to fulfill its mission.


The cut to USAF's top priority system was a body blow to the service and the wider US military, which is depending on the stealthy, speedy Raptors to provide the "kick down the door" capability needed to gain access to any well-defended military theater of the future. How it will do that now must be thoroughly rethought.

Defense Secretary Donald H. Rumsfeld directed the Air Force to halt the Raptor program at 180 airplanes—97 fewer than previously approved and budgeted. It is also 201 fewer than the service needs in order to equip all 10 Air and Space Expeditionary Forces with one squadron each. Production would end in 2008, rather than in 2011 or later, as planned.

The \$10.1 billion cut was made before this year's Quadrennial Defense Review of forces and strategy. No strategic justification for it was offered. The F/A-22 was among a number of defense programs which ran afoul of financial targets set by the Administration.

Accompanying the order to the Air Force was a directive from Paul D. Wolfowitz, Rumsfeld's deputy, that the QDR "include an assessment of





joint air dominance, the integrated joint capabilities that contribute to it, and the appropriate contributions by all types of tactical aircraft to joint air dominance in future warfare." Usually, changes in numbers of systems do not precede—but rather follow—a strategy review.

Rumsfeld refused an 11th-hour Air Force request to spare the Raptor and cut some less-capable F-35 Joint Strike Fighters instead. The JSF program, however, was untouched, and the Air Force was given leadership over the Joint Unmanned Combat Air Systems program, with instructions to focus on developing aircraft that "contribute to JROC [Joint Requirements Oversight Council]-approved future joint war-fighting concepts of operation."

Rumsfeld's cut now leaves the Air Force scrambling to rewrite various concepts of operation, developed over a decade, that made the Raptor the centerpiece of air and space operations in future conflicts. The 180-airplane fleet will support only five small squadrons of F/A-22s—too few to cover the obligations of the service to provide rapid, unquestioned air dominance in any theater of operations.

USAF acknowledged through a spokesman that it would have to do its part to reduce the federal budget deficit, but "our analysis for F/A-22 requirements still stands at 381 aircraft. We expect F/A-22 requirements to be further analyzed during the QDR process."

In an interview with Bloomberg News, outgoing Air Force Secretary

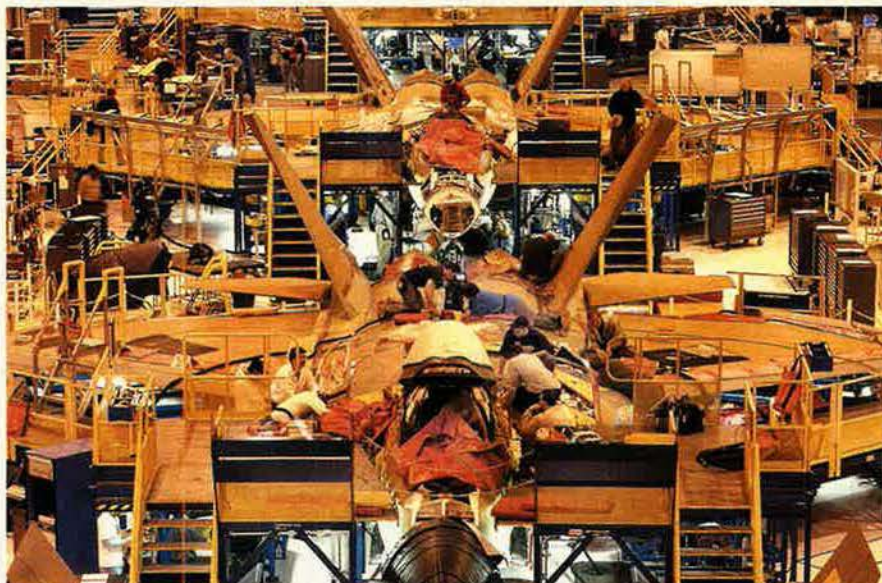
Over the Gulf of Mexico, a Tyndall AFB, Fla.-based F/A-22 of the 43rd Fighter Squadron is put through its paces on a pilot training mission. The Raptor accelerated toward operational status over the last year.

James G. Roche said the cut aircraft "could be restored if we can make the case that requirements justify more than the number that this budget would yield." He also said the cut came "at the last minute" of the budget process, and there wasn't much time to discuss whether alternatives could be found. If the deleted aircraft are restored, "then we've got to find something else to take away," he said.

The cut was all the more exasperating because the F/A-22 had just capped an extraordinary run of successes which saw nagging avionics problems resolved, stellar success in operational testing, declining costs, and increasing production rates. The hot streak was marred somewhat by the crash of an F/A-22 on takeoff for a night training mission at Nellis AFB, Nev., also in December. However, the fighter was deemed safe to resume flying in early January, and the Air Force said the crash was not due to a basic design defect. Before that accident, the F/A-22 fleet had racked up 7,000 flying hours without loss of an aircraft, an unprecedented safety record for a new fighter. A safety report identifying the cause of the crash was pending. (See box, "USAF Quickly Returns F/A-22s to Flight," p. 35.)

Despite the cut, USAF officials are slated to take the F/A-22 before the Defense Acquisition Board (DAB) this spring with an impressive story to tell.

■ In December, the Air Force concluded F/A-22 initial operational test and evaluation. These five-month tri-



Lockheed Martin photo by John Rossino

F/A-22 production is now beyond the initial "handmade" stage, and Raptors are coming off the line faster and with few defects. A peak rate of 32 per year is the plan.

als saw six developmental aircraft fly 188 simulated air combat sorties. In every engagement, the F/A-22 prevailed, usually against superior numbers of adversaries. It met the demanding requirement to be "twice as effective" as the F-15C it will replace.

■ The Raptor's super-sophisticated avionics, once a chronic headache, have been tamed. Pentagon overseers no longer require frequent reports on the state of avionics development.

■ The Air Force decided to send two F/A-22s from Tyndall AFB, Fla., to Langley AFB, Va., where pilots and maintainers are preparing for

initial operational capability as soon as December 2005. By then, some 17 Raptors will be at Langley's 27th Fighter Squadron. The first pure Langley-based Raptor arrives in July.

■ Impressed with F/A-22 progress last fall, the powerful Defense Acquisition Board set next month for a new and critical review of the program. Defense officials expect the DAB to approve full-rate production at that time.

■ In late 2004, initial production of the F/A-22 reached a rate of 18 fighters per year, on its way to planned annual rates of 24 per year in 2005 and 32 per year—the maximum—in 2006.

■ Raptor costs are falling. Lockheed Martin, the contractor, expects the next few production lots will get the F/A-22 unit flyaway cost under \$100 million (in 2005 dollars). That would mark a 25 percent decrease off today's \$133 million sticker price.

■ In its Fiscal 2005 defense bills, Congress without much hesitation voted to authorize and fund the Air Force's full Raptor request for 24 new Raptors.

Amid all of these mounting accomplishments, the Air Force believed it could credibly ask Congress to lift spending caps on the program, possibly as early as this spring. The caps were put in place to force the program into better cost and schedule performance, goals which the Air Force believes have now been met.

While lifting the caps may have

USAF photo by WSgt. Mike Ammons



Pilot production for the F/A-22 is proceeding apace. Eventually, Tyndall is expected to have a fleet of 59 Raptors for pilot training. They will have full air-to-air capability but will lack some of the ground-attack gear slated for later models.

been a tough sell on Capitol Hill, the Pentagon's proposed cuts may be equally hard for Rumsfeld to justify in Congress. Sen. Saxby Chambliss (R-Ga.), in whose district the F/A-22 is assembled, promised that the cuts would not stand and vowed a spirited fight against them. So did Sen. Ted Stevens (R-Alaska), whose state expects to see the F/A-22 based at Elmendorf Air Force Base, in Anchorage, Alaska.

However the final buy issue is settled, the F/A-22 program has shifted from a developmental to an operational mind-set.

Warriors in the Lead

Maj. Gen. Mark A. Welsh III, USAF's director of global power pro-



Photos © 2004 John M. Dibbs



The F/A-22 was designed to be easier to work on and require less labor per flight hour than the F-15. So far, it's reaching that goal. Above, the side weapon bay offers access to the airplane's self-diagnostic systems.

grams, declared in December: "The focus inside the Air Force has clearly shifted from developing this airplane ... [to] fielding the capability."

No longer are acquisition and engineering specialists at the fore. "Our warfighters are now leading this effort," said Welsh.

According to Welsh, the progress at Langley is visible.

"Buildings are going up," he said. "They're talking about how they're going to use their simulators; they're getting their first squadron commander through training. It's happening."

The F/A-22, Welsh continued, is no longer "a PowerPoint slide somewhere. This is taking place."

Moreover, Welsh contended, there is no reason to doubt that enough F/A-22s will be on hand at the end of the year to begin real operations. "We are planning to have on the ramp [at Langley] ... 12 to 18 [Raptors]," he reported.

The head of Air Combat Command will establish criteria for what constitutes IOC, he added. Tactics for the F/A-22 are being written by the 422nd Test and Evaluation Squadron at Nellis Air Force Base, "so the guys at Langley have it before IOC," Welsh said.

The F/A-22 will be the world's first fighter that can maintain extreme stealthiness even while maneuvering hard. It can fly at supersonic speeds

without using afterburners, it can engage the enemy while still undetected, and it has an avionics suite that integrates disparate sensor data into a display pilots can use to maximize the aircraft's position and capabilities.

Pilots in IOT&E—most drawn from the F-15C community—raved about its being a huge leap over the time-tested Eagle.

At this time last year, though, program managers were struggling to overcome avionics problems that were slowing the pace of testing and had critics calling for the program to be slowed or stopped.

"What a difference a year makes," said Ralph D. Heath, formerly Lockheed Martin's program manager for the F/A-22 and now the corporation's executive vice president. The change between the state of the program then and now is, in his words, "dramatic."

A year ago, the F/A-22 was making headlines for its inability to fly very long without its onboard computer operating system crashing. Pentagon leaders demanded that the aircraft demonstrate an ability to fly an average of three hours—and then five—without a computer problem, which was dubbed "avionics instability."

Those problems are ancient history, Heath asserted in a December interview with *Air Force Magazine*.

The avionics problem was settled last spring. Mean time between failures of the avionics quickly rose above three hours, then above five, then beyond 10, and is now "between 10 and 20" hours, Heath reported. This is the

case, even though the measuring criteria has become more stringent.

According to Heath, the Pentagon acting acquisition chief, Michael W. Wynne, has remarked that F/A-22 avionics are “not an issue anymore.” Heath paraphrased Wynne as saying, “I’m satisfied that you’ve solved the avionics issues and that’s no longer a metric that needs to be tracked.”

Avionics stability is still measured, but is no longer a pacing factor in getting aircraft built and delivered.

Zero Discrepancies

Heath noted that the two F/A-22s delivered to Tyndall in November had “zero discrepancies,” meaning acceptance inspectors found no defects, problems, or faults in the air-



Photo © 2004, John M. Dibbs

USAF photo by MSgt. Mike Ammons



A 21st century fighter, the F/A-22 offers state-of-the-art technology to ground crews. At top, a technician plugs into the airplane to let it tell him what it needs. Above, the aircraft log allows instant prompting of the parts supply system.

craft or its operating systems. Such an event is noteworthy enough in a mature weapon system; in a new platform, it is extremely rare.

“Literally,” Heath said, “the same day they received the jets, they took ’em and flew a mission.”

Meanwhile, the Raptor starred in the IOT&E phase.

Talking with a Bloomberg News reporter last fall, Thomas P. Christie, the Pentagon’s weapons test chief, claimed that the Raptor “has shown itself to be an outstanding air-to-air aircraft.” Christie told the news service that the Raptor demonstrated the stealth, maintainability, and

combat effectiveness “that we have paid for.”

In these combat-like evaluations, Raptors deftly cleared the skies of adversaries flying F-15s and F-16s. Christie described these air-to-air tangles as “some of the most combat-oriented sorties I’ve ever seen the Air Force fly in an operational test.” The F/A-22 demonstrated that “it’s a better machine for these specific missions” than the F-15C, he added.

The IOT&E examined the F/A-22 as an air-to-air dogfighter, not as a ground-attack aircraft, although even the initial Raptor models will have

the ability to employ satellite guided bombs. Additional ground-attack capabilities will be added during later lots of production, in developmental spirals. Testing will continue as new munitions are integrated with the platform. (See “Washington Watch: F/A-22 Sweeps Tests,” October 2004, p. 10.)

By early December, Lockheed had built 42 F/A-22s and had officially delivered 31 of these. The term “delivered” means they had met all of the technical requirements of the lot in which they were built. Almost a dozen more were in postproduction modification and checkout at year’s end.

Through Lot 4—the 2004 buy—USAF had contracted for 83 F/A-22s, a figure that includes nine developmental aircraft.

The cost of each F/A-22 has fallen 10 to 14 percent with each lot purchased, Heath reported. Those savings have come from a broad variety of initiatives—some funded by the Air Force and some by Lockheed Martin and its suppliers—that range from mundane to dramatic production changes.

The \$130 million flyaway cost quoted by the Air Force for Lot 4 covers the airplane, engines, and associated equipment. It does not, however, include development costs, which create a program unit cost of \$256 million. That, however, includes a sunk cost which does not recur in later lots. Thanks to the learning curve and process improvements, the Lot 6 airplanes are expected to come in for

"under \$100 million" in an apples-to-apples comparison with the \$130 million fighters, according to Heath.

Big Payoff

The Air Force spent \$626 million on streamlining Raptor production processes, a figure that was expected to yield a 9-to-1 return on investment in savings over a 277-aircraft production run. If the buy is halted at 180 aircraft, the return will be much smaller, as the savings would have had their greatest impact later in the run.

One area of improvement has been in maintaining the outer mold line, a critical factor in keeping the aircraft stealthy. A variance of a human hair's thickness in a joint or seam could cause the aircraft to bloom on enemy radar.

This kind of problem is manageable in a small production run, when aircraft are hand built, Heath said. It was the case, for instance, with the F-117 stealth fighter, only about 60 of which were ever built.

However, with "rate production," there is no time for craftsman-like attention. F/A-22 pieces must come together right. Yet, even with computer-aided design and manufacturing, variances in the composite surfaces still appeared. Tooling was changed to push variances inward, holding the outer mold line, Heath said.

"It's one of those things that I was frankly worried about a year ago, and I don't lose any sleep over it at all," he said. The F/A-22 has consistently beaten requirements for low observability, he said, noting, "We're better than spec on every airplane."

Moreover, the F/A-22 coatings and panel shaping make it possible to service the aircraft on the ramp without sacrificing its stealthy signature, something that has always been a labor-intensive issue with the F-117 and B-2, which need extensive reapplication of stealthy coatings after the surface is pierced for maintenance.

Savings will also flow from borrowing new avionics and software from the F-35 Joint Strike Fighter, also being developed by Lockheed Martin, Heath said. Likewise, the tooling that fixed the mold line variances on the F/A-22 is now an advance that can be applied to the F-35.

By using some common avionics,

USAF Quickly Returns F/A-22s to Flight

USAF immediately grounded all F/A-22s while it conducted safety inspections and began an accident investigation board following the Dec. 20 crash of a Raptor shortly after takeoff from Nellis AFB, Nev. By Jan. 6, officials had cleared the Raptors for a return to flight.

While the cause of the crash had not yet been determined, the service said "enough information is available for Air Force officials to be highly confident of the design, testing, and development of the F/A-22." USAF said it was satisfied the F/A-22 was safe to fly, following "a comprehensive review of procedural and engineering data" and based on the F/A-22 fleet's 7,000-plus hours of flying time.

Pentagon officials said the safety investigation was close to ruling out engine failure and was zeroing in on preflight procedures.

The pilot, who ejected safely from an altitude of only a few dozen feet, was preparing to depart on a night air combat maneuvering training mission. Both the pilot and aircraft were assigned to Nellis with the 422nd Test and Evaluation Squadron, which is developing initial F/A-22 tactics.

The aircraft had arrived at the base in 2002 and had accumulated 150 hours of flying time. It was not configured unusually for the flight. The pilot had logged 60 hours of flying time in the F/A-22, as well as many more hours of simulator time.

Heath said, the two aircraft can take advantage of larger production runs and lower unit costs.

The company has a team of cost-cutting engineers looking at every aspect of production for efficiencies. "We are leaving no stone unturned," Heath said. No suggestion from the factory team is ignored, and even some small ones have paid dividends.

Two years ago, the Air Force established a requirement of 381 Raptors. That was deemed to be a sufficient number to deploy one squadron with each of the Air Forces 10 Air and Space Expeditionary Forces and have enough left over for training, depot maintenance, testing, and attrition replacements.

Needed: 381 Raptors

The 381 figure "is still what we think is the minimum requirement," Welsh said, especially given missions demanded by the Strategic Planning Guidance, a secret document that spells out what the services must be capable of doing in wartime.

However, USAF is laboring under two strictures that have capped the amount of money that can be spent on production of the Raptor aircraft. One of these, set by Congress, imposes a cutoff point of \$36.8 billion. The other, set by the Pentagon, limits that expenditure to \$42.2 billion.

The upshot of the caps is that, so long as they are in place, the Air Force can only afford about 224 to

277 aircraft, depending on which cap one chooses to observe. Both figures are a far cry from the 381 the Air Force views as a minimum.

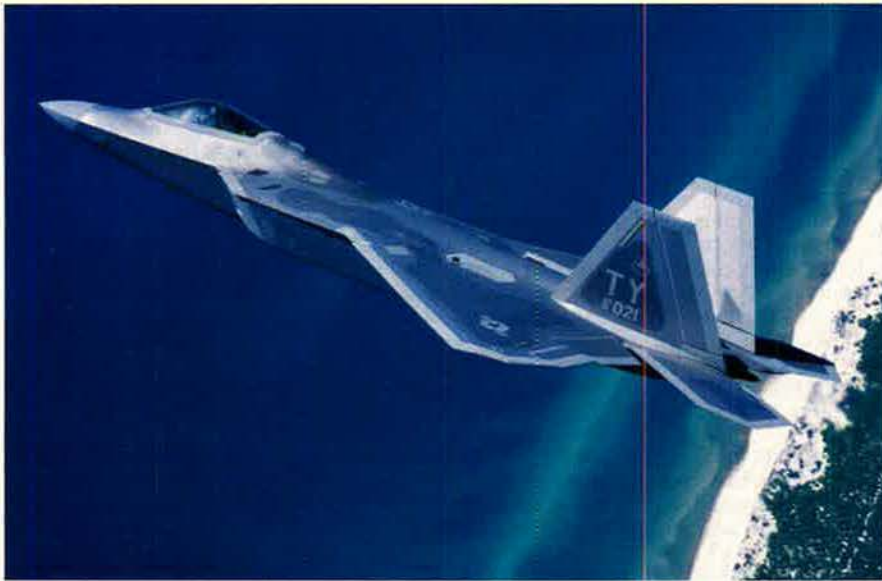
From the members of Congress, Welsh said, he hears a standard refrain. "Very consistent," he said. "'Let's make a production schedule, make it believable, deliver airplanes on time.' That's the major push from the committees."

The Air Force had hoped to make the case for lifting the caps in March, when the F/A-22 is reviewed by the Defense Acquisition Board. If the DAB approves, the F/A-22 will be cleared to enter full-rate production, which will hit 32 per year in 2006.

At that rate, however, the F/A-22 would not have reached 277 airplanes until 2011, and going to the full requirement of 381 would have taken until 2015. That would have seen the program overlap some other big-ticket programs, such as a new tanker, the E-10 flying command post, and the F-35.

Along with the F/A-22 cut, Rumsfeld also proposed trimming the E-10 and halting production of the C-130J tactical transport, eliminating the financial "bow waves" he wants the services to avoid in the out-years of the spending plan.

Congress, too, was concerned about bow waves. Rep. Curt Weldon (R-Pa.), chairman of the House Tactical Air and Land Forces Subcommittee, warned last year that the tactical



More than 80 F/A-22s have been ordered, and more than 40 have been built. The program faces tough scrutiny in the coming months, as DOD and Congress weigh the importance of air superiority against other needs.

aircraft program then envisioned—including the JSF and the Navy's F/A-18E/F SuperHornet—was not affordable and that “something has to give.” Weldon noted, however, that the F/A-22 was finally on the verge of production and that it was hard to believe the DOD would cut it just as the billions spent on its development were about to pay off with series production.

“Intense Scrutiny”

Welsh acknowledged that Congress has “lots of big bills coming up in the years between 2009 and 2015” and that increasing the F/A-22 buy during that period would have exacerbated the problem. However, he maintained, the F/A-22 has been a high-order priority of DOD during Rumsfeld's tenure, and the Air Force expected that, in tradeoffs with other programs, “the Department of Defense would have to prioritize.”

Heath said there have been many visitors from Congress and the Pentagon to the F/A-22 factory in Marietta, Ga., and they have come away impressed.

“Quite a number—and they are even some who have been skeptics in the past—are now believers,” Heath said. One such was Rep. Jerry Lewis (R-Calif.), who practically derailed the program over its cost in the 1990s. Lewis was among 60 House members who wrote the House leadership last fall to insist that the

F/A-22 be funded at the full request for Fiscal 2005.

Another believer is Sen. Orrin G. Hatch (R-Utah), who took to the Senate floor last May to say, “I have come to the conclusion that the Raptor is absolutely vital to our national security.” Buying an insufficient number of F/A-22s “would be an abdication of our Congressional responsibilities,” Hatch said.

Another looming financing issue for the F/A-22 is its modernization. Although only now being readied for initial operational deployment, the airplane will need block upgrades over time, to increase its power to attack a variety of ground targets, taking advantage of its speed, stealth, and maneuverability.

The first three block upgrades, or spirals, will cost \$3.5 billion and are already included in the F/A-22's program cost, an aide to Welsh explained.

Those spirals—Block 20 and 30 aircraft—will allow the fighter to release satellite guided bombs at supersonic speeds, improve the radar to perform ground-mapping and tracking functions, and improve its data links to other platforms. These improvements will sharply increase its ability to attack ground targets deep behind enemy lines.

Spirals four and five, however, are notional—Welsh called them “candidate lists” of improvements—that will make the F/A-22 a forward node of a network of data collectors.

They have yet to be defined, and their costs have not been rigorously estimated, he said.

These “Block 40” aircraft that would incorporate spirals four and five would notionally have better stealth and the ability to conduct some aspects of airborne electronic attack, as well as the ability to attack moving targets.

Making the F/A-22 into a “net-centric” warrior is still conceptual, Welsh said. “Everyone's brainstorming this right now.” Before the upgrades can be defined, ACC has to develop a concept of operations for the advanced Raptor.

The Government Accountability Office quoted an extra \$9 billion as the cost of enhancing the F/A-22 for its ground-attack role, but that figure included the already-counted \$3.5 billion for improvements and also made assumptions that are not the case, a Welsh aide reported.

“It assumed that every single capability that we envisioned, we would actually go buy,” he noted. The GAO also assumed “we would retrofit the entire fleet.” However, the first 59 F/A-22 will be kept as trainers and not outfitted with a full ground-attack suite.

“A lot of effort is being made to line these up with better cost estimates so we know what the modernization bill could be, to start the discussion of modernization of these aircraft,” Welsh said.

Although it is not yet clear how well-funded the enhancement of the F/A-22 will be, Pentagon officials said the Air Force will endeavor to keep the airplanes the Air Force does get as capable as possible, hoping to make up in quality what may be missing in terms of quantity.

What is certain, however, is that the Raptor will be a Total Force aircraft. In December, the Air Force announced that the Langley F/A-22 wing will include both active duty and Air National Guard pilots and maintainers, who will be attached to the unit from the Virginia ANG's 192nd Fighter Wing, based in Richmond.

The move is seen as a way to take advantage of Guardsmen experience while exposing them to a first-line fighter. The Guard has typically operated with hand-me-downs from the active force. That, clearly, is no longer the case. ■



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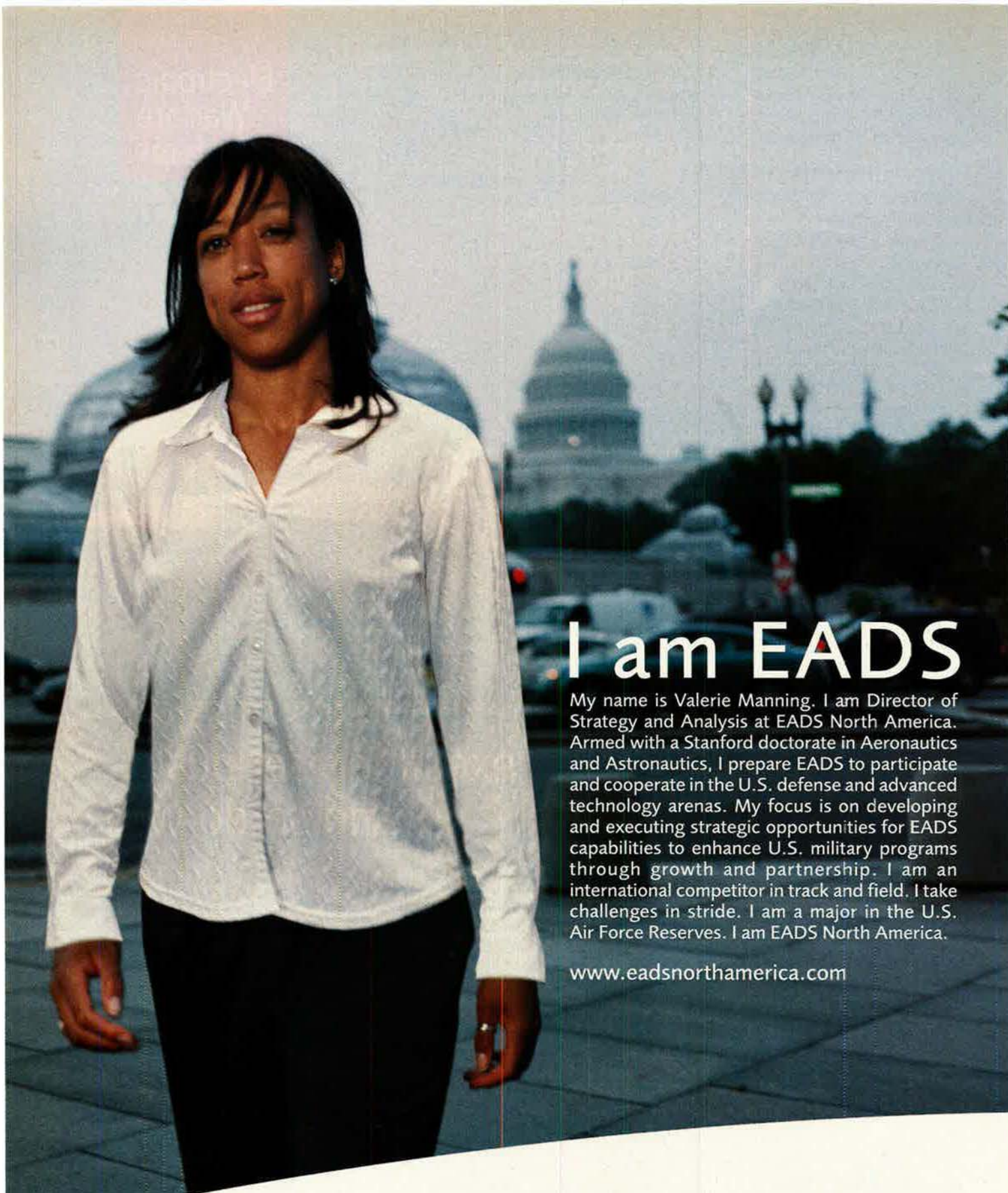
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Marvin Sambur, USAF's top acquisition official for four years, worries about the potential damage of the tanker controversy.

For the US Air Force, the Impact Spreads

Marvin R. Sambur was assistant secretary of the Air Force for acquisition from 2001 until last month and was USAF's top civilian official for weapons research and procurement. On Jan. 12, Sambur met with the Defense Writers Group in Washington, D.C. He discussed the ill-

fated Air Force tanker lease proposal, the improper actions of former USAF acquisition official Darleen A. Druyun, the criticism of Sen. John McCain (R-Ariz.), and the problems affecting USAF promotions and confirmations. What follows are excerpts.

The Great Scandal Myth

"This tanker deal has been labeled as a great scandal for the Air Force. From my point of view, I don't understand why. ... I understand [the criminality of] Darleen Druyun, but I don't think that people understand that Darleen Druyun ... left the Air Force one year before we brought forth to Congress the final proposal [for the tanker lease]. When she finished her negotiation, the price was in the \$146 [million per airplane] range, with no [safeguards]. We then took that negotiation and basically started from scratch, lowered the price considerably, [and added safeguards to the program]."

McCain's Motives

"I don't want to speculate on [Senator] McCain's motives [for attacking the Air Force over the tanker deal]. ... He should look at the data and look at our impact in this thing, and look at the fact that, the tanker thing—where he's talking about billions of dollars being lost to the government—all aspects of Darleen Druyun's influence ... were taken away *before* we brought the final proposal to Congress. And he's overlooking the fact that this was vetted by an OSD [Office of the Secretary of Defense] leasing panel for a year. The final decision was not made by the Air Force, to go forward. It was made by OSD."

Lack of Dialogue

"McCain would never talk to us. I have no idea to this day why. I walk out of this office completely baffled as to

why we are in the doghouse. I'm completely baffled, because, every time an IG report comes out, and we're cleared, he goes back and asks for another IG report."

Effect on the Air Force

"What I'm concerned about are the ramifications [of the hold on promotions and confirmations] with respect to the Air Force—what it means in terms of people and leadership. They [Senate opponents] are criticizing [us] for lack of leadership, and yet they are making the policies so that no one can get confirmed. ... Who is going to be taking over those places?"

The "Lack of Leadership" Charge

"If you look at what we're being accused of, it's lack of leadership, and what's happening right now is, because of the people leaving and because new ones are unable to be confirmed, we have a lack of leadership, by the vacuums that we have."

Critical Vacancies

"We can't have [Lt. Gen. Ronald E. Keys] promoted to take [Air Combat Command]. There's a vacuum at ACC. There's a vacuum in several positions with two-star generals, three-star generals. Nobody's getting confirmed. The civilian leadership—the next person who takes my

job, what type of grilling will he get? Or the [Secretary of the Air Force]? The next person will be under the mandate, 'You clean up everything within the Air Force,' before he gets confirmed. ... I mean, what type of morale does that leave you?"

Lining Up To Leave

"Who wants to be in acquisition? The good people are already lining up to leave, and anybody who wants to come in will be thinking, 'My God, why would I ever come into this thing?'"

No Exit?

"There's no way out of this until everybody [in the current Air Force leadership] leaves, and then you start from scratch here."

Heads Rolled

"My head rolled, and Secretary [James G.] Roche's head rolled. We did it [voluntarily resigned] because

late 2001]. The law said, 'Look at a lease.' The law said, 'Look at a Boeing 767.' The law *didn't* say 'competition.' The law *didn't* say, 'Buy it.' It said 'lease.' It said, 'Boeing.' The Air Force was supposed to bring forward a proposal, which we did."

Demands for Internal E-Mails

"E-mails are a dialogue within OSD. If you are worried about your e-mail, then you should have a lawyer over your shoulder every time you write an e-mail. That sets a new precedent, right now. When people were writing their e-mails, they thought they were having a dialogue, they were having discussions, they were having debates."

Druyun Unsupervised?

"She had no oversight because there was nobody confirmed [in a supervisory position] for 50 percent of the time [she was in office]. For five of the 10 years she was there, she had no boss. ... I was the last secretary of acquisition that she had. She had several before me. ...

"The good people are already lining up to leave, and anybody who wants to come in will be thinking, 'My God, why would I ever come into this thing?'"

we thought that that would be a mechanism to break this 'accountability' argument [by Senate critics of the tanker deal]."

Mass Conspiracy

"Right now, one of the things that is so puzzling to me, on the tanker, is the belief that everyone within the Air Force is in a mass conspiracy to help Boeing. I mean, that's the implication here—that we have all of the generals, everybody, has this mass conspiracy, that all of us are doing this to help Boeing. Does that makes sense?"

Decision-Makers

"It [the tanker deal] was vetted by OSD for a year, and the final decision was not made by the Air Force. It was made by OSD in collaboration with OMB [the White House's Office of Management and Budget]. ... So I'm kind of confused as to why everyone thinks that the Air Force is the culprit here, why the Air Force is tarnished."

The Will of Congress

"We were responding to a law from Congress [passed in

Do you happen to know who her boss was before me, who was involved with some of this stuff? Why is his name never mentioned?"

Stripping Her of Duties

"I was only there for a matter of two months before I recognized that she [Druyun] had too much power. She did not make a single source-selection decision while I was there. The PEOs—the program executive officers—were taken away from her. The PEOs reported to me within two months, not to her. I had taken away all of her head contract authority. She was not allowed to make any more contract decisions."

Druyun's Reputation

"At that time, she had this sterling reputation as being the greatest negotiator ever. Everyone in the Air Force thought that she was 'the Dragon Lady' who would squeeze her mother if she needed to. So my reaction, when I looked at [the tanker deal that she negotiated], was, 'Maybe at the end she was trying to leave here and didn't do such a great job.' ... You've got to be very paranoid to think that everybody who's working for you is doing something illegal. ... Sometimes people just do bad jobs." ■



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Noble Eagle

By Adam J. Hebert, Senior Editor

Two F-15s from the Oregon ANG's 142nd Fighter Wing patrol the Pacific Northwest with live weapons on a CAP mission. Directed by NORAD, air patrol pilots fly random missions in addition to sorties launched against specific threats.

IT DOES not attract much attention any more, and it has undergone a dramatic transformation, but Operation Noble Eagle is still going strong more than three years after the Sept. 11 attacks that brought it into being.

Noble Eagle now features a greatly expanded network of sensors, aircraft, and airmen devoted to the homeland air defense mission. The scale of the effort has been large enough to put a considerable strain on the Air National Guard, which provides most of the mission's personnel.

US air and space forces have seen



When it comes to defense of US airspace, the Air National Guard is in for the long haul.

Without End

no overall letup in the defense of American airspace. To the contrary, the mission has in some ways broadened and deepened.

At first, Noble Eagle was an emergency stop-gap defense anchored by combat air patrols (CAPs) over major cities, launched in the wake of the terrorist attacks in New York, Pennsylvania, and Washington, D.C. Now, Noble Eagle has become a steady-state affair. Nobody expects the mission to go away anytime soon.

North America's homeland defense system has been overhauled to reflect its new demands, but offi-

cialists say that much still needs to be done to make it an effective, permanent mission.

The US still has "a long way to go" in defending itself, said Air Force Gen. Ralph E. Eberhart, the recently retired commander of North American Aerospace Defense Command and US Northern Command.

Without question, Air National Guard units have taken on an enormous new responsibility—and without a manpower increase.

The Long Haul

"While we still call it Noble Eagle,

it's really a more steady-state air defense," said USAF Maj. Gen. David F. Wherley Jr., commander of the D.C. National Guard. The ANG, he said, is trying to "program" for the long haul.

Homeland defense began changing on Sept. 11, 2001, and it still is evolving.

Some changes were organizational. For example, US Northern Command, a new four-star unified command, was created in October 2002 and given the mission of defending North America. In January 2003, the Department of Homeland Security



NORAD keeps a close eye on threats to New York and Washington, D.C., and now has bases on alert closer to these target rich areas. Here, a pair of D.C. Guard F-16s out of Andrews AFB, Md., patrol the national capital region.

was established, unifying a hodgepodge of security entities, including the Coast Guard and the Transportation Security Administration.

Air defense has similarly evolved.

Initially, Noble Eagle CAPs were flown over cities such as New York and Washington, D.C., supported by E-3 Airborne Warning and Control System aircraft and tankers. These flights defended major urban areas against further 9/11-style aerial attacks and served as a visible symbol of government protection.

However, the CAPs proved to be unsustainable, in that they put a major strain on pilots, aircraft, maintainers, and the military budget. Cost estimates for the nonstop CAPs ran as high as \$200 million a month, and the Pentagon began looking for more cost-effective ways to defend America.

In the end, DOD settled on a plan based on increased strip alerts, supplemented by random and threat-based air patrols.

NORAD has always maintained alert bases—sites where fighters sit fueled, armed, and ready to take off on short notice. During the early years of the Cold War, North America was ringed by alert bases ready to intercept approaching Soviet bombers. To many planners, however, the end of the Cold War meant the end of the threat. US air defenses were allowed to atrophy.

At the time the Soviet Union collapsed in 1991, NORAD maintained

26 alert sites around the United States, said USAF Gen. Richard B. Myers, Chairman of the Joint Chiefs of Staff and a former NORAD commander.

By Sept. 11, 2001, however, the number was down to seven.

“The threat was not perceived to be so evident, ... so forces were scaled down,” Myers told the 9/11 Commission. “Alert facilities, which are expensive to maintain, were closed, and we wound up with those seven sites.”

None of the seven were particularly close to al Qaeda’s targets on that September day. Fighters from Otis ANGB, Mass., responded to the attacks on the World Trade Center towers in New York, while aircraft from Langley AFB, Va., were called to the capital’s airspace after the attack on the Pentagon.

Eberhart told the commission that, as a result of a major cost-benefit debate in the 1990s, “we came close to having zero airplanes on alert.” He said that the zero-alert option “almost went to the endgame.” Now, said Eberhart, no one questions the need to have air defense aircraft ready to scramble.

By 2002, NORAD was overseeing alert sites at more than 30 locations. Some Cold War units, such as ANG’s 177th Fighter Wing at Atlantic City Arpt., N.J., have permanently reactivated their air defense mission. One ANG unit—the 113th Wing at Andrews AFB, Md.—acquired alert status for the first time.

The Air Force varies the number of aircraft that it keeps on call and also changes their flying schedules, the better to keep potential terrorists guessing about their deployments.

No More 9/11s

Pentagon officials assert that another 9/11-style attack would not succeed this time around. On Sept. 11, 2001, NORAD had only nine minutes of warning before the first hijacked airliner hit the World Trade Center at 8:47 a.m. That was the only advance warning the US military received about any of the attacks on that day. (See “Sept. 11, Minute by Minute,” October 2004, p. 70.)

Had today’s systems been in effect that day, NORAD would have had “at least 17 minutes” of warning before the first attack on the North Tower, Eberhart told the 9/11 Commission. “We would be in position to fire for eight minutes,” he said, adding that it would be enough time to determine if it were necessary to shoot down the aircraft.

Communications and connectivity make the biggest difference between then and now, officials say.

Rear Adm. Charles J. Leidig Jr., the senior watch officer at the Pentagon’s National Military Command Center during the 9/11 crisis, said “the most significant lesson” from that day was the need to open communications channels and bring leaders together to make decisions in a timely manner.

Leidig told the 9/11 Commission that poor command and control hampered the nation’s military response that day and that “any improvements in that area would be significant.”

NORAD has given high priority to strengthening command and control. Under construction is a new command center and other upgrades at NORAD headquarters. Command posts at the alert units have also been significantly enhanced.

NORAD officials now have “multiple” ways of securely communicating with operational units, an official at the 113th Wing said. “They like to have redundancy.”

Just having more alert bases would not have been enough to thwart the attacks in New York.

“We still had a time and distance problem,” Eberhart told the com-

mission members. "We would not have been able to respond to these threats. [Fighters based at] Atlantic City ... would not have been able to get there in time."

However, if today's battlespace awareness and communications fixes had been in place, said Eberhart, "we would be able to shoot down ... all four aircraft."

NORAD and the Federal Aviation Administration now have a common situational awareness, integrated radars, and established lines of communication. These advances have eliminated a major American vulnerability, exploited on 9/11. At that time, NORAD radars were looking "out" from the borders of the US, while the FAA radars were looking "in" over domestic territory. NORAD was blind to what the FAA was seeing.

Take No Chances

NORAD, based under 2,000 feet of granite at Cheyenne Mountain AFS, Colo., now keeps a close eye on the domestic air picture that was once seen only by the FAA. The new terror threat keeps the binational command busy. The US has suffered no more hijackings and air attacks, but NORAD evinces a "take no chances" attitude about the threat.

Each day, NORAD scrutinizes roughly 7,000 "tracks" of aircraft approaching US airspace. By day, there may be as many as 10,000 air-

Staying Ahead of the Threats

Terrorists avoid well-defended targets. They look for vulnerabilities. Homeland defense planners know that, after they correct a weakness, they must immediately set about looking for the next potential target.

US Northern Command and North American Aerospace Defense Command officials feel that, with defense against hijacked airliners in relatively good shape, it is time to focus attention on other weaknesses.

Among the publicly mentioned vulnerabilities: the nation's inability to identify and stop low-flying cruise missiles and remotely piloted aircraft, and its lack of a system for detecting a hostile ship among thousands of innocuous-seeming vessels approaching North American ports.

Maritime security is a major concern.

"It is just a matter of time until terrorists try to use a seaborne attack," said Gen. Ralph E. Eberhart, the recently retired commander of US Northern Command and NORAD.

Canadian Lt. Gen. Rick Findley, NORAD deputy commander, pointed out that, taken together, the US and Canada offer an attacker nearly 250,000 miles of coastline. That creates "some vulnerabilities on the maritime side."

Officials tout the importance of stopping enemies before they get to North America. NORTHCOM performs a "day-to-day operational net assessment" to anticipate potential threats and plan responses, said Navy Capt. David Jackson. "The biggest threat to the US" comes from the massive number of unmonitored shipping containers arriving at domestic ports, he said.

Jackson, deputy director of the command's Standing Joint Force Headquarters-North, noted in an interview that NORTHCOM's area of responsibility extends roughly 500 miles out from the coast. That provides ample opportunity to play "the away game."

Current efforts are labor-intensive. The Homeland Security Department's Container Security Initiative, which sends US inspectors to foreign ports, was cited by Jackson as an effective "part of the away game," but more automation and better intelligence is needed. There is no situational awareness of commercial shipping akin to what NORAD provides for the air.

One step toward a solution may be to expand the aerospace defense command to include sea defense, or to create a separate "Maritime NORAD." Findley said the binational NORAD agreement is up for renewal in 2006, at which time it may be expanded to include maritime defense provisions.

USAF photo by S/A, Brett R. Ewald



Guard units bear the brunt of Noble Eagle, but they have not increased manpower for the mission. Live weapons, such as this AIM-9 Sidewinder being readied by MSgt. George Anderson, serve as reminders of Noble Eagle's importance.

craft in the air at any given time. In all, there are more than 80,000 domestic departures and landings daily, and NORAD watches all of them.

Airliners have flight plans they must follow, and small private aircraft need to stay out of restricted areas.

When an aircraft gets off track, NORAD is "aware of it nearly instantly" now, said Brig. Gen. Duane W. Deal, commander of the Cheyenne Mountain Operations Center.

Deal said this type of awareness would go far toward eliminating any repeats of the situation on 9/11, when DOD had no inkling the attacks were developing. As Deal said, the first airplane had nearly reached the North Tower "before someone bothers to call us up."

According to NORAD, alert fighters were scrambled roughly 125 times



Noble Eagle is a team effort. Lengthy fighter missions are made possible by refueling tankers. Airborne control aircraft make the CAPs effective. And at the alert sites, crew chiefs, pilots, and command post officials stand by 24/7.

for assorted reasons in 2000. Since Noble Eagle began, there have been about 1,000 scrambles—a pace of nearly three times the pre-9/11 rate.

The new US air defense setup also depends heavily on combat air patrols, which have undergone dramatic changes.

In 2000, there were no CAPs over the United States. Since Noble Eagle began, however, fighters have not only flown a large number of CAPs but also have been diverted from CAP flights to check out possible problems roughly 1,500 times.

The number of diversions has not declined despite the elimination of nonstop air patrols. In the first 10 months of 2004, for instance, NORAD had diverted fighters from CAPs more than 450 times.

Most of these tactical actions were triggered by commercial or private aircraft straying off course or their pilots turning off transponders or accidentally signaling that a hijacking was in progress.

While most of NORAD's actions are never publicized, a few have gained public prominence. For example, the command responded to the threatening actions of "shoe bomber" Richard Reid during a flight in December 2001, ordering fighters to shadow the Paris-to-Miami flight until it was safely on the ground at a "divert site" in Boston.

In June 2004, NORAD diverted two fighters and scrambled two others to intercept an airplane carrying

the governor of Kentucky. The aircraft had entered restricted airspace over Washington, D.C. A series of interagency miscommunications resulted in an evacuation of the Capitol building.

As such situations develop, NORAD can quickly call a "Noble Eagle" or "domestic event" conference to discuss it and determine a proper course of action. These conferences include participants "up to and including the Secretary of Defense," Deal said.

Rapid communication and established rules of engagement are im-

portant, he said, "because we could have to order a shutdown."

Last Resort

Officials stress that shooting down an airplane would always be the last resort, but it may be necessary if an aircraft appears to be a valid threat, will not respond, and is headed for a target. If NORAD is forced to order a shutdown, it must be to prevent "a bad situation from getting worse, because everybody on that airplane will die," said Eberhart.

"During this entire time, we're trying to work all the alternatives," Deal added. "We're trying to give passengers every ... chance that we possibly can for them to take over."

NORAD's rules of engagement call for air defense aircraft, faced with a suspect aircraft, to follow a sequence of steps such as firing warning flares. These measures are designed to prevent a shutdown "unless it becomes a major national decision" to prevent an even greater tragedy, Deal explained.

Before the 9/11 attacks, the mission of watching for enemy aircraft and missiles was not that complicated. "You pretty much knew what you were looking at," Deal said. "It was a straightforward mission." Now, he went on, "there are a lot more variables in what we're doing and a lot more information we have to fuse."

NORAD headquarters is currently building a larger command center



To prevent airliners from being flown into targets—and to prevent aircraft from being accidentally shot down—NORAD has new rules of engagement for its pilots. Pictured is a Florida ANG F-15A escorting a civilian airliner during an exercise.



The pace of operations has not let up, leading one senior official to call Noble Eagle a "steady-state air defense." Pilots such as Capt. Eric Armentrout of the 1st FW at Langley AFB, Va., will defend homeland airspace for the foreseeable future.

inside Cheyenne Mountain to meet its C2 requirements. The unit includes space for FAA personnel, air battle managers, and other officials to sit alongside the existing command center personnel.

One official said Noble Eagle was "designed for a sprint" but that air defenders are now "in a marathon." This changeover has been particularly difficult for the Air National Guard, which handles the lion's share of the alert mission.

NORAD's area of responsibility is divided into three regions: Alaskan Region, headquartered at Elmendorf AFB, Alaska; Canadian Region at Winnipeg, Manitoba; and Continental US Region at Tyndall AFB, Fla. Tyndall's 1st Air Force is responsible for guaranteeing the air sovereignty of the entire CONUS airspace. As a fact sheet notes, "All combat and support elements [in 1st Air Force] have come from the Air National Guard."

The 113th Wing at Andrews has responsibility for guarding the national capital area. It began performing air sovereignty missions for the first time on 9/11 and is composed primarily of traditional, part-time Guardsmen.

Members of the wing recognize the importance of their mission. They can hardly forget it; each day, as they make their way to the flight line, wing pilots pass by a memorial plaque, mounted on a block of stone that was part of a Pentagon

wall demolished by a hijacked airliner.

Firehouse

One official noted that the 113th has not gained any personnel since 9/11, even when the wing added the 24/7 alert mission. Being an alert unit requires "two or so" aircraft to be ready to scramble, with pilots and crew chiefs standing by, in a "firehouse" environment. The command post is also manned around the clock to receive orders from NORAD and coordinate air patrols and emergency scrambles.

All of the Guard units performing air defense are tasked "well beyond their 9/11 levels," one pilot said, but units "haven't caught up in the force structure yet." The problem is "recognized, ... and hopefully [it is] something that's going to get addressed."

The problem is especially acute in the command posts, which used to be part-time operations at locations like Andrews and Atlantic City. At the 113th, every command post operator is a traditional Guardsman, one of its officers said. The demand for more work hours has been met by Guard volunteers with understanding employers.

"I don't know how long you can operate on a temporary fix," the command post official said. "I think we need a plan with some legs to it."

The combat aircraft assigned to duty in Noble Eagle—USAF F-15s and F-

16s and Canadian CF-18s—are seen by some as less than ideal.

Paul McHale, assistant secretary of defense for homeland defense, argued that such "legacy" fighters are probably not the most efficient systems for air defense. "I'm convinced technology can give us a better way to do this," he said.

The D.C. National Guard commander said one of his frustrations is that the 113th Wing is not part of 1st Air Force. "We're not on their distribution list," said Wherley, who was commander of the 113th Wing on 9/11. Instead, the wing belongs to 9th Air Force, which is oriented toward US Central Command needs in the Middle East.

"That was a huge disadvantage, not being assigned to 1st Air Force," said Wherley.

The 113th directed the first fighter operations over the Pentagon on Sept. 11. The wing's F-16s, returning from a training mission as the Pentagon was hit, were armed only with practice rounds. Wherley ordered one aircraft to head to the Pentagon. NORAD fighters from Langley arrived shortly thereafter.

The wing's experience that day highlights the importance of command and control improvements. Wherley also launched the first CAP aircraft over the nation's capital, but the fighters "didn't have orders through military channels." The Secret Service "had called asking for support," Wherley said. He returned the call and was asked by a Secret Service agent to intercept any aircraft that approached the D.C. area airports or downtown.

That allowed Wherley to establish "weapons-free" rules of engagement and prepare two F-16s for launch.

Because of the confusion and concerns about accidental shootdowns, NORAD fighters initially had no authority to shoot at an airliner but NORAD was not running the F-16s out of Andrews when those aircraft were first cleared to shoot that morning, Eberhart said.

When the 113th Wing got its official rules of engagement from NORAD, wing officers were relieved to see that they were essentially the same as those issued by the Secret Service.

NORAD was worried about further attacks, said Eberhart, but, "frankly, we were just as concerned about making a mistake" and erroneously shooting down an airliner. ■

The operation has become the benchmark for airpower in urban joint force warfare.

The Fallujah Model

By Rebecca Grant

COMMANDERS engaged in urban warfare long have regarded airpower as a blunt instrument. In battles from Stalingrad in the 1940s to Grozny in the mid-1990s, airpower's primary purpose was to turn buildings into rubble—and fast.

Such no longer is exclusively the case, however.

With more than 150,000 US soldiers and marines on the ground in Iraq and Afghanistan, the public focus understandably has been on land war. Yet behind the scenes, coalition air forces have been deeply involved in urban “stability” operations. In fact, the November 2004 sweep of the Iraqi town of Fallujah has become the benchmark for airpower in urban joint force warfare.

Fallujah marked the unveiling of an urban-warfare model based on persistent air surveillance, precision air strikes, and swift airlift support. Together, these factors took urban operations to a new and higher level.

When President Bush declared that



the major combat operations phase of Operation Iraqi Freedom was at an end on May 1, 2003, he was announcing the start of one of the most difficult and uncertain transitions in warfare: the switch from battle to stability operations.

The term “stability operations” was relatively new when Iraqi Freedom began on March 20, 2003. It was derived from an Army doctrine change in the mid-1990s. Operations in Panama and Bosnia convinced the Army that contending with conflict after a regime change would be an important part of future military missions.

Stability operations joined offensive operations, defensive operations, and support operations as major parts of combined-arms doctrine. Army planning put Phase IV, Stability Operations, right after Phase III, Decisive Combat Operations.

Phase IV Stability Operations in Iraq turned out to be a major test, one which created unprecedented de-



USMC photo by SSgt. Jonathan C Krauth

mands on air and space forces as well as ground forces.

Twitching Regime

OIF decapitated Saddam's regime but left some body parts strong—especially in the north. Baathists who dominated the government bureaucracies and army also had used Iraq as a source of personal wealth. A variety of insurgent groups sought to tip the political balance through violence aimed at the coalition and the interim Iraqi government.

It was, by definition, an urban battle—Iraq's 16 biggest cities held 70 percent of the country's population.

From the very start of Phase IV, the town of Fallujah—35 miles west of Baghdad—was a hotbed of revolt. Tribal loyalties, nationalism, and dislike of foreigners were strong. These political features led to friction with coalition forces soon after they occupied the city in late April 2003.

In Fallujah, the "insurgency" com-

prised not only hard-line Baathists but also foreign jihadists such as the Jordanian-born terrorist leader, Abu Musab al-Zarqawi.

It was not until March 31, 2004, however, that Fallujah became notorious as the focal point of the insurgency. On that day, Iraqi gunmen ambushed and killed four American contract workers, whose bodies were subsequently burned, mutilated, dragged through the streets, and hanged from a bridge. Later that same day, five soldiers were killed by a roadside blast a few miles north of the city. In US Central Command's judgment, the killings demanded a response.

Fallujah was located in the easternmost region of the Marine Corps sector of Iraq, and thus responsibility for taking action fell to the I Marine Expeditionary Force commander, Lt. Gen. James T. Conway. He was ordered to attack on April 4.

Operation Vigilant Resolve featured 1,300 marines from I MEF,

along with some Iraqi participants. The marines surrounded the city, and then teams made forays into it in an attempt to locate those responsible for the slayings and draw out other insurgents.

From the start, the hunt for the ringleaders featured airpower. Air Force AC-130 gunships targeted specific sites, and marines called in precision air strikes against buildings harboring terrorists or Sunni insurgents. "I never thought I'd be calling for mortars and air strikes and all that," Marine Corps 2nd Lt. Joshua Jamison, who was among the first to go in, told the *North County (Calif.) Times*.

After a few days, however, US Central Command commanders halted the operation. They were responding to political pressure brought to bear by Iraq's interim governing council and to the problem of deaths of Fallujan civilians. Negotiations got under way. Iraqi forces were formed into the Fallujah Brigade, which was

to take control of the city while the marines remained outside.

This abortive April foray demonstrated an emerging set of goals for operations against insurgents in the urban environment. This was no pitched battle of army on army. The key to the strategy lay in isolating insurgent leaders and strong points inside the city.

Manhunt

It was, in part, a manhunt. Secretary of Defense Donald H. Rumsfeld said marines were “systematically moving through the city, looking for targets that are identified, that they have photographs of,” and that “they know who they want and what they want and why they want that person.”

Even after coalition ground forces pulled back, air operations continued. Gen. Richard B. Myers, the Chairman of the Joint Chiefs of Staff, said AC-130 gunships and fixed-wing aircraft went on attacking targets. “There were a lot of enemy [fighters] that died there,” he said.

Still, Round I in Fallujah left questions about use of airpower in urban operations. In some cases, ground forces just wanted to use their own organic direct and indirect weapons, rather than airpower.

Making positive identification and a collateral damage estimate—both requirements for an air attack—were cumbersome. Command-

ers wanted to exhaust all other means before going through that process. Only if the time was right and it was necessary would they call in an AC-130 or a fixed-wing platform to drop precision guided munitions.

In Fallujah, the goal of coalition leaders was not so much the taking of the city as it was about altering conditions there. Gen. John P. Abizaid, the coalition commander, explained that there were “certain things we will not tolerate in Fallujah,” such as the presence of foreign terrorists.

“We insist that the heavy weapons come off the streets,” added Abizaid. “We want the marines to have freedom of maneuver in Fallujah, along with Iraq security forces and Iraqi police.”

Through the summer and fall, the air component joined in what might be described as an ongoing hunt for prime insurgency targets in Fallujah and other cities.

Counterinsurgency efforts across Iraq relied heavily on persistent intelligence, surveillance, and reconnaissance from air and space platforms. Operation Enduring Freedom and Operation Iraqi Freedom had already proved the value of persistence. Now, for stability operations, the role of persistent surveillance was doubly important.

That is because the air component was not dealing with a battle roster of military targets such as Taliban

trench lines near Kabul or Republican Guards tanks in a field. Every target struck from the air in this stability operations phase had to be carefully developed and massaged, keeping recent intelligence and overall political goals in mind.

The result was a steady pace of air attacks, even though there were no US ground force attacks in Fallujah. Example: Sept. 13 air strikes targeted a suspected Zarqawi hideout in Fallujah. According to the Associated Press, there had been at least five series of air strikes over the previous week.

Turning to the air component in this way was a significant change in joint operations. A few years earlier, it would not have been possible.

Since Kosovo

Take, for example, the pursuit of Serbian police and military forces in Kosovo during Operation Allied Force, which unfolded in 1999. Serb forces went house to house, killing ethnic Albanians. Some 600,000 were forced to flee to refugee camps across the border in Albania.

The only way to stop the ethnic cleansing was to go to the heart of dictator Slobodon Milosevic’s power base in Belgrade and to interdict his forces in the field. Eventually, it worked—after a 78-day air campaign. At the operational and tactical levels of war, however, airpower did little to stop the house-to-house terror.

The USAF Chief of Staff, Gen. Michael E. Ryan, summarized the situation this way: “There was never any delusion that airpower was capable of stopping door-to-door thuggery—at less than platoon level and squad level. ... You’re not going to stop that directly with airpower.”

Ryan likened attempts to do so to hitting “leaves and branches” instead of striking at the roots of a problem.

In Fallujah, however, the air component proved it could do quite a lot to target those engaged in door-to-door thuggery. The situation was different from Kosovo, in that enemy forces were fewer, but the combination of persistent ISR and on-call strike aircraft was nothing short of stunning.

Heading the list of star systems was the Predator UAV. Its full-motion video had proved its utility in

USA photo by Sgt. 1st Class Johancharles Van Boeris



Precise application of airpower was a hallmark of the Fallujah II campaign, which required close integration of ground and air forces. Here, an airman calls in air support, while another airman provides cover.

Afghanistan and in the major combat operations phase in Iraq. However, the swiftness of the coalition's assault on Baghdad left Predator's urban operations talents largely untested—along with those of many other sensor and shooter platforms.

Round 2 in Fallujah, which unfolded in November 2004, was to show the full impact of the new sensor and shooter technology when integrated with other forces in joint operations.

For several weeks before the main assault, air strikes and artillery fire targeted key sites in the city as they were identified. The hunt for insurgents evolved into battlespace shaping.

Beginning in July 2004, the CAOC focused ISR coverage on building a picture of the insurgent network in Fallujah. Persistent ISR, ranging from imagery to electronic and signals intelligence was important, "particularly with a determined adversary" with a "low signature," said Lt. Col. John Johanson of the CAOC's ISR division. He said that constant ISR was required, lest "collection gaps create a collection bias" that could skew the overall assessment and characterization of the enemy network.

It culminated in August and September with a series of preplanned strikes that took out key insurgent targets—and did so with great precision. One such strike targeted a weapons-carrying vehicle moving between a residence and a small warehouse. US forces were watching it with Predator and waiting for the target to drive back to the walled compound of the residence. When it did, the driver parked the vehicle under the carport. "We put a Hellfire over the wall [of the house] and under the carport with no damage to the house," said Johanson. "That's the payoff."

Operations began on the night of Nov. 7, 2004, as lead elements of the 10,000-strong coalition force seized a hospital that doubled as a known insurgent base of operations. Aircraft hit preplanned targets—such as barricaded insurgent sites—then shifted to on-call response.

After eight days, Fallujah was "secure"—meaning that 100 percent of it was passable for coalition and Iraqi forces, although sporadic fighting continued. By the end of the month, it had been cleared of most insurgent resistance. Strike sorties



USMC photo by Lance Cpl. Thomas D. Hudzinski

The ability to precisely hit targets such as this insurgent stronghold marks a major departure from traditional air attacks on cities. There are many accounts of precision weapons "plucking buildings."

across Iraq that week surged to 379—a one-third increase over the average. ISR sorties for Iraq also hit a peak of 161 sorties, the highest total that fall.

Sharper Focus

From the start, the air component was able to focus on the urban area and provide major advantages scarcely seen in urban warfare. These included expanded situation awareness down to the tactical level, rapid precision strikes, and airlift support.

Planners had also mapped Fallujah "down to the street addresses," as one said. Information about a total of just under 800 buildings was fed into a database, to be shared among air planners, aircrews, and ground forces. For each building, mensurative coordinates already were in place. When joint tactical air controllers called for strikes, data about a particular building often was already in the database. Alternatively, controllers could use the data to call for strikes on a building near a mapped site. "One of the huge successes of Fallujah II was the ability to preplan and get the playbook to everyone," said Maj. Eric Grace, an air planner.

In both April and November, Lt. Col. Greg Harbin spent time on the ground controlling air strikes. Harbin said "a big lesson" of Fallujah is that "preplanning shortens the kill chain." He added, "We knew their alleyways better than they did."

On the front lines creating that new level of situation awareness was Predator. "It's Predator TV, a God's-eye picture for troops on the ground, that saves lives every day," Lt. Col. Stew Kovall, 17th Reconnaissance Squadron commander, explained to a Texas CBS News affiliate. He was speaking about Predator's focus on battlefronts from Afghanistan to Iraq. However, the value of the real-time overview was intensified in urban operations.

Restricted lines of sight had always been a factor that favored defenders. Predator—along with other tactical UAVs such as Pioneer—helped overcome that in many cases.

Direct feeds via satellite to command centers and selected forces on the ground opened up a full-motion video perspective on the street battle. Insurgent forces often were unaware of how closely they were being watched by airborne sensors.

For many coalition forces, watching such action was an eerie experience.

"We've seen people setting up mortars," said Capt. Catherine Platt, a Predator sensor operator with the 17th RS, to CBS News reporters in Dallas, "and actually located improvised explosive devices [known as IEDs], and were able to prevent somebody with weapons from being able to shoot or injure any of our troops."

Thanks to laptop links to the aircraft, troops on the ground in Fallujah got the same view of the battle-



AC-130 gunships, such as this one, can identify and track targets. If necessary, they will lay down close air support fire when friendly forces are dangerously close to enemy locations.

field as that given to Predator operators and command center duty officers.

The sensors of other aircraft, such as the AC-130 gunship, also got a tremendous workout in counter-insurgency operations. A widely circulated piece of video footage showed the gunship's ability to track, monitor, and target insurgents, make a positive ID, and then destroy them according to the rules of engagement.

Here were the main features of the air component operations for Fallujah:

- Complete air dominance. Despite the later discovery of a handful of SA-7 surface-to-air missiles in Fallujah, there was no doubt the coalition had complete air dominance there, courtesy of years of no-fly zone operations and the OIF air campaign. Air dominance over Fallujah and other hotspots permitted ISR assets and fighter, bomber, and gunship pilots to take the time required to build situation awareness, work with joint tactical air control parties on the ground, and select weapons ranging from Hellfire to the satellite guided Joint Direct Attack Munition.

- Layered 24-hour support. With air dominance, the air component could put its top sensor and strike platforms in holding patterns over the city and acquire from above a level of battlespace awareness never before seen in an urban fight. As

with Baghdad in the spring of 2003, the air component planned its air support for Fallujah meticulously. Task one was deconflicting platforms over the city's airspace by time, altitude blocks, and ingress and egress routes. Planners referred to the aircraft in the stacks as the upside-down wedding cake—"layered all the way up," as USAF Lt. Col. David Staven said to a reporter for the Associated Press.

- Joint integration. In those layers, fighters were on call for designated time slots. Air component planners scheduled their in and out trips

to achieve 24-hour coverage with no gaps. That gave the teams of special operations forces, Air Force, and Marine Corps tactical air controllers a constant resource. Improved consistency and training, plus better connections with higher command centers, now kept the flow of air support running smoothly even with multiple teams on the ground. Joint assets—Navy carrier-launched aircraft and land-based Marine Corps aircraft as well as Air Force aircraft—supplied the stacks. AC-130 gunships with their combination of sensors and precise artillery fire once again proved immensely popular with the ground forces they supported.

- Strafing. Gen. John P. Jumper, USAF Chief of Staff, cited what he called a "surprising" amount of strafing. He said that it was necessary at times "in order to get precision." Harbin, referring to his personal experiences calling in strafing in Fallujah, said, "It's a wonderful thing. We were ambushed, and an F-15 strafed and got us out of that. I've seen enemy break and run just because you have a fighter down low."

In addition to strafing, said Jumper, "we had a significant number of airplanes in there, working against individual buildings. There are many accounts of our GPS-guided weapons plucking buildings out of the middle of very populated areas."

- Heavy ISR tasking. It took a much greater percentage of ISR sorties to



USAF photo by SSGT. Suzanne M. Jenkins

Persistent battlespace awareness is critical in urban settings, and platforms such as this Predator UAV help meet the demand. Real-time surveillance lets ground forces "see" around corners and over buildings.

sustain urban operations during the Fallujah fight. In OIF in 2003, strike sorties flown outnumbered ISR sorties by more than 12-to-1. For Fallujah, the ratio was just over 2-to-1. That made ISR a top contributor to modern urban operations.

■ Demand for first-strike success. In Fallujah, the targets for fighters, bombers, and gunships were generally clusters of insurgents being identified by ground forces or other sensors in real time. The targets ranged from buildings to trucks to snipers. Aircrews tasked with the strikes had to hit targets the first time to be effective. The nature of the close support operations also meant there was rarely an opportunity to go back and restrike the same target.

■ Immediate follow-on attacks. As a result of operations throughout the prior months, airmen already knew what to do when insurgents fled a site under air attack. Ideally, air component systems would follow them and hit the next building they entered and resume the attack. The *Washington Post* reported the details of such a one-two punch that took place Nov. 10. Air strikes hit one house holding insurgents, then struck a second smaller house where the survivors had fled. That combination took persistent surveillance, communications, and striking power.

■ Airlift and medevac. Positioning people, equipment, ammunition, and supplies heavily taxed the air component's mobility forces. At Balad AB, Iraq, mobility airmen on one day tripled their typical daily transport average to 1.3 million pounds. Air Force strategic and tactical airlift surged to put in place the pieces needed for the renewed offensive. Medical evacuation moved wounded to higher-level care facilities rapidly.

It wasn't only the marines on the ground who were using innovative tools and tactics in the urban fight. The air component worked hard to maximize accuracy and minimize collateral damage. America's powerful military force could, if it wished, quickly turn Fallujah into a pile of



AP photo by Anja Niedringhaus

The proper integration of airpower into Fallujah's ground operation provided on-call strike and created an unprecedented level of urban warfare competence. The new model added to the "margin of superiority" for ground forces.

rubble, but there was no point to doing that. Making rubble was the old ideal, precision the new.

Ideal Weapon

When large quantities of the 500-pound GBU-38 JDAM arrived in the theater in fall 2004, the system quickly became a top air weapon for use in the urban environment. The GBU-38 caused less collateral damage and eliminated uncertainties associated with laser guided bombs.

"This was the right weapon for the job," said the F-16 lead pilot who flew the first GBU-38 mission. "If we used any bigger [weapon], we would have caused unnecessary damage."

Air component support increased ground force efficiency. The end result was a speedy offensive that focused firepower where it was needed.

As with other campaigns in recent years, commanders were admonished to keep attacks precise. Reported Marine Corps Col. Mike Regner, the I MEF operations officer: "Not a piece of ordnance goes into that city that I don't watch" in one way or another.

Regner also described how air attacks used laser guided bombs to

topple a minaret hiding snipers, without causing damage to an adjacent mosque.

In Regner's view, the weapon precision was unprecedented.

"Is this like Vietnam?" he asked. "Absolutely not. ... Hue City ... was leveled, and there wasn't precision targeting, and they didn't secure it in the amount of time that we've secured" Fallujah, he said.

There was no doubt the second battle for Fallujah was a necessary one. Many of the estimated 2,000 insurgents in the city were killed and their sanctuary eliminated.

"Besides being a safe haven for leadership command and control, Fallujah was a center for making the IEDs that were being produced and used in other parts of the country to attack the coalition," said USAF Lt. Gen. Lance L. Smith, CENTCOM deputy commander.

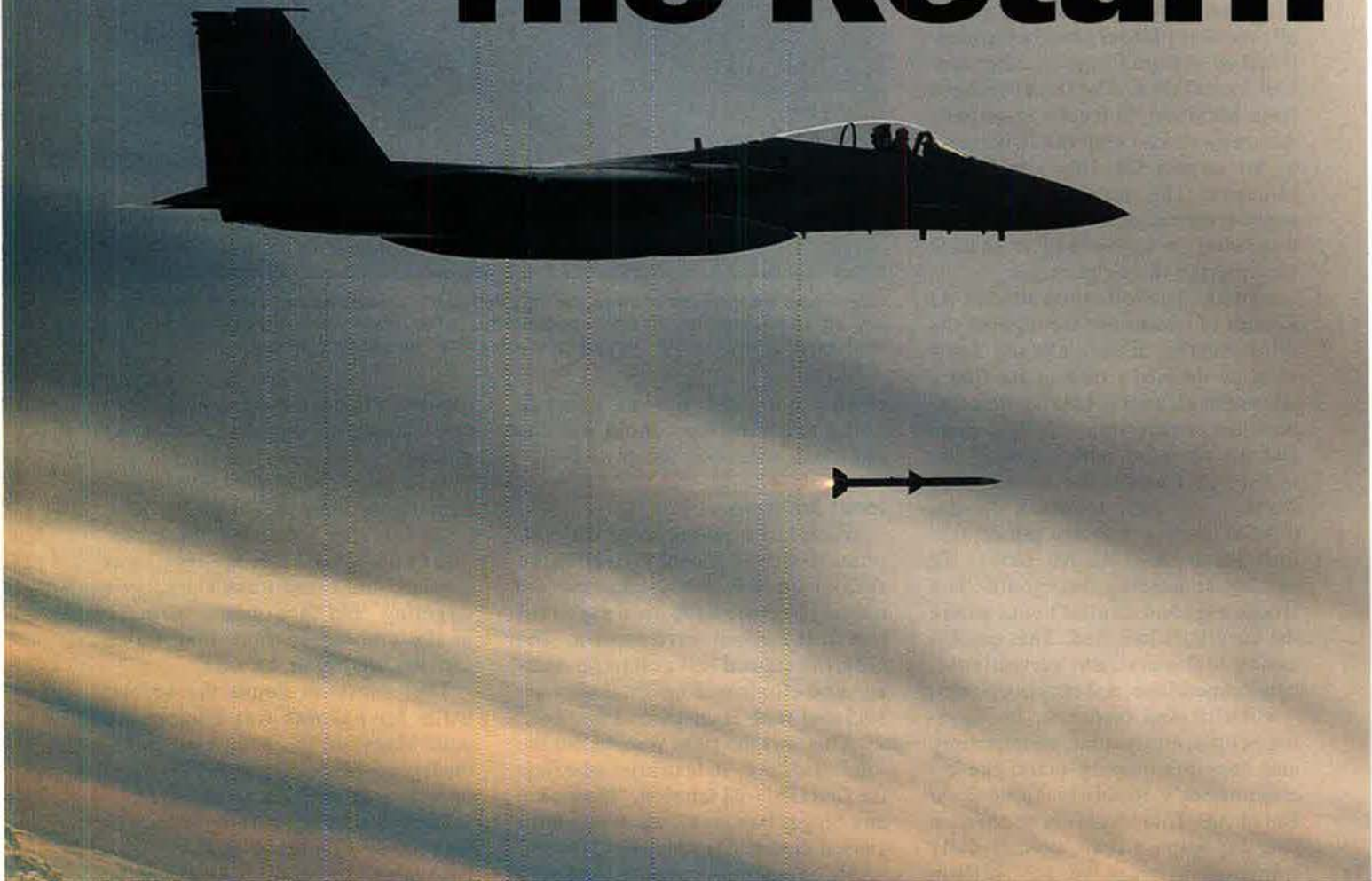
Fallujah was hardly left unscarred by recent operations there. Destruction was great. Even so, the evolution of airpower changed the calculus for insurgency operations in the urban environment. Air and space power working together can now engage targets with dial-up precision and immediate command and control.

The model unveiled in Fallujah adds to the margin of superiority for forces on the ground and takes the pursuit of major targets to a new level of competence through persistent ISR and on-call strike. ■

Rebecca Grant is a contributing editor of Air Force Magazine. She is president of IRIS Independent Research in Washington, D.C., and has worked for RAND, the Secretary of the Air Force, and the Chief of Staff of the Air Force. Grant is a fellow of the Eaker Institute for Aerospace Concepts, the public policy and research arm of the Air Force Association's Aerospace Education Foundation. Her most recent article, "Bomber Harris," appeared in the January issue.

USAF photo by TSgt. Iren Becker

The Return



USAF photo by TSgt. Lisa M. Zanzanlyka



Above, an Oregon Air National Guard F-15C from the 142nd Fighter Wing launches an AIM-120 AMRAAM during a live weapons-fire event.

At left, Capt. Brad Ertmer, 325th Fighter Wing, Tyndall AFB, Fla., signals to crew chiefs after returning from a William Tell sortie.

USAF's top air-to-air competition showcased the F-15 in air dominance and air sovereignty missions.

of William Tell

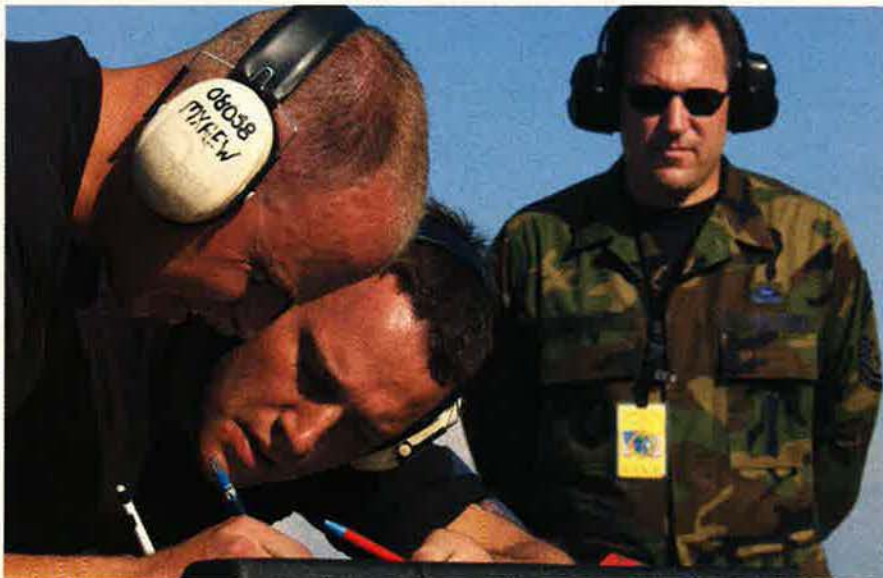
Photos by USAF photographers

The Air Force in November staged William Tell, its premier air-to-air weapons meet, at Tyndall AFB, Fla. Named for the legendary Swiss archer, the competition tested aircrew performance in the air dominance and air sovereignty missions, while evaluating weapons employment and tactics. The meet, which ran from Nov. 8 through Nov. 19, 2004, also featured competition in weapons loading, maintenance, and weapons direction. Because of USAF's high operations pace, it was the first William Tell in eight years.

In the photo at right, an unidentified aircrew member in an F-15C ascends from Tyndall for a live weapons-fire exercise. Below, CMSgt. Mike Cannon, a judge from PACAF, observes as SSgt. Kevin Skaggs (left) and A1C Matt Baker, both of the 95th Aircraft Maintenance Flight at Tyndall, review weapon documentation in a flight-line load event.



USAF photo by SSgt. Tanika Bell



Air Force officials decided to hold William Tell, which first ran in 1954, in 2004 to help spread new air superiority tactics. The competitors were members of: 1st Fighter Wing (Air Combat Command), Langley AFB, Va.; 3rd Wing (Pacific Air Forces), Elmendorf AFB, Alaska; 48th FW (US Air Forces in Europe), RAF Lakenheath, UK; 142nd FW (Air National Guard), Portland Arpt., Ore.; and 325th FW (Air Education and Training Command), Tyndall.

"Adversaries" included members of the 64th Aggressor Squadron, Nellis AFB, Nev., flying F-16s.



USAF photo by A1C Daniel DeCook

USAF photo by SSgt. Colette Bennett



USAF photo by TSgt. Ben Bickler

Above, Capt. Jonathan Gratton, a pilot of the 1st Fighter Wing, grabs his helmet for a sortie designed to pit four USAF F-15Cs against multiple enemy aircraft at varying levels and distances.

William Tell 2004 pitted F-15C pilots, maintainers, and weapons directors and loaders against live and simulated "enemies" in realistic combat scenarios. Action included sorting bandits from friendlies on a combat air patrol, air-to-air live fire against drones, air interdiction of various enemy aircraft, and a scramble for Noble Eagle, the domestic air defense operation.

Above, crew chiefs from PACAF's 3rd Wing marshal their F-15Cs.

At right, SrA. Nick Hofmann, with Lakenheath's 48th Fighter Wing, conducts an aircraft exhaust inspection.



USAF photo by SSgt. Colette Bennett

William Tell Scorecard

Major Command	Top Team	Top Aircrew	Top Element	Top Weapons Director Team	Top Maintenance Team	Top Weapons Load Team
ACC	37,595.5	15,304	8,195	11,200	8,905	2,186.5
AETC	36,349.0	13,294	7,683	10,750	10,345	1,960.0
ANG	37,790.5	14,579	9,007	9,275	11,390	2,546.5
PACAF	39,834.5	18,931	9,418	11,150	11,160	3,593.5
USAFE	36,914.0	13,308	7,926	9,900	11,315	2,391.0

Top Team PACAF **Top Aircrew** ACC **Top Element** PACAF **Top Gun** Capt. Pete Fesler, PACAF

Profile I PACAF

Two F-15s vs. four aggressors

Profile II ANG

Two F-15s attack a drone, firing live AIM-120 and AIM-9 missiles

Profile III ACC

Four F-15s vs. an unknown aggressor force

Profile IV ANG

Each F-15 fires 20 mm gun at a towed target

Profile V AETC

Operation Noble Eagle scenario, two F-15s scramble to intercept an intruder

Top Weapons Director Team ACC

Top Scope Capt. Daniel Wrazien, ACC

Top Maintenance Team ANG

Top Weapons Load Team PACAF

Each weapons director team has two directors. They normally work aboard surveillance aircraft such as the E-3 Sentry or E-8C Joint STARS and direct fighters to enemy aircraft. During William Tell, the directors work in a computer-packed building at Tyndall.

In photo at right, TSgt. Adam Melerski (left), a weapons director with the Oregon ANG, directs Air Guard F-15C pilots to targets. To his right, SrA. Jonathon Dennis monitors the action, serving as a safety observer. Dennis is with the test support squadron at Tyndall. Below, Melerski continues the action.



During the meet, each team's designated weapons directors compete in every flight profile except Profile IV Combat Banner, in which pilots fire their guns at a 40-foot-by-8-foot banner towed by a Learjet.

USAF photo by TSgt. Ben Bloker

USAF photos by SSgt. Josef Cole

Officers and enlisted members of Tyndall's Tabulation and Verification Office review computerized score sheets used during the competition. The office then posts all scores.

To determine the Top Team, the evaluators total the points from Profiles I through V as well as those awarded to maintainers and weapons directors and loaders.



USAF photo by SSgt. Josel Cole

USAF photo by SSgt. Dennis J. Henry, Jr.



Below, SrA. Mike Raimondo, SSgt. Jacob Watson, and A1C Joseph Ragadio, weapons loaders with the 1st Fighter Wing, carry an AIM-9 missile to a waiting F-15.

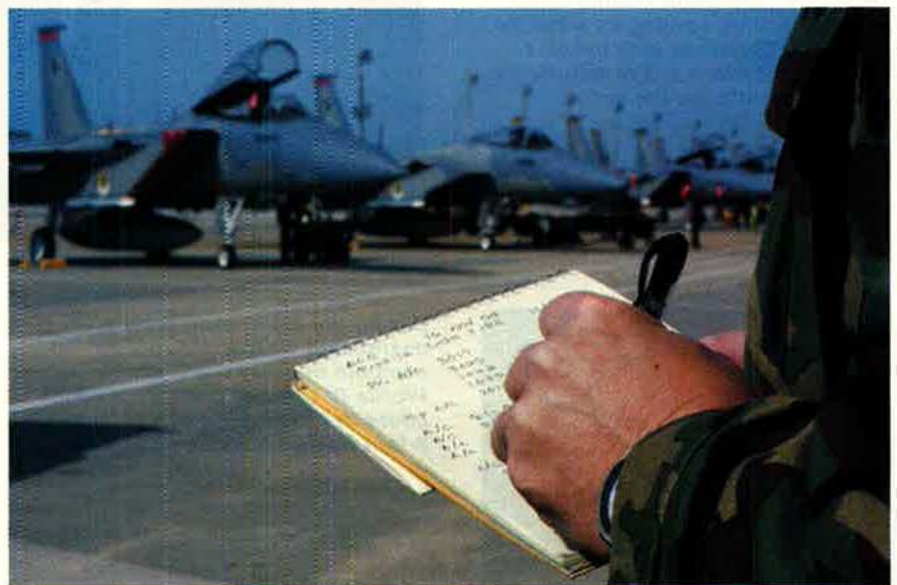


USAF photo by TSgt. Ben Bloker

The weapons load competition consists of two static munitions loads. The teams begin with 5,000 points, from which evaluators deduct points for violations of safety procedures, noncompliance with technical orders, and so forth.

Above, SSgt. Jason Phillips, TSgt. Mark Pyle, and MSgt. Ken Harris, a team from ANG's 142nd Fighter Wing, lift a missile off a fighter.

At right, SMSgt. James Dean, a competition judge, marks his evaluation of the 1st Fighter Wing.



USAF photo by A1C Daniel DeCook



Above, during Profile V—a simulated Operation Noble Eagle nighttime scramble—a pilot climbs into his F-15C as crew chiefs get the fighter ready for takeoff.

The five flying profiles rely heavily on aircraft maintainers, who are judged daily on their procedures and aircraft performance. Individual maintenance teams can earn a total of 2,500 points per profile.

At right, members of Tyndall's 95th Aircraft Maintenance Flight work on a wing aircraft for the competition.



At left, CMSgt. Pete Romeo, a judge, discusses rules with ANG team members before the live ammunition load competition.

At right, SSgt. Nick Pomonis, a 95th AMF crew chief, preflights an F-15.



USAF photo by SSgt. Josef Cole



At left, one of the "bad" guys, flying an F-16 from the 64th Aggressor Squadron at Nellis, prepares to take off.

Below, one of the QF-4 "aggressors" from Tyndall's 82nd Aerial Targets Squadron takes off.



USAF photo by SSgt. Tanika Bell

At right, Capt. Kevin Wenger, from USAFE's 48th Fighter Wing, signals to crew chiefs before brake release.

Teams from USAFE and PACAF were the only ones to employ the AIM-9X, the latest version of the Sidewinder missile.

PACAF's 3rd Wing was the first operational unit to receive the AIM-9X and its accompanying helmet cueing system and the new V2 electronically scanned radar array.



USAF photo by SSgt. Colette Bennett

USAF photo by TSgt. Ben Bloker



At left, an F-15C pilot from Lakenheath launches an AIM-120A AMRAAM at a subscale drone during a live weapons-fire event.

Arranging the 2004 competition was the task of Tyndall's 53rd Weapons Evaluation Group, whose commander, Col. Derek Hess, said the unit's airmen pulled it together over the past year "all without skipping a beat doing our normal mission."



USAF photo by TSgt. Ben Bloker

Above, an F-15D that collects telemetry data returns from a live weapons-fire exercise.

During Profile II, a live-fire test, two-ship F-15C teams were judged on their ability to launch AIM-120A and AIM-9M missiles at subscale drones.

At right, TSgt. Michael Long, a crew chief with ANG's 142nd Fighter Wing, prepares his fighter for launch.

Below, 1st Fighter Wing pilots check score posting via a video feed.

At right, below, ANG F-15s await takeoff.



USAF photo by SSgt. Dennis J. Henry Jr.

USAF photo by TSgt. Ben Bloker



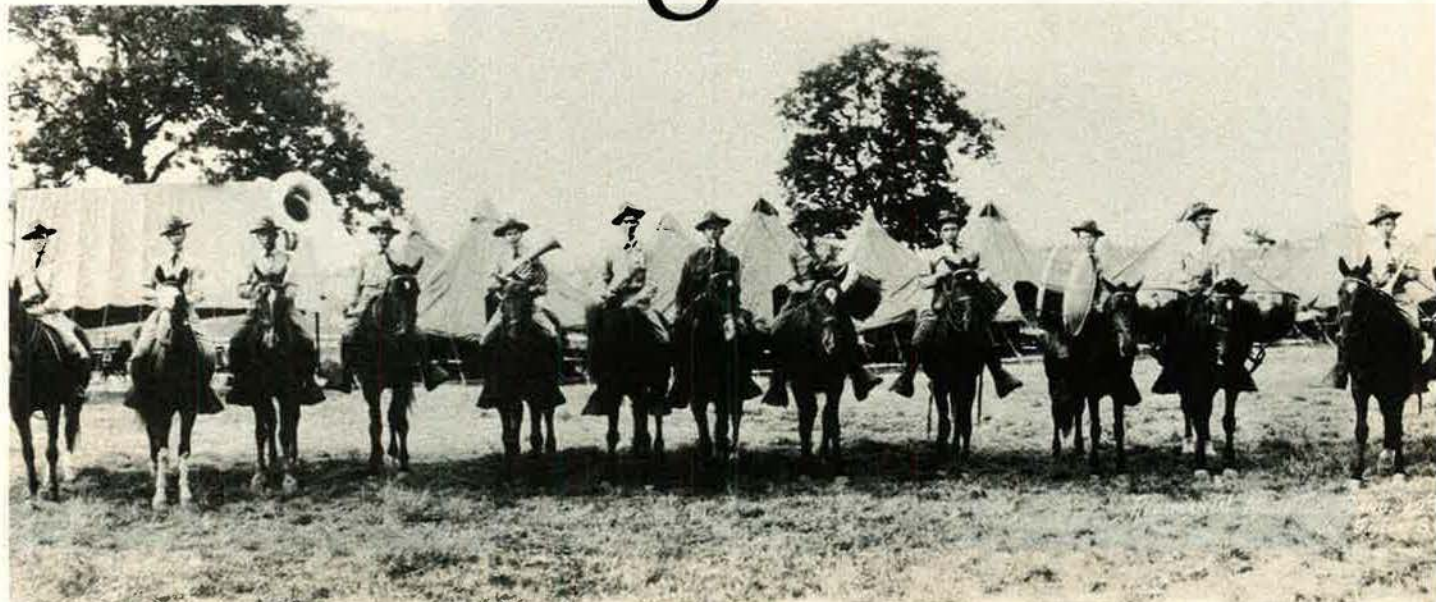
USAF photo by SSgt. Dennis J. Henry Jr.



Competition director Lt. Col. Edward Nagler said the meet has "left its roots as an air intercept event to become an air superiority event," representing "operations today." ■

He became an Air Force leader and thinker of great distinction—but he started out as a bugler in the cavalry.

The Strategic World of



By John T. Correll

Russ Dougherty decided at age 12 that he wanted to be a lawyer. He never wanted to be anything else—until he flew a B-29 in World War II.

After the war, he went home to Kentucky and resumed his legal studies, but it wasn't the same.

"While I was in law school, I recognized that I had fallen in love with flying big airplanes," he said. "That profession had more appeal to me than the law."

Nevertheless, he went into the inactive reserve and completed law school before going back into the Air Force. For a few years, he juggled two career paths, flying airplanes while practicing as a judge advocate. Eventually, he chose flying and gave up the legal specialty.

He spent the next three decades in the thick of the Cold War.

In the 1950s, he was in Strategic Air Command when Gen. Curtis E. LeMay was building it into the most awesome striking force the world has ever known. In the 1960s, he was in the Pentagon during the Cuban Missile Crisis and the struggles with Secretary of Defense Robert S. McNamara and his doctrine of "assured destruction." Pentagon assignments were interspersed with duty in Europe, where NATO was squared off against the Soviet Union and the Warsaw Pact.

In the 1970s, he was Air Force deputy chief of staff for plans and operations, commander of SAC's 2nd Air Force, and chief of staff of NATO's Allied Command Central Europe. From 1974 until his retirement in 1977, he was commander in chief of Strategic Air Command at a time when the Soviets were

deploying one new ICBM after another.

Along the way, Dougherty gained a reputation as one of the Air Force's best thinkers and planners. He was—and is—a leader who was held in exceptionally high regard by those he led.

James M. McCcy, the senior enlisted advisor at SAC during the Dougherty years (and later Chief Master Sergeant of the Air Force and National President of the Air Force Association) still has the desktop plaque that Dougherty passed out to his staff, bearing a statement he made at a conference in 1974: "There is nothing in your job description that requires you to be an S.O.B."

"Your dad chewed me out, and it took me a while to realize what had happened," an officer once told

Russell E. Dougherty



Dougherty's daughter, Dede Ralston. "He had time for everyone—janitors, chock pullers, secretaries, and Secretaries," said Brett M. Dula, Dougherty's aide in the 1970s (and later a lieutenant general and vice commander of Air Combat Command).

After retirement, Russ Dougherty was a senior statesman whose opinion carried particular weight in the power circles of Washington. He was executive director of the Air Force Association, continued his affiliation with such organizations as the Atlantic Council and the Defense Science Board, and joined the international division of a major law firm.

Six universities presented him honorary degrees and the University of Louisville named a building after him. The most recent honor was an award



Gen. Russell Dougherty rose from a 15-year-old cavalry bugler in 1935 to the four-star commander of mighty Strategic Air Command in 1974. He gave up a law career after flying B-29s in World War II.

last fall, for lifetime achievement, from the Air Force Association.

It was a remarkable career, and it all began in the 123rd horse cavalry of the Kentucky National Guard.

Bugler

Russell Elliott Dougherty was born in 1920 in Glasgow, Ky., a town in the southwestern part of that state. It was the county seat, with lawyers bustling all around the Barren County courthouse. Young Russell sometimes attended trials there, which he later recalled as both entertaining and inspirational.

A judge who lived next door was a further influence on him, and he decided at an early age to pursue a career in law. But that came later.



Lt. Russell Dougherty (top photo, front left) was aircraft commander for this B-29 crew in 1945. Lt. Tennessee Ernie Ford, a bombardier, is behind Dougherty. The famous singer (bottom photo, left) and Dougherty became lifelong friends.

In 1935, the 123rd Cavalry of the Kentucky National Guard was in need of a bugler. The commander of the headquarters troop was Capt. Sam Sears, cashier of the local bank in Glasgow and a distant relative.

He knew that young Russell Dougherty played a trumpet in the high school band and elsewhere around town. Russell's age—he was 15 at the time—was an issue soon overcome, and he was enlisted in the cavalry. That year, he went to summer camp at Ft. Knox, bugled, and took care of the captain's horse. He stayed in the cavalry through high school and college.

He also continued with his music.

He paid his way through school as the trumpet player and manager of a dance band.

"The thing in my lifetime that gave me the greatest satisfaction of anything I ever did was that I was able to go four years to college and three years to law school and never cost my parents a penny," Dougherty said.

Another member of the band was Billy Vaughn, born in Glasgow a year before Dougherty and destined to become a famous bandleader in the 1950s. Sometimes a songstress from Nashville—Dinah Shore—sang with them.

However, the singer that caught

Dougherty's eye was Geralee Shaaber of Louisville, who appeared with the band at a fraternity dance one night. She was engaged to someone else, but the persuasive young trumpet player "managed to disengage her." They were later married, when Dougherty was a lieutenant in the Army Air Corps.

He graduated from Western Kentucky University in 1941 and went to Washington to study law and take a job with the FBI. He had not gotten very far along with it when World War II began.

Airman and Lawyer

At the outbreak of war, Dougherty joined the aviation cadets and got his wings and a commission in the Army Air Corps in 1943. At first, he was an instructor pilot in Air Training Command and was later assigned to 3rd Air Force in crew and instructor duties as a B-17 pilot.

When the B-29, the most advanced bomber of World War II, came along, Dougherty qualified for it. His bombardier was a first lieutenant from Sullivan County, Tenn., Ernest Jennings Ford, who later made a name for himself in show business as Tennessee Ernie Ford.

When, in 1986, Dougherty organized the "Gathering of Eagles" in Las Vegas for the Air Force Association, Ernie Ford was there to lead in the singing of "Off We Go Into the Wild Blue Yonder."

At the end of World War II, Dougherty went into the inactive reserve and entered the University

of Louisville law school. In 1946, he accepted the offer of a regular commission, having been assured he could stay in law school to graduate and take the Kentucky bar exam. He was attached to Ft. Knox with duty station at the law school but was soon asked to take on an additional duty as unit instructor and operations officer of the local Air Force reserve training detachment.

"Soon after I took over this unchartered additional duty, there arrived at Standiford Field—my tiny command, one master sergeant and 10 junior sergeants—10 AT-6s and two C-45s," Dougherty said. "I was given a roster of names and instructions to get in touch with them, and anyone else who had served in World War II who was interested in maintaining an association with the AAF. I was authorized to requalify them in our training aircraft and to begin to build the nucleus of a reserve air transport wing."

Dougherty graduated from law school in 1948 and was assigned to the bomb wing on Guam. He turned the Standiford Field unit over to his replacement, Capt. David C. Jones—later Chief of Staff of the US Air Force and a lifelong friend of Russ Dougherty's.

On Guam, he flew with the 19th Bombardment Wing and also served as a judge advocate. He returned home as a procurement and contract attorney for Air Force Materiel Command. In 1952, he left the legal specialty and entered aircrew refresher training for his return to operations.

It would be more than 30 years before he returned to the legal profession, but his education and experience in law would always remain strong influences on him. For example, he kept a strong belief—which could be attested to by anyone who was ever careless in drafting a paper for him—that words are important.

"If you don't think so," he said, "just try writing a very binding will and use your own language, easy to read, simplistic language, and find out how much trouble you create for the person whose will you just wrote."

Cold Warrior

Dougherty spent the next six years (1953-59) in operational assignments in Strategic Air Command. This was

the time in which LeMay was building SAC from the poor and ineffective shape in which he had received it into the most famous organization of the Cold War.

"I probably wouldn't want General LeMay as my children's Sunday school teacher, but that wasn't his job," Dougherty said later. "I consider him the best wartime general we've ever had in the United States Air Force."

Dougherty, by then a major, took refresher training on the B-29, which SAC was still flying, although the huge B-36 by then was the first-line strategic bomber. Over the next few years, these propeller-driven bombers gave way to jets, first the B-47 and then the B-52. Dougherty qualified in the B-47 in 1954.

He progressed through a series of assignments that included command of a bomb squadron and culminated with a tour as deputy director of operations at 15th Air Force. When he left in 1959 to attend the National War College, Dougherty was well experienced in planning and command as well as operations.

He was also steeped in the strategy of deterrence in which the overriding objective is to prevent war by possessing enough military power to forestall enemy attack or aggression.

It was at the War College that Dougherty first encountered the legendary Col. George A. Lincoln of

the West Point faculty. As a visiting speaker, Lincoln talked about the formula for successful deterrence: Capability X Will = Deterrence.

Lincoln "emphasized that this is a proposition in multiplication, not in addition, for if either of the essential factors is zero, then the product—deterrence—is also zero," Dougherty said. Neither capability nor will, in whatever strength, is sufficient in the absence of the other. In subsequent years, Dougherty cited and built upon Lincoln's formula and made it one of his major themes when he spoke.

Over the next decade, Dougherty was assigned to the Pentagon four times, mostly in duties where joint and allied operations were central concerns. As a staff colonel during the Cuban Missile Crisis, "I made trips back and forth carrying pictures and carrying things to the White House," he said. He was in a position to see and learn.

As an Air Force planner, he had a part in the clash between the services and Secretary of Defense McNamara over what came to be known popularly as Mutual Assured Destruction, or MAD.

The Air Force advocated a "counterforce" targeting doctrine, in which the targets were military forces and assets rather than population centers. McNamara and his followers believed that counterforce was pointless and argued that the only way to deter was a balance of nuclear terror, with each



After World War II (and law school), Dougherty served with the 19th Bombardment Wing on Guam. Major Dougherty is pictured here during a stopover at Pusan AB, South Korea. He would soon return to SAC.

side holding an “assured destruction” capability over the other.

Nevertheless, MAD did not actually make it into the war plan, which continued to reflect a preference for counterforce. “We never really targeted a city as such,” Dougherty said. “We had many targets, discrete targets inside a city, the effect of which could be to destroy that city by peripheral effects. As our weapons got better, as our accuracy got better, we could limit that collateral damage very considerably.”

Dougherty’s Pentagon assignments were interspersed with duty in Europe, where he was twice assigned to US European Command in planning and policy jobs. He became a confirmed Atlanticist and made many lasting friends in Europe and NATO.

In 1970, he returned to the Pentagon as a three-star general and Air



When Dougherty assumed control of SAC, the command had 150,000 airmen; 1,200 nuclear-capable aircraft; and more than 1,000 ICBMs. In 1977, he flew the first B-1A strategic mission simulation.



Pictured here with USAF Gen. David Jones, Chairman of the Joint Chiefs of Staff, Dougherty vigorously advocated nuclear force modernization to meet the Soviet challenge in strategic arms.

Force deputy chief of staff for plans and operations. A year later, he took command of 2nd Air Force at Barksdale AFB, La. It was USAF’s largest numbered air force, consisting of the majority of SAC’s B-52s and KC-135 tankers.

In 1972, he received his fourth star and went back to Europe as chief of staff of NATO’s Allied Command Europe.

CINCSAC

In August 1974, Dougherty became commander in chief of Strate-

gic Air Command, the job for which he had been preparing, in one way or another, since his bomber pilot days in World War II.

SAC in 1974 had about 150,000 people, 1,200 airplanes, and more than 1,000 land-based ballistic missiles. The United States had adopted a policy of detente—or a lessening of tension—with the Soviet Union and was pursuing the objective of “essential equivalence” with Soviet strategic capabilities and power.

The Soviets, however, were aggressively improving their strate-

gic nuclear force, especially with large ICBMs armed with multiple warheads. The strategic advantage the United States had previously enjoyed was fading. The Soviets had more missiles and more throw weight. The United States had more bombers and more accurate warheads.

SAC had recently added the Short-Range Attack Missile (SRAM) as a standoff weapon for its B-52s and was deploying Minuteman III missiles with multiple independently targeted re-entry vehicle warheads to replace the Minuteman I ICBMs.

A prototype for the B-1A bomber made its first flight in December 1974, four months after Dougherty’s arrival, flying with the SAC shield and band painted on its nose.

As CINCSAC and US director of strategic target planning, Dougherty worked with Secretary of Defense James R. Schlesinger and others on more-precise strategic targeting options for SAC’s nuclear weapons, moving further from McNamara’s assured destruction theories of the 1960s.

In early 1977, Dougherty flew as pilot on the first full-length, simulated strategic mission of the B-1A bomber, of which he was a strong supporter. However, the new President, Jimmy Carter, canceled the B-1A in June 1977, a month before Dougherty’s retirement.

Dougherty had grown up in big bombers, but he took great interest

and pride in SAC's ICBM force. After a visit to the missile wing at F.E. Warren AFB, Wyo., in 1974, he said later, "I recognized that the ballistic missile force had turned a major corner in the two years I had been away. Our missile crews had come into their own. ... They were Air Force missileers and proud of it, with their own uniforms, new traditions, and professional expectations."

The CINCSAC was a night owl—had been ever since his dance band duties kept him up late during college—and he was a frequent visitor after midnight to the SAC command post. He enjoyed checking in with SAC people on duty around the world at 2 a.m. or 3 a.m.

In those days, Dougherty said, SAC maintained a fairly constant level of communication all the time because the Soviets were known to be monitoring the volume and watching for a sudden increase. "We kept a level of communication that was far more than we needed so that when we did need to communicate, it didn't raise red flags," Dougherty said.

Another reason, probably, was that the CINCSAC liked to talk with members of the command, whenever and wherever he found them.

Tom Domingues, his aide in 1976 and 1977, said that Dougherty "was always accessible, especially to the troops in the field—almost to a fault for those of us who were trying to meet published base visit timelines. He made us proud to be involved with the profession of keeping the nuclear peace. His standard departing comment at the end of the day to the office staff was, 'Good night, good people. I couldn't do it without you.'"

"General Dougherty hardly ever closed his door to his office, and his desk sat so that he could see who was in the outer office," said McCoy, the SAC senior enlisted advisor. "He drove his executive officers crazy because, when he would see someone standing there, he would call them in and simply ask them how they were doing."

Interested as he was in the strategic mission, Dougherty never forgot the importance of people or of making the command a good place to serve.

"I asked dad once what he was most proud of as the SAC com-

mander," said his son Mark. "He said planting trees. That wasn't the answer I expected, but that's what he was most proud of, planting trees at northern tier SAC bases."

Nor did he ever lose his love of aviation. He had flown most of the operational aircraft of the Air Force, from B-17s, B-25s, and B-29s of World War II to the B-52, KC-135, U-2, SR-71, and the F-15. Years later, Mark Dougherty said, "We counted the number of airplanes he had flown once, and I believe it was around 74."

Dougherty retired from active duty in 1977 after 35 years of commissioned service.

Thinker and Teacher

In retirement, Dougherty continued to speak and write. He was often interviewed and consulted. His roles as leader, planner, and strategist were well-established, but, in addition, new generations of airmen came to know him as a teacher with special insights.

"He wrote all his own speeches, longhand, on yellow legal pads," Mark Dougherty said. Among the views he expressed were these:

■ On long-range combat aircraft (1984): "Some years ago, I was accused by a close military associate of advocating a long-range combat aircraft of such conventional versatility that, in his words, it could 'deliver hay to the yaks in Katmandu.' We do not know on which day or to what remote corner of the world it may suddenly be in our nation's interest to put a platform carrying sensors, weapons, or, if it is in our national interest, hay for the yaks in Katmandu."

■ On the alleged "overkill" of nuclear weapons (1986): "Consider the capability of No. 6 shot in a 12-gauge shell, which you would use if you were hunting ducks. Each shell contains about 300 pellets. You could conclude that's 300 times overkill for a single duck, or maybe enough to kill 300 ducks with one shell. That's the analysts' approach, but that's not the way the ducks line up. And to apply the analogy to military capabilities, that's not the way the targets line up, either."

■ On the greatest changes in airpower (1996): "Some of you will remember that during my tenure as CINCSAC, I said, on numerous oc-



Dougherty worked closely with Defense Secretary James Schlesinger, shown here on a visit to SAC headquarters at Offutt AFB, Neb. Schlesinger and Dougherty agreed that the US needed more-precise strategic targeting options.



In 1980, a retired Dougherty became the Air Force Association's executive director. He is shown here in 1984 with retired Army Gen. William Westmoreland, former commander of US forces in Vietnam.

casions, that the greatest changes in capability of our Air Force aircraft during my lifetime resulted from 1) the jet engine; 2) air refueling; and 3) a standoff missile capability. At that time, 'standoff' weapons were the SRAM and the ALCM [Air-Launched Cruise Missile], with accuracies in the hundreds of feet. But today, the accuracy of our newer standoff missiles is measured in tens of feet."

■ On the importance of strategic access (1991): "I came up with what I considered to be the unique feature of aerospace power and it was contained in a single word—and that word was *access*. Aerospace power provides unlimited access to this world and, to an increasing degree, access out of this world. Access for whatever purpose—access for offense, access for defense, access for information and intelligence, access for political purposes, for psychological purposes, for exploration, for whatever is in our nation's interests."

■ On strategic thinking (2004): "Our military must continually evolve, and we must have people who think about it all the time. I'm not sure we have enough people thinking about it."

■ On the conventional Air Force mission (1992): "As I reflect on these past few decades, I confess that I now know that our peacetime emphasis on nuclear weapons and nuclear delivery systems dominated

our thinking—too much so. The operational ICBM force gave us the opportunity to diversify our bomber force, to equip and train for modern non-nuclear delivery. But we failed to take advantage of this, except when forced on us by war, and then backed away the minute the conflict ended."

■ On issues beyond peace (1984): "The easiest way for the United States to avoid war would be to disarm unilaterally and let Moscow have its way in the world. To most Americans, however, standing politically and economically isolated, a suppli-

cant to the Soviet Union, would not be acceptable."

Senior Statesman

After he retired from the Air Force, Dougherty did not take a full-time job until 1980, when the Air Force Association recruited him to be its executive director.

The organization fit him like a glove. Its mission was to inform the public—including the news media and Congress—about airpower and national defense. The focus was not only Washington but also more than 300 local communities where AFA had chapters.

At peak times, Dougherty made several speeches a week. He was also the publisher (and, for a short time, the editor in chief) of AFA's monthly journal, *Air Force Magazine*.

He continued in the AFA post until 1986, when he joined the international law firm of McGuireWoods LLP, where he remained until retiring in 1999.

He also served on the Defense Science Board, the Atlantic Council, and with other organizations. He was on the boards of visitors for Air University and National Defense University. For many years, until knee problems slowed him down, he was among the most popular speakers at the annual orientation for new Air Force general officers.

Honors and accolades kept com-



Dougherty was AFA's executive director until 1986 and, for a short time, was editor in chief of Air Force Magazine. He is shown here with AFA executives Ben Catlin (left) and Dave Noerr.

ing. In 1976, he was recognized as Man of the Year by the Los Angeles Philanthropic Society and was accorded the same honor in 1977 by the National Jewish Hospital and Research Center.

When the Armed Forces Communications and Electronics Association gave him its David Sarnoff Award in 1980, he surprised the crowd by pulling a bugle out of a bag he had brought and tooting off several bugle calls from the rostrum. This was to demonstrate that he was a communicator.

The Air Force Academy gave him its Thomas D. White National Defense Award in 1983. He was named an "Old Master" by Purdue. And the list went on.

He went back often to his home state of Kentucky, which remembers him with pride and fondness.

In 1987, the governor of Kentucky presented him with the state's Distinguished Service Award. Dougherty has also been designated by the governor as an Outstanding Alumnus of Kentucky.

Last October, the whole family went to Lexington, Ky., where retired Air Force Gen. Joseph W. Ralston (born in Hopkinsville, Ky.), formerly NATO's Supreme Allied Commander Europe, was inducted into the Kentucky Aviation Hall of Fame. Ralston was presented by his father-in-law, Dougherty, who had been similarly inducted in 1998.

Life's Great Adventures

Since retiring from the Air Force, Dougherty has made his home in Arlington, Va. Staying in one place for that many years was a big change from his military service, when the interval between assignments was short.

"It is always an exciting time to be on the move," Dougherty said. "In my family, we had a corny, trite tradition that grew up throughout our 35 moves in 35 years, mostly with children. As we pulled away, in the aftermath of the moving vans, I would say, 'OK, children, OK, Mom, here we go, off on another one of life's great adventures.'"

Part of the tradition was for the



Photo courtesy of Mark Dougherty

Dougherty keeps up with defense issues and stays active in Air Force Association events. His family is Air Force through and through—sons Mark (shown here with his father) and Bryant followed him into USAF, and his daughter, Dede, is married to retired Air Force Gen. Joe Ralston, a former Supreme Allied Commander, Europe.

younger Doughertys—Diane, called Dede, and the twins, Bryant and Mark—to then hoot in derision.

"Well, a few years ago we were at my daughter's house at Bolling," Dougherty said. "She and Joe were on their way to Alaska. Son Mark and his family were on their way to Turkey. Out at the edge of the grass, standing by our cars, Mark and Dede blurted out in unison, 'Well, here we go, kids, off on another one of life's great adventures.'"

"His family was his only hobby," Mark Dougherty said. "No golf, no hunting. Just work and family. My identical twin brother and I—Bryant was also a fighter pilot; he died of a melanoma in 1990 when we were 38—had the good fortune to follow him into the Air Force, so our personal and professional lives crossed and became intertwined, [and] when my sister Dede married Joe Ralston (they went to Miami University at Oxford, Ohio, together), our family truly bled Air Force blue.

"Bryant's wife was an Air Force cop when he met and married her. She just retired from the Air Force Reserve as a colonel. My wife is an Air Force brat. She and I have spent our entire lives associated with the Air Force in one way or another."

After Geralee Dougherty died in 1978, Russ Dougherty married Barbara Brooks of Birmingham, Ala. "Barbara has been his wife ... for 26 years," Mark Dougherty said. "Dad called my sister up to ask her, is it OK to go out on a date with Barbara, who sold them the house they still live in in 1977. The rest is history."

Dougherty keeps up with Air Force and defense issues. Several times a month, friends and colleagues receive a thoughtful e-mail from him, often with an article or report attached, and often dispatched at 3 a.m.

He puts about the Arlington town house amid papers, books, and printouts from his trusty computer. Nearby, on the bar, next to the big jar of salted nuts, is a bugle.

For the former horse cavalry trooper from Glasgow, Ky., the past and the present blend seamlessly with the future into life's great adventures. ■

John T. Correll was editor in chief of Air Force Magazine for 18 years and is now a contributing editor. His most recent article, "Disunity of Command," appeared in the January issue.

Top Air Force leaders gathered at AFA's Los Angeles symposium to ponder the future course of military space.

Space— The Next 50 Years

By Peter Grier

“WE LOOK at space support like oxygen. If you have it, you take it for granted. If you don't have it, it's the only thing you want.”

So said James G. Roche, then Secretary of the Air Force, at the Air Force Association's 2004 Los Angeles National Symposium, which commemorated the Air Force's 50 years of involvement in military space and missile activities.

Speakers noted that the service has come a long, long way from the days when it was racing to counter the Soviets early in the Cold War. Space is no longer a mysterious entity whose value has to be sold to top Air Force and Pentagon officials.

Secretary James G. Roche

As Roche's comment made plain, space systems are now so interwoven in US military operations that all forces might grind to a halt without them.

USAF puts the start of its space endeavor at July 1, 1954. On that date, Lt. Gen. Thomas S. Power, commander of Air Research and Development Command, ordered the establishment of Western Development Division (WDD), in Inglewood, Calif., under command of Brig. Gen. Bernard A. Schriever. WDD became the fountainhead of missile and, later, space systems.

Today, Air Force operations are on the verge of a grand transition, said Roche. Some old and tested systems

will be left behind. For example, 2005 will bring the last launch of a Titan rocket after nearly 50 years of successful operations. The future will belong to systems such as Evolved Expendable Launch Vehicles, intended to provide better and cheaper medium-to-heavy lift capacity.

Yet the progression in space systems over the last half-century has not been as dramatic as it has been in air systems, according to Roche. Satellites may be more complex, and electronic technology may be far beyond what was available in 1954, but the Air Force still relies on a few legacy launch systems and sites.

“You'll find in many ways, we are doing business much the same way as we did 50 years ago,” said Roche.

The challenge will be to change the image of space resources as separate items far removed from Earth. They are as much Earth-bound capabilities as they are physical assets in space.

Thinking about them in this way means that the first question in space operations will not be what new technology we can develop. It will be: What do combatant commanders need that we can provide?

As researchers work on very high altitude aerostats and unmanned aerial vehicles, the Air Force needs to consider how to bridge the gap between the atmosphere and space.

“The physical differences between space and atmosphere will always

exist, but the operational distinction probably should disappear over time,” said Roche. “You're just talking about altitude, after all.”

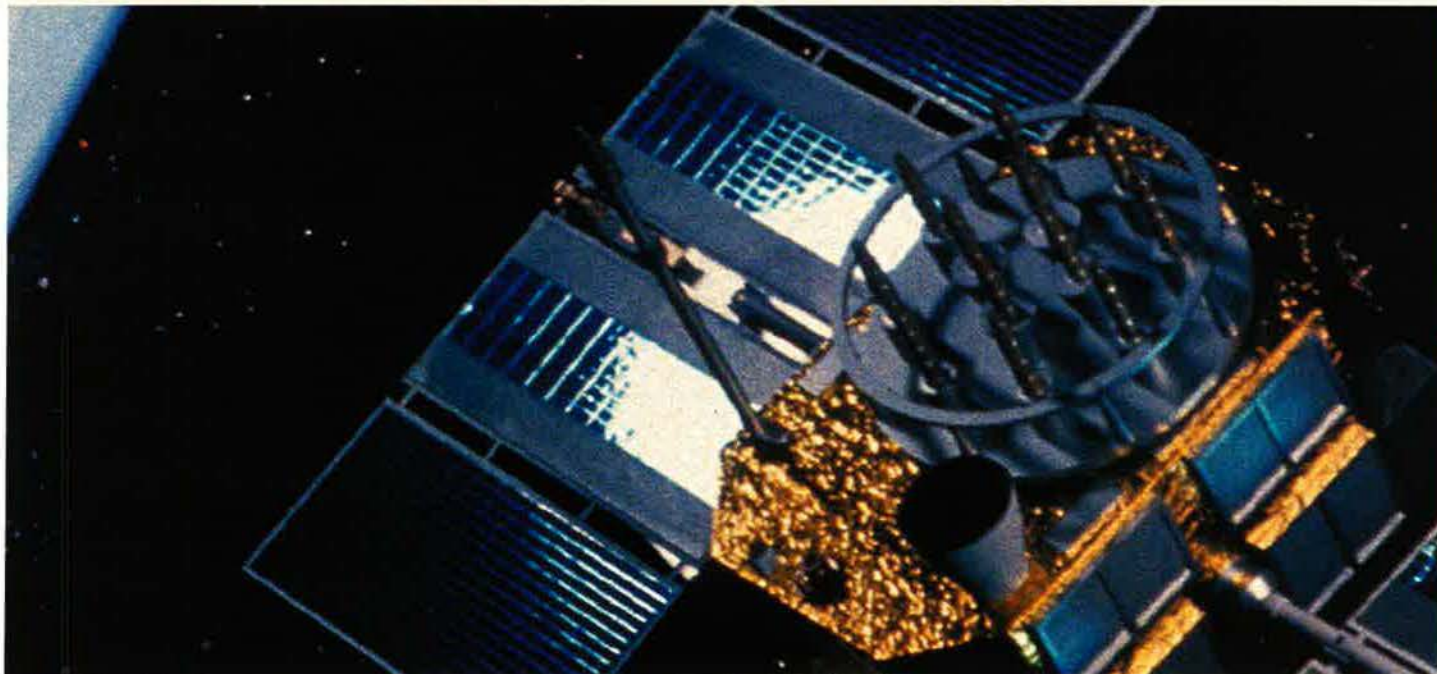
Gen. Lance W. Lord

Gen. Lance W. Lord, commander, Air Force Space Command, dedicated his remarks to the legendary space pioneer, Schriever. As the founding commander of the Air Force Western Development Division, later the Ballistic Missile Division, Schriever took the Thor ICBM from concept to deployment in four years, 1955 to 1959, while simultaneously working on Atlas, Titan, and Minuteman. At another point, he persevered with the nation's first reconnaissance satellite program, despite the fact that it failed a dozen times before it launched a success.

“We can't contemplate that now, a dozen failures. ... We're just not that tolerant any more,” said Lord.

Schriever may have been one-of-a-kind, but there are still great people pushing forward in his spirit. Capt. Jeremy Walker of the 2nd Space Operations Squadron, 50th Space Wing, at Schriever AFB, Colo., is one. Walker and his nine enlisted personnel were on alert, fine-tuning the GPS constellation throughout the November 2004 US offensive in Fallujah, Iraq—helping to make sure the marines who went house to house knew where they were.

Then there is SSgt. Dan Levy, who works on space superiority issues at



the Space and Missile Systems Center, Los Angeles AFB, Calif. Deployed to Iraq to help train the Iraqi Army in intelligence information, Levy was riding the second-to-last vehicle in a convoy that was ambushed from behind. He and his fellow passengers dismounted, took up defensive fighting positions, destroyed the enemy, and got the convoy going on its way.

As a result, Levy was awarded the Bronze Star by an Army two-star. It was the first Bronze Star the general had ever given and it went to an Air Force NCO, Lord told AFA attendees.

The leadership of key people is helping the space acquisition system move forward, said Lord. Some may complain that most space systems are broken in the acquisition process, and indeed, some decisions made 10 to 15 years ago are today coming home to roost.

"But I'll tell you that [Lt. Gen. Brian A. Arnold, SMC commander] and his team ... are working hard together to make sure that those chickens don't sit down too long, and we're making chicken stew out of some of them," said Lord.

Looking toward the future, the framework for the space business will be based on two words: space superiority. The US wants to make sure it protects the asymmetric advantage it has gained by dominating the space high ground.

Three items will underpin this su-

periority, said Lord. The first will be space situation awareness, the capability to monitor the medium and see and understand who's out there.

"You don't have to be a peer competitor of the United States to be involved in space operations and to have capabilities, so it's something we really need to think about," said Lord.

The second foundational item will be a defensive counterspace mind-set. Space operators cannot assume the medium they are working in is benign.

Lastly, offensive counterspace will be part of the effort. The Air Force now has a countercommunications capability that has reached IOC, with its point being to deny the use of space against US forces. (See "Toward Supremacy in Space," January, p. 22.)

"That's with a reversible effect. But make no mistake about it, if something happens and troops are getting killed because somebody's trying to use space against us, we will do more than [apply] reversible effects," said Lord.

Lt. Gen. Brian A. Arnold

Lt. Gen. Brian A. Arnold, commander, SMC, reminisced a bit about the history of US military space programs. Western Development Division first set up shop in a little schoolhouse in Inglewood in the summer of 1954, he said. After a short while, the program's budget began to drift downward, but then the Russians launched Sputnik in 1957, and back up it went.

"I was told by some of the gray-beards that, 'geez, you know, we used to launch a lot more.' Well you did, but they didn't last as long; and secondly you had a lot more failures," said Arnold.

Many of today's satellites are lasting 10 and upward of 15 years, the head of SMC pointed out. For instance, GPS-IIR 13, launched Nov. 6, replaced a satellite that was put up in 1992.

Satellite durability is just one of many successes in US space development. Another is the reliability and readiness of the nation's ICBMs, even as they undergo major modifications.

Today's Minuteman IIIs maintain "about a 99 to 100 percent alert rate every single day for all 500 of those ICBMs on alert," said Arnold.

Boosters used to lift satellites into space have been showing tremendous reliability, as well. As of mid-December, the Air Force was approaching 39 successful launches in a row.

Typically, the service used to launch a rocket only once out of every 10 attempts. The Air Force has shifted its focus to successful launches rather than making a schedule. That new focus has saved four missions.

So to those who complain that space systems are broken and acquisition is in trouble, Arnold has one thing to say: Look up. The Defense Support Program warning satellite constellation is the healthiest the US has ever seen. With 30 operational

Martin's Dictum: Be Fast. Stay Connected.

Gen. Gregory S. Martin, commander, Air Force Materiel Command, noted that the entire Air Force acquisition process—*not just space programs or air programs*—is under significant scrutiny due to the problems involving the tanker lease deal with Boeing.

That's just one of the challenges today's midlevel personnel will face as their careers progress over the next 10 to 15 years, said the AFMC chief. Another will be threat projection. Today, global terrorism and small unit insurgency are planners' focuses, but the US military cannot lose sight of the fact that it must protect the nation against an array of possible foes.

"We don't know in 10, 15, 20 years that we won't be dealing with a coalition of forces that for one reason or another has decided to align itself against the United States, that with the transferability of technology, that they won't find some sort of

asymmetric advantage, some niche, that could cause us difficulty," said Martin.

In terms of precision power projection, there are a number of things that the Air Force today doesn't do as well as it would like. These include constant battlespace surveillance, tracking of mobile targets, and the ability to react quickly once mobile targets are spotted.

Martin cited a real world example: At one point during the combat operations that preceded the fall of Baghdad, US intelligence thought they had good indications that Saddam Hussein was conducting some sort of meeting in a restaurant. From the time a B-1 received orders to target the area, to the time the restaurant was destroyed, was only 11 minutes.

The problem was that it took 35 minutes for the intelligence to travel up through the chain of command and the order to fire to travel back down. Total elapsed time from tip to bomb release was 46 minutes. The real target, Saddam himself, got away.

GPS satellites, the Air Force has reached the limit of its ground control systems capability.

"So when we put the next one up, we're going to have to de-orbit one or put it in silent mode and put it off to the side or something because we only fly 30," said Arnold. "That is the best we have ever had."

Space and Missile Systems Center still faces challenges, of course. Among them is the pace of acquisition, which has never been greater. In 1992, the Air Force was developing 16 major space programs; today it is working on 32. It is doing so with one-third fewer active duty personnel, following a decade of turmoil caused by various acquisition reform efforts.

Overall, the budget has grown from about \$3.5 billion in 1992 to a projected \$10.5 billion for 2008.

That's a "remarkable ramp" while downsizing the number of people, "so we really need to keep our eye on the bubble," said Arnold.

Space development is different from aircraft development, after all. For one thing, it requires much more money up front, early in a program's life cycle—70 percent, as opposed to 27 to 30 percent for air. There is less margin for development error. There are no taxiing tests, and you can't fly a booster around the airfield and land it if a warning light goes on. The first time the Air Force sends a satellite up, it's generally an operational satellite.

Lastly, the Air Force buys space systems in small numbers. If there's a cost overrun, USAF can't just shrink the size of the program.

"We don't have that ability, so we have to absorb that shock, if you will," said Arnold.

Gen. Thomas S. Moorman Jr.

Gen. Thomas S. Moorman Jr., USAF (Ret.), a vice president with Booz Allen Hamilton and former AFSPC commander, said that these are unique and exciting times to be in the space business. The reason: Virtually every US military space system is in the process of being replaced.

Aircraft modernization has taken place by decades, with the fighter force renewed in the 1970s, bombers in the 1980s, and transports in the 1990s.

"In contrast, the entire [space] inventory is being changed out," said Moorman.

The bad news is that, at the same time, the space acquisition system is strained. Among its recent challenges have been requirements creep, under-budgeting, cost-centric decisions, and an erosion in the experience level of management.

"All those have worked together to create some acquisition problems," said Moorman.

In addition, the sheer pace of change may be outrunning available funds. The budget is not likely to grow over the next decade, said Moorman.

"What that means to me is perhaps some phasing, perhaps some tough choices," he said.

At the same time, the US military is dependent on space as never before, and that reliance is not just for current operations. The Army and Navy (as well as the Air Force) are proceeding with major force and equipment development plans that assume the existence of certain space capabilities.

"The bandwidth demands for these systems in the future ... are beyond belief," said Moorman. "What they're assuming is that we will come through with laser [communications], and we will come through on a certain timeline. That's real dependency."

Space itself is becoming more interdependent, in the sense that all its sectors—military, intelligence, civil, commercial—are increasingly intertwined. Communications is only the most obvious example. Some 70 percent of Administration communications for Iraqi Freedom go through commercial lease lines, for instance. GPS has become a kind of global utility, crucial not only to national security but to transportation, safety, and economic growth as well.

"It seems clear to me that the management of GPS ... needs to evolve," said Moorman.

Considering President Bush's vision of a return to space exploration, launch interdependence is likely to be a hot issue in coming years.

"We have to get that knowledge up the channel to the decision-makers quickly. We have to be able to then make that decision and execute it very quickly. So that's kind of what we're focused on," said Martin.

Among the capabilities AFMC is looking at to solve this problem is something that might be called always-on surveillance. This would be a system of systems, perhaps connecting Predators, Global Hawks, Joint STARS aircraft, and satellites that could hand the job of surveillance back and forth, depending on availability and the hostility of the environment.

"We have to have systems that can basically be connected and be over a place forever so that we can stare and understand the nature of that battlespace," said Martin.

Then the information gathered would have to be compiled and presented with unprecedented battlespace digitalization. In this regard, the military could learn a thing or two from the entertainment industry about human-friendly displays.

Instead of symbols—Martin called them "stickology"—modern 3-D screens ought to be able to show colored MiG-25s or F-15s or whatever so that the average decision-maker could quickly understand the battlespace picture.

"We really have to think carefully about how to present it so that humans can make decisions. ... We haven't done that as well as we should have, because in the end what's happening is we're presenting huge amounts of information in the old way," said Martin.

All this needs to be done at unprecedented speed—and followed by immediate action. If the environment is not too dangerous, that might mean a Predator can spot a target, relay information, get a decision, and fire a Hellfire, all in a minute or less. If it's a hostile environment, maybe the answer is hypersonics. Or perhaps it is directed energy, or space-based kinetic weapons.

"I'm not sure what the right answer is, but we have to pursue all of them because we're not sure exactly which one will pay off the fastest," said Martin.

Moorman insisted that the US needs a consolidated vision for access to space—it can't afford the four space sectors bumping up against each other with separate plans.

On surveillance, the military and intelligence sectors need to look past traditional roles and missions and figure out what's best for all concerned. One thing they may determine is that space based radar should be a top priority.

"I think [space based radar] is going to be like air-conditioning. We're going to wonder why we never had it before, and it will fundamentally change the way we do modern war," said Moorman.

Gen. Lester L. Lyles

Gen. Lester L. Lyles, USAF (Ret.), briefed conference attendees on the work of the Presidential Commission on Implementation of US Space Exploration Policy, on which he served. President Bush appointed the panel to take a new look at the future of the US and civil space. Their vision was outlined by Bush in a speech at NASA headquarters in January 2004: to go back to the moon and to go Mars and beyond.

"The President pulled together a commission as a way of trying to

address a viable implementation strategy for doing that," said Lyles.

The panel's work and its recommendations were shaped by the Defense Department and by the Air Force in particular. While the connection between returning to the moon and supporting troops in Fallujah may not be obvious now, it will become more so in the future, as the commonality between the sectors becomes more apparent, said Lyles.

"This is a national objective. ... It is a national vision that many, many other agencies need to be a part of," he said.

That degree of effort was the No. 1 recommendation the panel gave President Bush when it sat down with him last July. It also urged reinvigoration of the Space Council and an overhaul in NASA culture.

"They have to reach out more to the private sector, both for involvement in technology and development, but also bringing some resources to help achieve the objectives of what is necessary for this and anything else in space in the future," said Lyles.

Furthermore, NASA should restructure its centers to more closely resemble federally funded research and development centers and seri-

ously consider embracing the management process that the Air Force and the rest of the Defense Department use for space programs.

"System of systems approaches, systems engineering robustness, systems integration, bringing on lead systems integrators, spiral development—all of the things that we are practicing and using so very well in DOD space and DOD programs in general—are the kind of things that we have recommended that NASA fully embrace," said Lyles.

NASA is already adopting some positive management practices. The agency is trying to develop its own professional space cadre, such as Air Force Space Command and the other services have been doing. The Navy has loaned NASA two of its senior personnel for two years to help manage this new activity. Lyles recommended that the Air Force consider a similar arrangement, where it would loan space personnel to NASA and, in turn, take NASA personnel into the USAF space community as another means to develop professionals in space.

"I'd love to see the Air Force consider something like that also," said Lyles. ■

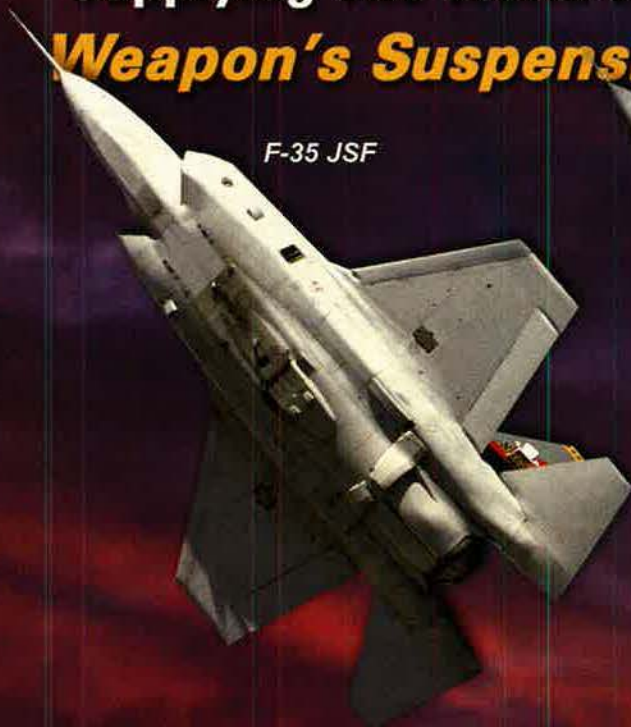
Peter Grier, a Washington editor for the Christian Science Monitor, is a longtime defense correspondent and a contributing editor to Air Force Magazine. His most recent article, "Airpower and the 'Long War,'" co-authored with John A. Tirpak, appeared in the November 2004 issue.

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It will take a while, but the Pentagon is going to get a modern personnel system.

New Day for Defense Civilians

By George Cahlink

MAJ. GEN. John M. Spiegel, until recently the Air Force's director of personnel policy, knows a thing or two about DOD civilian workers. He was deeply involved in the latest effort to transform USAF's 169,000-strong civilian workforce. He looked at new ways to hire, reward, and promote them.

He indicates that it is a gargantuan job.

"This is a multidimensional, multifaceted, multilayered process," explained Spiegel, who retired Jan. 1. In a real sense, he went on, the task is about as tough and complex as designing and developing a new fighter aircraft.

In the 2004 defense authorization act, Congress gave the Pentagon wide-ranging authority to discard its decades-old system for managing civilian workers and create a new and modern human resources management system. This so-called National Security Personnel System (NSPS), now taking shape, will modify rules governing employee rights and labor relations.

As a result, all of the Defense Department's nearly 700,000 civilian employees will, by 2009, see sweeping changes in aspects of their jobs. The change will range from how they interact with their bosses to the size of their paychecks.

The existing system and rules have long been criticized for making it hard to reward top employ-

ees, fire bad ones, and attract qualified workers from the private sector to work for the Defense Department. Pentagon leaders successfully lobbied lawmakers to make the change, arguing that such alterations were vital to military transformation goals. DOD claimed that the prosecution of the Global War on Terror demanded a more-agile workforce.

Moreover, employees of the baby-boom generation may retire en masse over the next decade, meaning that the Pentagon faces the need to hire thousands of replacement workers.

Back to the Force

Secretary of Defense Donald H. Rumsfeld said managers frequently assign uniformed military personnel to civilian-type jobs because, under today's rules, it takes too much time to move civilians into those positions.

Rumsfeld said at a press conference in November, "Tens of thousands of office jobs currently held by uniformed military are being considered for conversion to civilian positions, returning those needed military billets to the warfighting force."

Initially, Pentagon officials wanted to roll out the new system by the end of 2004, but that did not happen. DOD quickly designed a system; however, after that, the drive was slowed by federal employee unions, the Office of Personnel Manage-

ment, and lawmakers who claimed they had been shut out of the negotiations.

John Gage, president of the American Federation of Government Employees (AFGE), asked Congress to stop the "destruction of the civil service system." Sen. Carl Levin (D-Mich.), a key member of the Senate Armed Services Committee, claimed Pentagon officials had ignored the wishes of labor unions on the matter.

The Pentagon relented and scrapped plans for activating the system in 2004. Rumsfeld made Navy Secretary Gordon R. England the DOD point man in a new and more open attempt to overhaul the personnel system. England immediately slowed down the process, scheduled town-hall style meetings and focus groups with defense employees, and established working groups from each service and defense agency.

"When we are ready, we will do it, and not before," England told an audience of Pentagon workers last July. He said rollout of NSPS will be "event-driven, not time-driven."

Under the new approach, some DOD civilians will transition to the new system in three large chunks, known as spirals, beginning in summer 2005. In July, 60,000 workers will begin the transition, and another 240,000 will be added over the next 18 months to complete the first spiral.

Once those employees are moved

into the new system, the Pentagon will assess the system, make necessary changes, and move toward adding remaining employees under spiral two. The Pentagon must get OPM approval to move its remaining civilian workers to NSPS. Assuming that OPM gives its assent, the conversion will be completed by January 2008.

Mary Lacey, the Defense Department's program executive officer for NSPS, said in a prepared statement to spiral one workers that "we will gain experience with the procedures we put in place, and I am counting on you to provide feedback in identifying any improvements as we implement the system to the entire workforce." A list of those employees and organizations in spiral one is available at <http://www.cpms.osd.mil/nsps/SpiralOneActivities.html>.

Eventually, the Pentagon will add a third spiral that will put tens of thousands of workers at defense research labs under the new system. Congress has currently prohibited those workers from participating in NSPS, although many already are governed by special pay and personnel rules.

Speigel said the step-by-step implementation of NSPS is modeled on the "spiral development" method used to develop complex weapon systems. Under that approach, systems are fielded incrementally and are upgraded as new capabilities come on line. Speigel expects NSPS to change as pilot programs play out and more workers are affected.

Specifics Yet To Come

The Pentagon has yet to release specifics of how the new system will be constructed. In the fall, the Pentagon did publish the "Requirements Document for National Security Personnel System," which lays out guiding principles and parameters.

"The overarching mission objective of NSPS is to place the right civilian employee in the right job with the right skills at the right time and at the right cost," stated the requirements document. "The NSPS system must allow rapid adaptation of the civilian workforce composition to meet changes in mission requirements."

The document laid out six key performance parameters:

- High performing workers and

Rollout of the new National Security Personnel System will be "event-driven, not time-driven."

—Gordon England, NSPS leader

managers should be compensated and retained, based on performance and contribution to the mission.

- The workforce should be agile and responsive to handle changing missions.

- Workers and managers should understand and have access to the system to ensure credibility and trust.

- The system must be fiscally sound, so managers can make salary decisions and set personnel budgets.

- Training programs and information technology systems must be established for managers and workers.

- The system must be operational and stable by no later than November 2009.

The most significant change will be the elimination of the General Schedule for classifying and paying employees. The GS pay table, long a staple of federal employment, places workers in one of 15 pay grades, depending on their job responsibilities. Within those grades, employees move up 10 salary "steps," based on how long they've been in the job.

For example, an Air Force white-collar supervisor might be rated in a GS-11 position, which paid in Fiscal 2004 \$44,621 to \$56,707 a year, with the exact amount depending upon how long the employee has been in that position. Employee raises are tied to the annual pay increase authorized by Congress and regional cost of living pay adjustments made by the Office of Personnel Management.

Pay scales are standard across the federal government.

In other words, said Speigel, "The outstanding employee is paid the same as the average employee."

Under NSPS however, DOD will abolish the General Schedule's narrow pay grades and steps and place employees into one of a handful (three to five) of broad pay categories. The so-called "pay bands" would group employees by job occupation and allow the Defense Department to offer a wide range of salaries without regard for longevity.

The Pentagon believes a more flexible system will make it far easier to award top performers and offer higher pay to those coming in from outside government.

Return to the example of the Air Force GS-11 supervisor. Under a system of pay banding, he or she might be eligible for a salary ranging from \$40,000 to \$75,000, depending on skills and job performance. The employee's pay raise would be determined after an annual performance review and not by a rigid increase for all federal workers.

Managers Must Manage

Sharon Seymour, associate director for NSPS, said supervisors will be asked to manage a pool of personnel dollars. "Typically, supervisors have not had to deal with civilian pay," she said, adding that a big challenge will be teaching supervi-

sors how to negotiate salaries, develop personnel budgets, and evaluate employees.

Spiegel said, "Managers are going to have to manage employees."

Employees will no longer be evaluated on a pass-fail basis. Managers will judge an employee's strengths and weaknesses and how close he or she has come to meeting specific goals in annual performance reviews. Workers will receive pay raises beyond annual governmentwide adjustments, based on whether they meet those goals.

"If pay remains stationary," added Speigel, "then [an employee] is not performing well."

Seymour said employees will be more fairly rewarded under the new system. Moreover, they will also find it easier to win a promotion.

In the traditional system, promotions between grades take months because of paperwork and job-posting requirements. By broadening career fields, managers will be able to more easily move employees to new jobs without extensive personnel actions.

The NSPS Web site (<http://www.cpm.sosd.mil/nsps>) cites pay banding as a way to give government workers salaries that are more competitive with the private sector.

The OPM Web site notes several pilot programs, known as personnel demonstration projects, which link pay to performance that could serve as models for NSPS. These include:

- The Navy demonstration project at China Lake Naval Air Warfare Center. There, employees meet with supervisors twice a year to set performance goals and then receive or fail to receive predetermined pay increases. Started in 1980, Congress made it permanent in 1994.

- The Defense Department's acquisition workforce program. Employees in various acquisition organizations are rated as "appropriately compensated," "overcompensated," or "under compensated" by supervisors, following preset goals. Implementation began in October 1999 for this "contribution-based compensation system."

- The Air Force Research Laboratory demonstration project. Scientific and technical employees work under a system in which pay is linked to accomplishment of the agency's mission. The demo started in 1997. According to an AFRL assessment, about 96 percent of the employees in the program were adequately compensated in 2003.

In a January 2004 report, the Government Accountability Office reviewed several pay banding projects and said pay banding should be expanded throughout the federal government. "How it is done, when it is done, and the basis on which it is done can make all the difference," GAO found.

No Panacea

Diane M. Disney, Pentagon civilian personnel chief in the Clinton

Administration, warns against viewing pay-for-performance as a "panacea." She said managers must have the "backbone" to give honest performance evaluations; otherwise they risk raising personnel costs by giving all employees raises for meeting basic goals.

"There has to be a big emphasis on the evaluation system," she warned. "Without that, pay banding won't reach its potential."

Labor unions, meanwhile, have criticized the pay-for-performance initiative discussed for NSPS.

Brian DeWyngaert, executive assistant to the AFGE president, said at OPM's 2004 Federal Workforce Conference in Baltimore that pay-for-performance systems are "anti-employee" and warned they would create turmoil in the workforce. He said DOD civilians trust the current system and wondered whether they would ever get raises under the new system.

"Why do we want to go to a pay system where everything is secretive?" DeWyngaert asked.

The International Federation of Professional and Technical Engineers union sent brochures to Congress last fall warning about implementing a pay-for-performance system. They included written accounts from defense workers who have participated in pilot personnel demonstration programs.

Gary E. Phetteplace, a scientist at the Army Corps of Engineers Cold Regions Research and Engineering Lab in New Hampshire, wrote: "The pay-for-performance plan we participated in for four years did nothing to force federal employees to prove their worth due to the fact that it had no performance metrics. The appraisals by the supervisors were entirely subjective, and the employee is left with no specifics upon which to appeal and the taxpayers are left with no assurances of performance."

Already, DOD has begun using some new hiring flexibility and workforce-shaping authorities it was granted under the reform package in 2004.

The Pentagon now can hire retired civilians for hard-to-fill jobs without those workers losing federal pensions. Retirees have been reluctant to take defense jobs because their salaries had to be offset by the income they received from federal pen-

Managers must have the "backbone" to give honest performance evaluations.

—Diane Disney, former DOD civilian personnel chief

sions. Now, they can receive a full salary and full retirement benefits.

DOD also now can hire up to 2,500 "highly qualified experts" for up to five years (with a possible one-year extension) for full-time, part-time, or intermittent work outside normal pay and personnel rules. Salaries could range from \$125,000 to \$136,900, depending on issues ranging from labor market conditions to the candidate's experience. The move is meant to make it easier for the Department of Defense to hire top private-sector workers, who would otherwise have to take a big pay cut to work for the government.

Aside from streamlining hiring, the legislation enables DOD to eliminate workers it no longer needs. Congress made permanent the Pentagon's authority to offer annual buyouts of up to \$25,000 to as many as 25,000 defense workers and make unlimited use of early retirement. The Pentagon will use the new provision to cut unneeded jobs and add new positions without swelling the ranks of the civilian workforce.

Labor Union Issue

The most contentious issues concern not pay but the role labor unions will have in representing defense workers and employee rights in appealing management action. Congress has given the Pentagon wide latitude in redefining how it works with labor unions and streamlining the employee appeals processes.

The Pentagon has proposed several options for overhauling labor management relations and employee appeals, including:

- Limiting what can be bargained over by unions and putting time limits on negotiations between the Defense Department and unions, to avoid delays in carrying out national security missions.

- Requiring the Defense Department to bargain only with national unions, rather than hundreds of local unions when proposing changes that impact all defense civilians.

- Changing how labor disputes are resolved by either creating a new organization to resolve them or requiring existing agencies, like the Federal Labor Relations Board, to

Pay-for-performance systems are "anti-employee." They will create turmoil in the workforce.

—Brian DeWyngeart, union official

make quicker decisions and consider DOD's national security mission.

- Changing how employee appeals of management actions are decided, by either streamlining current systems, such as the governmentwide Merit Systems Protection Board, or building a new one for DOD cases.

Speigel said that bargaining with a single national union rather than hundreds of smaller unions saves time. The Defense Department has about 40 national unions with about 1,150 local branches at military bases around the globe. He noted that, when the Pentagon began issuing purchase cards, they were instantly issued to the military, but distributing them to civilians took far longer because rules for their use had to be negotiated with each local union.

Speigel emphasized that local unions will not be completely left out of bargaining sessions. He said that, on issues that have an impact on specific bases, they'll still have a say.

Federal unions, however, have attacked those proposals, claiming the Defense Department wants to minimize the role of unions and eliminate the right of an employee to challenge managers. A coalition of more than 30 unions with defense workers has formed the United DOD Workers Coalition and is urging members

to go to town hall meetings and question the changes.

AFGE has run radio advertisements on stations near military bases. Don Hale, a civilian worker at West Point, N.Y., says in one radio spot, "DOD is driving a plan to break our union, gut our pay, and replace our dedicated workers with unreliable private contractors and political patronage hires. Without question, the critical support for our military will be weakened."

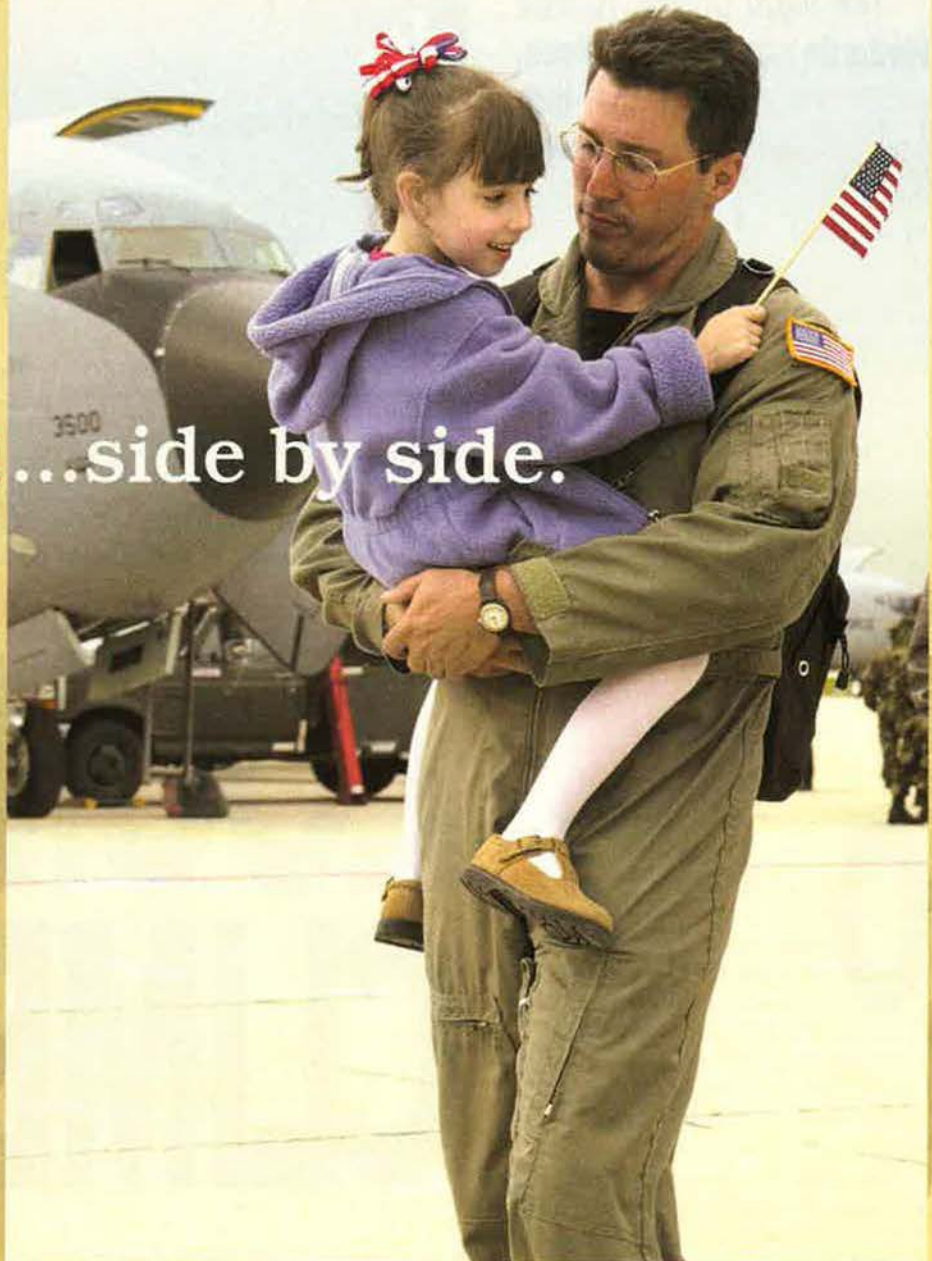
DOD has countered those charges, noting that it has held nearly monthly meetings with union leaders to discuss proposed changes. As of mid-October, defense officials said they had held more than 100 focus group meetings with more than 1,000 defense civilians at installations around the globe, as well.

Disney gives DOD a mixed review for handling issues concerning labor relations and the appeals process. She said there is no question that the Pentagon should streamline and simplify the appeals processes and suggested that mediation be an option. On bargaining issues, Disney warned against locking out smaller unions.

For his part, England strove to avoid politics at a town hall meeting this summer at the Pentagon. He said the NSPS long-term goal is more straightforward: "We want everybody to go home every night and brag about the great job they accomplished that day. That is what we are trying to accomplish." ■

George Cahlink is a military correspondent with Government Executive Magazine in Washington, D.C. His most recent article for Air Force Magazine, "Shaking Up the Alliance," appeared in the October 2004 issue.

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The flight of Maj. Kermit Haderlie saved other lives, but it cost him his own.



By John Lowery

On Nov. 22, 1968, Maj. Kermit L. Haderlie, a student in the Air Force's Aerospace Research Pilot School, flew a Lockheed F-104C Starfighter on a zoom climb mission to the edge of the Earth's atmosphere. For ARPS students at Edwards AFB, Calif., the zoom maneuver was a rehearsal for possible future space-flight.

The Mach 2 mission took the airplane so high that the standard F-104's jet engines routinely exceeded their temperature limits and had to shut down. Sometimes the engine simply flamed out for lack of air. Then the pilot steered the aircraft like a returning spaceship to a lower altitude, where he would restart the engine.

Failing that, a returning zoom climb pilot would instead make a horizontal glide landing on the base's 15,000-foot runway. If short of the main runway, the lake bed runway complex offered another landing option.

Without engine power, the cockpit would depressurize on these missions. Consequently, for protection against the rarified atmosphere, the pilot wore a full-body pressure suit. Properly outfitted, a pressure-suited pilot received oxygen under very high

ZOOM CLIMB

The F-104 Starfighter, above, often was described as the "missile with a man in it." It was the first operational fighter capable of speeds higher than Mach 2 and set both speed and altitude records. USAF had Lockheed add a rocket engine to three F-104s (designated NF-104 or Aero Space Trainer) for zoom climbs above 100,000 feet. Haderlie used the non-rocket-assisted F-104, which was limited to climbs to 80,000 feet.

pressure, at extreme altitudes, without ill effects.

Standard Air Force pressure suits of the time were found to be effective even in the vacuum of outer space. But in Haderlie's case, a bad design made his suit ineffective, and the defect killed him.

Zoom Missions

The Air Force's investigation into Haderlie's flight revealed a design flaw in the ring that locked his gloves to his pressure suit. This allowed an "inadvertent disconnection" when Haderlie was at 66,000 feet. The primary cause of the mishap was a "design deficiency," investigators found, in a suit that was otherwise "as sound as if it were new."

Officials ordered a "permanent locking design fix" for the problematic pressure suits, to "preclude inadvertent unlocking ... in flight."

As risky as the test program sounds, it was found to be well-planned and supervised and was the Air Force's "only fully controlled environment ... for flight-test training in a full pressure suit," critical for spaceflight and extreme-altitude flight.

The zoom mission was an important part of the school's curriculum. It was designed to familiarize students with the problems of operating in the upper atmosphere. The actual climb angle and apogee altitude were calculated, by the student, based on current atmospheric conditions.

At the top of the zoom, the pilot



Haderlie, shown as a lieutenant when he was a member of the Skyblazers, pursued a graduate degree in astrophysics to improve his chances to enter test pilot school and become an astronaut.

had to have at least 35 pounds per square foot of dynamic pressure on the aerodynamic surfaces in order to maintain control. Otherwise he would tumble out of the top into a potentially unrecoverable spin. Haderlie's calculations called for a 30-degree zoom angle.

Nearing the end of the course—and among the top students in class standing—he was already enthused about the possibility of becoming an astronaut. Several of his classmates became part of the space program.

The zoom mission capped the final phase of the ARPS program,

which took a seasoned operational pilot and gradually helped him develop the skill and confidence needed to perform at the edge of the Earth's atmosphere.

The day prior to his zoom flight, Haderlie had flown with an instructor pilot and practiced the procedures applicable to a solo zoom mission. This was his first zoom flight alone. His projected apogee altitude was probably around 80,000 feet.

Haderlie was flying a single seat F-104C, call sign Zoom 3. His chase airplane (call sign Zoom Chase) was used to monitor all such flights and was a dual seat F-104D crewed by two of the school's students.

Unlike the usual Air Force procedure, for these missions the chase pilot was tasked with preflighting the zoom aircraft. This relieved the pressure-suited and constrained pilot from the chore. He had enough to manage with the cumbersome life-support system.

Haderlie's chase pilot dutifully completed the walk-around inspection and signed the ship's logbook.

The procedure used at the time called for the pilot to don the pressure suit in a special room that housed all the protective equipment used by the Aerospace Research Pilot School. After fitting and pressure-checking the suit, the pilot went through a denitrogenation procedure—eliminating nitrogen from his blood and body tissue.

This required the pilot to breathe



A life sciences technician waits to connect the pilot (not Haderlie) in a pressure suit, to the F-104's life-support system. After the technician did his work, a life sciences officer or senior NCO would make a final check.

100 percent oxygen for at least 30 minutes before the flight. Then, carrying and breathing from a portable oxygen bottle, he was escorted to the airplane by life sciences personnel.

A suit technician then helped the pilot enter the cockpit, and the technician made the suit-to-ship connections. Finally, the life sciences officer in charge rechecked the connections and again pressure-checked the suit. Both pressure checks simulated a pressure differential much greater than what was expected in flight.

Technicians qualified to manage pressure suits were carefully trained and supervised by a life sciences officer and NCO for several weeks before being certified for their job. Certification required proficiency in tasks for specific missions, such as the zoom climb.

It was at this point that the critical factor came into play. USAF's suit-donning procedures originally required the glove-locking slide to be taped over after the slide had been attached to the pressure suit. The objective of this technique was to increase the force required to move the sliding lock and thus reduce the possibility of an inadvertent unlocking.

A life sciences technician checks the locking mechanism on an unidentified pilot's pressure suit glove. Failure of that mechanism led to Haderlie's death and a change in USAF equipment and procedures.



The Pressure-Filled Environment

While flying an F-104 in the upper atmosphere on a zoom climb mission, the oxygen pressure needed to keep the blood-oxygen level in the normal range would cause severe eye and sinus pain. Higher pressure would collapse the lung alveoli, which collect and distribute the oxygen. The collapsed alveoli would then prevent the lungs from drawing oxygen from the air and transferring it to the red blood cells.

Therefore, Air Force regulations at the time required a full pressure suit for all flights above 50,000 feet.

In the event of an emergency depressurization, the maximum altitude at which a pilot was thought able to function with the standard pressure demand oxygen system was 43,000 feet. (This has since been revised to 25,000 feet.) At that altitude, 100 percent oxygen is supplied under 30 mm HG (millimeters of mercury) of pressure to provide an 82 percent blood saturation. This is roughly equivalent to breathing air at 15,000 feet.

But at pressures above 25 mm HG, it is difficult to get a good seal on an oxygen mask. Further, flight surgeons found that human lungs could tolerate a maximum oxygen regulator pressure of 30 mm HG—but just barely and only for short periods.

Greater pressure could rapidly lead to unconsciousness and shock.

To overcome these deleterious effects, it was necessary to counterbalance the high oxygen pressure in the lungs. The full-body pressure suit did that. And to prevent the pain produced by high oxygen pressure in the eyes and ears, it was necessary to enclose the entire head in a pressure-containing helmet.

Inexplicably, in the spring of 1968—shortly before Haderlie's zoom flight—the taping procedure was removed from the regulations.

The full pressure suit worn by Haderlie was designed to provide counterpressure on the human body, beginning at 35,000 feet. It accom-

plished this by surrounding the user with an envelope of pressurized air.

Fatal Flight

Haderlie and his chase were airborne at 9:15 a.m. After departure, Zoom 3 contacted the Edwards space positioning facility that controlled the flight. The facility began radar and optical tracking of Haderlie's flight.

Meanwhile, the entire ARPS class watched his mission on closed-circuit television.

Haderlie and his chase airplane climbed toward the northeast. At 35,000 feet, Haderlie ran through checklist items peculiar to the zoom mission. These included depressurization of the cockpit to activate and check the pressure suit, along with a check of the angle of attack indicator and electronics bay pressurization.

About 80 miles from Edwards Air Force Base, Zoom 3 began a right-climbing turn to 45,000 feet. During the climb, additional checks of electronics bay pressurization were accomplished, along with a check for proper functioning of the pilot's pressure suit. Everything appeared normal.

At this point, Edwards cleared Zoom 3 to enter the supersonic flight corridor, to begin the acceleration run to Mach 2. This acceleration would culminate in the zoom maneuver.

Once in position on the corridor's

inbound track, Zoom 3 accelerated to the target airspeed.

Haderlie again notified his chase aircraft that all checks were complete. Then he requested that the Edwards space positioning facility notify him as he approached the geographical abort point. That would be the farthest point on the acceleration track from which a zoom maneuver could be initiated. From there, if the engine failed to restart, the aircraft could still be recovered on the Edwards runway.

As requested, Edwards called Haderlie with 20 seconds and again with 10 seconds remaining. At the 10-second warning—at 47,500 feet and Mach 2—Haderlie initiated the zoom maneuver. As required by mission protocol, upon reaching 50,000 feet, he confirmed that his pressure suit was inflating properly.

At 61,000 feet, the F-104 was in its preplanned 30-degree climb. When it reached 63,000 feet, the positioning facility called Haderlie to order the standard afterburner shut down.

The call was not acknowledged. On the closed-circuit television monitor in the space positioning facility, the Starfighter was seen rolling inverted. Four seconds later, Haderlie transmitted, "I lost my glove."



Before any zoom flight, pressure suits were checked several times by different technicians. The pilot checked the suit again at about 35,000 feet, just before going beyond the limit for the standard oxygen system.

The aircraft had now passed through 66,000 feet.

Loss of the glove caused total loss of air pressure within the suit and helmet. With an explosive decompression, his body was instantly in a depressurized cockpit. He would stay conscious for only a few seconds.

Zoom Chase transmitted, "How do you read?" There was an imme-

diately but garbled reply, then silence.

The accident report shows that Haderlie attained an apogee altitude of 69,400 feet, then three seconds later began an inverted descent—still in afterburner.

As the Starfighter rapidly descended past the chase aircraft's altitude of 44,000 feet, the chase crew began transmitting, "Pull out! Pull out! ... Eject! Eject!"

Hurting down at an extreme airspeed, the aircraft exceeded the so-called thermal barrier. As space positioning personnel and his classmates watched, the F-104's skin and canopy overheated. Then, as the aircraft reached the denser air in the lower altitudes, Haderlie's Starfighter disintegrated.

Sixty-one seconds elapsed from the time of Haderlie's final garbled transmission at 69,000 feet until ground impact.

Westerly winds caused significant dispersion of the wreckage. The ejection system had not been activated, but he could not have survived an ejection at more than 1,750 mph.

At the time, three major commands had roughly 400 of these pressure suits, and "large quantities" of a new suit—with the same connection mechanism—were on order. USAF therefore reinstated the emergency safety procedure of taping over the connections and ordered a glove-to-pressure suit connector redesign to prevent additional accidents. ■

A Long Climb

Maj. Kermit Lloyd Haderlie's path to the edge of space had been challenging. He was born and raised in rural Wyoming, where his staunch Mormon parents were ranchers. Haderlie paid his college tuition by working summers driving bulldozers and other heavy equipment. In 1952, he graduated from Utah State University and was commissioned a USAF second lieutenant through the school's ROTC program.

Haderlie found his niche in the Air Force. He was first in his flight school class and designated a "distinguished graduate." At fighter gunnery school, in the F-86 Sabrejet, he was again first in his class and upon graduation received the "Top Gun" award. He was assigned to the 36th Tactical Fighter Wing in Germany as a fighter pilot.

Subsequently he was picked as a member of the wing's aerobatic team, the Skyblazers, the European version of the Thunderbirds. He was then sent to Luke AFB, Ariz., as an instructor pilot. It was there, while teaching new Air Force pilots to operate the F-100 Super Sabre, that he nurtured his plans for spaceflight.

A year later, he applied for the test pilot school but was rejected. An advisor told him he had the wrong education: He had a bachelor of science degree, but for test pilot school, he was told, a degree in engineering or astrophysics was preferable.

So Haderlie went back to school, earned a degree in astrophysics from the University of Arizona, and was immediately accepted for the Aerospace Research Pilot School at Edwards Air Force Base in California.

Haderlie was approaching his dream of spaceflight. The zoom climb mission was to have helped prepare him for the job.

John Lowery is a veteran Air Force fighter pilot and freelance writer. He is the author of four books on aircraft performance and aviation safety. This is his first article for Air Force Magazine.

By Frances McKenney, Assistant Managing Editor

Space Award

At the 33rd annual Air Force Ball in Los Angeles in November, Brig. Gen. Duane W. Deal received the Gen. Thomas D. White Space Award for his leadership of the 21st Space Wing during combat operations in Afghanistan and Iraq.

Deal commanded the wing, headquartered at Peterson AFB, Colo., from May 2002 to March 2004. He also served on the board investigating the space shuttle *Columbia* accident. Deal now heads the Cheyenne Mountain Operations Center at Cheyenne Mountain AFS, Colo.

The **Gen. B.A. Schriever Los Angeles Chapter** hosts the ball. Since 1996, a highpoint has been presentation by the Air Force Association of the White Award to a USAF individual or organization that has made the year's outstanding progress in the field of aerospace.

Also in LA

A second award presentation at the LA Ball honored retired Gen. James E. Dalton, who was designated an Aerospace Education Foundation General Schriever Fellow. Dalton was an Air Force pioneer in space leadership, working on Atlas, Titan, and Minuteman ICBMs, beginning in 1960. He retired from USAF in 1985 as chief of staff, Supreme Headquarters Allied Powers, Europe.

This year's ball celebrated 50 years of Air Force space and missile systems and had retired Gen. Bernard A. Schriever—"the father of the US space and missile program"—as its honorary chairman.

The LA Ball's sponsors include AFA and the **Schriever Chapter**, the **General Doolittle Los Angeles Area Chapter**, and the **Orange County/Gen. Curtis E. LeMay Chapter**. In more than three decades, the ball has raised \$3.4 million dollars to support AEF and the chapter's Schriever Education Foundation.

Special guests at the ball included AFA Chairman of the Board Stephen P. "Pat" Condon and National President Robert E. "Bob" Largent; AEF Chairman of the Board L. Boyd Ander-



USAF photo by Ron Hall

At the Air Force Ball in Los Angeles, Brig. Gen. Duane Deal accepts the Gen. Thomas D. White Space Award from Sebastian Coglitre (left), Schriever Chapter board chairman, and AFA Board Chairman Pat Condon.

son and AEF President Mary Anne Thompson; and Lt. Gen. Brian A. Arnold, commander of the Space and Missile Systems Center, Los Angeles AFB, Calif. Arnold was military host for the ball.

Pearl Harbor Anniversary

As keynote speaker for a ceremony called Dropping of the Roses, AFA Chairman of the Board Pat Condon joined the **Long Island Chapter (N.Y.)** in observing the 63rd anniversary of the attack on Pearl Harbor.

In addressing a crowd estimated at 500 people, Condon noted the similarities between veterans of World War II and those of more recent wars and the 9/11 terrorist attacks.

The annual Pearl Harbor remembrance took place at Republic Arpt., Farmingdale, N.Y., where one American Beauty rose—representing each year since Dec. 7, 1941—was blessed.

In the past, vintage aircraft have then flown the roses to the Statue of Liberty in New York Harbor and dropped them at 12:55 p.m., the East Coast time of the Japanese attack. However, rain grounded the aircraft

this year. Instead, a police helicopter from Nassau County flew the flowers to the county line and passed them on to a New York City Police Department helicopter to complete the memorial observance.

A Pearl Harbor survivor from New York started the Dropping of the Roses tradition in 1970. New York State President Fred Di Fabio organizes the event, with support from three other area AFA chapters. Among those on hand for the ceremony were Edward W. Keil, **Queens Chapter** treasurer; Maxine Donnelly from the **Iron Gate Chapter**; and Rick Wright from the **Gen. Daniel "Chappie" James Jr. Memorial Chapter**. William G. Stratemeier Jr., Long Island Chapter president, served as master of ceremonies.

Head of the Class

Central Indiana Chapter's Teacher of the Year wasted no time in retirement. Lt. Col. Michael L. Robards retired at Eglin AFB, Fla., one Friday in January 1997 and the next Monday morning began student teaching in Indiana.

A program manager with Eglin's 36th Engineering and Test Squadron, Robards had prepared for the swift transition from lieutenant colonel to teacher by earning a master's degree in education during his last year on active duty. The student teaching stint, in Trafalgar, Ind., wrapped up his degree requirements, and he was then hired to teach at Custer Baker Middle School in Franklin, Ind.

Chapter President Michael Malast said the chapter selected Robards as Teacher of the Year because of his work at Custer Baker as an eighth-grade science teacher. The chapter noted that Robards quickly became the Science Department chairman, improved the science curriculum, and supervised completion of a building renovation that created science labs for all grades.

Robards said he chose a teaching career because he had enjoyed a USAF assignment as an instructor pilot. He brings to his middle school classroom an engineering degree from the Air Force Academy, as well as experience as a pilot of T-38s and F-4, F-5, and F-15 fighters.

"I use my tape of my centrifuge training to show the effects of cen-



USAF majors from different eras—Frank Luke Chapter members Maj. Tanya Kubinec (left) and retired Maj. Anne Krizanauskas—meet at the chapter holiday party. Krizanauskas was among the first volunteers for the Women's Army Auxiliary Corps. She retired from USAF in 1967.

trifugal force and let my students see just what nine times the force of gravity does to you," he said.

Malast joined Charles Blessing, chapter aerospace education VP, in presenting the Teacher of the Year

award to Robards at a chapter meeting in October.

On Roller Skates

It's rare for more than a dozen explosive ordnance disposal specialists to get together in one place at one time—and not to disarm weapons but for fun.

The Frank Luke Chapter helped make that possible when it paid for a pizza party, held at the base bowling alley, for EOD personnel from the 56th Civil Engineer Squadron at Luke AFB, Ariz.

Chapter President Harry Bailey said these airmen are "almost on roller skates," constantly deployed or undergoing training or on temporary duty. That's why chapter member SSgt. Aaron D. Davenport asked the Luke Chapter to throw the pizza party.

Davenport is an Air Force Outstanding Airmen for 2004 and an EOD equipment technician with the squadron. When Bailey first met Davenport last year, he told him about the many ways the chapter supports Luke airmen and their families. During the 2002 Christmas holiday, for example, the chapter arranged a free screening of first-run movies at a Luke dormitory. After the 9/11 terrorist attacks, chapter members delivered pizza and a holiday feast to the security forces working 12-hour shifts.

These days, the chapter and one of its Community Partners provide pizza as a way to recognize Luke's low profile units, Bailey said. Some of the pizza parties have been given for personnel from the base phar-

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macy, hospital emergency room, fire department, and control tower.

Breakfast Tradition

In World War II, a combat breakfast was apt to be fried eggs, bacon, and pancakes. When the **Alamo Chapter (Tex.)** held its Combat Breakfast in San Antonio in November, the chow featured another mess hall staple:

creamed chipped beef on toast. "Real SOS" is how Alamo Chapter Secretary Kaye Biggar described it.

The guest speaker for this annual event was Medal of Honor recipient Robert L. Howard, a retired Army colonel. In 1968, he was a US Army sergeant first class in Vietnam. He and his platoon leader were wounded when a large enemy force attacked their

unit. Unable to walk, and with his weapon destroyed, Howard crawled through gunfire to retrieve the wounded lieutenant. He then organized the platoon's defensive actions, directed fire, and administered first aid. When rescue helicopters arrived, Howard did not leave until all others were aboard safely.

Howard told the audience that America's armed forces make a difference wherever they're stationed.

Listening to his remarks were more than 170 guests, including 10 veterans who are recovering at Brooke Army Medical Center (Ft. Sam Houston, Tex.) from wounds sustained in Iraq. The breakfast also paid tribute to 15 military personnel—the top NCOs from the services, said Biggar.

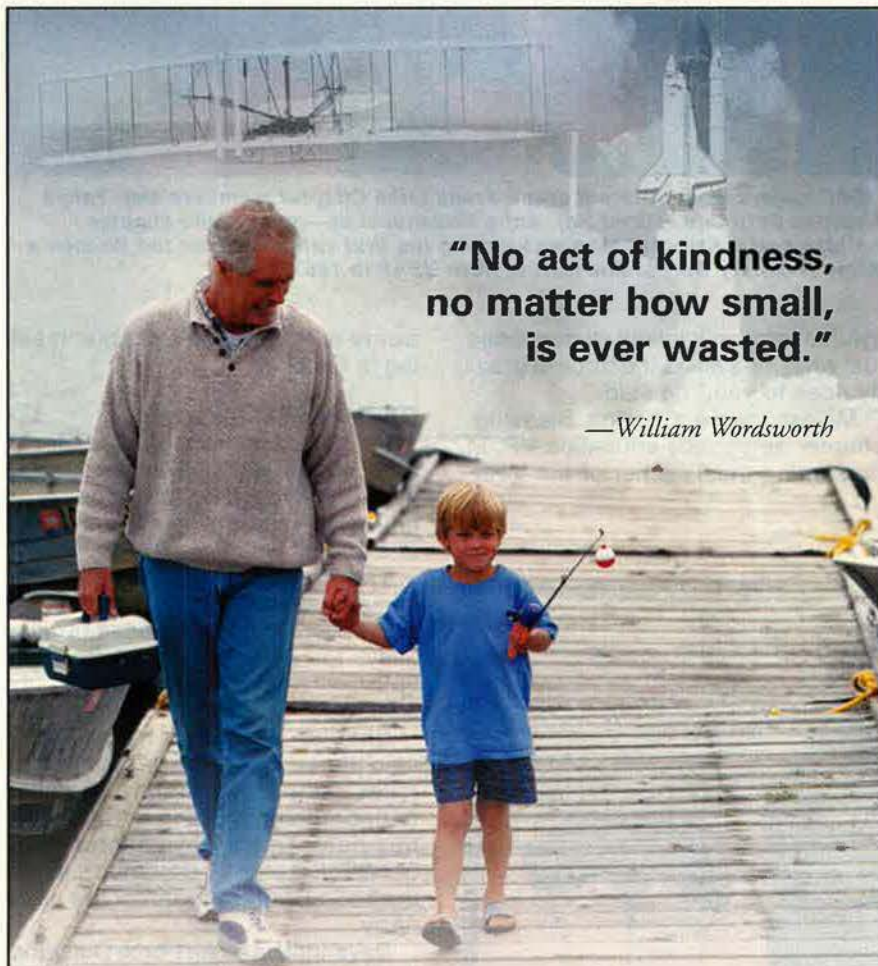
The Combat Breakfast, co-sponsored with the San Antonio Chamber of Commerce and coordinated by Biggar, was part of the city's week-long Celebration of America's Military.

More AFA/AEF News

■ Air Force Association National President Bob Largent, John R. Allison, an AFA national director emeritus, and Executive Director Donald L. Peterson recently helped Rolls-Royce North America cap a year-long celebration of the company's 100th anniversary. To mark the milestone, the AFA officials gathered at the company's headquarters in Chantilly, Va., and presented a bronze statue of an AFA eagle to James M. Guyette, president and CEO of Rolls-Royce North America, and Stephen B. Plummer, defense relations senior VP. The memento was recognition for the company's role in supplying engines for USAF aircraft.

■ The **McChord Chapter (Wash.)** honored retired Maj. Gen. Jack K. Gamble by designating him an AEF Jimmy Doolittle Fellow. Gamble retired in 1975 as commander of Alaskan Air Command, Elmendorf AFB, Alaska. The award recognized Gamble's decades of support for the AFA chapter and its aerospace education programs. The audience at the presentation ceremony included Gamble's son, retired Gen. Patrick K. Gamble, who, until 2001, headed Pacific Air Forces.

■ On Veterans Day, the **Tidewater Chapter** unveiled a granite marker with bronze plaque at Veterans Memorial Park, located next to the Tidewater Veterans Memorial in Virginia Beach, Va. Led by Chapter President Allan G. Berg, chapter members John



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—William Wordsworth


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An Air Force Outstanding Airman of the Year, SMSgt. Jonathan Rosa (center), from the 123rd Special Tactics Squadron (ANG) at Louisville, Ky., and the squadron commander, Maj. Jeremy Shoop (right), briefed the Louisville Chapter on their unit's role in the war on terror. The 123rd's personnel include combat controllers, such as Rosa, and pararescue jumpers who have served in Operations Iraqi Freedom and Enduring Freedom. On the left is William McKinney, chapter president.

Gaffney, Robert C. Hudson, Randall Kruger, Edwin C. Spencer, and Gordon Strong dedicated the memorial to the Air Force's Total Force personnel. The plaque is inscribed with Air Force and AFA logos, the poem "High Flight," and the phrases "Pride in our Past" and "Faith in our Future." Also on hand was Thomas O. Moran of the **Richmond Chapter (Va.)**.

■ Gen. Lance W. Lord was keynote speaker at a luncheon co-sponsored by the **Mile High Chapter** in Denver, the local National Defense Industrial Association chapter, and the Aurora (Colo.) Chamber of Commerce. At the luncheon, Lord, commander of Air Force Space Command, Peterson AFB, Colo., helped Lt. Col. Thomas A. Deall, chapter president, present \$3,055 to the Colorado wing of the Civil Air Patrol. The wing plans to use the award to fund aerospace education activities, such as building model rockets and radio-controlled model airplanes.

■ They were framed! The **Central Florida Chapter** recently donated funds to the AFROTC unit at the Uni-

versity of Central Florida in Orlando. The detachment used the \$350 to frame five pieces of artwork from the "100 Years of Airpower" series produced by Air Force News Service. Richard A. Ortega, state education VP, pointed out that the chapter's donation filled a gap. He said that federal or state funds could not be used to frame these lithographs, which now decorate the unit's newly renovated classrooms. ■

Have AFA/AEF News?

Contributions to "AFA/AEF National Report" should be sent to *Air Force Magazine*, 1501 Lee Highway, Arlington, VA 22209-1198. Phone: (703) 247-5828. Fax: (703) 247-5855. E-mail: afa-aef@afa.org. Digital images submitted for consideration should have a minimum pixel count of 900 by 1,500 pixels.

Reunions

reunions@afa.org

34th TFS. Sept. 9-11 at the Hope Inn, Wright-Patterson AFB, Ohio. **Contacts:** Ken Mays, PO Box 1240, Hewitt, TX 76643 (254-857-4720) (kmaysthuddriver@earthlink.net) or Larry Bogemann (lbogemann@earthlink.net).

67th TRW. May 5-11 in Dayton, OH. **Contacts:** Paul or Pat Graves, 6515 Alum Creek Dr., Groveport, OH 43125-9490 (614-491-4432).

83rd FIS, Hamilton AFB, CA. April 7-10 at: The Columns Hotel in New Orleans. **Contact:** Jacques Creppel, 3811 St. Charles Ave., New Orleans, LA 70115 (800-445-9308) (columnshl@aol.com).

444th FIS. April 14-16 at the Sheraton Hotel in North Charleston, SC. **Contact:** Wallace Mitchell, 535 Mimosa Rd., Sumter, SC 29501 (803-469-3297).

614th TFS (1966-70). April 4 in Las Vegas. **Contact:** Matt Wallace, 4724 Stavanger Ln., Las Vegas, NV 89147 (702-876-5775) (colmatt@prodigy.net).

A-1 Skyraider Assn. Sept. 16-17 at the Menger Hotel in San Antonio. **Contacts:** Rocco DeFelice (210-659-5965) (roccodef@earthlink.net) or Ralph Hoggatt (210-494-3190) (tadhoggatt@aol.com).

RED HORSE, all units, Feb. 4-5 in Ocala, FL.

Contact: Tom Gallagher (352-860-1629) (tgallag1@tampabay.rr.com).

Pilot Class 49-B. Oct. 24-27 in Gatlinburg, TN. **Contact:** Jack Stolly, 11323 Cotillion Dr., Dallas, TX 75228 (972-681-8290) (flyingjack@juno.com).

Pilot Training Class 50-B. May 12-15 at the Sheraton Gunter Hotel in San Antonio. **Contact:** Howard Evans, 9500 Castlewood Dr., Austin, TX 78748-6109 (412-282-2830) (hoandme@aol.com).

Seeking members of the **3650th Basic Military Training Wg**, Sampson AFB, NY (1950-56), including permanent party, basic trainees and special school personnel, and Womens Air Force, for a reunion. **Contact:** Chip Phillips, PO Box 331, Williamsville, NY 14231-0331 (phone: 716-633-1119 or fax: 716-633-9118) (chip34@aol.com). ■

Correction

The December 2004 "AFA/AEF National Report" news item on the **Paul Revere Chapter (Mass.)** should have noted that the chapter raised \$20,000 for the Aerospace Education Foundation through the gala held in conjunction with the chapter's C4ISR Summit. Chapter President Kevin Gilmartin presented the donation to AEF President Mary Anne Thompson and AFA Chairman of the Board Pat Condon.

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.

Pieces of History

Photography by Paul Kennedy

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Since 1948, Air Force Office of Special Investigations agents have often conducted clandestine operations while performing their four primary missions. AFOSI members give early warning of worldwide threats to the Air Force, prevent crimes affecting USAF readiness and discipline, counter threats to service information systems, and stop acquisition fraud. Many of AFOSI's tools

of the trade are on display at the National Museum of the United States Air Force, Wright-Patterson AFB, Ohio. Among the artifacts pictured above are a 1950s passport (with the special agent referred to only as a US government employee); a 1970s disguise kit including shoe lifts, eyeglasses, and other materials; and a concealable "key impression tool" that could be used to

open locked doors. More recent is the denim jacket, from the 1980s, used primarily by special agents who were conducting narcotics raids.

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