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# AIR FORCE

JOURNAL OF THE AIR FORCE ASSOCIATION

MAGAZINE

HAWAII

## Guard Over the Pacific

The 154th Wing, Hawaii Air National Guard

Foreign Fighters Get Better

The New Chief

Threats to the Nets

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MAGAZINE

October 2001, Vol. 84, No. 10 JOURNAL OF THE AIR FORCE ASSOCIATION

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**About the cover:** A Hawaii Air National Guard F-15 gets in position to refuel over the ocean. See "Guard Over the Pacific," p. 44. Photo by Erik Hildebrandt.

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By John T. Correll, Editor in Chief

## Defense and the Shrinking Surplus

**I**n June, President Bush sent Congress his amended defense budget for the coming fiscal year. It asked for \$18.4 billion more than the placeholder defense proposal he had inherited from the Clinton Administration.

The Bush budget gives the military a seven percent increase, adjusted for inflation. Even so, and as acknowledged by almost everybody, it is not enough to keep the armed forces from slipping further into decline after a decade of underfunding and neglect. The White House budget office called it the "first installment of the President's national defense rebuilding program."

Amazingly, the budget debate now pivots on a phony issue—unfounded fear that Social Security "reserves" are in danger—that threatens to cut off the defense recovery before it gets started.

In late July, word leaked out that the federal budget surplus would be less than predicted just a few months earlier. Speculation arose that the \$18.4 billion defense increase might have to be curtailed.

Sure enough, we learned in August, the surplus had fallen about 40 percent from the level estimated in April and May. The revised estimate was still more than \$150 billion a year, but it was attributable almost entirely to revenues from Social Security.

At that point, the budget debate took a bogus turn.

Bush's political foes accused the Administration of setting up a raid on the Social Security trust fund to pay for defense and other expenses in 2002. The White House, passing up a simple and direct answer for a less relevant one, said there is plenty of money without raiding Social Security.

In fact and by law, the Social Security trust fund does not hold cash reserves, and never has. If there is a surplus after the current year's Social Security benefits are paid, it goes into the general fund in return for government IOUs.

All tax revenues, including those

from Social Security, are spent every year. The only variable is on what.

When the regular, non-Social Security part of the budget is in balance or in surplus, Treasury will use any Social Security revenue it gets to pay down the national debt. When the main part of the budget is in deficit, Treasury has traditionally filled the gap with (a) money received from Social Security if there is any,

### The "raid" on Social Security is a phony issue.

or (b) from the sale of government bonds if there isn't.

In 33 of the past 35 years, the regular budget was in deficit. In 25 of those years, the deficit was offset by a Social Security surplus. The fabled "balanced budget" of 1969, for example, was in balance only when the Social Security surplus was counted.

Sometimes the Social Security program is in deficit. If so, Treasury covers the difference from general funds. This has happened eight times in the past 35 years.

The Social Security surplus has been called, correctly, "an accounting fiction." Its imputed inviolability was invented after the economic boom generated a surplus in the regular budget in 1999, more than sufficient for that year's spending.

Democratic political strategists seized the opportunity to float the idea of a "lock box" that would supposedly preserve the Social Security trust funds. Both parties subsequently agreed that revenues from that source could be used to pay down the national debt but not for current operations. Bush did his part by promising to use Social Security funds only "in case of an economic recession or war."

The regular budget surplus soon

melted. The leading reason, ironically, was the crash of the previously booming economy. The second biggest factor was the tax cut, but neither party wanted to roll that back.

The usual and sensible solution—using some of the large total surplus remaining to fund expenses—is, by agreement, unavailable. It is kept that way by politicians who stir up fears of a "raid" on Social Security.

Secretary of Defense Donald Rumsfeld has told Congress that "every nickel" of the \$18.4 billion increase is necessary and the White House is standing firm on its budget proposal.

It will be a hard fight, and if the proposal survives uncut, the perception may be that defense has gotten its fair share and the problems are fixed. Administration officials feed this misconception by proclaiming repeatedly that this is the biggest defense increase since the Reagan buildup of the 1980s.

That is true, but the bar was not set very high. Between 1985 and 1998, the enacted defense budget, adjusted for inflation, declined for 13 years in a row. In actuality, the proposed defense increase for 2002 is about half of what the Department of Defense needed and reportedly asked for. The recovery is not yet in hand.

The armed forces are operating old equipment that is wearing out, base facilities are dilapidated, stocks of spare parts and munitions are low, and the backlog of maintenance and repair keeps getting worse. The services have been encouraged to innovate and save, but they cannot save themselves out of a hole this deep.

Rumsfeld has told Congress that just to hold the line—making no improvements, but not falling any further behind—the 2003 defense budget will need another increase about the size of the one proposed for 2002. Any progress on the much-touted transformation of the armed forces to meet the needs of the coming century would be at extra cost.

We ought to be worrying about that, not about some mythical raid on the Social Security trust fund. ■



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## The Axe, Part Deux

A letter in the September issue said that this is a "time of testing the courage and integrity of high ranking active duty Air Force officers to speak up about the dangerous and destructive proposal to take out of service more than a third of our most capable strategic bombers, the B-1." [See "The Axe," p. 6.]

Times change. So do threats. Maybe the combination has resulted in the B-1 becoming the "most capable" strategic bomber, but the letter was unclear, to me at least, whether "strategic" referred to long-range conventional or nuclear delivery or both.

High-ranking officers, I absolutely believe, are speaking to their bosses in frank and candid conversations. Why wouldn't they? What may be missing from the conversation is what was being said when the decisions were being made to buy the B-1 in the first place. Times change and so do threats, so it may not really matter what the original intentions were, but I bet it would enliven, if not enlighten, the debate if it could be made a part of the open discussion.

Col. Allan K. Bean,  
USAF (Ret.)  
Jonesville, La.

## Misgivings on Osprey

"The Osprey Factor" [August, p. 66] on the CV-22 restarted some misgivings that [I] first [had] 12 years ago while I was at Bell Helicopter. I was not directly associated with the V-22 program, but my close proximity to some of those who were leads me to believe that my concern was shared.

Before retiring from the Air Force I piloted both multiengine fixed wing and rotary wing aircraft. I feel that each type of aircraft has its own unique and well thought out flight-control systems. My concern is that the V-22, a rotary winged aircraft, is equipped with a fixed wing aircraft's flight-control system. This was done at the insistence of a Marine Corps general and much to the consternation of many of the people working on the [V-22] development.

I transitioned into helicopters after flying multiengines (B-26, KC-97, and

KC-135) for 15 years. The transition was smooth; there was no carryover of fixed wing control instincts. After completing my helicopter tour in Southeast Asia, I returned to the KC-135 without any confusion as to how the flight and power controls should be operated.

The major difference between the two types of aircraft is in the application of power. In fixed wing aircraft, the power is controlled by throttles (power levers)—push for more power, pull for less power. In rotary wing aircraft, the power lever is just the opposite. [It] is pulled up or back for more power and increased rotor blade angle and pushed down or forward for less power and rotor blade angle. "Power settling" is caused by too steep of an approach angle and magnified by the slightest tailwind; recovery is made by decreasing power and blade angle and accelerating forward airspeed. This maneuver calls for an immediate and correct power application. When in an abnormal situation or close to the ground, power applications should be instinctive and not the result of a thought process that has to factor in which cockpit the pilot is sitting in.

I have discussed this with some Bell Helicopter test pilots and human factor engineers [who share] the same concern. I am sure that the Marine Corps wants this control configuration so it matches up with their Harrier jump jet.

If the Air Force were to select and train pilots to fly nothing but the V-22, there would be no problem. However, every USAF pilot is expected to be able to fly, with training, any aircraft in

the inventory. I am an enthusiastic supporter of the tilt-rotor concept for the Air Force but would like to see the Air Force's CV-22 version have rotary winged controls. The conversion would be well within the manufacturer's capabilities. It is interesting to note that Bell Helicopter's commercial version and the Coast Guard's version of the tilt-rotor will be configured with rotary wing controls.

Lt. Col. William J. Warwick,  
USAF (Ret.)  
Lindale, Tex.

## Medevac

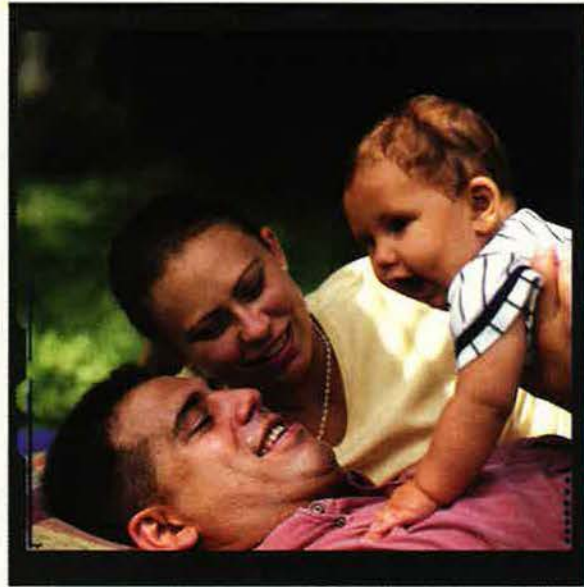
Paul Kennedy is to be commended for his "Pieces of History" in July. The piece entitled "Medevac" [p. 80] was an excellent portrayal of the proud heritage of this Air Force mission. Aeromedical Evacuation proved its importance as a USAF capability early on, and it continues to evolve to meet a changing world. As USAF combat forces have become more light, lean, and lethal under the Expeditionary Aerospace Force concept, the AE system is becoming more light, lean, and lifesaving.

[It] is reorganizing patient staging facilities and evacuation crews into small modular teams. These teams can deploy with a high capability for patient movement with minimal impact on the airlift system. As the mission dictates—and airlift availability permits—additional modules can be deployed to add capacity to this initial high-capability/low-capacity patient movement system. The modular teams have also become more flexible, employing procedures that allow them to use a broader range of opportune aircraft for patient evacuation, to include the C-130, C-141, C-17, KC-135, and C-21. Added to the AE system were Critical Care Air Transport Teams, each consisting of a critical care physician, critical care nurse, and respiratory therapist, along with advanced medical equipment. The CCATTs augment the AE crews to give the AE system the organic capability to manage critically ill patients during transport.

Two recent operations highlight the exceptional capability and global

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**Publisher**  
John A. Shaud

**Editorial** [afmag@afa.org](mailto:afmag@afa.org)

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John T. Correll

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

**US and European Sales Manager**  
William Farrell • 847/295-2305  
Lake Forest, Ill.  
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reach of the AE system. In August 2000, an AE team—augmented by a neonatal team from Wilford Hall Medical Center [in Texas]—flew to Camp Lester Naval Hospital, Okinawa, to place a critically ill newborn on a heart-lung bypass machine. The infant was then transported to Wilford Hall on a 5,700-mile nonstop mission by the only team in the world capable of providing such advanced care during long-range transport. Against all odds, the baby recovered. In October 2000, the 86th Airlift Wing [in Germany] responded to the bombing of USS *Cole* in Yemen by sending in AE crews and CCATTs within hours of the bombing. These crews safely evacuated 39 patients to Ramstein, including 11 who were critically injured. This operation will be honored with the 2000 Mackay Trophy on Nov. 5, 2001. The proud heritage of Aeromedical Evacuation in USAF lives on and continues to evolve with advanced medical capability and cutting-edge equipment, in support of our beneficiaries around the world.

Lt. Col. William Beninati,  
Bolling AFB, D.C.

## Quick and Painless

In the July "Verbatim" [*It Is Written*, p. 63] Army Lt. Col. Steven Sifers is quoted as saying of the air war over Serbia: "Despite a protracted strategic air campaign employing thousands of sophisticated precision guided munitions, airpower achieved none of the initial war aims."

Vietnam was protracted. Getting Slobodan Milosevic, a Soviet-style dictator with everything on the line, to capitulate after two-and-a-half months of air-only combat was relatively quick and painless (at least for the alliance). If the war ended up going extra innings, a fair amount of the blame needs to be apportioned to the man commanding the NATO forces—Gen. Wesley K. Clark, US Army. Perhaps the Army should save the term "protracted" to describe their long running yet futile attempt to get a few Apache helicopters deployed from within theater and into the fight.

Timothy J. Kregel  
Ramstein, Germany

## More on Secrets

I was really intrigued by the article "When Secrets Crash" [July, p. 58], written by Jeffrey T. Richelson, until I noted a gross error I couldn't let escape mentioning. During his recap on the F-117 shootdown near Novi Sad in 1999 he said specially equipped HH-60 and HH-53 helicopters were clandestinely flown on the rescue and recovery mission. In fact, the real



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**To explain these needs to the American people.**



aircraft flown during this mission were the special operations variant, the MH-60 Pave Hawk and the MH-53 Pave Low. Although all USAF's MH-60s have been converted to the HH-60 variant employed by combat rescue forces, USAF hasn't had an HH-53 helicopter in the inventory for some 12 to 13 years, when the last of them were converted to the MH-53J.

I would have expected the author, as a senior fellow and consultant of the National Security Archive, to have a better working knowledge of USAF's current inventory.

Lt. Col. Bill Bassett,  
USAF  
Enterprise, Ala.

### The Tricare Dilemma

I fully realize the Tricare drain is a problem the Air Force needs to deal with, and I would expect the first response would be to those still in the uniform. [See "The Tricare Budget Drain," August, p. 84.] My comment, though, is for those of us past that prime. With [new base closures coming] it should be more affordable to maintain Air Force medical facilities, as there will be a dwindling number. It is, however, unrealistic to expect us to travel cross-country to one of the few remaining Air Force hospitals. The faith needs to be kept with those of us who have retired.

If Tricare is to be reduced, then the military should keep open satellite facilities or negotiate contractual agreements the Air Force thinks are more fair, but don't leave us out in the cold just so the generals can have more F-22s or B-2s to play with.

Lt. Col. Michael A. Moran,  
USAF (Ret.)  
Kokomo, Ind.

Your article is enough to scare anyone thinking of abandoning [an] HMO for the Tricare for Life system. It makes it sound as if the whole military medical system is on very shaky ground.

If the Clinton Administration badly mismanaged military health care budgets, why weren't the surgeons general, members of the Joint Chiefs of Staff, Tricare contractors, and military service associations publicizing the problem and lobbying for changes? As everybody knows, it is Congress that appropriates money, not the President. If the President's budget didn't have enough money for military medical purposes, Congress could have made changes. I seem to recall that since about 1995 the Republicans have controlled Congress and they usually announced that the President's budget was dead on arrival, so it appears

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that there may be enough blame to go around.

Lt. Col. Mary A. Delsman,  
USAF (Ret.)  
Riverside, Calif.

At a time many of us have gotten comfortable with the Tricare for Life concept and look forward to canceling our supplemental medical coverage [this month], along comes your article. Everything I've read suggests Tricare for Life is a fully funded program, and the government is finally taking steps to honor its commitment to military retiree health benefits. Yet, Lt. Gen. Paul K. Carlton Jr. describes the Tricare budget drain as a "death spiral." He also says he is willing to weigh alternatives to Tricare.

It may be that this article is broadly focusing on the entire Tricare program, rather than just the Tricare for Life. Even so, the tone of the article is less than reassuring to millions of retirees who have waited a very long time for some assurance that their government will honor its commitment to quality health care for them and their families. It would be negligent beyond belief to allow retirees to cancel their coverage only to announce some new program that doesn't provide some comparable coverage at no cost to the retiree.

Lt. Col. Donald L. Gilleland,  
USAF (Ret.)  
Suntree, Fla.

### Deep Freeze

Reference your article in the August issue [on] "The Deep Freeze" [p. 76]: I feel that all were given credit for a good job except the unit that was originally responsible for resupplying the Navy and scientists in the late '50s.

Really, [it] is a snap [for] these jets that are now going in and out of the South Pole, compared to the old four-engine C-124s. [They] flew the sup-

plies to McMurdo Sound that the Navy and scientists required for their wintering. Believe me, I, for one, spent my tours at Christchurch, New Zealand, and McMurdo Sound when the days were really rough. By the way, we did lose a few C-124s that never did make it to McMurdo Sound. Please give credit where credit is due.

SMSGt. Edward S. Stepien Sr.,  
USAF (Ret.)  
Panama City, Fla.

I certainly enjoyed the exceptional photography. Salutes to the photographers [and] authors. One small point: Two of those three LC-130s look suspiciously like Navy (vs. NY ANG) aircraft of the now-disestablished squadron VXE-6: LC-130R (BuNo 160740) "XD-02" and LC-130F "XD-03."

Lt. James J. Mulquin,  
USN (Ret.)  
North Bethesda, Md.

### ■ We should have noted that.—THE EDITORS

You left out some of the earliest participating units. The units of the 61st Troop Carrier Group (H), 63rd Troop Carrier Wing (H), started resupply missions from McMurdo Sound in 1956 using C-124 aircraft. That was challenging and exciting flying, especially between Christchurch and McMurdo at low altitudes in some of the worst weather conditions ever encountered.

Col. Kenneth W. Blan,  
USAF (Ret.)  
Clearwater, Fla.

### Corrections

In the "Space Almanac" in the August issue, p. 38, the Sea Launch launch vehicle should be Zenit-3SL. On p. 50, the Taurus launch vehicle has four stages.

By Peter Grier

## Ryan: US May Need Space Weapons ...

The US will soon have to decide whether to deploy offensive and defensive capabilities in space, said Gen. Michael E. Ryan, the recently retired USAF Chief of Staff. Bringing the issue to the forefront, he said, will be the continued increase in the number of vital satellites on orbit.

Soon, the Pentagon will have to devise ways to defend critical assets in space, Ryan said. He explained that the United States might do so in a purely defensive way but added, "I would say that, eventually, we are going to have to have capabilities to take things out in orbit."

Ryan, who retired Sept. 6, made his remarks in an Aug. 1 session with defense writers in Washington.

Space systems are already an area of huge "asymmetrical" advantage for the US, he noted and added, "Should we lose them, it will be a huge blow."

## ... And Research Is Under Way

The Pentagon is already spending research money to develop a space based laser capable of blasting ballistic missiles, Ryan said, adding that it might be ready for on-orbit test by 2010.

Ryan also said the Pentagon might eventually develop a space bomber—a hybrid system that would blast off like a missile and fly at hypersonic speed to targets anywhere on Earth, all in a matter of minutes. Precision munitions dropped from such a bomber would have such destructive force that they could destroy deeply buried bunkers without the use of explosives.

Asked whether the US should develop and deploy actual anti-satellite weapons, Ryan replied, "I think that we ought to have the capability. In fact, we are charged at [US] Space Command to be prepared to do that."

The Air Force Chief acknowledged that weaponization of space carries "huge policy implications" and also faces "some legal hurdles."

## Predator UAV Crashes in Iraq

On Aug. 27 an Air Force Unmanned Aerial Vehicle flying a reconnaissance

## Bush Taps the Air Force's Myers for JCS Chairman

As President Bush saw it, Gen. Richard B. Myers of the Air Force was "the right man to preserve the best traditions of our armed forces while challenging them to innovate to meet the threats of tomorrow."

That, he said, is why he nominated Myers to become the next Chairman of the Joint Chiefs of Staff, succeeding Army Gen. Henry H. Shelton in that job.

Bush made the Aug. 24 announcement from a community center near his ranch in Crawford, Tex. It marked the end of a lengthy search-and-decision period in which Bush and Secretary of Defense Donald Rumsfeld interviewed a large number of candidates.

Myers was already familiar with the job. The veteran fighter pilot served for more than a year as the JCS vice chairman, frequently taking up the duties of the Chairman when Shelton was traveling.

Myers would be the first Air Force officer in the nation's top military post since Gen. David C. Jones, who was Chairman in the period 1978–82.

Myers served as both commander of 5th Air Force, Yokota AB, Japan, and as overall commander of Pacific Air Forces. He was commander in chief of US Space Command, 1998–2000, where he was a forceful proponent of space power.

Myers grew up in Merriam, Kan., and graduated from Kansas State University, where he signed up for the Reserve Officer Training Corps. He entered the Air Force in 1965.

His unusually broad career has included 4,000 flying hours in a variety of aircraft as well as a stint directing the Air Force fighter acquisition program.

mission crashed in Iraq and was destroyed. A second UAV fell to Earth Sept. 11.

The August event marked the first time in 10 years of post-Gulf War operations that USAF has lost any kind of aircraft in Iraq. The downed aircraft—a Predator UAV—failed to return to base after its mission.

US officials, if they knew the cause of the crash, did not immediately disclose it. Baghdad claimed it had shot down the UAV in a combat operation. The Pentagon did not dispute the claim but said the loss may have stemmed from technical failure.

Meantime, Air Force officials warned that the incident underscores the increasing dangers that confront pilots carrying out daily patrols of the skies over Iraq in Operations Northern and Southern Watch. (See box on p. 13.)

Pentagon officials said the Predator was lost not far from Basra, a city at the southern extremity of Iraq. Details on the second crash were not immediately available.

## Roche Seeks New C-17 Funds

Secretary of the Air Force James G. Roche has asked the Pentagon to add about \$200 million to its pending

budget to buy long-lead items for more C-17 transports.

Roche reported that the Air Force forgot to include the request in its program for the Fiscal 2002 budget. He chalked up the oversight to the great haste with which the new spending plan was developed in the summer.

He told defense reporters on Aug. 14 that he asked Defense Secretary Donald Rumsfeld to bring the matter to the attention of Congress, which would have to rectify the problem. (InsideDefense.com reported the oversight and the amount on Aug. 10.)

"As we put together the '02 amendment, it was done so quickly that, in fact, the long lead for that fell through the cracks," said Roche.

The long-lead money is important because it is necessary to keep the Boeing C-17 production line running at an efficient rate in Fiscal 2003.

Current plans call for the Air Force to buy only 12 C-17s during that year, not the 15 Boeing considers optimal. The extra \$200 million would put the service in a position to increase its 2003 C-17 order.

## Aldridge: No F-22 Tail Cracks

Defects found over a small area of

# The September Massacre—Sept. 11, 2001

Shocking the world, faceless terrorists launched an astonishing clockwork air blitz on America's key military and financial power centers.

President Bush declared the sneak attacks to be "acts of war," and members of Congress called for a military response.

In a well-planned and well-coordinated operation, suicide teams hijacked four huge commercial jetliners and crashed them into two World Trade Center towers in New York, the Pentagon in Washington, D.C., and—in an apparent failure—the Pennsylvania countryside.

It was the deadliest terrorist event in American history and most dramatic assault on US soil since Pearl Harbor on Dec. 7, 1941.

With deaths still being counted, the September Massacre may yet prove to be the worst single day of carnage in US history, surpassing even Sept. 17, 1862—the day more than 4,000 American soldiers died in the Civil War's Battle of Antietam.

The attack leveled the World Trade Center's twin 110-story towers, caused chaos at the Pentagon, paralyzed domestic air traffic, and put the US military on something close to a war footing.

Of the 266 passengers and crew on the four aircraft, none survived. At the Pentagon, 124 civilians and active duty military personnel were dead or missing. The number of dead in the Twin Towers is as yet unknown, but it is surely in the thousands. A total of 4,957 people were missing in the World Trade Center catastrophe, officials said Sept. 16. Among those lost in the conflagration were some 300 New York firefighters and police.

While no terrorist organization claimed "credit" for the raids, US officials said they saw the hand of Muslim extremists who are linked to Osama bin Laden, the fugitive Saudi Arabian mastermind of many previous terrorist spectacles.

Other suspects included the security and intelligence organs of Iraq and Iran and the terror groups Hamas and Islamic Jihad.

Bin Laden resides in Afghanistan and enjoys protection of that nation's Muslim extremist rulers, known as the Taliban. That fact alone immediately put the Central Asian nation and its leaders in danger of US military action.

Addressing the nation on the day after the attacks, Bush declared, "We will make no distinction between the terrorists who committed these acts and those who harbor them."

At home, US military activity was immediate and extensive.

Air Force F-16 and F-15C fighters, controlled by North American Aerospace Defense Command, launched combat air patrols over more than 30 US cities. The combat aircraft were deployed to enforce an unprecedented ban on civilian air traffic over the United States. The concern was that terrorists would attempt further attacks using airliners.

Secretary of Defense Donald Rumsfeld said the fighters would continue to fly CAP "as long as it is appropriate."



—Agence France-Presse



DOD photo by Gerry J. Gilmore

The Pentagon also sent aloft at least one E-3 Airborne Warning and Control System aircraft to keep track of activity in the skies and provide early warning of any further attack.

The Navy deployed a group of ships equipped with anti-aircraft missiles to patrol the US East Coast and West Coast.

The Pentagon on Sept. 14 asked Bush to authorize the activation of thousands of reserve troops for "homeland defense," primarily increased "strike alert" protection in the air.

Rumsfeld planned to activate at least 30,000 reservists and National Guard members, including pilots, flight crews, military police, flight controllers, and others at military bases.

Rumsfeld was also expected to announce expanded fighter operations from 26 domestic US bases.

Meanwhile, the Pentagon's second-high-

est-ranking official said Sept. 13 that Washington planned to mount a "sustained" military campaign against terror forces abroad.

"It's going to unfold over time," said Deputy Defense Secretary Paul Wolfowitz. "One thing that is clear is you don't do it with just a single military strike, no matter how dramatic. ... It will be a campaign, not a single action," he said. "And we're going to keep after these people and the people who support them until this stops."

Wolfowitz added:

"These people try to hide, but they won't be able to hide forever. They think their harbors are safe, but they won't be safe forever. I think one has to say it's not just simply a matter of capturing people and holding them accountable, but removing the sanctuaries, removing the support systems, ending states who sponsor terrorism."

—by Robert S. Dudley

## Defense Needs Every Nickel, Says Rumsfeld

The Administration will fight any attempt by Congress to trim its defense budget request, Secretary of Defense Donald Rumsfeld said during an Aug. 23 appearance in the Pentagon press briefing room.

The armed forces need every nickel of the \$18.4 billion increase in funds that the White House wants, said Rumsfeld. "Defense is a priority that's distinctive, and the President has indicated that," he said.

Some lawmakers have begun grumbling that shrinking surplus predictions make it less likely that the Defense Department will get all it wants. On Aug. 22, the Office of Management and Budget lowered its estimate of the Fiscal 2001 surplus to \$158 billion. That's the second largest amount of black ink ever recorded by the federal government—but virtually all of it is generated by the Social Security and Medicare trust funds, which politicians of both parties have vowed to protect.

Even top Republicans have begun indicating that the defense budget increase might be in danger.

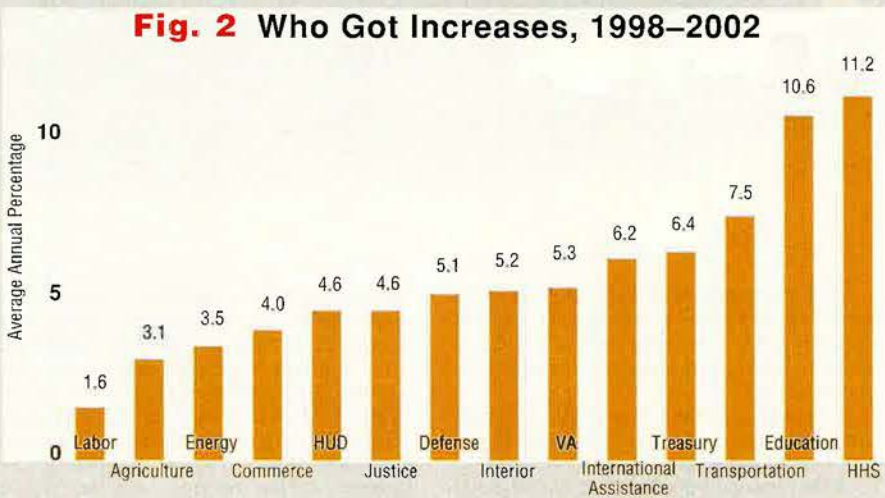
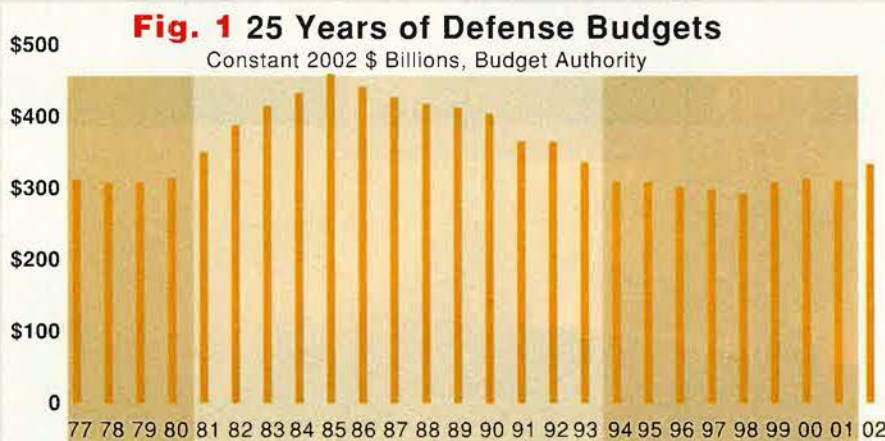
"If we don't have \$18 billion, we won't do \$18 billion," said Minority Leader Sen. Trent Lott (R-Miss.) earlier this year.

President Bush's original request for Fiscal 2002 defense money, submitted shortly after he took office, was for \$310 billion, up from \$296 billion in 2001.

Subsequently the Administration asked for \$18.4 billion more, to cover increased health costs, more missile defense spending, and other Bush priorities.

Rumsfeld predicted that the increase would, in the end, win approval—despite the current level of Congressional static.

"I've generally found that there are always some people who are against defense spending at any level. And yet when the votes tend to be done, they seem to find a majority to support a strong national defense," he said.



*Pundits often refer to Bush's 2002 DOD budget as if it were unusually large. It is not—not by historical standards. The Bush budget is \$328.9 billion. As Fig. 1 shows, that is only a bit larger than any of the eight Clinton budgets (1994–2001), but it is smaller—usually far smaller—than any of the Reagan or Bush I defense budgets (1982–93) and even the last Carter budget (1981). In other words, over the last 25 years, the new budget ranks 13th in size. Fig. 2 shows that DOD experienced 5.1 percent annual growth over the past five years. However, that rise was smaller than seven of 13 major US agencies. Moreover, the modest increase was preceded by 13 straight years of budget cuts.*

an F-22 tail are no problem and should not necessitate any structural redesign, said Pete Aldridge, undersecretary of defense for acquisition, technology, and logistics, at an Aug. 15 appearance before reporters.

"Crack" isn't even really the right word to use in this context, according to Aldridge.

He noted that there is a honeycomb

structure inside the tail that is used to fill a void, and technicians have found that, in a few of the Raptors currently undergoing flight testing, some of that honeycomb has pulled away from an internal structural member.

"There is no crack in the F-22 tail, OK?" Aldridge said in response to a question. "It's not a structural problem. ... It's a delamination of an area."

Air Force Secretary Roche echoed Aldridge's statement. "You've read about the little delamination that's around the pivot point," said Roche. "It's not a problem. You build with plastics, that happens. It happened to every plastic airplane."

The Pentagon in August approved production of nearly 300 more of the F-22 fighters.

## McCain Sees "Pork" in Veterans Bill

Pork barrel projects abound in the funding bill for the Departments of Veterans Affairs and Housing and Urban Development, according to Sen. John McCain (R-Ariz.).

Senators earmarked \$523 million, for 492 "parochial projects" in the bill, said McCain.

On Aug. 2, the Senate rejected an amendment proposed by McCain that would have shifted \$5 million of this money to veterans' accounts.

The projects include:

- \$100,000 for a spaceship-shaped museum in Nevada.

- \$1 million to celebrate the bicentennial of the Louisiana Purchase.

- \$200,000 for historical renovation to an art museum in Newport, R.I.

- \$350,000 for Pittsburgh's Harbor Gardens Greenhouse Project, a large glass building dedicated to producing orchids.

"I really believe it would be a good idea to grow orchids in Pittsburgh," said McCain. "I also happen to believe our veterans ... [are] a greater priority."

## Handy, Foglesong Named for New Posts

Gen. John W. Handy, vice chief of staff of the Air Force, has been nominated by President Bush to become the commander in chief of US Transportation Command and commander of Air Mobility Command, the Pentagon announced Aug. 6.

Handy has been in his present post since April 2000. Prior to that, he served as deputy chief of staff for air installations and logistics and commander of 21st Air Force at McGuire AFB, N.J., among other positions.

Lt. Gen. Robert H. Foglesong, the Air Force's deputy chief of staff for air and space operations, was tapped to move up to become the vice chief and receive a fourth star. Foglesong is a former commander of 12th Air Force at Davis-Monthan AFB, Ariz.

## B-1Bs Will Be Moved, Says Roche

The Air Force and Pentagon will persist in attempts to cut the B-1B bomber force from 93 to 60 aircraft and consolidate the remaining aircraft at Dyess AFB, Tex., and Ellsworth AFB, N.D., according to Secretary of the Air Force James Roche.

Lawmakers from states that will lose airplanes are opposed to the move, acknowledged Roche during an Aug. 9 press conference near Robins AFB, Ga., one of the affected installations.

But the need to save money is paramount. At 90 aircraft, the B-1B

## Base Closing Fight Begins

The Administration submitted its long-awaited base closing legislation to Congress on Aug. 3, marking the official beginning of what is likely to be a contentious effort to trim fat off the nation's military infrastructure.

If previous base closing rounds are any guide, lawmakers from states with endangered installations are sure to battle the effort.

"It's going to be tough," said Pete Aldridge, undersecretary of defense for acquisition, technology, and logistics, at a news conference.

If Congress passes the Efficient Facilities Initiative of 2001, Secretary of Defense Donald Rumsfeld will work with the services on a comprehensive review of DOD installations, with an emphasis on their military value. He would then recommend an infrastructure plan to a nine-member EFI commission by March 2003.

The commission—composed of persons appointed by both the legislative and executive branches—would deliberate this plan and then forward its own recommendations to the President by July 2003. Once the plan hits the Oval Office, President Bush would have two weeks to accept or reject base closing recommendations in their entirety.

Following Presidential action, Congress would have 45 days to pass a resolution that would kill the plan, on a similar all-or-nothing basis. Absent such a move, the closures would become binding.

The Secretary of Defense must then "initiate the binding recommendations within two years and complete them within six years," said Aldridge.

fleet is not mission ready. Its budget for maintenance and upgrades is at least \$2 billion short.

"I would not send that plane into heavy combat today, unless I had that \$2 billion," said Roche.

At Robins, loss of the B-1B mission would result in the loss of about 550 full-time Air National Guard jobs. But those affected are likely to be retrained as information technology specialists.

Robins employs about 23,000 personnel, the bulk of whom work at Warner Robins Air Logistics Center. Since the Administration has proposed a new round of base closures, the loss of any mission raises fears that a base may become a prime closure candidate.

However, the Secretary was unequivocal about his endorsement of the ALC at Robins.

"I would not worry about Warner Robins. I need Warner Robins and I need it to be a world-class center," said Roche.

## Aldridge Still Assessing Osprey

Pentagon acquisition chief Pete Aldridge says he has been briefed on the troubles of the V-22 tilt-rotor aircraft but has not yet decided where he stands on the program's future.

"I'm going to reserve judgment," he told reporters at an Aug. 15 Pentagon briefing.

There are still many uncertainties surrounding the program, he said, from the aerodynamic phenomena it creates during flight to the possible need for reliability improvements.

"It's just a very difficult problem to decide upon, and we are not going to decide quickly," he said.

## Study Prompts Look at JP-8 Health Effects

An 18-month study led by the Air Force surgeon general has investigated complaints of acute, short-term health effects among personnel who work closely with JP-8 jet engine fuel—and determined that more effective protective clothing may be necessary.

The effects in question are similar to those experienced by painters working in closed rooms or others who work closely with solvents. They include dizziness, lightheadedness, and skin irritation.

For fuel cell maintainers and others at risk "we have protective equipment and technical orders in place, but we're taking the initiative to explore recent advances in equipment that may provide greater protection," said Lt. Col. Thomas Neal, chief consultant for occupational medicine at the Air Force surgeon general's office.

Study results so far indicate no long-term health problems from JP-8 exposure, said Neal.

## Maintainers Finish START Job

Maintainers from the 90th Space Wing, F.E. Warren AFB, Wyo., have finished reconfiguring 150 Minuteman IIIs to turn them into single-warhead weapons.

The ICBM nosecones previously contained three independently targetable warheads.

This reduction in striking power was called for by the terms of the START I nuclear arms control agreement between the US and the Soviet Union. When the Soviet Union collapsed, Russia assumed its treaty obligations and START I continued in

## USAF Names Distinguished Dozen

The Air Force has selected the 12 Outstanding Airmen of the Year for 2001, honored as the service's top enlisted members.

The 12 selectees, whose names were announced July 20, are authorized to wear the Outstanding Airman of the Year ribbon with bronze service star device. The Air Force Association sponsors the award. The selectees are:

**SSgt. Dennis L. Alexander**, Pacific Air Forces  
**MSgt. (sel.) Marla D. Cornella**, Air Education and Training Command  
**TSgt. Myrna L.S. Cornelson**, Air Force Reserve Command  
**SSgt. James J. Delo Jr.**, Air Combat Command  
**SSgt. Gregory W. Fry**, Air Intelligence Agency  
**TSgt. Ronald A. Gisel**, Air Force Honor Guard, 11th Wing  
**MSgt. (sel.) Monica M. Hill**, Air Combat Command  
**SSgt. Tien N. Ho**, Air Mobility Command  
**SMSgt. (sel.) David D. Lesleur**, Air Force Materiel Command  
**MSgt. (sel.) John A. Maldonado II**, US Air Forces in Europe  
**SSgt. Brandon R. Pearce**, Air National Guard  
**SSgt. Jason Raether**, Air Force Space Command

force. The Air Force maintainers completed their work Aug. 6, four months ahead of schedule.

"It's not every day that you go to work knowing you completed an international treaty," said A1C David Glass, a Minuteman III maintenance technician.

### Air Force Pushes Data Link Upgrades

At Air Combat Command, the Aerospace Command and Control & Intelligence, Surveillance, and Reconnaissance Center is wrapping up a Tactical Data Link Roadmap intended to smooth the way for upgrades of data links throughout the force.

Data links allow information to be sent graphically to aircraft via a computer link, as opposed to voice communication over radios. They are exceptionally effective—increasing daytime air-to-air kills by three times and nighttime kill ratios by more than four times and boosting air-to-ground targeting success to nearly 100 percent.

"Right now we have less than 400 aircraft that have data links," said Capt. Kjall Gopaul, Aerospace C<sup>2</sup> & ISR Center's data link expert. "Within the next 15 years, that number is expected to explode by 1,000 percent."

The roadmap will set priorities for data link implementation within and across Air Force mission areas.

### Airlifters for Space Launch?

Air Force Research Laboratory is looking at a concept to transform the C-17 transport and other large airlifters into flying space launch com-

plexes. The plan calls for equipping each aircraft with a pneumatic launch tube that would spit small expendable or reusable spaceplanes, carrying microsattellites, out the back of the transport.

The new concept could produce a modular system that could allow airlifters to be reconfigured to space launch mode in less than a day, claims its inventor, Ken Hampsten, who is head of AFRL's Space Vehicles Directorate's Advanced Space Transportation branch.

The tube, which would be integrated into the inside of the cargo bay, would expel the small spaceplane out of the aircraft—flying at about 40,000 feet at approximately 530 mph—over the

ocean. The process would give the spaceplane a head start in altitude and speed, possibly lowering the propulsion system orbital velocity requirements by up to 10 percent.

The whole system would provide the low flight cost, high reliability, and quick turnaround that is needed to feed microsattellite constellations, which can range from 40 to more than 200 satellites.

The system could also provide "a quick and cheap way to send supplies up to the International Space Station," said Hampsten.

### Tech Orders Going Digital

The Air Force is quietly revolutionizing its aircraft maintenance by converting millions of pages of technical orders into billions of electronic bytes.

At the direction of the Department of Defense, USAF is testing digital technical orders at several bases, aiming for implementation of an Air Force-wide system by 2004.

Digital tech orders, displayed on computers, are far easier to update than printed versions. They're also far less bulky. There are 1.4 million pages of tech data that support the F-16, for example, weighing in at around 14,000 pounds. Yet one test electronic system holds the whole set—and weighs eight pounds.

"We anticipate more than \$200 million in savings over the lifetime of the aircraft, and that's just for the F-16," says Al Simpson, an Air Combat Command digitalization field service evaluation manager.

Nor are all test systems laptops. The Air Force is also looking at eye-

## DOD Takes Second Look at Up or Out

The Pentagon is considering longer tours of duty and a relaxation of "up or out" promotion rules in an effort to increase military job satisfaction.

Longer tours would allow members of the armed forces to become more proficient at each position, David Chu, undersecretary of defense for personnel and readiness, told reporters at an Aug. 8 Pentagon briefing. They might also ease family strain and increase retention.

"One of the reasons I do think we get people declining assignments that in the past have been seen as plum jobs is because the families have said, 'We've had it. You know, we're not moving,'" said Chu.

The downside of longer tours might be that key personnel would have fewer experiences in preparation for senior posts.

"The issue, of course, is can I substitute some other vehicle for giving them that preparation," said Chu. "The average tour is very short. ... Are we demanding so much that it is so badly undercutting family life that we are turning away many talented people?"

At the same time Pentagon officials are considering relaxation of the up-or-out rule to help the military fill critical skill slots, such as computer technician, and allow people to stay longer in jobs they enjoy. For instance, Chu cited the oft-repeated example of officers who want to stay in the cockpit rather than advance to command positions.

He said, "The critics would say we've driven the up-or-out principle, both in the officer and enlisted force, a little bit too far."

pieces that project the equivalent of a 15-inch digital screen to the user, and other versions of "wearable" hardware.

### Some Enlisted To Get Pay Hike

Some Air Force command chief master sergeants and first sergeants may be eligible for special duty assignment pay of up to \$165 a month.

The planned increase, effective Oct. 1, is meant to recognize the special demands placed upon these NCO leaders, whether active, Guard, or Reserve.

Among criteria for eligibility: Recipients must be master sergeants and above, serving in an authorized billet. Command chief master sergeants must be serving in Special Duty Identifier 9E000. First sergeants must have completed the First Sergeant Academy and be serving in Special Duty Identifier 8F000.

### Army Guard Releases C-23 Crash Findings

The March 3 crash of a Florida Army National Guard C-23B Sherpa that killed 18 Virginia ANG members and its three Army Guard flight crew was caused by crew error, according to an accident investigation report released Aug. 6.

The report said the Sherpa crew, because it did not properly load the aircraft, created a cargo weight imbalance.

In an unusual dissent, however, the Florida National Guard official who convened the investigation board claimed that an imbalance of cargo was only one factor contributing to the accident.

The Florida adjutant general, Army Maj. Gen. Ronald O. Harrison, said he believed the aerodynamic forces produced by a severe thunderstorm was the primary cause of the crash.

Harrison cited a weak weather radar, poor route selection, possible cargo imbalance, and design limita-

## Iraq Rebuilds Defenses, Intensifies Effort

Iraq has rebuilt air defenses damaged by US and British warplanes in last February's extensive bombing raids, say US officials.

In particular, some fiber-optic communications cables linking defense sites have been re-laid, Secretary of Defense Donald Rumsfeld said at an Aug. 3 meeting with reporters. The cables, a target of the February strikes, could enable anti-aircraft missile batteries to fire without having to be guided by nearby, easily detectable radars.

"It does appear that Iraq has been successful in quantitatively and qualitatively improving [its] air defense," said Rumsfeld.

Slicing the cables with another attack might prove difficult. They have now been buried, and Saddam Hussein knows that the US knows of their existence. Instead, the US is weighing other response options.

"If you're going to do something, one question is, What's its value and for how long does it last?" said Rumsfeld. "One tends to want to do things that will have somewhat more lasting effects."

Reconstruction of the cables is only part of a stepped-up Iraqi air defense effort, according to the Pentagon. Saddam is doing his best to try to bring down a US or coalition aircraft.

Through the first seven months of this year, the US counted 370 "provocations" against airplanes enforcing Operation Southern Watch, as opposed to 221 for all of 2000. Anti-aircraft gunfire, missile launches, and radar lock-ons all count as provocations. Operation Northern Watch has seen 62 provocations through July 31, compared to 145 in the previous year.

The increased volume of fire does not necessarily mean Iraq is coming closer to hitting an aircraft. "Sometimes [they're] closer, sometimes they're farther away. I'd be hard-pressed to make an across-the-board assessment" of their capabilities, said Pentagon spokesman Rear Adm. Craig Quigley on July 31.

In response, Northern Watch warplanes have launched seven strikes on Iraq through July 31, as opposed to 48 in 2000. The corresponding figures for Southern Watch are 19 this year and 32 last year.

The US "reserve[s] the right to strike targets at a time and a place and a manner of our choosing," said Quigley.

tions of the autopilot system as secondary factors.

According to the investigative report, the airplane was carrying "a large amount of personal baggage, as well as four large toolboxes, two sets of golf clubs, and a commercial stereo system (about 25 pounds)." Investigators could not determine the exact position of passengers and cargo but believe that the aircraft was over its maximum weight.

In his briefing, Harrison stated that none of the contributing factors could have individually caused the crash. "Only this combination of factors, acting together on the aircraft at one precise moment, pushed the

aircraft beyond its normal operating limits."

The investigation was conducted by Army and Air Force experts.

### Hero at Mogadishu Retires

USAF MSgt. Timothy A. Wilkinson, the only enlisted Air Force Cross recipient in uniform, retired from active duty July 20.

Wilkinson, a pararescueman, received the medal for heroic efforts in supporting Task Force Ranger during an 18-hour firefight in Mogadishu, Somalia, in October 1993.

A Somali rocket propelled grenade had shot down a US Army MH-60 helicopter, sending the aircraft and its load of Rangers to the streets of Mogadishu. A firefight with Somali irregulars ensued. Wilkinson ran repeatedly through enemy fire to extract, one by one, five wounded Army Rangers. As the fight continued, he crossed an exposed intersection twice to bring medical supplies to more wounded and helped fight off the attackers.

The US suffered 18 dead and 80 wounded that day, but the toll would have been far worse had it not been for Wilkinson's efforts.

The Army Ranger team leader on the scene said that Wilkinson displayed absolutely no fear throughout the ordeal.

## Spence, Former Armed Services Chairman, Dies at 73

South Carolina Congressman Floyd D. Spence, a Republican and former chairman of the House Armed Services Committee, died Aug. 16 of post-surgery complications. He was 73.

Spence was a staunch supporter of military spending and a proponent of national missile defense throughout his years in the GOP leadership. First elected to Congress in 1970, he ascended to the top post of what was then called the National Security Committee after his party took control of the House in 1995. He stepped down from the post earlier this year.

Spence retained the chairmanship of the panel's subcommittee on military procurement until his death.

Spence's basic position was that the world was a dangerous place and that in the post-Soviet years America needed as strong a military as ever to deal with regional conflicts.

## Age of Aircraft Only One Part of O&M Problem

The rising age of the aircraft fleet is a significant factor driving up Operations and Maintenance costs, even though other problems figure into the O&M increase as well, according to Air Force officials.

They made their comments following release of a Congressional Budget Office report that cast doubt on claims that aging weapons are the main force behind spiraling O&M costs.

"Aging aircraft are a considerable concern to the Air Force, as they are to all the services with their types of respective equipment," said Lt. Gen. Michael E. Zettler, deputy chief of staff for installations and logistics, at an Aug. 16 press conference.

Since 1996, the number of hours flown by Air Force pilots has remained relatively constant. Yet flying hour costs have been going up by about 10 percent per year, according to figures presented by Zettler, even after adjusting for inflation and the highly variable cost of fuel.

One reason the same airplanes have become more expensive to fly is that they consume more spare parts as they age. Within the flying hours category, the cost of spare parts has risen 50 percent since 1996, according to Air Force data.

"That's the cost we associate with aging," said Zettler.

F-15s, for example, have seen a large cost increase in maintaining engines as they go through a cyclic replacement of the parts that have literally worn out over their 15- to 20-year operating time.

Congressional Budget Office analysts, by contrast, figured the rise in spares costs at 10 percent since 1995, instead of 50 percent.

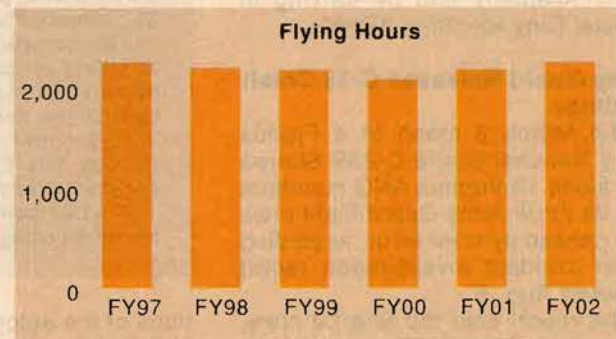
Their report, released in August, held that O&M costs for aircraft increase by one to three percent for each additional year of age—well below Air Force estimates.

Other driving forces—such as the need to factor in rising health care costs and more stringent environmental requirements—have pushed up O&M costs faster than aircraft age, according to CBO.

Air Force officials agree that these other factors are important. But they feel that for technical reasons CBO analysts have underestimated aging's effects.

"We believe it's in the methodology, and we've got apples and oranges," said Zettler.

### Aging Fleet Indicators



### DOD Braces for Health Cost Rise

The Defense Department is preparing to pay for the new lifetime health care and prescription drug benefits mandated by the Congress for military retirees age 65 and over.

The benefits, provided under the banner of the Tricare health care program, will cost \$3.9 billion in Fiscal 2002, according to the Pentagon's top personnel officer.

"This is a better package than the average American is going to receive," said David Chu, undersecretary of

defense for personnel and readiness. "But these people have also done things that are different from the average citizen."

DOD's plan called for activating the so-called Tricare for Life system on Oct. 1. Under that plan, 65-and-over military retirees would use Medicare as the primary insurer, with Tricare serving as a second payer on many costs not covered by Medicare.

Until now, military retirees were forced out of the Tricare system and

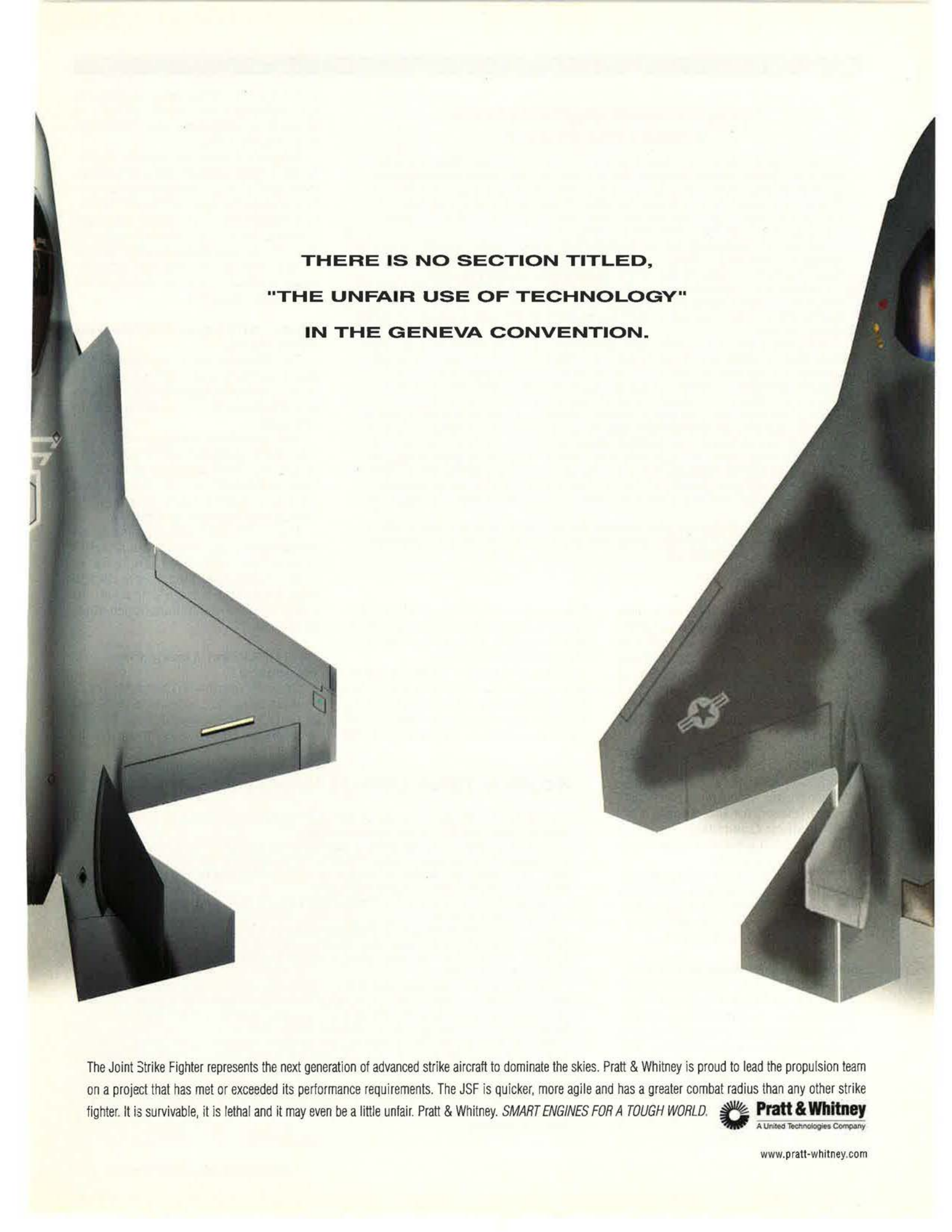
into Medicare at age 65. Many had to buy expensive private insurance supplements to pay for uncovered expenses.

Tricare is now supposed to fill that role, but Tricare officials had not yet made public a full listing of expenses that will or will not be covered.

### US-Europe Defense Spending Gap Narrows

The gap between US and European defense spending burdens has narrowed over the last 15 years, but





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## Public Supports Missile Defense, Knows Little About It

Public opinion polls show that Americans, in general, support the concept of defenses against ballistic missiles. But the surveys also reveal that the respondents know little about the subject and that their opinions remain unsettled.

"Few Americans have followed the issue closely, and most are unaware that the United States does not already have such a system," said an analysis published Aug. 1 by the Gallup Organization.

The idea of missile defense has received high marks in polls since the days of Ronald Reagan. When Gallup asked about the development of Reagan's "Star Wars" program in 1986, 52 percent of respondents said they favored it.

More recently, a Gallup survey from last February found that 44 percent of Americans support research, and possible development, of a defensive system. Twenty percent said they were opposed, and 36 percent said they were unsure of their opinion.

But missile defense is down near the bottom of policy issues that average Americans are following. In a CBS/*New York Times* survey from last year, only six percent of respondents said they were following the subject "a lot." Fully 58 percent believed the US was already protected by missile defenses, with another 14 percent unsure as to whether a shield was already in place or not.

Given their lack of knowledge about the subject, Americans thus respond with different opinions about defenses, depending upon how the question is asked. Told that the Pentagon has already spent \$60 billion on defenses and that opponents think it won't work, 52 percent of ABC News poll respondents said they oppose development. When told in the CBS/*New York Times* survey that building defenses would mean ending an arms control treaty with Russia, 52 percent of those who had initially supported the system changed their minds and registered opposition.

These variances suggest "that attitudes on the matter could undergo a significant fluctuation in the wake of a public debate about the merits of the proposed missile system," said Gallup.

it still is large, according to a new Congressional Budget Office report.

In 1985, near the peak of the Reagan Administration's military buildup, the US defense budget was equivalent to about 6.7 percent of US Gross Domestic Product. For NATO Europe, the corresponding figure was an average of 3.5 percent.

By 1999, the US figure had declined to 3.0 percent of GDP, while Europe's burden shrank less slowly, to 2.3 percent, according to a CBO study prepared for the Senate Foreign Relations Committee. Numbers for Fiscal 2000 were expected to be similar, projected CBO.

The only European allies whose 2000 defense spending-to-GDP ratio was projected to be higher than that of the US were Greece, at 4.9 percent, and Turkey, at 6.0 percent.

### BMDO Presents Reorganization

Lt. Gen. Ronald T. Kadish, director of the Ballistic Missile Defense Organization, was to propose a streamlined management plan for BMDO at a meeting with senior defense officials Aug. 16, according to Pentagon acquisition chief Pete Aldridge.

Final details are not yet set, but the plan would allow the BMDO director to make quick program decisions across the whole range of technolo-

gies he now oversees. BMDO management would become similar in flexibility and style to that of the National Reconnaissance Office.

Given that Kadish oversees multiple approaches to everything from terminal defense to boost-phase intercepts and missile defense command and control, "he cannot afford

all the [typical Pentagon procurement] oversight and scrutiny of every one of his programs every day," Aldridge told reporters Aug. 15.

A Senior Executive Council of Defense Department officials would provide BMDO with board of directors-like oversight, said Aldridge. When, or if, deployment decisions are made on specific missile defense technologies, those programs would then be turned over to the services and become subject to the normal defense acquisition process.

### Report: NRO Loses Satellite Data for 12 Hours

The National Reconnaissance Office may have lost touch with one of its most technologically sophisticated spy satellites for a 12-hour period in late July.

The satellite in question was a Series 3100 radar-imaging Lacrosse, according to an account of the incident published in the *Washington Times*. Lacrosse radar can operate through clouds and at night.

The NRO declined comment on the specific malfunction, but an NRO spokesman said that from time to time US spy satellites automatically shut down into a "safe" mode in the event of computer malfunction or other problems.

### Retired Airman Arrested for Espionage

Brian P. Regan, a retired Air Force master sergeant, was arrested and charged with conspiracy to commit espionage. He worked for a govern-

## Academy Takes a Step to Resume Powered Flight

On July 31, officials of the US Air Force Academy announced they will resume powered flight training in the summer of 2002.

There has been no powered flight training at the academy since 1997, when it was suspended due to accidents involving T-3 Firefly aircraft. Beginning in late 1998, the academy initiated an Introductory Flight Training program contracted with civilian flight schools in the local area.

Taking this training back in-house will provide the extra rigor of military oversight, note officials.

"Civilian flight schools are concerned with preparing students for their [Federal Aviation Administration] check ride, not with preparing them for the challenges of [Undergraduate Pilot Training]," said Lt. Col. Kathy Doby, 557th Flying Training Squadron commander.

The academy takes such preparation seriously, since it provides almost 50 percent of the Air Force pilot candidates in UPT. Its cadets also generally do well—the academy has a 50 percent lower attrition rate for pilot training than the Reserve Officer Training Corps or Officer Training School.

Increased noise as flights resume is a concern for many in the surrounding Colorado Springs community. But the program will consist of only 300 students to start, as opposed to 650 in previous years. The number of sorties will be capped at 96 per day.

"Obviously, no matter what we do, short of quitting flights altogether, some folks aren't going to be happy," said Col. Korby von Kessel, 34th Operations Group commander.

## Kadish Says October NMD Test Will Be a Repeat

The next test of the Pentagon's missile defense technology will look very similar to the last one.

In particular, that means it will not have any more sophisticated decoys or other countermeasure devices than did July's successful intercept experiment. The reason: Lt. Gen. Ronald T. Kadish wants to further test the system's technologies in the context of simple defense scenarios.

"I am worried that we have the reliability we need in the system's basic functionality," said Kadish at a breakfast meeting with reporters.

The next test is currently scheduled for October. If things go well, more countermeasures can be introduced into the test series relatively quickly, perhaps as early as next year.

During July's test of the hit-to-kill interceptor technology, software problems affected the system's ability to assess its success, added Kadish. The problem was not in the X-band radar that tracked the target missile but in the software used to process the radar tracking data. System engineers are now patching in a software fix.

ment contractor and was assigned to the National Reconnaissance Office in Chantilly, Va.

The FBI picked up Regan on Aug. 23. He is a resident of Bowie, Md., a suburb of Washington, D.C. Regan retired from the Air Force in August 2000, officials said.

The FBI filed an affidavit stating that the NRO was Regan's last active duty assignment.

Published reports said FBI agents observed Regan taking clandestine notes about classified NRO surveillance data to which he had access. They further alleged that Regan may have intended to sell his information to Libya.

The FBI took Regan into custody at Dulles International Airport, near Washington, as he attempted to board a flight to Switzerland.

## Rumsfeld Names Two to Head Nuke Panel

Defense analysts Keith B. Payne and Kurt Guthe are co-chairing an advisory panel on nuclear deterrence concepts for the Pentagon, according to *Inside the Pentagon*.

Payne and Guthe are president and a former senior analyst, respectively, of the Washington, D.C.-area National Institute for Public Policy. Prior to last year's election, NIPP produced a long report urging the US to combine cuts in nuclear warheads with missile defense, among other doctrinal changes.

The Deterrence Concepts Advisory Panel will serve as part of Secretary of Defense Donald Rumsfeld's overall nuclear posture review.

Other members include: Linton F. Brooks, vice president at the Center for Naval Analyses; James N. Miller Jr., vice president of national security planning at Hicks and Associates; and Chris Williams of Johnston and Associates.

## Shays Blasts DOD Hold on F-22 Data

Rep. Christopher Shays (R-Conn.), chairman of the House government reform subcommittee on national security, veterans affairs, and international relations, has written a letter to two House defense subcommittees, warning members about the Pentagon's projected cost estimates for the F-22. He criticizes the Pentagon for what he calls its close hold on F-22 production cost data.

Both his subcommittee and the General Accounting Office have been denied access to methodologies and supporting analyses used by DOD's Cost Analysis Improvement Group to develop Raptor price projections, the Congressman wrote.

CAIG's estimate of F-22 total program costs, and the Air Force's own projections, are nearly \$7 billion apart.

The Pentagon approved low-rate production of the F-22 Aug. 14.

## Lockheed Wins Targeting Contract

Air Force Materiel Command has awarded Lockheed Martin a seven-year, \$843 million contract to replace the service's existing missile target-

ing technology with Sniper XR targeting pods.

The contract provides for up to 522 targeting pod sets, though the Air Force currently estimates it is likely to buy only 168 of the advanced targeting pods.

The Air Force's current targeting system is LANTIRN, also produced by Lockheed. It is based on 20-year-old technology and is intended for use with low-level flight tactics.

Sniper XR's range is three times that of LANTIRN, according to firm officials, and lends itself better to high-altitude tactics.

First sets are scheduled for delivery in January 2003. Active duty F-16 Block 50 and National Guard F-16 Block 30 aircraft will be first in line for the new equipment.

## News Notes

■ TSgt. Charles L. Fouch III, an aerospace propulsion technician instructor from the 361st Training Squadron at Sheppard AFB, Tex., received the 2001 Pitsenbarger Award for heroic action by an enlisted member of the force. Fouch was honored by the Air Force Sergeants Association for risking his life to save a neighbor in an apartment building fire.

■ Northrop Grumman delivered the eleventh E-8 Joint STARS aircraft to the Air Force on Aug. 6. The aircraft was the first of the new Block 20 models.

■ Both competitors for the Joint Strike Fighter program, Boeing and Lockheed Martin, announced in late July that demonstrator aircraft have successfully completed their flight test programs.

■ An accident board report concludes that the March 30 crash of a Predator UAV supporting the Kosovo Stabilization Force was caused when the aircraft experienced icing problems and the pilot was unable to maintain control of the aircraft.

## Reagan Library Lands an Air Force One

The aircraft that served Ronald Reagan as Air Force One throughout the eight years of his Presidency was flown to San Bernardino International Airport, near the Ronald Reagan Presidential Library in Simi Valley, Calif., on its final flight Sept. 8.

The library's foundation will pay to build a hangar for the Air Force C-137 next to the library itself and to contract with Boeing for its maintenance. It will be restored to Air Force One colors and redecorated with a Reagan-era interior, complete with Reagan's signature bowl of jelly beans.

If all goes as planned, the aircraft will eventually be the centerpiece of a Museum of Presidential Travel.

"We are extremely pleased with the vision set forth by the Ronald Reagan Presidential Library Foundation," said Secretary of the Air Force James G. Roche. "Not only do they have the commitment to preserve this significant piece of American history, but their proximity to the Los Angeles metropolitan area provides opportunities for millions of people to view this historic aircraft."

■ The April 3 crash of an F-16 off the coast of Japan was caused by foreign object damage that resulted in engine failure, according to the accident report. The pilot ejected from the aircraft with minor injuries in the incident.

■ The Pentagon announced Aug. 7 that it has granted clearance for foreign military sales of the F/A-18E/F Super Hornet. Malaysia is among the nations that have expressed interest in upgrading their current F/A-18 fleets with new purchases of the E/F variant.

■ Russian officials say Russia needs to develop new fighter jets to stay competitive with the United States, according to a press report out of Moscow. And they think pooling resources with China or India might be the best way build next-generation warplanes.

■ The Air Force's recruit attrition rate has dropped from 8.8 percent in 1999 to 7.1 percent so far this year, thanks in part to revamped training and the delayed enlistment program, which helps to prepare enlistees for the rigors of basic training.

■ Three National Guard units were certified as the nation's first fully mission capable Weapons of Mass Destruction Civil Support Teams on July 26. The units are from Aurora, Colo.; Scotia, N.Y.; and Tacoma, Wash.

■ An Indiana ANG F-16 crashed into a cornfield in southern Illinois on July 26. The pilot ejected safely.

■ An F-16 from Luke AFB, Ariz., crashed north of Gila Bend, Ariz., on July 23. The pilot, Maj. Robert P. Egan, ejected safely.

■ The Air Force plans to spend more than \$150 million over the next seven years to upgrade about 1,300 military housing units in the United Kingdom. With an average age of more than 40 years, UK housing is nearly 10 years older on average than US military housing.

■ A three-judge panel from the 10th US Court of Appeals has ruled that the Colorado ANG is within its legal rights to conduct low-level training flights through Colorado's San Luis Valley and Wet Mountain Valley. The flights were opposed by some local residents and environmentalists.

■ DOD announced in August that the remains of a USAF pilot—Maj. Victor J. Apodaca Jr.—missing in action from the Vietnam War were identified via DNA analysis.

■ An Air Force C-9 Nightingale based in Japan evacuated a critically injured Chinese national seaman from Christmas Atoll on Aug. 8 and flew him to Hickam AFB, Hawaii, for treatment at a Honolulu hospital. ■

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## Senior Staff Changes

**CHANGES:** Maj. Gen. John J. **Batbie Jr.**, from Dir., Mobilization and Reserve Component Affairs, EUCOM, Stuttgart-Vaihingen, Germany, to Vice Cmdr., AFRC, Robins AFB, Ga. ... Maj. Gen. Paul L. **Bielowicz**, from Dir., Log., AFMC, Wright-Patterson AFB, Ohio, to Dir., Ops. & Log., STRATCOM, Offutt AFB, Neb. ... Brig. Gen. (sel.) Ted F. **Bowlds**, from Spec. Asst. to Principal Dep. Asst. SECAF, Acq., Pentagon, to PEO, Airlift, Trainers, & Modeling & Simulation, AFPEO, Asst. SECAF, Acq., Pentagon ... Brig. Gen. Robert W. **Chedister**, from PEO, Airlift, Trainers, & Modeling & Simulation, AFPEO, Asst. SECAF, Acq., Pentagon, to Cmdr., Air Armament Ctr., AFMC, Eglin AFB, Fla. ...

Brig. Gen. Robert J. **Elder**, from Dep. Dir., Reaction Force Air Staff, Allied Cmd. Europe, NATO, Kalkar, Germany, to Vice Cmdr., 9th AF, ACC, Shaw AFB, S.C. ... Maj. Gen. Michael N. **Farage**, from Cmdr., 37th Tng. Wg., AETC, Lackland AFB, Tex., to Chief, US Mil. Tng. Mission, CENTCOM, Saudi Arabia ... Gen. (sel.) Robert H. **Foglesong**, from DCS, Air & Space Ops., USAF, Pentagon, to Vice C/S, USAF, Pentagon ... Brig. Gen. Terry L. **Gabreski**, from Dir., Maintenance, DCS, Instl. & Log., USAF, Pentagon, to Dir., Log., AFMC, Wright-Patterson AFB, Ohio ... Brig. Gen. (sel.) David S. **Gray**, from Cmdr., 319th ARW, AMC, Grand Forks AFB, N.D., to Vice Cmdr., 12th AF, ACC, Davis-Monthan AFB, Ariz. ...

Gen. John W. **Handy**, from Vice C/S, USAF, Pentagon, to CINC, TRANSCOM, Scott AFB, Ill. ... Maj. Gen. Gary W. **Heckman**, from Dir., Force Structure, Resources, Rqmts., & Strategic Assessments Ctr., SOCOM, MacDill AFB, Fla., to Asst. DCS, P&P, USAF, Pentagon ... Brig. Gen. Thomas P. **Kane**, from Cmdr., 60th AMW, AMC, Travis AFB, Calif., to Dep. Dir., Reaction Force Air Staff, Allied Cmd. Europe, NATO, Kalkar, Germany ... Brig. Gen. (sel.) David R. **Lefforge**, from Exec. to CINC, TRANSCOM, Scott AFB, Ill., to Cmdr., 60th AMW, AMC, Travis AFB, Calif. ... Maj. Gen. David F. **MacGhee Jr.**, from Cmdt., AWC, AETC, Maxwell AFB, Ala., to Cmdr., AF Doctrine Ctr., Maxwell AFB, Ala. ...

Brig. Gen. Robert E. **Mansfield Jr.**, from Dir., Supply, DCS, Instl. & Log., USAF, Pentagon, to Spec. Asst., Supply Chain Integration and Log. Transformation, DCS, Instl. & Log., USAF, Pentagon ... Lt. Gen. (sel.) Teed M. **Moseley**, from Dir., LL, OSAF, Pentagon, to Cmdr., 9th AF, ACC, Shaw AFB, S.C. ... Gen. Richard B. **Myers**, from Vice Chairman, JCS, Pentagon, to Chairman, JCS, Pentagon ... Maj. Gen. Larry W. **Northington**, from Dep. Asst. Secy., Budget, Asst. SECAF (Financial Mgmt. & Comptroller), OSAF, Pentagon, to Dep. to Asst. Secy., Strategic Planning, Asst. SECAF (Financial Mgmt. & Comptroller), OSAF, Pentagon ...

Maj. Gen. Bentley B. **Rayburn**, from Dir., P&P, ACC, Langley AFB, Va., to Cmdt., AWC, AETC, Maxwell AFB, Ala. ... Maj. Gen. Mary L. **Saunders**, from Cmdr., Defense Supply Ctr. Columbus, DLA, Columbus, Ohio, to Dir., Supply, DCS, Instl. & Log., USAF, Pentagon ... Brig. Gen. Frederick D. **Van Valkenburg Jr.**, from Dep. Cmdr., 16th AF, USAFE, Vicenza, Italy, to Cmdr., 37th TW, AETC, Lackland AFB, Tex. ... Lt. Gen. Charles F. **Wald**, from Cmdr., 9th AF, ACC, Shaw AFB, S.C., to DCS, Air & Space Ops., USAF, Pentagon.

**COMMAND CHIEF MASTER SERGEANT RETIREMENT:** CMSgt. Larry D. **Palmer**.

**CCMS CHANGE:** CMSgt. James V. **Callander**, to 11th Wg., Bolling AFB, D.C. ■



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# Verbatim

By Robert S. Dudley, Executive Editor

## Beaten Senseless

"The two-war strategy makes a lot of sense. It made a lot more sense when we had the forces that could support it."—**Secretary of Defense Donald Rumsfeld, in Aug. 22 interview with Washington Post reporters.**

## The Skelton Option

"There is no simple, elegant proposition ... to replace the two Major Theater War construct, but let me offer a notional '1 - 2 - 3' approach. One: We must be able to fight and win decisively at low risk a major regional conflict. Two: We must be able to conduct serious military actions in at least two other regions simultaneously to deter those who would take advantage of our distraction in a major conflict. Three: At the same time, we must be able to undertake at least three small-scale contingencies throughout the world."—**Rep. Ike Skelton (D-Mo.), House Armed Services Committee, in Sept. 4 address to the Center for Strategic and International Studies.**

## Don't Miss, Don't Kill

"When a bomb goes astray and hits a residential area, when a Tomahawk missile crashes into a hotel lobby, or when a sniper's bullet kills a pregnant woman getting water at a well, US foreign policy—not just military policy—suffers a setback. We can no longer afford to miss. More than that, even when we hit the target, we have to do so almost softly and with minimal impact. One is reminded of TV Westerns many years back: The good guy—the one in the white hat—never killed the bad guy; he shot the gun out of his hand and arrested him. That is our new standard."—**Retired USAF Col. Phillip S. Meilinger, writing in the fall 2001 issue of Aerospace Power Journal.**

## And You Know Who You Are

"We can't afford to have the entire armed forces of the United States being 'expeditionary.' We don't have the airlift or the sealift—even if it

was a requirement—to move it. We are going, in a Major Theater War, to flow forces. There's going to be [a group of] people who are going to get there early, and there's going to be follow-on forces."—**Gen. James L. Jones, Commandant of the US Marine Corps, quoted in Sept. 4 Washington Post.**

## Dr. Feel-Good

"To the extent I bring anything ... to the job, maybe it's an ability to think about how a product, whether it's Prozac or a president's proposal, is marketed."—**Mitchell Daniels, Bush Administration's budget director and foe of DOD budget increases, quoted in Aug. 15 Wall Street Journal. Daniels is a former executive of pharmaceutical giant Eli Lilly & Co.**

## Two Wrongs Strategy

"I am very worried that, in all this rhetoric about the budget, we're not going to take care of national security when we have a surplus. It should be the No. 1 priority of this nation. Nussle and Conrad are budget guys. Their expertise is on the budget, and both of them are wrong."—**Rep. Norman Dicks (D-Wash.), House defense appropriations subcommittee, in Aug. 29 Washington Post. He referred to Rep. Jim Nussle (R-Iowa) and Sen. Kent Conrad (D-N.D.), chairmen of House and Senate Budget Committees, who opposed Bush's \$18 billion defense increase.**

## Corvettes and Corvairs

"At some point, if you're in a conflict, it's going to get back to a lot of what we already do today. You're going to need divisions. You're going to need a r wings of a somewhat conventional sort. And you can't be flying airplanes that are already getting up pretty old in average age. At some point, you've got to replace your car. At some point, you have to replace your airplanes. In a way, the ideal balance would probably be 15 percent that's highly modern and maybe 85 percent that's the Chevrolet of the

present— ... a good, reliable, low-end system."—**Deputy Defense Secretary Paul Wolfowitz, quoted in Aug. 30 Washington Times.**

## After the U-2?

"Our U-2s are slowly attriting out, and we don't have anything short of Global Hawk [unmanned aerial vehicle] right now that is a replacement. No one has invented another way to do this that gives us the persistency we need. I don't have another choice. If someone else has one, I'd like to hear it."—**Gen. Michael E. Ryan, then USAF Chief of Staff, in Aug. 29 remarks.**

## Message to Beijing

"We can more than adequately back up the commitments that are enshrined in the Taiwan Relations Act and which the President affirmed. So the Chinese would be making a great mistake if they thought they could settle this thing on their terms by using force."—**Deputy Secretary of Defense Paul Wolfowitz, quoted in Aug. 29 Washington Times.**

## The Longest Day

"[The Pentagon should take the] B-2 and move it from its present 16-weapon capability [and convert it] to Small Diameter Bombs—of which it can carry 324. If we launch 18 ... B-2s, that's 5,824 individually targeted weapons. That represents the first seven-and-a-half days of Desert Storm operations."—**Retired USAF Gen. James McCarthy, in Aug. 28 remarks at the Center for Emerging Threats and Opportunities, Arlington, Va.**

## Meet Vlad the Impaler

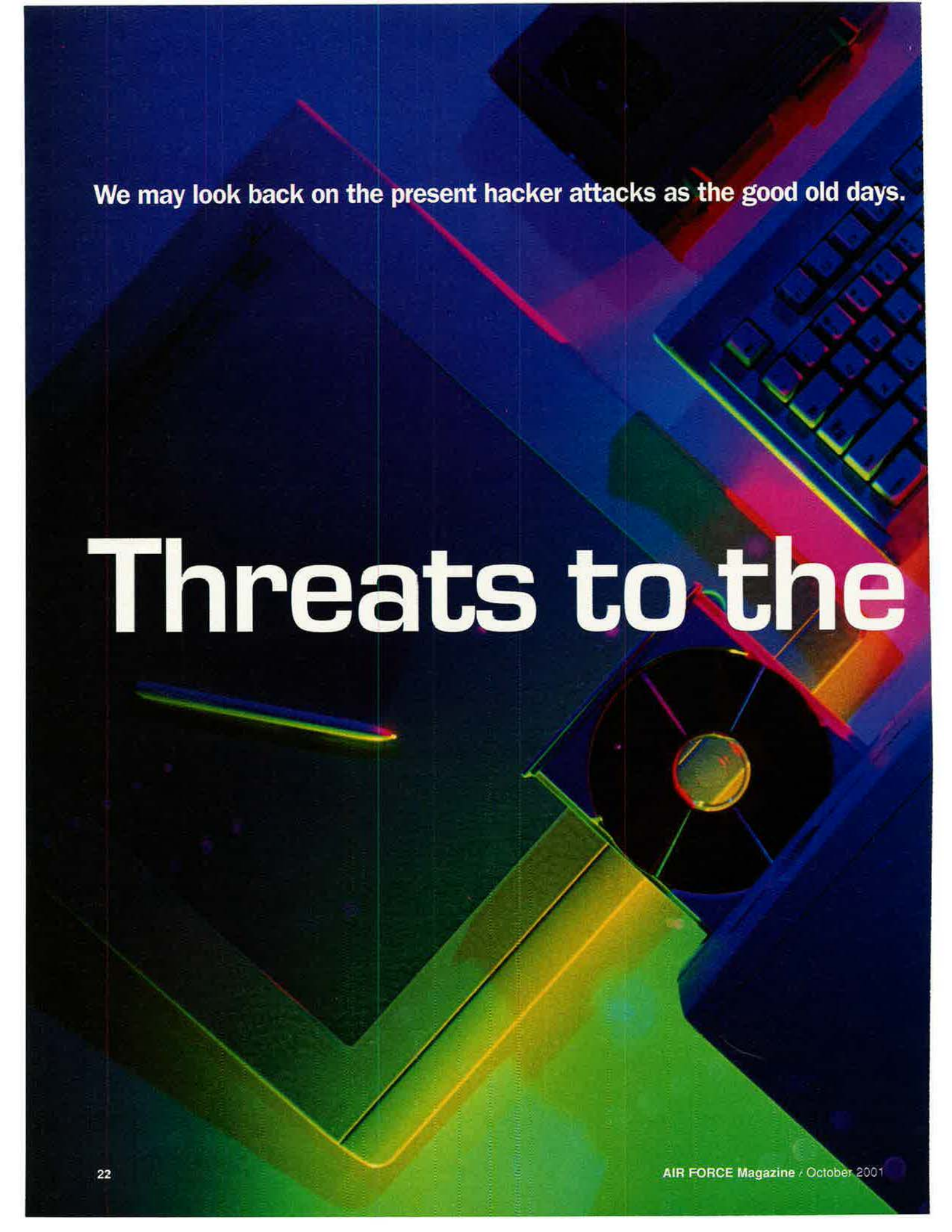
"I keep telling the old guys like me who are a little concerned about the nontraditional [recruiting message], We're not recruiting you, we're not recruiting me. We're recruiting the kids that watch 'Buffy the Vampire Slayer.'"—**Army Secretary Thomas White, in Sept. 3 remarks to the press concerning use of the new recruiting slogan, "An Army of One."**



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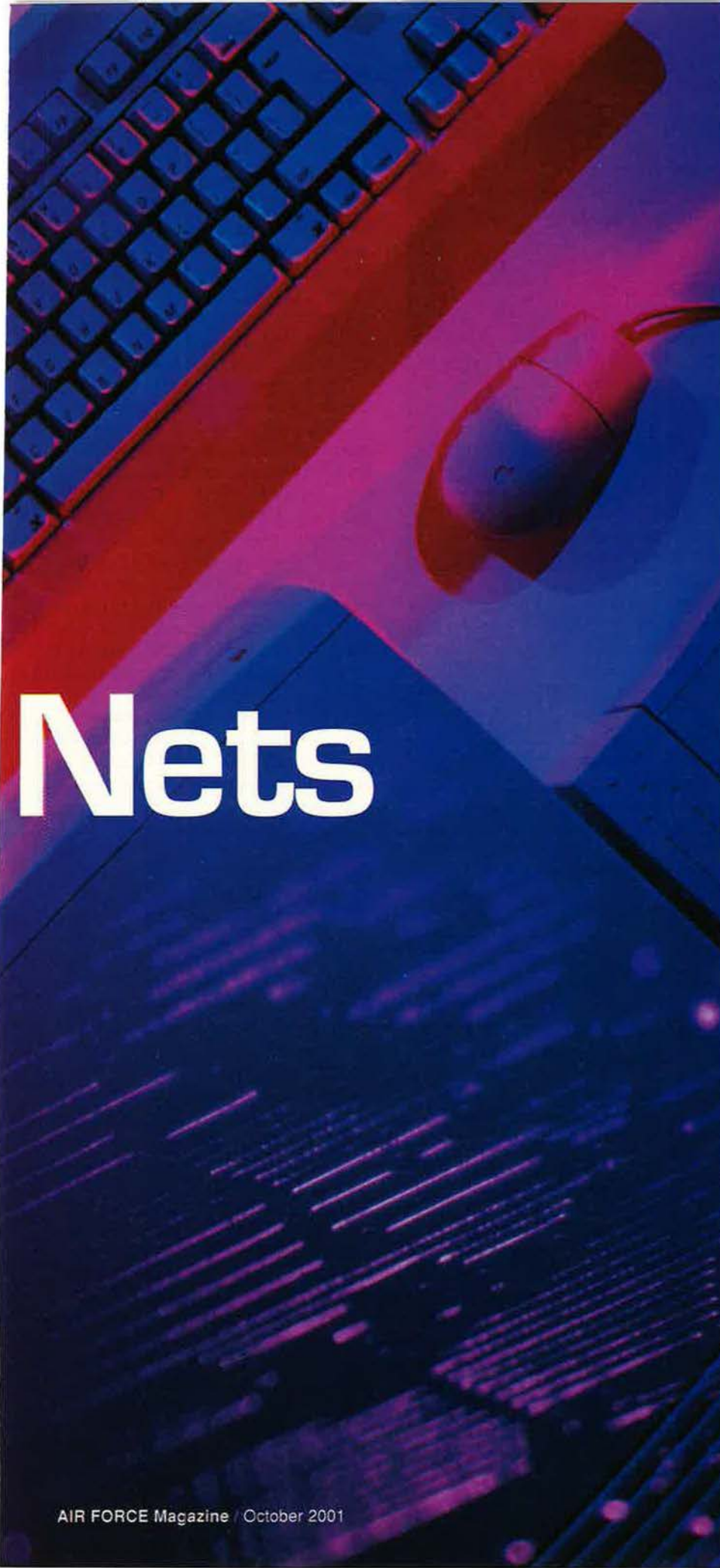
The result: a cost-effective platform delivering unprecedented performance—with a service life that's easily extended to 2040 and beyond. And with our long-term strategic partnership with the Air Force called Total System Support Responsibility we maximize the number of Joint STARS aircraft ready for action and minimize the cost of maintenance and upgrades.



We may look back on the present hacker attacks as the good old days.

# Threats to the





# Nets

By Michael C. Sirak

**T**HE power to gain information superiority over any foe and ensure unimpeded delivery of information to American armed forces are key parts of US warfighting doctrine as spelled out in Joint Vision 2020. More and more, the Pentagon relies on computer networks to drive its worldwide array of sensors, communications links, and analysis tools and to disseminate information around the globe. And as this reliance grows, so too, do the dangers associated with network vulnerabilities.

Secretary of Defense Donald Rumsfeld has warned, "Our dependence on computer-based information networks makes those networks attractive targets for new forms of cyber-attack."

In fact, the Pentagon's networks have already come under heavy bombardment. Last year, DOD's unclassified computer systems experienced 23,662 detected "events," or attempted intrusions, which is up from 22,000 cases reported in 1999. The upward trend is continuing. In just

the first three months of this year, DOD said its computer sleuths detected 16,482 events. Even taking into account more comprehensive reporting methods and better monitoring capabilities, the total number of attacks will wind up showing a hefty increase this year.

Officials said that, to date, they mostly have been successful in thwarting intruders. However, they acknowledge that there is growing concern about the increasing sophistication and frequency of the attacks.

Today's attackers range from lone hackers and hacker groups to what DOD considers more refined intrusions staged by criminal gangs, terrorist organizations, and sophisticated state-sponsored enterprises. "We are under attack every day," said a Pentagon intelligence analyst with regard to the low-level hacker-type threats. To date, most hacker attacks have sought to disrupt, but not destroy, DOD's operations, the analyst noted.

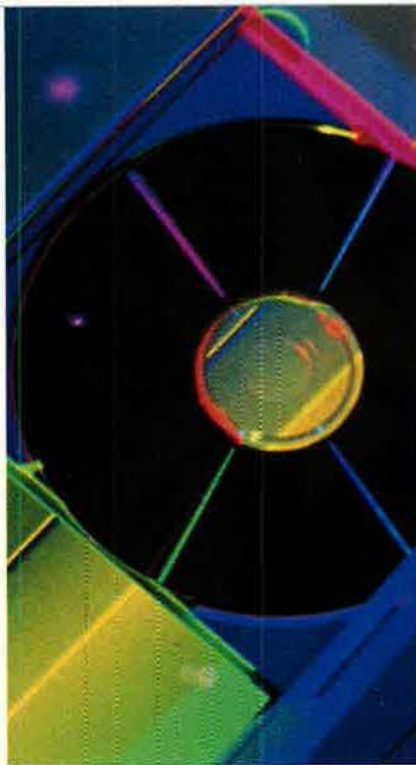
More ominous, however, is the specter of state-sponsored attacks. A recent study by DOD's Defense Science Board reported that some 20 nations are pursuing capabilities for information warfare. Topping the list is China, which announced openly its intent to devote large resources to this area as an asymmetric means of countering US conventional military strength. Unlike the hackers, who usually are thrill seekers in a quest for fame and notoriety, state-sponsored attackers seek to extract information while lurking undetected.

At risk, in the DSB's view, is the Pentagon's vast assemblage of networks, known as the Global Information Grid or GIG.

### The New Arms Race

"The GIG is a weapon system and must be treated as such," said the DSB report. "The nation is in an arms race with regard to superiority of such capabilities. Experience suggests that as US defensive capabilities increase, so will the adversary's offense."

To counter the threats, DOD is mounting a comprehensive effort, under the leadership of US Space Command, to establish a coordinated Computer Network Defense system. While the emphasis today is focused on fielding a potent defense, the command is also working simultaneously



on incorporating into US warfighting doctrine the capability to target an adversary's own computer networks. The goal, command officials said, is to have warfighting commanders come to rely on Computer Network Attack operations as an effective tool at their disposal just like any other weapon system.

US Space Command officials, headquartered at Peterson AFB, Colo., said they are making significant strides in standing up the tactics, techniques, and procedures needed for effective CND and CNA operations. Still, they said, this mission forces DOD into uncharted territory, with many challenges ahead. "We are starting from a blank sheet of paper here," said Army Lt. Gen. Edward Anderson, US Space Command's deputy Commander in Chief. "This is not something [where] we can open up some books or open up some file folders and see how it used to be done, because basically, it is a new task for the military."

In its study, the DSB chronicled the defensive challenges ahead. Among its main findings was the study's claim that DOD remains too focused on low-level hacker-type attacks. The Pentagon, it said, "cannot today defend itself from an information operations attack by a sophisticated nation-state adversary" that understands how to exploit compromised data. The science board further asserted that there is "a serious shortage" of information tech-

nology professionals within the Pentagon, with the expectation that the shortage will become even more acute.

### Needed: \$3 Billion

Annual expenditures of some \$3 billion—roughly twice the current amount—are needed to adequately protect DOD's systems, the board noted. "If Joint Vision 2020 is to be the path to the future, these vulnerabilities and shortfalls must be addressed," stated the board.

The latest version of the Pentagon's Unified Command Plan, dated Oct. 1, 1999, assigned US Space Command immediate responsibility for Computer Network Defense. Army Gen. Henry H. Shelton, Chairman of the Joint Chiefs of Staff, said the command was "a logical fit," given its global perspective and its collection of experts adept at operating computers, communications systems, and space assets. Exactly one year later, on Oct. 1, 2000, the command acquired the mission of conducting Computer Network Attack.

As part of all of these changes, SPACECOM was given authority over Joint Task Force-Computer Network Defense, which the Pentagon had set up in late 1998 to coordinate and direct defense of its computer systems. However, the task force did not have any role in attack. That changed in April 2001, when US Space Command expanded the task force's mission and gave it operational control of both CND and CNA, changing the name to Joint Task Force-Computer Network Operations. In the beginning, it had a staff of about 25, but it will expand to 145 personnel.

The JTF-CNO works with the services, the Defense Information Systems Agency and its DOD-Computer Emergency Response Team, National Security Agency, Defense Intelligence Agency, and other entities. It develops methods to assess the operational impact of intrusions, identifies proper responses, coordinates actions with appropriate organizations, prepares response plans, and—with US Space Command approval—executes the plans through the command's service components.

For example, the task force oversees all Information Assurance Vulnerability Alerts, which DOD-CERT issues whenever it identifies vul-

nerabilities that require immediate corrective action such as software patches.

SPACECOM is responsible only for protecting networks belonging to DOD or the armed services and not those of other government or private organizations. It coordinates its activities, however, with other cyber-defense entities. The main federal effort centers on the FBI's National Infrastructure Protection Center in Washington. The NIPC, established in 1998, works with the federally funded CERT Coordination Center at Carnegie Mellon University to detect, assess, and develop responses to cyber-attacks.

There is no question, however, that the Defense Department ranks as the major target. The Pentagon's GIG comprises the Non-Secure Internet Protocol Router Network (NIPRNET), the Secret Internet Protocol Router Network (SIPRNET), the Joint Worldwide Intelligence Communications System, and each service's tactical command, control, communications, and intelligence system.

Army Maj. Gen. J. David Bryan, commander of JTF-CNO and vice director of DISA, said NIPRNET currently serves more than 2.5 million users through 1,503 post, camp, and station connections. Since 1996, its customer base has grown 20 percent and its total traffic has expanded by 400 percent, he noted. SIPRNET, said the general, has become "the most critical data system supporting the warfighter today." Currently, it serves approximately 125,000 users at more than 900 connections. Over the past five years, it has experienced a 200 percent increase in customers and more than 600 percent increase in traffic.

### Sources of Danger

Potentially hostile nations such as China, Russia, Cuba, Iran, Iraq, Libya, and North Korea are developing capabilities to attack this system. Also developing their own cyber-war powers are several US allies and friends such as France, Israel, and Britain. Even some of the world's most significant neutrals such as India and Brazil are getting into the act.

Anderson, US Space Command's deputy CINC, said, "Major countries, Russia and China, have openly said that they are undertaking activi-

ties because they see our dependence upon [our computer networks] and they see the possibility of using it" to their advantage.

State sponsorship affords an intruder a base of operations, protection, time, resources, and a clear focus, explained one top DOD intelligence analyst. "Once you get to the state-sponsored level, they understand the repercussions of what they are doing," he said. "That is a very conscious effort and needs a very conscious response."

Anderson said the command faces the major challenge of trying to prepare for unknown, never-before-seen types of network attack. "It is ... the 'we-don't-know-what-we-don't-know' problem because these capabilities will not have been seen" until they are employed, he said. "We are doing a lot with a lot of different agencies as far as working this problem and we have come a long way, but at the same time, we still realize that we have a long way to go."

Hacker groups are cause for concern, Anderson added.

"I think it is reasonable to expect that, as they develop capabilities, [and] they then start to try to market those, they could market them to potential adversaries," he said. Further, he said, "Hacker groups could market themselves, and not just their tools, but themselves as mercenaries." Anderson made clear that, thus far, he has seen no evidence that such activities have occurred, though it is "within the realm of the possible."

Attackers seek to exploit the weak link in any network chain. "To attack a large number of systems, an adversary need only find and attack a single exploitable connection to the system (through the use of a wide and growing variety of commonly available and inexpensive hacker tools)," stated Linton Wells, who was acting assistant secretary of defense for command, control, communications, and intelligence when he testified to Congress in May. "Once inside a system, an adversary can exploit it and the systems networked to it."

This has, in fact, happened. Take the case known to investigators as Solar Sunrise. In 1998, two teenagers from California and one from Israel combined forces to penetrate

computer systems at 11 Air Force and Navy bases. The hackers succeeded in disturbing the normal operations of those systems, causing DOD to rethink its lax security measures.

### Menace by Moonlight

To date, the largest apparent intrusion of DOD's networks occurred under a case known variously as Moonlight Maze and Storm Cloud. Starting in early 1998 and continuing into this year, millions of unclassified yet sometimes sensitive documents have been sucked out of Pentagon systems and into computers traced back to Russia. Whether the intrusions have occurred at the behest of the Russian government or criminal elements inside Russia remains undetermined, US officials have said.

Further details of this strange case were provided by James Adams, head of a cyber-intelligence and risk-management firm and member of the NSA's advisory board. Writing in a recent issue of *Foreign Affairs*, Adams noted:

"The attacks appear to be coming from seven Russian Internet addresses, but it is unclear whether the initiative is state-sponsored. Last year, Washington issued a demarche to the Russian government and provided Russian officials with the telephone numbers from which the attacks appeared to be originating. Moscow said the numbers were inoperative and denied any prior knowledge of the attacks.

"Meanwhile, the assault has continued unabated. The hackers have built 'backdoors' through which they can re-enter the infiltrated systems at will and steal further data. They have also left behind tools that re-route specific network traffic through Russia.

"Despite all the investigative effort, the United States still does not know who is behind the attacks, what additional information has been taken and why, to what extent the public and private sectors have been penetrated, and what else has been left behind that could still damage the vulnerable networks."

Another wave of attacks occurred after the collision this year of a Navy EP-3 reconnaissance aircraft and a Chinese fighter aircraft off the coast of Hainan Island. The crash resulted

in the death of the Chinese pilot. In the weeks and months following the incident, US and Chinese hackers engaged in a cyber-battle, each side trying to deface and disrupt Web sites in the other's country. Chinese efforts were said to have occurred with at least the tacit support of the Beijing government. Chinese hackers subsequently archived an extensive set of hacking tools at a freely accessible Web site.

This summer, DOD was hit with the new Code Red virus. Those who unleashed Code Red did not directly target DOD networks, yet the virus still forced the department, as a precaution, to shut off public access to many of its unclassified sites on several occasions for several days at a time.

### Potential Havoc

The Air Force's Air Intelligence Agency, the service's operational arm for information warfare, reported 45 incidents of attempted disruption or exploitation of Air Force operations in the year 2000. In 15 of these 45 incidents, intruders succeeded in fully penetrating some Air Force systems and could have wreaked havoc, had they not been detected, the agency said.

The task of differentiating between an attack and other random computer anomalies remains difficult, SPACECOM officials said. "It's important to remember that network malfunctions and attacks have the same symptoms and effects," said Brig. Gen. Dale W. Meyerrose, the Air Force officer who directs command-and-control systems within the command. "However, the corrective action for a malfunction may differ greatly from a defensive action when the source of the problem is an enemy and the intent is to harm or disable DOD networks."

USAF Gen. Ralph E. Eberhart, the head of US Space Command, said DOD possesses capabilities to counter the intruder, once it knows its computer networks are under attack. However, this "burglar alarm" technique, as the general calls it, is a passive approach. The US must wait on an attacker to make the first move.

A more effective defense, he said, must incorporate predictive and active, pre-emptive measures, making better use of intelligence and allow-

ing the defenders to take steps to prevent, deflect, or minimize the effects of any hostile action. Eberhart calls this a "neighborhood watch" capability.

Anderson noted that acquiring such an "indications and warning" capability is no easy task. "That is a huge challenge for both technology as well as the Intelligence Community to be able to provide those kinds of things," he said. "We don't have that kind of capability right now."

US net warriors face another enormous challenge—making accurate attribution of specific acts to specific individuals or entities. It is surprisingly difficult to trace the path of an attack back to its source and thereby identify the malefactor. The difficulty of making accurate and timely attribution calls stems not only from the immature state of technology but also from the strictures of US law.

According to Air Force Lt. Col. John Pericas, chief of the CND operations branch at SPACECOM, current law bars the Department of Defense from tracing an intruder's attack back through more than one Internet service provider address—or "hop." At that point, law enforcement must be brought in. At times, said an intelligence official, DOD may have technologies that would permit more accurate tracing, but the legal framework lags behind, sapping the initiative. "We can't conduct recon outside our networks," he said. "We'd like to, but we can't."

The DSB report highlighted these and other problems that limit the Pentagon's ability to defend its computer networks. In fact, said DSB, such defense won't be possible without extensive and concerted effort. "Incremental modifications to our existing institutions and processes will not produce the adaptation we need," stated the DSB study.

### GIG Bite

The GIG is becoming increasingly vulnerable, the board found, stating, "Development and deployment of new network technology has greatly outpaced information assurance technology, thereby increasing the vulnerability of DOD systems."

The DSB report recommended that the Pentagon and the armed services move all of their public Web sites

off the NIPRNET and into a more controlled environment, characterized by encryption and digital identification keys. A public key infrastructure with public key-enabled applications "must be a key component of the GIG security architecture," said the study.

The board deemed it critical for DOD to develop certain technologies that can be used after an attack to help recover and restore networks and the data they contain. Unfortunately, "today DOD has no methodology for dealing with the consequences of a successful attack and restoring integrity in its systems," noted the study.

Greater investment in CND and CNA research and development is essential, the board found, noting that the Pentagon should focus funding on global access control, malicious code detection and mitigation, mobile code security, fault tolerance, integrity restoration, and recovery and reconstitution.

The study also cited a need for DOD to establish a distributed test bed to evaluate information assurance measures. It urged Pentagon officials to assign priorities within parts of critical infrastructure, including certain private-sector assets on which it relies. Many of these could prove to be highly vulnerable to attack and exploitation.

What the Pentagon needs, board members concluded, is a defense in depth, consisting of layered security measures that are more likely than any single system to detect an attack. The DSB study pointed out that, over the past several years, National Security Agency "Red Teams" secretly staged mock assaults on DOD networks. Some 99 percent of them went undetected, even though the Red Teams attacked with known tools.

The board, recognizing the damage that one disgruntled computer network "insider" could cause, recommended an increase in background checks and security training. It also called for a better system to train DOD operators to replace the fragmented one now in place. Further, it cited a need for greater efforts to attract and retain skilled information technology professionals.

The board also called for the creation of a "national coordinator for

*Continued on p. 28.*

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Continued from p. 26.

Defensive Information Operations” to oversee all of the nation’s cyber-defense efforts. It also suggested a “Commander in Chief–like organization” to coordinate government and industry defensive actions.

### Loosen Up

The board called on the FBI to drop the institutional and political barriers surrounding the NIPC and make available the kinds of information that could be critical to DOD in carrying out its defensive mission. The FBI has a reputation in the field for refusing to share critical information with anyone, including US defense authorities. As the task force concluded, “These barriers should be removed, and soon, if DOD is to continue to support and rely upon NIPC. Unless NIPC, FBI, and Justice overcome their narrow crime fighting perspectives—in a formal high-level agreement with the Defense Department—then DOD and the Intelligence Community should consider pulling out of NIPC to create an independent center for gathering and sharing information about the most serious network attacks. But this should only be a measure of last resort.”

In spite of the challenges and current shortcomings highlighted in the DSB study, US Space Command continues to refine and improve CND capabilities, command officials said. The command is working to put in place later this year a revised alert system in which all DOD command echelons will have standard guidelines for reacting to protect their networks.

The focus of the new alert system is to keep the networks up and running to maintain the flow of information to the warfighter while network defensive operations are being carried out to thwart the intruder. Under the previous alert system—DOD’s first attempt at a standardized warning capability—operators would shut down the networks as part of the defensive countermeasures.

That was not smart. As Pericas noted, it not only thwarted attackers but halted the flow of critical information to American forces. “There is just no way that you are going to gain information superiority or in-



formation dominance on the battlefield if you are already creating a self-denial-of-service [situation],” said Pericas. “We are going to stay connected throughout.”

The system calls for declaring a state of alert—an Information Operations Condition or INFOCON—that can be raised or lowered based on intelligence warnings, before a network intrusion has been confirmed. These INFOCON levels range from Normal to Delta, the highest state of CND activities. Between them lie Alpha, Bravo, and Charlie levels.

The new guidelines clearly define the roles of the operational commanders in protecting the networks and go beyond merely recommending defensive measures and instead establish a baseline of action across DOD for each INFOCON level, Pericas said. They will help to codify how the US military will share networks and information with allies and coalition partners.

The command also recently conducted a headquarters-level, internal INFOCON exercise, called Ambitious Immortal, to assess the operational impact of carrying out the defensive measures prescribed for each INFOCON level. The exercise was a first step toward building a capability to conduct realistic CND exercises. It could serve as a model for a similar DOD-wide exercise, perhaps in 2002, SPACECOM officials said.

Command officials said they want

to operationalize CND and CNA missions. For example, the Air Force earlier this year placed Air Intelligence Agency under authority of Air Combat Command, not only to merge intelligence gathering and information operations into combat operations but also to institutionalize information warfare as a legitimate weapon for combat.

One important step at DOD-wide level will be the inclusion in coming months of the CND and CNA missions in the Joint Monthly Readiness Reviews prepared by warfighting commands for the JCS Chairman. “It allows us to give [the Chairman] a report card on how well we are executing this mission,” said Pericas.

Further, DOD is also establishing a Joint Computer Emergency Response Team Database to centrally track cyber-events, officials said.

### Mutually Assured Crashes

Some day, network defense may well come to include the element of deterrence. DOD certainly has the wherewithal to stage retaliatory strikes at enemy computers. These offensive tools are among the Pentagon’s most highly classified technologies, but the department is said to possess a potent array of so-called logic bombs, worms, and other cyber-war tools that can trigger malicious codes, reproduce themselves to cause networks to overload, and eavesdrop and steal data from a “foreign” network.

CNA operations touch on sensitive legal issues that still need to be resolved. US Space Command officials said the US side would have to carefully weigh a retaliatory counterstrike against a foreign government for an attack on DOD’s networks. However, if the attacker is deemed to be a civilian, he would be considered a criminal under US law and therefore would become a problem for law enforcement officers. In addition, a US cyber-attack response against a foreign government to disable civilian infrastructure also raises thorny legal issues, according to officials. ■

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*Michael C. Sirak is a Washington, D.C.-based staff reporter with Jane's Defence Weekly, an international defense magazine. This is his first article for Air Force Magazine.*

# Flashback

## Check Your Oil?



*The flight crew of Hitler's Headache was barely on the ground in 1945 when the redeployment maintenance crew at Bradley Field, Conn., swarmed in. The B-17 was being refueled even before personal bags were unloaded. The various line crews on Bradley's repair strip would each cover one aircraft from nose to tail in about an hour. Minor repairs were done on the spot—enough*

*to ensure the bomber could be flown to its new home or, if needed, to a major repair depot.*



# Foreign

By John A. Tirpak, Senior Editor





Call them generation four-and-a-half—not fifth generation, but getting closer.

# Fighters Get **Better**

*Check Six: The Air Force has long enjoyed unquestioned dominance in fighters, but new foreign aircraft entering production are faster, longer ranged, have better avionics, and even exhibit a degree of stealth.*

**F**OREIGN air forces will be shrinking during the next two decades, but the aircraft they deploy will be more sophisticated than those they currently possess. They will pose a greater potential danger to US airpower than has been the case since the end of the Cold War, in the view of intelligence experts and industry analysts.

Within 25 years, notes one internal Air Force briefing paper, most of the world's air forces will decline in size by 20 to 30 percent. Savings reaped from the retirement of the older aircraft types and reductions in force structure will generally be applied to buying newer, more capable platforms.

USAF analysts expect to see during this period a sharp global rise in the number of fourth-generation fighters. These aircraft, comparable to Air Force F-15s and F-16s and Navy F-18s, are highly maneuverable and have advanced radars and Beyond-Visual-Range missiles. Already, some 2,500 such fighters—MIG-29s, Mirage 2000s, Tornados, and the like—can be found in active service in about 40 countries, according to the Air Force. A like num-



*Two of the most lethal fighters now for sale are the French Rafale (here) and multinational Eurofighter Typhoon (below). Both are superior to the F-15 in many respects and could end up in unfriendly hands.*

ber of US-built fighters are in service in about 25 countries.

### **Swarms**

These numbers have become important because US defense strategy calls for the Air Force to fight its wars in the enemy's airspace. It takes time to deploy fighters in large numbers, and the initial squadrons sent to a crisis zone may be outnumbered in the air by a factor of 20. Facing such swarms, and flying against a new generation of advanced, double-digit surface-to-air missiles, Air Force fighters will have to be not merely superior but *far* superior to prevail in the early days of a future conflict.

Even more worrisome than generation four fighters are the aircraft coming just behind. These "fourth-and-a-half" generation aircraft, a quartet of new foreign fighter designs now entering production, are considered significantly more powerful than most of the top aircraft in the US inventory.

The four are Eurofighter's Typhoon, Dassault's Rafale, SAAB's Gripen, and Sukhoi's Su-35/37. They feature, in a limited but real way, some of the characteristics of the Air Force's—and the world's—only fifth-generation fighter, the F-22 Raptor. These traits are supersonic cruise without afterburner, sensor fusion, extreme maneuverability, and stealth. They will have longer range, better situational awareness for the pilot,



and the ability to engage multiple targets at once, along with more capable and jam-resistant weapons.

"Advances in sensor technologies ... provide the enemy with a 'first-look' advantage over US pilots," said the Air Force paper, which referred to airmen flying in current-generation F-15s, F-16s, and F-18s. "Advances in fire control provide the enemy with a 'first-shot' and launch-and-leave capability. Enemy first-look and first-shot capabilities will put US pilots at a deadly disadvantage."

Intelligence analysts stressed that new missiles equipping emerging threat fighters pose just as deadly a

problem, as they can equip older, less advanced aircraft. In large numbers, they could pose a serious problem to US aircraft.

"Many countries will focus on modifying and upgrading versions of proven airframes to accommodate [a] newer generation of air-launched weapons," the Air Force said. These advanced missiles "will be characterized by increased range through ramjet propulsion, more sophisticated motors, helmet-mounted cueing systems, improved seekers, ... and improved counter-countermeasures." Newer missiles, like the Advanced Medium-Range Air-to-Air Missile, will have active-radar seekers, which will allow the pilot to fire, turn around, and run without giving any further guidance to the missile.

Air Force officers say the F-22

will be the only "true" fifth-generation fighter to enter active service during the next 20 years. It was designed to defeat Soviet-built Su-27 and MiG-29 fighters, which began entering service in the 1980s. Outside of the United States, only Russia and China have said they are at work on development of a true fifth-generation fighter. They are not likely to enter service any time soon.

### **Fighters of the East**

Meanwhile, the greatest challenge to USAF in the first quarter of the 21st century probably will come from Russian-built fighter aircraft, chiefly due to their large numbers. The ma-

jority of those fighters won't even be in Russia but rather in the air forces of other nations seeking an inexpensive way to provide some counter to US airpower.

Russia has had great success marketing its front-line fighters—the Su-27 Flanker and its derivatives—to neighboring countries, most notably China and India. Although the transfers so far have been mainly of Russia's most basic Flanker, which is equivalent in capability to the Air Force F-15A of 20 years ago, both countries have struck deals for more-advanced variants that in many key aspects exceed the capabilities of the 1990s—vintage F-15C in service today.

Within a decade, reported a highly placed Pentagon intelligence analyst, "There may be more Flankers in service outside Russia than Russia will be able to put in the air itself." And Su-27 variants sold abroad may be more sophisticated than the ones Russia can afford for its own use, he added.

Russia is selling Flankers for about \$20 million to \$30 million apiece; that is less than half the cost of a new F-15 fighter. Third-party avionics enhancements add up to \$8 million to the cost of each Russian aircraft.

Both China and India will produce Flanker variants under license, and both will enhance the aircraft with some indigenous and imported avionics. India's avionics enhancements will come primarily from France and



Photo by Katsuhiko Tokunaga

**The JAS-39 Gripen is Sweden's 21st century fighter. Small and agile, it's easy to fix in the field, has advanced avionics, some stealth, and multirole capability. South Africa will be the first export customer.**

Israel, which are providing the head-up display and electronic warfare suite, respectively.

China already has deployed several squadrons of Su-27s. Beijing plans to acquire an additional 200, at least. Two years ago, China ordered 40 Su-30s—a ground attack variant of the Flanker similar in concept to the F-15E. Total cost: some \$1.8 billion. In July, as an adjunct to a new 10-year "friendship pact" between Moscow and Beijing, China placed a new order for about 40 more Su-30s, at a cost of \$2 billion. Russian press reports said the Sukhoi

factory workers would be on overtime fulfilling the deal as quickly as possible.

The parts for these aircraft will be made in Russia, but the aircraft will be assembled in China. Russia will hold back some key elements of the technology, and so the Chinese aircraft at least will have to return to Russia for periodic overhauls. China is not allowed to re-export any of the aircraft that it builds.

India has a similar deal to build the Su-30 under license.

### Eagle Equal

According to Air Force intelligence analysts, the Flanker family is equal to the F-15C in maneuverability, radar detection range, and visibility on radar. The Flanker is larger than the F-15 and enjoys an advantage in range because of its internal fuel-carrying capacity. These estimates of the Flanker's capabilities are based on intelligence, statements by Sukhoi representatives, and the firsthand experiences of US, European, and Japanese pilots who have been allowed to fly the aircraft.

All told, there are about 600 air superiority Flankers in service, about 400 of them in Russia. Vietnam operates 12 and has 24 more on order. Belarus, Kazakhstan, and Uzbekistan each have at least a squadron's worth, and Ukraine has about 70. Ethiopia has a handful of secondhand models, and there are unconfirmed reports of transfers to



**Russia's effort to sell the Su-27 Flanker and its variants is a success. Hundreds are in service, and India and China are producing their own under license. Performance of the Su-27—this one is Chinese—is on par with the F-15.**

## Fighter Generations

Photo by Ted W. Van Geffen



MIG-21 Fishbed

**Generation 2**  
Range-only radar  
IR missiles



F-4 Phantom II

**Generation 3**  
Pulse radar  
All-aspect, depressed-angle BVR  
missiles

Photo by Gert Kromhout



Mirage 2000

**Generation 4**  
Pulse-Doppler radar  
High maneuverability  
All-aspect, lookdown/shootdown  
missiles

Photo by Katsuhiko Tokunaga



**Generation 4.5**  
L mited supercruise/maneuverability  
L mited sensor fusion  
Some stealth



F-22 Raptor

**Generation 5**  
Full integrated avionics  
All-aspect stealth  
Robust supercruise/maneuverability

Angola and Syria. Yemen is said to be in final negotiations to buy about 24 airplanes.

Russia has decided to build its air force for the next 20 years around the Flanker and its variants and is aggressively marketing the Su-27 family to help defray its own costs. Sales of the aircraft include several types of weapons. The most advanced of these is the AA-12, Russia's answer to the US AIM-120 AMRAAM. India may actually deploy the AA-12 in advance of the Russian air force.

Other potential near-term customers include Iraq and Iran, although a number of Asian Pacific nations have shown high interest. Malaysia is still considered a prospect; Indonesia had placed an order but canceled it, for the moment at least.

Outside of India, Russia, and China, pilot training in the Flanker is "spotty," one industry analyst observed. However, he said, "You can't discount the fact that it [the Flanker] is a world-class airplane. ... A great airplane can make a good pilot out of an average pilot and a great pilot out of a good pilot."

The top version of the Flanker is known variously as Su-35 or Su-37 (Russia has been cagey about the designation). Features include thrust-vectoring nozzles, canards for greater agility, and a more sophisticated sensor and electronic warfare suite. It is capable of extraordinary maneuvers, which include a virtual midair stop,

quick recovery from extreme attitudes, and other tricks that would be hard to deal with in close-in combat. It has an avionics suite to match, employing Russia's best and longest-range missiles. It would likely be able to detect and shoot the F-15 before the F-15 could spot the Su-37 and attack.

### Russian Stealth?

The aviation press has buzzed for years with reports about a follow-on to the Flanker, which the Russians have been touting as a direct challenger to the F-22. In this respect, they unveiled two interesting aircraft in the 1990s—the MiG Project 1.44 and the Sukhoi S-37 Berkut.

Russia revealed the MiG 1.44 three years ago. It features thrust-vectoring engine nozzles, but little else about it is very revolutionary. Though advertised as a stealthy aircraft, its appearance suggests low observability wasn't much of a design concern. The company has experienced huge financial problems, particularly with the selection of rival Sukhoi's Flanker series as the centerpiece of the Russian air force, and the 1.44 is considered, at best, a technology demonstrator.

The S-37, a large aircraft with forward-swept wings, has performed interesting flight routines. Its design is considered to be more advanced than that of the 1.44. It appears that low observability was a



*Russia's hottest current fighter design is the S-37 Berkut. It's a technology demonstrator—with some stealth, forward-swept wings for extreme agility, and presumed state-of-the-art avionics—moving toward an F-22 challenger.*

goal; the engines are concealed somewhat by an overhanging leading-edge extension, and there are opportunities for radar-absorbing materials to be used. There have been rumors that the S-37 will soon be designated the Su-47.

Still, a true, fielded Russian counterpart to the F-22 could be as much as 20 years away, said a top Pentagon official. Even if a program were to be launched immediately, it would still take "about seven years" to construct such an airplane, he said, followed by "12 to 15 years to test and bring it to IOC [Initial Operational Capability]." There's no indication that the required cash is available. The program "is pretty chaotic," he added.

China is working on an airplane reminiscent of the F-22 and French Rafale, called the X-X-J or F-12, but



*China's multirole F-10, derived from the canceled Israeli-US Lavi project, is roughly comparable to the F-16 Block 30. China plans to build hundreds to replace its aging inventory of 1950s-70s Russian-designed fighters.*



*Not much has leaked out about China's X-X-J, said to be a true fifth-generation fighter on a par with the F-22. It may appear when the F-22 reaches middle age, around 2025. Given China's growing economic power, maybe sooner.*

analysts said it is too soon to even guess when it will fly, let alone enter service. "All our previous estimates of how fast they can develop something have been too generous," an industry analyst said.

Still, the Chinese are poised to begin production of a significant new airplane, called the F-10. This fighter, which strongly resembles the aborted Israeli-American Lavi project of the 1980s, is expected to replace large quantities of 1960s- and 1970s-vintage MiG-19s and MiG-21s in Chinese service.

The F-10 will be indigenously produced and may even be offered for export once production gears up. It is "an open secret" one analyst said, that Israel has assisted China in the development of the F-10 and that it is in fact based on the canceled Lavi. The airplane will be comparable to the Air Force F-16 Block 30 and should be in service by 2005. Experts think China plans to build about 500 F-10s in its initial version.

Russia is also offering a substantial upgrade to its MiG-29 Fulcrum, which has been exported to over 25

countries. The MiG-29 SMT features a more powerful radar and a deepened "spine" to carry more internal fuel. Fire control is also updated, as are the avionics and displays.

The F-15 was considered superior to the earlier versions of MiG-29s, enjoying an advantage in radar detection and range, if at par in maneuverability and radar cross section. The SMT upgrade will close that gap and make the improved Fulcrum the match of the F-15, the Air Force said. Hundreds of Fulcrums are in service worldwide, particularly in India, Iran, Iraq, North Korea, and the former Soviet states, but it is not yet clear how many Fulcrum operators will sign up for the upgrade.

Older fighter types such as the MiG-21 will also pose a threat in the near future. Upgrades are being offered by Russia and Israel to equip the MiG-21—a second-generation fighter—with modern fire control and Beyond-Visual-Range missiles with active-radar seekers.

"Inferior aircraft armed with superior missiles may be able to defeat US aircraft carrying current generation missiles," the Air Force said in its briefing paper.

### Fighters of the West

The Eurofighter Typhoon, which is expected to see operational service in a few years, will easily outstrip the capabilities of the Su-37, as well as the F-15, and in fact is con-

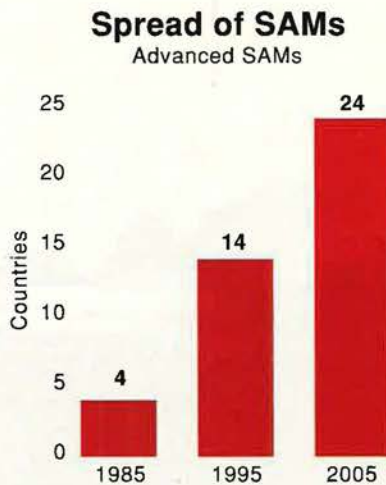
sidered second only to the F-22 in capability. The Air Force regards it as a potential future threat, however, because the English–German–Italian–Spanish consortium building the Typhoon plans to market the airplane widely.

“You never know how politics will change or who could end up with a squadron of very high-performance fighters,” an industry analyst noted.

During the Gulf War, for example, coalition allies had to take care not to accidentally shoot down French Mirage F-1s. The Mirage was a target because Iraq was operating F-1s purchased from France. To prevent fratricide, the French F-1s were always included in a coalition strike package and “never sent out alone,” an Air Force officer involved with planning Gulf War missions reported.

Countries participating in Typhoon ruled out the use of an American engine or radar because they did not want to be bound by US export controls. The Typhoon was designed to carry the AMRAAM, but concerns over its releasability to potential Typhoon customers has spurred the consortium to choose the European-built, ramjet-powered Meteor missile as a near-term replacement for AMRAAM.

Typhoon is more maneuverable and has better radar detection capability than the F-15 and is harder to detect on radar, though it is not considered “stealthy.” Steps have



Source: USAF



been taken to conceal the engine fan blades—a big radar reflector—and coat the air intakes and some leading edges with radar absorbent material. The fighter has canards and digital flight and engine controls and takes advantage of most aerospace state-of-the-art advances through the mid-1990s, when the design was frozen.

The aircraft will have the ability



to operate on shorter runways, and a ground attack capability is being developed for it as well. However, Typhoon was envisioned as an air superiority airplane.

So far, the consortium has lined up no orders outside of the participating nations, a situation that may have a lot to do with Eurofighter’s staggering cost of over \$100 million per copy. A total of 710 Typhoons are on order, to be delivered through 2014, with Germany and the UK the largest operators.

### New Customers

Greece has shown keen interest in buying the type, and South Korea is considering it alongside the F-15 in its current competition to choose a new front-line fighter. The US recently told Korea it would not approve integration of South Korea’s substantial inventory of US-made weapons, such as AMRAAM, with the Typhoon or French Rafale if Korea selected one of those aircraft over the F-15.

Saudi Arabia, which bought a large inventory of British Tornado and Hawk aircraft when it was rebuffed from buying top-of-the-line US equipment in the mid-1980s, has requested information on the Typhoon as well. Singapore, the Netherlands,



**New, superfast, and extremely agile missiles pose an increased threat. The already potent Typhoon will give up its AMRAAMs for the Meteor, a ramjet-powered, long-range missile with high speed and resistance to countermeasures.**

and Australia are also reportedly considering Typhoon.

When France set out to design the Rafale, it originally meant to be a partner with the European nations that wound up building the Typhoon. It withdrew from the Eurofighter project and decided to pursue its own aircraft, partly because it wanted a larger leadership role in the program and partly because it wanted less potential interference with sales. France also saw a good chance of export success because of its track record selling Mirage fighters to nonaligned nations.

The Rafale, built by Dassault, is deemed to be comparable to the Eurofighter in many respects; both have a canard/delta-wing configuration. The Rafale is smaller than the Typhoon and carries less payload but is thought to have equally good avionics and radar and to be somewhat stealthier. It has better range than the Eurofighter but is not quite as agile. Its range of munitions is expansive and they are equal to munitions in USAF. Its radar system can track six targets simultaneously and automatically assign priority. Equal in range and agility to the F-15, it is superior in its radar detection range and stealthiness.

So far, France is the only customer for Rafale and plans to acquire 140 for its air force and about 60 navalized versions for its aircraft carriers through 2012–15. However, US intelligence analysts believe that



Photo by Gert Kromhout

**France, which supplied fighters to many nonaligned nations during the Cold War, has positioned itself to help Iraq rearm once sanctions are lifted. It is expected to sell Mirage 2000s, like this one, or the more powerful Rafale.**

France has positioned itself to sell Rafale to Iraq, as one said, “as soon as the sanctions are lifted.” The price of one Rafale exceeds \$60 million, not including munitions.

The Swedish Gripen is also a canard/delta configuration. It employs excellent avionics, a degree of low observability, and has performance roughly on par with the F-15, although it is far smaller and lighter. In keeping with Sweden’s strategic plan of operating its aircraft from austere, dispersed airfields, it has been designed for ease of maintenance in the field by draftees with

only a few months’ training. Its small internal fuel supply limits its range, but it can be fitted with sizable external tanks.

Weapons for the Gripen include an impressive array of dogfight missiles and air-to-ground munitions, including anti-ship missiles. These are also available for export.

Sweden has ordered about 200 Gripens, of which about 80 are already in service, with the rest to be delivered through 2007. In a marketing partnership with BAE Systems of the UK, SAAB has logged a single export sale of 28 airplanes to South Africa that will be delivered starting in 2007. Other interested countries include Poland, Hungary, the Czech Republic, Brazil, and the Philippines.

“Overall,” the USAF briefing paper said, “proliferation of both current and developmental advanced airborne weapon systems increases the threat to US airborne operations worldwide,” affecting the ability of the US “to achieve and maintain air superiority.”

Analysts agreed, though, that the Air Force’s rigorous and realistic training gives it the edge against aircraft that are at or near parity with the F-15. “We operate [ours] better,” said one intelligence expert. “That’s the source of our advantage right now.” However, it’s perishable. “If another country could afford to train and fly as we do,” he added, “our edge would be eroded.” ■



Lockheed Martin photo by Kevin Robertson

**The only true fifth-generation fighter is the F-22, designed to counter the aircraft now rolling off foreign assembly lines. As new foreign types enter service, USAF faces a window of vulnerability as it slowly trades F-15s for F-22s.**

**Here's part of what Gen. John Jumper said at his confirmation hearing.**

# The **New** Chief

**Gen. John Jumper** on Sept. 6 became the Chief of Staff of the Air Force. At his Aug. 1 confirmation hearing before the Senate Armed Services Committee and in a separate written statement for the record, Jumper provided his views on a wide range of issues. What follows are excerpts from his testimony and his statement.

## **Problem One**

"The most serious problem facing us today is adequate resources. ... No matter how you slice it, the Air Force needs more funding to provide the essential tools to our warfighting commanders."

## **Bomber Requirement**

"The Air Force needs a minimum of 157 bombers—B-52, B-1, B-2—at their full capability to employ a variety of weapons across the full spectrum of conflict."

"[W]e also need to recapitalize our bomber force and to continue to modernize so that our long-range strike assets can communicate en route to targets and have the ability to carry larger loads into the target area."

## **Long-Range Operations**

"[USAF's warfighting] concept calls ... for forward deployed bomber assets ... at our bases in England and Diego Garcia and other places that are specified bomber beddown bases. We want to include the B-2 in this forward deployment capability, and we are now, as you're aware, sir, developing a shelter that will allow us to do the self-maintenance on the B-2 in forward locations."

"When we do put these bombers forward, we get greater sortie rates out of them and they're much more useful to us."

"[In Allied Force,] I was frustrated with our inability to retarget, so I went to Whiteman Air Force Base [Mo.] myself and sat down with the young captains, and we figured out how to do it. And we created a very meager flexible-targeting capability which is exactly the type we're trying to expand [and make] more sophisticated."





### **B-52s Forever?**

"We benefit from the way they built airplanes back in the '60s, before the advent of computer-aided design. Not knowing all we know about structures today, they overbuilt them [B-52 bombers] by two or three times. So the structure of the B-52, with the rate we fly at today, is very sound out to [2037]."

### **Bulking Up the B-2**

"[W]e have \$3.7 billion over the Future Years Defense Plan invested in the B-2 for its survivability, its maintainability, and its supportability. ... It does not do all that we would like to do with the B-2, but what it does do is it begins a program where we'll be able to take the aircraft from the current load of 16 near-precision guided munitions up to 80 near-precision guided munitions."

### **B-1 Consolidation**

"The decision to consolidate B-1s is a monetary one. The money saved from consolidating the B-1 units onto two bases will be used to bring the remaining B-1 fleet up to current modernization levels. With over \$2 billion in unfunded requirements, we can pour that money back into modernizing the remaining B-1 fleet."

### **F-22 Fighter**

"This F-22 puts us as far ahead of anything that we know is coming down the road as the F-15 did over the MiG-21 25 years ago."

"The F-22 will enable us to kill the most difficult SAMs. It will allow us to bring stealth into the daytime for the first time. This is the generation of technology we need."

"We have had two new bombers before we've had the last new fighter. ... And that's why we put the emphasis now on the F-22—not to the denigration of the other platforms but just because of the necessity to upgrade."

### **F-22 Affordability**

"If we committed the same percentage of national resources for the F-22 that we did for the F-15, we would be buying an inventory of 1,000 F-22s [rather than the planned 339]."

"The F-22 program is structured around a buy of 339 aircraft. ... [T]he need for this airplane is very clear. The numbers will be the question as we go through this review."

### **Strike Fighter**

"The Joint Strike Fighter brings stealth—persistent stealth—over the battlefield for the first time. ... The Joint Strike Fighter is the persistence force. That's the one that stays over the battlefield to do things like close air support when the troops come ashore, time-

critical targeting, and to handle those critical targets that emerge very quickly that you can't deal with with a bomber that's 3,000 miles away."

### **Military Space**

"The Air Force has fully embraced the findings of the Space Commission. And Gen. [Michael E.] Ryan and Secretary [James G.] Roche are implementing provisions of those recommendations as we speak. ... I will continue to do the same thing."

"The Air Force is the right service for departmentwide responsibility for planning, programming, and acquisition of space systems."

"I think our greatest leverage lies in space."

### **Threats From Space**

"I ... see the threat emerging—the threat that allows you to take your Visa card and dial up an address on the Internet and get a picture almost instantly of anywhere you want on the Earth. This is going to impact our ability to provide strategic surprise. We're going to have to learn to deal with this problem in our space-control mission in the future, because we won't be able to hide our intent to deploy."

### **No Space Pearl Harbor?**

"[M]uch like other US military resources, space assets make a lucrative target for those that wish to discredit or damage the United States. However, we are aware of the threats posed to space-based assets and are vigilant to finding ways to counter possible threats. It is unlikely we would be taken completely unaware by an attack on our space capabilities."

### **Encroachment**

"We can't afford to wake up one morning and discover that encroachment [of civilian population near military areas] prevents us from launching our live ammunition training out of Nellis Air Force Base, for instance."

"Encroachment is a very serious problem. ... Maintaining continued access to our ranges, airspace, and frequency spectrum is absolutely critical. In fact, if our ability to train our aircrews continues to diminish, America will soon lose its only edge in air combat proficiency."

### **New Training Demands**

"With [introduction of] the F-22 and JSF, we will go to the limits of our current range and airspace capability to accommodate [test] and training requirements. Not only will more sophisticated instrumentation be needed but more complex surface-to-air threat emitters will be required. ... We cannot endure further encroachments that will decrease the size or quality of the airspace and ranges we use."

*Continued on p. 42.*



# THE EXPERIENCE TO MAXIMIZE

From C-17 to F/A-18E/F to 777 and beyond, the track record of Boeing in efficiently managing Boeing the ideal partner for the Joint Strike Fighter. From successfully integrating hundreds the world, to extraordinary cost and timeline management, Boeing delivers all



USAF  
BOEING  
JCI  
DELTA  
SKYNET

VALUE AND MINIMIZE RISK.



**BOEING**

complex programs is unmatched in the industry. It's precisely this experience that makes of subcontractors around the globe, to utilizing the most advanced manufacturing processes in that's expected without compromise or surprise. Namely, maximum value with minimum risk.



*Continued from p. 39.*

### **The Combat Edge**

"The biggest advantage we have today is our edge in training. Every air force in the world out there that could contend against us in some way is trying to figure out a way to deal with and beat the United States Air Force. This training edge that we have is one that we absolutely have to keep. It's absolutely precious to us. And by the way, we are still the best trained Air Force in the world."

### **High on UAVs**

"I'm the guy who's supposed to fear [Unmanned Aerial Vehicles] the most. I'm the white-scarf fighter pilot that everybody says hates UAVs. As you may be aware, I've worked personally very hard to accelerate the Global Hawk. I'm the guy who had us install Hellfire missiles on the Predator UAV, and we've tested over a dozen shots of the Hellfire missile off the Predator. I do not fear UAVs, and especially the [Unmanned Combat Air Vehicle], which promises to give us great leverage in the suppression of enemy air defenses mission with its stealth capabilities."

### **Future of UCAVs**

"I would like ... to pursue the marriage of the UCAV with directed-energy weapons to see if this promising technology would combine well with the UCAV [and provide a] payoff, which I think it will."

### **UCAVs: A Third of the Force?**

"I don't know if the goal of one-third is correct or not. We have to work very hard on the concept of operations to make sure that we don't disturb other necessary elements of our readiness. For instance, if the concept for UCAV is to put them into boxes and load them aboard C-5s or C-17s, we've got to make sure that the balance of airlift is proper."

### **Munitions Shortage**

"In the current budget, we have attempted to fix some of our training munitions shortfalls, but we continue to be behind in procuring our most beneficial precision munitions, [a matter that is] complicated both by the expenditure rate of over 5,000 of these weapons in Operation Allied Force and then, as you know, we continue every day to expend a certain number of weapons in Iraq in Northern and Southern Watch. ... The combination of these episodic contingency operations ... has kept us from being able to replenish the spares that we need."

"They [precision munitions] are still well below desired inventory level, and failure to increase stockpiles risks wartime shortfalls. ... [S]erious shortfalls in standoff and legacy munitions persist through FYDP."

### **Guard and Reserve**

"Today ... 25 percent of our deployed forces are from the Guard and the Reserve. This is a level of support

that was higher than during the middle of Desert Storm, and they sustain that now on a daily basis."

"[T]o be relevant in the present and future Air Force, which is key to funding and survival, the [Guard and Reserve] must at all times mirror their active duty counterparts. If the missions ever separate into [different parts], then funding, organization, training, equipping, etc., becomes threatened."

### **Associate Units**

"There are obvious synergies and benefits to reserve associate programs throughout the Air Force. ... We have completed a very successful test of a fighter Reserve associate program at Shaw Air Force Base [S.C.]. [Air Mobility Command] has indeed been very successful in such programs, and [Air Combat Command] and [Air Force Reserve Command] are in the midst of developing the requirements for expansion to other weapon systems. Reserve associate programs have tremendous potential to leverage the experience resident in the Air Reserve Components."

### **Readiness Worries**

"[O]ur readiness requirement [is] 92 percent. Since 1996, our worldwide combat force readiness rates have decreased 23 percentage points to ... 68 percent in April 2001. Furthermore, our overall Air Force readiness is lower than any time since June 1987. We are capable of winning today. However, we are concerned about these trends in readiness indicators."

### **Aging Aircraft**

"Day-to-day readiness of our aging aircraft fleet depends on continued robust funding of spare parts, aggressive efforts to enhance retention of skilled personnel, and engaged unit leadership on our flight lines. I plan on focusing much of my efforts on these three essentials."

"An aging fleet costs more, both in effort and dollars, to operate and maintain. Last year, while we flew only 97 percent of our programmed hours, they cost us 103 percent of our budget. Over the past five years, our costs per flying hour have risen almost 50 percent. The only way we can control these costs is to recapitalize the aging fleet."

### **Global Strike Task Force**

"It is imperative we develop our Global Strike Task Force, a kick-down-the-door force that will assure access and aerospace dominance for all our joint forces."

"Global Strike Task Force ... [entails] the horizontal integration of manned platforms, unmanned platforms, and space platforms. ... When you combine persistence of the airborne platforms with the high grounds of space, you have no place to hide. And you would integrate these at the machine level, at the digital

level, so we don't have human beings that have to interpret the digits in order for us to get precise target location and precise identification."

### **Depot Philosophy**

"[T]he founding notion behind the depots is that we have a capability within our service to surge and to repair what we have needed in times of crisis. I see no reason to erode that philosophy in any way, and I'm committed to that philosophy."

### **Strategic Airlift**

"The largest [airlift] challenge remains the reliability of the C-5 fleet and the modernization of this fleet. I will place a strong emphasis on the Air Force's two-phase program to modernize the C-5. Phase I is an Avionics Modernization Program that replaces unreliable and unsupportable avionics components. Phase II is a reliability and re-engining program. ... The resulting goal of this program is a 75 percent mission capable rate for the C-5 fleet."

### **Standing Joint Forces**

"There may be a place for a standing Joint Task Force (or Joint Response Force) headquarters, consisting of command and planning elements organized under a war-fighting [Commander in Chief] and exercised jointly by [US CINC Joint Forces Command]. However, that requires further study and coordination with the services."

### **Anthrax Vaccination**

"In the past, almost everyone who has been fully informed of the [anthrax] threat and the protection afforded by the vaccine has chosen to be inoculated. For those few members who ultimately refuse an order to be vaccinated, appropriate disciplinary action should be considered."

### **Keep ICBMs On Alert**

"ICBMs are an essential element of the United States' nuclear forces and I believe will remain so in whatever future framework evolves. As such, I believe that those systems should be operated as designed—on alert. To do otherwise, by increasing the time it takes to employ these forces, increases safety, security, stability, and possibly even proliferation risks. As a matter of military practice, lowering military readiness lessens credibility."

### **Enlisted Retention**

"We ... this year will meet our goal in the first-term retention at 55 percent. The 75 percent and the 95 percent we attempt to get in the second term in the career, we're still going to be [a few] percentage points short, but it's improving."

"The Air Force is recovering from several years of low retention rates from first-term airmen through career airmen. ... Part of the trouble with retaining second-

term and career airmen is they have been overtaken year after year. Collectively changing their minds to stay in the Air Force is more difficult than convincing a first-term airman to give us a second chance."

### **End Strength Increase?**

"The requested end strength is justified. ... Our long-term goal is to stop the decline in end strength and start growth to size the force to support increased operations tempo."

"We are stretched too thin and are wearing people and equipment out. Sustained operations tempo is a major factor in recruiting and retention [problems]. It has taken its toll on the force—which is still deploying over three times more often despite the drawdown."

### **Losing the Edge**

"I fear that our technological edge is waning. ... Our best pilots flying *their* airplanes beat our best pilots flying *our* airplanes every time."

"Our science and technology portfolio is our investment in the future and cannot be forsaken. Already, potential adversaries possess capabilities beyond those of our own. We cannot afford to fall further behind."

### **Expeditionary Force**

"We will continue ... to transition fully to an air expeditionary force structure. This puts predictability into the lives of our people. It includes the ability to fully incorporate the Guard and Reserve into our operations."

### **Cost of Missile Defense**

"[Building a national missile defense system] is going to mean some very tough trade-offs, and my belief is that we need to make sure that the technologies that emerge ... prove themselves worthy as we invest in those into the future, because the trade-offs will be very difficult indeed."

### **Cyber-War**

"Information Operations personnel are part of our new warrior class, an integral arm of the Air Force, and Information Operations in synchronization with traditional kinetic means will remain a critical element of our strategy to fight and win future conflicts. ... In particular, we must bring IO to the operational and tactical levels of war."

### **Forward Bases**

"We have already drawn down our overseas basing to a critical level. ... [O]ur forces are capable of traveling thousands of miles to conduct precision strikes. However, to conduct an effective air campaign, ... you must have persistent airpower and the capability to perform time-critical strike, which dictate that either permanent or temporary forward basing will continue to be a requirement for effective operations." ■

An aerial view of Earth from space, showing a curved horizon and a layer of white clouds against a deep blue sky. In the lower right foreground, the nose and cockpit area of a green F-16 fighter jet are visible, flying towards the left. The overall scene is a high-angle, wide-area shot of the planet from orbit.

**A unique blend of aircraft places the 154th Wing  
at the forefront of worldwide operations.**

# Guard Over the Pacific

**An F-16 from the Hawaii Air National Guard's 154th Wing prepares to refuel  
from a 154th KC-135 tanker.**

Photo by USAF/Bluesky



The 154th Wing's unusual complement of aircraft—F-15s, KC-135s, and C-130s—and aircraft control and warning, mobile aircraft control, and other mission support units mark the wing as perhaps the most diverse in the Air National Guard. The wing is headquartered at Hickam AFB, Hawaii, and has radar sites located throughout the islands.

At right, a commercial airliner waits its turn as an F-15 lands—runways are shared with Honolulu International Airport.



Staff photos by Guy Aceto



Above, a four ship returns to Hickam. At left, a wing pilot completes paperwork after a sortie. Below, Maj. Glen Nakamura in his F-15.

The flying units of the 154th are the 199th Fighter Squadron, 203rd Air Refueling Squadron, and 204th Airlift Squadron. Their range extends beyond the Pacific region to Europe, the Middle East, even Iceland. They participated in operations over Bosnia and Kosovo. They have covered the no-fly zone operations in Iraq and are scheduled to return to Northern Watch this fall. They've flown NATO alert missions from Iceland and humanitarian missions throughout the Pacific.







The 154th also has the distinction of being the only ANG unit charged with sole responsibility for air defense of a state.

At top, F-15s from the 199th taxi back after a training sortie. At left, an F-15 in an alert hangar.



Here, a crew chief checks over his fighter. During the unit's first deployment to Southern Watch in the Persian Gulf region, maintainers chalked up a 100 percent mission capable rate.

The mission of the wing's 203rd ARS is to cover long-range operations in the Pacific. It does that and more. Actions in the Pacific have included refueling B-52 bombers flying across the Pacific to participate in Desert Strike in 1996 and B-2 bombers as they made their first operational overseas deployment, flying to Guam in 1998. But, the unit also sent its tankers and pilots, along with wing maintainers and support forces, to Europe—for combat operations in Allied Force.

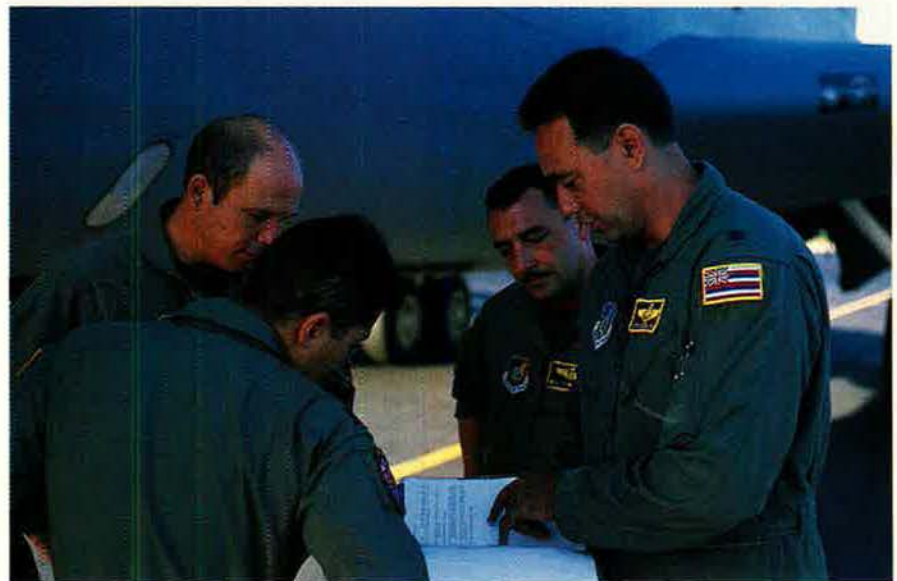


Staff photos by Guy Aceito



At top, SSgt. Wendell Au checks over a KC-135R refueling boom. At left, other 203rd maintainers at work.

At right, Lt. Col. Steve Su'a-Filo holds an outdoor preflight briefing with his crew members: Capt. Scott Oka (back to camera) and boom operators TSgt. Chris Killion (left) and MSgt. Frank Santos. Killion is an extra boomer, going for his check ride.





At top, a KC-135 is ready for its next sortie.

At left, on the flight deck, Killion makes fuel calculations at the station that once belonged to a navigator. All the tankers in the 203rd now have Pacer CRAG avionics upgrades, a change that eliminated the need for a navigator on the crew. (CRAG stands for Compass, Radar, and Global Positioning System.)



Here, Killion checks out his refueling station.

One of the many wing functions includes aircrew life support. Here, TSgt. Marc Ochoco, superintendent of the section, looks over a set of Night Vision Goggles that 199th FS pilots use in night intercept missions.



At left stands one of the C-130 transports flown by the wing's 204th Airlift Squadron.

Although it is the wing's smallest flying unit, the 204th's four C-130 cargo aircraft and their crews are in heavy demand. Besides flying regular support missions throughout the Pacific, the airlift squadron provides tactical airdrop and paratroop drops for the US Army's 25th Infantry Division, stationed on Oahu at Schofield Barracks. The unit also participated in operations in Bosnia and Kosovo.

At right, SrA. Billy Dagulo checks an aircraft propeller during maintenance.





At top and at left, a 204th maintenance crew member runs up an engine on a C-130.

Although Hawaii lies more than 2,000 miles from the continental US and might be thought of as isolated in the Pacific, its Air National Guard is an active partner in worldwide operations of the Total Force.



# Altitude

**Contrary to popular opinion, lower is not always best.**

**By Rebecca Grant**

**A**LTIUDE, altitude..."Every pilot of a modern fighter aircraft has heard the soft female voice of the cockpit warning system indicating that the aircraft is too near the ground. For commanders, altitude is a tactical commodity, traded for time, accuracy, and survivability. The goal is to pick the operating altitude that gets the mission done while giving the aircrew as much control as possible over the risks and benefits of the battlespace.

The United States fought low-casualty air wars over Iraq in 1991, Bosnia in 1995, and Yugoslavia in 1999. Operations Desert Storm, Deliberate Force, and Allied Force, respectively, put a new twist into the question of altitude. Critics of Allied Force claimed airmen compromised accuracy—and integrity—by flying at 15,000 feet to avoid air defense threats.

"I was very frustrated with [the] preoccupation with altitude as if that were a measure of commitment," remarked Maj. Gen. (sel.) Daniel P. Leaf, commander of the USAF wing at Aviano AB, Italy, during Allied Force.

A year later, during the 2000 Presidential campaign, Sen. John McCain (R-Ariz.) said this: "The most obscure chapter in recent American history [was] the conduct of the Kosovo conflict, when the President of the United States ... had them flying at 15,000 feet, where they killed innocent civilians because they were dropping bombs from such high altitude."

In fact, altitude is not a linear guide to justice in war. Risk is present at all altitudes and the choice of altitude for a mission is a complex tactical calculation constantly reviewed by pilots and commanders as they seek the best way to get the job done.

## **No Man's Land**

During the Cold War, pilots trained extensively to fly at low altitude. Systems as diverse as the F-111 fighter-bomber and the B-52 heavy bomber practiced with terrain following systems to improve their proficiency in flying low and fast. Pilots knew that the airspace from 500 feet to 5,000 feet was No Man's Land: It was constantly endangered by small-arms fire, anti-aircraft artillery, and handheld surface-to-air missiles like the SA-7 and SA-14.

At that time, the idea was that, at least for the first few nights of the war, aircraft would fly low and fast. Then, attacks on the enemy's integrated air defense system were supposed to reduce the threat at medium altitude. Meanwhile, technological breakthroughs in electronic countermeasures, anti-radiation missiles, and later, stealth sought to reclaim the optimal airspace at medium altitude.

On the eve of Desert Storm, USAF was still training to go low and fast. An F-111F pilot commented that, while he and other pilots trained for both medium and low altitude, "80 percent of our training was for the low-level altitude environment."

Air Force Lt. Gen. Charles A. Horner (now retired general), the Joint Forces Air Component Com-

*Critics attacked USAF pilots for flying at high altitude during Allied Force, but the choice of altitude is based on the best way to do the job. At right, an F-16 rolls in during a practice run near Hill AFB, Utah.*

Staff photo by Guy Aceto





**Initially, most Gulf War sorties were flown above 15,000 feet, but this changed. A-10s, like this one showing battle damage, were flown at 4,000 feet and F-16s at 8,000 feet. When ground combat commenced, they flew as low as needed.**

mander in the Gulf War, actually raised the training altitude restriction from 500 to 1,000 feet in October 1990. He did so after the US experienced a pair of training accidents. However, he allowed the B-52s to continue training at 500 feet.

Whether to fly low depended on the aircraft, the weapons, and the attack profile. Early in the war, an RAF Tornado pilot described attacking an airfield at “520 knots and 180 feet radar altitude, through what seemed to be a solid red and white wall of tracer.”

The RAF pilot had to fly low because the attack employed JP233 mines optimized for delivery at about 200 feet. Although this RAF crew survived the fireworks display, three Tornados were lost in low-level attacks. On the war’s second night, a B-52 at low altitude had to turn back from its target in the face of heavy gunfire.

Gulf War planners concluded that risk and mission accomplishment factors did not favor low-altitude attacks because there were other ways to do the job. Units shifted to medium-altitude tactics. While Horner did not order the change, he gave it his approval and told the RAF specifically after the first few days that their low-altitude losses were unnecessary. As it turned out, the Desert Storm air campaign planners “would largely abandon low altitude in favor of altitudes above 10,000 feet,” said the Gulf War Air Power Survey.

More to the point, the premier fighter-bombers of 1991 worked best at medium altitudes. The stealthy F-117 specifically was designed to fly above small-arms fire and to survive the SAM threat at medium altitudes. Precise delivery of its laser-guided bombs required room to work. From an altitude of 15,000 or 20,000 feet, the pilot had time to identify the target and guide in the weapon. The laser-guided bombs needed time to leave the aircraft, acquire the laser-spot, and fly in to the target, within launch parameters that required steady flight. Dropping a laser-guided bomb outside the launch window would result in a miss.

#### **Time to Target**

The point is that an F-117 streaking over a target at an altitude of 1,000 feet would rob the pilot and weapon of the time needed to acquire the target. Stealth helped reclaim the preferred airspace from 15,000 to 25,000 feet, and for precision attack, medium altitude worked best.

For F-111Fs with the Pave Tack pods, the case was much the same. Whether attacking fixed targets or “plinking” Iraqi tanks, medium altitude—neither too low nor too high—was essential for accuracy. Moreover, early attacks on Iraq’s integrated air defense system reduced the impact of its surface-to-air missiles, the deadliest weapons for medium- and high-altitude aircraft.

In contrast with F-117 and F-111F, F-16 and F/A-18 fighters had no precision targeting pods at the time of the Gulf War. When they attempted higher altitude deliveries, their accuracy suffered.

In the Kuwait Theater of Operations, where the bulk of the sorties were flown, aircraft at first generally flew above 15,000 feet. A need for greater accuracy pushed them lower. On Jan. 31, 1991, A-10s were ordered to drop down to between 4,000 and 7,000 feet for weapons delivery. F-16s were told to release bombs below 8,000 feet.

#### **Going Low**

What caused the change in tactics was the need to pick out targets by eyesight in the Kuwait kill boxes. “The lower altitude allowed the A-10 pilots to find their targets more easily than before, and the tank kills rose,” Horner later wrote. After the change, the attrition of Iraqi military equipment picked up pace, and so did battle damage to the A-10s.

During the ground war of Feb. 24–28, 1991, aircrews once again went very low. Horner told the aircrews to fly as low as needed, saying, “You have a sacred duty to help the men on the ground. ... Now is the time for you to risk your jet, to risk your life, because they are down there engaged in combat and are for sure risking their lives.”

Desert Storm demonstrated that altitude would now be considered a controllable variable in mission effectiveness. With precision weapons, medium altitude was the most effective place to operate. There were, to be sure, some drawbacks. Overcast weather hampered precision bombing when cloud layers disrupted infrared targeting. Still, the trend was clear. The best periods of sustained attrition bombing of Iraqi tanks came from the F-111Fs and F-15Es with laser-guided bombs working at medium altitude.

Four years later, the prosecution of Operation Deliberate Force in Bosnia saw a jump in the percentage of precision weapons employed. By then, most Air Force and many naval aircraft had precision targeting pods. The attacks on fixed targets in the air campaign ending in September 1995 were conducted almost entirely from medium altitude.

The air campaign known as Op-





**Desert Storm proved that altitude was a controllable variable in mission success. Medium altitude produced the best results for F-111Fs, like this one, and F-15Es employing laser-guided bombs.**

eration Allied Force began in March 1999 with a directive ordering pilots not to fly below the established “floor” of 15,000 feet altitude. USAF Lt. Gen. Michael C. Short, the JFACC, noted that the NATO allies agreed that it would be a precision campaign insofar as possible. With laser- and GPS-guided bombs, Short said, “we would ... be as precise and as accurate as we could.” The idea was to accept legitimate risk but avoid the squandering of aircraft and pilots by exposing them to small-arms fire, anti-aircraft fire, and man-portable SAMs.

“The first measure of merit is not to lose aircraft,” directed Gen. Wesley K. Clark, US Army, Supreme Allied Commander of NATO forces. Clark’s directive drove decisions on tactics for the air war. “We had all agreed that 15,000 feet was going to be the floor,” Short said.

“We started with 15,000 feet and it worked OK,” Leaf recalled. Attacks on fixed targets were no problem unless cloud layers slipped between the strike aircraft and the target. Bad weather early in the campaign forced a number of canceled missions. Except for the GPS-guided Joint Direct Attack Munition on the B-2, all the precision munitions employed by the Air Force were line-of-sight, meaning, as Leaf said, “you had to see the target to guide it.”

More challenges came when NATO airmen initiated serious attacks on

the Yugoslav 3rd Army. In the Kosovo Engagement Zone “we had to find and identify and strike targets,” said Leaf. The 15,000-foot restriction “became more difficult” in the dynamic attack environment.

“I don’t mean that we had to get down to 500 feet AGL [Above Ground Level] or 5,000 feet AGL,” Leaf explained, “but that [staying about 15,000 feet] was a pretty challenging rule to live by in the KEZ, where you were finding and locating targets.”

One F-16 pilot told reporters that seeking targets was like bungee jump-

ing from the top of a building and trying to pick out details on the way down.

Then came the April 14 incident at Djakovica. At midday, forward air controllers spotted a large convoy of vehicles moving along a road. Airborne controllers in an EC-130 verified that the convoy was “VJ”—meaning Yugoslav Army—and cleared several fighters to attack the vehicles. The fighters employed laser-guided bombs from 15,000-foot altitude. The pilots were emphatic that, from the attack altitude, to the naked eye, they appeared to be military vehicles. At least one F-16 reported taking fire from anti-aircraft artillery near the convoy.

However, controllers called off the engagement when intelligence specialists at the Combined Air Operations Center said that VJ forces did not normally travel in such large convoys. An OA-10 was sent in to check the column and reported military and possibly civilian vehicles. The attack was terminated. The Serbs immediately reported civilian casualties from the air attacks. Subsequent investigation showed that at least one vehicle had been misidentified. There had been two convoys in the area, with a mix of military and civilian vehicles. Clark later wrote that the truth about the number of civilians in the columns might never be known.

International criticism instantly focused on the fact that the airmen



Staff photo by Guy Aceto

**In Allied Force, many of the precision munitions, like the laser-guided bomb here, required the pilot to see a target to guide the bomb. That was no problem for fixed targets, but as the targets changed, the 15,000-foot rule was relaxed.**



**A damage assessment photo of a bridge in Serbia shows that a span was hit during precision bombing. For this type target, greater precision is gained at higher altitude.**

operated under an altitude restriction.

Short felt responsible. He later said, "Under the limitations I had placed on the crew to stay above 15,000 feet and to let the forward air controllers go down to 10,000 feet for excursions, it was inevitable that we were going to drop a bad bomb." Short called Leaf at Aviano within hours of the incident and said, "I've been too restrictive. ... How do I need to change the rules?"

### Relaxing the Rule

According to Short, Leaf advised him, "We needed to let the forward air controllers go down to 5,000 feet and to let the strikers go down as low as 8,000 feet in a diving delivery to ensure that they verify their target."

The new rules were implemented immediately via special instructions to the NATO airmen. When the change came, Operation Allied Force was just in its fourth week of operations. More than 85 percent of the sorties in the Kosovo Engagement Zone were flown under the new, broader guidance that gave aircrews expanded flexibility.

Those who flew on the forward air controller missions, as Leaf did, were pleased with the change. "It was good to have that flexibility," he said. "You went down to that altitude when you needed to be there, and you spent as little time as possible down there."

Even with the new guidance, however, medium altitude often was the

right place to be. "You still tried to keep a nominal operating altitude above 15,000 feet," said Leaf. "We didn't want people just cruising around at 5,000 feet AGL, the heart of the man-portable infrared missile regime. But if you had to get the mission done, you had to get the mission done."

The Djakovica incident sparked an ugly and ongoing debate on operating altitude. It became a flashpoint for highly publicized charges that, by restricting their altitude, NATO airmen were in some way shirking their responsibilities.

NATO immediately apologized for the incident and released extensive details on the confusing engagement. Still, accusations about the moral implications (such as McCain's) continued. Commentators failed to pick up on the change in altitude rules or the fact that airmen often found themselves in danger even at higher altitudes. Retired Marine Corps Lt. Gen. Bernard E. Trainor wrote of being discomfited by events, saying, "High-tech weaponry permitted pilots to fly high out of harm's way while visiting destruction below." To Trainor, this development had "troubling moral and political implications" because the air campaign could "drive an enemy to his knees without shedding a drop of the bomber's blood."

### 700 SAM Shots

Trainor's sensitivities notwithstanding, the fact is that Allied Force strike missions were risky and pilots were

## Changes in Attitude, Changes in Altitude

Airmen have struggled with altitude questions since the dawn of air combat. Often, they decided low was best.

Second Lt. H. L. Borden, an observer in the 90th Aero Squadron, wrote in 1918: "For the individual observer the altitude will depend upon weather conditions, the keenness of his eyesight, concealment offered by the nature of the terrain to troops on the ground, etc." Borden found an altitude of 330 feet "most satisfactory" for demanding infantry contact missions.

However, flying too low had its drawbacks. Another observer in the squadron wrote, "I found that at an altitude less than 150 meters [495 feet] it is necessary to circle over [one] point and search it thoroughly before proceeding to another, as the speed of the plane would only permit a short glance at one point."

A pilot from another squadron said that, during the Meuse-Argonne offensive of 1918, "never were we allowed to fly above 600 meters [1,980 feet]"—a situation that made emergency landings treacherous.

Second Lt. James E. McCurdy, 50th Aero Squadron, put it best. "Now comes the question of altitude," he wrote. "No two observers will agree on the correct altitude to fly on infantry liaison, but it is a fact that little can be accomplished at a greater altitude than 300 meters [990 feet]." McCurdy himself liked 330 to 660 feet and commented that the "machine gun fire from the ground is no worse at this altitude than at 300 meters [990 feet]."

Like their World War I predecessors, World War II pilots often attacked at low altitude to achieve accuracy.

P-47s strafed trains from altitudes of only 50 feet, a tactic that often resulted in losses if exploding ammunition hit the fighter itself.

At Ploesti in Romania on Aug. 1, 1943, bombers flew toward the target at treetop altitude. Thirty percent of the attacking force was lost and five men received the Medal of Honor for their daring low-level attacks, the highest number in any single engagement in World War II.

Close air support in World War II, Korea, and Vietnam often demanded low-altitude work. If pilots, bombardiers, and navigators had to seek the target with their own eyes to hit it, chances were they flew low.

not “out of harm’s way” by any means. President Clinton said, “I was surprised that we’d lost only two planes and no pilots.” Serbian gunners fired almost 700 radar-guided SAMs at NATO aircraft. “They were still firing SAMs on the last day of the war,” said Maj. Gen. Dennis G. Haines, who was then director of combat weapons systems at Air Combat Command. Leaf had command of about 48 F-16s at Aviano. Over the course of the campaign, he said, many of his pilots “got down to last-ditch SAM maneuvering” to avoid missile shots. “I think about 20 people came very close to being shot down,” Leaf said. “Most if not all were well above 15,000 feet.” An A-10 flown by Short’s own son was struck and dented by a SAM that somehow failed to explode. He was flying at 18,000 feet.

The criticism of Allied Force fueled an impression that there is an area of the battlespace where pilots fear to tread. Purely technical critiques of air operations have also suggested that the low-altitude region is a “lost battlespace” and that valuable targets are slipping away because of a reluctance to go down to low level. The new Secretary of the Air Force, James G. Roche, lent some credence to the case when, in June, he reportedly stated that the Air Force needed to work on regaining control of the airspace below 20,000 feet.

From the airman’s point of view, the actual issue is how best to find and destroy targets efficiently. Altitude alone does not resolve the problem. Low altitude frequently has no special advantages and in most cases, flying low can degrade the capabilities of a strike aircraft.

“In a modern weapon system, there’s no payoff” below 5,000 feet, Leaf explained. “In terms of precise, laser-guided bomb employment, moving it up to 15,000 or 20,000 feet, if the weather allows, you get better, not worse, in terms of precisely placing your ordnance.”

As the tactical payoff diminishes, the random dangers to aircraft increase. Said Leaf: “If you are below



USAF photo by SSgt. Tony R. Tolley

**For airmen, the issue is how best to find and destroy targets efficiently. About 20 pilots came close to being shot down during Allied Force—most were flying above 15,000 feet. There is no safe altitude.**

5,000 feet AGL, anybody with an AK-47 or anything else can really ruin your day.” In Vietnam, there were several reported cases of pilots or their backseaters being killed by small-arms fire. “Above 15,000 feet, you’ve got less vulnerability and more reaction time,” continued Leaf. “Based on radar warning or visual acquisition of something that’s threatening you, you’ve got more time to respond and they’re less likely to hit you. You don’t get comfortable, but you do have a sense that above 15,000 feet you have a more significant sense of being able to control the situation.”

Target acquisition is no longer the sole responsibility of the individual aircrew. Time-critical targeting that evolved during Allied Force drew on the resources of satellites, reconnaissance aircraft, UAVs, forward air controllers, airborne battle managers, and intelligence specialists processing data and tracking targets at the CAOC and other locations. Finding and killing a target is a team game; the altitude of the strike aircraft certainly is not the sole determining factor.

The transition of operations from low to medium altitude represents

an evolution in the tactical flexibility of aerospace power. To Leaf, the main point was that “we didn’t go to medium altitude because we had to for risk avoidance; we went to medium altitude because we had developed the capability in both airframe and associated systems and weapons to do it and still be effective.”

Even so, airmen expect to come face to face with special situations in which the mission requires striking from extremely low altitude. The need to support friendly ground forces in close combat might very well be such a situation. Gen. John P. Jumper, the new Air Force Chief of Staff who was commander of US Air Forces in Europe during the Balkan air war, put it this way: “Pilots should never have to venture below the clouds unless our troops are in jeopardy. When our troops are in jeopardy, we will, but we shouldn’t be going below the clouds merely to demonstrate a nobility that others accuse us of not having.”

As the changing guidance in Desert Storm proved, American airmen consider it their duty to take any risk necessary to assist troops in contact with the enemy. Said Leaf, “Sometimes, in extremis, when a fire team out conducting perimeter security or security operations for a battalion in combat is at risk, and has no way to respond but USAF air, then if we have to get down to 50 feet and use 20 mm then we’ll do it. We’ll probably take some losses, but that’s war.” ■

*Rebecca Grant 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, “Wesley Clark’s War,” appeared in the September 2001 issue.*

Beijing's sights are on Taiwan, but it keeps a wary eye on the United States.

# The Chinese Sharpen Their Options

By Richard J. Newman

**E**VER since its formation in 1949, the Chinese People's Liberation Army has undeniably been about people—lots and lots of them. During the Cold War, it was China, not the Soviet Union or the United States, that fielded the world's most populous military force. The PLA in 1987 boasted some 4.2 million troops at their peak, twice the size of the US armed forces.

Chairman Mao Zedong's philosophy of "People's War," the cornerstone of Chinese defense planning for decades, called for swamping an invader with virtually limitless reinforcements in a defensive war of attrition. In Mao's plan, China's overwhelming numbers would simply grind down the enemy, overcoming any technological advantages he possessed.

That, however, was then, and this is now. Even the aging functionaries running the world's last major bastion of communism have come to understand that bigger isn't necessarily better. At present, the ranks of the PLA stand at about three million troops. The Chinese military, since the early 1990s, has been slimming down and smartening up, in prepara-

tion for some future combat against a technologically savvy foe.

The reasons for the change are twofold:

First, as China has expanded its security goals to include hegemony over much of Asia, it has concluded that its massive but antiquated army offers little or no real advantage in reaching its objectives. Its logistics are so outdated that it can barely deploy beyond its own borders, and even if its forces could actually deploy, they would lack staying power and operational swiftness to do much that could be considered decisive.

Second, there is Taiwan, and standing behind it, its muscular bodyguard, the United States. If Beijing ever attempted forcible reunification of China and Taiwan—and the United States intervened on Taiwan's behalf, as President Bush promised earlier this year—China's lumbering legions would suddenly come face-to-face with the highest of high-tech militaries.

### No Illusions

China's leaders harbor no illusions about being able to match America's modern fighters, warships, or conventional power of any sort, and they certainly do not believe they could prevail in a standard type of conventional war. They do believe, however, that a few key high-tech advantages could make a war over Taiwan so painful that Washington just might bail out.

Underlying this strategy is a wish list of "asymmetric" capabilities:

- Missiles able to threaten Taiwanese airfields and ports and keep US forces out.

- Overhead reconnaissance systems capable of tracking US deployments, especially movements of carrier battle groups.

- "Smart" mines and other nuisance weapons that are cheap and deadly and could slow down an American assault.

- Anti-satellite weapons to shut down Washington's space-based intelligence, communications, and targeting systems.

Such capabilities would be useful against regional competitors such as India, Vietnam, or Japan. Still, they seem clearly designed for use in a future face-off with the United States.

While the US military now looms large in China's defense planning, it

is a relatively new arrival at the dance. Throughout most of the Cold War, China worried primarily about a showdown—perhaps a nuclear showdown—with the Soviet Union, with which it shared a tense, militarized 3,600-mile border. Then, as the USSR weakened and collapsed in the 1980s, China turned its attention to regional competitors on its territorial rim.

Only after the 1991 Persian Gulf War did China focus on possible conflict with the United States. Chinese defense experts were awestruck by the devastating effect that could be generated by a relatively small force armed with "smart" bombs and other high-technology equipment. They gaped at the kind of damage that such a force could inflict on a numerically superior foe such as the Iraqi army—or, theoretically, the PLA. Looking critically at the PLA, its leaders found a "Short Arms—Slow Legs" problem.

In a paper for the USAF Institute for National Security Studies, Chinese-military analyst Russell D. Howard wrote the following:

"'Short Arms—Slow Legs' is an idiom first used by a Chinese general to describe the PLA after he had analyzed the Gulf War. It is symbolic of the PLA's present dilemma: They do not have the transportation to get to a fight, and even if they get there, they cannot hit anybody, unless their opponent has even shorter arms and slower legs than the PLA."

Ever since then, Chinese strategists have been conducting regular wargames simulating high-tech battles against US forces. The apparent lesson: Load up on missiles.

"[Communist China] is developing one of the most daunting conventional theater missile challenges in the world," wrote Air Force Maj. Mark A. Stokes, a former Defense Intelligence Agency analyst, in a comprehensive 2000 report by the Army War College called the "People's Liberation Army After Next." Stokes cites Western estimates claiming that China may build up to some 1,000 theater ballistic missiles in the next decade, most of them with a range between 180 and 1,200 miles.

### War by Salvo

Taiwan clearly is the prime target. Western analysts maintain that China may deploy 650 short-range ballistic missiles directly across the Tai-

wan Strait from the island nation. It is their belief that PLA leaders might fire off up to half of the total missile arsenal in an opening salvo. But dozens of China's missiles also could reach Japan and South Korea, the principal basing areas for US troops in the region. Even if China declined to attack those neighbors, the threat alone could force them to think twice about allowing US forces to use their bases in support of Taiwan. The result could be neutralization through self-deterrence.

Some of China's ballistic missiles were designed in the 1950s or 1960s for nuclear attacks and are inaccurate, with Circular Error Probable radii of 2,000 feet or more. But China is producing modern missile technology as well. The DF-11 short-range ballistic missile under development may have a CEP as low as 495 feet. And China is working on terminal guidance systems that could improve the accuracy of incoming warheads to a CEP of 100 feet or less.

The Chinese also are developing varying payloads for their ballistic missiles to make them more effective against different types of targets. These include a submunition warhead packed with numerous bomblets for cratering runways or damaging aircraft, penetration warheads for attacking hardened facilities such as command centers, and fuel-air explosives that can produce three to five times the blast damage of a conventional high-explosive warhead.

China also is working on ways to overcome Taiwanese—and, presumably, American—air defenses. An attitude control mechanism for the old DF-15 ballistic missile would make the warhead maneuverable as it approaches the target and therefore far more difficult to shoot down with anti-missile systems like the Patriot, which the US has sold to Taiwan.

Chinese designers have reduced the radar signature of the DF-11 and DF-15 warheads by changing their shapes. They also have tested chaff packages, jammers, and other countermeasures. "Saturation" is considered a countermeasure as well. Stokes claims that Chinese engineers have established a saturation rate for American Patriot missile defenses and "are confident" that they can get

their warheads onto the proper targets—in other words, overwhelm Taiwan's air defenses.

The cruise missile is given a high priority because it is cheaper, more accurate, and more operationally effective than the standard ballistic missile. China already builds the powerful Silkworm anti-ship cruise missile and exports it to countries such as Iran.

### Cost-Benefit Analysis

The first Chinese land attack cruise missile probably will be an air launched Silkworm derivative known as the XY-41. More-advanced systems, such as the YJ-8 and the larger YJ-82, could be available within five years and will probably have some kind of GPS-style and digital mapping guidance systems. That could improve CEPs to as low as 30 feet—nearly comparable to accuracy rates for the Tomahawk fielded today by the US Navy. Chinese engineers also are working on stealth coatings to make cruise missiles harder to spot. Stokes cites one Chinese estimate which contends that the cost of producing an effective defense against a robust arsenal of cruise missiles could exceed the cost of producing such a force by a factor of nine.

Not to be forgotten are China's intercontinental ballistic missiles, capable of carrying nuclear warheads. Its total arsenal is still small—probably numbering no more than 20 weapons—but planners intend to develop two new types of mobile ICBMs over the next decade, the DF-31 and the DF-41.

Those, along with a planned ballistic missile submarine, could give China the capability to launch several hundred nuclear warheads at the United States, from locations that could be hard to pinpoint. As for Chinese strategists, they “probably assume that our missile defense programs are directed in large measure at blunting their offensive forces,” said Aaron L. Friedberg, a China specialist at Princeton.

Growing Chinese missile arsenals give Western planners plenty to worry about, but China's bark often is worse than its bite. “The Chinese still confront severe problems when moving from prototypes to production, including drawn-out development times, program slippage, and small and fitful production runs,”

wrote James R. Lilley, former ambassador to China, in “People's Liberation Army After Next.”

In the same report, Asia specialist Richard A. Bitzinger cited particular shortcomings: The inability to integrate dozens or hundreds of disparate components into a finished weapon system, a lack of technical expertise in the workforce, wasted resources due to Soviet-style overcapacity, and a defense industry that is highly compartmented and secretive.

Beijing's concept of “jointness,” or combined air, ground, sea, and



[Communist China]  
is developing one  
of the **most**  
**daunting**  
conventional theater  
**missile**  
**challenges**  
in the world.

space operations, is so primitive that it considers the simultaneous activity by ground and air forces in nearby areas to be a “joint operation”—regardless of whether those operations are integrated or not.

Beijing may also lack the wallet to fulfill many of its ambitions. With GDP growth continuing at about seven percent per year, China's economy is still expanding rapidly, but China's bills also are mounting. Maintaining economic growth will require major investments in imported oil and transportation, which may be nonnegotiable: Allowing the economy to backslide could produce revolt in a society increasingly enamored of free enterprise.

Many China analysts doubt that Beijing's aging autocrats would jeopardize internal security—and their own futures—for the sake of a more capable military. “Are they really going to spend all this money on

defense,” asks retired Army Col. Richard Dunn, an Asia specialist now working for a Washington, D.C., defense consulting firm, “when they've got to spend it on things like energy and transportation?”

### Chinese Weaknesses

China's huge emphasis on missiles also reflects weaknesses in other areas of its military.

“Dependence on theater missiles,” says Stokes, “reflects a failure of China's aviation industry to provide the types of aircraft that normally would carry out this mission.” A salvo of 600 missiles launched at Taiwan, for instance, would doubtless produce a tremendous shock effect and do considerable military damage. However, damaged airfields can be repaired, hardened command centers can survive, and ground troops can ride out an air attack. What China lacks is the air force to sustain high-intensity bombardment of Taiwan.

Recent purchases of the advanced Russian Su-27 fighter and orders for Su-30 strike aircraft have set off alarms in Asian and American defense councils. However, only about 45 of China's 5,300 fighters and bombers combat aircraft are fourth-generation aircraft like the Su-27, according to a 2000 Pentagon report on the balance of power between China and Taiwan. More than half of the total fleet is obsolete, says the Pentagon. Only the Su-27s—which China hopes to begin producing domestically—are capable of extended combat operations beyond China's border. By contrast, the air force of little Taiwan numbers only about 400 combat aircraft, but they are mostly modern US-made F-16s, French Mirage 2000s, and a modern, home-made indigenous air defense fighter. Those jets give Taiwan a sizeable qualitative edge over the Chinese air force.

Still, the Pentagon's 2000 report states, “After 2005, ... if projected trends continue, the balance of airpower across the Taiwan Strait could begin to shift in China's favor.”

By then, China could have as many as 70 uprated Su-27s and an equal number of domestically built fourth-generation fighters. Aerial refueling airplanes and airborne early warning aircraft, similar to the USAF E-3 AWACS aircraft, could be oper-

ating by then. China hopes to shed about 2,300 older aircraft from its fleet to make the whole more modern. It will upgrade its air-to-air missiles as well. China already fields Russian-built air-to-air missiles that are superior to the AIM-9 Sidewinder that the US has supplied to Taiwan. And China is developing or planning to purchase advanced beyond-visual-range and active-radar air-to-air missiles that could outgun Taiwanese armaments by 2005. Its bomber force will remain old, slow, and vulnerable, although the aging B-6 is being reconfigured to launch anti-ship cruise missiles and air launched land attack cruise missiles.

### Minimal Pilot Training

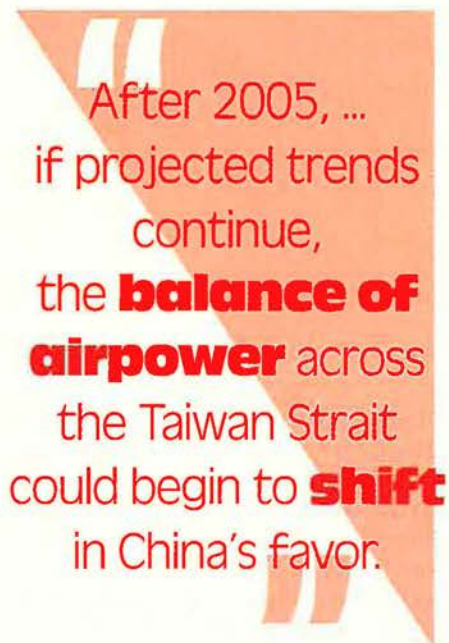
When it comes to pilot training, China's ambitions exceed its resources. Over the past decade the PLA air force has made air combat training more realistic, forming aggressor forces that play the role of the enemy, conducting live missile firings, and developing fairly sophisticated flight simulators. But overall pilot training remains "minimal at best," argues China analyst Kenneth W. Allen. He estimates that most Chinese combat pilots fly between 100 and 110 hours per year, about half what their US counterparts fly. The collision this year between a Chinese fighter jet and a US EP-3 surveillance aircraft off the Chinese coast has been widely attributed to poor airmanship by the Chinese pilot.

The PLA will be outgunned by the US military for the foreseeable future. So China is seeking to augment its raw power with improved intelligence and reconnaissance systems and other kinds of advanced warfare. By 2010, China is expected to have a satellite-based surveillance system that would include synthetic aperture radar capable of seeing through clouds, electronic eavesdropping sensors that, among other things, could monitor emissions from US ships in the western Pacific, and mid-to high-resolution optical imaging satellites.

China also has developed anti-satellite technology, such as lasers that could temporarily blind or "dazzle" US intelligence satellites, although the Pentagon is vague about whether its satellites are actually vulnerable to Chinese tampering. China has

experimented extensively with computer attacks and other kinds of information warfare, though, again, Washington reveals little of what it knows of these capabilities.

The modernization of the Chinese navy parallels that of China's air force: Recent purchases of a few advanced platforms mask widespread obsolescence in the broader fleet. China recently acquired two Sovremenny-class destroyers from Russia, which represent a fledgling capability to operate in blue water far off the coast. Those ships will be



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equipped with Russia's SS-N-22 Sunburn anti-ship cruise missile, meant to strike carriers. Aside from small numbers of newer platforms, however, China's fleet of about 50 destroyers and frigates and 50 landing ships are mainly old designs outclassed by other regional navies.

One exception, however, is China's submarine force. China is in the midst of purchasing at least four Russian-built Kilo-class diesel submarines, and has as many as 60 Chinese-made boats. That fleet gives China an overwhelming undersea advantage over Taiwan. China's subs are primarily focused on using torpedoes and mines to interdict surface ships, especially around Taiwan. As their capabilities improve, they will represent "a growing threat to submarines in the East and South China Seas"—i.e., US subs—says a 1999 Pentagon report on China.

China's ground force—while still

the world's largest, at about two million men—remains a bloated appendage of the Communist Party. Officers are commissioned and promoted based more on party loyalty than ability. Only now is the PLA making efforts to establish an effective corps of noncommissioned officers. The Pentagon describes morale in the PLA as "poor." About 80 percent of the force is armed with weapons commonly derided as "museum pieces," dating to the 1950s or 1960s.

### Shrinking Ground Force

As a remedy, China announced in 1997 that it would reduce its ground forces by 420,000, as part of an overall reduction of 500,000 military troops. The army has already transferred 14 light infantry divisions—four divisions more than the entire active duty US Army—to China's internal police force. By 2010, according to Western estimates, further reductions could bring the size of the Chinese army down to as few as 932,000 troops.

Remaining units will become smaller, with more emphasis on special operations forces. Savings from force reductions could be used to purchase more sealift and airlift platforms, since China can currently transport only 20,000 or 30,000 ground troops beyond its borders. Better deployability could bring Chinese ground troops to bear in an invasion of Taiwan—now considered well beyond China's capabilities—although the army will also focus strongly on internal hot spots such as Tibet and a disputed border area near India.

With analysts on both sides of the Pacific dismissing any possibility of US land operations in mainland China, PLA ground forces may be the one component of the Chinese military that at present doesn't have to worry about confronting the American military machine. For that, they should give thanks. ■

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*Richard J. Newman was until recently the Washington-based defense correspondent and senior editor for US News & World Report. He now is based in New York. His most recent article for Air Force Magazine, "Space Watch, High and Low," appeared in the July 2001 issue.*

**Access is denied, one way or another, by a third of US schools.**

# The Recruiters and the Schools

**By Bruce D. Callander**

*An Air Force Honor Guard drill team member performs outside a Dallas high school. Texas is one of the states in which a great majority of schools permit access by military recruiters.*

**D**URING World War II, many American high schools showed an Army Air Corps recruiting film for their male students. "Winning Your Wings," starring Jimmy Stewart, lured countless youngsters into the aviation cadet program.

Some 50 years later, the school board of Portland, Ore., banned the US military from undertaking any recruiting activities in that city's public schools. Board members charged that the Pentagon's "don't ask, don't tell" policy on gays in the military violated school policy against recruitment by agencies that discriminate by race, gender, or sexual orientation. The board recently ruled that school officials could provide information on military service opportunities, so long as they also advised students about DOD policy on homosexuals. The board did not end the ban on recruiting on campus, however.

Few systems have gone as far as Portland's. Even so, military recruiters say they meet stiff resistance in a number of schools nationwide. Thirty-one percent of US schools deny access in one way or another. Some withhold student directories. In others, recruiters say, counselors

disparage military service and urge students not to fill out applications.

Such actions, when they came to Washington's attention, generated intense Congressional displeasure and sparked a plan to punish uncooperative schools by cutting their access to federal funds. Final legislation did not go that far, but the services hope the new law will ease the way to contacting students.

In February 2000, the Senate Armed Services Committee's subcommittee on personnel, then headed by Sen. Tim Hutchinson (R-Ark.), held hearings on the problem. SSgt. Reggie Hamilton, a USAF recruiter in Georgia, told the panel that some schools in his area released student directories to colleges and potential employers but not to military recruiters. They were allowed access only once a semester, Hamilton said, and had to schedule their visits through the academic counselors.

In some cases, recruiters were allowed to contact only students who opted to take the Armed Services Vocational Aptitude Battery, a series of tests used to measure the subject's potential for various civilian and military occupations.

The testimony of other recruiters was mixed. One Navy petty officer

working in New Jersey reported few access problems, noting that his area was heavily populated with service personnel and was generally more receptive to the military. In contrast, a Marine in Arizona estimated that about half the schools in his district denied recruiters access to student directories.

## **Invisible Men (and Women)**

Several witnesses blamed school resistance on the fact that the services have become less visible to the public.

Lt. Gen. Donald L. Peterson, former USAF deputy chief of staff for personnel, said, "I think that the propensity to join is down, and I'd say that's certainly because of the footprint we have around America. We've reduced our force here by about 40 percent. Our CONUS bases are down 25 percent; our overseas bases are down 65 percent. We don't have the influencers out there that we had. If you take the World War II veterans out, only about six percent of our population has served in the military. It's not that our young people don't like the military, don't want to be a part of it. It's just difficult for them to see it."

Working recruiters gave other explanations.





USAF photo by TSgt. Mark Suban

“The schools are graded on how many of their kids go off to college,” said Hamilton, “so a lot of the counselors will hold us back from going in because they’re trying to push their kids to go to schools and colleges.”

Several recruiters noted too that their states offered generous tuition breaks to residents, which tended to offset the services’ traditional attractions of training and post-service college benefits.

On the Senate floor, Hutchinson said, “In 1999, there were 4,515 instances of denial of access to the Army. There were an additional 4,364 instances in the case of the Navy, 4,884 instances in the case of the Marine Corps, and 5,465 instances in the case of the Air Force. ... As of the beginning of 2000, nearly one-fourth of all high schools nationwide did not release student directory information to armed forces recruiters.”

Incensed, Hutchinson introduced a bill to “deny federal educational assistance funds to local educational agencies that deny the Department of Defense access to secondary school students or directory information about secondary school students for military recruiting purposes and for other purposes.”

The measure was patterned after a law passed in 1994 that denied funding to uncooperative colleges. That measure, initiated by Rep. Gerald Solomon (R-N.Y.), originally applied only to defense funding but later was expanded to cover money from the Department of Education and other government agencies.

Several education groups opposed the cutoff in the Hutchinson bill. The National School Boards Association said that it recognized the career opportunities the services offered and would work with DOD to improve access but opposed cutting off federal funding to public high schools because it would hurt poor and disabled students. Other organizations opposed giving the military access to any schools.

Parts of the Hutchinson bill were enacted in the 2001 National Defense Authorization Act, but the final version dropped the provision for denying federal funds to secondary schools. That threat still applies only to colleges.

William J. Carr, assistant director, recruiting policy, in the Office of the Undersecretary of Defense for Personnel and Readiness, explained the distinction. “The law requires that, if a college denies access, then

it loses grants from a number of federal agencies. When it comes to secondary education, there is no denial of funding.”

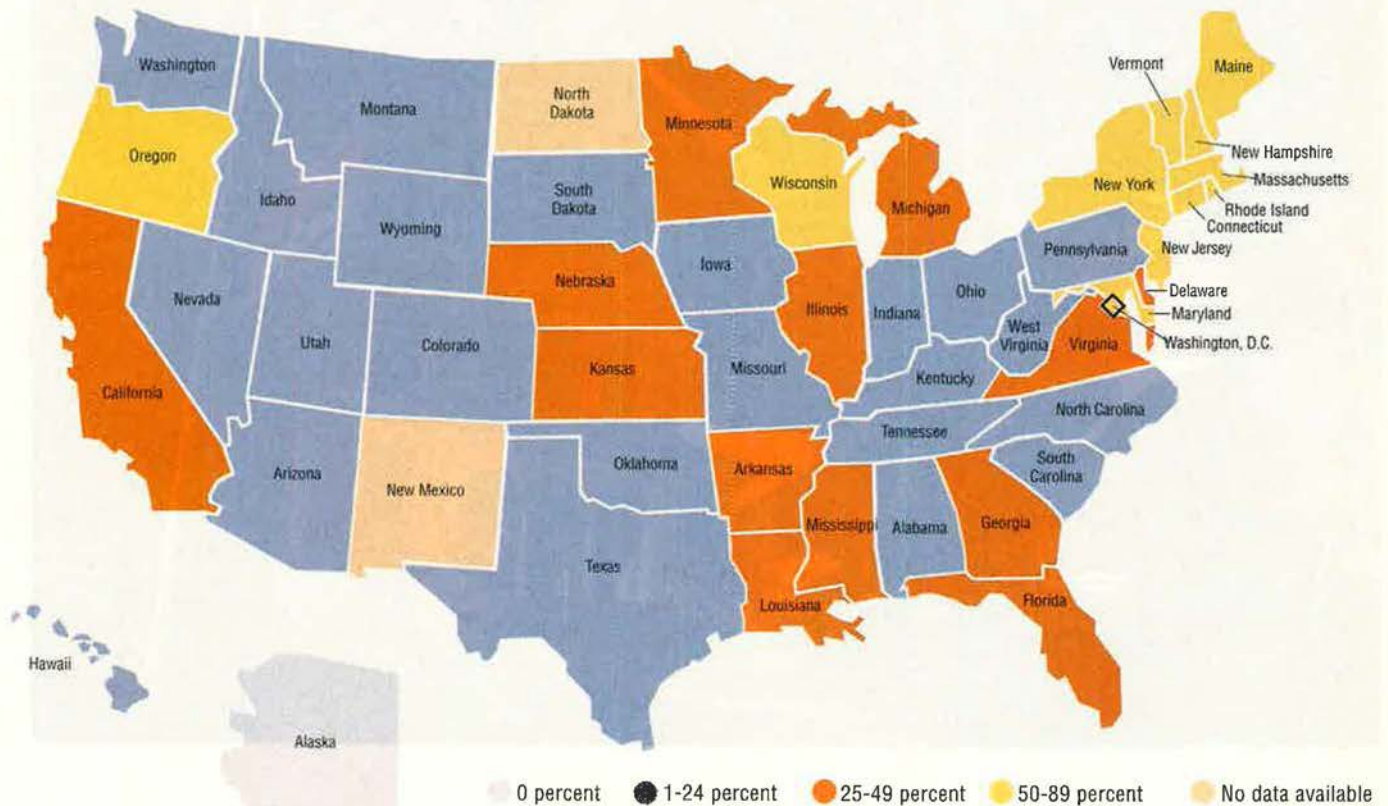
### Six Percent

“The Defense Department has been opposed to doing that in high schools for a couple of reasons. The federal funding that goes to colleges for grants and contracts is significant to them. But, if we take the high school, how much federal funding is provided? The answer is about six percent,” said Carr.

Moreover, that funding is wrapped up in teacher training, helping disadvantaged students, and providing impact aid. The view is that cutting off this funding would do more harm than good.

Other Pentagon officials had worried that threatening to cut off the funds would only make the situation more confrontational and pose more problems for recruiters. “That was one of my biggest concerns,” said Carol A. DiBattiste, former undersecretary of the Air Force and now a partner in a Washington law firm. “But I don’t think the legislation that passed is forcing the issue. I think the best approach is just to continually work the schools so that

## The Geography of Problem Schools



**Some 31 percent of high schools deny access in one way or another, but the problem varies by region. The law defines a problem school as one barring more than one service. Shown here are percentages of a state's high schools denying access to two, three, or four branches of the armed forces.**

there is no retaliation against the recruiters.”

Although the threat of cutting off federal funds was dropped from the final version, the law still provides for a series of actions by the services.

For starters, the Secretary of the affected armed service is required to send an officer to visit a school when it is reported to be denying access. Hutchinson's original bill called for the messenger to be a general or flag officer, but the final law specifies it be at least a colonel (or Navy captain) or “a senior executive of that military department.”

The service has up to 120 days after the initial report to make the visit. If that doesn't resolve the problem, the Defense Secretary is to notify the governor of the state involved and ask for help in obtaining access. The Secretary has up to 60 days to take that action and must send a copy of his letter to the Secretary of Education.

If a school still won't cooperate,

the Defense Secretary is to determine whether it denies access to two or more services. If so, he is to notify the appropriate Congressional committees, the Senators from the state involved, and the representative who represents the specific district. A formal statement from the Defense Department said, “The expectation is that each public official learning of a problem would work with the offending school to resolve it.”

The law does not take effect until July 2002.

### 3,000 Schools

Meanwhile, DOD has gotten a feel for the extent of the problem and has begun to build a national database of problem schools. Under the law, it cannot include a high school that denies access to only one service. Nor can it count private secondary schools that have religious objections to military service or secondary schools that base their exclu-

sions on a majority-vote policy of the local governing body.

The Defense Department statement said, “Preliminary data suggest that between 2,000 and 3,000 secondary schools nationwide (about 10 to 15 percent of all high schools) ultimately will be identified ... under the definitions set forth in current law.”

The Pentagon's preliminary list shows that the states with the highest percentages of schools denying access are in New England. (See map above.) In Connecticut, Rhode Island, Vermont, Massachusetts, and Maine, 79 to 89 percent of schools have refused access to two or more services. The same data show, however, that from 41 to 53 percent of the schools in these states deny access because of governing body policies or religious reasons, factors which put them beyond the scope of the law.

At the low end of the list, states with five percent or less of their schools limiting recruiting are Texas,

Indiana, South Dakota, Colorado, and Alaska. Overall, 31 percent of US schools deny access and 15 percent do so because of governing body policies or for religious reasons.

Defense officials concede that the new legislation lacks sufficient bite to force schools to open their doors, but they hope it will have a beneficial effect nonetheless. Said Carr, "First, it establishes that it is national policy to allow recruiters and students to get together so the students can learn about the military. Also, the Secretary of Education wrote to state governors and reinforced the point that it is in the interests of the education community to work with the military on this."

The Education Secretary's letter said the department hopes the governors "will personally underscore military service as a post-high school option that merits students' careful consideration."

"We are trying to make it clear that recruiters are doing noble work and are decent people," said Carr. "And the more we talk about opportunities in the military, the more likely it is that educators would take that story to heart."

Carr agreed with the recruiters who testified before the Hutchinson subcommittee that many of the high schools are not so much hostile to the military as ignorant of what it offers. "Let me talk about influences by teachers, coaches, and so forth," said Carr. "We know that there are far fewer military alumni now than was the case when we were one-third larger. With fewer people in society with military experience, getting an accurate description of the military around society is that much more difficult."

### "Boot Camp"

"When we ask young people about the military, it is surprising how many describe it as being like boot camp. Certainly that is part of the experience for a very brief part of a career, but after that, it is far less regimented. Yet they believe that is what it is, and there aren't as many influencers as there were to correct them in that perception."

Carr said he doesn't think that the anti-military feeling common during the Vietnam War era is behind the schools' resistance to recruiting.

"I think it is driven more by a

concern that college is really the right way to go and they would rather limit the interference the military might offer," he said. "Of course, we counter that by saying, 'Let the young person make the decision based on what we can offer them, even if they are motivated toward a college education. Let us talk about what we have there.'"

Another reason for school resistance: They don't like to release the students' names and addresses to third parties.

"There are laws restricting that, and they say, 'I don't want to have people telemarketing, and I'm afraid the military recruiters might be like that,'" said Carr. "That's why the letter from the Secretary of Education was helpful in clarifying that they don't have a problem there in sharing information with the military."

Defense officials clearly hope that actions such as the education secretary's letter, the visits by officers, and in extreme cases, the pressure from members of Congress will persuade more schools to cooperate. There is some evidence that this kind of attention will help.

DiBattiste said, "I traveled to several schools and talked to administrations and encouraged them. In the San Diego and Los Angeles areas and in Miami, San Antonio, and Boston, we asked them not only to turn over the school lists but give recruiters unlimited access. We were very successful in those areas."

### Active Opposition

Still, there are well-organized groups actively opposed to giving the military any access to high school students.

These include organizations such as the American Friends Service Committee's National Youth and Militarism Program, the Central Committee for Conscientious Objectors, and the War Resisters League. Most oppose not only military recruiting of any kind but the presence of Junior ROTC units on campus. Others are not necessarily anti-military but object to service policies on gays or their perceived lack of opportunities for women.

Several such groups carry on active campaigns on the Internet. When Hutchinson introduced his bill to block federal funding to uncooperative high schools, Web sites were filled with complaints that the Pentagon was seeking an unwarranted advantage. Others charged that military recruiters already used unfair tactics with students.

When Congress removed the threat of funding penalties from the Hutchinson bill, much of the furor died down, but some groups still oppose any cooperation between public schools and the services. The Portland recruiting ban, for example, still has strong support among anti-military activists. Since it is based on a policy of the local school board, however, the schools involved apparently will not come under the new law's requirement that they be visited by a military official and reported to Congress for noncompliance.

The Pentagon has launched its own Web site aimed at parents, teachers, and other mentors to provide more information about the training and educational opportunities in service. The individual services also have gone on the Web with their messages.

In a more direct pitch, the services offer enlistment bonuses to prospects going into certain specialties. To counter the argument that enlistment ends a student's chances for higher education, Air Force recruiters emphasize the advantages of the Community College of the Air Force, tuition assistance programs, and the GI Bill.

Even if they encounter fewer roadblocks in the schools, recruiters have a tough job selling young people on service. A major downturn in the nation's economy may help to reduce the competition from civilian employers, but it is unlikely to change the minds of young people whose hearts are set on going to college. Once they get in the door, recruiters still have to convince youngsters that military service is not an extended boot camp experience. ■

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*Bruce D. Callander, a regular contributor to Air Force Magazine, served tours of active duty during World War II and the Korean War. In 1952, he joined Air Force Times, serving as editor from 1972 to 1986. His most recent story for Air Force Magazine, "Total Force IPs," appeared in the September 2001 issue.*

**The new Secretary considers how the Air Force can do what it must do.**

# Roche Plots a Course

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

**T**HE Air Force may be 40 percent smaller than it was 10 years ago, but James G. Roche, the new Secretary of the Air Force, says the service can get smaller still—and must, if it is to have hope of paying for all of its top-priority programs.

Roche declares that he does not want to see USAF leaders have to “go beg for more money” from Congress, adding that the service must learn to live within its means and not make frequent use of midyear supplemental funding requests to cover shortfalls.

The civilian service leader warns that no large cash infusions are likely to come from either the Bush Administration or Congress, but he insists that the Air Force be allowed to keep any savings and plow it back into needed programs.

“There is no windfall of money coming,” Roche said in an August meeting with defense reporters in Washington, D.C. “We’ve got to manage ourselves.”

In Roche’s view, the Air Force has no choice but to make itself smaller. “For years,” he reported, “there has been an insufficient amount of funding to take care of a bunch of things. ... The fact that there was underfunding in such a pervasive manner has really surprised us.”

At the session with defense reporters, Roche was asked for his view on the general subject of cutting USAF’s force structure to free up funds for other purposes.

“Is there part of the Air Force that could be cut?” Roche responded. “Sure there is. ... Do we have some old things that could go away? Absolutely.”

First on the Roche list of options: Get rid of a third of the 93-airplane B-1B bomber fleet and apply the savings generated to pay for an update of the 60 remaining B-1Bs to make them more combat capable—adding new weapons, jammers, and other systems to improve both their readiness and survivability.

He conceded that the announcement of the move, which caught many by surprise and was hotly challenged by irate lawmakers, was not handled “particularly elegantly” and was a swift lesson that the changes he wants to make will not come easily.

## **Eye on B-52s**

Though the Bush Administration has emphasized the need for long-range airpower, the bomber force faces other cuts.

Roche has declared, “I’ve had my evil eye on” 18 older B-52 bombers based at Minot AFB, N.D. The Air Force has labeled them expendable and keeps them in an “attrition reserve” status at the insistence of Congress.

Roche, however, said the BUFFs draw off funding for maintenance but are not kept in a fully combat-ready condition. Again, he would retire them and use the savings to improve the rest of the B-52s with upgraded systems.

“There are 30 planes there,” said Roche. “We have crews for 12. We would like to get rid of the other 18. Those are not just going to sit there [like] stone monuments. They get sent to the weapon school. And because

they are attrition reserve, they get put into a pool [and] are used at various places, but we have 12 more than we would want. ... Carrying these other aircraft just doesn't seem to make sense to us."

Another candidate for elimination: the oldest and hardest-to-maintain C-130 tactical transports. "We probably have a number of old C-130s that ought to be retired," said the service Secretary, "especially as the new C-130Js come on line." He noted that the Air Force is retiring worn-out C-141s as the new C-17s enter the inventory.

Roche appeared to draw a line at making any reductions to USAF's collection of 10 Aerospace Expeditionary Forces. Each of these first-to-deploy composite units contains some 150 aircraft, most of them fighter and attack aircraft.

"We can talk about reducing force structure," said Roche. "That is different from talking about reducing say, AEFs, our expeditionary forces. ... [The force] is organized so as to ensure that our personnel don't get too much more than 120 days away from their home base. That would be more difficult, because those are the forces that are used routinely to meet the requirements we have in Northern Watch, Southern Watch, Bosnia-Kosovo area, Korea, and elsewhere."

That said, Roche went on to put some of the fighter force on the endangered list, along with some bombers and lifters.

"We have some old fighters as well that we would look at," noted Roche. Pressed for specifics, he mentioned A-10s and older-model F-16s. And that was not all. "Some of the early F-15s are tired and they ought to be taken a look at to be retired," he maintained.

Roche expressed clear concern about the rising cost of keeping older airplanes in combat trim.

"One of the things we want to take a good strong look at is the cost per flying hour," he explained. "If we have planes that are consuming so much maintenance money, it might be better to retire them, if we can bring new planes on board."

### Losing "a Flag or Two"

With retirement of aircraft might also come some elimination of units. "We would have to ... see what the proper distribution [of aircraft] might be, but we might lose a flag or two," he allowed.

However, he also recognizes that, around the world, "we still have these obligations that we have to do"—the defense of South Korea and the aerial blockade of Iraq. In late summer, there were few signs that those missions would be going away any time soon.

A 23-year Navy veteran who retired as a captain, Roche commanded a destroyer and worked as a liaison to Congress and the State Department. He also worked in the Pentagon's Office of Net Assessment under Andrew Marshall, who headed the Pentagon's recent strategy review.

After his Navy service ended, Roche served as Democratic staff director of the Senate Armed Services Committee and then went to work for Northrop Grumman in a number of executive positions, ending as president of the company's Electronic Sensors and Systems Sector.

Roche believes strongly that the Air Force must be allowed to close bases to "get the inventory consolidated, just as you would do in a business." The Air Force,

he said, "has bases all over, and we feel we are overcapitalized at least 20 percent."

He is open to sharing facilities with the other services. Roche believes, for example, that more can be done to consolidate training with the Navy and to share bases with other agencies. USAF is looking at putting "more of one type of an airplane on a base as compared to multiple types," he added.

For Roche, the bomber question—specifically, the planned reduction of the force—has become especially acute. He defended his desire to dramatically downsize the fleet by arguing that new, very small, but very precise munitions will make each bomber significantly more effective and that one should look to the fighters—particularly, the F-22 Raptor—for the real advantages in future aerial warfare.

The 250-pound Small Diameter Bomb, he noted, will dramatically increase the number of aim points which can be struck by a B-2 bomber in a single mission.

"We would put ... 360 [SDBs] on each plane [and use] 10 planes—meaning we'd have 3,600 of them" on a single mission, Roche noted. Bombers are "particularly good against fixed targets," but, he noted, there were only some 200 fixed targets at the outset of the 1991 Gulf War.

"We have basically mastered the fixed target problem," he asserted, and at present it does not seem necessary to acquire any more bombers to address it.

### The "Access" Challenge

However, to do battle against persistent, anti-access threats—weapons of mass destruction, mobile surface-to-air missiles, and offensive ballistic and cruise missiles—it will take a very fast aircraft that is stealthy, Roche insisted.

The F-22 will be able to remain over the battlefield, responding quickly when mobile targets are spotted. And, Roche said, it will be better able to "work much more closely with the Army," finding and destroying time-critical ground targets.

"Bombers aren't good for that role," Roche explained. "Bombers tend to just pass through an area. You need something like the F-22 to be able to operate over somebody else's territory and be able to respond either to an air-to-air situation or to go after some very particularly important surface targets," he said.

Only after an enemy fighter threat is completely pacified would a bomber be useful in this role, he noted, and only when escorted by F-22s.

Still, the Pentagon was in the throes of its Quadrennial Defense Review, and Roche conceded that the Pentagon leadership "may come along and say we want more" bombers.

His operating philosophy, however, will be one of razors and razor blades. The analogy is that the Air Force, instead of buying new razors, will seek new razor blades. It will emphasize the expendable munitions more than the relatively long-lived platforms that carry them.

The F-22 drew from Roche an unequivocal statement of support. He reported that the aircraft, now in testing, has been exceeding requirements for stealth, for some aspects of its avionics, and "it has really pleased us" with its supercruise capability.

"The F-22 is ready to go into ... production," Roche

told reporters on Aug. 14. "The plane works. It works, gang. It [the fighter program] is 20 years old. It is time to get on with it." (The Pentagon approved low-rate production of the F-22 on the same day that Roche spoke.)

He insisted that waiting for the airplane to be perfect is not economically or militarily wise and said he will promote spiral development and fielding of systems which are deployed in blocks that can be upgraded. This approach allows fielding new systems much more quickly than in the past.

Differences between the Air Force and the Pentagon's own cost predictors add up to zero in the next four years, and the widening disparity beyond that is something that can be solved with multiyear procurement of the airplane, investment in production efficiencies, and reinsurance of vendors that the program will go forward, according to Roche.

The Pentagon's Defense Acquisition Board gave the F-22 a green light to enter low-rate initial production, with the Air Force free to build as many F-22s as it can get under a new production cost cap of \$45 billion. Roche has said he preferred managing to a dollar figure than a production figure, as it gives greater flexibility to program managers.

### Is it 331 or 303?

The Air Force has said it can build 331 fighters for that amount. The Pentagon auditors say the figure is more like 303.

It will be tough getting Congress to go along with the cuts he wants to make throughout the Air Force, Roche said, but he added that the B-1B trim is only the opening salvo. He warned, "I have every expectation, with the [Fiscal 2003 budget], that there is going to be a lot more of this."

He said Congress is not ready to fork over huge amounts of money for military forces—a position he can understand.

"If I put myself in their shoes," said Roche of the Congressmen and Senators, "there is no massive external threat to the country," and the trade-offs he is suggesting can be "very subtle to constituents" who might stand to lose economically if units are eliminated and bases closed. All in all, he acknowledged, this is a tough sell back home.

However, he also thinks the Air Force is just too small for any part of it—Guard and Reserve included—to be declared exempt from cuts.

The Total Force—active, Guard, and Reserve—has to "take these problems on together if we are going to make any headway," said Roche. "If you are getting rid of old stuff, it has got to be gotten rid of."

Efficiency doesn't mean just cuts. Roche said a new philosophy will be to make sure that there are no longer any single-purpose airplanes in the fleet.

A future tanker, he speculated, might be a good platform on which to put sensor arrays, since "it is going to be in the area." He is taking a hard look at what missions can be moved to space in the near future and which will take longer.

For example, he believes that a Space Based Radar with moving target capability is a technology "ready to be tried." However, the approach should be experimental at first and not an effort to do it all on the first attempt.

The hash-out of which intelligence, surveillance, and reconnaissance missions to move to space, whether to package more of these capabilities on one multimission aircraft, and what will be the role of uninhabited aerial vehicles is the "toughest intellectual problem" facing the Air Force leadership right now, Roche said.

Even if the Bush Administration does not develop a sweeping new defense strategy, elements of transformation of the Air Force are already under way, Roche said.

### Enter the UCAV

He noted, for example, that Uninhabited Combat Air Vehicles will be a hallmark of the future Air Force and that "there is no group that is fighting" against them in some sort of turf war. Rather, he has detected the sentiment that the vehicles will be a benefit, and USAF people are asking, "How can we bring some of these on faster?"

Ballistic missile defense, and the new emphasis it is getting from the Bush Administration, will also help transform the military, Roche asserted. Primitive ballistic missiles were used in the Gulf War. "People forget we had ... 28 young people killed from Scuds in Saudi Arabia," said Roche. "This is not a fictitious weapon."

Roche noted that the military threat to Western Europe has markedly declined while the threat in East Asia appears to be on the rise. This is another factor which will drive the military in new directions. Such considerations will cause a second look at "how we design things" which are needed for operations in the Pacific.

However, he noted that Defense Secretary Donald Rumsfeld will not make hasty decisions to abandon anything prematurely.

Rumsfeld is trying "to get people to articulate issues, and then he absorbs all of that and he has made the point over and over: You don't replace something that works with something you don't understand."

Roche and the Secretaries of the Army and Navy will work as an executive committee to rationalize forces, avoid unnecessary duplication, and try to distill issues for Rumsfeld, Roche said at a Pentagon briefing. He said he and the other Secretaries agreed to take on the jobs—at a pay cut and with attending losses with the sale of their defense-related assets—only if they would be allowed to shake things up and give the military a thorough overhaul. Rumsfeld agreed that this is what he wants to do, Roche reported.

Roche said he has been criticized for not recusing himself from major acquisition decisions that might involve his old company but maintains that he has severed all financial ties with it and stands to gain nothing from influencing procurement decisions involving Northrop Grumman. At his confirmation hearings, he said he would rather divest himself of whatever he had to divest to have a free hand as Secretary.

He instructed his lawyers to "do what is right" so as to eliminate any potential conflicts of interest. Because of company retirement rules, "I can't go back," so he dismisses any charges of partiality.

Besides, he believes "the taxpayer is better served by honorable people who do things that are totally transparent but who know something" about the defense business and the national industrial base. ■

# Books

Compiled by Chequita Wood, Editorial Associate

**The 421st Night Fighter Squadron in World War II.** Jeff Kolln. Schiffer Publishing, Ltd., 4880 Lower Valley Rd., Atglen, PA 19310 (610-593-1777). 203 pages. \$45.00.



**I Always Wanted to Fly: America's Cold War Airmen.** Col. Wolfgang W.E. Samuel, USAF (Ret.). University Press of Mississippi, 3825 Ridgewood Rd., Jackson, MS 39211-6492 (800-737-7788). 363 pages. \$30.00.



**Reminiscences.** Douglas MacArthur. Naval Institute Press, 2062 Generals Hwy., Annapolis, MD 21401-6780 (800-233-8764). 438 pages. \$19.95.



**A-1 Skyraider: Walk Around No. 27.** Ed Barthelmes and Richard S. Dann. Squadron/Signal Publications, 1115 Crowley Dr., Carrollton, TX 75011-5010 (800-527-7427). 79 pages. \$14.95.



**Keepers of the Spirit: The Corps of Cadets at Texas A&M University, 1876-2001.** John A. Adams Jr. Texas A&M University Press, John H. Lindsey Bldg., Lewis St., College Station, TX 77843-4354 (800-826-8911). 396 pages. \$40.00.



**Robert Taylor Air Combat Paintings: Masterworks Collection.** Robert Taylor. Howell Press, 1713-2D Allied Ln., Charlottesville, VA 22903 (800-868-4512). 128 pages. \$34.95.

**The Ethics of Destruction: Norms and Force in International Relations.** Ward Thomas. Cornell University Press, Sage House, 512 E. State St., Ithaca, NY 14850 (607-277-2211). 222 pages. \$16.95.



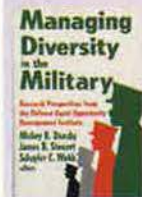
**Leadership: The Warrior's Art.** Christopher D. Kolenda. Stackpole Books, 5067 Ritter Rd., Mechanicsburg, PA 17055-6921 (800-732-3669). 437 pages. \$19.95.



**Siege, Crisis Leadership: The Survival of US Embassy Kuwait.** Roberta Culbertson and W. Nathaniel Howell. Howell Press, 1713-2D Allied Ln., Charlottesville, VA 22903 (800-868-4512). 154 pages. \$14.95.



**Expanding the Envelope: Flight Research at NACA and NASA.** Michael H. Gorn. University Press of Kentucky, 663 S. Limestone St., Lexington, KY 40508-4008 (800-839-6855). 472 pages. \$35.00.



**Managing Diversity in the Military: Research Perspectives From the DEOM Institute.** Mickey R. Dansby, James B. Stewart, and Schuyler C. Webb, eds. Transaction Publishers, 390 Campus Dr., Somerset, NJ 08873 (888-999-6778). 557 pages. \$49.95.



**War in the Fourth Dimension: US Electronic Warfare, From the Vietnam War to the Present.** Alfred Price. Stackpole Books, 5067 Ritter Rd., Mechanicsburg, PA 17055-6921 (800-732-3669). 272 pages. \$29.95.

**Germs: Biological Weapons and America's Secret War.** Judith Miller, Stephen Engelberg, and William Broad. Simon & Schuster, 1230 Avenue of the Americas, New York, NY 10020 (800-223-2348). 382 pages. \$27.00.



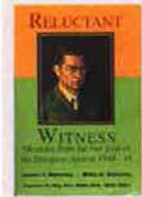
**Not Going Home Alone: A Marine's Story.** James J. Kirschke. Ballantine Publishing Group, 1540 Broadway, New York, NY 10036 (800-726-0600). 298 pages. \$6.99.



**The Wizards of Langley: Inside the CIA's Directorate of Science and Technology.** Jeffrey T. Richelson. Westview Press, 5500 Central Ave., Boulder, CO 80301-2877 (800-386-5656). 386 pages. \$26.00.



**Henschel Hs 129 in Action.** Dénes Bernád. Squadron/Signal Publications, 1115 Crowley Dr., Carrollton, TX 75011-5010 (800-527-7427). 50 pages. \$9.95.



**Reluctant Witness: Memoirs From the Last Year of the European Airwar 1944-45.** James J. Mahoney and Brian H. Mahoney. Trafford Publishing, Ste. 6E, 2333 Government St., Victoria, British Columbia, V8T 4P4, Canada (888-232-4444). 537 pages. \$34.00.



**Women in Combat: Civic Duty or Military Liability?** Lorry M. Fenner and Marie E. deYoung. Georgetown University Press, c/o Hopkins Fulfillment Service, P.O. Box 50370, Baltimore, MD 21211 (800-537-5487). 207 pages. \$19.95.

**Concept of Operations 2020 is an operator's view of aerospace power over the next 20 years.**

# The CONOPS With a Difference

By Amy Butler

**I**N the US Air Force, Concepts of Operations are nothing new. USAF has produced many CONOPS to guide specific actions—strikes on enemy radars, for example, or on computer networks.

Such CONOPS have generally been tactical in nature. Conspicuously lacking has been an overarching servicewide “picture” of integrated aerospace power at a strategic level.

Yet, in recent months, USAF has unveiled and begun refining “Concept of Operations 2020,” a broad-gauged conceptual framework for employing air, space, and cyberpower. A white paper billed CONOPS 2020 as “an operator’s view of how aerospace power will be orchestrated” over the next 20 years.

The paper concentrated on six mission areas. They are operations to deter a conventional or nuclear attack; provide vigilance; deploy, deliver, and sustain; gain freedom to operate; achieve attack superiority; and control the information environment.

For the Air Force, CONOPS 2020 will help to guide future procurement decisions, and it will have a major impact on how USAF allocates its future budgets, in the view of Gen. Robert H. “Doc” Foglesong, the vice chief of staff.

“It provides the construct that guides our corporate investment and organizational decisions to address challenges as we race into the next two decades,” said Foglesong.

## “Shot at Every Day”

Foglesong added that operators needed an overarching Concept of Operations because “we’re getting shot at every day, ... we’re providing



*Gen. Robert Foglesong, USAF vice chief of staff, says the Concept of Operations is a bridging mechanism to guide the Air Force's corporate investment and organizational decisions in the next two decades.*



space services [and] utilities every day, ... we're delivering cargo and people every day, ... we're deterring conflict every day, ... we're training [and] engaging around the world every day."

Foglesong, until recently USAF's deputy chief of staff for air and space operations, is mastermind and primary advocate of the new CONOPS. He and officers in the Air and Space Operations Directorate began writing it late last year, as the Bush Administration prepared to enter office and DOD geared up for a Quadrennial Defense Review.

As the Administration continues with its review of defense strategy and force structure requirements, USAF looks to the new plan as a "bridging mechanism" to help the service traverse the next two decades.

The plan is underpinned by several assumptions. These include the belief that the US will emphasize deterrence; that the armed forces will become heavily expeditionary; that the service will fully integrate its air, space, and information operations; that the nation will conduct numerous humanitarian operations; and that US forces must have freedom to operate in and over geographic areas of critical national interest.

Basic operational assumptions are that the Air Force will have less access to foreign bases, will need extreme precision in everything it does, and that war will demand capabilities along the full spectrum of conflict.

### The Biggest Change

Air Force officials said the most notable difference between today's threat environment and that of years to come will be the difficulty of gaining early access to theater airspace and foreign bases.

As a result, Foglesong said, the Air Force must place greater emphasis on long-range strike capability in all of its forms.

"We will require theater access, but the scope may be diminished," according to Foglesong's briefing on the CONOPS. "We are going to have to execute globally, maybe with limited access."

The Air Force white paper noted, "Presence is a powerful component of conventional deterrence" and is to be used when at all possible. "How-

*The most notable difference between scenarios of today and in the future will be limited early access. CONOPS 2020 calls for stealthy long-range strike aircraft to be able to "execute globally."*



Photo by Tod Carlson

ever," it continued, "due to nationalism and other external pressures, it will be more difficult in the future to maintain a large permanent presence overseas."

The Air Force depended heavily upon its European bases to stage Operation Allied Force in 1999. Because it enjoyed access to those bases, the service was able to use pre-positioned assets and establish a heavy flow of troops and cargo into the theater with its strategic airlifter force.

"Our overseas presence is likely to be diminished," Foglesong remarked. "We ... have to have an option so that, when the President calls up and says, 'Can you reach out globally and touch someone,' we can do that."

The service also learned during the air war over Kosovo that potential enemies will likely have robust air defenses capable of targeting some of the service's more sophisticated aircraft, such as the stealthy F-117 fighter, one of which was shot down in the early days of the air campaign.

In its formulation of ways to deal with the anti-access problem, the

CONOPS 2020 solution comes very close to matching that produced by Air Combat Command. ACC's Global Strike Task Force was unveiled this year by Gen. John P. Jumper when he was still ACC commander. Jumper is now USAF's Chief of Staff.

Under the GSTF concept, Air Force operators would employ stealthy B-2 bombers and stealthy F-22 fighters early in a future conflict to neutralize enemy air defenses. Once an adversary's air defenses had been struck and disabled, other assets could enter to maintain air superiority in a region.

### Long-Range Strikers

Foglesong noted, "We would see a Concept of Operations where long-range strike aircraft take off and get updated en route somehow, and then are on the way in. ... If you have [fighter] assets that are forward deployed, those assets can go in and suppress air defense systems, but even if we're not [forward deployed], the long-range strikers should be able to get in and get out."

As envisioned by Air Force planners, each operation would have a

trigger point, well-established ahead of time.

"When the trigger point is reached," stated the white paper, "employment of the full range of aerospace firepower is required. Simultaneity will be the key to attack superiority—the aggressor is stunned by the simultaneous application of kinetic and nonkinetic means at strategic, operational, and tactical targets."

The white paper went on to say, "Information superiority, fused intelligence, and highly refined battle management will generate focused target sets to create specific effects to halt the enemy, shape the battlespace, and ensure freedom of operations."

This system would rely heavily upon a flawless system of tankers, Intelligence, Surveillance, and Reconnaissance systems, and communications capabilities.

The CONOPS calls for "redefined" ISR. ACC is now exploring ways to consolidate and modernize the service's ISR fleets into an integrated constellation of assets containing satellites, unmanned aerial vehicles, and manned platforms.

A more robust communications infrastructure is key to the success of GSTF, officials said.

During Allied Force, the military contracted with commercial communication firms to fulfill surge requirements of the air war. Commanders in Europe were particularly interested in attaining large imagery

files and conducting video teleconferences with leaders in the United States.

Those capabilities and others, such as transmitting targeting data and mapping files, require "big pipes" that are expensive to procure and maintain.

"Today, the Air Force has an adequate communications infrastructure," reported USAF's white paper. "We are adding to that capability and its reliability daily. However, the demands on bandwidth and connectivity are growing exponentially."

The service's command-and-control capabilities were "embryonic" during the 1999 Balkan air war, stated the white paper. Now, officials at ACC's Aerospace Command and Control and ISR Center at Langley AFB, Va., are working to meet this challenge.

The focus of the center's effort is the experimental Combined Air Operations Center, or CAOC-X. The facility allows operators to test and integrate a variety of software packages into the service's air operations centers, using a streamlined acquisition process.

Operators get the tools for improved command and control into the field much more quickly than would be the case if they used traditional acquisition processes, officials say.

The goal in using regional air operations centers is to deploy far fewer support forces into a hostile area

while maintaining positive control over airspace. However, this approach also requires a significant communications infrastructure.

### Sharing the Wealth

USAF forces must become lighter, leaner, and faster, stated the white paper. Because it will want to be able to quickly deploy forces from the continental United States to some overseas battle area, the Air Force will continue to refine its Expeditionary Aerospace Force.

The EAF divides the service's warfighting assets and personnel into 10 separate Aerospace Expeditionary Forces that are given plenty of time to train and equip for an overseas contingency operation.

However, these forces at present are not equally equipped, and Air Force leaders hope to procure the equipment in the future to more evenly equip all AEF organizations. The service plans to continue "maturing" its lighter-and-leaner concept of warfare, according to Foglesong's briefing.

The Air Force will continue to use its strategic nuclear assets to deter aggression, but its ability to employ long-range conventional strikes against an adversary will likely be more important in the future, according to the white paper.

"While we have been successful for over 50 years in using our strategic nuclear capabilities to 'keep the genie in the bottle,' in the future we will more heavily leverage our conventional capabilities for strategic deterrence," the white paper stated.

### "Slicking"

The Air Force of the future will be geared toward desired "effects" rather than weapon systems, said Foglesong. By looking at effects in the battlespace, the service is not tied to traditional notions of warfighting or weapon systems.

USAF can employ precision guided munitions with such effectiveness and such miniscule collateral damage that effects-based operations now is the preferred method for fighting wars.

"Slicking" a runway to keep an adversary from scrambling its fighters, or attacking electric transformers outside of the urban area rather than hitting generating stations in



Foglesong, here in his A-10 cockpit, says the new CONOPS will address the challenge of destroying mobile targets like the air defense missile launchers and ballistic missiles that were a problem in Allied Force.

highly populated areas are examples of effects-based operations.

Information attack and defense will also become a crucial element of effects-based operations, stated the white paper.

It noted that officials at US Space Command are refining the service's CONOPS for computer network defense and computer network attack, and many officials say wise use of information warfare will give the United States positive control over future battlefields.

Foglesong said current forces using current Concepts of Operations are well-prepared to conduct tactical missions to kill fixed targets. The new CONOPS also emphasizes having the power to destroy mobile targets that plagued the Air Force during Operations Allied Force and Desert Storm.

These include mobile air defense missile launchers and mobile ballistic missiles.

To attack this problem, the service is building a capability to accurately model mission outcomes in advance of an operation, the general said. This predictive approach would provide a region's air component commander a variety of options.

"We need to improve [to the point that] the JFACC [Joint Forces Air Component Commander] can sit back at the end of the table and watch the war actually being played out," said Foglesong, "playing the ATO [Air Tasking Order] out, on the screen, so that he can see what the effects are going to be."

Foglesong went on, "Then, he can call back up to the [commander in chief] and say, 'Boss, strategically, ... we can get better effects if we reprioritize,' or, 'Boss, this is great. This is meeting your strategic objective.'"

Not only would the JFACC be able to forecast what is going to happen, according to Foglesong, but he would watch the action as it happens.

"So," he explained, "if a target pops up, and we know it is something we need to get to quickly, then he can quickly call up what assets are available ... and then make a decision based on all those inputs."



*On its way to the goal of highly integrated air, space, and information operations, USAF expects to have in place in about 10 years a Transformation Force that would have upgraded airlifters, as well as enhanced combat and ISR aircraft.*

CONOPS 2020 was designed to serve as a roadmap to transform the current Air Force into a "Vision Force" of 2020, one with dramatically different capabilities.

#### **Transformation Force First**

The 2020 goal is to achieve highly integrated air, space, and information operations, but officials admitted full integration is a tall order. To balance current needs with future goals, Foglesong said, USAF has agreed on a way point called the "Transformation Force," with a general target date of 2010.

This midpoint—the first incremental leap in capability—would see a force that is a more dynamic and precise aerospace force. The Transformation Force, for example, would have enhanced combat, airlift, and ISR fleets, be lighter and more agile, and include a more robust space force.

The Vision Force of 2020 will be considerably different. In a recent

interview with *Air Force Magazine*, Maj. Gen. John L. Barry, director of Air Force strategic planning, sketched out a new kind of Air Force. "Today, we know pretty much what a potential adversary is doing," Barry said. "What the Vision Force will give us is a means to engage and create effects as well as know. It's the difference between just advertising what the bad guy is doing and doing something about it."

Foglesong agreed, and he noted it is too soon to choose specific weapon systems that will fight those future battles.

"Two decades from now, or sometime out in the future, we see ourselves in a different force," said Foglesong. "If you are asking me to [predict], it is not easy. I know the capabilities that we would like to have out there. But the platforms—it is probably a little premature to decide 20 years out what are your platforms."

For all the uncertainty, the white paper argued, this much is clear: "This country's aerospace forces will continue to be a force called upon to go from zero to 'engaged' in minimum time." ■

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*Amy Butler is managing editor of Inside the Air Force, a Washington, D.C.-based newsletter. Her most recent article for Air Force Magazine, "Loggies vs. Contractors," appeared in the January 2001 issue.*



An  
**Air Force Association**  
National Symposium & Annual Air Force Ball

**Nov. 16, 2001**

**Toward Air and Space Integration—The Space Roadmap**

**Beverly Hilton Hotel  
Los Angeles, CA  
(310) 274-7777**

#### The AFA Symposium

The US Air Force is the world's pre-eminent air and space force with integrated plans, programs, and training that make it the pillar of national security strategy. Nearly 90 percent of the people and money for the entire military space program comes from the Air Force. In its new role as the executive agent for space for all of DOD, the Air Force is responsible for ensuring space integration and for the space roadmap. Pre-eminence in space is so vital to national interest that it requires a strong military, civil, and commercial partnership. In the new millennium this partnership must work toward optimal integration of space and information systems for air, land, and sea forces. Military and commercial leaders will address these important issues at the Air Force Association sponsored symposium.

#### Invited Speakers

**James G. Roche**, Secretary of the Air Force

**Gen. John P. Jumper**, Chief of Staff

**Gen. Ed Eberhart**, CINC, NORAD and US Space Command, and Commander, Air Force Space Command

**Gen. Lester L. Lyles**, Commander, Air Force Materiel Command

**Lt. Gen. Brian A. Arnold**, Commander, Space & Missile Systems Center, Panel Moderator

**Albert E. Smith**, Executive VP, Space Systems, Lockheed Martin, Panel Member

**James F. Albaugh**, Senior VP, Boeing, Panel Member

#### Registration

The fee for the symposium is \$375, which includes a continental breakfast, coffee break, and lunch. Additional luncheon tickets are available for \$50. To register, call (800) 727-3337, ext. 5838.

#### The Air Force Ball

The 30th annual Air Force Ball will also be held this year at the Beverly Hilton Hotel, Friday, Nov. 16. For additional information on the ball and to reserve tickets or a table, please call Henry Sanders at (310) 645-3982. E-mail: sandersh@pacbell.net.

#### Beverly Hilton Hotel

Please identify yourself as an AFA member when you call the Hilton at (310) 274-7777 or (800) HILTONS to make reservations at the special rate of \$169 per night, single, or \$189 per night, double, plus 14.05 percent tax. Reservations at this rate will be accepted through Oct. 19, 2001.

**Visit our Web site: [www.afa.org](http://www.afa.org)**

By Frances McKenney, Assistant Managing Editor

## Leadership School

The **Chuck Yeager (W.Va.) Chapter** supported a leadership school for AFJROTC cadets held at Concorde College in Athens, W.Va., in June.

More than 40 cadets from five high schools participated in the week-long Mountaineer Cadet Officer Leadership School, the first open to all AFJROTC programs in the state. The school covered academic topics, as well as leadership, drill and ceremony, physical fitness, intramural sports, and teamwork. A geography component involved classroom instruction on computer-based geographic information systems and GPS. Field exercises taught cadets to take bearings and measure distances. An orienteering competition tested their use of topography maps and a compass.

Chapter member David F. Slaughter, from the AFJROTC program at Nitro (W.Va.) High School, was among the leadership school's organizers. He pointed out that until now, cadets had to travel out of state to attend a summer leadership school.

The chapter provided more than \$300 worth of plaques and trophies for the awards ceremony held on the last day. Samuel Rich, chapter president, Ira S. Latimer Jr., chapter vice president, and Herman N. Nicely II, chapter treasurer, helped present them. Chris Hickok of Woodrow Wilson High School, Beckley, W.Va., took home a trophy as outstanding basic cadet.

Nicely said the leadership school was so successful that Concorde College plans to host one every year.

## Perot Named AFM Chairman

The Air Force Memorial Foundation's board of trustees named Ross Perot Jr. chairman of the foundation. He is president and chief executive officer of Perot Systems and chairman of the Hillwood Development Corp. in Dallas. He will focus on gaining final design approval and on construction of the memorial, planned for a site on Arlington Ridge, next to Arlington Cemetery.

He had been chairman of the memorial foundation's Site and Design



*AFA National Chairman of the Board Thomas McKee sits in a Barany chair at the aerospace physiology training facility at Vance AFB, Okla., as A1C Kimberly Jarrait explains how the revolving chair tests a person's equilibrium. McKee toured the base with Oklahoma State Convention attendees. The Enid Chapter hosted the convention in August.*

Committee and will continue to serve in that capacity.

## Convention in Washington State

AFA National Chairman of the Board Thomas J. McKee was keynote speaker for the Washington State Convention, held in June at McChord AFB, Wash. According to O. Thomas Hansen, state president, McKee described the restructuring of military forces and provided an update on the Air Force Memorial.

He also presented AFA coin mementos to Sherman W. Wilkins, an AFA national director emeritus, and to Hansen, in recognition of their service to AFA.

During this convention, Hansen and the other current state officers were re-elected: David A. Reinholz, vice president, and Ernest L. Hansen, treasurer, both from the **Greater Seattle Chapter**; and Helen Lindsey of the **McChord Chapter**, secretary.

The gathering took place in conjunction with McChord's two-day open house. Volunteers from the Greater Seattle Chapter and the McChord

Chapter manned an AFA table during the open house, and the chapter provided both a continental breakfast each morning for air show performers—including the Air Force Thunderbirds—and a "Performers Party" for them each night. The chapter also hosted an AFA social, so members could meet McKee in an informal setting.

## Convention in Virginia

AFA National Chairman of the Board McKee attended a state convention closer to his home in July—the Virginia State Convention, hosted by the **William A. Jones III Chapter** in Charlottesville, Va.

Cadets from the Arlington Career Center in Arlington, Va., received the state's outstanding AFJROTC unit award during the convention's awards luncheon. Their Senior Aerospace Science Instructor, retired Lt. Col. Randolph W. Royce, accepted the award, along with two cadets. Royce is a member of the **Donald W. Steele Sr. Memorial (Va.) Chapter**.

Clement P. Moore of the **Langley (Va.) Chapter** received special rec-

ognition from State President William L. Anderson and McKee, for serving 14 years as state treasurer.

For a Saturday night highlight, convention-goers were bused to nearby Ashlawn Highland, the home of fifth US President James Monroe. It operates as a living history farm in the 19th century style. Following a picnic dinner under a tent, the guests enjoyed a performance of "Fiddler on the Roof," one of Ashlawn Highland's summer festival presentations. The evening was the convention's highlight, according to Allan M. Van Wickler, chapter vice president for membership.

### Convention in Georgia

Lt. Gen. Lance W. Lord, assistant vice chief of staff, and AFA National President John J. Politi were among the special guests at the Georgia State Convention at Robins AFB, Ga., in August.

While at Warner Robins, Politi visited the 93rd Air Control Wing and received an overview mission briefing and a tour and demonstration of a Joint Surveillance Target Attack Radar System workstation and mission crew training simulators. He then took an orientation flight on an E-8C Joint STARS. The aircraft's crew demonstrated its role in ground surveillance, battle management, and command and control.

Lord spoke at the convention's awards luncheon, where, among the many honorees recognized, Arthur D. Bosshart, chapter president, accepted the Chapter of the Year award for the **Carl Vinson Memorial Chapter**.

Christy L. Garvin, a teacher for fourth- and fifth-grade students at Vaughan Elementary School in Powder Springs, Ga., received the State Teacher of the Year Award.

The chapter also presented the first Denise Camejo Spirit of AFA Award. It is named for Harriet Denise Camejo, a former Air Force public affairs officer and an AFA Medal of Merit recipient in 2000 who had been active in chapter affairs until her death last year. Her husband, Pedro, and their three children received the first award.

### Convention in Texas

The Texas State Convention, hosted by the **Fort Worth (Tex.) Chapter** in July, turned the spotlight on Air Education and Training Command during its annual awards banquet.

AFA National President Politi presented AFA Citations to active duty AETC members Capt. David J. Bottomlee, from Luke AFB, Ariz., Flying Training Flight Commander of the Year; Maj. Mark G. Connolly, Moody



**AFA National President John Politi (right) presents an AFA memento to Rep. Robin Hayes (R-N.C.) during an office visit on Capitol Hill. The two discussed the need for infrastructure improvements at many Air Force installations. Hayes is vice chairman of the House Armed Services Committee's military installations and facilities subcommittee.**

AFB, Ga., who received the Maj. Gen. Glenn A. Profitt II Award for Flying Training Instructor of the Year; TSgt. Robert E. Robinson, Tyndall AFB, Fla., Flying Training Enlisted Instructor of the Year; and Maj. Janelle E. Costa and MSgt. Andrew M. Donate, both from Sheppard AFB, Tex., Technical Training Officer and Enlisted Instructors of the Year, respectively. Donate is a member of the **Gen. Charles L. Donnelly Jr. (Tex.) Chapter**.

In all, more than 30 active duty, Guard and Reserve, AFROTC, civilian personnel, and AFA members received honors. The **Northeast Texas Chapter** and the **Panhandle AFA Chapter** were named chapters of the year. William A. Solomene from the **Dallas Chapter** and Charlotte Loos from the **Alamo Chapter** received AFA Texas State Member of the Year awards.

Convention activities included information briefings on the F-22, Joint Strike Fighter, and the National Defense Review. During the business session, Dennis F. Mathis of the Northeast Texas Chapter was elected state president. Edward W. Garland and Kermit V. "B.J." Bjorge, both from the Alamo Chapter, were elected vice president and secretary, respectively. Helen S. Seidel, from the Dallas Chapter, was re-elected treasurer.

Aerospace Education Foundation Chairman of the Board Jack C. Price, AEF President Richard B. Goetze Jr., Texoma Region President M.N. "Dan" Heth, and Oklahoma State President Donald L. Johnson were among the

many national and state AFA officials at the convention.

### Focus on Recruiting

The **Swamp Fox (S.C.) Chapter** got a firsthand report on today's recruiting and retention challenges when AETC commander Gen. Hal M. Hornburg returned to Sumter, S.C., as guest speaker for the chapter's fourth annual dinner with the local Chamber of Commerce.

Hornburg, whose command recruits, trains, and educates all airmen, spoke about the Air Force's efforts to bolster recruiting and retention programs. He also reminded the audience of the importance of mentoring. According to David T. Hanson, chapter president, Hornburg said mentors could help the airmen focus on their careers and help them understand their importance to the Air Force.

Hanson said Hornburg accepted the chapter's invitation for a Shaw Air Force Base stopover—on his way to Langley AFB, Va., and the UK—because he had been 9th Air Force commander (1998–2000) and wanted to renew his ties to the area and help strengthen the bond between the military and civilian communities.

Among the civilian leaders from Sumter and military officials from Shaw on hand for the dinner was Lt. Gen. Charles F. Wald, commander of 9th Air Force and US Central Command Air Forces.

### Teacher Recognition

The **Central Florida Chapter** and

## Air Force Association Balance Sheet

	Dec. 31, 2000			Dec. 31, 1999		
	General Fund	Life Membership Fund	Total	General Fund	Life Membership Fund	Total
<b>Assets</b>						
Cash and Investments	2,290,274	14,040,443	16,330,717	2,024,158	13,242,796	15,266,954
Accounts Receivable	1,514,237	237,735	1,751,972	1,315,379	293,622	1,609,001
Prepaid Expenses	259,473		259,473	221,247		221,247
Inventory	118,067		118,067	242,929		242,929
Property and Equipment (net of depreciation)	10,675,889		10,675,889	11,056,438		11,056,438
Prepaid Pension	4,736,954		4,736,954	4,030,447		4,030,447
Other Assets	1,456,860		1,456,860	1,455,620		1,455,620
<b>Total Assets</b>	<b>21,051,754</b>	<b>14,278,178</b>	<b>35,329,932</b>	<b>20,346,218</b>	<b>13,536,418</b>	<b>33,882,636</b>
<b>Liabilities and Net Assets</b>						
<i>Liabilities</i>						
Accounts Payable	1,970,488		1,970,488	1,980,783		1,980,783
Premium Refund Payable	405,391		405,391	390,000		390,000
Accrued Expenses	605,879		605,879	481,112		481,112
Deferred Revenue	908,419		908,419	1,081,134		1,081,134
<b>Total Liabilities</b>	<b>3,890,177</b>	<b>0</b>	<b>3,890,177</b>	<b>3,933,029</b>	<b>0</b>	<b>3,933,029</b>
<i>Net Assets—Unrestricted</i>						
Undesignated	15,462,879		15,462,879	14,814,491		14,814,491
Designated	1,698,698	14,278,178	15,976,876	1,598,698	13,536,418	15,135,116
<b>Total Net Assets</b>	<b>17,161,577</b>	<b>14,278,178</b>	<b>31,439,755</b>	<b>16,413,189</b>	<b>13,536,418</b>	<b>29,949,607</b>
<b>Total Liabilities and Net Assets</b>	<b>21,051,754</b>	<b>14,278,178</b>	<b>35,329,932</b>	<b>20,346,218</b>	<b>13,536,418</b>	<b>33,882,636</b>



## James M. Trail 1918–2001

Retired Brig. Gen. James M. Trail, a former AFA Chairman of the Board (1958–59) and national director emeritus, died Aug. 12. He was 83 years old.

Born in Eolia, Mo., Trail moved to Star, Idaho, in the 1920s and graduated from the University of Idaho in Moscow, Idaho, with a bachelor's degree in civil engineering.

He enlisted in the Army Air Corps in 1940 as an aviation cadet and, after receiving pilot wings and a commission, became a flight training instructor at Randolph Field, Tex. He also served as a communications officer. He left active duty in 1946.

Trail became a squadron commander in the Idaho Air National Guard and was recalled to active duty for the Korean War. He later became assistant adjutant general, Idaho ANG, until retirement in 1977. He had been promoted to brigadier general in 1960. His military service spanned 37 years.

A life member of AFA, he joined the association in 1946 and was first elected to the board 10 years later.

Boeing arranged for the chapter's Teacher of the Year to receive a tour of Cape Canaveral AFS, Fla., and the Kennedy Space Center.

Accompanied by Tim Brock, chapter president, and Si Song, from Boeing Space Coast Operations, Rajnish Singh visited space launch complexes and NASA's Space Station Processing Facility. They received briefings and tours of a Delta IV and Delta II rocket (which on Aug. 8 launched

NASA's Genesis spacecraft on a two-year mission to the sun). A close-up look at several flight elements of the International Space Station capped the day's visit, Brock reported. One of these elements, the Italian-built Raffaello Multipurpose Logistics Module, will carry storage and system racks for the space laboratory.

Singh teaches fourth-graders at Durrance Elementary School in Orlando, Fla. According to Brock, Singh

developed such an effective aerospace education program that the county school district chose Durrance as an aviation magnet school.

Elsewhere in Florida, the **Hurlburt Chapter** hosted its second annual Educator and Community Partner Luncheon in August at Hurlburt Field.

The chapter invited principals and teachers from area schools and honored Glenn Rutland as Chapter Teacher of the Year and Florida State Teacher of the Year. A science teacher at Holley-Navarre Intermediate School in Navarre, Fla., she teaches fifth-graders and uses the *USA Today*-AEF Visions of Exploration Program, field trips, space camp, and science clubs to encourage the study of math, science, and aerospace topics.

Twenty-nine Community Partners received plaques (as newcomers) or medallions (as renewing partners), and E. Max Friedauer, chapter president, recognized Gene Eller of Lockheed Martin as the outstanding Community Partner for the year.

Robert Gaskin, executive director of the Focus Center—a hands-on, interactive science museum in Fort Walton Beach, Fla.—was guest speaker for the luncheon. He stressed the importance of science and math education.

## Air Force Association Comparative Statement of Revenues and Expenses

	Year Ended	
	Dec. 31, 2000	Dec. 31, 1999
<b>General Fund</b>		
<b>Revenue</b>		
Aerospace Technology Exposition	1,306,865	1,281,977
Building Operations	822,285	774,876
Convention	352,616	368,763
Industrial Associates	96,800	84,950
Insurance Programs	1,978,604	2,094,878
Investments	1,108,220	159,785
Magazine	1,519,895	1,364,018
Membership	3,731,011	3,510,445
Patrons	228,928	221,226
Other	458,486	742,437
<b>Total Revenue</b>	<b>11,603,710</b>	<b>10,603,355</b>
<b>Expenses</b>		
<i>Program Services:</i>		
Aerospace Technology Exposition	644,600	636,292
Convention	983,170	937,856
Industrial Associates	118,892	129,003
Insurance Programs	3,359,564	3,493,963
Magazine	1,205,470	1,170,166
Patrons	254,362	249,339
<b>Total Program Service Expenses</b>	<b>6,566,058</b>	<b>6,616,619</b>
<i>Supporting Services:</i>		
Building	477,817	571,034
Membership	3,811,447	3,822,135
<b>Total Supporting Services Expenses</b>	<b>4,289,264</b>	<b>4,393,169</b>
<b>Total Expenses</b>	<b>10,855,322</b>	<b>11,009,788</b>
<b>Changes in Net Assets General Fund</b>	<b>748,388</b>	<b>(406,433)</b>
<b>Life Membership Fund</b>		
Life memberships granted	283,887	351,968
Revenue from investments	1,746,498	645,250
Less: Transfer to General Fund for equivalent annual dues and other costs	(1,288,625)	(1,063,110)
<b>Changes in Net Assets Life Membership Fund</b>	<b>741,760</b>	<b>(65,892)</b>

Treasurer's Note: The figures presented herein have been extracted from audited financial statements submitted previously to the Board of Directors of the Air Force Association. Expenses include chapter commissions, state commissions, and other direct support for field units totaling \$444,419 in 2000 and \$401,372 in 1999.

The **Harry S. Truman (Mo.) Chapter** presented its Teacher of the Year Award at its May meeting, which featured Gen. Ralph E. Eberhart as guest speaker. Nearly 100 guests listened to the remarks by the NORAD and US Space Command commander in chief and commander of Air Force Space Command.

Eberhart and Charles H. Church Jr., an AFA national director emeritus, presented Karen Cavender with the teacher award. She teaches first grade—using a curriculum emphasizing space topics—at Hawthorne Elementary School in Kansas City. She had received an AEF Educator Grant earlier this year.

### AFA Medals to Cadets

Truman Chapter President Patricia Snyder participated in the awards

ceremony at Blue Springs South High School in Blue Springs, Mo., to present James Cox with an AFA Medal and Citation as an outstanding AFJROTC cadet. Cox's Senior Aerospace Science Instructor is retired Maj. Paul W. Bekebrede, a chapter member. The chapter supports five AFJROTC units in the Kansas City area.

In Georgia, Jacquelyn Fisher from Bainbridge High School received the award from John Schmidt, secretary of the **Col. H.M. "Bud" West (Fla.) Chapter**, at the school's seventh annual AFJROTC awards banquet. Fisher's instructors are retired Col. P.G. "Gary" Breedlove, SASI and a chapter member, and retired SMSgt. Frank W. Geslak Jr., who is a member of the **Dobbins (Ga.) Chapter**.

Aaron D. Hagan, **Greater Cincin-**

**nati (Ohio) Chapter** vice president, attended the annual dining-out at Springboro (Ohio) High School to present the award to cadet Melanie Tomasson.

### More AFA/AEF News

■ "Where are we headed in space?" Brig. Gen. Robert C. Kehler posed this question to the audience at a luncheon at Grand Forks AFB, N.D., co-hosted by the **Red River Valley (N.D.) Chapter**. Commander of 21st Space Wing at Peterson AFB, Colo., Kehler described how USAF uses space systems to carry out missions—integrating space into the fight, reported the chapter newsletter.

■ In July the **Wright Memorial (Ohio) Chapter** co-hosted a reception to welcome back Lt. Gen. Richard V. Reynolds, the new commander of Aeronautical Systems Center, Wright-Patterson AFB, Ohio. Reynolds, who assumed command in June, has had several previous assignments at Wright-Patterson, most recently as director, B-2 system program office. Nearly 170 base personnel, local government officials, and defense industry representatives attended the reception. AFA officials included W. Ron Goerges, Great Lakes region president, and chapter vice presidents Christine Spivey, George Simons, William J. Schaff, and Fredrick L. Pumroy. Ron Thompson, vice president for community partners, organized the reception.

■ The **Carl Vinson Memorial (Ga.) Chapter** raised \$3,000 through its 16th annual fund-raiser golf tournament on Robins AFB, Ga., in July. The event raises money for a scholarship program that benefits Robins enlisted members E-5 and below.

■ **Mercer County (N.J.) Chapter** observed Flag Day with a June 14 ceremony at a housing complex for senior citizens in Hamilton, N.J. Charles W. Johnson, chapter president, and Marcy L. Johnson, vice president for membership and communications, represented New Jersey AFA. Marcy Johnson reported that a resident of the complex, Nancy Tafrow, donated a flag, and it was dedicated in a ceremony to Lt. Antoinette Mary Chianese, an Army nurse who served in World War II and died July 10, 1943.

■ Also in June, the New Jersey AFA and the **Highpoint (N.J.) Chapter** held a joint meeting at High Point State Park, in Summit, N.J. Attendees also got to visit High Point Monument, the highest point in the state, at 1,803 feet above sea level. Among the AFAers at the meeting were Ethel Mattson, state president; Frances



Jackson, state treasurer; James E. Young, **Hangar One Chapter** president; Murlin R. "Monte" Lower, a Highpoint Chapter past president; Mary F. Lower, Highpoint Chapter secretary; and the Johnsons from the Mercer County Chapter. The Highpoint Chapter held its annual dinner at a local country club the next month. Joining chapter officers were state officers Mattson, Jackson, Vincent Fairlie, state treasurer, and Almalinda B. Fairlie, state vice president south.

■ Several California AFA chapters and members supported the reunion of the Doolittle Raiders in May in Fresno, Calif. The reunion brought together 12 of the 80 raiders who had joined then—Lt. Col. Jimmy Doolittle for the first attack on the Japanese home islands April 18, 1942. The **Fresno Chapter** donated three reunion banquet tickets to AFOTC cadets of California State University Fresno and the local Civil Air Patrol unit. James H. Estep, AFA state president, helped the reunion planners as the DOD liaison. Three California chapter presidents attended the reunion: William G. Estep, Fresno Chapter; John K. Barbour, **Tennessee Ernie Ford Chapter**; and Louis Kridelbaugh, **General Doolittle Los Angeles Area Chapter**.

#### 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](mailto:afa-aef@afa.org). ■

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### AFA Convention

Oct. 12-14

Pennsylvania State Convention, Altoona, Pa.

## Unit Reunions

[reunions@afa.org](mailto:reunions@afa.org)

**40th BG.** Oct. 17-21 at the Regency Plaza in San Diego. **Contact:** Jean Suitt, 802 Harness Trail, Granbury, TX 76049 (888-417-1491).

**305th Rescue Sq Top 3 Assn.,** including all AF Reservists who served at Davis-Monthan AFB, AZ (1987-present). Nov. 10-11 at the Holiday Inn Palo Verde in Tucson, AZ. **Contacts:** CMSgt. Craig Berman (DSN 228, 520-228-5253) ([craig.bergman@dm.af.mil](mailto:craig.bergman@dm.af.mil)) or Capt. Keith Belhumeur (DSN 228, 520-228-2433) ([keith.belhumeur@dm.af.mil](mailto:keith.belhumeur@dm.af.mil)) ([www.dm-reunion.org](http://www.dm-reunion.org)).

**414th Combat Training Sq.** July 19-21, 2002, at the Flamingo Hilton in Las Vegas. **Contact:** Gregory Wood (702-652-2238) ([gregory.wood@nellis.af.mil](mailto:gregory.wood@nellis.af.mil)).

**493rd BG,** Eighth AF (WWII). Oct. 24-29 at the Harvey Hotel in Irving, TX. **Contact:** Jack Rude, 2609 S. Bowie, Amarillo, TX 79109 (806-353-2486).

**548th Recon Tech Sq/6th Photo Tech Sq,**

Yokota AB, Japan. Sept. 18-22, 2002, in Savannah, GA. **Contact:** Charlie Wilson, 151 Loretta Ln., Lu:ersville, GA 30251-9613 (phone: 770-927-6179 or fax: 770-927-6060) ([wilson193@aol.com](mailto:wilson193@aol.com)).

**862nd Engineers Aviation Battalion** (1942-57). May 1-5, 2002, at the Key Largo Casino & Hotel in Las Vegas. **Contact:** Sherl Hasler, RR 7, Box 1111, Bloomfield, IN 47424-8003 (812-384-4666).

**3558th CCT Sq/FT Sq,** Perrin AFB, TX. April 24-27, 2002, in Panama City, FL. **Contact:** Mike Foy, PO Box 6461, Panama City, FL 32404 (850-769-4346) ([wmfoy1@aol.com](mailto:wmfoy1@aol.com) or [wmfoy2@webworkz.com](mailto:wmfoy2@webworkz.com)).

**Air Commando Assn.** Oct. 4-7 in Fort Walton Beach, FL. **Contact:** ACA (850-581-0099) ([aircomando@aol.com](mailto:aircomando@aol.com)) (<http://home.earthlink.net/~aircommando1/>).

**Aviano Reunion Assn.** Oct. 13-20 in Tuscany,

Italy. **Contact:** E. Povey, 626 E. Davis Blvd., Tampa, FL 33606 (813-251-4664) ([empoff@hotmail.com](mailto:empoff@hotmail.com)).

**Pilot Class 54-N,** Hondo, TX. Nov. 15-16 at Nellis AFB Officers Club in Las Vegas. **Contact:** Bob Filler, Box 452, Mims, FL 32754 (407-267-8853).

**Tac Recon Wgs** and all Korean War veterans. April 25-28, 2002, at the Clubhouse Inn Atrium Way in Nashville, TN. **Contact:** Edward C. Rice, 315 Gun Club Rd., Nashville, TN 37305 (615-352-6204) ([mildred03@juno.com](mailto:mildred03@juno.com)). ■

Mail unit reunion notices four months ahead of the event to "Unit Reunions," *Air Force Magazine*, 1501 Lee Highway, Arlington, VA 22209-1198. Please designate the unit holding the reunion, time, location, and a contact for more information. We reserve the right to condense notices.

# Pieces of History

Photography by Paul Kennedy

## Home on the Range



Memorabilia courtesy Air Force Space and Missile Museum.

*These uniforms with various patches and other memorabilia, such as the historical photos, offer vestiges of the more than 50 years of space and missile operations conducted by the 45th Space Wing and its predecessors. The wing maintains and operates Cape Canaveral Air Force Station, as well as tracking stations in Antigua and Ascension islands. Headquartered at—*

*and host unit for—Patrick AFB, Fla., the 45th Space Wing was activated in November 1991. However, it traces its lineage to October 1949 and the Air Force Division of the Joint Long Range Proving Ground. The first milestone in the wing's space launch history came when the Bumper No. 8 missile lifted off from Cape Canaveral on July 24, 1950.*

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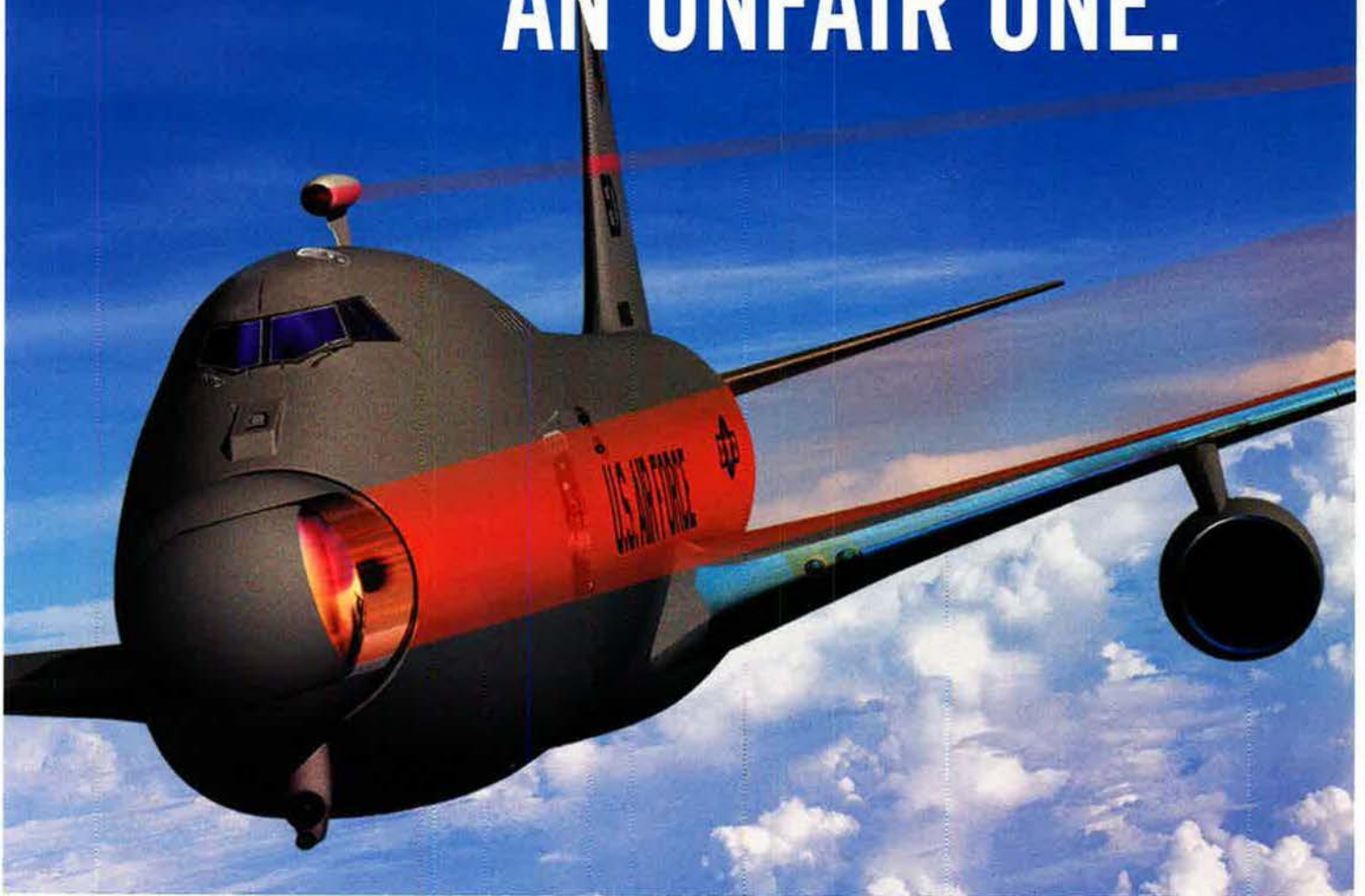
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