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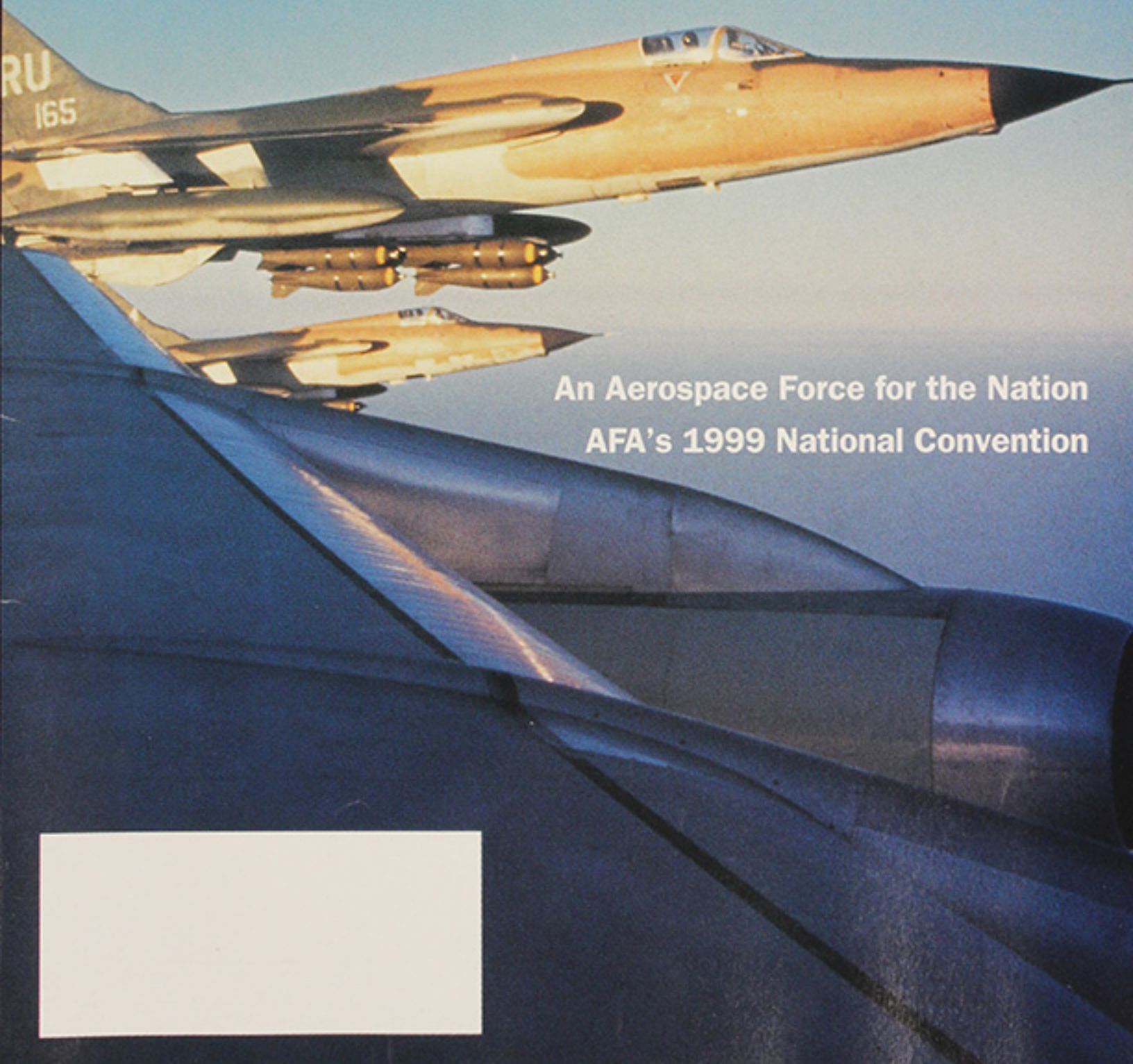
# AIR FORCE

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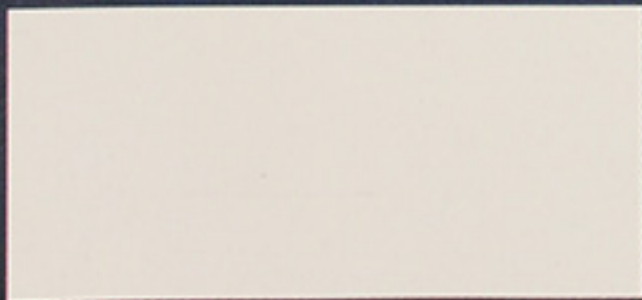
# MAGAZINE

## Route Pack 6

Taking the War to Hanoi



An Aerospace Force for the Nation  
AFA's 1999 National Convention



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# AIR FORCE

MAGAZINE

November 1999, Vol. 82, No. 11 PUBLISHED BY THE AIR FORCE ASSOCIATION

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**About the cover:** Two F-105Ds from Takhli RTAB, Thailand, take a last look at a KC-135 tanker on their way to North Vietnam. See "Route Pack 6," p. 56. Photo by John Piowaty via Warren Thompson.

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## An Aerospace Force for the Nation

**F**ROM the Gulf War in 1991 to Kosovo in 1999 and through dozens of contingency operations in between, the nation has looked again and again to its aerospace forces for crisis response and global power projection. The military strength of the United States is defined primarily by the global reach, power, and awareness that are derived from its capabilities in air and space.

As we enter the 21st century, however, these capabilities have been weakened by excessive reductions to the defense program. As impressive as the US Air Force was in Kosovo, it was stretched by a 78-day operation that also demonstrated the limited sustainability of the force in extended conflict.

The Air Force Association believes it is imperative to provide more adequately for all of the military services, and especially for the aerospace forces upon which the nation has become increasingly reliant.

- The US Air Force is 40 percent smaller than it was during the Cold War, yet the rate at which it is employed has risen by a factor of four. Readiness and mission capability rates are dropping precipitously.

- Retention problems, especially in the pilot force, are growing worse. The enlisted force is undermined in critical specialties, and experience levels are still falling. For the first time in 20 years, the Air Force has begun to miss its recruiting goals.

- After the Cold War, we entered a "strategic pause," when no real challenge to US military superiority was foreseen and when operational pressures on the force were expected to lessen. This was to be our chance, despite a smaller defense budget, to make orderly investments in R&D and force modernization. As it turned out, the budgets did not cover current operations, and the investments in future capability got short shrift.

We believe the nation requires a balanced mix of land, sea, and aerospace forces. In some instances, perhaps most, the Air Force will lead the operation; in other instances, it may be the supporting force. Either way,

no military operation of major scope will be conducted without aerospace power as a strong element.

The importance of aerospace power will grow more pronounced in the years ahead. This is the force the nation will depend on, early and often, in time of trouble. This reality should be reflected to a greater extent than it is now in policy, planning, doctrine, and resources.

**Forces and Strategy.** In 1993, searching for a rationale to justify a

### **Air Force Association 2000 Statement of Policy, adopted by the delegates to the Air Force Association National Convention, Sept. 13, 1999.**

reduction to the defense budget, the Department of Defense determined—as the minimum standard feasible for sizing the force—that US forces should be prepared for two major theater conflicts that occurred almost simultaneously.

This standard, if met, would serve the nation reasonably well. The need to cover at least one theater conflict is indisputable. Also, there must be additional forces, both to perform other military missions and to serve as a hedge and deterrent against opportunistic adversaries who might take the first conflict to be an advantageous time to move aggressively elsewhere.

Unfortunately, the US armed forces do not have the resources to execute a two-war strategy. For the US Air Force, the operation in Kosovo was the rough equivalent of a major theater conflict. By the end of the first month, it was running short of preferred munitions and had stripped stateside bases of spare parts and experienced aircrews. When the operation ended after 11 weeks, the Air Force needed a period of reconstitution in which to recover.

Specialty aircraft, such as those that fly Intelligence, Surveillance, and Reconnaissance (ISR) missions, were sorely pressed to meet the concurrent demands in Kosovo and in other theaters. A regular assumption for implementing the two-war strategy has been that these systems, which the Air Force has in very limited numbers, would "swing" from one conflict to another. It is now clear that the force needs more of these aircraft.

Had a crisis begun in another theater while the operation in Kosovo was still in progress, the Air Force's capability to respond would have been definitely constrained. Furthermore, it would not have been possible for the other services to fill the gap, since many of the capabilities required are unique to the Air Force.

We congratulate the Air Force on its regrouping of operational and support units into Aerospace Expeditionary Forces to cover peacetime contingencies. This approach provides some stability and redistributes the impact that deployments have on units and people.

It does not, however, change the fact that the Department of Defense is not prepared to meet the two-conflict standard in carrying out the strategy. Our armed forces need to be larger—and they need more money.

**Resources for Defense.** After the various gimmicks and questionable assumptions were factored out, and contrary to proclamations of a landmark increase in military spending, the Administration's budget proposal for Fiscal 2000 marked the 15th year in a row that defense has been cut. Adjusted for inflation, the defense budget authority proposed for Fiscal 2000 was actually less than it had been in Fiscal 1999.

Resources are short on all fronts. The emphasis on current operations has crowded out force modernization and other priorities in the budget—and current operations are underfunded themselves. Force structure is inadequate. Readiness is deteriorating. Mission capable rates are down. Crises that do not end quickly pose a problem in sustainability.

Department of Defense spending on procurement today is only two-thirds the level necessary to maintain the average age of aircraft and other major military equipment. The present fleet of aircraft is the oldest the Air Force has ever operated. This leads to further readiness and maintenance problems, to say nothing of what failure to modernize does to the effectiveness of the force.

The military space program is woefully underfunded. The Air Force provides most of the space resources to support all of the services, but its share of the defense budget has not been adjusted to compensate for that. Furthermore, the only proposals floated to increase spending on space involve the reallocation of money from other accounts in the Air Force budget, which was already too short to meet the nation's needs.

This is only one example of what happens when resources for defense are based on fiscal preconceptions rather than strategic requirements. Ceilings are artificially set and arbitrarily imposed. Valid military requirements are then played off against each other for what resources are left. The services are forced to choose between readiness and modernization, as if either of them were expendable. This is a dangerous practice and contrary to the nation's interests.

The defense budget is dropping toward 3 percent of Gross Domestic Product—down from 6 to 10 percent during the Cold War. The Air Force Association believes that we can and should afford a defense program that meets the needs of national security and that the level of such a program will be close to 4 percent of GDP.

**Technology and Force Modernization.** In the early 1990s, the Department of Defense took a "procurement holiday," postponing the purchase of weapon systems and other major equipment. A peace dividend was demanded, collected, and spent.

It was a budget-cutting exercise from which we have never recovered. Air Force investment accounts, chiefly spending on procurement and R&D, have now declined for the past 10 years in proportion to funding for current operations.

Military modernization programs have been singled out and attacked in detail. The B-2, which later performed so splendidly in Kosovo, was assailed relentlessly for years and cut back harshly. A more recent example has been the Congressional initiative to strip funding, for reasons that were essentially economic, from the Air Force's No. 1 modernization priority, the F-22 fighter.

Budget considerations were obviously a prime consideration in the 1999 Bomber Roadmap, which said that the present bomber fleet, with upgrades, will be adequate until 2037 and that 2013 is soon enough to begin work on the next long-range bomber. We believe the Air Force should revisit this decision and its implications for the future of long-range airpower.

The 1990s also saw the demise of the great R&D organizations—of which Air Force Systems Command was the finest example—that once explored, developed, and advocated new military capabilities in work that ranged from basic research to delivery of finished systems. In the field, these activities were merged with the service materiel commands, and at headquarters level, the emphasis was put on acquisition management rather than on R&D.

We no longer have the burgeoning 20-year pipeline in which active technology investments once led to such dominant capabilities as ballistic missiles, stealth, precision weapons, and the current generation of Intelligence, Surveillance, and Reconnaissance systems.

There are instances of emphasis on technology. For example, the Air Force has announced a large increase in S&T funding for space over the next five years, but that is to be paid for by a compensating drop in S&T funding for aeronautical systems. Overall, the portion of the budget allotted to research and development has declined sharply.

For years, we have lived off the investments made during the 1960s and 1970s. We produced the weapons that won the Gulf War during the 1970s and 1980s. In the 1990s, we have failed to invest in the future. We have squandered our leadership, and the risk is soaring. Unless that mistake is corrected, we will pay a high price for it in lives and in risk to our national security.

**Operation Allied Force.** Operation Allied Force in the Balkans demonstrated some of the potential of aerospace power, but not the full range of its capabilities. US and allied airmen were effective within the restrictive rules of engagement that were enforced to prevent casualties and collateral damage.

The US Air Force was the mainstay of the air campaign. Strike missions were accurate beyond precedent, with 99.6 percent of the bombs dropped hitting their targets. The Air Force also proved the efficacy of projecting combat power, day after day, around the world from bases in the United States.

Aerospace power ultimately succeeded—despite an ill-conceived strategy, political micromanagement, the needless concession of initiatives, and the incremental use of force—in making the Serbian regime yield to NATO's terms. This was achieved with the loss in action of only two aircraft and with no allied combat casualties. Furthermore, and several highly publicized exceptions notwithstanding, these results were achieved with comparatively little collateral damage.

The Air Force Association recognizes the excellent performance in Operation Allied Force and congratulates all of the NATO crews and support forces, especially the men and women of the US Air Force. We are proud of them.

It is a tribute to aerospace power and to these airmen that the campaign was successful in its major purpose of bringing Belgrade to terms. However, this was not the prototype for an air operation. Political goals were imprecisely stated and difficult to translate into missions that could be carried out by military force. Some of those goals, such as directly ejecting the Serbs from Kosovo where they were engaged in door-to-door violence, were not possible to meet with airpower alone or within the commitment the allies were willing to make.

A great deal more might have been accomplished by attacking the full set of strategic targets, with determination, shock, and surprise, beginning on the first night of the conflict.

We congratulate the joint force air component commander for superb execution of the campaign. It would have been beneficial, both in formulating the objectives and in planning the operation, to have had an airman, with special competence in the application of airpower, at the most senior levels of the NATO chain of command.

**People.** For the men and women of the armed forces, the concept of service is strong. To an extent seldom encountered in the commercial world, they are driven by a sense of duty and mission. However, they must also believe the system that sustains them is fair. It is important to them that their relationship with the nation they serve is one of mutual respect.

People in uniform accept the hardships and hazards of the military profession; in return, they look to the nation to take care of them and their families, providing reasonable compensation, personal security, and quality of life.

Their confidence that the government will provide for them has been shaken in recent years. The Depart-

ment of Defense has been unable to keep the promise of lifetime medical care for those who serve a full career. Although a guiding principle of the all-volunteer force was parity in compensation with the private sector, the divergence has reached 13.5 percent. The value of the military retirement system, once the No. 1 retention benefit, has been reduced by about 25 percent.

The relationship is further strained by constant short-notice deployments to distant locations for operations in which the nation's interest may be marginal. The sacrifice that this demands from service members and their families has seemed to be expended almost casually. It is not surprising that military people take such trends, along with the reductions in programs that affect them personally, as a significant signal of the value the nation puts on their service.

It is anticipated that legislative action this year will close part of the pay gap with the private sector and partially restore the military retirement program. These actions are long overdue and much appreciated. Unfortunately, the problems with medical care continue, both for those now serving and for those who are retired.

The solution to retention problems and other personnel problems that beset the force will be to re-establish the trust in which military people believe the system that supports them is fair and reasonable and that their service to the nation is valued and respected.

**Total Force.** The Air Force continues to lead the way among the military services in the employment of its Air National Guard and Air Force Reserve components. We especially commend the expansion of the Reserve Associate concept, long in effect in Air Mobility Command, to fighter units of Air Combat Command. The Guard and Reserve are rich in operational experience. The question is not whether to draw further upon that experience but where and how that can be best done. As the Guard and Reserve components take on a larger role in the Total Force, it is essential that they be equipped and trained to the same standards as the active duty component.

The Air Force Association expresses its appreciation and regard for the support of employers of Guard and Reserve members. Without their cooperation, the great strength of Total Force would not be possible.

**A Diversity of Threats.** Conflicts occur in unpredictable places and at unpredictable times. When the baseline was laid for the defense programs

of the 1990s, no one imagined that within the decade, US forces would be involved in a large scale conventional conflict in the Balkans.

The scope and pace of emerging threats are consistently underestimated. Two years ago, the Central Intelligence Agency said rogue nations like North Korea were 15 years away from acquiring long-range ballistic missiles. North Korea has since demonstrated that it has such a capability and soon, according to revised Intelligence estimates, will have ICBMs that can threaten the continental United States.

Problems of unpredictability are compounded when our preparations do not keep up with the threat. Our vulnerability to ballistic missile attack is of particular concern. Advanced military technologies of all kinds are proliferating, as are weapons of mass destruction and the means to deliver them. First-rate fighter aircraft, approaching parity with those flown by the US Air Force, are coming into service around the world. Lethal surface-to-air missiles are widely available. All nations have modern electronics. The effort to penetrate and attack defense information networks is constant.

In view of this, the nation would be unwise to believe, as it has a tendency to do, that the military capabilities that prevailed this year, or 10 years ago, will be adequate to deal with threats and conflicts of the future.

We believe that the main focus of the national defense strategy should remain on regional conflict, and we view with concern the rising emphasis on military operations other than war. Noncombat capabilities are a consideration in structuring the force, but they must not be the priority consideration. The essential mission of the armed forces is to fight and win the nation's wars. It is to that standard and purpose that they must be organized, trained, and equipped.

**Aerospace Power.** The traditional concept of war, which still prevails in joint doctrine and war planning, perceives the role of airpower to be secondary and in support of land power. This concept is wrong, and the perpetuation of it is irresponsible.

A Revolution in Military Affairs—the main aspects of which are information technology and long-range precision strike—has changed the face of war. Massive, force-on-force engagements and attrition warfare are no longer inevitable. Military effectiveness can no longer be measured by battle lines on the ground.

Aerospace power, the hardest-hit-

ting, longest-reaching, and most versatile force that the nation possesses, has assumed a larger role in the conduct of military affairs. It will be used, one way or another, when we are confronted with a crisis abroad. Either as the supporting force or the supported force, it will be critical to the outcome.

Whether projecting power over great distances or providing worldwide situational awareness and mobility, aerospace power is uniquely global in its perspective. Theater commanders and other elements of the joint force depend on aerospace forces for that perspective. The joint force also looks to aerospace forces for air superiority, which provides not only freedom from attack but also freedom to attack.

Aerospace power is the force that can respond within hours rather than within days, and as it has demonstrated yet again, it can do so with great accuracy and focus.

The Information Operations mission, pivotal to national security strategies of the future, is moving inexorably toward space. It is inevitable that air superiority and space superiority will eventually merge and that strategists will think of aerospace power as an integrated whole.

**Force of the Future.** The Revolution in Military Affairs affects all of the services, but its key elements—stealth, long-range precision strike, and the obtaining, exploiting, defending, and attacking of information—depend on and center on aerospace forces.

The dimensions of aerospace power are still expanding. Vast improvements still lie ahead in sensors, weapons, and the capabilities of air and space vehicles. The inherent features of aerospace power allow us to act with effectiveness and flexibility, over long range, on short notice, while putting as few Americans in harm's way as possible.

The dividing lines between airpower and space power will continue to blur. In the integrated arena of aerospace, airpower and space power share common operational characteristics that include elevation, perspective, speed, range, and freedom from the geographic constraints of the Earth's surface.

Aerospace power will remain the military instrument of choice. It is the force of the future. As we enter the new century, the mission the Air Force must advocate and pursue is command of the aerospace medium and operations in it, from missile silo and treetop levels to High Earth Orbit. ■

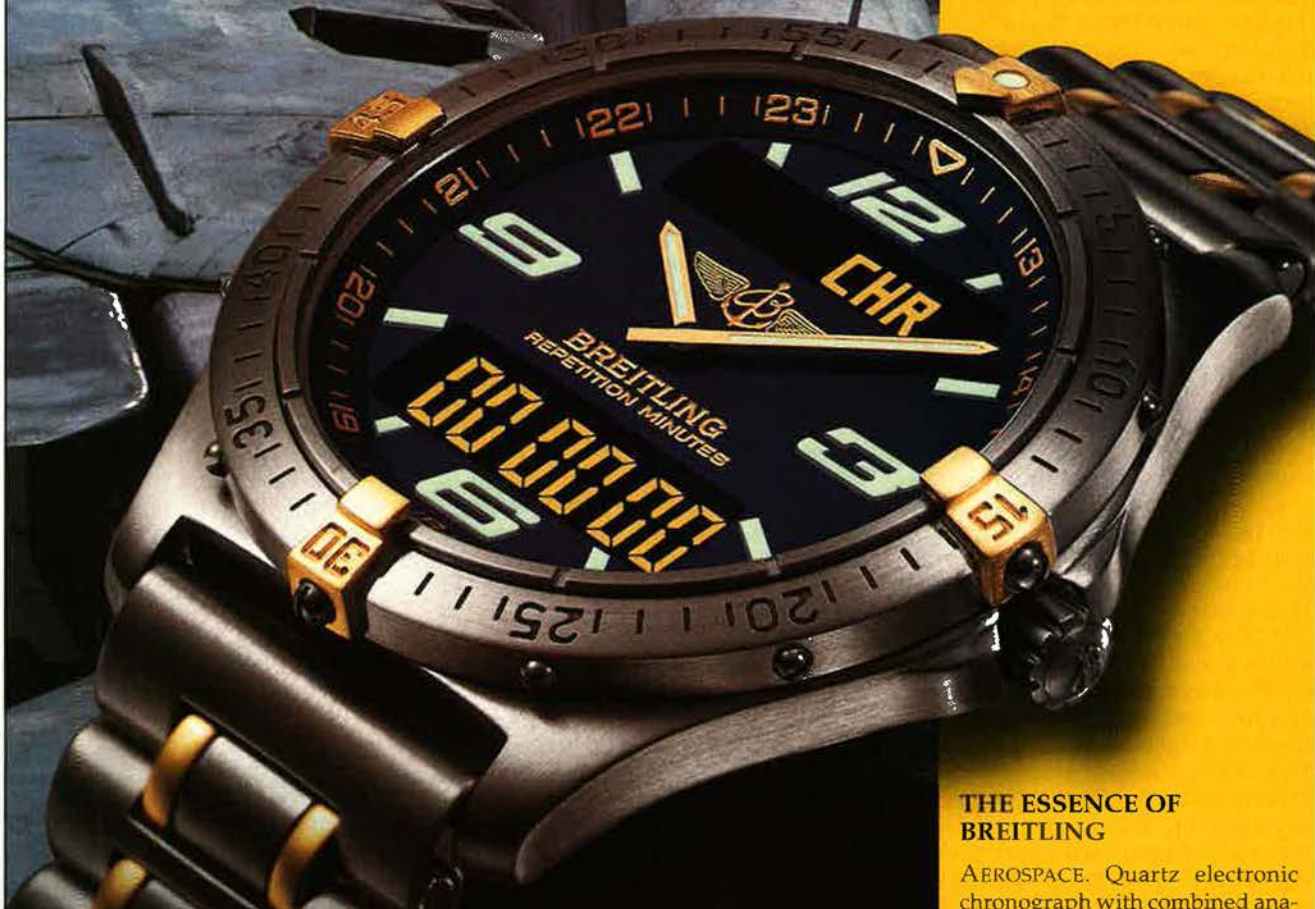
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## One by One

When is Congress going to stop wasting time and billions of dollars starting, then stopping, then starting aircraft programs? [See "One by One," September, p. 4.] The F-22 is the aircraft the Air Force needs today. Lewis needs to read the General Accounting Office report [about] Military Operations Other Than War draining US forces. [See "MOOTW Draining US Forces, Warns GAO," September, p. 28.] How many years of no-fly zone enforcement can the F-15Cs endure? Surely not decades. Also, the F-22 would do away with the intermediate maintenance level now required to support an F-15 deployment. This will allow airlift resources to be used for other critical missions.

MSgt. Jeff L. Surratt,  
USAF (Ret.)  
Sand Coulee, Mont.

## No Surprise on Recruiting

The shortfall of about 2,500 recruits should not be a big surprise to anyone. USAF recruiting was showered with [a] \$54 million additional appropriation for recruiting. The government's answer to most any problem: Throw more money at it!

If DoD [leaders] looked back, they would see the best recruiters in the world were happy and satisfied active duty families and military retiree families. I have seen and listened to disgruntled active duty personnel [talking about the] Redux [retirement pay system], Tricare, and extended family separations, plus pay not keeping up with inflation or the private sector. Military retirees are not happy campers, either. Why? [Members of] the retired community are being denied appointments at military treatment facilities. We lose our primary health care provider at age 65.

When military retirees start walking picket lines in front of bases, they are seen by young people who talk with them; they learn of the erosion of our earned benefits. If [young people] talk to an old soldier and hear of the fights being waged for benefits earned and now denied, or if they speak with active duty person-

nel—many spending more than 180 days separated from loved ones [and] airmen eligible for food stamps—no wonder they laugh at recruiters and opt for the civil sector.

CMSgt. Robert G. Saner,  
USAF (Ret.)  
Greenbush, Mich.

## Confused About Tricare

The first thing I noticed is that [Army Lt. Gen. Ronald R.] Blanck had to turn to his own expert staff to figure out if there was a problem with [his] bill. [See "With Tricare, Even the Boss Gets Confused," September, p. 33.] To whom can the rest of us turn? As is indicated in the article, it's probably only the retirees who can afford to fight the system and collection agents.

Maj. Douglas B. Hardie,  
USAF (Ret.)  
Newbury Park, Calif.

## Unwarranted Attack

The article entitled "Pentagon Investigator Hit for Questions About Hart" [recounts] another example of the arrogance and disregard for national security that the Clinton Administration has displayed since taking office. [See September, p. 38.] Pushing the security clearance investigation of a friend is one thing, but the personal attack, suspension, and destruction of a federal employee's career for doing his job is another.

I find it ironic that Gary Hart, being appointed to a position involving a national security issue, complained

to the Secretary of Defense that security clearance investigations were "inappropriate and intrusive."

I applaud David Kerns for doing his job. Apparently, he is more security conscious than his supervisor, Gary Hart, or [Defense Secretary] William Cohen.

CMSgt. Jack Martin,  
USAF (Ret.)  
Dayton, Ohio

## The "Civilian Branch"?

I read with extreme displeasure the arrogance of your disinformation stated in the announcement that the courts had ruled in favor of the Air Force Memorial intruding on the sanctity and honor of the Iwo Jima Memorial. [See "Circuit Court Upholds Air Force Memorial," July, p. 9.]

You may have won in court, but you have not won in [the] court of honor, the court of integrity, and certainly not the court of sacrifice required to blemish the hallowed memorial commemorating the combat deaths of over 6,000 Marines taking Iwo Jima.

Pure arrogance. But what should we expect from the civilian branch of the armed forces?

A citizen of the United States and, yes, a former Marine,

J.C. Allen

■ We honor those who fell at Iwo Jima; we honor the memory of all 19,733 Marines killed in battle in World War II. We would suggest that you skip the cheap shots and pay similar respect to the 52,173 Army Air Forces battle deaths in that war.—

THE EDITORS

## Not Enough on Weasels

I am disappointed. There was just a lot of pictures and no story about the Wild Weasel mission. [See "Mitsawa's Weasels," September, p. 56.] I was in the "Thud" and left the program upon return from Southeast Asia. The mission was ably carried on by the F-4G, it seemed to me, prior to my retirement in 1980. I was in the contingency planning business from 1974-80 and felt that I was pretty

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up-to-date during that time. Properly modified, the Strike Eagle can handle the mission. It seems to me that to place the workload on one person is placing the aircraft, pilot, and mission into unnecessary jeopardy. There probably will never be an electronic box that can perform the decision making like that extra person, with the extra eyes, sitting just to the rear of the pilot—they are a team and think as one.

I remember Bill Sparks's choice words of wisdom when I was a student "Bear" at the Wild Weasel School in 1968 at Nellis AFB, Nev. He said, "As a fighter pilot I used to think that there was nothing that I couldn't do by myself and do it better than anyone else. Then I got to 'weasel it,' and that is something that it takes a second person on a crew to do." He went on to say that the extra pair of "eyes" were absolutely necessary and a welcome addition when you are out there dueling with SAMs. I believe USAF needs a two-seat aircraft for this mission and that the person in back must be a trained Bear, meaning a weapons system officer/electronic warfare officer with the specialized electronic warfare training.  
Jim Bradley (WW#520)  
Westmoreland, Kan.

■ *There were many photos because "Misawa's Weasels" was a pictorial. It was not intended to be a feature on the Wild Weasel mission or history.*—  
THE EDITORS

### View Too Prevalent

I must take exception to the well-intended, but erroneous, views of [retired Army] Col. [David A.] Appling concerning the "unjointness" of the operations in Allied Force. [See "Airpower, Allied Force, and a Misperception," September, p. 6.] I wish I could say his views were unique, but they are still all too prevalent in many corners of the military community. He states that "joint warfare would have produced a clear win, arguably with fewer civilian casualties and in fewer days of combat—surely with far less expenditure of ordnance." It is as if the integration of assets from USAF, USN, USMC, [and] Special Ops Command were somehow less than joint, simply because of the absence of massed US Army forces. I assume he is contrasting Allied Force with the "clear win" gained in Desert Storm through the introduction of ground forces—that "clear win" that aerospace power is still monitoring eight years later. Considering the time required to mass the forces, exactly how would the introduction of several



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### AFA's Mission

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*To explain these needs to the American people.*

## Letters

armored divisions have done anything to stop the slaughter in Kosovo? And, by the way, is the expenditure of ordnance more costly than the expenditure of the most critical of American resources—human lives? In this day of limited warfare, we may never see a clear win again. I assume Appling would agree that, as the preface of Joint Pub 1 ["Joint Warfare of the Armed Forces of the United States"] states: "We fight as a team. This does not mean that all forces will be equally represented in each operation." It is up to the theater commanders to determine the right mix of forces needed to accomplish the stated objectives.

With the emerging view of theater warfare changing in accordance with complex global realities, it is critical the right mix of joint forces be selected for the right capabilities required. Appling wonders how much better it would be if the Air Force could get over its "Douhetian fixation" and embrace joint action. I suggest that Allied Force may have been the best example seen to date of modern joint warfare. Tomorrow's warriors need to get past the outdated philosophy that only ground armies win wars.

Outcomes of future wars will be determined by whatever forces are necessary to coerce the enemy into favorable actions, not solely by the occupation of territory.

Col. Charles T. Fox,  
USAF (Ret.)  
Maxwell AFB, Ala.

### True Patriot

It was reassuring and timely as the century winds down to see *Air Force Magazine* reprint the story of one of our greatest military aviation feats ["One-Man Air Force," September, p. 85]. Jim Howard passed away just a few years ago, and those of us who knew him will always remember him as a modest man and a true patriot.

After World War II, he became the last wartime commander of the Third Air Force gunnery training base at Pinellas AAF, near St. Petersburg and Clearwater, Fla. This airfield later became St. Petersburg–Clearwater IAP. It is fitting that many highlights of his career in the Navy, Flying Tigers, Army, and Air Force Reserve are prominently displayed in a permanent exhibit near the main entrance to the terminal.

In his memoir, *Roar of the Tiger*, he wrote, "There is nothing so tran-

sient in the minds of the public as military heroes or the wars they fought." Thanks for refreshing our memories and proving him wrong on that point!

Col. David W. Buermeyer,  
USAF (Ret.)  
Vienna, Va.

### Since When?

I find it somewhat strange and smelling of politics as usual that [Col.] Eileen Collins was selected as an astronaut while a student at the USAF Test Pilot School ["USAF Was the Training Ground," September, p. 25]. All the male astronauts I've known or read about had to wait until they had graduated from Test Pilot School before they could even apply for astronaut consideration, much less be selected. Did NASA need a female pilot astronaut that desperately?

Lt. Col. Karl Hutchinson,  
USAF (Ret.)  
USAF TPS Class 81A  
Williamsville, N.Y.

■ You might want to ask NASA. However, if you check their list of requirements for pilot astronaut applicants, there isn't one for completion of Test Pilot School.—THE EDITORS

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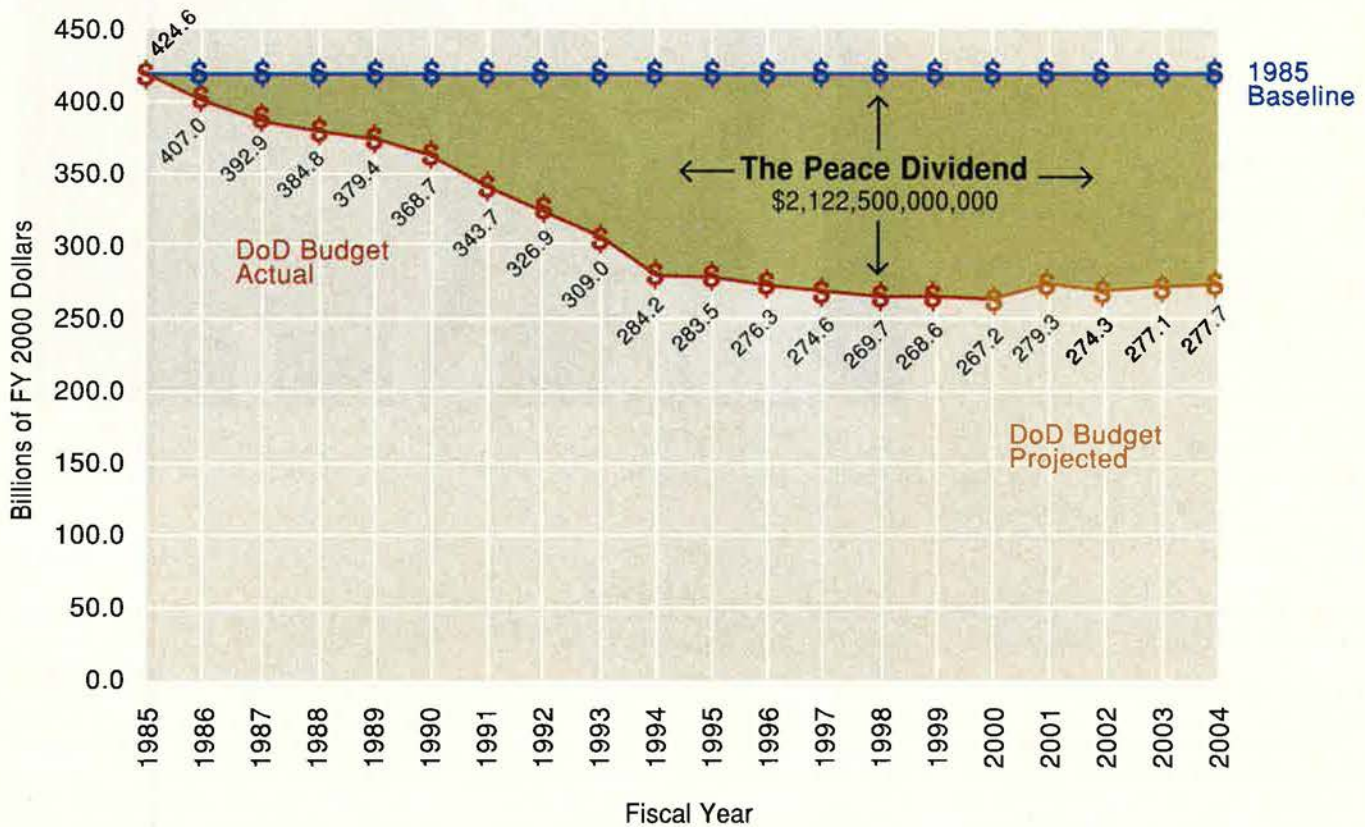
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# The Chart Page

By Tamar A. Mehuron, Associate Editor

## The Peace Dividend: \$2 Trillion

Tracking the Decline of US Military Spending



Source: Congressional Research Service, Defense Budget for FY 2000: Data Summary.

No one knew it at the time, but 1985 was the high-water mark of the Cold War. The Reagan Administration's defense buildup pushed DoD spending to the equivalent of \$424.6 billion, higher than it had been for some two decades. However, the year 1985 also saw the rise to power in the USSR of Mikhail Gorbachev. The new Soviet leader's reform policies and skillful public diplomacy almost immediately eased East-West tensions and undercut the willingness of Congress and the US public to back big defense increases, especially at a time of huge federal deficits.

In the very next year, Pentagon spending went into a slide that has yet to end. Actual and planned budgets for the 20-year period 1985–2004 total \$6.4 trillion (as calculated in Fiscal 2000 dollars). However, had the US maintained annual defense budgets at the 1985 level, spending would have totaled \$8.5 trillion. The difference in the two figures—sometimes known as “the peace dividend”—works out to about \$2.1 trillion.

# Aerospace World

By Peter Grier

## Silver Stars Go to Three USAF Pilots

Three Air Force pilots on Sept. 15 were awarded Silver Stars for gallantry in Operation Allied Force, NATO's air action over the Balkans.

One recipient, Capt. James L. Cardoso, an MH-53 helicopter pilot, led an Air Force search and rescue team deep into Serb territory on the night of March 27 to snatch the pilot of a downed F-117 stealth fighter. Serb soldiers had intercepted the downed pilot's radio messages and were closing in and within 30 feet of the pilot when the MH-53 arrived.

Silver Stars also were awarded to two F-16 pilots, Capt. Sonny P. Blinkinsop and Capt. Adam B. Kavlick. Blinkinsop was honored for risking his life to ensure the safety of a large group of US and British strike aircraft receiving heavy fire from Serb air defenses. Kavlick, while under fire, helped marshal forces to rescue his wingman, who had to eject near the city of Novi Sad after his airplane was struck.

Secretary of Defense William S. Cohen presented the decorations in a ceremony at Andrews AFB, Md.

## Busy Time Hits Hurricane Hunters

Air Force Reserve Command's 53rd Weather Reconnaissance Squadron from Keesler AFB, Miss.—the famed "Hurricane Hunters"—has been busy this late summer and fall. A string of storms bouncing up the East Coast of the US has had them flying 12-hour missions in their specially equipped WC-130 airplanes an average of 3.5 times each day.

The squadron is the only DoD unit that routinely flies weather reconnaissance missions over the oceans which surround the US mainland. Its crews gather information on the size, heading, and character of each storm and feed it via satellite to the National Hurricane Center in Miami.

"It's exciting flying a hurricane mission, but it's not as scary as it looks because we train constantly," said SSgt. Jay Latham of the 53rd.



*In a ceremony at Andrews AFB, Md., Defense Secretary William Cohen pins a Silver Star on (l-r) Capt. James Cardoso, Capt. Adam Kavlick, and Capt. Sonny Blinkinsop. The military decoration recognized their actions during Operation Allied Force.*

On each hurricane flight, a WC-130 aircrew penetrates the eye wall four times. Pilots aim for the dead center of the storm, where pressure and wind speed are lowest.

Using a spring-loaded gun, the dropsonde operator fires an 18-inch, 3-pound cardboard cylinder packed with electronics into the hurricane's center. This sonde descends on a parachute, gathering pressure, wind speed and direction, temperature, and humidity data.

"Flying and doing a weather job is as good as it gets," says Latham, who joined the Reserve after four years on active duty as a weather observer at Tyndall AFB, Fla.

## Russian Bombers Intercepted

Two USAF F-15 fighters on Sept. 16 confronted a pair of Russian bombers headed toward Alaska, officials said.

The Tu-95 Bear bombers had been detected on radar while still 200 miles from US territory. Both Russian aircraft turned away before crossing into US airspace and while they were still about 90 miles away from the fight-

ers, which had flown from Elmendorf AFB, Alaska.

The event marked the first time since 1993 that USAF has noted Moscow-controlled bombers being sent toward Alaska in such a manner. In the Soviet era, the Kremlin would routinely do so to test North American air defenses.

In June, two Russian Bears flew so close to Iceland's coastline that a pair of Air Force F-15 fighters scrambled from a NATO air base to escort them around the island.

The Clinton Administration dismissed both of the June incidents as militarily insignificant. "Russia stayed well within international airspace, and there was no danger of confrontation," said National Security Council spokesman Mike Hammer.

Moscow, however, expressed "surprise and regret," according to US officials, that US jets had intercepted two bombers in the September incident.

## New Inscription on Tomb of Unknowns

On Sept. 17, Secretary of Defense Cohen and other top military officials

USAF photo by SSgt. Angela Stafford

## Funny Figures in the F-22 Fighter Flap



"With a most recent cost estimate of \$200 million for each plane, we need to be asking if [building the F-22 fighter] is our most important priority."

So said Rep. Jerry Lewis (R-Calif.), chairman of the House defense appropriations subcommittee, just after his panel zeroed F-22 production funds last July. Lewis and other critics repeatedly cite the \$200 million figure.

As the chart shows, per-aircraft cost is calculated in nine main ways. None reaches the level of \$200 million. The highest figure is \$184 million, but it is attained by using inflated dollars and including nonrecurring costs such as development and military construction.

Critics frequently imply that \$200 million is the Raptor's "sticker price"—what it will cost to buy each new F-22 from this point forward. The chart shows that fly-

away cost (excluding sunk costs and inflation) comes to \$85 million per F-22—not much more than what would be spent for a new, but far less capable, F-15E.

## F-22 Survives a Stealth Attack

After weeks of dispute, Congress voted to sustain the F-22 fighter with a new \$2.5 billion appropriation.

"I'm satisfied that the F-22 is funded enough to keep it going," said Sen. Ted Stevens (R-Alaska), chairman of the Senate defense appropriations subcommittee and the F-22's key backer.

Lawmakers voted the funds as part of a \$267.7 billion Defense Department appropriation bill (not including military construction) for Fiscal 2000. To take effect, it had to be signed by President Clinton.

The fighter program had been in turmoil since midsummer, when a small band of House appropriators, led by Rep. Jerry Lewis (R-Calif.), launched a surprise attack on its production budget. The House chopped out \$1.8 billion needed to buy the first production F-22s and approved only \$1.2 billion for research. In contrast, the Senate had approved the full \$3 billion request.

F-22 backers warned that the House, though it claimed to be seeking only a "pause" in the program, was actually killing it.

Senate and House negotiators on Oct. 6 shook hands over a compromise. Technically, it postpones fighter production (a House demand) from 2000 to 2001. However, it protects the production option by providing the following amounts:

- \$1.9 billion in development funds, available not only for research but also to build six so-called "test" F-22s in 2000.

- \$277 million in advance-procurement funds, to buy or build long-lead items for 10 more F-22s to be procured in 2001.

F-22 Fighter Unit Cost	Base Year 1990 Dollars	This Year 1999 Dollars	Then-Year Inflated Dollars
Flyaway Cost + aircraft + management + nonrecurring start-up + allowance for changes	\$70 m	\$85 m	\$98 m
Procurement Cost + all of the above, plus ... + contractor services + support + other government costs	\$84 m	\$101 m	\$117 m
Program Acquisition Cost + all of the above, plus ... + research & development + military construction	\$142 m	\$172 m	\$184 m

Source: USAF, Fiscal 2000 Budget

- \$300 million in reserve funds, intended to cover contract-termination liabilities but also usable, in time, for aircraft.

A final go/no-go decision on production will come in 2001 and will depend on whether the F-22 during the next year meets an array of test goals for critical areas such as avionics. The Senate-House agreement specifically precludes production until the avionics software is successfully flown in an F-22.

"The testing language is quite strong," Lewis said.

The Air Force wants the F-22 to replace the F-15, which will have been in service for 30 years by the time the Raptor becomes operational. USAF already has spent more than \$20 billion to develop the F-22. It plans to produce 339 of the fighters, at a marginal cost of \$85 million per fighter.

—Robert S. Dudley

dedicated a new inscription carved on the empty Vietnam crypt at Arlington Cemetery's Tomb of the Unknowns: "Honoring and Keeping Faith With America's Missing Servicemen."

"Those words will always remain, eloquent in the clarity of their pur-

pose, enduring by the dignity of their provenance," said Cohen.

The Prisoner of War/Missing in Action Day ceremony was the culmination of events that began more than 25 years ago. Air Force 1st Lt. Michael J. Blassie was shot down on

a combat mission over South Vietnam. Days after his crash, remains from a crash site were recovered, but officials could not prove their identity conclusively.

In 1983, officials selected those remains to be interred at the crypt

reserved for the Vietnam Unknown. President Ronald Reagan presided over the interment ceremony on Veterans Day 1984.

But the advance of DNA identification technology proceeded apace. The family of Blassie, suspecting the Vietnam Unknown might be their loved one, petitioned the Defense Department to test the remains.

In June 1998, DoD specialists determined that the body was, indeed, that of Blassie. It was turned over to his family for burial.

DoD announced that it would not place another body in the crypt, as new technology made it possible to identify virtually all military remains. Instead, the national shrine would carry an inscription highlighting America's commitment to account for all those missing in action, said officials.

"Science helped ease the sorrow and suffering of a family and return their son to his rightful place, and science may one day help ease the weight of grief of those who wait and wonder," Cohen said. "But science cannot succeed without faith and without dedication."

#### FEHBP Hit by Rising Costs

Clinton Administration officials said health insurance premiums for the Federal Employees Health Benefits Program will rise an average of 9.3 percent next year.

That would mark the third consecutive year of substantial rate increases for the plan, under consideration as an alternative for military retirees in



USAF photo by MSgt. Val Gempis

**In Australia, USAF members from the 18th Transportation Squadron/Combat Mobility Element, Kadana AB, Japan, load vehicles onto C-130s from Elmendorf AFB, Alaska. The vehicles were bound for East Timor, as part of the United Nations-backed International Forces East Timor.**

lieu of the Defense Department's Tricare health care system. FEHBP premiums increased by 9.5 percent in 1999 and by 7.2 percent in 1998. Earlier in the decade, rate increases were considerably smaller.

The Office of Personnel Management said spending on prescription drugs and new technology in hospitals and doctors' offices account for the bulk of the rate increases.

The FEHBP covers approximately 9 million federal workers, retirees, and their families worldwide. About

300 health plans participate in the FEHBP. The government pays 72 percent of the average premium.

The House in 1998 approved a demonstration project allowing thousands of certain Medicare-eligible military retirees to utilize FEHBP starting in January 2000. Military retirees who have reached age 65, when Medicare kicks in, are currently not covered by Tricare.

#### Ryan Says Easing of Optempo at Hand

Long effort will pay off in the next six months, with such improvements as the Air Expeditionary Forces and the long-awaited pay raise finally coming to fruition, Chief of Staff Gen. Michael E. Ryan told airmen Sept. 1 on a visit to Peterson AFB, Colo.

The stand up of the new AEFs will not reduce total optempo, he said. But it does promise predictability, leading to increased use of the Guard and Reserve.

"As we use Guard and Reserve forces more, it lessens some of the active duty tempo," said Ryan. "It puts predictability and stability in the lives of our folks, unless we have another Major Theater War."

Operations in Kosovo, and recovery from the wear and tear thereof, could delay the coming of positive AEF effects. But it will be felt in the field by next spring, said the Chief.

Effects from the pay raise will likely appear faster. The new 4.8 percent increase is expected to take effect Jan. 1.

## Clinton Doctrine? What Clinton Doctrine?

In the wake of the successful NATO operation to oust the troops of Serb leader Slobodan Milosevic from Kosovo, President Clinton earlier this year proclaimed a new emphasis on humanitarian intervention that some experts labeled the "Clinton Doctrine."

"Whether you live in Africa, or Central Europe, or any other place, if somebody comes after innocent civilians and tries to kill them en masse because of their race, their ethnic background, or their religion, and it's within our power to stop it, we will stop it," Clinton said at the time.

Then came East Timor. After Indonesian-backed paramilitaries began rounding up and killing civilians in their restive province after it voted for independence, the Administration suddenly changed its mind.

The US would support a multinational intervention, said US officials. But only a small number of US troops would actually take part. The world is a messy place after all, and the US can't intervene everywhere, said Clinton's National Security Advisor Sandy Berger.

"You know, my daughter has a very messy apartment up in college," Berger said on Sept. 8. "Maybe I shouldn't intervene to have that cleaned up."

"I don't think anybody ever articulated a doctrine which said that we ought to intervene wherever there's a humanitarian problem. That's not a doctrine, that's just a kind of prescription for America to be all over the world and ineffective," Berger continued.

Berger later apologized for comparing his daughter's housekeeping to the slaughter of innocents in a long-troubled part of the world.

## Survey Shows NATO Close on Serb Damage Estimates

NATO did a fairly good job of estimating the amount of damage it inflicted on Serb forces in Yugoslavia, but the alliance never used a running count of Serb equipment destroyed as a measure of its success, according to the Supreme Allied Commander Europe, US Army Gen. Wesley K. Clark.

Clark briefed reporters in Brussels Sept. 16 on the results of an exhaustive survey intended to determine just how effective NATO was in striking Serb forces in Kosovo and southern Serbia during Operation Allied Force. He said NATO aircraft destroyed 93 tanks, 153 Armored Personnel Carriers, 339 military vehicles, and 389 pieces of artillery or mortars.

The figures are "actually pretty close" to those NATO was quoting toward the end of the bombing campaign, based on aircraft surveillance imagery, and eyewitness accounts, and some 35 experts made a direct, on-the-ground examination of 429 bombing sites in Kosovo.

Corley attributed the discrepancies in numbers to several causes: multiple hits on the same targets, hits on Serb decoys, relocation or covering of damaged vehicles, and an "exceptionally conservative" approach to the tally, which imposed "extremely rigorous" standards "to validate a successful strike." Some hardware probably destroyed by NATO aircraft was not included in the count because it could not be satisfactorily confirmed as destroyed, he said.

Only those items that could be positively deemed "totally destroyed, nonsalvageable" were counted, Corley said.

This survey is based on data from an on-going 12-month Air Force effort to systematically understand the air campaign's effects and glean useful lessons for future operations. The survey also fed into the Pentagon's quick-look lessons-learned effort, but Clark's briefing was spurred in large part by press reports questioning NATO's vehicle-damage figures, given the relatively few hulks found in Kosovo after Yugoslav President Slobodan Milosevic capitulated. The reports also quoted Serb leaders claiming a vastly smaller number of vehicles destroyed than NATO figures suggested.

NATO destroyed about a third of Serbia's 350 or so tanks, more than a third of its 430 to 450 APCs, and more than half of its 750 mortar and artillery pieces, according to Clark. He said he had "no way of knowing" what Serb casualties were. In monitoring the withdrawal of Serb forces from Kosovo, Clark said NATO has noted that "they're missing a good deal of their equipment."

In some cases, NATO pilots deliberately attacked known decoy sites so they could not be used for subsequent Serb "ambush traps," Corley noted.

There was clear evidence that the Serbs had cleaned up the battlefield, and Corley said this was part of an effort on their part to make NATO's strike planning and assessment job tougher. Scars on the ground found at many bombing

sites indicated that very heavy objects had been dragged away and removed from the scene. Witness reports showed some damaged vehicles were covered with tarps. Some new pieces were brought in during the conflict, making the counting job harder still.

Col. Ed Boyle, who planned and coordinated the airstrikes at the Combined Air Operations Center in Vicenza, Italy, also explained that, because Serb military vehicles were often intermingled with civilian ones, and because the weather was bad about half the time, the Serbs "did have periods during this entire campaign when they could freely move around the battlefield, move equipment, and reposition it."

Despite having what Corley described as "a perfect world" where we could see the battlefield 24 hours a day and be able to prevent them from moving equipment."

Clark said the NATO strategy was two-pronged. One part was a "strategic attack line operating against Serb air defenses, command and control, [army troops and militias], their sustaining infrastructure, and supply routes and resources." The other was a "tactical line of operation against the Serb forces deployed in Kosovo and in southern Serbia, ... who were doing the ethnic cleansing."

It was imperative that this latter target set get priority, Clark asserted, since ethnic cleansing was the principal motivator of NATO's intervention in the first place. However, it was necessary to pursue "both lines of operation to be successful," he said.

Clark added that the operation was a success.

"The conflict ended on NATO's terms. Serb forces are out, NATO forces are in, the refugees are home, a cease-fire is in place. So in that sense, we succeeded in this conflict," he said.

Clark conceded that the tank-plinking effort was an "extremely controversial part of the campaign," but that, "from the very beginning, we said we didn't believe in battle damage bean-counting as a way of measuring the effects of airpower."

Wholesale destruction of the Serb army was not necessarily a goal of the tactical effort, Clark said. Rather, "what we had been successful in doing was keeping it in hiding, under wraps, ineffective. ... What we found was that the Serb use of heavy equipment was quite constrained as a result of the airpower."

The measure of success in the tactical effort is clear, Clark asserted. "We destroyed and struck enough," along with more strategic targets, to get Milosevic to accept NATO's terms.

Clark also asserted, without offering evidence, that another factor influencing Milosevic's decision to capitulate was that "he had ample evidence to conclude that, had he not conceded when he did, the next step would have been the long-awaited and much-talked-about NATO ground effort."

—John A. Tirpak

Target Category	Pre-War Estimate of Serb Arms	Reported Destroyed (June 1999, Initial BDA)	Confirmed Destroyed (September 1999, After Survey)
Tanks	350	110	93
APCs	430 to 450	210	153
Artillery/Mortars	750	449	389
Military Vehicles	N/E	N/E	339

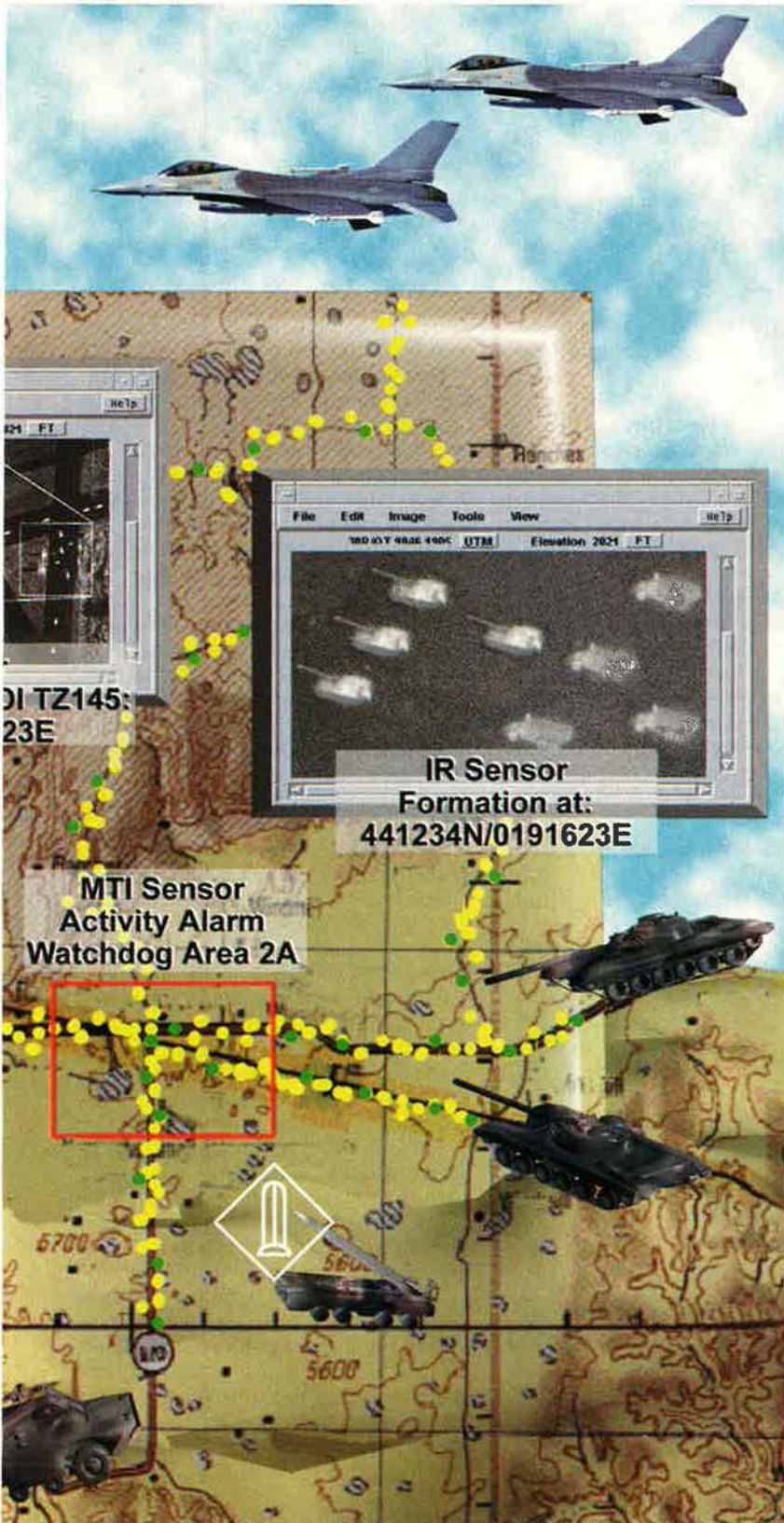
Source: NATO. N/E means Not Estimated, BDA means Bomb Damage Assessment.

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"These changes will have a positive effect," said Ryan. "Our people don't say, 'Show us the money,' but in some cases we ask so much from our folks that this kind of need—that they have to take care of their families monetarily—is really important."

Families, after all, play a big retention role in today's military. Most members of the service are married and thus have more than themselves to think about when making the decision to remain in service.

"The family has a vote, a big vote, on whether they stay or go," said Ryan.

On other subjects, Ryan said that troops wouldn't have to wait six months to see the payoff from greater integration between space and air forces. That is already here.

In Kosovo, space was involved across the whole spectrum of operations, in areas such as surveillance, intelligence, reconnaissance, navigation, weather prediction, and communication.

U-2 information, for instance, was beamed back to the US, interpreted by "reachback" personnel, and kicked right back to people in-theater.

"Integration is the process of making sure all the systems we have within our military capability interact with each other in a synergistic way, in an additive way, and that they are more than just a sum of their parts. In Kosovo we saw that in spades," said Ryan.

"Space has become integral to all

## Marines "Can't Take Care of the Air Force"

The Air Force believes other US services need to take on some additional operational duties while USAF reconstitutes from the war in Kosovo, but a senior Marine had a response: No.

The Air Force's Chief of Staff, Gen. Michael E. Ryan, recently argued the USAF case in front of the Joint Chiefs of Staff, but the Marines say their own workload is so heavy that they can't help out.

"I don't think the Marine Corps right now can take care of the Air Force," said Marine Lt. Gen. Frederick McCorkle, deputy chief of staff for aviation, on Sept. 9. "We've got our own problems."

Many Marine air units are overworked, said McCorkle. Radar-jamming EA-6B Prowlers have been in heavy demand, for instance. During Operation Allied Force 17 of 20 Marine EA-6Bs were deployed.

the operations we do; that's why we call ourselves an aerospace force," said the Chief.

### DiBattiste Talks Recruitment

The new undersecretary of the Air Force, Carol A. DiBattiste, traveled to Randolph AFB, Texas, this August to talk about something that relates to her past life and future duties: recruiting.

A former Air Force "mustang," who served in both the enlisted ranks and as an officer, DiBattiste spent three tours as a recruiter on active duty. A lot has changed since 1991, when she last got a new recruit to sign on the dotted line, DiBattiste admitted. But she still thinks she can help the Air Force get out of the recruiting "pickle" it's in.

The service will be about 2,000 recruits short this fiscal year, she noted. Senior leadership is worried

and is pursuing a number of efforts to turn the situation around.

Solution one: More recruiters. The service needs "more top-of-the-line production recruiters," she said. "That's who sold me on the Air Force."

Solution two: Enhanced prior-service recruiting. "They are qualified, they are skilled, they've received the thousands and thousands of dollars of training that we've pumped into them," she said.

Solution three: More enlistment bonuses in more career fields. The service started offering such bonuses in more than 100 specialties last year.

But in the end, it all comes down to the recruiter promoting the service, she said.

"We're different from private industry," said Undersecretary DiBattiste. "We offer something different. We offer someone the ability to serve his or her country in a way that private industry does not."

### Delay Hits New Standoff Missile

The Air Force announced Aug. 27 that it is pushing the decision on low-rate production of the Joint Air-to-Surface Standoff Missile from 2001 to 2002—in effect, delaying the program for a year.

The move is necessary because subcontractor Teledyne is moving slower than planned on engine development, due to design changes in the engine main bearing and digital fuel control, among other things.

In addition, configuration changes made by prime contractor Lockheed Martin have set back some airframe part deliveries, and the JASSM program is facing the unforeseen need for two extra development flight tests to calibrate data for the flight control and autopilot systems.

### JSF Competitors Girding for Battle

Both competitors in the Joint Strike

USAF photo by TSgt. Lance Cheung



*TSgt. Humberto Garcia, 607th Transportation Flight, rehydrates after completing a run/walk-a-thon at Osan AB, South Korea. Participants collected donations or pledges for their performances in this 24-hour event, called the "Fall Stampede." The money goes to fund base morale events.*

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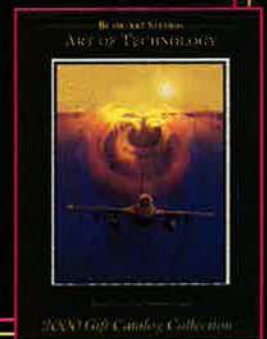
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## Defense Experts Oppose Test Ban Treaty

Fifty-two former cabinet officers, defense officials, military leaders, and lawmakers urged the Senate on Sept. 9 to reject appeals to ratify the Comprehensive Test Ban Treaty, which President Clinton signed in 1996. In alphabetical order:

**Richard V. Allen**, former national security advisor  
**Kathleen Bailey**, former assistant director of the Arms Control and Disarmament Agency  
**Robert B. Barker**, former assistant to the secretary of defense for atomic energy  
**William P. Clark**, former national security advisor  
**Angelo Codevilla**, former staff member, Senate Select Committee on Intelligence  
**Henry F. Cooper Jr.**, former director of the Ballistic Missile Defense Organization  
**Gen. Raymond G. Davis**, USMC (Ret.), former vice commandant, USMC  
**Midge Decter**, former president, Committee for the Free World  
**Kenneth deGraffenreid**, former senior director of intelligence programs, National Security Council  
**Diana Denman**, former co-chair, US Peace Corps Advisory Council  
**Donald Devine**, former director, US Office of Personnel Management  
**Paula J. Dobriansky**, former director of European and Soviet affairs, National Security Council  
**Elaine Donnelly**, former commissioner, Presidential Commission on the Assignment of Women in the Armed Services  
**Gen. Russell E. Dougherty**, USAF (Ret.), former commander in chief, Strategic Air Command  
**Maj. Gen. Vincent E. Falter**, USA (Ret.), former deputy to the assistant secretary of defense for atomic energy  
**Douglas J. Feith**, former deputy assistant secretary of defense  
**Frank J. Gaffney Jr.**, former acting assistant secretary of defense for international security policy  
**William R. Graham**, former director of the Office of Science and Technology Policy and science advisor to President Reagan  
**Charles A. Hamilton**, former deputy director, strategic trade policy, Department of Defense  
**Moretta Hoeber**, former deputy undersecretary of the Army  
**Vice Adm. William Houser**, USN (Ret.), former deputy chief of naval operations for aviation  
**Lt. Gen. James H. Johnson**, USA (Ret.), former commanding general, 1st US Army  
**Robert G. Joseph**, former US representative to the Standing and Bilateral Consultative Commissions  
**Lt. Gen. Thomas Kelly**, USA (Ret.), former director for operations, Joint Chiefs of Staff  
**Jeanne J. Kirkpatrick**, former US ambassador to the United Nations  
**Brig. Gen. Albion W. Knight Jr.**, USA (Ret.), former director, research and development, Atomic Energy Commission Division on Military Applications  
**Sven F. Kraemer**, former director of arms control, National Security Council  
**Gen. Frederick J. Kroesen**, USA (Ret.), former commander in chief, US Army Europe  
**Gen. John M. "Mike" Loh**, USAF (Ret.), former commander of Air Combat Command  
**Taffy Gould McCallum**, columnist and freelance writer  
**Adm. Wesley McDonald**, USN (Ret.), former Supreme Allied Commander, Atlantic  
**Edwin Meese III**, former attorney general and counselor to President Reagan  
**Lt. Gen. Sinclair L. Melner**, USA (Ret.), former deputy chairman, NATO Military Command  
**J. William Middendorf II**, former Secretary of the Navy  
**Vice Adm. Jerry Miller**, USN (Ret.), deputy director, Joint Strategic Target Planning Staff  
**Lt. Gen. Thomas H. Miller**, USMC (Ret.), former deputy chief of staff for aviation, Headquarters, US Marine Corps  
**Norman Podhoretz**, former editor, *Commentary* magazine  
**Maj. Gen. J. Milnor Roberts**, USA (Ret.), former chief of Army Reserve  
**Roger W. Robinson Jr.**, former senior director of international economic affairs, National Security Council  
**Edward L. Rowny**, former advisor to the President and Secretary of State for arms control  
**Maj. Gen. John K. Singlaub**, USA (Ret.), former chief of staff, US Forces Korea  
**Gen. Lawrence A. Skantze**, USAF (Ret.), former vice chief of staff, US Air Force  
**Leon Sloss**, former assistant director of the Arms Control and Disarmament Agency  
**Gerald Solomon**, former US representative from New York  
**Gen. Donn A. Starry**, USA (Ret.), former commander in chief, US Readiness Command  
**Michelle Van Cleave**, former associate director, Office of Science and Technology  
**Troy E. Wade II**, former assistant secretary of energy for defense programs  
**Gen. Louis C. Wagner Jr.**, USA (Ret.), former commanding general, Army Materiel Command  
**Malcolm Wallop**, former US senator from Wyoming  
**Gen. Joseph J. Went**, USMC (Ret.), former assistant commandant  
**Gen. Louis H. Wilson**, USMC (Ret.), former commandant  
**Curtin Winsor Jr.**, former US ambassador to Costa Rica

Fighter program are proceeding apace, company officials said late this summer.

Lockheed Martin will end the concept demonstration phase on time and within budget, company representatives said Aug. 25. In February, the firm had predicted a \$100 million cost overrun on its JSF program. It has since restructured its effort—planning to build only one cockpit, instead of three different ones for the three JSF variants, for instance.

Lockheed's X-35A is about half completed and will fly next year in the configuration of the Air Force's conventional JSF variant.

Boeing, for its part, is also on time and on budget, with 80 percent of its concept demonstration work already finished, according to Frank D. Statkus, vice president and general manager of the program.

Boeing's X-32A conventional take-off and landing demonstrator has been completely assembled, except for the Pratt & Whitney engine. Its X-32B short-takeoff-and-vertical-landing demonstrator should be done by the end of the year. The Boeing demonstrators are slated to fly next summer.

Meanwhile, the Navy has decided to ask program competitors to increase the range of their naval JSF variants by 100 miles, to a 600-mile combat radius. Adding the range means adding more weight—already a concern for the carrier-based JSF, which will be heavier than its land-based counterpart.

### Last Engine Completed at Kelly

An era ended at Kelly AFB, Texas, when the San Antonio Air Logistics Center completed work on its last F100 engine. Kelly workers first started to maintain the F100 engine, which powers F-15 and F-16 fighters, 26 years ago.

"We received the first F100 at Kelly in 1973," said Curtis Mendez, F100 production manager. "It came in for unscheduled maintenance."

The F100 flow peaked in the early 1980s at 27 engines a month. In recent years the workload has averaged about eight engines a month. "Whole up" work includes borescope inspection, break down into modules, disassembly, module repair and overhaul, replacement of electronic harnesses as required, reassembly, and testing.

Customers also sent individual engine modules—inlet fans, gearboxes, augmentors, and other sec-

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tions—to Kelly for work. In the last 10 years Kelly had done more and more module maintenance, while the number of whole engines declined.

Following the 1995 decision to realign work at Air Force Air Logistics Centers, the service decided to keep 24 percent of its F100 work as a core workload. In a public-private competition, Oklahoma ALC won the right to perform F100 maintenance at Tinker AFB, Okla.

Kelly's F100 workforce began closing out accounts and moving the last of its tools and equipment to Tinker on Sept. 1.

"We finished up what was here," said Mendez. "Anything that was inducted here was completed here. This F100 was the last engine on work order."

**Historic Tuskegee Unit Rejoins Air Force**

A unit with roots in the historic Tuskegee Airmen squadrons of World War II rejoined the US Air Force on Sept. 24 in a ceremony at Randolph AFB, Texas.

The 100th Flying Training Squadron was reactivated as part of the Air Force Reserve Command's 340th Flying Training Group. It will train AT-38, T-1, T-37, and T-38 instructor pilots.

The 100th Fighter Squadron, when activated in 1942, was one of four original all-black flying units from Tuskegee AAF, Ala. These units compiled distinguished war records—they never lost to enemy fire a bomber under their escort. Yet they had to overcome prejudice from much of the military to even reach the European theater of operations.

*In the wake of Hurricane Floyd in September, MSgt. Troy Arce, a pararescuer from the 920th Rescue Group, Patrick AFB, Fla., cradles an infant he rescued from flood waters in North Carolina. HH-60 rescue crews used night vision goggles and infrared sensors to find people stranded on rooftops, trees, and in cars.*



USAF photo by Maj. Dave Willingham

"Standing up this historic unit is a big help in making people aware of the baseline these men set," said Capt. P.J. Adams of the 340th FTG.

When fully staffed next summer, the 100th FTS will include 58 traditional Reservists, 15 Active Reserve members, and four support staff.

With its reactivation, two units of Tuskegee fame now make their home at Randolph. The 99th Flying Training Squadron already conducts T-1 instructor pilot training for Air Education and Training Command's 12th Flying Training Wing.

**Pave Hawk Era Ends for AFSOC**

The 55th Special Operations Squadron was inactivated in a Sept. 13 ceremony at Hurlburt Field, Fla. The action is part of Air Force Special Operations Command's preparation for the eventual arrival of the tilt-rotor CV-22 Osprey at Hurlburt.

"The inactivation is part of the command's preparation for the next century," said Lt. Col. Steve Laushine, 55th SOS commander. "The 55th's contributions to the [special operations forces] will not be forgotten when we close our doors."

The 55th provided support in Operations Just Cause, Desert Shield, and Desert Storm. Unit members spent seven years supporting no-fly zone enforcement over Iraq.

Even as they were preparing to furl the unit guidon, they were pulled away to participate in Operation Allied Force. Members of the 55th were among the AFSOC team that rescued two downed US pilots during the NATO operation.

"I think the way the missions were executed says a lot for the caliber of all the men and women in AFSOC," said Laushine, who was commander for both rescue missions.

The unit traces its heritage to the 55th Aerospace Rescue and Recovery Squadron, which stood up in 1952 at Thule AB, Greenland. Among the aircraft it has flown are the HH-19, the HH-53, and most recently the

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## When an Order Isn't an Order

The three-star British general in charge of NATO forces in Kosovo refused to follow an order from his American superior, NATO supreme commander, four-star US Army Gen. Wesley K. Clark, to block Russian troops from taking over an airfield in June.

Gen. Sir Michael Jackson said he would not do it because "it's not worth starting World War III," according to an account related by Joint Chiefs Chairman Army Gen. Henry H. Shelton to Congress on Sept. 9.

The British officer successfully appealed to his own national chain of command, including top British government officials, to overturn Clark's order.

In NATO, such an appeal—known as "using a red card"—is not unknown. Alliance procedures allow for a subordinate to ask his own commander for permission to disobey a foreign officer.

The incident was "troubling," admitted Shelton. Military discipline during tense operations can be a "matter of life and death," he told a Senate Armed Services Committee hearing.

MH-60G Pave Hawk. The 55th's Pave Hawks were transferred to Air Combat Command.

Most unit personnel are moving to other major commands. Some will stay in Air Force special operations, though they will be flying or maintaining other airframes.

### First Launch of New Sidewinder From F-15

On Sept. 1, the AIM-9X Sidewinder was launched into guided flight from a USAF F-15 for the first time. The missile hit a remotely piloted drone in

the test, which was carried out at White Sands Missile Range, N.M.

The firing also marked the first time the new short-range air-to-air weapon has been tested in a look-down, shoot-down engagement. The missile's infrared seeker successfully tracked its target through launch, flyout, and intercept, said officials from program contractor Raytheon.

"This success comes on the heels of the successful F/A-18 guided attack against an F-4," said Navy Capt. Dave Venlet, program manager, air-to-air missile systems, PMA-259.

"These missile shots keep us on the path toward FY 2000 production approval."

AIM-9X is a joint USAF-Navy program that is in the engineering and manufacturing development stage. Older Sidewinder models are in use by more than 40 nations.

### Make Anthrax Shots Voluntary?

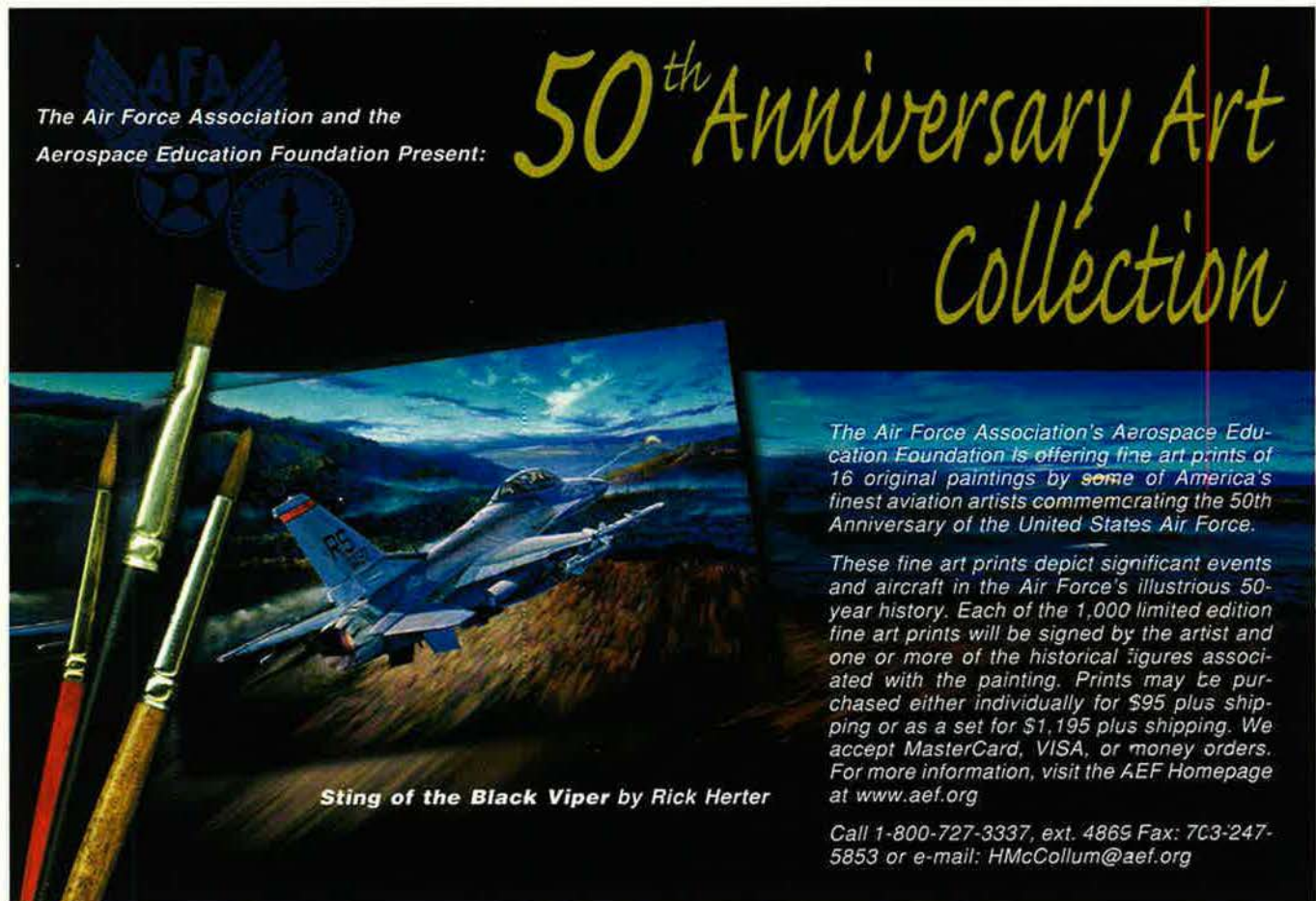
A member of the House Armed Services Committee is pressing legislation that would make the Department of Defense's anthrax vaccination program voluntary.

The Army's decision to coordinate a new set of studies on the long-term effects of the vaccine is a step in the right direction, said Rep. Walter Jones Jr. (R) of North Carolina. But it isn't enough, he said.

Jones's bill would make the DoD vaccination program voluntary until such time as the FDA approves a new anthrax vaccine for humans or a new, reduced course of shots.

Rep. Benjamin Gilman (R) of New York is pushing related legislation that would suspend the vaccination effort until a series of health studies are conducted.

"It is our contention that the continuance of this program, in its current state as a mandatory requirement,



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*Sting of the Black Viper by Rick Herter*

will, rather than improve readiness as its stated goal, continue to further deteriorate both morale and retention, especially in the Reserve and National Guard units," the two lawmakers wrote in an Aug. 3 letter to fellow members of Congress.

**Cost Cuts Have Played Role in Launch Failures**

Lockheed Martin's recent string of space launch failures may have been at least partly caused by too much emphasis on saving money and too little on the "mission success" the company takes as its motto, according to the report of an independent panel released Sept. 8.

The panel—headed by former Martin Marietta President and Chief Operating Officer A. Thomas Young—concluded that "success needs to be re-established as the most important" element in preparing for launch.

The group recommended that Lockheed Martin prepare a flyout plan that will address personnel retention, management accountability, and quality control on the Titan IV program in particular.

Lockheed Martin President and COO Peter B. Teets told reporters that the firm had already begun "to make our oversight and quality control procedures more robust" as a result of the panel's findings and would go along with the flyout plan suggestion.

**News Notes**

■ Air Force Link Plus—a new Internet Web site that allows users to tune in to a multimedia service news broadcast 24 hours a day—went on the air Sept. 13. The site features clips from Air Force television and radio news, as well as print features, and can be reached at <http://www.af.mil/aflinkplus>.

■ A joint Army–Air Force team beat teams from 14 other countries to win the International Military Sports Council pentathlon championship in Warsaw, Poland, recently. It was the first such triumph for the US in 15 years.

■ The Air Force won three of four Department of Defense firefighter awards presented at the International Association of Firefighters convention in Kansas City, Mo., held Aug. 30–Sept. 2. SrA. Delton J. Tills, Air Force Academy, Colo., was named Military Firefighter of the Year. Tetsuro Hayashi, assistant fire chief at Kadena AB, Japan, was named Civilian Firefighter of the Year. And the 314th Civil Engineer Squadron Fire Department, Little Rock AFB, Ark., was named Fire and Emergency Services Department of the Year.

■ The F-22's Block 1.1 avionics suite was turned on for the first time Aug. 31. The suite, installed in Raptor 4004, is intended to integrate all radar, electronic warfare, and identification sensor data, among other

things, in a manner that makes the resulting fused information easy for pilots to understand.

■ An F-16D assigned to the 56th Fighter Wing, Luke AFB, Ariz., crashed while landing at about 11:26 p.m. on Sept. 20. The pilot, Maj. Sharon J. Preszler, ejected safely.

■ The Air Force's men's softball team won its third consecutive Armed Forces Men's Softball Championship title at a tournament played Aug. 25–27 at Foster Stadium, Eglin AFB, Fla. The Air Force men scored 159 runs en route to the trophy.

■ The Fiscal 2000 Air National Guard and Air Force Reserve line and health professions lieutenant colonel selection board released on Sept. 1 a list of 827 majors picked for promotion, out of a candidate group of 1,435 majors. The list of promoted officers is available online at <http://www.arpc.org>.

■ A failed self-locking mounting bolt caused an AIM-120 missile and launching rail to fall off an F-16 from Misawa AB, Japan, on an April 10 training run, according to an accident report released Aug. 30. A lack of guidance about how often the bolts should be checked contributed to the incident, concluded the report.

■ The 17th Training Group, Goodfellow AFB, Texas, recently won the National Intelligence Meritorious Unit Citation Award. The honor is the highest military unit-level intelligence trophy in the Department of Defense.

■ The Weapons School Adversary Support building at Nellis AFB, Nev., was dedicated to the late Col. John R. Boyd in a Sept. 17 ceremony. Boyd was a former Fighter Weapons School instructor who retired from the service in 1975 and died two years ago after a long bout with cancer. He was renowned for his elaboration of the "OODA Loop"—Observe, Orient, Decide, and Act—a concept for anticipating and crippling an enemy in a fast-paced battle.

■ The Department of Defense has given the Navy the go-ahead to establish a new EA-6B Prowler squadron at NAS Whidbey Island, Wash. The radar-jamming Prowlers were in great demand during the Kosovo air war, and enlargement of the force is seen as one way to ease future demand. The move adds aircrews, not airframes—there are 123 EA-6Bs in the Navy and Marine Corps inventory, and the production line has been shut down for some time.

**Senior Staff Changes**

**NOMINATIONS:** To be Lieutenant General: Paul K. **Carlton Jr.**, Charles H. **Coolidge Jr.**, Charles F. **Wald**.

**CHANGES:** Lt. Gen. (sel.) Paul K. **Carlton Jr.**, from Cmdr., AF Medical Ops. Agency, Bolling AFB, D.C., to Surgeon General, Hq. USAF, Bolling AFB, D.C. ... Lt. Gen. (sel.) Charles H. **Coolidge Jr.**, from Dir., Ops. & Log., USTRANSCOM, Scott AFB, Ill., to Vice Cmdr., AFMC, Wright–Patterson AFB, Ohio ...

Brig. Gen. David A. **Deptula**, from Cmdr., CTF, Operation Northern Watch, USEUCOM, Incirlik AB, Turkey, to Dir., EAF Implementation, DCS, Air & Space Ops., USAF, Pentagon ...

Brig. Gen. (sel.) Bob D. **Dulaney**, from Asst. Dep. Dir., Ops. (Current Readiness & Capabilities), Jt. Staff, Pentagon, to Cmdr., CTF, Operation Northern Watch, USEUCOM, Incirlik AB, Turkey ... Maj. Gen. William S. **Hinton Jr.**, from Dir., EAF Implementation, DCS, Air & Space Ops., USAF, Pentagon, to Asst. DCS, Air & Space Ops., USAF, Pentagon ...

Lt. Gen. Walter S. **Hogle Jr.**, from Vice Cmdr., AMC, Scott AFB, Ill., to Cmdr., 15th AF, AMC, Travis AFB, Calif. ... Lt. Gen. Hal M. **Hornburg**, from Cmdr., 9th AF, ACC, Shaw AFB, S.C., to Vice Cmdr., ACC, Langley AFB, Va. ...

Lt. Gen. Thomas J. **Keck**, from Vice Cmdr., ACC, Langley AFB, Va., to Cmdr., 8th AF, ACC, Barksdale AFB, La. ... Lt. Gen. Ronald C. **Marcotte**, from Cmdr., 8th AF, ACC, Barksdale AFB, La., to Vice Cmdr., AMC, Scott AFB, Ill. ... Lt. Gen. (sel.) Charles F. **Wald**, from Vice Dir., Strategic P&P, Jt. Staff, Pentagon, to Cmdr., 9th AF, ACC, Shaw AFB, S.C. ■



■ Recruiter SSgt. Azzaam Rahmaan has hit the century mark—100 enlistees in less than a year. The 341st Recruiting Squadron member is the first Air Force recruiter to enter the "Century Club" since 1989.

■ Two airmen from Fairchild AFB, Wash., helped save the life of a woman trapped in a burning car Sept. 1. Capt. Steven Clark, a 92nd Aerial Refueling Squadron flight surgeon, and SSgt. Robert Jones, a 92nd Security Forces Squadron Reserve augmentee, came to the woman's aid after her car was rear-ended by a pickup truck. Smashing the car's windshield, they pulled her to safety across the hood while the auto was enveloped in flames.

■ MSgt. Mark E. Gibson, an instructor at the USAF School of Aerospace Medicine, Brooks AFB, Texas, received one month's confinement, reduction in rank to basic airman, and a bad conduct discharge after pleading guilty to violations of military law during a Sept. 16 court-martial. Gibson's offenses were having sexual relations with two trainees and lying to Air Force investigators about a separate incident.

■ Capts. Clifford Rich and Brett Machovina, pilots from the 37th Helicopter Flight, F.E. Warren AFB,

Wyo., plucked an injured rock climber from mountainous terrain near Navajo Peak, Colo., in a daring August rescue. The crew balanced their UH-1N on a rock outcropping at about 11,300 feet, then inched out of the box canyon for the unit's 775th overall save.

#### Obituary

Retired USAF Maj. Gen. Oris B. Johnson, a pioneer in night fighting and often-decorated veteran pilot of three wars, died Sept. 14 in Baton Rouge, La. He was 79.

Johnson entered the Army Air Corps as an aviation cadet in November 1940. By 1943 he was commander of the 422nd Night Fighter Squadron, in the European theater of operations. The 422nd flew P-61 Black Widow aircraft, the first radar-equipped fighters ever fielded by the US.

After the war, his experience with advanced weaponry led to his appointment as project officer for a number of advanced fighters, from the F-86D to the F-101 and F-106. He later commanded 14th Aerospace Force, at Ent (now Peterson) AFB, Colo. During the Vietnam War era he commanded the 313th Air Division, Pacific Air Forces. ■

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# Dealing With **Air**

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



PHOTO BY JEFFREY M. HARRIS FOR ENR  
ENR PHOTOGRAPHY: TONALUYA

**The Balkan War pointed up how short the force is for electronic combat.**

# Defenses

**Armed to the teeth with air-to-air and anti-radar missiles and targeting and jamming pods, these F-16CJs of the 35th FW at Misawa AB, Japan, represent the Air Force's multirole answer to the Suppression of Enemy Air Defenses mission. Tasked to deal with pop-up anti-aircraft radars, the F-16CJs are the escort of choice in a high-threat neighborhood.**

# O

PERATION Allied Force marked the first time since Korea that the Air Force has waged a Major Theater War without fighters expressly designed to suppress enemy air defenses and without its own tactical aircraft to jam enemy electronics. Both kinds of aircraft had played key roles in Vietnam and in the Persian Gulf, not to mention smaller combat operations over several decades.

In the Balkan conflict, USAF-led NATO forces flew about 35,000 sorties but lost just two airplanes and no crew members. In that sense, the mid-1990s decision to phase out F-4G "Wild Weasel" Suppression of Enemy Air Defenses aircraft and EF-111 Raven jammers seems not to have been a force breaker.

However, a major lesson of the Balkan War was that the Air Force's defense suppression assets have been spread thinly. Faced with many surface missiles and radars and not quite enough electronic protection to go around, Allied Force planners couldn't always put as much force in the air as they would have liked. The ever-present Surface-to-Air Missile threat drove NATO airplanes to higher altitudes and forced existing SEAD and jammer assets to fly around the clock, stressing them to their limits.

Serb radar operators were cagey, quickly turning radars on and off, usually before NATO's airplanes could locate and destroy them. They therefore remained at large throughout the conflict, complicating strike planning and forcing NATO to be more cautious than would be necessary if the defenses had been eliminated.

Shortly after the operation ended, Gen. Michael E. Ryan, USAF's Chief of Staff, told *Air Force Magazine* that "we need more SEAD" and that he has initiated a comprehensive review of Electronic Warfare that will address both hardware shortages and USAF's entire EW concept of operations.

## **Need for "Fundamental Review"**

Gen. John P. Jumper, head of US Air Forces in Europe, echoed the Chief, saying that it is time to reassess whether reliance on the joint USAF-Navy fleet of EA-6B Prowlers for jamming is adequate for the future. "I think we all agree it's time for a fundamental review of our Electronic Warfare posture," Jumper told *Air Force Magazine*. "We need to decide which combination of things—or a platform, if that's what the answer is—is going to give us [the needed capability]."

The Air Force will work with the Navy to determine what joint measures can be taken to beef up SEAD capabilities in both services. The Air Force intends to add funds to its budget for short-term, stopgap measures to enhance the capabilities of its current SEAD aircraft—the CJ adaptation of the F-16—and is looking to mid- and long-term solutions that will involve a mix of new weaponry.



*The F-4G was the king of SEAD from Vietnam to the Gulf. The backseater would interpret waveforms and sounds of enemy radars and select threats to attack in order of priority. The HARM Targeting System lacks the F-4G's range and precision, but it automates threat ranking for a solo pilot.*

Complementing the introduction of new hardware will be a shift in tactical emphasis to hard-kill SEAD—that is, the act of destroying enemy SAMs and anti-aircraft artillery rather than simply discouraging them from engaging US airplanes.

Another key part of the equation involves stealth. Over the next year, the Air Force will conduct studies to try to determine the magnitude of the role that low-observable technologies should play in the overall SEAD mission. The Air Force anticipates that, within 15 years, its inventory of combat aircraft will comprise mostly stealth vehicles.

The employment of air defenses in Yugoslavia was “drastically different” than the methods used by Iraq during the 1991 Gulf War and afterwards, according to Maj. Gen. Bruce Carlson, USAF director of operational requirements.

Carlson said that, whereas the Iraqis tend to turn their radars on and leave them on, allowing US and coalition pilots time to locate and destroy them, the Serbs were “much more sophisticated.” In many cases, they waited until the last possible moment to emit and reveal their locations, Carlson explained.

Serb operators, after launching weapons or relaying targeting information to other defense batteries, would quickly shut down the radars again. While the reduced radiating time cut down on Serb success—

reduced tracking and targeting time produces less-effective missile guidance—it also cut down on NATO's effectiveness at finding and destroying Serb SAM batteries.

“The SEAD capability that we've built in the US Air Force is a little bit dependent on the enemy fully utilizing his assets,” Carlson said. The rapid on-and-off tactic “cuts down on the effectiveness of your SEAD campaign,” he emphasized. “If they're not emitting, then you're not suppressing very much.”

### Multiphase Destruction

Lt. Col. Sal Collura is the deputy operations group commander of the 20th Fighter Wing, Shaw AFB, S.C., in which much of USAF's SEAD capability resides. He said that, early in an air campaign, USAF planners concentrated on destroying enemy air defenses at a strategic level. Command-and-control sites and the electronic sinews that create an integrated air defense system typically are eliminated with cruise missiles. “Then, we follow up with strikers—[such as F-15E and F-16 fighters equipped with laser-guided bombs]—to take out known, fixed air defense sites,” said Collura.

Later, though, when the threat has been pushed down to mobile radars and missiles, the bulk of the SEAD effort lies with the F-16CJ and the High-speed Anti-Radiation Missile, Collura said.

The AGM-88 HARM is the principal US weapon against pop-up radar threats. It homes in on the source of designated radar emissions. HARMs are typically fired as quickly as a radar can be detected and its location roughly approximated. The missile is designed to keep flying toward the last known location of the radar even if the radar is turned off. The HARM's speed is such that, even if the radar is mobile, the missile will arrive before the radar can be moved.

The drawback of the HARM is that it trades speed for warhead size. While a HARM can easily take out a radar vehicle, it is not powerful enough to also destroy the other attendant vehicles and missiles in a SAM system.

The Serb cat-and-mouse approach did not bring down large numbers of Western airplanes. However, by staying off the air, many Serb air defense batteries survived, leaving an unknown number of air defense systems active and posing a threat through most of the conflict. This in turn required many dedicated SEAD missions long after the time when planners had expected to be able to shift SEAD airplanes to other tasks.

As a result, the Air Force is changing its tactical view. “From a big-picture standpoint, we think it's important to go to a destructive capability,” Carlson said. The Air Force wants to quickly fix the location of an entire emitting radar site and rapidly destroy it even if it is turned off. Carlson said development of these kinds of capabilities are funded in the current future years defense plan.

The first step is an improvement of the current SEAD system, the F-16CJ and its HARM Targeting System, or HTS pod, which fits under the CJ's “chin.”

The HTS automatically performs many of the tasks that used to be the responsibility of the backseater in the F-4G. It scans the area, analyzing the frequencies, wavelengths, and pulsewidths of enemy-generated radar beams and microwave energy. Then, the HTS classifies these threats, identifies them, and presents the information to the F-16CJ pilot on his multifunction display. With the presentation of the data comes an itemization of the priority of the threats.

## No Guy in Back

The F-16CJ has never been touted as an outright substitute for the F-4G. It lacks the F-4G's 360-degree capability, it can process fewer threats at once, it lacks the effective range of the F-4G's sensors, and it operates with less precision when it comes to identifying the location of an enemy emitter.

However, the HTS can analyze threats automatically, and it can do so faster than the task could be done by the typical F-4G weapons systems officer. The F-4G backseater had to be trained to recognize wave patterns and the unique sounds of certain types of tracking and targeting radars and interpret them on the fly.

"The F-4G could gather all the data that was out there," Collura explained. Then, however, "it was up to the guy in back to interpret that data—that was the limiting factor. With the HTS, it has a filter on it so it only looks for what we tell it to look for."

Collura said the F-16CJs, like their F-4G predecessors, can tease an enemy SAM radar into turning on by radiating in some frequencies or simply by just showing up. Another tactic is to blind enemy search radars, forcing the individual SAM sites to go autonomous and reveal themselves, he said.

The Air Force is working to replace the current HTS with an updated version, called the R-7. Plans call for it to provide a better capability for geo-location of threat radars, Carlson said. In addition, 30 more F-16CJs were requested in the Fiscal 2000 budget to provide more SEAD capability for the Air Expeditionary Forces.

The new jets would give each AEF greater SEAD capability to take along when they deploy. The move is designed to prevent the type from becoming a high-demand, low-density system. "We'll wear them out and wear the people out if we continue to use them as we have," Carlson noted.

The 20th FW at Shaw fields four squadrons of the F-16CJ type. Two squadrons reside with the 35th Fighter Wing at Misawa AB, Japan; another with the 52nd Fighter Wing at Spangdahlem AB, Germany; and some aircraft are in the on-call "911" force at Mountain Home AFB, Idaho.

Col. Daniel J. Darnell, 20th FW

commander, said that he had sufficient F-16CJs in Allied Force but was short of people and pods. "My limiting factor was personnel," he said. "If you're going to fly 24-hour [operations] ... that becomes very difficult."

Darnell said his people could have kept up the pace some time longer, but "if they had needed additional people, no. I was just about maxed out." Moreover, Darnell said he was down to just one HTS pod available back at Shaw for training. Every one of the unit's other working pods was sent to Allied Force.

The shortage affected the wing's ability to train, Darnell noted, but "it did not shut us down." In Allied Force, there were more F-16 aircraft capable of carrying the pod than there were pods to go around, he observed. (There is \$26 million in the budget to buy more HTS pods, Carlson noted.)

Beyond more CJs and an update to the HTS, the Air Force wants to buy a targeting pod to complement it, Carlson said. USAF will compete three existing targeting pod systems and select one to help a CJ pilot better zero in on a threat radar. After an HTS finds the general location of a radar, the targeting pod's wide field of view could help further refine its location. Using its narrow field of view, the pod could then enable the pilot to use a laser-guided bomb, Maverick missile, or just about anything against the SAM system, Carl-

son said. The larger weapons would better ensure a hard kill of the SAM, he added.

Chief of Staff Ryan "has pushed us very hard to lay out a program to do that," Carlson noted.

## Enhanced Jamming Powers

In addition to acquiring these new "killer" airplanes, the Air Force and Navy will embark on a joint effort to enhance their jamming capabilities. The Air Force and Navy share the EA-6B Prowler tactical jammer, in that the two services each contribute funding for the system and use it for combat support. Some Air Force pilots and weapons systems officers fly the EA-6B, which can also shoot the HARM.

Pentagon officials said they expect the Navy and Air Force will decide to accelerate the upgrade of older Prowlers and to deploy more of the available 123 airplanes as soon as possible. The number of EA-6B squadrons would rise from 19 to 20, with the 20th a dedicated expeditionary unit.

Carlson said he doesn't anticipate that the Air Force will get its own dedicated jamming platform in the foreseeable future. "In a 40-wing Air Force, you could afford to have ... F-4Gs and EF-111s," he said. "In a 20-wing Air Force, I'm not sure we can afford to have that much specialization."

The only areas in which the Air Force can realistically expect to



Staff photo by Guy Aceto

*The Air Force plans to buy 30 more F-16CJs to fill out the needs of its Air Expeditionary Forces. A shortage of HTS pods was keenly felt in Operation Allied Force, and stateside training in SEAD had to be virtually dropped for the duration.*



**The HARM only takes out a SAM radar, not the system of vehicles and missiles that go with it. The new goal is the permanent destruction of SAM sites—like this Iraqi SA-2 system attacked and obliterated during the Gulf War.**

maintain such specialty combat airplanes is in the air superiority and deep strike/interdiction roles, he explained.

“We do need to have specialization in the high-tempo, very demanding, air superiority and deep interdiction airplanes. We just have to have that,” Carlson said, adding that the F-22 will inherit the air superiority role and the F-117 and F-15E will do the interdiction job well into the next decade. Defense suppression, though, will be a task that falls to the multirole F-16 and, later, the Joint Strike Fighter, he said.

However, “if the demands of destructive SEAD are such that we can’t do it with a multirole airplane like the F-16 or the JSF, then at some point in the future, we may have to reconsider, and maybe a new, dedicated JSF or F-15E or F-22 [would be applied to the SEAD or jamming mission],” Carlson said. “But that’s certainly not on the drawing boards right now.”

He said he is aware that the Navy is looking at a Boeing proposal to develop a jamming variant of the new F/A-18E/F Super Hornet, which would replace the EA-6Bs when they reach retirement age in about 15 years. The Air Force is not contributing funds to such an effort, said Carlson.

### Analyze Alternatives

Carlson reported that the US is now conducting an analysis of alter-

natives for a follow-on to the EA-6B, noting that “we’re certainly playing very heavily” in it. The Navy has the lead, but the Air Force is beginning to come up with ideas for addressing the role. These ideas go beyond simply buying a new platform.

“One thing that might be useful is a B-52 as a standoff jammer,” Carlson noted. “Another thing that might be considered is the F-15E. [It’s a] big airplane, [with a] big bomb load; it certainly could carry some pods.”

The services will also look at unmanned aerial vehicles for the SEAD

role—perhaps in a destructive role or as a jammer, Carlson said. The Air Force has an uninhabited combat air vehicle program in the works which might serve as a solution. “It’s certainly a candidate,” said Carlson.

Another element could be the Miniature Air-Launched Decoy, or MALD, a small, disposable air vehicle that appears as a fighter on enemy radar. Such a decoy could be used to draw away many enemy SAMs, Carlson said, but it must be affordable.

Another possibility is a small loitering vehicle that could orbit the battlefield, waiting for enemy radar to be turned on; it could then attack the radar. Such a concept was once developed in the form of the Tacit Rainbow missile, but it proved too expensive and technically problematic. Technology has improved to the point where the idea may warrant another look, Carlson said. Once again, the question is whether the price can be made right.

“Those weapons are only really useful if you’re going to ... preemptively launch ... tens or hundreds of them. They have to be relatively inexpensive.”

Carlson contended, “As we approach this analysis of alternatives with the Navy, we will focus our attention on the lower bands, the acquisition-type radars.” This, he added, will in turn allow the EA-6Bs to “focus their power and the things they do best up in the high band where the target trackers are—



**The joint standoff weapon, with high potential for defeating air defenses, is a new stealthy glide bomb with global positioning system accuracy. It can be released well away from SAMs—at a safe distance for airplane and pilot.**

the SA-10 and the real formidable threats.”

Carlson said the third step in addressing Air Force SEAD requirements will be to develop the means to detect nonradiating systems and destroy them at night and in all weather. Such a capability is “not on the horizon, yet, [but] once you get that figured out, you can do all kinds of other things,” he said. “You can figure out how to kill weapons of mass destruction.”

Playing some role in this next phase of SEAD will be the joint standoff weapon—a stealthy glide bomb—and the joint air-to-surface standoff missile—a stealthy, long-range munition. Anti-radiation roles have been suggested for both platforms, but even without special sensors for the task, they could be very useful in SEAD if an enemy SAM site were located by satellites or other sensors. Both would allow an airplane to attack the missiles from standoff distance, outside the threat zone.

The solution will probably be a system of systems, Carlson predicted. “You probably can’t put all that capability on an F-15 or on a B-2 or JSF.” The answer lies in “integrating intelligence, surveillance, and reconnaissance assets with shooters and tightening the timelines between when a system is detected and when ordnance can be dropped on it,” he added.

### Tough to Beat

Carlson said the SAM threat is getting tough to beat, in any case.

“Double-digit SAMs are available on the open market,” he said, referring to Soviet-designed systems of the series SA-10 or higher. “Seventy million dollars will buy you a battalion of those things, which is a couple of launchers and 16 to 20 missiles and a couple of radars—a pretty good capability, with a radius of a hundred miles or so.”

Two such systems on the Korean peninsula would be “a formidable threat to take out,” said Carlson. He added, “Put two of those in Yugoslavia, and essentially ... most of the country is off-limits to a [nonstealthy] airplane unless you bring in a fairly heavy support package.”

Carlson said the Air Force “didn’t learn anything tremendously new about stealth” from Operation Allied Force, due to the constraints of air-



Staff photo by Guy Aceto

**World air defenses are getting tougher to beat. The Air Force hopes that more HTS pods, new munitions, uninhabited combat air vehicles, and better surveillance and intelligence, when combined with a stealthier force, will keep it ahead of the SAM threat.**

space and the political restrictions on the use of force. However, he said, one of the results of the operation may be a new impetus to integrate stealth assets with the rest of the force in a more open way and better than has been the case thus far.

“We’re doing that,” he noted. “[Ryan] has put a lot of emphasis on that. I think you’ll see a much more open Red Flag scenario, ... with stealth assets being incorporated.”

It may be time to declassify some aspects of stealth operations so US commanders can better work with stealth airplanes and include them in their thinking, thus operating more efficiently with them, Carlson said. “There may be more advantage gained than lost ... by declassifying some things ... and having everybody on your side know [how best to employ stealth airplanes].”

For example, he said, the Air Force might want to reveal additional tactical data on the F-117 stealth fighter so that US commanders know “the optimum way to employ an F-16 package with an F-117 flight. ... Do you have them fly close or far apart? Where do you want the jammers? What frequencies do you want the jammers to work on, vs. where you want your HARMs? Do you want them to come in first, the middle, or at the end? And those are things we know how to do, but not everybody in the Air Force knows how to do it, because

... we have kept those employment concepts very closely held. Maybe it’s time to be more open.”

Lt. Col. Steve Searcy, commander of the 78th Fighter Squadron at Shaw deployed to Allied Force, said the SEAD training he and his pilots received in Red Flag and Green Flag exercises turned out to be highly realistic. The Serb anti-air capability was about what he expected, stated Searcy, except for some surprises that indicated that the Serbs were well-trained and sophisticated in their tactics. “We were up against ... sophisticated operators who [were] going to pick and choose when to engage and who were tactically smart about doing so.”

He noted that the Serb operators believed they’d shot down more NATO airplanes than they actually did, which was not much of a surprise. To them, he said, “the missile tracked and went up and exploded as advertised. They had no way of knowing if it blew up chaff.”

Still, said Searcy, the real world matched “very closely to the systems we train for and studied.” He said he’s not of the school that thinks that the Flag exercises are unrealistically tough. “You train so that you know you can handle anything that comes at you,” he said. “It’s designed to be the worst-case situation.” The fact that no aircrews were lost ... “is a tribute to those training programs,” he added. ■

**Airpower got the job done in the Balkans despite an initial strategy that was—among other things—very shortsighted.**

# Airpower Made It Work

By Rebecca Grant

**O**PERATION Allied Force started out on March 24 to be a short, sharp military response to a political event—the refusal of Yugoslavia to accept the Kosovo peace plan forged earlier during talks in Rambouillet, France. When the NATO strikes began, 112 US and 102 allied strike aircraft were committed to the operation. Thirteen of NATO's 19 nations sent aircraft to take part. NATO's three newest members—Poland, Hungary, and the Czech Republic—did not join in. Greece, Iceland, and Luxembourg also abstained.

The initial plan envisioned a few days of air operations against a carefully chosen set of about 50 pre-approved targets. Target categories included air defense sites, communications relays, and fixed military facilities, such as ammunition dumps. No targets in downtown Belgrade were on the list for the initial strikes. Planners had data on far more than 50 targets, but the consensus in NATO would support only limited action.

The alliance military campaign opened with the use of a formidable array of weapons. The Air Force's conventional air launched cruise missiles and the Navy's Tomahawk land attack missiles were launched against Yugoslavian air defense sites and communications. Two B-2 stealth bombers flew from Whiteman AFB, Mo., marking the first use of the B-2 in combat. The B-2s flew more than 30 hours on a round-trip mission and launched the highly accurate Joint Direct Attack Munition against multiple targets. US and NATO fighters



USAF photo by S/A Jeffrey Allen

*A pilot from the 510th Fighter Squadron at Aviano AB, Italy, on return from an Operation Allied Force bombing mission. The 510th carried out numerous strikes on targets across Yugoslavia.*



in theater maintained combat air patrols while others bombed targets.

No one knew exactly what it would take to shake Serbian dictator Slobodan Milosevic. Two statements made at the start of the campaign bracketed the range of ways it might unfold. Pentagon spokesman Kenneth Bacon said on March 23, "We have plans for a swift and severe air campaign. ... This will be painful to the Serbs. We hope, relatively quickly, that the Serbs will realize they've made a mistake." Bacon's comment echoed NATO's collective hope that a show of resolve would get Milosevic to accept Rambouillet.

### Tough Talk

The Supreme Allied Commander Europe, Army Gen. Wesley K. Clark, on March 25 spelled out the other option at the other end of the spectrum. He said, "We are going to systematically and progressively attack, disrupt, degrade, devastate, and ultimately destroy these forces and their facilities and support—unless President Milosevic complies with the demands of the international community." Clark's statement described what NATO airpower could do, given time. But the air campaign had started from the premise that NATO wanted to try limited action to achieve its goals.

How would Milosevic react? A White House "senior official" had already mulled over the possibilities: "As we contemplated the use of force over the past 14 months, we constructed four different models. One was that the whiff of gunpowder, just the threat of force, would make Milosevic back down. Another was that he needed to take some hit to justify acquiescence. Another was that he was a playground bully who would fight but back off after a punch in the nose. And the fourth was that he would react like Saddam Hussein. On any given day, people would pick one or the other. We thought that the Saddam Hussein option was always the least likely, but we knew it was out there, and now we're looking at it."

Milosevic ignored the initial NATO airstrikes, just as he had flouted NATO-backed diplomacy. CIA Director George J. Tenet had forecast for weeks that Yugoslav forces could respond to NATO military action by accelerating the ethnic cleansing. Now

## Theater of operations



Milosevic gambled that his forces would push ethnic Albanians and the Kosovo Liberation Army out of Kosovo before NATO could react.

By the time Milosevic backed away from Rambouillet, his forces had battlefield dominance in Kosovo. The Yugoslav 3rd army was assigned to Kosovo operations, along with reinforcements from 1st and 2nd armies. About 40,000 troops and 300 tanks crossed into Kosovo, spreading out in burned out villages and buildings abandoned by the refugees. Paramilitary security forces from the Interior Ministry were engaged in multiple areas across Kosovo.

By early April, the KLA was bloodied, and organized resistance in most of central Kosovo was diminishing. An American official said the government forces had carried out devastating attacks, and the prospects for the KLA were dim.

### The Tactical Blunder

But Milosevic's gamble was also his major miscalculation. His push through Kosovo created a mass of

refugees that ignited world opinion. Estimates of the number of displaced persons jumped from 240,000 in March to 600,000 by early April. Clark called it "a grim combination of terror and ethnic cleansing on a vast scale." Central Kosovo was largely emptied of its ethnic Albanian population.

Milosevic's tactical gamble hit NATO in a vulnerable spot. The allies were committed to limited airstrikes, with no firm plans beyond a few days or weeks. Since fixed targets were the focus of the plan, NATO flew just a few packages each night. There was nothing that military force could do quickly against the fully developed offensive. As US Air Force Chief of Staff Gen. Michael E. Ryan commented, there was no way that airstrikes alone could halt the door-to-door killings that had been under way. On April 3, a Pentagon official

said of Milosevic's campaign, "He's basically done."

The plight of the Kosovo refugees stiffened NATO's resolve. Now, the alliance would have to win.

To deprive Milosevic of his gains in Kosovo, the alliance would have to use its air forces to meet goals that had just gotten much more difficult. The politics of the situation meant that NATO missed the chance to let its airmen do it "by the book" and halt or disrupt Milosevic's forces as they massed on the border and moved into Kosovo in March. As Secretary of State Madeleine K. Albright explained on March 28, the new goal was to force Milosevic to back off by "making sure that he pays a very heavy price."

The first thing NATO needed was more airpower. An additional five B-1 heavy bombers, five EA-6B electronic warfare aircraft, and 10 tankers were already en route, along with more allied aircraft. The aircraft carrier USS *Theodore Roosevelt*, veteran of Bosnia operations four years earlier, was due to arrive with its battle group around April 4.

NATO also needed enough aircraft to sustain 24-hour operations over the dispersed Yugoslav forces in Kosovo. Allied planners proposed an augmented package of forces. This was known as the "Papa Bear" option, and it would more than double the number of strike aircraft in the theater.

Secretary of Defense William S. Cohen captured the new mood of resolve after a meeting at Supreme Headquarters Allied Powers Europe on April 7 when he declared, "Whatever General Clark feels he needs in order to carry out this campaign successfully, he will receive."

Now the joint and allied air forces faced a most difficult task. NATO air had to take on the military both directly, at the tactical level, and indirectly, by hitting strategic targets in Yugoslavia as well as in Kosovo. Airmen would have to expand the roster of strategic targets and seek out and destroy both fixed military targets and mobile military forces, including tanks, armored personnel carriers, and artillery pieces. Much of this would take place in close-battle conditions. Yugoslav forces were mixed in with civilians and refugees. Military vehicles and forces hid in and around buildings.

## Two Target Sets

In early April, NATO expanded and clarified the air campaign plan, revising it to including simultaneous attacks on the two types of targets. Here was the heart of the air campaign as it would be carried out over the next two-and-a-half months.

Target set 1 included fixed targets of unique strategic value. It included national command and control; military reserves; infrastructure such as bridges, Petroleums, Oils, and Lubricants production, and communications; and the military-industrial base of weapons and ammunition factories and distribution systems. Serbia's electric power grid was soon added to the list.

Target set 2, a high priority for Clark, comprised the Serbian fielded forces—military forces, tactical assembly areas, command-and-control nodes, bridges in southern Serbia and Kosovo, supply areas, POL storage and pumping stations, choke points, and ammunition storage. Initial guidance focused on forces south of the 44th parallel, but soon, military targets north of the line also made the list.

NATO was now pursuing a multi-pronged strategy with its air campaign. The goal was not just to demonstrate NATO resolve and hope to coerce Milosevic. It was to directly reduce and eliminate the ability of Yugoslav forces to carry on their campaign of destruction in Kosovo.

American military experience and doctrine say that it is most efficient to hit enemy forces when they mass and maneuver at the beginning of operations. In early April, NATO did not have enough forces in theater to clamp down on units of the regular Yugoslav army (VJ) or the paramilitary special police (MUP). NATO air forces had been postured for combat air patrol and flexible strike packages against a limited set of targets, not for 24-hour operations over dispersed forces. In early April, it was possible to close one engagement zone over some of the ground forces for only a few hours a day. Under these conditions the Yugoslav forces could hide in buildings and move at night.

Poor weather also limited airstrikes. Brig. Gen. Leroy Barnidge Jr., commander of the 509th Bomb Wing, Whiteman AFB, Mo., told how one night, one of the wing's B-2s en route to the target was recalled because of weather. That night "the weather was so bad, the whole war was canceled," he remarked. Weather was favorable only about one-third of the time—with most good weather days coming late in the campaign.

Preservation of NATO's cohesion rested on several factors that defied military logic but made political sense. First, NATO casualties had to be held to an extremely low level. The allies came to the Balkan War with sharply differing views on the Balkan political dispute, and com-



USAF photo by SSgt. Efrain Gonzalez

*The stealthy B-2 was not the only US bomber in the action. B-1 Lancers and venerable B-52 Stratofortresses, shown here on the ramp at RAF Fairford, UK, added heavy firepower to Operation Allied Force.*

manders feared that losing aircraft could undermine NATO's will to continue the campaign.

### **We're Here to Help**

Moreover, each NATO government could approve or veto targets. In the US, sensitive targets were forwarded for White House approval, and similar processes took place in the capitals of Europe. "Each president of the NATO countries, at least the major players, [are given] an opportunity to at least express their judgment [on targets]," explained Cohen in April. Some targets of high military value were never released to be added to the list for airstrikes.

Gen. Richard E. Hawley, then commander of USAF's Air Combat Command, spoke for many airmen when he said, in late April, "Airpower works best when it is used decisively. Shock, mass are the way to achieve early results. Clearly, because of the constraints in this operation, ... we haven't seen that at this point."

However, the tide was about to turn. On April 23, the allies gathered in Washington, D.C., for the long-planned celebration of NATO's 50th anniversary. They reaffirmed their commitment to stick with the air war. Target approval procedures eased somewhat. The White House announced a major force increase, and now the campaign was on course toward its objectives.

Combat deployments increasingly demanded more aircraft and supplies. In the midst of the surge, the air mobility forces of the US Air Force also began humanitarian relief operations. Albania's capital city, Tirana, opened up its airfield and quickly became the aerial port for relief supplies and for a heavy Army force of Apache helicopters.

While the air campaign was gearing up in intensity, talk of a ground invasion began. However, it was clear from the beginning that NATO had to keep discussion of ground force options off the table. President Clinton said outright, "I do not intend to put our troops in Kosovo to fight a war." The Chairman of the Joint Chiefs of Staff, Army Gen. Henry H. Shelton, pointed out the military reality that NATO estimated it would take anywhere from a low of 20,000 up to a couple hundred thousand ground troops to carry out a NATO military action in Kosovo—numbers well beyond what NATO was

willing to contemplate. The options for using ground forces never materialized.

The experience of Bosnia and ambivalence about political elements of the Kosovo crisis made it highly improbable that NATO would agree as an alliance to fight Milosevic's army and special police with ground forces. Also, the Russians made it plain from the start that they would stand against a ground force invasion. On April 9, Russian President Boris Yeltsin appeared on Russian television to warn against NATO bringing in ground troops.

Clark did, however, move quickly to deploy Army attack helicopters to Tirana. Twenty-four Apache helicopters plus 18 multiple launch rocket systems went into the busy airfield along with nearly 5,000 soldiers. Pentagon spokesman Bacon described the deployment as "an expansion of the air operation." With their formidable firepower, it was thought the Apaches could help in identifying and attacking Yugoslav military forces in Kosovo. A force of 12 USAF C-17s flew more than 300 sorties to deploy the Apache force.

In the end, the Apaches were never used in combat. Two training accidents in late April and early May tragically claimed the lives of two crewmen and destroyed two helicopters. However, the problems with employing the Apaches had been evident from the outset. To reach the key areas of fighting, the Apaches would have had to fly 100 miles and more at low altitude over terrain studded with Yugoslav military forces. Small-arms fire, anti-aircraft artillery, and shoulder-fired missiles from these troops would pose a constant threat to the helicopters.

### **The Lion's Share of Airpower**

To carry out a sustained air campaign, NATO tapped primarily the resources of the US Air Force. For the Air Force, the commitment to the Kosovo campaign quickly went from a contingency operation to a Major Theater War. The Air Force had downsized 40 percent since 1989. That meant that Kosovo strained the smaller force and tested its new concept for expeditionary operations. In late April, President Clinton called up reserve component forces to keep the air war going.

Desert Storm had marked a leap forward in capabilities in 1991, but the Kosovo operation demonstrated that aerospace power had evolved into something far stronger. Many aspects of the Kosovo campaign resembled other operations in the 1990s. But unique rules of engagement and the spectacular debut of new systems marked points of special interest in the campaign. All along, the overriding challenge was to summon expeditionary airpower and unleash the aircrews to carry out the missions they had been trained to do.

Operations began with constant combat air patrols over Kosovo and Bosnia. Suppression of Enemy Air Defenses assets were also on call. Then, strike packages, most with dedicated SEAD assets, would be assigned to specific missions. Operation Allied Force included combinations of NATO and US aircraft and some US-only packages. NATO seized and held air dominance from the start of the operation. However, the operational environment for NATO airmen flying over Yugoslavia held many challenges.

Yugoslavia's air defenses could present a considerable challenge, as NATO airmen well knew. Just before the air war began, USAF head Ryan cautioned: "There's no assurance that we won't lose aircraft in trying to take on those air defenses." The air defense system in Yugoslavia, especially around Belgrade, was dense, and mobile Surface-to-Air Missiles added more complexity.

Targets in the integrated air defense system were included in the first night's strikes. However, even as NATO gained freedom to operate, the Yugoslav air defense strategy presented some unorthodox challenges. Reports suggested that spotters used cell phones and a chain of observers to monitor allied aircraft as they took off. Many times, the air defense system simply did not "come up" to challenge NATO strikes. "Their SAM operators were, in the end, afraid to bring the SAMs up and engage our fighters because of the lethality of our [SEAD] aircraft," Gen. John P. Jumper, commander, US Air Forces in Europe, remarked.

### **More Dangerous Than 1991?**

That was a mixed blessing. The Yugoslavs could not prevent NATO from attacking key targets, but they

could—and did—make it tough to completely decimate the air defense system. Yugoslav air defenses were not efficient, but they were not dead, either. As a consequence, pilots often got warnings that SAMs were active while on their missions. An initial assessment from pilot reports and other sources tallied almost 700 missile shots: 266 from SA-6s, 174 from SA-3s, 106 from man-portable systems, and another 126 from unidentified systems. One informal estimate concluded a pilot was more than twice as likely to be shot at by SAMs over Kosovo than in Desert Storm.

Overall, NATO did not destroy as many SAM batteries as air planners would have liked. Preliminary data from the Joint Staff estimated that two out of a total of three SA-2 batteries were hit and 10 of 13 SA-3s were destroyed. However, early estimates cited kills of only three of about 22 SA-6s. “We learned from this war that it is a different ball game when SAMs don’t come up to fight,” acknowledged Jumper. The concept of operations for lethal SEAD depended on targeting individual batteries as they begin to track and illuminate friendly aircraft.

Offensive counterair actions scored many successes. The Yugoslav air force included frontline MiG-29s as well as older MiG-21s and other aircraft. American pilots shot down five aircraft in air-to-air engagements and a Dutch F-16 got a MiG-29 on the first night. Many more aircraft were destroyed on the ground. In one remarkable example, a Tomahawk targeted and destroyed a MiG-29 fighter on the ramp.

NATO also did well against Yugoslav airfields. “One of the myths that was dispelled in this conflict was that you can’t close an airfield,” commented Jumper. “As a matter of fact, we closed almost all the airfields,” he said.

Despite this overall success story, the loss of the F-117, known by the call sign Vega 21, became one of the major media events of the war. On March 27, the stealth fighter went down over Serbia. Sources cited evidence suggesting the airplane was hit by a Yugoslav SA-3 missile active in the area at the time. Other reports hinted that the Serbs may also have tracked the fighter optically using an intricate network of ground observ-



**A1C Jason Fifield of the 393rd Bomb Squadron, Whiteman AFB, Mo., examines a rack of Joint Direct Attack Munitions before they are loaded onto a B-2 bomber during Allied Force.**

USAF photo by SrA Jessica Kochman

ers. A daring rescue retrieved the pilot from Serb territory. Public interest spiked with dramatic television pictures of the wreckage clearly showing the aircraft’s Holloman AFB, N.M., markings.

USAF officials stuck to a policy of revealing no details about the crash or the rescue. The loss of the F-117 did not shake the commitment to employing stealth as 24 F-117s in the theater continued to perform tough missions. SEAD was used routinely for all strike packages, as had been the custom in the Balkans since the shootdown of Capt. Scott F. O’Grady four years earlier.

### Supplement to Stealth

In early July, Lt. Gen. Marvin R. Esmond, USAF’s deputy chief of staff for air and space operations, described it this way, “The question I get frequently is, was ECM [Electronic Countermeasures] required for stealth assets? The answer is no, it is not required—depending on the risks you want to put the aircrews at. If you have the capability, then the prudent person would say, why not suppress the threat with Electronic Countermeasures as well as taking advantage of our stealth capability, which all totaled up to survivability for the platform. That is simply what we did.”

Concern over collateral damage had a profound impact on how NATO ran the air war. A key part of the air campaign strategy was to target Milo-

sevic’s power base, shock the Serb leadership, and disrupt the functioning of the state—but it all had to be done without targeting the populace.

The rules of engagement for Operation Deliberate Force in Bosnia in 1995 indicated that collateral damage would always be a dominant factor in the execution of a NATO air campaign. Back then, NATO and the UN approved a category of targets prior to the operation. Ryan, who was then the commander of Allied Air Forces Southern Europe, personally approved every designated mean point of impact that was struck.

In the Kosovo operation, target approval and concerns for collateral damage became some of the stickiest challenges for the alliance. The vast displacement of refugees made the pilot’s job infinitely harder. “There’s little doubt in my mind that Milosevic had no compunction at all about putting IDPs [Internally Displaced Persons] inside of what we felt to be valid military targets,” said USAF Lt. Gen. Michael C. Short, NATO’s joint force air component commander. “And, in fact, a couple of times we struck those targets and then saw the results on CNN.”

NATO released 23,000 bombs and missiles, and, of those, 20 went astray to cause collateral damage and casualties. By far the most serious geopolitical shock came from the accidental bombing of a Chinese Embassy building May 7. Reports suggested that several JDAMs hit the building,

crashing through several floors, and killing three Chinese nationals. The US apologized and said that intelligence sources had been using an outdated map of Belgrade that pinpointed the wrong location.

Even so, the air campaign kept up high standards of accuracy. Defense Secretary Cohen said, "We achieved our goals with the most precise application of airpower in history."

Pilots operated under very strict rules of engagement. They were "as strict as I've seen in my 27 years [in the] military," commented USAF Maj. Gen. Charles F. Wald, of the Joint Staff's Strategic Plans and Policy Division and key Pentagon spokesman during the operation. NATO was able to impose and live with the rules of engagement because aircrew training and technical capacities of aerospace power permitted rapid conferences about whether to strike a target or not. Often, getting clearance to attack a target required a pilot to make a radio call back to the Combined Air Operations Center to obtain approval

from the one-star general on duty.

### The 15,000-Foot Floor

Concern over the air defense threat led Short to place a 15,000-foot "floor" on air operations. Flying at that altitude reduced the effects of anti-aircraft fire and shoulder-fired SAMs. Aircraft could dip below the limit to identify targets. For the most part, precision attacks were carried out with laser-guided weapons that worked well from that altitude.

Changes came from the highest political authorities, too, even after aircraft had taken off. One B-2 strike had to turn back when a target was denied en route. Short recounted how at the last minute, one or two nations could veto a target, causing packages in the air to be recalled via airborne warning and control system aircraft and tankers. This played "havoc with a mission commander's plan."

While the short leash was frustrating, it was also a sign of the incredible technological sophistication of the NATO air campaign. Control-

ling it all was the CAOC. According to Jumper, it is a weapon system in its own right. The CAOC connected pilots and controllers airborne over the battlespace to the nerve center of the operation. Since Bosnia, the CAOC at 5th Allied Tactical Air Force in Vicenza, Italy, had grown from a hodgepodge of desks and unique systems to an integrated operation. Its staff swelled from 300 to more than 1,100 personnel.

CAOC planners crafted the air tasking order on a 72-hour cycle to plan allocation of assets. But the strikes were executed on a much shorter cycle. Commanders were able to assign new targets to strike aircraft and change munitions on airplanes in a cycle as short as four to six hours.

Increasingly, the CAOC served as the pulse-point of aerospace integration, linking up many platforms in a short span of time. Multiple intelligence sources downlinked into the CAOC for analysis. Operators integrated target information and relayed it to strike aircraft. Pilots could radio back to the CAOC to report new targets and get approval to strike.

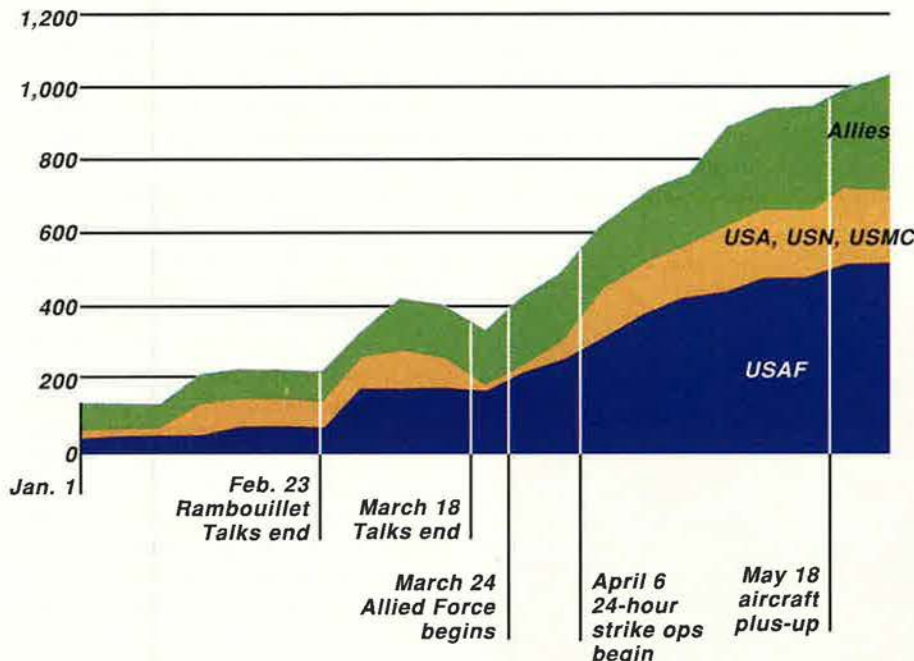
Jumper recounted how, in the CAOC, "We had U-2s that allowed us to dynamically retask to take a picture of a reported SA-6, beam that picture back to Beale AFB [in California] for a coordinate assessment within minutes, and have the results back to the F-15E as it turned to shoot an AGM-130 [precision guided munition]." This real-time tasking was a leap ahead of Desert Storm operations. Over time, Predator unmanned aerial vehicles were used in a similar way via the CAOC and, with a brand-new laser designator, could direct strike aircraft already flying in the engagement zone onto positively identified targets like tanks and armored personnel carriers.

The B-2 flew 49 sorties, with a mix of two-ship and single-ship operations. All told, the B-2 delivered 650 JDAMs with an excellent, all-weather accuracy rate. The targeting system allowed the B-2 crew to select 16 individual designated mean points of impact, one for each JDAM carried.

### Measures of Effectiveness

The B-2 crews proved first of all that they could operate effectively

## Aircraft Committed to the Effort



*Deploying more aircraft to the theater was a key to making the campaign work. With new guidance in early April, NATO airmen had two target sets: targets of unique strategic value and Yugoslav army forces and their sustainment elements scattered across Kosovo. Isolating and pinning the fielded forces required 24-hour coverage of the Kosovo engagement zones to detect and prevent organized movement. All that demanded more aircraft, and USAF bore the brunt of the surge. "This is the equivalent of a Major Theater War," Secretary of Defense William Cohen said at a briefing in late May. "It's a major campaign on the part of the United States Air Force."*

on missions that took more than 30 hours to complete. A folding chaise lounge behind the pilots' seats and stashes of hot food on board helped the two-man crew manage fatigue. At the same time, the bomber proved itself combat-worthy. Using just six of the nine aircraft at Whiteman, the 509th made every takeoff time and participated in 34 of the 53 air tasking orders generated for Operation Allied Force. Every B-2 was launched in "pristine" condition—meaning its radar and infrared signature met low-observable specifications, with no rough patches to degrade survivability. The B-2 stood up to the demands of combat operations, sometimes taking as little as four hours to refuel, rearm, and turn the jet in preparation for another combat sortie. "It is an incredibly durable, incredibly robust airframe. You turn it on, and it just keeps running," Barnidge reported.

The secret new art of disrupting enemy military capabilities through cyberspace attacks appeared to have been a big part of the campaign. Air Combat Command stood up an information warfare squadron in Fiscal 1996 to handle defensive protection of information and offensive information techniques at forward-deployed locations. According to one report, the unit had its "combat debut" during the Kosovo operation and the Serbs felt the impact. "They're pulling their hair out at the computer terminals," said one unnamed official. "We know that."

Jumper said there was "a great deal more to talk about with regard to information warfare that we were able to do for the first time in this campaign and points our way to the future."

By May, USAF had deployed another significant increment of forces. With 24-hour operations under way the air campaign was able to keep the pressure on military forces in a much wider area of Kosovo via the "Kosovo engagement zones," updated terminology for the "kill box" concept pioneered in the Kuwait theater of operations in Desert Storm. There were enough forces in theater to cover the engagement zones for about 20 hours a day. Strike aircraft tripled so that a total of 323 American and 212 allied strike aircraft worked against the two major goals of hitting Serb military forces and striking targets of unique strategic value. Air forces now attacked from all sides. Marine F/A-18s flew missions from a base in Hungary. Strike packages from Italy could fly around Yugoslavia to ingress from the northeast, surprising air defenses around Belgrade.

#### "Take Them Out"

"The mission is to pin them down, cut them off, take them out," said NATO spokesman Maj. Gen. Walter Jertz. "We have pinned them down, we have pretty much largely cut them off, and are about to begin to take them out." Under the relentless pres-

sure of air attacks, Milosevic's forces in Kosovo were losing. Evidence of VJ and MUP defections was mounting. Their fuel supplies were limited, and their resupply lines had been cut, and Milosevic knew it would only get worse. More forces were slated to deploy, and two months of good summer weather lay ahead. Wald said, "This is a game with as many innings as we want, and I think [Milosevic] is running out of baseballs."

Around May 22, the pressure increased again. Better weather and more forces allowed NATO airmen to ramp up the pressure on the Yugoslav army. In about 10 days, bomb damage assessment confirmed that NATO airmen had doubled the number of tanks destroyed, hit three times the number of armored personnel carriers, and hit four times as many artillery and mortar pieces. "We're driving him to a decision," announced Clark at the end of May.

Also in late May the KLA began its first large-scale offensive in more than a year. About 4,000 troops pressed ahead from points along the Albanian border. The KLA's Operation Arrow soon met heavy resistance from Yugoslav artillery and troops. In about two days, the rebels were pinned down along Mount Patrik. Heavy mortar and artillery fire ensued and the KLA was "creamed" according to a senior US intelligence official.

The small-scale offensive reportedly helped NATO identify more Yugoslav military equipment in the immediate area. "As the VJ and MUP fire their artillery, they're detected," said Wald. "Then we'll go ahead and attack them and destroy them." Cohen emphasized that NATO was not coordinating operations with the KLA. Indeed, by this time, NATO air attacks on Yugoslav military installations and forces were spread widely across Kosovo and southern Serbia every day and night, well beyond the localized effects of the KLA actions.

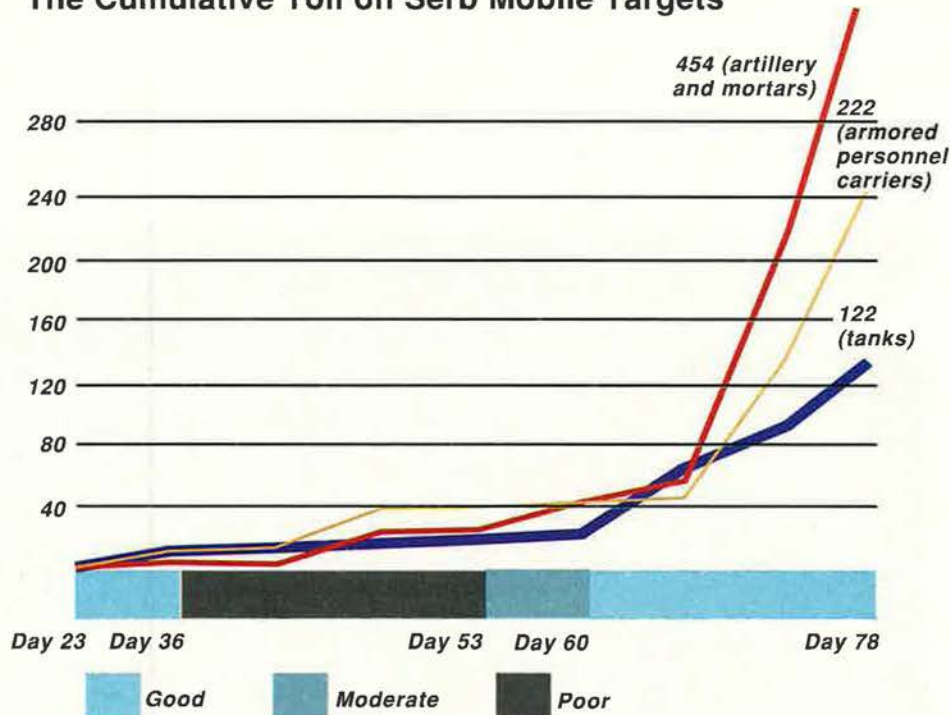
By early June, military impact and a series of diplomatic events were coming together as powerful coercion. The diplomatic chain of events had started a few weeks earlier, with the G-8 meeting in Bonn on May 6. There, the major Western economic powers plus Russia agreed on a basic strategy to resolve the conflict.

USAF photo by SrA. Jeffrey Allen



SrA. Aaron Fontagneres and SSgt. John Rodriguez of the 494th Fighter Squadron at RAF Lakenheath, UK, load a Mk 82 bomb onto an F-15E on April 7. Bad weather hampered operations and forced cancellation of many sorties.

## The Cumulative Toll on Serb Mobile Targets



Source: CJCS briefing, June 10, 1999.

**US Army Gen. Henry H. Shelton, Chairman of the Joint Chiefs of Staff, briefed the immediate count of the results of the campaign on June 10. Better weather and more forces exponentially increased the hits on tanks, armored personnel carriers, and heavy artillery. Numbers subsequently confirmed by NATO on Sept. 16, 1999, were 93 tanks, 153 armored personnel carriers, and 389 artillery and mortars.**

The European Union announced its appointment of President of Finland Martti Ahtisaari as its special envoy for Kosovo on May 17. Under Ahtisaari's auspices, the US, NATO, and Russia agreed to a NATO-drafted plan in late May. On May 27, an international tribunal in The Hague indicted Milosevic as a war criminal—an indictment, as Cohen pointed out, with no statute of limitations. Yugoslavia's parliament voted to accept the plan on June 3.

The air campaign was also having a devastating effect. Roads, rail lines, and bridges across Yugoslavia had been knocked out, halting the normal flow of the civilian economy. Good weather and long summer days ahead meant that more of Milosevic's country and his military forces would be exposed to devastation. In late

May and early June, the impact on fielded forces spiked.

### Heavy Losses

Destruction of armored personnel carriers, artillery, and tanks continued to rise "almost exponentially" in the words of Shelton. He said the Yugoslav army forces lost 450 or about 50 percent of their artillery pieces and mortars to air attack. About one-third of their armored vehicles were hit: a total of about 122 tanks and 220 armored personnel carriers. A later NATO assessment released Sept. 16 put the numbers at 389, 93, and 153, respectively. These heavy losses meant they could not effectively continue organized offensive operations.

At the same time, Yugoslav forces in Serbia were also feeling the pres-

sure. First army, in the north, had 35 percent of its facilities destroyed or damaged while 2nd army, near the Kosovo border, had 20 percent of its facilities hit. Third army, assigned to operations in Kosovo, had 60 percent of its fixed facilities damaged or destroyed. The Joint Staff assessed that the air attacks had significantly reduced 3rd army's ability to sustain operations.

Belgrade was largely without electric power and about 30 percent of the military and civilian radio relay networks were damaged. Across Yugoslavia, rail and road capacity was interdicted: Some 70 percent of road and 50 percent of rail bridges across the Danube were down. Critical industries were also hard hit, with petroleum refining facilities 100 percent destroyed, explosive production capacity 50 percent destroyed or damaged, ammunition production 65 percent destroyed or damaged, and aviation and armored vehicle repair at 70 percent and 40 percent destroyed or damaged, respectively.

Industrial targets and bridges would take a long time to repair. In many cases, electric power and communications could be restored more readily. However, the combined effect had brought the war home to Belgrade and restricted Milosevic's ability to employ his fielded forces effectively. On June 9, after last-minute wrangling with Yugoslav military commanders, Milosevic accepted the NATO conditions. "I think it was the total weight of our effort that finally got to him," said Short, the allied air commander.

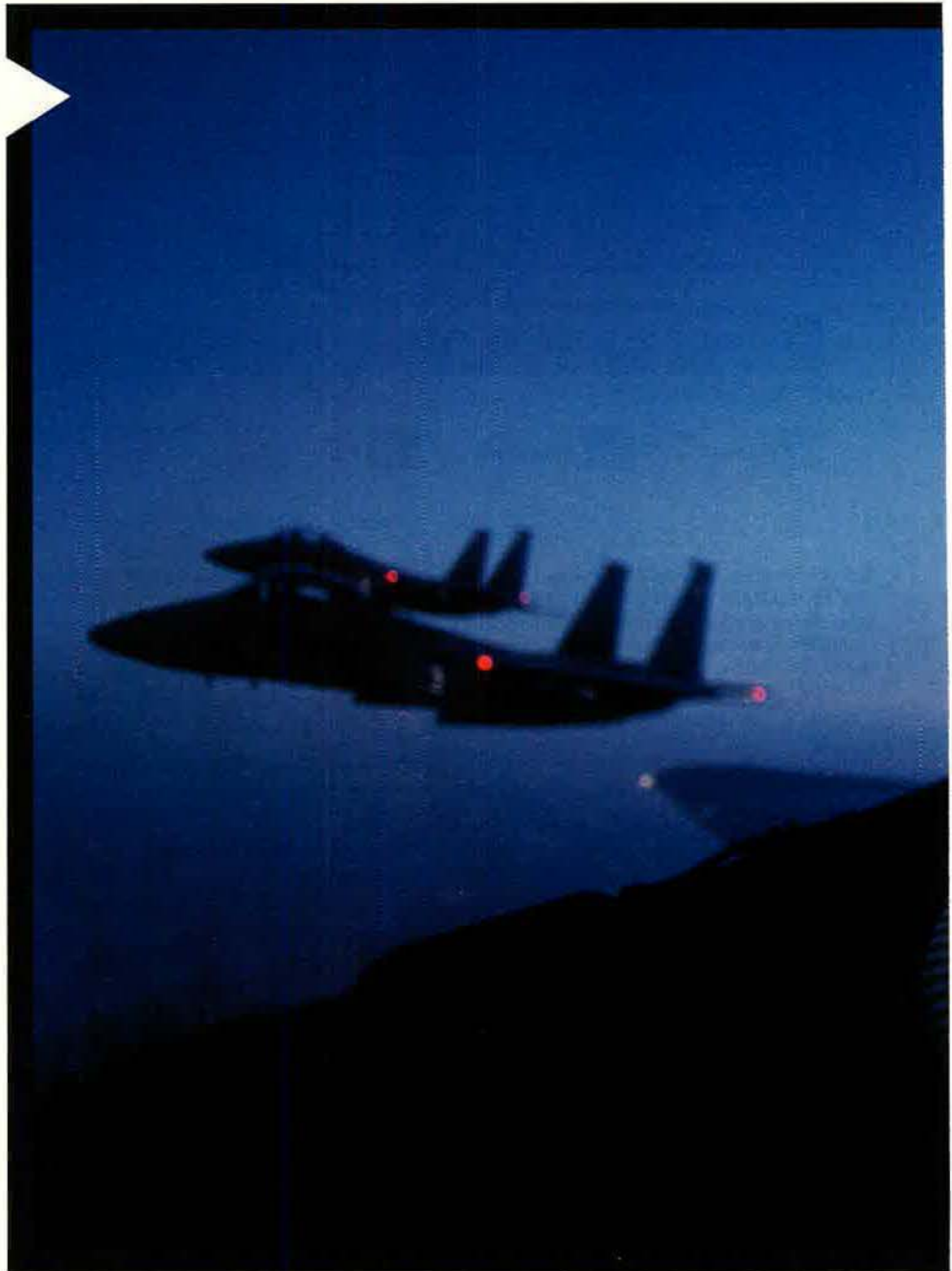
The 78-day air campaign brought about an ending that seemed almost impossible back in March. Milosevic agreed to a cease-fire, the withdrawal of Serb forces from Kosovo, the entry of an international peacekeeping force, the return of refugees, and Kosovar autonomy within Yugoslavia. Kosovo would remain within the sovereignty of Yugoslavia. However, the international peacekeeping force would be armed and empowered.

Military historian John Keegan wrote with some awe, "Now, there is a new date to fix on the calendar: June 3, 1999, when the capitulation of President Milosevic proved that a war can be won by airpower alone." ■

*Rebecca Grant is president of IRIS, a research organization in Arlington, Va. She has worked for RAND, in the Office of Secretary of the Air Force, and for the Chief of Staff of the Air Force. Her most recent article for Air Force Magazine, "The Carrier Myth," appeared in the March 1999 issue. This article was adapted from a longer Air Force Association special report, "The Kosovo Campaign: Aerospace Power Made It Work," published in September.*

## **Air Combat Mission Systems**

Paveway Laser Guided Bombs  
Joint Standoff Weapon  
EGBU-15  
AIM 9X, AIM 9M Sidewinder  
AMRAAM  
HARM, HARM Targeting System  
Maverick  
ALE-50 Decoy  
ALQ-184 Jammer Series  
F-15: APG-63/70/63(v)1 Radars  
F-16: MMC, EEFC Computer  
F/A-18: ALR-67(v)3 Radar  
Warning Receiver  
F-117: IRADS Targeting System  
F-22: APG-77 Radar (JV) and  
Common Integrated Processor (CIP)  
Joint Strike Fighter  
B-2: APQ-181 Radar  
AC-130 Gunship: FLIR and  
Fire Control Radar  
CV-22: Radar and Infrared Systems  
Advanced Targeting FLIR (ATFLIR)  
U-2: Advanced Synthetic  
Aperture Radar  
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**Air Force Materiel Command units at Eglin AFB, Fla., work together to make the best weapon systems even better.**

**Photography by Guy Aceto, Art Director, and Paul Kennedy**



# A Test of Precision

**T**est-flying is not just about exploring the limits of new airplanes. The characteristics of each new weapon, too, must be carefully assessed before it is deployed in the field. This F-15E from Eglin, carrying a national load of air-to-air missiles, prepares to release the "star" of this test: a brightly painted GBU-15 glide bomb fitted with a Global Positioning System guidance kit, which will give the TV-guided weapon an all-weather capability.





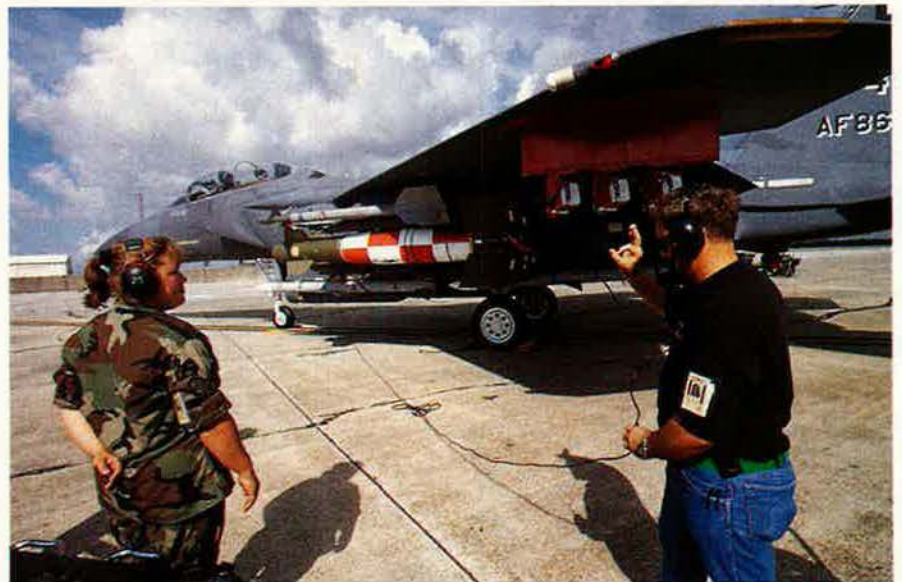
At left, Lt. Col. David Smith (left) and Maj. Vinnie Eovine, check over their aircraft and the weapon prior to the test. The GBU-15 made news during the 1991 Gulf War, when two of the weapons, released by F-111s, prevented an environmental catastrophe by destroying two pumping stations that were discharging oil into the Persian Gulf.

A proven weapon, the GBU-15 is nevertheless a fair-weather bomb. Low cloud cover, smoke, or haze could degrade the TV image received by the aircrew. The conflict in Kosovo underscored the urgent need for all-weather, precision strike capability—adding a GPS kit can bring the GBU-15 right to the doorstep of the target, regardless of atmospheric conditions.



The Precision Strike System Program Office and the 46th Test Wing had just 45 days to develop, test, and field the improved, GPS-guided GBU-15 for Operation Allied Force.

At right, the program's lead test engineer, Martin Hammond, and the F-15E's crew chief, SSgt. Alicia Camp, signal readiness for this test sortie, which featured one of the first drops of the new munition.



The 46th Test Wing handles the flying side of the development and test process. Its 39th Flight Test Squadron flies various models of the F-16 and A-10, while the 40th FTS flies nearly every version of the F-15. Both aircrews and ground crews have long experience in many variants of their airplanes—a key to understanding how aircraft and munitions will interact. At left, Col. Kevin P. Burns, 46th Operations Group commander, checks out the F-16 he'll fly as chase aircraft for that afternoon's test. The two squadrons cooperate extensively and often fly on the same test sorties. The squadrons merged after this test to form the combined 40th FTS—flying F-15, F-16, A-10, and C-130 aircraft and UH-1 helicopters.



*In each test flight, a finely scripted "dance card" provides the precise agenda. More a checklist than a card, the script details timing, coordinates, and altitudes that must be attained to properly measure the system being evaluated. A chase F-16 gives the F-15E test subject a good once-over to make certain all is where it should be.*



*Fitted with the same kind of load it would have on a combat mission, the F-15E also carries a telemetry pod to record data while the bomb is in flight. Not every weapon tested gets the loud paint job, but, in this case, the bright markings on the munition help cameras and observers track it and will help those reviewing the test footage.*



*The chase aircraft reports that, after two preliminary passes, everything looks good. Keeping close watch on speed and altitude, the F-15E aircrew makes the drop (left).*

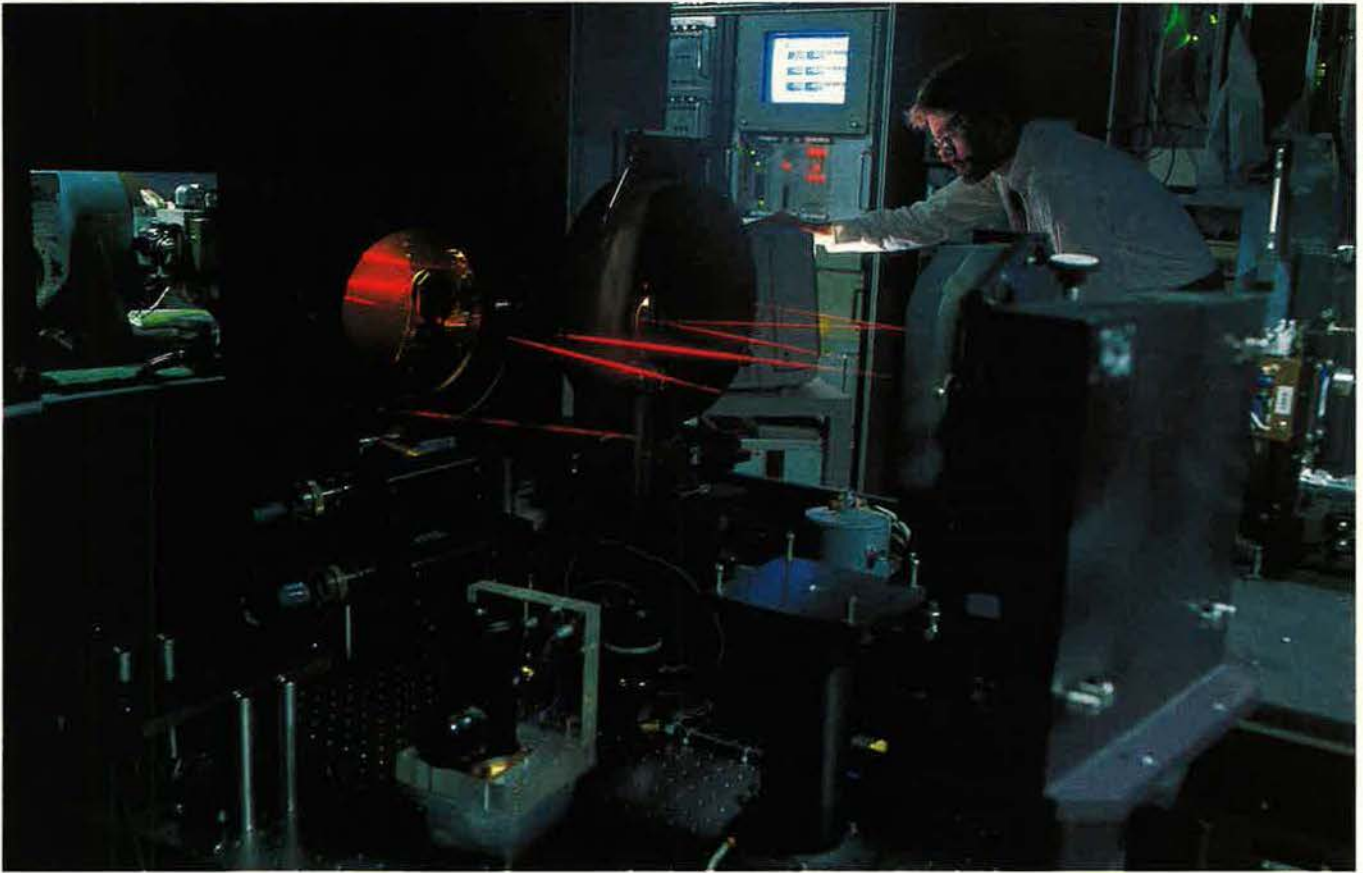


New weapons start out in the lab. The Munitions Directorate operates several facilities that examine munitions down to the molecular level. At left, a technician mixes the explosive brew that gives bombs their punch. Air Force research is on a drive to pack more boom into every bomb to make precision guided munitions smaller. Smaller bombs mean more can be carried, allowing more targets to be hit with the same effectiveness as their bigger ancestors.

And now, the loud part: At another area, technicians set up a test of the new multimodal warhead meant for the Low Cost Autonomous Attack System. This weapon can select the proper firing mode for the target—soft, medium, or hard—being attacked. At right, the test subject is arranged with sensors that won't survive the blast (below) but will yield valuable data.



The mother of invention: To test the imaging capability of a new sensor and seeker, engineers installed the system in a gyro-stabilized pod and flew it, along with a testing computer, on a UH-1 helicopter. Flying the system on the range against a variety of targets, they obtained useful data, which, when combined with other data from computer modeling and simulation, will form a detailed database for the new weapon.



*Laser radar seeker technology, used in LOCAAS, is the subject of the experiment shown above. Lasers can precisely measure the distance to a target and "paint" a detailed image to provide autonomous target recognition. Such technologies will be critical as USAF pursues uninhabited combat aerial vehicles in the future.*



*In the development and test mode of any new system, the first examples are usually handmade, as Ricardo Sayles is doing above. The systems are tweaked, and, once thoroughly wrung out and approved, put into production. Some 1,500 GBU-15s are to be modified with GPS in the next year.*



*Above, Carlotta Garrett uses a microscope to fine-tune the circuitry of a GPS-equipped GBU-15, while Honeywell technician Ken Bett (at left) carefully wraps the circuits in foil prior to the test to help keep them cool and help ensure the data obtained are accurate.*



A1C Richard Kleen (left) and SSgt. David Currie carefully position the weapon on an F-15E for the drop test. Everything must be right to ensure that a test subject is not accidentally lost. Below, a tech rep positions cameras that will record every instant, at every angle, of the release.



Company and program technicians at the side of the airplane conduct comprehensive checks and rechecks. A computer strapped to a cart becomes an impromptu mobile test set as technicians labor to ensure that the GBU is "talking" to the aircraft and that both are feeding data to the pods. With only 45 days to get the weapon into service, every flight was critical.



Back in the Central Control Facility, the test is scrutinized by experts monitoring every aspect of the release. Cameras are trained on the bomb, the launch airplane, and the target area. The bomb's own nose-mounted TV camera will record the flight to target from the best vantage point of all.

With a war on, the test group has a strong motivation to get this new system into the field without delay. Many members are combat veterans and know full well the benefits of the improvement they are making.





*After releasing the weapon, the F-15E heads back to base. At right, high-speed cameras freeze the moment of payoff: right-on-target delivery of 2,000 pounds of high explosive. The GPS unit can guide the bomb to this pinpoint impact without the aircrew's active intervention.*



*New dogfight missiles, small laser-guided bombs, deep-penetration warheads, and autonomous munitions are all on the roster of upcoming tests at Eglin.*

*The first two lots of GPS-aided GBU-15s have entered the inventory and have been deployed overseas.*



*The crews, engineers, and technicians at the 46th Test Wing are determined that anything they test comes to the force with no hidden surprises or operational shortcomings, to work reliably and "as advertised." ■*



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**The Defense  
Department  
identifies  
functions that  
might be  
moved to the  
reserve  
components.**

# New Roles for the Guard and Reserve

**By Peter Grier**

**T**RANSFER more bombers from the active forces into the Air National Guard and Air Force Reserves. ... Create more associate program units, with squadrons of reservists ready to step in and help fly regular Air Force fighters in wartime. ... Use Guard and Reserve personnel for national missile defense missions, and increase their participation in counterdrug operations. ...

These are just a few of the suggestions outlined in a comprehensive new Department of Defense study of better ways to use the nation's National Guard and Reserve forces. The Reserve Component Employment 2005 Study is the product of a year-long effort by personnel from all the military services and aims to help make reality of the seamless Total Force envisioned two years ago by Defense Secretary William S. Cohen.

"The RCE-05 study is an important step in an ongoing and rigorous process of identifying new and better ways of using the reserve components," said Charles L. Cragin, acting assistant secretary of defense for reserve affairs. "Both the study itself and its follow-on recommendations will significantly enhance Secretary Cohen's efforts to build a fully integrated Total Force that is able to respond to a wide range of missions well into the next century."

As it looked at the prospective role of the Guard and Reserve in the next century, the study team focused on three particular areas: homeland defense; Smaller-Scale Contingencies, such as the peacekeeping operation in Kosovo; and Major Theater Wars.

Its general conclusions were that the Guard and Reserve should play an expanded role in providing homeland defense capabilities, could provide relief from the operations tempo for the active forces participating in SSCs, and needed to have their roles in any major conflict further clarified.

Specific recommendations from the report, if implemented, could affect Guard and Reserve units of all the military forces, but many of the study's most important ideas have particular implications for the Air National Guard and Air Force Reserve Command.

### Homeland Defense

Defense of the US homeland is becoming an increasingly important mission for the Department of Defense, said the RCE report. The Guard and Reserve are particularly well-suited to an increased role in this area, as their infrastructure exists in all 50 states, and reserve component units are already quite familiar with one significant part of the homeland defense mission—disaster response.

The growing threat of terrorist use of nuclear, chemical, or biological weapons against US targets is one reason homeland defense is more and more crucial. The RCE report recommends studying whether some Guard and Reserve units could be given the additional mission of providing physical security for key infrastructure targets in the event of an attack involving weapons of mass destruction.

Such "dual-missioning" might be impractical for many units, however, as the skills needed, such as poison gas detection, are highly specialized.

"Re-missioning or restructuring a certain number of [reserve component] units to focus solely on specialized homeland defense tasks could be a more cost-effective solution," said the reserve component study.

Among the units in particular that might be restructured, according to the study: Air National Guard bare base air wings.



USAF photo by SrA Greg Davis

*ANG Maj. Scott Grant was among the Alabama Air National Guardsmen flying refueling missions during Operation Allied Force. The Guard and Reserve role in such operations was a focus of the RCE-05 study.*

During the Cold War these units supported the establishment of operational capability at austere locations. However, with the establishment of the Air Expeditionary Force, this mission has become less viable. AEFs provide their own support.

Thus ANG bare base units might be converted to something resembling the Army National Guard's Rapid Assessment and Initial Detection teams, said the RCE report. RAID teams are on-call units that provide rapid response capability to assess attacks by nuclear, chemical, or biological weapons to help local authorities manage in the aftermath.

RCE-05 urges the Air Force to study this option in detail. "There are as many as 6,000 Air National Guard personnel in bare base units who could be made available through unit conversions to organize into mission-specific units similar in concept to RAID teams," said the report.

### National Missile Defense

National Missile Defense is another homeland mission that might lend itself to increased participation of the Guard and Reserve.

As yet, the US has no final plans for missile defense deployment, but the rough outlines of such a system are well-known. It would involve ground-based interceptors and upgraded early warning radars, among other items.

Such systems would be located in fixed installations and have regularly programmed activities, the study noted. Such characteristics might make Guard and Reserve participation possible, if not relatively easy. The Pentagon's acquisition and technology office, in conjunction with the Ballistic Missile Defense Office and the Army, needs to study the issue, according to RCE participants.

"Staffing such a system with a significant number of [reserve component] personnel appears feasible," said the study.

Similarly, Guard and Reserve personnel might be able to play an expanded role at the Air Force National Preparedness Office, said the RCE study.

The National Preparedness Office currently provides disaster response assistance, such as weather tracking, to national leadership. Currently, it is staffed primarily with active duty personnel. Converting these slots to Guard and Reserve would both save money and enhance flexibility, according to study participants.

Converting 80 percent of the office staff to Guard and Reserve would involve replacing 11 active officers and nine active enlisted personnel. Such a conversion would generate \$335,000 in savings annually, predicted the reserve study.

The Air Force should "consider including this initiative in its Pro-

gram Objective Memorandum," said the study.

The Air Force's Alaska Regional Operations Control Center might face a similar personnel switch, if RCE recommendations are ever implemented.

The service has already switched responsibility for its two other ROCCs to the reserves, the study noted. Using the same conversion process, the Alaska facility would require 45 full-time Active Guard/Reserve officers and 266 AGR enlisted personnel, as well as 12 part-time officers and 45 part-time enlisted members.

This change would actually increase manning costs by approximately \$1.7 million annually. But "over time the transfer would generate savings due to less frequent permanent changes of station and some infrastructure and base support savings," said the study.

One hurdle: The site is not exactly a central location. The center's remoteness could make recruitment and retention of a Guard and Reserve force difficult.

Reserves are already making a strong contribution to the nation's homeland defense against drugs. The Navy, for instance, already provides significant reserve component aviation support to the counterdrug mission, noted the report.

But some services still might be able to do more. And more help is needed: Currently, optimum for ac-

tive and reserve personnel who do anti-drug work is substantial, noted RCE-05.

Twenty million dollars would pay for a 25 percent increase in Guard and Reserve participation in the drug war, figured the study. That would generate 237,000 more man-days of small unit and individual reserve support for the counterdrug mission.

The services should all look at such an increase, urged the RCE report.

### Smaller-Scale Contingencies

The demand for American military participation in relatively small operations is skyrocketing. Bosnia and Kosovo are just two examples of how national priorities can produce a large workload for a few key military units.

Increasing Guard and Reserve participation in such missions could have the dual effect of providing rest to some hard-pressed active duty units and broadening the range of Guard and Reserve skills.

So-called "High-Demand/Low-Density" units are the ones that contingencies are wearing out the most. These organizations—A-10 units, HC-130 units, Army Patriot missile batteries, and the like—have such a high operations tempo that a distressingly large number of their active personnel are opting to leave military service.

With the exception of the Army, the services already use appropriate

reserve HD/LD units as much as they can, concluded the RCE study. But a Defense Department-wide tracking system that would follow individuals with HD/LD skills might be a boon to filling in the units, concluded the report.

The study recommended developing such a tracking system by the end of this year.

The Air Force already envisions substantial Guard and Reserve participation in SSCs through its Expeditionary Aerospace Force concept. Increased reserve component involvement "will be critical to sustaining an adequate [EAF] rotational base," noted the study.

Beginning this January, reserve component crews and personnel will start rotating into SSC operations on a 90-day deployment basis. The RCE team urged "that as the Air Force fully implements the [EAF] program, it continue to refine Guard and Reserve participation in these types of operations."

The reserve study team even looked at using reserve component units to entirely staff one continuous, rotational large peace operation, similar to the stabilization force in Bosnia. Such a deployment would not be possible using only volunteers and would require repeated use of a Presidential Select Reserve Call-Up. "The [reserve component] does not have sufficient units in several high-demand areas to sustain a rotational force package of this size," said the RCE.

### Major Theater Wars

The nation's defense strategy requires the Defense Department to be able to fight—and win—two Major Theater Wars in close succession. Given the current size of the force, that is an ambitious goal and one that could never be met unless the Guard and Reserve forces contribute all that they can.

The RCE study examined a range of possible ways to increase the role of Guard and Reserve units in MTWs. Many involve switching Air Force assets to the Guard and Reserve.

Bombers, for instance. Transferring one B-52 and one B-1B squadron to the Guard and Reserve may generate cost savings of up to \$54 million annually and could ease the shortage of active duty pilots for these aircraft.

The bomber mission is a natural

Photo by Ted Carlison



**Adding additional bombers—B-52s and B-1s, such as this one from the Kansas ANG—to the Guard and Reserve is one way to improve USAF's ability to fight two MTWs in close succession, according to RCE-05.**

one for the reserves, RCE-05 noted, because it has a low optempo during peacetime. But adding to the bombers already in the Guard and Reserve would not be without drawbacks. Guard and Reserve pilots would have to undergo the Personnel Reliability Program required of all who have access to nuclear weapons. Fewer bombers in the active force means fewer pilots with bomber skills—and, eventually, fewer pilots with bomber skills transferring to the Guard and Reserve.

The change could incur some difficult-to-quantify costs in personnel retraining and base reconfiguration.

Still, the Air Force should study the issue, urged the RCE study. "At a minimum, this follow-on study would examine the operational impacts and basing and conversion costs associated with the transfer," said the report.

The study team also looked at converting another Air Force fighter wing from active to reserve status. The active wing could be broken up and converted into aircraft and personnel used to augment existing A-10 and F-16 squadrons, for example. It might also be converted into three new ANG F-15 squadrons and a number of plus-ups to existing Guard and Reserve F-16 units.

Either of these options would cost large sums in the near term—from \$40 million for the first option, to \$125 million for the second. Furthermore, remaining active duty units would then face even higher operations tempo pressure.

The Air Force should be able to figure out by March 2000 whether this idea is worth doing, said RCE-05.

Reserve associate units for A-10, OA-10, F-16, and F-15C squadrons might be an easier path to take. Such units—which already exist for the C-5, C-9, C-17, C-141, KC-10, and KC-135 airframes and one E-3 Airborne Warning and Control System unit—provide squadrons of pilots who step in and fly the aircraft of active duty units.

Such an approach has the advantage of lowering the active force's optempo without the cost of buying more airplanes.



USAF photo by SrA Jeffrey Allen

**Reserve associate fighter pilots, part of a test program at Shaw AFB, S.C., deployed for Allied Force along with their active counterparts. The study views creating Reserve associate fighter units as a lower cost means to reduce active force optempo, since the units would share active aircraft.**

The Air Force has already begun testing the concept. The Fighter Reserve Associate Test program, now in its second year at Shaw AFB, S.C., places an associate unit of 14 Reservists with the 78th Fighter Squadron. When active crews went to Southwest Asia in 1998, Reserve crews went, too. This year, Reserve pilots deployed with their active counterparts to Operation Allied Force.

The possibility of regularly assigning elements of the Guard and Reserve to active fighter wings is a central focus of the Air Force's ongoing Future Total Force study. [See "Future Total Force," July, p. 29.]

Current personnel shortfalls mean that some active units are not fully manned. By converting 20 percent of active component positions into associate positions, figured the RCE, the total number of crews available to fly could be increased.

### Reverberating Benefits

Training costs could reach \$12 million, but the benefits could reverberate throughout the fighter force in terms of fewer active deployments, more interesting reserve employments, and increased retention throughout the total Air Force.

Associate programs might help

ease the optempo problems associated with E-8 Joint Surveillance Target Attack Radar System aircraft as well. The problem here is that these radar airplanes are in extremely high demand. Reserve crews would likely have such a high deployment rate that it would be difficult for them to keep their civilian employment, and retention rates could suffer.

Establishing Joint STARS associate crews would cost about \$8.6 million a year, not counting the operations and maintenance costs of harder use of Joint STARS platforms.

Guard and Reserve crews could also help out by operating half of all strategic Unmanned Aerial Vehicles, figured the reserve study. But since strategic UAV platforms are still under development, this is an idea whose time has not yet come, the study team agreed.

Some general restrictions on the use of the Guard and Reserve might need to be lifted if any of the above recommendations are ever to come to pass. Current law includes the so-called 180-day-limit requirement, under which all volunteer reservists who have been on active duty for more than 180 days must be counted against active force end strengths.

The study supports a proposal to modify this restriction to allow reservists to serve for 181 days or more, as long as the total number of reservists on active duty does not exceed 0.2 percent of the authorized active duty end strength. ■

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*Peter Grier, the Washington editor of the Christian Science Monitor, is a longtime defense correspondent and regular contributor to Air Force Magazine. His most recent article, "Up in the Air About Anthrax," appeared in the October 1999 issue.*

By John L. Frisbee, Contributing Editor

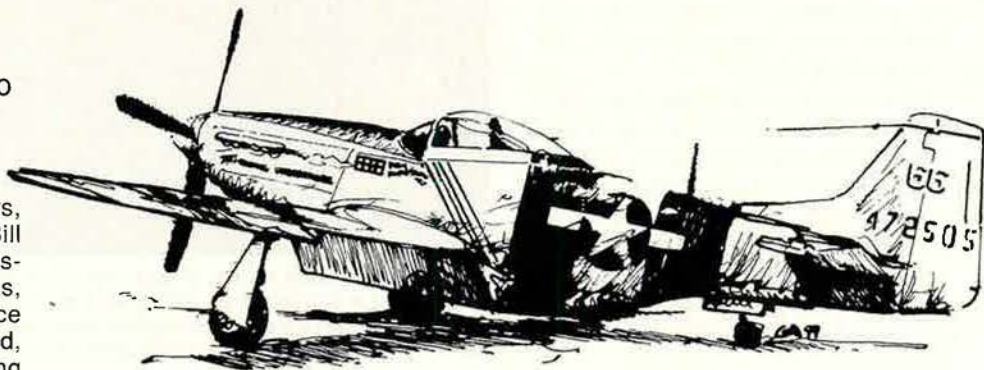
## Instant Ace

After 11 months of shooting up ground targets, Bill Shomo finally got a crack at a whole squadron of enemy fighters.

**T**HERE are pilots who fly fighters, and there are fighter pilots. Bill Shomo was a fighter pilot, and a frustrated one at that. For 11 months, the 82nd Tactical Reconnaissance Squadron, to which he was assigned, had moved from strip to strip along the north coast of New Guinea and finally to Morotai Island, Indonesia, some 250 miles northwest. The squadron was equipped with obsolete P-39s and P-40s, too short-ranged to reach the air-to-air combat action where every true fighter pilot wants to be. The P-38 and P-47 jocks got the glory, while Shomo and his squadron mates supported Gen. Douglas MacArthur's drive to the Philippines by photographing and shooting up ground targets—hazardous work but not very satisfying for a fighter pilot.

As 1944 drew to a close, it looked as though the war would end before Shomo had a chance to test his skill in air-to-air combat. Then, in December, things began to pick up. The squadron learned that it was getting North American P-51Ds equipped for photorec work. Shomo had flown two local check outs in the P-51 and one short mission to test its guns when, on Dec. 24, he was called to group headquarters on Leyte in the Philippines. There he was made commander of the squadron and ordered to move it to Mindoro, an island off the southwest coast of Luzon, to support MacArthur's landing about 75 miles north of Manila, which would take place on Jan. 9, 1945.

A fortnight after Shomo took command of the 82nd, it was in place at Mindoro, and on Jan. 9 he led his first P-51 combat mission (which was also only his sixth flight in the Mustang). It was a low-level recce to find out what air strength the Japanese had in northern Luzon. As they approached the Japanese airfield at



*Maj. William Shomo's P-51, The Flying Undertaker, became one of the best known Mustangs in the Pacific theater after Shomo shot down seven Japanese aircraft, one morning in January 1945. Even the victory flags painted on this aircraft sported black borders.*

Tuguegarao, Shomo spotted the first aerial target he had seen while airborne in all his months of combat—a Val dive bomber, turning onto its final landing approach. One burst from his six .50-caliber guns brought it down at a spot Shomo described as precisely years later as he did on that January day. And with good reason.

Two days later, on Jan. 11, Shomo and his wingman, Lt. Paul Lipscomb, were heading north on the deck to photograph and strafe Japanese airfields at Tuguegarao, Aparri, and Laoag at the extreme north of Luzon. Over the exact spot where Shomo had picked up the Val, they caught a brief glimpse of enemy airplanes flying south above broken clouds at about 2,500 feet. How many enemy airplanes? What difference did it make? Shomo and Lipscomb pulled up through the clouds in an Immelman and rolled out behind a Betty bomber that was being escorted by a squadron of fighters—11 Tonys and one Tojo.

On their first pass through the formation, Shomo and Lipscomb had the advantage of surprise. Shomo shot down three Tonys, then came up under the bomber, putting a burst into its belly. The flaming Betty headed for a crash landing with two Tonys still hanging to its right wing.

As Shomo and Lipscomb pulled

up in a tight vertical spiral to regain altitude, Shomo met another Tony firing head-on and shot it down. Meanwhile, the Tojo latched onto Shomo's tail, firing until it stalled out and dove into the clouds. The Betty blew up as it bellied in, and the two escorting Tonys headed for the hills, staying on the deck. Shomo made a second diving pass, nailing each Tony with a short burst, for a total of seven victories. In less than six minutes, Bill Shomo had become an ace, the ultimate goal of every fighter pilot. Lipscomb got three-fifths of the way to that goal. The last three enemy fighters then disappeared into the clouds.

On April 1, 1945, William A. Shomo, by then a major, was awarded the Medal of Honor for leading an attack against heavy odds and destroying seven enemy aircraft in a single encounter.

In more than 200 combat missions, Shomo saw only 14 enemy aircraft from his cockpit. He attacked and shot down eight of them. Shomo, who died in 1990, credited that remarkable record to closing within 40 yards of each target and not wasting ammunition on deflection shots. It may be credited equally well to the valor of a fighter pilot who didn't stop to count the odds. ■

*First appeared in March 1984 issue.*





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It was the most dangerous of the "Route Packages,"  
taking airmen into the deadly defenses around Hanoi.

# Route Pack 6



By Walter J. Boyne

*Two F-105Ds from Takhli RTAB,  
Thailand, pass a KC-135 tanker on  
their way north to Route Pack 6.*

In every war, there is a place that comes to symbolize its most ferocious moments. For airmen in the Vietnam War, it was Route Pack 6, taking the battle to the heart of Hanoi—"going downtown." A relatively small band of US pilots fought a long and valiant war under conditions that rarely made sense to them. Handicapped by onerous—foolish might be the better term—rules of engagement, they nonetheless flew into battle every day, delivering bombs on the most well-defended targets in history. Many brave men died in the process, and more suffered the fate of imprisonment by a cruel enemy.

With its dogleg outline, North Vietnam had a long border with China in the north, Laos in the west, and the Gulf of Tonkin to the east. The long narrow extension to the south—the Republic of Vietnam, or South Vietnam—was separated from the Democratic Republic of Vietnam, or North Vietnam, by a narrow demilitarized zone, a buffer about four miles deep and 47 miles wide. As a result of its geography, North Vietnam was subject to air attack by Navy Carrier Task Force 77 from the east and by the US Air Force from bases in South Vietnam and Thailand.

### Rolling Thunder

In February 1965, USAF and the Navy were given approval to begin Rolling Thunder, an operation with goals established by President Lyndon B. Johnson and his Secretary of Defense, Robert S. McNamara. Rolling Thunder had many conceptual flaws, but the most egregious was that of "graduated escalation." The planners called for Rolling Thunder attacks to begin at a relatively low level in southern North Vietnam. If the enemy did not react "properly"—that is, with the realization that the United States was so strong that the idea of conquering South Vietnam had to be given up—the program was to be moved northward and increased incrementally in intensity.

The stated goals of Rolling Thunder were as follows:

- Create a viable state in South Vietnam.
- Prevent an armed conflict with either the Soviet Union or China.
- Allay the concerns of the US public about the air campaign.
- Raise morale in South Vietnam.



*As part of Rolling Thunder, F-105s (shown here in protective revetments at Takhli RTAB) and F-4s flew strategic missions into North Vietnam, battling air defense systems and highly maneuverable MiGs.*

- Stop the infiltration of men and materiel from North Vietnam to the Viet Cong forces in South Vietnam.

It is worth noting that none of these goals called for the physical destruction of the enemy's capability to wage war.

The Air Force and the Navy found it difficult to conduct joint operations and instead competed for resources and targets. As a result, an Air Force–Navy coordinating team in December 1965 divided North Vietnam into six sectors. The zones were given the name "Route Packages" and were designated as 1, 2, 3, 4, 5, and 6. (See map, p. 58.) The term Route Package was quickly shortened to "RP," "Pack," or "Pak."

In April 1966, Adm. Ulysses S. Grant Sharp, commander in chief of US Pacific Command, added a seventh area by dividing RP 6 into two sections, 6A and 6B. The Navy's Carrier Task Force 77 was assigned RPs 2, 3, 4, and 6B, as these bordered on the Gulf of Tonkin. The Air Force was given responsibility for air operations in RP 1, RP 5, and 6A.

The lines, drawn so precisely at CINCPAC, served reasonably well for planning purposes. However, during actual operations, both USAF and Navy crews crossed them at will in pursuit of their missions. Because RPs 6A and 6B contained targets in Hanoi and Haiphong, respectively, they were the most heavily defended at all times. The other Route Packages were dangerous and consumed

many aircraft and aircrews, but there was no question that Pack 6 was the toughest of all.

Going downtown required the utmost planning, skill, and courage from the American aircrews, and it required it again and again. A combat tour was considered completed when 100 "counters"—missions to North Vietnam—had been flown. By 1966, F-105 pilots commented, "By your 66th mission you'll have been shot down twice and picked up once." For most of the war, the odds against completing a tour of 100 missions ranged from impossible to very high.

### The RPs Grow Tougher

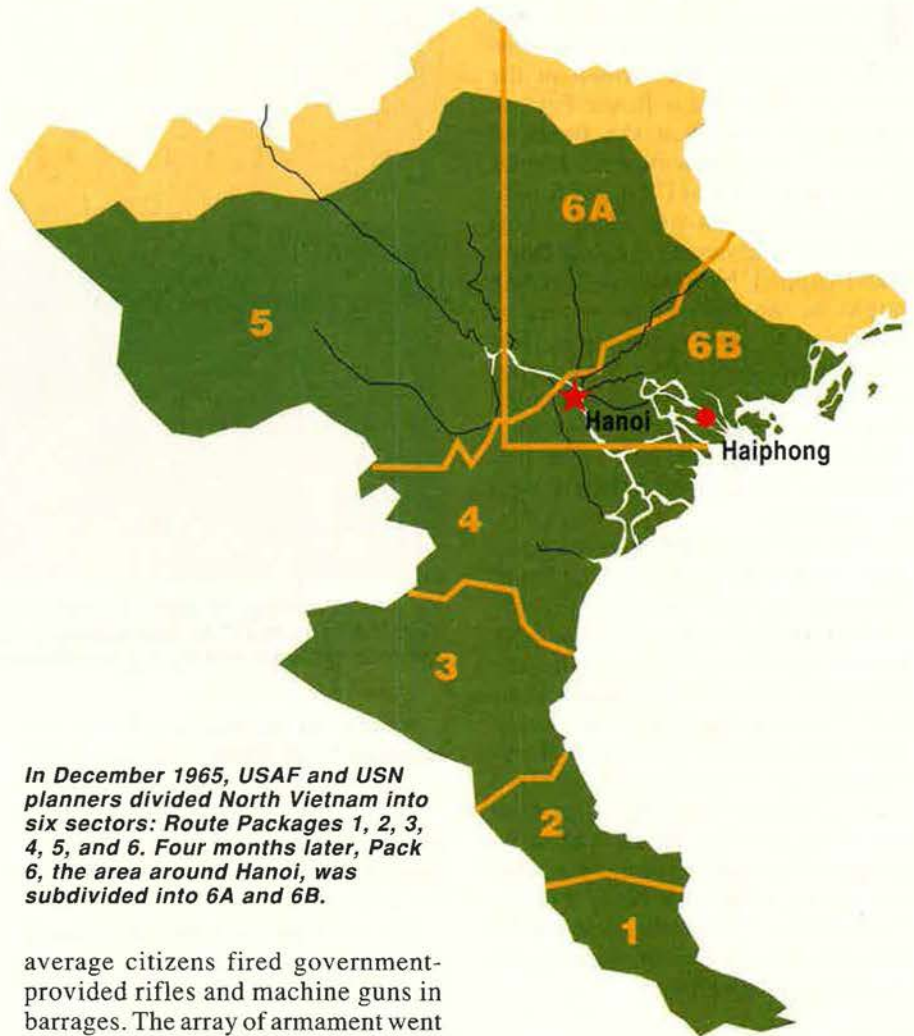
The North Vietnamese were far too serious about their war and far too good as soldiers to be taken in by the unrealistic goals of Rolling Thunder or the policy of graduated escalation. Their reaction was to redouble their efforts and to obtain from both Red China and the USSR much more assistance in the form of advisors and materiel.

In 1964, the aerial defenses of North Vietnam were relatively primitive, consisting of 22 early warning radars, four fire-control radars, and 700 anti-aircraft guns. By the time President Johnson called a bombing halt on Nov. 1, 1968, this had grown into an integrated air defense system comprising 400 radar systems, 8,050 anti-aircraft guns, 150 fighters (including reserves based in China), and 40 SA-2 Guideline missile sites.

The bombing halt would be used to further increase the defenses so that the area around Hanoi and Haiphong became the most heavily defended in the world. In addition, the halt allowed North Vietnam to deploy heavier anti-aircraft guns and Surface-to-Air Missiles much further to the south, particularly along the Ho Chi Minh Trail. At its peak strength, North Vietnam would deploy more than 200 SA-2 launchers, supplemented by much smaller numbers of the more sophisticated SA-3, which was intended for use against fighters.

The growth in numbers and sophistication of the North Vietnamese weapons was more than matched by American technology. Unfortunately the advances in US technology were somewhat offset by the relatively static USAF tactics. This made sorties into North Vietnam far more dangerous than they should have been.

The first leg of the North Vietnamese defense triad was composed of Anti-Aircraft Artillery systems, which grew much more numerous over time. This was especially true of the larger caliber, radar-guided guns. The 37 mm and 57 mm guns were always very good at medium altitudes, sometimes erupting so furiously that they seemed to lay a sudden overcast in the sky. The North Vietnamese anti-aircraft fire was comprehensive. It started with the "People's Air Defense" in which



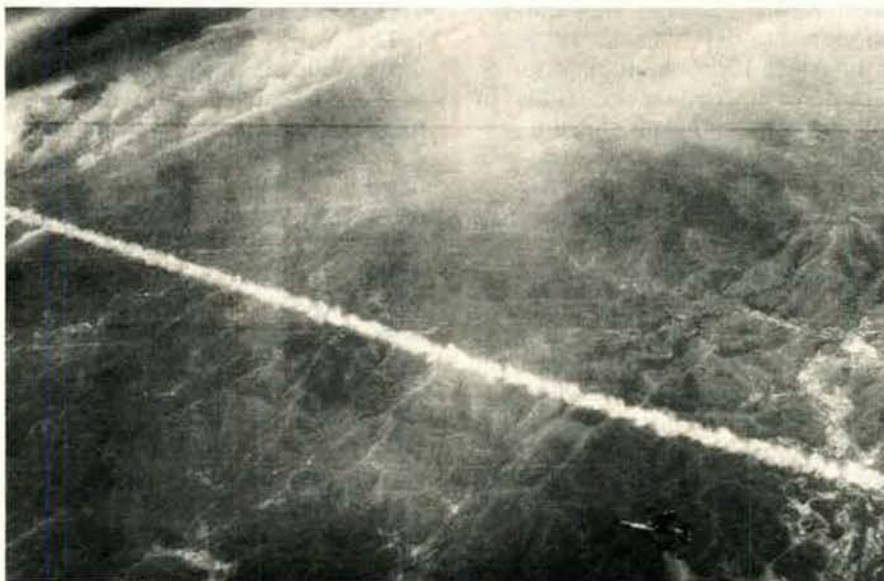
*In December 1965, USAF and USN planners divided North Vietnam into six sectors: Route Packages 1, 2, 3, 4, 5, and 6. Four months later, Pack 6, the area around Hanoi, was subdivided into 6A and 6B.*

average citizens fired government-provided rifles and machine guns in barrages. The array of armament went on to include heavy machine guns and 20, 23, 37, 40, 57, 80, and 100 mm cannons, covering an altitude range from 1,500 to 45,000 feet. By 1967, North Vietnam was firing

25,000 tons of anti-aircraft ammunition a month, almost all of which was brought either by land transport from China or sea transport from the Soviet Union. Accuracy increased when radar-controlled tracking became common in 1968.

### Flying Telephone Poles

The second leg of the triad was the SA-2 Guideline (NATO designation), known to the Soviet Union as the V75 Dvina. In the course of the war the North Vietnamese would fire more than 9,000 SA-2s and shoot down approximately 150 US aircraft with them. Looking like a rocket-powered telephone pole in flight, the SA-2 was 35 feet long but only 20 inches in diameter. It had a top speed of Mach 3.5 and a ceiling of more than 90,000 feet. It could be defeated in flight by a "SAM break" if the aircrew was warned of its approach or happened to see the dust signature of its launch. They would turn into it and maneuver so that the SA-2 was unable to fol-



*An F-105 strike camera captured the contrail of a Surface-to-Air Missile as it passes close to another Thunderchief over North Vietnam. During the war, the North Vietnamese fired more than 9,000 SA-2s, taking down about 150 US aircraft.*

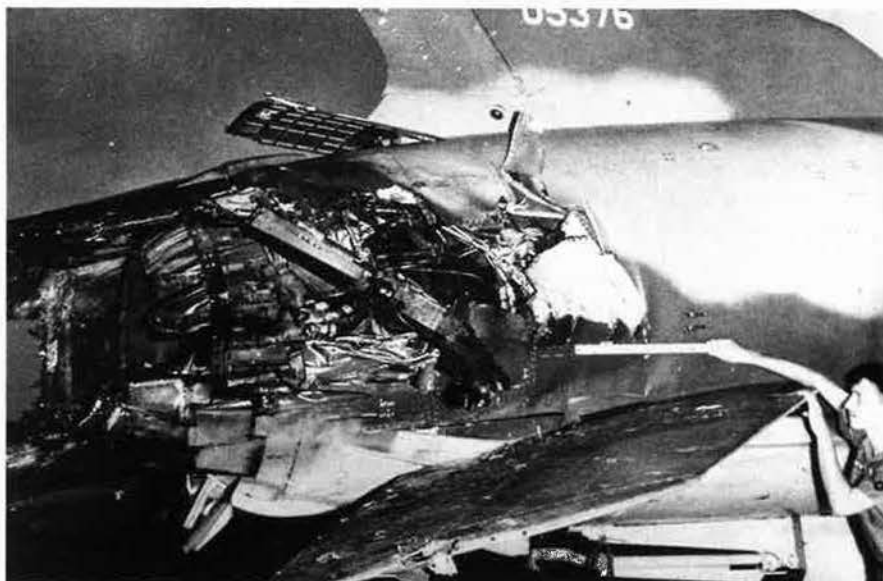
low, stalling to fall out of control or break up in flight. The SA-2's high-flying capabilities forced the US aircraft to fly at lower altitudes where the anti-aircraft fire was heavier. Introduction of better Electronic Countermeasures and the use of "Wild Weasel" air defense suppression teams kept the SAM kill rate down. The SAM's kill rate fell from its initial 20 percent level to about 1.8 percent by 1968.

The third leg of the enemy triad comprised the MiG fighters—old but effective MiG-17s and -19s and the modern delta-wing MiG-21s. The MiGs operated under strict guidance from a central ground control. They were all equipped with cannons, and the MiG-21 had Atoll heat-seeking missiles as well.

USAF fought the war under severe handicaps. Political constraints had brought about an inversion of tactics in which the B-52 strategic bomber was dedicated to tactical operations in South Vietnam, while the two tactical fighters, the F-4 Phantom and the F-105 Thunderchief, were tasked with strategic bombing in North Vietnam. Neither fighter had been designed for this mission, the Phantom being originally designed as a Navy fleet defense fighter and the "Thud" as a USAF tactical nuclear bomber.

The fighters were handicapped by the limitations of their radar-guided AIM-7 Sparrow and heat-seeking AIM-9 Sidewinder missile armament, neither of which had been designed for fighter vs. fighter combat. The great advantage conferred by the Sparrow, its ability to engage the enemy from any angle at up to 12 miles, was nullified by a rule of engagement which called for visual identification of the enemy before firing. The Sidewinder could be fired from up to one mile, but only from the rear, in a 30-degree cone that led to the engine's heat. Both missiles were limited by their reaction to g forces, and both required a set up time that was difficult to effect in air combat.

The F-105 had a 20 mm multibarrel cannon that could be used for close-in fighting. The Phantom did not get a cannon until SUU-16/A cannon pods were fitted as external stores in 1967. The cannon pods were not as accurate as the internal gun of the F-105, and some felt that it was a net



**An airman measures the tail of a missile that protrudes from the aft end of an F-105 that its pilot managed to bring back from a Rolling Thunder mission. This Thunderchief received a new tail section and returned to action.**

disadvantage, as it induced drag and displaced other stores. Some also thought it might induce the Phantom pilot to attempt to dogfight with the more maneuverable MiGs—not good practice. Later, the F-4E arrived, modified to carry an M-61A1 rotary 20 mm cannon internally.

The F-105 was the fastest aircraft in the theater at the low altitudes at which its missions were flown, but it was not maneuverable. The F-4 had to use its speed and energy to offset the MiG's greater maneuverability by fighting in the vertical plane.

### Measures, Countermeasures

The air war over North Vietnam saw the advantage swing from one side to another. Washington permitted this because of its fixation on limiting the war and sending signals to North Vietnam. If they had had the political will to do so, they could have had sufficient airstrikes to crush North Vietnam from 1965 on—a fact demonstrated in the December 1972 Linebacker II attacks.

For their part, the North Vietnamese worked as hard and as effectively as they could to use the ever-growing assistance of China and the Soviet Union. China was particularly pleased with a war that placed two of its enemies in conflict, for it had no love for North Vietnam, either.

Aerial combat started inauspiciously for the United States when MiG-17s attacked and shot down one

F-105 and damaged another on April 3, 1965. The demands of flying safety had greatly degraded fighter pilot training in the pre-Vietnam War years. Many F-105 pilots lacked realistic air combat maneuver training. It seemed incredible that an obsolete 700 mph derivative of the Korean War-vintage MiG-15 could defeat modern Mach 2.1 cannon armed fighters, yet such was the case. The smaller MiGs had an advantage at low speeds and higher altitudes, while the F-105s and F-4s were superior at higher speeds and lower altitudes. The MiG-17's two 23 mm and one 37 mm cannon were slow firing and had ammunition for only about five seconds of action, but each heavy shell constituted a potential "golden BB" for any aircraft it hit. Fortunately for the US, the MiG sighting system was inferior and it was a poor gun platform. Offsetting this was its dazzling maneuverability and its ability to turn in an amazingly short radius.

Maximum performance of US aircraft was found in the energy maneuverability concept, in which their powerful engines were used to obtain advantages in altitude, airspeed, or both. This enabled the US fighter to fight in a vertical plane, using excess energy to climb, turn, or accelerate as required. It was a demanding tactic, however, requiring experience on the part of the US pilot and, in addition, good vision, for at the speeds and altitudes at

which they were operating, the MiGs could disappear in an instant.

The task of the US force was to get bombs or missiles on designated targets; shooting down MiGs was a secondary goal. F-4s would fly missions equipped with both bombs and missiles. If no combat ensued, bombs were put on target. If the MiGs warranted an attack, the bombs were jettisoned and the MiGs engaged.

In a similar way, the MiGs were not primarily interested in gaining aerial victories; they could achieve their objective by simply making the fighter-bombers jettison their bombs, and for this the threat of an attack was sometimes enough.

The North Vietnamese advantage in radar grew as the war progressed and was not matched by the United States until 1972, when sufficient airborne warning and control aircraft became available at last. Curious, but typical of the war, was the fact that one of the duties of the EC-121s was to report US violations of the Chinese buffer zones. Pilots sometimes turned off their identification, friend or foe system to have a better chance of not being identified and reported by their own people.

### Rivals Among Thuds

To offset the inherent advantages of the North Vietnamese defenses, USAF began to operate in far more complex formations. The F-105s operated out of Thailand, with the 355th Tactical Fighter Wing based

at Takhli RTAB and the 388th at Korat RTAB. Oddly enough, the two F-105 wings evolved different tactics and styles of fighting. The 388th generally flew at higher altitudes while the 355th typically came in low. The two units were true rivals, and each one claimed that its method was the best.

Two-seat F-105Fs served as Wild Weasel aircraft out of both Takhli and Korat, using the AGM-45 Shrike anti-radar missile. The Shrike carried a receiver tuned to known enemy radar frequencies; when it picked up a transmission, the missile could be fired and would track on the enemy radar.

The fighter-bombers were supported primarily by F-4s from the 8th TFW operating out of Ubon RTAB and to a lesser degree by F-4s based in South Vietnam. Combat operations were further augmented by EB-66 aircraft also based at Takhli. The EB-66s would gather real-time intelligence and do standoff jamming. They usually operated in orbits that were outside of SAM range and protected by a MiG combat air patrol of F-4s. One EB-66, piloted by Capt. John Fer, was shot down by MiGs; he became a prisoner of war.

KC-135 tankers were absolutely essential to all operations, and a series of tanker orbits were established along the Thai-Laos border and in the Gulf of Tonkin. Both valuable and vulnerable, the KC-135 aircrews had strict orders not to venture close

to North Vietnam, but, as the war progressed, they often went in to meet returning fighters that were critically short on fuel. Doing so laid their careers on the line, for they were controlled by Strategic Air Command, and a violation of orders, no matter how worthy the result, could get a crew fired on the spot.

The large and complex formations of many different kinds of aircraft required detailed planning, immense logistic effort, and sometimes no little subterfuge, as in Operation Bolo on Jan. 2, 1967. In Bolo, the 8th TFW tailored its F-4s electronically to fly as a simulated F-105 strike, then flew the routes and altitudes used by the Thuds. The ruse successfully provoked a response by MiG-21s, and seven of the enemy were shot down in the most successful single action of its type in the war.

The technological developments of the war often caused some surprising results. Electronic reconnaissance pods had been introduced as early as 1966, but when the SAM threat seemed to be at a peak and rising, an additional effort was put into Electronic Countermeasures. Although they were in short supply initially, the QRC-160 ECM pod became more readily available. When flown in the specified formation (four aircraft flying with a 1,500-foot lateral separation and vertical separation of 500 to 1,000 feet) the QRC-160 pods' jamming patterns overlapped and were very effective against the SA-2's Fan Song radar and AAA radars.

North Vietnam responded to the success of the QRC-160 pods by introducing more MiG-21 fighters, equipped with the Atoll heat-seeking missile, a knockoff of the AIM-9. The Atoll was effective when used with new tactics. In these, the MiGs would approach low and from behind a US formation, pop up and fire an Atoll, then break off for the sanctuary of their home base. The home bases, incidentally, were for most of the war off-limits to US attack.

### Going Downtown

The geography of North Vietnam and the establishment of sanctuary and off-limits areas combined to limit the number of approaches to the targets available to US aircraft. This was compounded by the tendency of US high-level planners to repeat the use of the same times, routes, and

Photo by Bave Brog



Use of two-seat F-105Fs in the "Wild Weasel" air defense suppression role kept the SAM kill rate down. These two still have AGM-45 Shrike anti-radar missiles on board.

altitudes for the attacks. As a result, North Vietnam was able to concentrate its formidable defenses in the most effective manner, including the installation of anti-aircraft and SAM sites in areas known to be off-limits to the Americans.

There was much to defend, for 80 percent of the enemy's war materiel arrived by two rail lines that ran from China to Hanoi, while a similar percentage of the materiel for North Vietnam's civilian economy came through the port of Haiphong.

Going downtown has been eloquently and vividly described by some of the pilots who did so—Jack Broughton, Mark Berent, Ken Bell, G.I. Basel, and Robin Olds, an ace from World War II and Korea who also flew fighters in Vietnam. Olds has said that none of his missions over Germany in World War II were as bad as any one of his missions over Hanoi during the Vietnam War.

As the commander of the 8th TFW, Olds selected a "first team" from his veterans to go into Route Pack 6. Less experienced pilots were given 10 or more missions in less dangerous regions, such as Pack 1, before being allowed to go to Hanoi. Over time it came to be a generally accepted practice that the first 10 missions would be given in "easy" areas, and so would be the last 10, for by the time a pilot had flown 90 missions North he was approaching his limits of stress.

The extreme difficulty of the Pack 6 mission is more obvious when one analyzes just how inherently hazardous any combat mission was. Just taking off in a heavily loaded aircraft on a typical hot Southeast Asia day was dangerous in itself, as were the multiple in-flight refuelings. Missions to the other Route Packages and to Laos became increasingly hazardous. North Vietnam continually moved Anti-Aircraft Artillery south, particularly along the Ho Chi Minh Trail, and a careless pilot could easily and quickly become a dead pilot.

Yet Pack 6 was of another order of magnitude of danger. From the long, hot flight from Thailand to Thud Ridge, the karst mountain outcrop



Photo by Ken Smith via Warren Thompson

**On RP 6 missions, F-4 Phantoms would fly with both bombs and missiles, although shooting down MiGs took second place to bombs on target. In Operation Bolo, F-4s, electronically disguised as F-105s, shot down seven MiG-21s.**

northwest of Hanoi, to the short, flak-filled flight into the center of Hanoi, and back out again, the Thuds and Phantoms were exposed to a constant barrage of anti-aircraft fire, SAMs, and, when their opportunity arose, MiGs.

#### **No Good End**

The flight had to be performed with cohesion, so that ECM coverage was maintained, but with sufficient flexibility to be able to detect either SAMs or MiGs. The moment of truth came with a headlong plunge into the sea of flak so that ordinary iron bombs could hit a target that was often picked in the Oval Office and which might have been of doubtful value. In the process the pilot might see a comrade hit by flak or a SAM and then watch anxiously for the parachute. Sadly, a bailout over Hanoi had no good ending. It featured one or more of the following: injury, death, captivity, torture.

There was little time to relax on the flight back if the aircraft had suffered battle damage or was running low on fuel. Even after a final refueling there was often the prospect of thunderstorms to penetrate before a final landing.

Broughton has noted that, despite

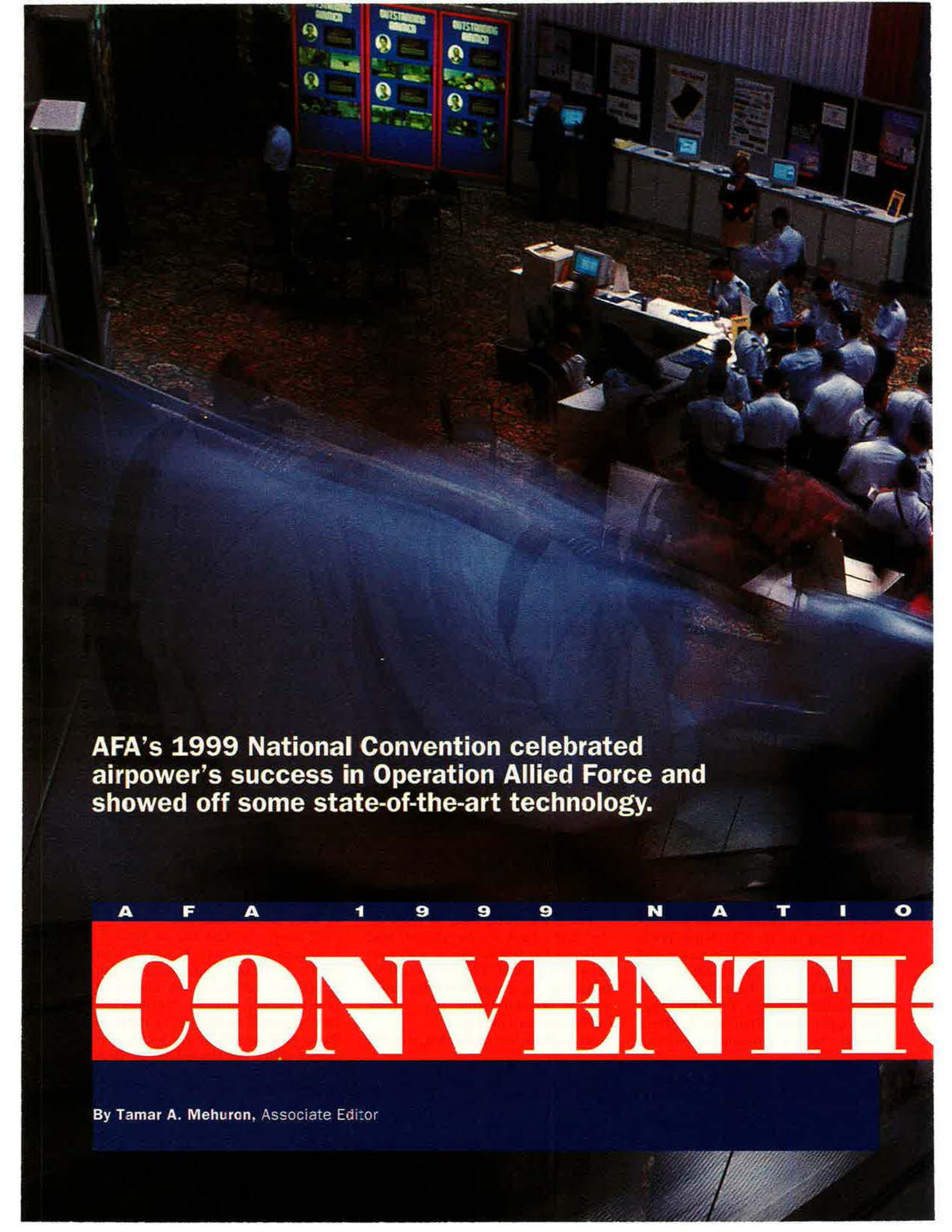
the stress and the hazards of Pack 6, it was a letdown to be "fragged" for one of the easier zones and even worse if a mission to Pack 6 was scrubbed and you were diverted to a target in the easy packs. There was not so much an addiction to danger as an addiction to the sense of pride of doing a near-impossible job well.

In Linebacker II, joint operations were conducted and the rules of engagement were relaxed to permit simultaneous attacks on airfields. There was adequate ground controlled intercept support from EC-121s and ships. New ECM were applied, including the use of the old standby, chaff. New F-4E Phantoms made their appearance. The B-52s were used in force although the initial tactics of their employment were inadequate and had to be changed. Pressure was kept on night and day, with precision guided munitions hitting many targets previously held off-limits. SAM sites were destroyed, as were SAM stockpiles.

In short, the last trip to Pack 6, Linebacker II, was a signal that North Vietnam could understand. Disarmed, defeated, and unable to resist further attacks, North Vietnam returned to the peace table in Paris and agreed to the terms that would allow the United States to at last disengage from the Vietnam War. The same net result could have been done easily and with less exposure to danger eight years and more than 47,000 lives earlier. ■

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*Walter J. Boyne, former director of the National Air and Space Museum in Washington, is a retired Air Force colonel and author. He has written more than 400 articles about aviation topics and 29 books, the most recent of which is Beyond the Horizons: The Lockheed Story. His most recent article for Air Force Magazine, "Reconnaissance on the Wing," appeared in the October 1999 issue.*



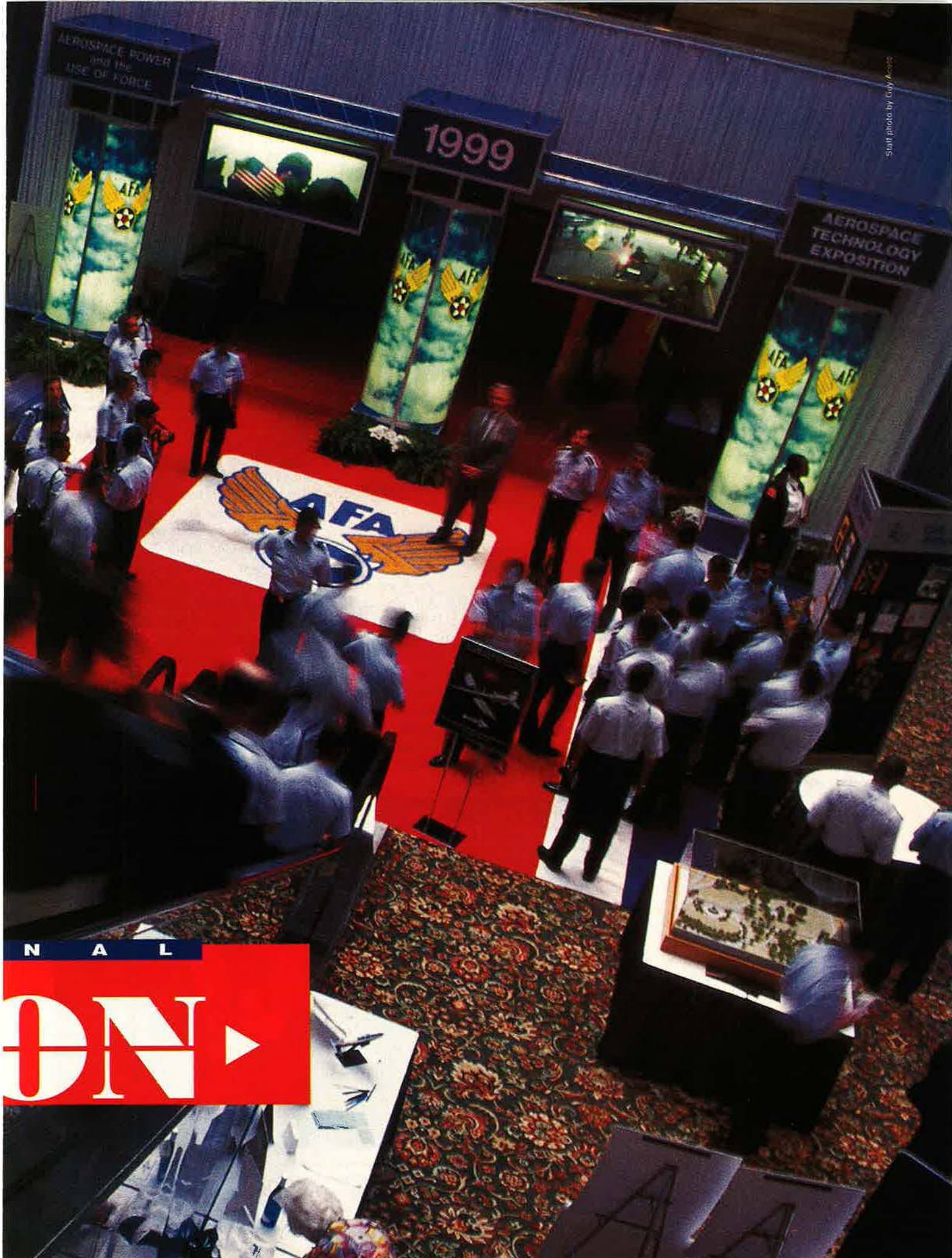
**AFA's 1999 National Convention celebrated airpower's success in Operation Allied Force and showed off some state-of-the-art technology.**

A F A 1 9 9 9 N A T I O

# CONVENTION

By Tamar A. Mehuron, Associate Editor





N A L  
**DIN** ▶

Photo by Paul Kennedy



**Lt. Gen. Michael Short and active, Guard, and Reserve representatives received a standing ovation at the Air Force Anniversary Dinner, Sept. 14, in recognition of USAF performance in Operation Allied Force.**

**A**CCOLADES for USAF's stunning performance in Operation Allied Force were woven throughout the speeches and ceremonies of the Air Force Association's Convention, held Sept. 13-15 at the Marriott Wardman Park Hotel, Washington, D.C.

AFA paid tribute to the leaders and troops of the Kosovo operation at the Air Force Anniversary Dinner, Sept. 14. The evening's program, titled "A Salute to the Allied Forces in Kosovo," recognized Lt. Gen. Michael C. Short, commander of NATO's Allied Air Forces Southern Europe. Short received the H.H. Arnold Award, AFA's top award for a military contribution to national security in a given year.

Short commanded NATO's Kosovo air operation, which entailed 78 days of combat and more than 35,000 operational sorties. Seldom has a commander had to direct such a complex air campaign under such a stringent set of political constraints.

Despite the difficulties, the campaign concluded with Yugoslavia's capitulation to NATO, the withdrawal of its forces from Kosovo, only two aircraft lost, and no allied combat casualties. On stage with Short, and representing all of the USAF troops under his command during the Kosovo operation, were service personnel from each of the

major commands and the Air National Guard.

In that same evening, AFA awarded the Secretary of the Air Force, F. Whitten Peters, the W. Stuart Symington Award for his outstanding civilian contributions to national security. Sam B. Williams, chairman and CEO of the Williams International Co., received the John R. Alison Award for industrial contributions to the nation's security.

The USAF String Orchestra opened

the evening festivities with a musical presentation and a special program by Tony Award-winning singer Nell Carter, with the US Air Force Orchestra punctuating the celebration. Both the USAF String Orchestra and the USAF Orchestra performed under the direction of Col. Lowell E. Graham.

In conjunction with AFA's convention, Air Force leaders held a special appreciation event Sept. 15 at Andrews AFB, Md., honoring all USAF service personnel who contributed to the Kosovo operation.

Maj. Gen. Charles F. Wald, the vice director for strategic plans and policy, Joint Staff, opened the convention Sept. 13 with the keynote address. As part of the opening day activities, AFA honored the Air Force's 12 Outstanding Airmen of the Year at the annual dinner on the convention's first evening. Air Force Vice Chief of Staff Gen. Lester L. Lyles was the dinner speaker, and CMSAF Frederick J. "Jim" Finch served as toastmaster.

AFA convention delegates, military attendees, and other guests heard major addresses by Air Force Secretary Peters and Air Force Chief of Staff Gen. Michael E. Ryan.

The convention also featured a policy forum whose theme was "Aerospace Power and the Use of Force." Those speaking at the forum



**Exchanging viewpoints are (r-l) James McCoy, former AFA National President, Charles Church Jr., National Treasurer, and USAF Chief of Staff Gen. Michael Ryan. In the background is Gen. John Jumper, USAFE commander.**

Photo by Paul Kennedy



**Former Defense Secretary Caspar Weinberger (second from left) was a distinguished panelist at the convention's policy forum. With him here are AFAers Peter Hurd (left), Maine's state president, and Tom Hissem (second from right), Indiana's vice president for government relations.**

were Gen. Joseph W. Ralston, USAF, vice chairman of the Joint Chiefs of Staff, and Caspar Weinberger, Secretary of Defense during the Reagan Administration.

About 9,000 people participated in one or more of the convention-related activities. The 335 registered delegates, representing 48 states and the District of Columbia, were joined by senior military and government officials for the Aerospace Technology Exposition, featured speeches, and social events. The three-day exposition featured 135 exhibitors. On hand to cover the convention were 90 reporters and other news representatives.

Meeting concurrently with the convention were AEF trustees, AFA's Command Chief Master Sergeants Conference, and the Air Force Memorial Foundation Board of Trustees, as well as AFA's Air National Guard Council, Civilian Advisory Council, Enlisted Council, Junior Officer Advisory Council, Reserve Council, and Veterans/Retiree Council.

**Election of officers.** Thomas J. McKee, Fairfax Station, Va., was re-elected National President of the Air Force Association for a second term. Doyle E. Larson, Burnsville, Minn., was re-elected Chairman of the Board for a second term. William D. Croom Jr., Colorado Springs, Colo., was re-elected National Secretary for a third term, and Charles

H. Church Jr., Lenexa, Kan., was re-elected National Treasurer for a fifth term.

AFA's Aerospace Education Foundation re-elected the following officers: Michael J. Dugan, Dillon, Colo., as Chairman of the Board; Jack C. Price, Pleasant View, Utah, as President; Martin H. Harris, Montverde, Fla., as Vice President; Charles B. Jiggetts, Clifton, Va., as Secretary; and Phillip J. Sleeman, Tolland, Conn., as Treasurer.

**Other elections.** Eight new Region Presidents were elected, and

six Region Presidents were re-elected. Newly elected are Richard C. Taubinger (Far West Region), David R. Cummock (Florida Region), Eugene M. D'Andrea (New England Region), Charles A. Nelson (North Central Region), Boyd Anderson (Rocky Mountain Region), Billy M. Boyd (South Central Region), Zack E. Osborne (Jack H. Steed, serving temporarily) (Southeast Region), and Scotty Wetzel (Southwest Region). Thomas J. Kemp was re-elected but now covers the new Texoma Region. (Effective Oct. 1, the title "National Vice President" changed to "Region President," in accordance with the reorganization of regions approved at AFA's 1998 convention.)

Elected to the Board of Directors for three-year terms were Ted Eaton, Springport, Ind.; I. Fred Rosenfelder, Renton, Wash.; Jack H. Steed, Warner Robins, Ga.; William G. Stratemeier Jr., Quogue, N.Y.; Charles G. Thomas, Albuquerque, N.M.; and Mark J. Worrick, Denver, Colo.

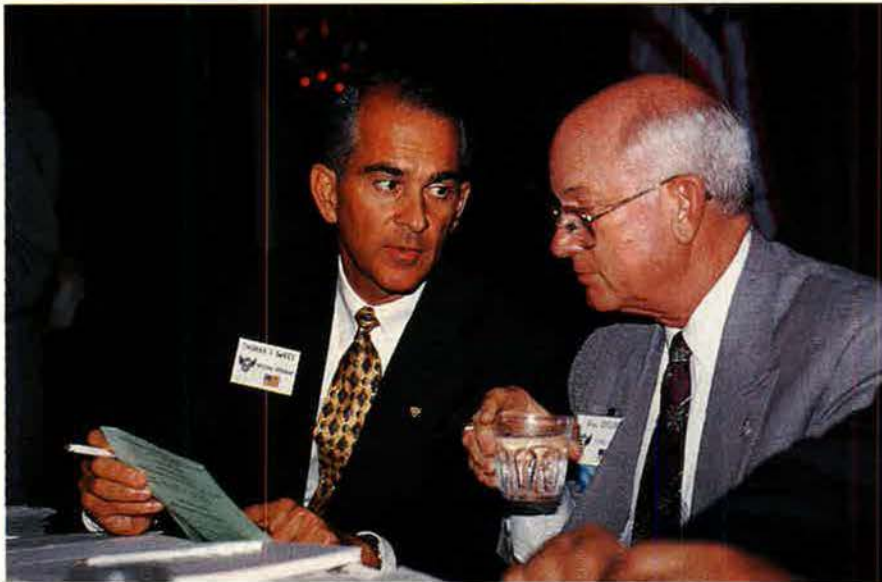
Three new Under-Forty Directors joining the AFA board are Stephan R. Kovacs Jr., Grand Island, N.Y.; Jenifer R. Petrina, Dublin, Calif.; and William T. Rondeau Jr., Great Falls, Mont.

For a complete list of AFA Region Presidents and National Directors, including those re-elected, see "This Is AFA" on p. 68.

The newly elected AEF trustees are: Bonnie B. Callahan, East Am-



**Pennsylvanians Lee Niehaus, from the Total Force Chapter, and Edmund Gagliardi, of the Eagle Chapter, pose with Aerospace Education Foundation trustee Robert Stein and his wife, Arlene, before the awards ceremonies.**



**AFA National President Thomas McKee (left) was re-elected for a second term during the convention. Here, he discusses AFA business with William Croom Jr., who was re-elected National Secretary for a third term.**

herst, N.Y.; H.T. Johnson, McLean, Va.; Claudius E. "Bud" Watts III, Charleston, S.C.; and Charles P. Zimkas Jr., Colorado Springs, Colo.

There was also a joint meeting of the National Executive Boards of the Arnold Air Society and the Silver Wings Society.

**Resolutions and changes.** Delegates voted for a change in AFA membership dues. Annual dues will increase from \$30 to \$36, effective Jan. 1, 2001. Three-year membership dues will increase from \$75 to \$90, and life membership dues will increase from \$450 to \$500, effective Jan. 1, 2000.

**Congressional activity.** AFA state delegations sponsored 23 Congressional breakfasts on Tuesday and Wednesday, with 55 members of Congress participating. Among them were Sens. James M. Inhofe (R-Okla.), Tim Hutchinson (R-Ark.), and Wayne Allard (R-Colo.), on the Senate Armed Services Committee, and Sens. Pete V. Dominici (R-N.M.), Ben Nighthorse Campbell (R-Colo.), Kay Bailey Hutchison (R-Texas), and Slade Gorton (R-Wash.), who are on the Senate Appropriations Committee. Other senators who attended the meetings were Republicans Orrin G. Hatch of Utah, Craig Thomas and Michael B. Enzi, both of Wyoming, and Don Nickles of Oklahoma, and Democrat Kent Conrad of North Dakota.

Also participating in the AFA

breakfast meetings were several members of the House Armed Services Committee, including Chairman Floyd D. Spence (R-S.C.), ranking member Ike Skelton (D-Mo.), Herbert H. Bateman (R-Va.), Saxby Chambliss (R-Ga.), Lindsey Graham (R-S.C.), James V. Hansen (R-Utah), Joel Hefley (R-Colo.), Walter B. Jones Jr. (R-N.C.), Owen B. Pickett (D-Va.), Ciro D. Rodriguez (D-Texas), Jim Saxton (R-N.J.), Norman Sisisky (D-Va.), John M. Spratt Jr. (D-S.C.), and James Talent (R-Mo.). Members of the House Appropriations Committee also participated: Congress-

men Norman D. Dicks (D-Wash.), Chet Edwards (D-Texas), Rodney Frelinghuysen (R-N.J.), Kay Granger (R-Texas), Jim Kolbe (R-Ariz.), John E. Sununu (R-N.H.), and Charles H. Taylor (R-N.C.). In addition to Chambliss and Dicks, co-chairmen of the Airpower Caucus, Rep. Cliff Stearns (R-Fla.) and Rep. Sam Johnson (R-Texas), co-chairmen of the Air Force Caucus, also attended the breakfasts.

Other congressmen attending the breakfasts were Bob Barr (R-Ga.), Michael Bilirakis (R-Fla.), Leonard L. Boswell (D-Iowa), Howard Coble (R-N.C.), Benjamin A. Gilman (R-N.Y.), Charles A. Gonzalez (D-Texas), J.D. Hayworth (R-Ariz.), Rush Holt (D-N.J.), Kenny C. Hulshof (R-Mo.), Asa Hutchinson (R-Ark.), Johnny Isakson (R-Ga.), Rick Lazio (R-N.Y.), Karen McCarthy (D-Mo.), John Mica (R-Fla.), George P. Radanovich (R-Calif.), Pete Sessions (R-Texas), Charles W. Stenholm (D-Texas), John R. Thune (R-S.D.), Tom Udall (D-N.M.), and Heather A. Wilson (R-N.M.).

State delegations that also met separately with their representatives included the Georgia delegation, which met with Sen. Paul D. Coverdell (R), and the New York delegation, which visited with Rep. Maurice Hinchey (D).

Congressmen Bilirakis, Isakson, and Radanovich received AFA awards for service to USAF.

Air Force Secretary Peters visited breakfasts hosted by Arizona, Colo-



**David Blankenship, National Director Emeritus, is flanked by the Petrina sisters—Capt. Jenifer Petrina (on the left), who is a new AFA Under-Forty Director, and Capt. Julie Petrina, former president of the Baltimore Chapter.**

rado, New Hampshire, South Carolina, and Virginia. Chief of Staff Ryan visited the breakfasts hosted by the Missouri-Kansas-Iowa, North Central Region, Pennsylvania, and Texas-New Mexico delegations. Vice Chief Lyles visited the Florida, Great Lakes Region, Maryland, New Hampshire, Oklahoma, Rhode Island, South Central Region, Utah, and Wyoming breakfasts.

**Aerospace Education Foundation.** A video on the theme of "AFJROTC: Preparing Leaders for the 21st Century" won the foundation's annual contest for presentations by AFJROTC cadets. The winning entry was from Unit WV-942 at Cabell Midland High School in Ona, W.Va. The cadets' video emphasized that they are able to learn from mistakes they make and turn those mistakes into successes. AFJROTC offers the cadets opportunities to develop communications and other skills through various outlets, including speaking to elementary school classes.

Sandra Armstrong, from Abbeville, Ala., won the Christa McAuliffe Memorial Award for Teachers as the year's outstanding aerospace science, mathematics, and computer science teacher. The Central Florida Chapter received the Sam E. Keith Jr. Aerospace Education Award of Excellence. The award is named in honor of the late AFA leader, who



Photo by Paul Kennedy

*At the podium is Jack Price, AEF President, with Michael Dugan (center), AEF Board Chairman, and Charles Jiggetts, AEF Secretary, also at the head table. AEF's trustees were among several groups meeting during the convention.*

served as National President and Board Chairman, from Fort Worth, Texas. Victoria W. Hunnicutt, of the Carl Vinson Memorial (Ga.) Chapter, won the George D. Hardy Memorial Award. The winner is nominated by an AFA chapter for outstanding contributions to furthering the scientific, technical, and aerospace education of the nation.

On Tuesday afternoon, following the policy forum, Ryan presented the Chief of Staff Team Excellence Awards to the Due in

From Maintenance Action Work-out Team, 637th Aircraft Generation Squadron, Charleston AFB, S.C.; the Self-Inspection Tracking System Team, 917th Logistics Group, Barksdale AFB, La.; the Supply and Transportation Re-engineering Concept Team, 20th Fighter Wing, Shaw AFB, S.C.; Family Helping Families, 15th Air Base Wing, Hickam AFB, Hawaii; and the Aerospace Ground Equipment Emission Reduction Initiative Team, 452nd Air Mobility Wing, March ARB, Calif.

**Acknowledgments.** Parliamentarians for the AFA National Convention were Martin H. Harris, for the Sept. 13 business session, and Joan Blankenship for the Sept. 14 business session. Inspectors of Elections were Gerald S. Chapman (chairman), John L. Burrow, and James E. Callahan. Daniel C. Hendrickson chaired the Credentials Committee, serving with James E. Fultz and Sharon M. Johnson.

The association is particularly grateful to a corps of volunteers who assisted the staff in convention support: Cecil Brendle, Jimmy Canlas, Jose Corella, Noel Garcia, Max Keeney, Tim Monroe, Yosef Morris, Glenda R. Shepela, Charlie Tippet, M. Allison Trujillo, Debbie and Greg Snyder, Dana Steinhauser, and Leola Wall.

The 2000 convention will be held at the Marriott Wardman Park Hotel, Washington, D.C., Sept. 11-13, 2000. ■



Staff photo by Guy Aceto

*Jo Smith, Ann Ragland, and Nelda Hull (r-l) look over Lockheed Martin's Joint Strike Fighter simulator at the Aerospace Technology Exposition. Smith is Oklahoma state's AFA vice president, while Ragland is the state vice president for aerospace education. All three are from the Central Oklahoma Gerrity Chapter.*

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# This Is AFA

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Members of Congress, Air Force officials, and AFA leaders enjoyed an AFA convention tradition—Congressional breakfasts. Here, Rep. Saxby Chambliss (R-Ga.) (left) and AFA National President Thomas J. McKee (right) chat with Georgians Jack H. Steed, AFA member of the year, and Dan Callahan, national director. Georgia was among the states and regions hosting 23 Congressional breakfasts this year.



Photo by Susan Kennedy

A member of the House Armed Services Committee, Rep. Walter B. Jones Jr. (R-N.C.) (right), sits with James E. "Red" Smith, AFA national director emeritus. Among his recent actions on military issues, Jones has taken a stand against DoD's mandatory anthrax vaccination program. He has sponsored legislation to make the program voluntary until a new vaccine or a new, reduced course of shots is approved.

Congressional breakfasts provide opportunities for Air Force officials and AFA members to informally discuss issues with members of Congress and build relationships with them.

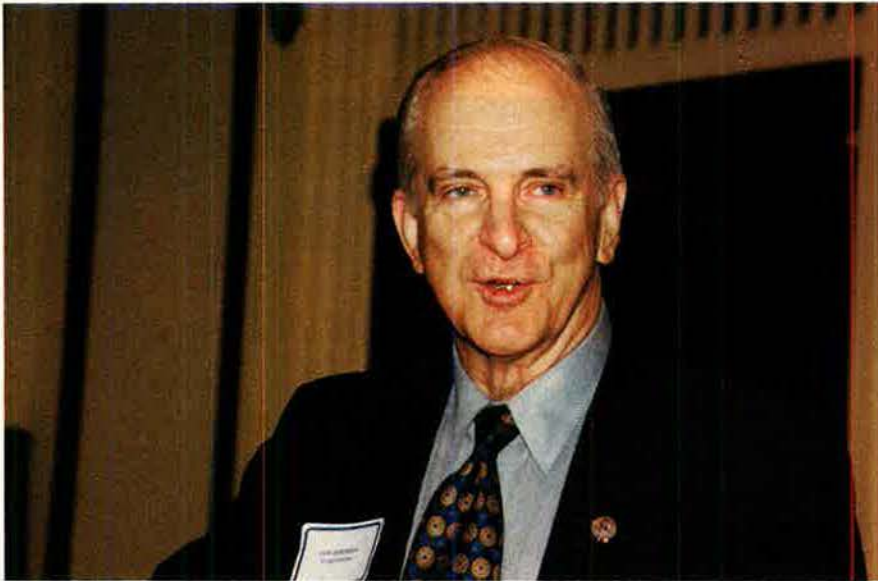


Photos by Paul Kennedy



At the North Central Region Congressional breakfast, Sen. Kent Conrad (D-N.D.) (above) expressed support for funding full production of the F-22. He also looked over an AFA special report, "The Kosovo Campaign: Aerospace Power Made It Work." Ronald L. Garcia, a former North Dakota AFA state president, is sitting next to Conrad.





*Rep. Sam Johnson, a Texas Republican, was a distinguished guest at the Texas–New Mexico breakfast. His 29-year USAF career encompassed flying with the Thunderbirds, 62 combat missions during the Korean War, and nearly seven years as a POW during the Vietnam War. Johnson is co-chairman of the Congressional Air Force Caucus.*



*AFA Chairman of the Board Doyle E. Larson (at left, above) greets Rep. James V. Hansen (R–Utah) at Utah’s Congressional breakfast. A Navy veteran, Hansen sits on the House Armed Services and Veterans’ Affairs committees. At right, Sen. Orrin Hatch (R–Utah) is welcomed by Larson and (at far right) Boyd Anderson, region president (Rocky Mountain Region).*



*More than 50 members of Congress attended the breakfasts. At left, Rep. Bob Barr (R–Ga.) talks with McKee. Air Force Secretary F. Whitten Peters, Chief of Staff Gen. Michael E. Ryan, and Vice Chief of Staff Gen. Lester L. Lyles headed the list of USAF leaders who dropped in on the gatherings, hosted by AFA states and regions.*



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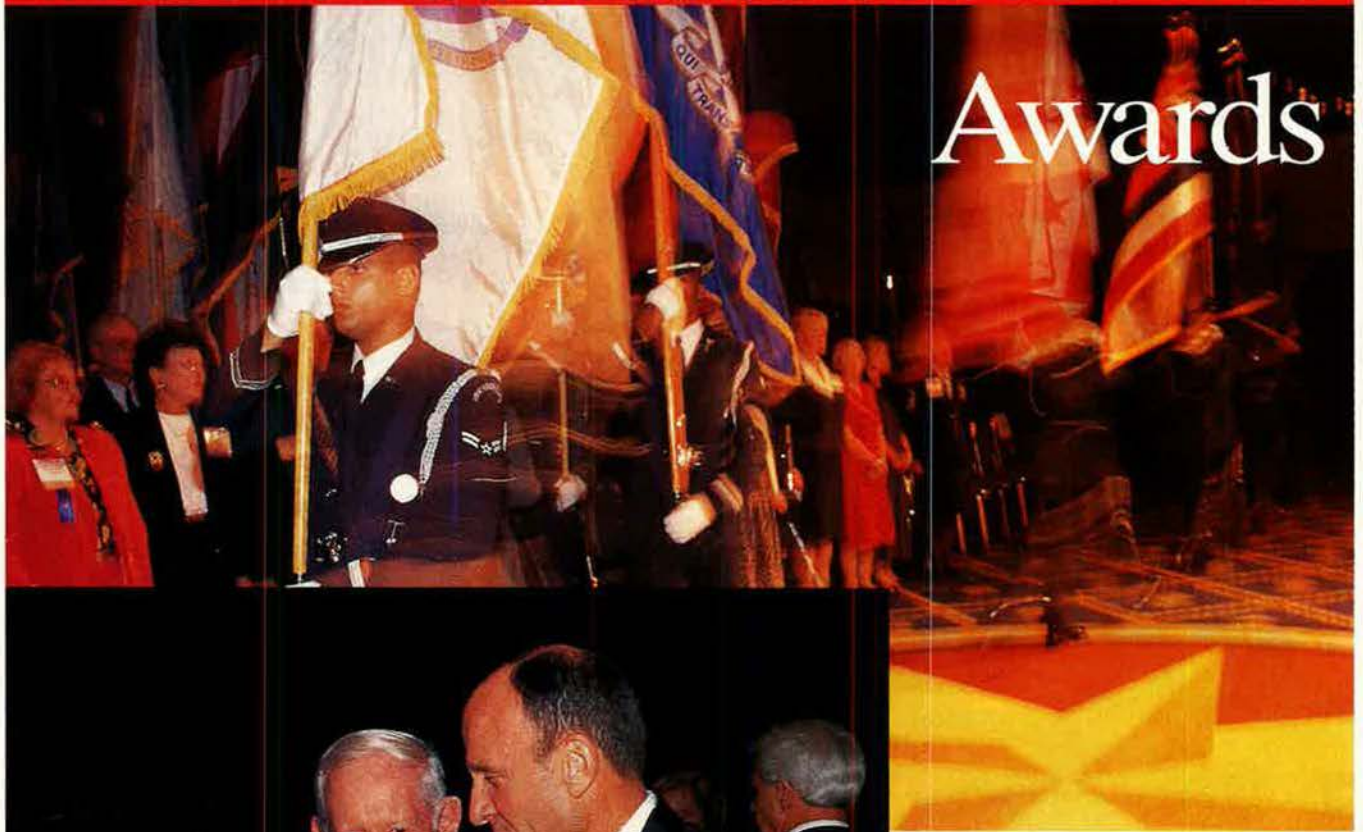
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# CACI

Photos by Paul Kennedy



# Awards



*Lt. Gen. Michael C. Short (right), who earned AFA's H.H. Arnold Award for his leadership in Operation Allied Force, chats with Medal of Honor recipient Bernard F. Fisher.*

## National Aerospace Awards

**Award**

**H.H. Arnold Award** *AFA's highest honor in national security to a member of the armed forces*

**W. Stuart Symington Award** *AFA's highest honor in national security to a civilian*

**John R. Alison Award** *AFA's highest honor for industrial leadership*

**David C. Schilling Award** *outstanding contribution in flight*

**Theodore von Karman Award** *outstanding contribution in science and engineering*

**Gill Robb Wilson Award** *outstanding contribution in arts and letters*

**Hoyt S. Vandenberg Award** *outstanding contribution in aerospace education*

**Thomas P. Gerrity Award** *outstanding contribution in logistics*

**Department of Veterans Affairs Employee of the Year**

**Recipient(s)**

Lt. Gen. Michael C. Short, joint force air component commander

F. Whitten Peters, Secretary of the Air Force

Sam B. Williams, chairman and CEO, Williams International Co., Walled Lake, Mich.

509th Bomb Wing, Whiteman AFB, Mo.

Air Force Research Laboratory

1st Combat Camera Squadron, Charleston AFB, S.C.

Det. 2, USAF Air Ground Operations School, National Training Center Ft. Irwin, Calif.

Lt. Col. Marilee A. Molk, commander, 3rd Equipment Maintenance Squadron, Elmendorf AFB, Alaska

Guy A. Liedke, program specialist, James A. Haley Veterans Affairs Hospital, Tampa, Fla.

## Crew Awards and Special Citations

Award	Recipient(s)	Achievement	Accepted by
Lt. Gen. Claire L. Chennault Award	Capt. Eugene S. Anderson, Seymour Johnson AFB, N.C.	Best aerial warfare tactician	Capt. Eugene S. Anderson
Brig. Gen. Ross G. Hoyt Award	Aircrew Bass 01 (KC-10A), 2nd Air Refueling Sq., McGuire AFB, N.J.	Best air refueling aircrew	Capt. Leif E. Eckholm
Gen. Curtis E. LeMay Award	Crew Slam 04, 28th Bomb Wing, Ellsworth AFB, S.D.	Best bomber aircrew	Capt. Randy L. Kaufman
Gen. Jerome F. O'Malley Award	Rivet Joint Crew, 38th and 343rd Reconnaissance Sqs., and 97th, 390th, and 488th Intelligence Sqs., Offutt AFB, Neb.	Best reconnaissance crew	Capt. Michael LaRocco TSgt. Scot Clyde
Gen. Thomas S. Power Award	Crew S-210/211, 12th Missile Sq., 341st Operations Gp., Malmstrom AFB, Mont.	Best missile combat crew	Capt. Brian G. Hollomon
Space Operations Award	2nd Space Warning Sq., Buckley ANGB, Colo.	Best space operations crew	Capt. Christopher W. Musick
Lt. Gen. William H. Tunner Award	Aircrew Shark 01, 7th Special Operations Sq., RAF Mildenhall, UK	Best airlift aircrew	Lt. Col. David H. Sammons
Airborne Battle Management Crew	Crew 3, 963rd Airborne Air Control Sq., Tinker AFB, Okla.	Best ABM crew	Maj. Beau Grassé
USAF Test & Evaluation Team of the Year	Project 23 Electronic Warfare Optimization Test Team, Eglin AFB, Fla.	Best test team	Lt. Col. Guy D. Turner

## Air National Guard and Air Force Reserve Command Awards

Award	Recipient(s)	Achievement	Accepted by
CMSgt. Dick Red Award	CMSgt. John E. Hurst, 126th Air Refueling Wing, O'Hare IAP/ARS, Ill.	Best ANG aerospace maintenance	CMSgt. John E. Hurst
Maj. Gen. Earl T. Ricks Award	The Air National Guard Aircraft Maintenance Team	Best ANG airmanship	Col. Timothy Carroll
Best Air National Guard Unit	129th Rescue Wing, Moffett FAF, Calif.	Top ANG unit	Col. Steven C. Speer, wing commander
Best Air Force Reserve Unit	440th Airlift Wing, Gen. Mitchell IAP/ARS, Wis.	Top AFRC unit	Col. Michael Smith, wing commander
President's Award	301st Airlift Sq., Travis AFB, Calif.	Best Reserve aircrew	Capt. William W. Barbour

## Citations of Honor

Recipient	Achievement
Edward W. Corson, associate editor, <i>The Macon Telegraph</i> , Macon, Ga.	Contributed to greater public understanding of national defense issues and the USAF mission through his cogent, clear editorials and columns.
Air Force Doctrine Center, Maxwell AFB, Ala.	Unified fragmented USAF doctrinal efforts under one organization and refocused doctrine on aerospace power's contributions to the warfighter.
Security Forces Skills Training Development Team, Lackland AFB, Texas	Developed an efficient new method of instruction for students.
USAFE Computer Systems Squadron, Ramstein AB, Germany	Provided consistently excellent communications and information support for more than 160 European C <sup>3</sup> sites and 15 air traffic control and weather facilities for DoD, NATO, and NASA missions.
8th Maintenance Sq., Kunsan AB, South Korea	Achieved new maintenance standards that helped the 8th Fighter Wing, Kunsan AB, South Korea, attain new levels of combat capability.
31st Air Expeditionary Wing, Aviano AB, Italy	Led US and NATO coalition aircraft in combat against the Serbian regime in Operation Allied Force. Flew more than 8,500 combat sorties over Yugoslavia.
99th Air Refueling Sq., Robins AFB, Ga.	Set a new record in hours logged for an active duty Air Mobility Command unit and achieved an unprecedented operational aerial refueling rate of 100 percent.
488th Intelligence Sq., RAF Mildenhall, UK	Provided distinguished service in worldwide tactical, strategic, and contingency signals operations to support special operations crews and maintained a 98 percent mission effectiveness rate.
Combat rescue team	Combat rescue operations during Operation Allied Force.

**AEF Chairman of the Board Michael J. Dugan (right) and AEF President Jack C. Price congratulate Sandra Armstrong as AEF's Teacher of the Year. Armstrong was sponsored by the Montgomery (Ala.) Chapter. She had initiated a science and technology week at her school that was developed statewide into "Alabama Aerospace Week."**



## Professional, Civilian, and Educational Awards

### Award

CMSAF Thomas N. Barnes Award for Crew Chief of the Year  
 Gen. Billy Mitchell Award for C<sup>4</sup> Excellence  
 Paul W. Myers Award for Physicians  
 Verne Orr Award for Human Resources  
 Juanita Redmond Award for Nursing  
 Stuart R. Reichart Award for Lawyers  
 Personnel Manager of the Year\*  
 Civilian Wage Employee of the Year\*  
 Civilian Program Specialist of the Year\*  
 Civilian Program Manager of the Year\*  
 Civilian Senior Manager of the Year  
 AFROTC Cadet of the Year  
 CAP Aerospace Education Cadet of the Year  
 Joan Orr Award for Air Force Spouse of the Year  
 Christa McAuliffe Memorial Award for Teachers  
 Sam E. Keith Jr. Aerospace Education Award of Excellence  
 George D. Hardy Memorial Award  
 Outstanding Initiative in Visions of Exploration Program Award  
 Outstanding Visions of Exploration Chapter Award  
 Jimmy Stewart Aerospace Education Award

### Recipient

SSgt. Dana T. Alexander, Ramstein AB, Germany  
 Capt. Michael L. Cote, Robins AFB, Ga.  
 Lt. Col. Virgil S. Jefferson, McClellan AFB Calif.  
 3rd Combat Communications Group, Tinker AFB, Okla.  
 Capt. Judy D. Stoltmann, Robins AFB, Ga.  
 Col. Lester K. Katahara, Hanscom AFB, Mass.  
 Lt. Col. Gregory F. Patterson, Hurlburt Field, Fla.  
 Joseph R. Dixon, Minot AFB, N.D.  
 John J. Glover, Robins AFB, Ga.  
 Edward J. Ah Sam Jr., Beale AFB, Calif.  
 Brent Ellerbroek, Kirtland AFB, N.M.  
 Nicholas H. Martin, University of Colo.  
 Thomas T. McKenney, Onida, S.D.  
 Norma Holland, Vicenza AB, Italy  
 Sandra Armstrong, Abbeville, Ala.  
 Central Florida Chapter, Fla.  
 Victoria W. Hunnicutt, Carl Vinson Chapter, Warner  
 Robins AFB, Ga.  
 Central Florida Chapter, Fla.  
 Gen. E.W. Rawlings Chapter Minn.  
 WV-942 Unit, Cabell Midland High School, Ona, W.Va.

## Management and Environmental Achievement Awards

### Award

AFMC Executive Management Award\*  
 AFMC Middle Management Award\*  
 AFMC Junior Management Award\*  
 Gen. Edwin W. Rawlings Award for Environmental Excellence (Management)\*  
 Gen. Edwin W. Rawlings Award for Environmental Excellence (Technical)\*

### Recipient

Col. Ellen M. Pawlikowski, Wright-Patterson  
 AFB, Ohio  
 Maj. Karl S. Bosworth, Edwards AFB, Calif.  
 Capt. Mark Bednar, Hanscom AFB, Mass.  
 Lt. Col. Stanley W. Hotschneider, Cape  
 Canaveral AS, Fla.  
 Andrew L. Carlisle, Langley AFB, Va.

\* These awards are now presented at the recipient's locations by an AFA chapter.

## 1999 AFA Membership Awards

### Arthur C. Storz Sr. Membership Awards

AFA's most prestigious membership awards are named for Arthur C. Storz Sr., a former permanent AFA national director, a life member, and a principal founder of the Ark-Sar-Ben (Neb.) Chapter. The Storz membership awards, made possible through a generous endowment to the association by his son, Art Storz Jr., have been awarded for membership excellence based on criteria approved by AFA's board of directors for the year ending March 31, 1999.

### Special Recognition—Sustained New Member Recruitment

These awards recognize chapters that have attained the quarterly new member recruitment goal for three consecutive quarters, from October 1998 to June 1999. *(The awards are based on their recruitment of new members during the 12-month period ending March 31, 1999.)*

#### Chapter Award

Presented to the AFA chapter that produces the highest number of new members during the 12-month period ending March 31, 1999, as a percentage of total chapter membership as of March 31, 1998, and meets certain other minimum indicators of overall performance and excellence.

Steel Valley, Ohio

### 1999 Unit Activity Awards

#### Donald W. Steele Sr. Memorial Award

*AFA Unit of the Year*  
Hurlburt Chapter, Fla.

#### Outstanding Region of the Year Award

Rocky Mountain Region

#### Outstanding State Organization

Colorado

#### Outstanding Chapters

Extra Large Chapter: Donald W. Steele Sr. Memorial Chapter, Va.

Medium Chapter: Golden Triangle Chapter, Miss.

Small Chapter: Pensacola Chapter, Fla.

#### Exceptional Service Awards

Best Single Program: Delaware Galaxy Chapter, Del.

Communications: Mile High Chapter, Colo.

Community Relations: Willamette Valley Chapter, Ore.

Overall Programming: Cape Canaveral Chapter, Fla.

Veterans' Affairs: Fort Wayne Chapter, Ind.

#### President's Award for Public Education (Extra Large Chapter)

Ark-La-Tex Chapter, La.

#### Special Citation

Northern Utah Chapter, Utah

#### Jack Gross Award

These awards recognize the chapter in each size category with the highest number of new members as a percentage of chapter size at the beginning of the membership year. A minimum of 10 is required. *(The award is based on their recruitment of new members during the 12-month period ending March 31, 1999.)*

**Small Chapter** Newport Blue & Gold, R.I.

**Medium Chapter** Miss Veedol, Japan

**Large Chapter** Enid, Okla.

**Extra Large Chapter** Anchorage, Alaska

**Chapter Larger Than 1,500** C. Farinha Gold Rush, Calif.

Ark-La-Tex, La.  
Badger State, Wis.  
Bakersfield, Calif.  
C. Farinha Gold Rush, Calif.  
Central Florida, Fla.  
Col. H.M. "Bud" West, Fla.  
Contrails, Kan.  
Diamond State, Del.  
Dolomiti, Italy  
Enid, Okla.  
Brig. Gen. James R. McCarthy, Fla.  
Gold Coast, Fla.  
Golden Triangle, Miss.  
Happy Hooligan, N.D.  
Joe Walker—Mon Valley, Pa.  
John W. DeMilly Jr., Fla.  
Klamath Basin, Ore.  
Leigh Wade, Va.  
Lincoln, Neb.  
Miss Veedol, Japan  
Newport Blue & Gold, R.I.  
Northeast Texas, Texas  
Ouachita, Ark.  
Pensacola, Fla.  
Richard S. Reid, Ariz.  
Robert H. Goddard, Calif.  
Sal Capriglione, N.J.  
Steel Valley, Ohio  
Thomas Watson Sr. Memorial, N.Y.  
Total Force, Pa.

### AFA Staff Member of the Year

A donation from Jack Gross, national director emeritus, enables AFA to honor staff members each quarter. Those members become eligible for AFA Staff Member of the Year.

1992 Doreatha Major  
1993 Jancy Bell  
1994 Gilbert Burgess  
1995 David Huynh  
1996 Sherry Coombs  
1997 Katherine DuGarm  
1998 Suzann Chapman



Hurlburt Chapter President Mark Andrews and his wife, Kathy, celebrate the Florida chapter's selection as AFA Unit of the Year—winner of the Donald W. Steele Sr. Memorial Award.

Photo by Paul Kennedy

## 1999 Individual Activity Awards

### Member of the Year

Jack H. Steed, Ga.

### Presidential Citation

Craig Allen, Utah  
Michael F. Cammarosano, La.  
Norman S. Collard, Fla.  
David R. Cummock, Fla.  
Marguerite H. Cummock, Fla.  
Virginia M. Leitch, Wash.  
Joan Lopez, Texas  
Paul Maye, Calif.  
Donald E. Persinger, Iowa  
Oscar L. Curtis, Okla.

### Chairman's Special Citation

James E. Callahan, N.Y.  
Joseph R. Falcone, Conn.

### Central East Region

#### Medal of Merit

Brig. Gen. Jack Gingerich,\* Md.  
Maj. Tracey L. Hale,\* Va.  
Allen S. Hedgecock, Del.  
Ira S. Latimer, W.Va.  
Joseph D. Lemieux, Va.  
Ronald H. Love, Del.  
Patricia A. Meier, Del.  
Stephan A. Mosier, Va.  
Kenneth K. Robertson Jr., Del.  
Howard G. Sholl Jr., Del.  
Stephen W. Welde, Del.  
Johnny Whitaker, Va.

#### Exceptional Service Award

Monte Correll, Va.  
Robert Maiocco, Va.  
Edward R. Martin, Va.  
Herman N. Nicely, W.Va.  
Julie E. Petrina, Md.  
Glen E. Thompson, Va.

#### Special Citation

Andrew H. Heath, Va.  
David S. Lutz, Va.  
Veterans/Retiree Council, Va.

### Far West Region

#### Medal of Merit

John K. Barbour, Calif.  
Linda Bunnell, Calif.  
Arthur Cartwright, Calif.  
Capt. Grant S. Case,\* Calif.  
Angelo Di Giovanni, Ariz.  
Arthur W. Gigax, Ariz.  
Eugene W. Grimm, Calif.  
Chris Harlambakis, Calif.  
John L. Hill, Calif.  
Richard L. Randall, Calif.  
Lisa Smith, Calif.  
Michael E. Solomon, Hawaii  
Robert J. Wickwire, Calif.

#### Exceptional Service Award

Thomas A. Hohman, Calif.  
John A. Miller, Ariz.  
Michael J. Peters, Calif.  
E. Robert Skloss, Calif.

### Great Lakes Region

#### Medal of Merit

Andrew De Radder, Mich.  
Frank Gustine, Ill.  
James R. Jenkins, Ky.  
Capt. Timothy P. Kern,\* Ohio  
Roger K. Myers, Ind.  
Everitt Padgitt, Ind.  
James S. Parker, Ky.  
Kenneth W. Ratiiff, Mich.  
Ronald E. Thompson, Ohio

#### Exceptional Service Award

Eunice L. Bailey, Ill.  
William Howard Jr., Ind.  
Ralph E. Shadel, Ohio  
Jack L. Ventling, Ohio  
Frank J. Wombwell, Ill.

### Midwest Region

#### Medal of Merit

Ralph H. Bradley, Neb.  
Charles B. Froemke Jr., Ohio  
Lucia R. Harlan, Mo.  
Rodney G. Horton, Mo.  
Terri Politi, Mo.  
Patricia J. Snyder, Mo.  
David R. Wolfe, Neb.

#### Exceptional Service Award

Robin M. League, Mo.

### New England Region

#### Medal of Merit

Joseph P. Bisognano Jr., Mass.  
David T. Buckwalter, R.I.  
Bruce R. Denner, N.H.  
Peggy Shaw, Mass.  
Russell A. Taylor, Mass.  
David A. Zamorski, Mass.

#### Exceptional Service Award

Robert B. Kennedy, Mass.  
David L. Ladd, Vt.

### North Central Region

#### Medal of Merit

Albert J. Amatuzio, Minn.  
Jerry W. Browning, N.D.  
Roger J. Mertes, N.D.

### Northeast Region

#### Medal of Merit

Steve Briggs, N.Y.  
Richard H. Waring, N.Y.  
Richard T. Yarosz, Pa.

### Northwest Region

#### Medal of Merit

Carl W. Bradford, Alaska  
Michael T. Cook, Alaska  
Floyd E. Gori, Alaska  
Gary A. Hoff, Alaska

John C. Moore, Wash.  
Gordon D. Smith, Wash.  
Gordon L. Wohlfeil, Wash.

#### Exceptional Service Award

Karl W. Berg, Wash.  
Richard A. Seiber, Wash.

#### Special Citation

Charles C. Tomlinson, Ore.

### Rocky Mountain Region

#### Medal of Merit

Ted Helsten, Utah  
Carol A. Hollanc, Wyo.  
Jack Libidinsky, Utah  
Mark A. McClure, Utah  
David W. Thomson, Colo.  
James E. Uram, Colo.

#### Exceptional Service Award

Karl McCleary, Utah  
Terry D. Miller, Colo.  
Howard R. Vasina, Colo.

### South Central Region

#### Medal of Merit

Joseph C. Bryant, Tenn.  
CMSgt Paula Campa,\* Ala.  
G. Peyton Cole Jr., La.  
Wayne C. Cullins, Ark.  
James W. Graves, La.  
Fran Jones, Ala.  
Barry Metz, Ala.  
Teresa F. Miley, Miss.  
Ronald J. Vaughan, Miss.

#### Exceptional Service Award

Donald C. Brown, Ala.  
James E. Huggins, La.  
Col. Robert J. Kraynik,\* Ala.  
Lt. Col. Jimmie Varnado,\* Ala.  
Nancy R. Zehrer, Ala.

### Southeast Region

#### Medal of Merit

Edward L. Bensman, Fla.  
Michael J. Bolton, Ga.  
Timothy R. Brock, Fla.  
Lloyd J. Burns, N.C.  
David S. Corbett, Ga.  
Maj. Gen. W. Reed Ernst II,\* Fla.  
Lindy C. Gunderson, N.C.  
Shirley A. Jones, Fla.  
David M. Loar, Fla.  
Karen M. Masotti, Fla.  
Brian P. McLaughlin, Fla.  
John J. Mitchell, Fla.  
Pamela L. Mongin, Ga.  
Raymond A. Monti, Fla.  
Dennis M. Moran, Fla.  
Richard J. O'Neil, Fla.  
Jacob N. Shepherd Jr., N.C.  
Nathan R. Stanley, N.C.  
Sandra S. Wood, Fla.

### Exceptional Service Award

James W. Council, Fla.  
Zack E. Osborne, Ga.  
Robert E. Patterson, Fla.  
Michael E. Richardson, Fla.  
Joanne T. Richart, Fla.  
Kevin Sluss, N.C.  
Gerald V. West, N.C.

#### Special Citation

Christopher G. Bailey, Fla.  
Jimmey R. Morrell, Fla.

### Southwest Region

#### Medal of Merit

Anne Bailey, Texas  
Thomas E. Bailey, Texas  
Jack E. Beam III, Okla.  
Roger L. Claypoole Jr., Texas  
Mario V. DeSanctis, Texas  
Carol R. Griffin, Okla.  
Howard M. Hachida, Texas  
George E. Hoback, Texas  
Cassandra Y. McMillan, Texas  
Yvonne B. Robillard, Texas  
Marsha D. Runnels, Texas  
Mark F. Stevens, Okla.  
Joseph T. Thomas, Texas  
Richard C. Walker, Texas  
Patricia A. Watson, Texas

#### Exceptional Service Award

Dennis H. Alvey,\* Texas  
C. Wayne Calhoun, Texas  
Ralph Charlip, Texas  
Pat Gloff, Texas  
Richard E. Greenblum, Texas  
Albert Leferink Jr., Texas

#### Special Citation

Ramsdell B. Gunter, Texas  
Air Force Recruiting Service,  
Randolph AFB, Texas  
USO Council of Metropolitan  
San Antonio

### Pacific

#### Medal of Merit

Karin L. Fones, Okinawa  
Deborah Haussler, Okinawa

\*Recognized by Awards  
Committee for significant  
achievement as members of  
AFA Advisory Councils or as  
Presidential Advisors.

**AFA Member of the Year Jack H. Steed talks with Secretary of the Air Force F. Whitten Peters during the Air Force Anniversary gala. Steed is a member of the Carl Vinson Memorial (Ga.) Chapter.**



## 1999 Community Partner Membership Awards

The following chapters have qualified for these awards based on their recruitment of new members during the 12-month period ending March 31, 1999.

### Exceptional Service Award

Selection for this award is made by the National Awards Committee from among the chapters that have recruited the greatest percentage of Community Partners, in terms of chapter membership.

Enid, Okla.

### Gold Awards

These awards recognize chapters that have a total number of Community Partners equal to or greater than 6 percent of overall chapter membership, with a minimum number of Community Partners to qualify. The minimum number is determined by the chapter size.

Altus, Okla.  
 Ark-La-Tex, La.  
 Cape Canaveral, Fla.  
 Col. H.M. "Bud" West, Fla.  
 Concho, Texas  
 Contrails, Kan.  
 Delaware Galaxy, Del.  
 Eagle, Pa.  
 Enid, Okla.  
 Fairbanks Midnight Sun, Alaska  
 Florida Highlands, Fla.  
 Fort Wayne, Ind.  
 Gen. Charles L. Donnelly Jr., Texas  
 Golden Triangle, Miss.  
 Happy Hooligan, N.D.  
 High Desert, Calif.  
 John W. DeMilly Jr., Fla.  
 Leigh Wade, Va.  
 Llano Estacado, N.M.  
 Lloyd R. Leavitt Jr., Mich.  
 Montgomery, Ala.  
 Northeast Texas, Texas  
 Pope, N.C.

Richard D. Kisling, Iowa  
 Richard S. Reid, Ariz.  
 Robert H. Goddard, Calif.  
 Steel Valley, Ohio  
 Swamp Fox, S.C.  
 Total Force, Pa.  
 Wright Memorial, Ohio

### Achievement Awards

These awards recognize chapters that have a total number of Community Partners equal to or greater than 3 percent of overall chapter membership, with a minimum number of Community Partners to qualify. The minimum number is determined by the chapter size.

Anchorage, Alaska  
 Badger State, Wis.  
 Cape Fear, N.C.  
 Carl Vinson Memorial, Ga.  
 Chautauqua, N.Y.  
 Colin P. Kelly, N.Y.  
 Colorado Springs/Lance Sijan, Colo.  
 David D. Terry Jr., Ark.  
 Del Rio, Texas  
 Diamond State, Del.  
 Francis S. Gabreski, N.Y.  
 Gen. B.A. Schriever Los Angeles, Calif.  
 Gen. David C. Jones, N.D.  
 Harry S. Truman, Mo.  
 Highpoint, N.J.  
 Jackson, Miss.  
 John C. Stennis, Miss.  
 Long's Peak, Colo.  
 McChord AFB, Wash.  
 Mel Harmon, Colo.  
 Mount Clemens, Mich.  
 Panhandle AFA, Texas  
 Tidewater, Va.  
 William A. Jones III, Va.

## Named in Memorial Tribute

Deaths during the past year formally recognized by the convention

Gen. James Allen  
 Rose Marie Anderson  
 Maj. Gen. Charles I. Bennett Jr., USAF (Ret.)  
 Alice S. Brown  
 Patricia C. Brownelle  
 Charles "Pete" Conrad Jr.  
 Col. Isaac M. Copeland Jr., USAF (Ret.)  
 Col. John H. deRussy, USAF (Ret.)  
 Carolyn V. Donnelly  
 Vice Adm. Donald E. Engen, USN (Ret.)  
 Col. Loren D. Evenson, USAF (Ret.)  
 Col. Aubrey S. Gaskins, USAF (Ret.)  
 Maj. James E. Gordon Jr., USAF (Ret.)  
 Bruce F. Hampel  
 Maj. Gen. Gilbert O. Herman, USAF (Ret.)  
 Gen. James E. Hill, USAF (Ret.)  
 Lt. Col. Lester H. Hughes, USAF (Ret.)  
 Glen LaMar Jensen Jr.  
 Lt. Col. Robert S. Johnson, USAF (Ret.)  
 Robert H. Jones  
 Martha Lafferty  
 Col. William R. Lawley Jr., USAF (Ret.)  
 Paul Jubelt  
 Lt. Col. Richard C. Keller, USAF (Ret.)  
 Jana Knoska Brink  
 Michele T. Kriebel  
 Lt. Col. Carlton H. McConnell, USAF (Ret.)  
 MSgt. Samuel B. Moody, USAF (Ret.)  
 Harold E. Renner  
 Costello N. Robinson  
 Lt. Col. Albert J. Sambold, USAF (Ret.)  
 Sgt. Edmund F. Sarno  
 Alan B. Shepard Jr.  
 Col. Joe Snow, USAF (Ret.)  
 Thomas W. Swoop  
 Louise Timken  
 Col. Charles J. Vesely, USAF (Ret.)  
 Maj. Wilbur E. Young, USAF (Ret.)

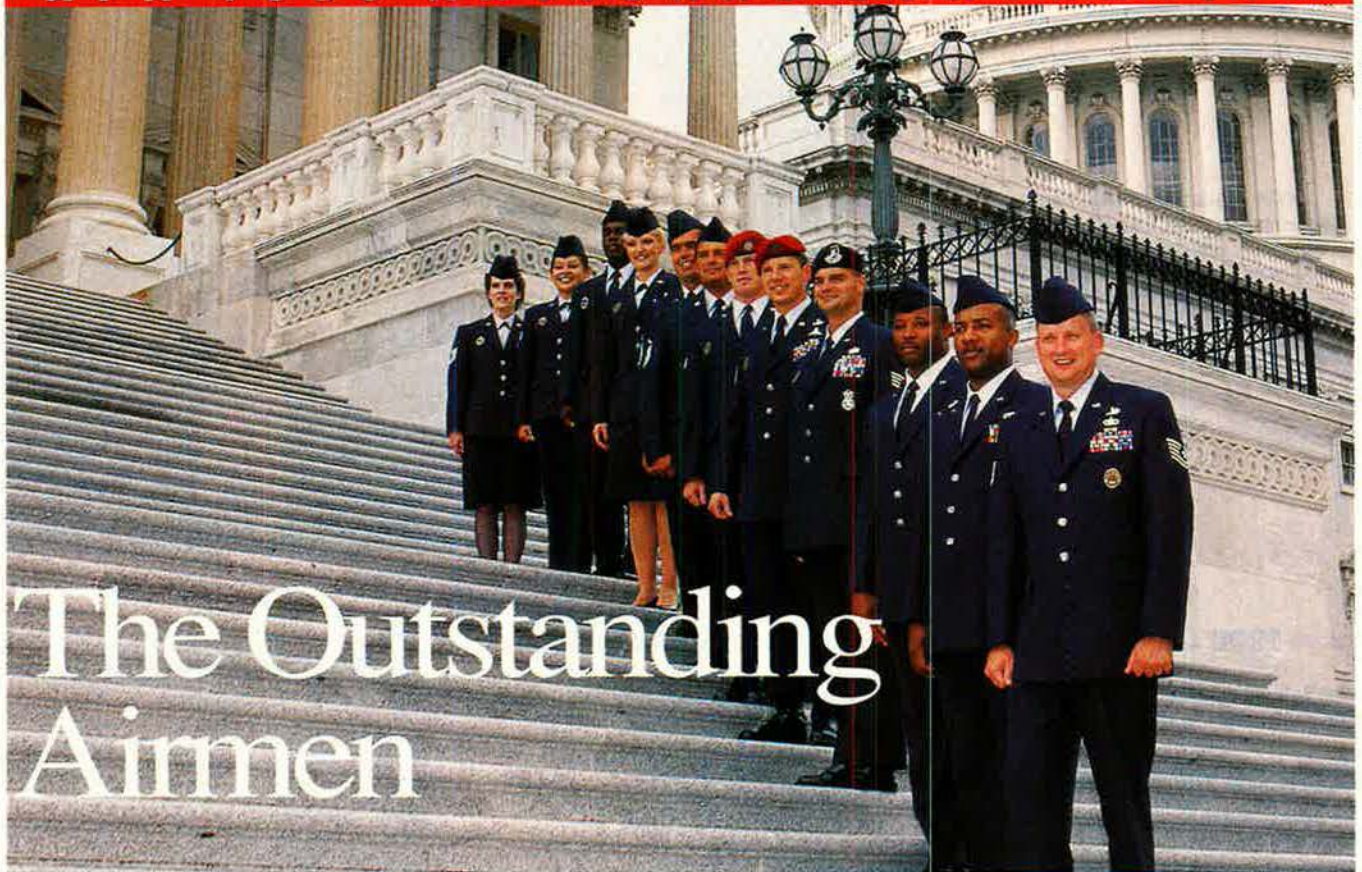


Photo by Nick Kennedy

## The Outstanding Airmen

The 1999 USAF Outstanding Airmen line up on the steps of the US Capitol. They are (l-r) TSgt. Patricia M. Woodham, SrA. Margaret S. Rawls, SSgt. Gregory A. Coleman, SSgt. Angela L. Coyle, SMSgt. Albert M. Romano Jr., MSgt. Michael T. Barrie, SrA. Aaron F. May, TSgt. Joseph J. O'Keefe, SSgt. James C. Lee, MSgt. Larry E. Williams, SSgt. Edward J. Moore, and TSgt. Darin L. Miley.

By Tamar A. Mehuron,  
Associate Editor

**MSgt. Michael T. Barrie.** Superintendent, Accessory Flight; 49th Maintenance Squadron, Holloman AFB, N.M. (Air Combat Command)—Leadership was a major factor in the 49th's selection for 1998 Outstanding Unit Award in Logistics. ... Oversaw 75 specialists responsible for three fighter squadrons. ... Management of fuel system repairs contributed to a 98 percent reliability rate for F-117A aircraft and HH-60G helicopter sorties.

**SSgt. Gregory A. Coleman.** Instructor, Fuels Apprentice Course; 366th Training Squadron, Sheppard AFB, Texas (Air Education and Training Command)—Wrote and implemented lesson plans and devised training sessions based on field situations. ... Developed program to maintain top fuel quality. ... Set up a fuel sampling schedule that ensured the supply met standards.

**SSgt. Angela L. Coyle.** Family Readiness NCO; 11th Mission Support Squadron, Bolling AFB, D.C.

(11th Wing)—Created and implemented family readiness plan for 11th Wing. ... Provided support to more than 42,000 Air Force family members throughout the National Capital region. ... Plan was made part of curriculum for family readiness instruction at Maxwell AFB, Ala.

**SSgt. James C. Lee.** Security Forces Craftsman; 45th Security Forces Squadron, Patrick AFB, Fla. (Air Force Space Command)—Earned top marks as a security forces trainer. ... Deployed to Kunsan AB, South Korea, to demonstrate intrusion scenarios to then-acting Secretary of the Air Force F. Whitten Peters during the annual Foal Eagle 98 exercise. ... Helped unit achieve 97 percent training completion rate.

**SrA. Aaron F. May.** Combat Control Journeyman; 23rd Special Tactics Squadron, Hurlburt Field, Fla. (Air Force Special Operations Command)—Trained Italian, Spanish, and US Army special forces in



close air support operations and procedures while on temporary duty in Bosnia. ... Selected and surveyed helicopter landing zones in Bosnia for medical evacuation, refueling, and air recovery operations. ... Created Global Positioning System course as part of local land navigation training.

**TSgt. Darin L. Miley.** Space Systems Operations Specialist; 310th Space Group, Schriever AFB, Colo. (Air Force Reserve Command)—Served as unit's operations superintendent, a job normally held by a senior master sergeant. ... Maintained 100 percent error-free rate in recovery of Defense Meteorological Satellite Program mission data. ... Led squadron to complete more than 500 sorties in record time.

**SSgt. Edward J. Moore.** Aerospace Control and Warning Systems Operator; Western Air Defense Sector, McChord AFB, Wash. (Air National Guard)—Only airman in sector qualified as a weapons director technician. ... Consistently managed effective aircraft control responsibility transfers and intercept missions. ... Maintained second qualification as tracking technician and selected as instructor.

**TSgt. Joseph J. O'Keefe.** Combat Control Operator; 24th Special Tactics Squadron, Pope AFB, N.C. (AFSOC)—Top special tactics element leader in the squadron. ... Joint Service Commendation Medal for



*The 1999 USAF Outstanding Airmen and their guests toured the Pentagon (above). Also on their agenda during five days of special activities in the Nation's Capital was a tour of Washington and Capitol Hill.*

role in recent classified mission. ... In training, led a parachute employment of 50 special tactics personnel and 300 US Army personnel in assault on airfields. ... Helped develop urban call-for-fire procedures for AC-130 gunships.

**SrA. Margaret S. Rawls.** Bioenvironmental Engineering Journeyman; 3rd Aerospace Medicine Squadron, Elmendorf AFB, Alaska (Pacific Air Forces)—Exemplary efforts on behalf of base environmental safety. ... Tested 67 ventilation systems,

assessed impact of 500 hazardous materials on workers, helped shop management dispose of nine hazardous chemicals, and audited 22 industrial shops.

**SMSgt. Albert M. Romano Jr.** Sortie Generation Flight Chief; 23rd Fighter Squadron, Spangdahlem AB, Germany (US Air Forces in Europe)—Moved jets and maintainers in two major contingencies (Bosnia, Northern Watch) and four training deployments in 1998. ... Helped maintain 85 percent mission capable rate for squadron aircraft.

**MSgt. Larry E. Williams.** Superintendent, Aircraft Systems Element; 652nd Combat Logistics Support Squadron, Sacramento ALC, McClellan AFB, Calif. (Air Force Materiel Command)—Led 55 A-10 and F-117 maintainers. ... Established 13 teams to conduct battle damage repair on A-10s and F-117s and TF34 engines. ... Contributed to unit's jump in aircraft mission capable rate, up from 57.7 percent to 68.3 percent.

**TSgt. Patricia M. Woodham.** Personnel Specialist; Hq., Air Mobility Command, Scott AFB, Ill. (AMC)—Served as the chief of support airman assignments. ... Ensured that proper staff was on hand for orderly closure of Howard AFB, Panama. ... Developed and assigned proper maintenance personnel to Keesler AFB, Miss., for the arrival of new C-130J transports. ■



*Secretary of the Air Force F. Whitten Peters and his wife, Monnie Peters (at left), meet (r-l) Rachell Harrington and SSgt. Edward Moore from McChord AFB, Wash., and Kathryn Miley and TSgt. Darin Miley, Schriever AFB, Colo., in the receiving line at the Outstanding Airmen banquet.*

# Aerospace Technology Exposition

More than 100 exhibitors at the Aerospace Technology Exposition presented displays highlighting the Air Force Association's 1999 National Convention theme: "Aerospace Power and the Use of Force."

At right, Air Force Chief of Staff Gen. Michael E. Ryan (second from the right) talks with airmen presenting the Air Force Research Laboratory's Distributed Mission Training exhibit.



The DMT exhibit featured two F-16 simulators (at left), where visitors could "fly" daily training missions with other individuals at simulators located in Mesa, Ariz., and Hurlburt Field, Fla. Through the use of distributed training, the Air Force expects to be able to train its aircrews and combat mission personnel at geographically separated bases virtually in the same airspace.

27,000 pounds of thrust is a small part of the force it takes to propel an F-16. From the launchers to the refuelers to the air traffic controllers, weapons loaders and end of runway personnel, it takes a team. We give airmen the technological edge they need to rise to the challenge. We are as dedicated to the success of the United States Air Force as they are to the security of our country. And we know that it's about more than our technologies: it's about the people who use them.

IT TAKES ONE  
PERSON TO  
GET THIS PLANE  
INTO THE AIR  
AND A CREW TO  
KEEP IT THERE.



RAYTHEON SYSTEMS COMPANY

**Raytheon**

*Expect great things*



*The exposition attracted 9,000 visitors and covered 1.3 acres of floor space.*

*At Lockheed Martin's exhibit, Maj. Gen. Timothy A. Kinnan (left), commander, Air Force Doctrine Center, Maxwell AFB, Ala., takes in a demonstration of the Joint Strike Fighter from company representatives Joe B. Phillips and (in the cockpit) Mike Skaff. Cockpit demonstrators and other simulators dominated the displays, giving exposition visitors a sometimes dizzying look (inset) at the future.*



*At right, AFA member James E. Callahan (right), who received a Chairman's Special Citation this year, discusses a Flight Management System desktop training system with Ace Hearon from Smiths Industries. The expanding capabilities of desktop systems provide the Air Force with a number of opportunities to lessen its demands on full-scale simulators to train aircrews.*



*Unusual sights included this model of a Bell Helicopter Textron quad tilt-rotor transport. Company plans call for the C-130-sized aircraft to be capable of 140,000 pounds maximum weight, 2,000 miles maximum range, and a cruise speed of 280 knots.*



*Weapons upgrades and improvements in accuracy and standoff range were among the topics of discussion at the exposition. At left, Melody A. Johnson, Maj. John Spain, and Chris S. Ferguson (l-r), all from the 497th Intelligence Group at Bolling AFB, D.C., check out a High-speed Anti-Radiation Missile and a GBU-12 at the Raytheon Systems exhibit.*



*Above, Alenia Marconi featured a low-cost wing kit that could be used on a number of bombs. Company officials said the kit is designed to give longer range and greater maneuverability to weapon systems such as the joint direct attack munition and the wind-corrected munitions dispenser.*

*At one of the exposition's largest exhibits, AFA blue-suiters learn about Boeing's Minuteman ICBM upgrades: (l-r) Capt. William T. Rondeau Jr., outgoing Montana state president, Lt. Regina L. Cain, the incoming president, and Capt. Brian P. McLaughlin from the Pensacola (Fla.) Chapter.*



*At left, defense industry representatives gather around Lt. Gen Thomas J. Keck, Air Combat Command vice commander, for an informal talk. The Aerospace Technology Exposition offers many such opportunities for visitors from the military, industry, and government sectors to catch up on advances in technology, make new contacts, and gather ideas through a dynamic venue.*



# AFA State Contacts



Following each state name are the names of the communities in which AFA chapters are located. Information regarding these chapters or any of AFA's activities within the state may be obtained from the appropriate contact.

**ALABAMA** (Birmingham, Huntsville, Mobile, Montgomery): **Austin S. Landry**, 154 Lucerne Blvd., Birmingham, AL 35209-6658 (phone 205-879-2237).

**ALASKA** (Anchorage, Fairbanks): **Steven R. Lundgren**, P.O. Box 71230, Fairbanks, AK 99707 (phone 907-459-3291).

**ARIZONA** (Green Valley, Phoenix, Prescott, Sedona, Sierra Vista, Sun City, Tucson): **Angelo Di Giovanni**, 973 Vuelta Del Yaba, Green Valley, AZ 85614 (phone 520-648-2921).

**ARKANSAS** (Fayetteville, Hot Springs, Little Rock): **John L. Burrow**, 211 W. Lafayette St., Fayetteville, AR 72701-4172 (phone 501-751-0251).

**CALIFORNIA** (Apple Valley, Bakersfield, Edwards AFB, Fairfield, Fresno, Los Angeles, Merced, Monterey, Orange County, Palm Springs, Pasadena, Riverside, Sacramento, San Diego, San Francisco, Sunnyvale, Vandenberg AFB, Yuba City): **James H. Estep**, 6251 N. Del Rey Ave., Clovis, CA 93611-9303 (phone 209-299-6904).

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# Aerospace Exhibitors in Review

Companies represented at the AFA Aerospace Technology Exposition

**AEREA S.p.A.** Specializing in external store carriage and release systems, structural components, and ground support equipment for fixed and rotary wing aircraft.

**Air Force Distributed Mission Training; Air Force Research Laboratory DMT** concept demonstrates the future of USAF mission training.

**Air Force History Support Office**

**Air Force Research Laboratory—Propulsion, Information Systems, Space Vehicles, and Sensor Technologies** Advanced technologies for space and launch vehicles; advanced propulsion technologies; and advanced warfighter information systems.

**Air Force Weather Agency World Wide Web**—based weather information.

**Air Intelligence Agency** Expertise in the areas of information warfare and information-in-warfare.

**Alenia Marconi Systems, Inc.** Development of air-to-surface guided weapons, support equipment, and instrumented training range systems.

**AlliedSignal Aerospace** Premier supplier of auxiliary power, propulsion engines, avionics, engine control systems, wheels and brakes, and environmental controls.

**ANSER (Analytical Services, Inc.)** A not-for-profit public service research institute.

**Armed Forces Bank** "Your Hometown Bank Around the World." Worldwide, military-oriented banking services.

**Armed Forces Benefit Association** Low-cost insurance and financial products.

**Armed Forces Journal International** Independent, professional magazine of military and industrial affairs.

**Army and Air Force Mutual Aid Association** A nonprofit service organization serving members of the military.

**Army Times Publishing Co.**

**Arnold Engineering Development Center** A national ground-test facility that conducts tests, engineering analysis, and technical evaluations.

**Atlantic Research Corp.** Advanced composites, missile and rocket propulsion, rocket motors, tactical systems, and space propulsion.

**Battelle Common Large Area Display System (CLADS); Handheld Holographic-Imaging Radar Gun (H<sup>2</sup>G); and Air Force Total Ownership Cost (AFTOC) Program.**

**Bell Helicopter Textron CV-22 Osprey**, the upgraded UH-1Y, Eagle Eye UAV, and conceptual quad tilt-rotor design.

**Boeing Co., The** Electronic and defense systems, missiles, rocket engines, launch vehicles, information and communications systems, and aerospace support services.

**Bombardier Aerospace (Defense Services)**

**Booz-Allen & Hamilton** International management and technology consulting firm.

**Brown & Root Services** Full service, life-cycle management programs.

**Celsius** Electronic warfare equipment: BOL countermeasures dispenser.

**Chauncey Group Intl., The** A leader in designing state-of-the-art assessments systems.

**Compaq Computer Corp.** The second largest computer company in the world and the largest supplier of personal computers.

**DaimlerChrysler Aerospace AG** One of the world's leading companies for design, manufacture, and support of military and training aircraft.

**DBA Systems, Inc.** Manufacturer of digital imaging, electro-optical, and infrared systems for USAF.

**Defense Information Systems Agency** The Global Command and Control System common operational picture.

**Defense Systems Management College** Courses in acquisition management for military and civilian program managers and their defense industry counterparts.

**Dowty Group** Innovative, advanced technology solutions for major aircraft and engine manufacturers.

**DRS Technologies, Inc.** A leading supplier of defense electronics systems.

**DynCorp** Life-cycle support of the United States Air Force.

**EDO Corp., Marine and Aircraft Systems** Suspension and release equipment used to carry internal and external stores on fighter aircraft.

**Fairchild Defense, Orbital** Contractor in the design, development, production, integration, and test of advanced digital electronics and avionics systems.

**Flight International** Global weekly news magazine for professionals working in all sectors of aerospace worldwide.

**Flight Refueling Ltd.** Aerial refueling systems and Common Rail Launchers (CRL).

**Galaxy Aerospace Corp.** Markets and supports the Astra SPX transcontinental business jet and Galaxy intercontinental business jet.

**GE Aircraft Engines** New millennium technologies that will improve the mission capabilities of tomorrow's Air Force.

**General Atomics** 40-year leader in high-technology R&D, taking concepts through prototype to full-scale development.

**General Atomics Aeronautical Systems, Inc.** Develop and manufacture remotely operated aircraft—GNAT and Predator.

**Government—Industry Data Exchange Program** A governmentwide central system for exchanging information among agencies about nonconforming products.

**Gulfstream Aerospace Corp.** Designer, developer, manufacturer, and marketer of technologically advanced intercontinental business jet aircraft.

**Hughes Space and Communications** A provider of space systems to the US government and the leading manufacturer of commercial communications satellites.

**IBP Aerospace Group, Inc.** The K-36/3.5A ejection seat.

**IFR** Portable frequency-agile communications test systems for tactical communications testing and maintenance.

**Innovative Concepts, Inc.** A communications engineering firm demonstrating the Improved Data Modem (IDM).

**Innovative Solutions and Support, Inc.** RVSM—compliant air data systems; fuel quantity and flow-measurement instruments; engine and hydraulic displays; and more.

**Internav Corp.** Avionics engineering and manufacturer.

**Israel Military Industries (IMI)** Capabilities in auxiliary mission equipment and advanced aircraft systems.

**JANInc.** Provider of complete ATA/milspec—compliant technical publications services.

**Jane's Information Group** Magazines, references, yearbooks, and news services available online, on CD-ROM, and in hard copy.

**John Deere Co.** The M Gator—A small tactical or utility vehicle developed for the Army.

**Joint Direct Attack Munition Program** A full-scale Mk 83 JDAM mock-up.

**Joint Program Office for Biological Defense** Current and emerging biological detection systems and components and vaccine capabilities.

**Kerrigan Media Intl., Inc.** Publisher of trade magazines.

**Kwajalein Missile Range** The US Army's premier missile test range.

**L-3 Communications** Communication systems and products, microwave components, avionics and ocean systems and telemetry, instrumentation, and space and wireless products.

**Litton Industries**

**Amecom Division** Airborne early warning systems, air traffic control systems, and command and data handling systems.

**Applied Technology Division** Threat warning, missile approach warning, and electronic support measures.

**Data Systems Division C<sup>3</sup>**, missile defense, handheld digital communications terminals, and air defense systems.

**TASC, Inc.** High-end information technology solutions.

**Lizard Tech, Inc.** The MrSID portable image format, a wavelet-based image encoder.

**Lockheed Martin** A diversified global business, spanning space and telecommunications, electronics, information and services, aeronautics, and energy and systems integration.

**Marconi North America, Inc.** A world leader in intelligent electronic systems and advanced products.

**Martin-Baker Aircraft Co. Ltd.** The US16B ejection seat for the Boeing X-32 JSF.

**MCI WorldCom Government Markets** A broad range of telecommunications services, including managed network services and systems integration.

**Merck & Co., Inc., Vaccine Division** Dedicated to the discovery, development, manufacturing, and marketing of innovative vaccines.

**Mnemonics, Inc.** Designs, develops, manufactures, and integrates tactical satellite and line-of-sight communications systems.

**Motorola Theater Deployable Communications Integrated Access Communications Package (TDC/ICAP).**

**National Imagery and Mapping Agency** A major combat support agency of the Department of Defense.

**Northrop Grumman Corp.** Technologies in systems integration, defense electronics, and information technology.

**Northrop Grumman Ryan Aeronautical Center** The capabilities of the new Global Hawk unmanned aerial reconnaissance system.

**Parker Hannifin Corp.** The Aerospace Group—a complete line of hydraulic, fuel, and pneumatic systems and components, plus heat transfer systems, monitoring and control computers, and wheels and brakes.

**Pentagon Federal Credit Union** A market-leading financial products and services provider.

**Pratt & Whitney, A United Technologies Company**

**P&W Canada** A full-scale PT8 cutaway engine and graphics.

**P&W Large Military Engines** The F100, F119, JSF119, and F117.

**P&W Space Propulsion** Leading supplier for solid and liquid rocket propulsion systems for space and missile applications.

**PricewaterhouseCoopers LLP** Leading professional services organization.

**Raytheon Systems Co.** Products and services in defense electronics, commercial and special mission aircraft, and engineering and construction.

**Rockwell Collins Government Systems** A world leader in the design and manufacture of advanced avionics, and leading supplier of GPS receivers.

**Rolls-Royce** Rolls-Royce North America designs, develops, produces, and markets gas turbine engines.

**Sargent Fletcher, Inc.** An upgraded version of their next-generation cargo pod.

**Smiths Industries Aerospace** Systems for Global Air Traffic Management (GATM), cockpit modernization, and capabilities to reduce training costs and monitor aging fleets.

**Systems Wireless, Ltd.** The Matrix Plus 3 Digital Intercom System.

**TEAC America, Inc.** Hi-8 mm integrated debriefing station and single- and triple-deck Hi-8 mm high-reliability, airborne qualified recorders.

**Team SBL IFX** A community team to develop, design, and conduct the Space Based Laser Integrated Flight Experiment. Team members: DoD, Boeing, Lockheed Martin, and TRW.

**Textron Systems** Real-time control systems and sensor fused munition systems.

**Thiokol Propulsion** The propulsion integrated team leader on the TRW team under USAF contract to replace the Minuteman motors.

**Toys and Models Corp.** Models of aircraft and space vehicles, display type.

**TRW, Inc.** World leader in defense and communications technology, displaying the latest developments in existing technology.

**USAA** Auto and property insurance, life and health insurance, investments, banking services, and travel and merchandising services.

**US Army Threat Simulator Management Office** The reconfigurable virtual fire unit, which simulates various threat surface-to-air missile systems in both live and virtual environments.

**Veridian** An information technology and advanced engineering services company.

**Williams International** A variety of small gas turbine engines for manned and unmanned military air vehicles.

**W.L. Gore & Associates, Inc. Electronic Products Division** A supplier of microwave cable assemblies for defense, spacecraft, avionics, ground-based, and test applications.

Air Force leaders sum up as the century draws to a close.

# The Heritage of Airpower—



USAF photo by SSgt. Angela Stafford

## and Some Recent Achievements

By Peter Grier

### Wald: Airpower and Future War

At the beginning of the 20th century, the idea that man could fly—much less use air and space as a medium for projecting military might—was a crazy notion. Yet, at its close, aerospace power has become the key to the future of warfare, said keynote speaker Maj. Gen. Charles F. Wald, vice director for strategic plans and policy for the Joint Chiefs of Staff, at AFA's 1999 National Convention.

Teaching the accumulated knowledge of generations of aerospace pioneers to the next generation of dreamers and thinkers is "a sacred trust," Wald told the Sept. 13 opening session. Wars are won by preparation, not by chance, he added.

"Yet I feel we have a long way to go before we can as airmen say we thoroughly understand war," said Wald. Coming after what may be the most successful use of airpower ever, Operation Allied Force in Kosovo, such sentiments might seem to be heresy.

However, the advent of aerospace power has greatly accelerated the pace of military operations, Wald said. The air war of the near future will be different from that of today,



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as that of today is very different from those of the recent past.

Soon, Wald will again have direct contact with such operations. Secretary of Defense William S. Cohen on Sept. 28 announced Wald's nomination for promotion to lieutenant general and assignment to be commander of 9th Air Force (Air Combat Command) and commander, US Central Command Air Forces, Shaw AFB, S.C. In the latter post, he will be in charge of air operations in South-west Asia.

Joint US military doctrine holds that, in a few years, a fusion of sensor information will allow US forces to sense danger far more rapidly. Airmen will have an increased awareness of the overall operational environment. New weapons will give them new power.

"They will have enhanced ability to produce a range of desired effects, bringing together a mix of assets, at the place and time most favorable to success," said Wald.

Yet Air Force education might not keep pace. Pilots and planners need to be trained to think beyond a two-aircraft formation or a single line on an Air Tasking Order if they are to succeed in this brave new environment.

"I'm convinced the aerospace culture we have so carefully cultivated has not adequately prepared our airmen to conduct our wars in the future," said Wald.

Wald invited his listeners to consider a possible scene from a conflict of the not-too-distant future. An air commander has three B-2s at his disposal, each carrying 200 small smart bombs and therefore capable of attacking 200 different targets with one sortie. Suddenly the situation on the ground changes. The commander has to rethink 600 targets—in less than two minutes.

"When we need it most, we may lack the airmen who have the training and experience to operate in such an intense, dynamic environment," said Wald.

This future brand of warfare is not emerging by happenstance, said the AFA keynoter. It evolved quickly after the introduction of Precision Guided Munitions in the Vietnam War.

PGMs came of age in Desert Storm. Even then, however, the Air Force was dogged by a narrow "one line" mentality, said Wald. Technical and doctrinal shortcomings marred the

effort. Most disconcerting, perhaps, was the way information was stove-piped, or hoarded, within organizational boundaries.

"Many airmen could not gain comprehensive [intelligence]," said Wald.

Operation Allied Force witnessed another revolutionary advance in aerospace power. The use of the Joint Direct Attack Munition introduced the next PGM generation. Air Force leaders introduced combined air operations centers that featured information-fusing integrated warfighting capability.

There were still opportunities for error. Planning reaction times just weren't always quick enough, said Wald.

"On at least one occasion, JDAMs had to be withheld because there was insufficient time for planners to react to a sudden shift in defense on the ground," said Wald.

In wars of the next century planners must be prepared for the inevitable immediate change, Wald emphasized. Airmen who embody flexibility will become the key to airpower.

Wald concluded, "These must be airmen who have mastered the art of campaign planning—airmen who not only think beyond the one line of the Air Tasking Order but who live the ATO and can transfer a 24-hour time capsule into a living, breathing aerospace process."

### **Ryan: Expeditionary All Along**

To worry about the future is not to belittle recent Air Force accomplishments. During the past 12 months, USAF hasn't missed many opportunities to respond to crises in a significant way, said Gen. Michael E. Ryan, Chief of Staff.

"These successes have much, much more to do with people than equipment—our Air Force members have literally and figuratively served above and beyond," Ryan told the gathering at a luncheon speech on Sept. 14.

On the part of USAF, Operation Allied Force involved the deployment of more than 17,000 people and more than 500 aircraft, the Chief noted. Before it began, USAF was operating out of five fixed and four expeditionary bases in support of Bosnia. When [Allied Force] was over, the service had moved into 20 more, from RAF Brize Norton, UK, to Souda Bay on Crete and Bandirma in Turkey.

Ryan said that when he visited Aviano AB, Italy, during the conflict, several sergeants told him that bedding down in the hastily constructed tent city there was no big deal.

"They laughed and said they were pros at it; they had done it in Saudi Arabia, in Kuwait, in Turkey," said Ryan.

Almost 60 percent of the force has joined up in the past 10 years, the Chief noted. Like the sergeants at Aviano, they have known little but high operations tempo, austere fields, and remote locations.

"They've been expeditionary all along. We just hadn't provided the label," he said.

USAF flew more than 11,000 airlift sorties during Operation Allied Force. The C-17 hauled more than a third of the cargo, even though Globemasters account for only 13 percent of the airlift force. Air refuelers flew 7,000 sorties and pumped more than 300 million pounds of fuel. The service used "every acronym we had," noted Ryan, from AWACS [Airborne Warning and Control System aircraft] to JSTARS [Joint Surveillance Target Attack Radar System] and ABCCC [Airborne Battlefield Command and Control Center].

The Air Force called on nearly 5,000 reservists, who provided 40 percent of the deployed KC-135 force and a quarter of the A-10 force, among other things. By any measure the size of the effort was impressive.

"For the US Air Force this was a Major Theater War—by percentage of force in tankers, bombers, fighters, and ISR [Intelligence, Surveillance, and Reconnaissance] assets, Operation Allied Force, combined with our other contingency deployments, was bigger than our efforts during Desert Storm or for that matter Vietnam," said the Chief.

At a tactical level the force performed superbly. It quickly closed Serbian airfields and destroyed much of the country's air defense infrastructure. Interdiction forces pounded the Serbian military-industrial complex. Oil refinement was halted and electricity shut down. Transportation routes were cut throughout the country.

In Kosovo itself F-16s and A-10s hit tanks, personnel carriers, and artillery pieces wherever they could be found.

No Air Force top commanders thought that this effort would stop the Serbs' "door-to-door infantry thuggery," said Ryan.

"What they successfully argued was that to stop the carnage in Kosovo, you must go to the root cause and that was in and around Belgrade—where the strategic center of gravity lay," said Ryan.

The Chief said that commanders kept the faith, knowing they would be successful—and in the end, they were.

Today the beat goes on. USAF is patrolling the skies over Bosnia, Kosovo, Korea, Iraq. It has responded to humanitarian crises in Latin America and Turkey, among other places, and even airlifted specially trained mine-sniffing dolphins to Lithuania.

This workload is likely to only expand in the future. The service is likely to be called upon to protect national interests in space, as well as the air.

"We must continue to meld our capabilities into a seamless integrated force," said Ryan. "It is not air and space segregation that's important; what's important is aerospace integration for combat capability where it counts."

### **Peters: Power of Integration**

Integration was also a key theme for F. Whitten Peters, Secretary of the Air Force. For one thing, the war in Serbia showed that many of the concepts which will be central to the Air Force of the 21st century have already been integrated into the force and will work, Peters told the convention Sept. 15.

New weapons like JDAM and the Joint Standoff Weapon worked. Communications networks were able to reach back to intelligence and logistics support in the United States. For the first time ever, Unmanned Aerial Vehicles generated targets for manned aircraft.

"We showed that the B-2 could not only fly in the rain but that it could drop bombs through the rain, through the clouds, and in darkness with tremendous precision," said Peters.

But today's Air Force leaders face a simple question, said Peters. Can this superb force be sustained in the face of the highest peacetime op-tempo in its history and the strongest US economy in generations?

## **Weinberger, Ralston, and "Gradualism"**

Though Operation Allied Force was ultimately successful, many analysts have criticized the air campaign's design. It began as a collection of limited airstrikes mostly against air defense targets and escalated into a widespread strategic effort only in its latter stages.

To many, that smacked of the approach which failed in Vietnam—"gradualism," slow escalation, fighting with a hand tied beyond one's back. At an AFA symposium on the use of force, former Secretary of Defense Caspar Weinberger made such a comparison.

"What we did was do pretty much what we had done in Vietnam," said Weinberger, a key architect of the Reagan Administration's US military buildup of the 1980s. "We did not go into [the Balkan War] to win. We did not go in to take [out] the leadership of the country, Serbia, that had caused all of this."

Weinberger in 1984 made a classic declaration on the question of military power. It was a declaration based on six criteria for the use of force, and he reviewed them at the forum:

- Intervention must be in the nation's vital interest.
- Wars must be prosecuted with the intent to win.
- Wars must have clearly defined political and military objectives.
- The US should employ force sufficient to win.
- There should be a reasonable expectation that the public and Congress will support the use of force.
- Sending US troops into combat should be a tool of last resort.

The Clinton Administration's Kosovo operation met the first of those six conditions, according to Weinberger.

"I don't think any of the others were fulfilled, and I have to say that ... it is a source of great disappointment to me," he said.

In the end, an escalated campaign caused Serb leader Slobodan Milosevic to capitulate, but he was allowed to remain in power, Weinberger noted. He was allowed to take his troops and equipment out of Kosovo unhindered, and Kosovo was not granted independence.

"You had a number of failures which in effect tarnished to a very considerable extent and reduced the value of the enormous contribution by the Air Force," said Weinberger.

In his appearance at the policy forum, USAF Gen. Joseph W. Ralston, the vice chairman of the Joint Chiefs of Staff, agreed that the air campaign against Serbia resembled Vietnam more than it did the Gulf War.

However, he noted, Belgrade was not Hanoi. As a developed country, Yugoslavia had industrial targets which it did not want to lose—unlike the more agrarian North Vietnam. World opinion was much more firmly against it.

"Finally, the weapons we went to war with in 1964 were far inferior to those we used just this year," said Ralston. "The air war for Kosovo introduced a new and unique twist to the concept of gradualism."

The military will be called upon to undertake such gradual fights in the future, said Ralston. That is just political reality.

Precision Guided Munitions, stealth capability, space communications, and advanced intelligence capabilities "may have added sufficiently strong teeth to make a strategy of gradualism work," said Ralston.

—Peter Grier

"I think we can, but if we are to do so we must continue to work the fundamentals," said Peters.

On people, the service has begun to fix pay and retirement benefits. But Tricare must still be made more user friendly, the service's top civilian official said.

On equipment, officials have worked to fix the spare parts problem. They still must make progress on modernization.

"Could we use more money? Sure. Who couldn't?" said Peters. "But can we work with what we've got? Absolutely."

Even in normal circumstances Air Force personnel are stretched thin, the Secretary admitted. Ninety days overseas in a year is considered a routine load, yet it translates into being away from home one day in four for contingency operations—not to mention travel for training.

Surveys do show that many in the service relish the chance to be part of real-world operations. Peters said he was surprised by the reaction to the Stop-Loss order he signed at the beginning of Allied Force. He thought that after it was lifted there would be a stampede out of the service. Instead the opposite occurred.

Maybe half of the people who could pull their retirement papers have pulled their papers, said the Secretary. "That is quite a remarkable event."

That does not mean the answer to the retention problem is to deploy everyone all the time. Until the service can guarantee all its members that they can have a family life during peacetime it will still struggle to retain all the skills it needs.

That is what splitting up the workload via Air Expeditionary Forces is supposed to accomplish.

"It is a major journey for the Air Force. It is a completely different way of looking at how we do our business," said Peters.

If AEFs can prove to US national command authorities that the Air Force can get to fights quickly, it will lessen pressure to keep units deployed overseas against the possibility of a conflict arising.

"If we cannot keep the CINCs and our national command authorities happy with us and happy with our ability to get out of town fast, we are never going to solve the optempo problem," said Peters.

Re-engineering can help. The service has found 2,700 active duty slots it can move from support "tail" positions to warfighting "tooth" units. In 1999, recruiters will have brought 700 prior-service people back into the Air Force, most of whom already have critical skills and don't need years of training before filling critical jobs.

Pilot retention is looking better, said Peters, with pilots opting to re-enlist at a 43 percent rate.

"That sounds like a low number, but ... around 50 percent has been viewed as a stable force," he said. "A year ago that number was in the high 20 percents."

The recruitment force is being brought back up to strength, with the addition of 200 recruiters in 1999 and 300 in 2001.

"Every recruiter we can get on the street, once they get a chance to get their feet on the ground, brings in about 30 recruits," said Peters.

Readiness funding is going back up, too. That may not seem like a quality-of-life issue, said Peters, but it is—nobody is happy cannibalizing aircraft to keep forces in the air.

The parts holiday of the mid-1990s is over. Spares funding has risen from a low of 80 percent of the requirement in 1996 to almost 130 percent of the estimated requirement for 1999.

Depot maintenance funding has gone from a low of 80 to 85 percent in the mid-1990s back up to 95 percent, said Peters.

Some members of Congress, and even some Air Force officials, are impatient that this new money has yet to put new parts on the flight line. But the booming civilian economy had slowed military production down.

"It's hard to turn dollars into parts at the moment. It can take up to 24 months to do that," said Peters.

On modernization, the Air Force leadership is working many issues

besides continuation of F-22 funding, said the Secretary. The service's largest procurement program, at the moment, is in fact the C-17, which is proceeding well. The Air Force has put a billion dollars into the evolved expendable launch vehicle, and the CV-22 tilt-rotor is just around the corner.

"We are funding replacements and upgrades for every one of our satellite systems. We are fixing the cockpits of every one of our 'heritage' aircraft. We are bringing a whole new generation of [smart] weapons to bear," said Peters.

On infrastructure, the conversion from a five-depot to a three-depot Air Force has cut capacity from 41.6 million hours to 25.4 million hours. That has resulted in the remaining depots running at full capacity—"for the first time in human memory," joked Peters.

But integration remains key. It is a crosscutting issue of great importance for the Air Force of the 21st century.

"We need to do integration of all of our systems and people," said Peters.

In Operation Allied Force, for instance, USAF got a big bang for the buck out of Predator targeting. Operators took video from the UAV, shot it through the sky to satellites, beamed it down to forward-based computer analysts who fused it with 3-D terrain data from spy satellites, and sent the whole thing back to pilots in the cockpit—all in less than a minute.

"It shows the power of putting air and space and manned and unmanned together," said Peters. "That's what I think is the future."

Another example of integration was the U-2 effort over Serbia. U-2s sent their electronic "take" back to California, where it was examined by linguists and photointerpreters at Beale AFB, and to Maryland, where it was sifted by signals analysts at National Security Agency headquarters, Ft. Meade.

"Our vision for the future is one of integration," concluded Peters. "We need to make sure that we use the best components that we have available, that we put them together using the information systems that we now have, and that we build those systems carefully and smartly to support the future." ■

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*Peter Grier, the Washington editor of the Christian Science Monitor, is a longtime defense correspondent and regular contributor to Air Force Magazine. His most recent article, "Up in the Air About Anthrax," appeared in the October 1999 issue.*

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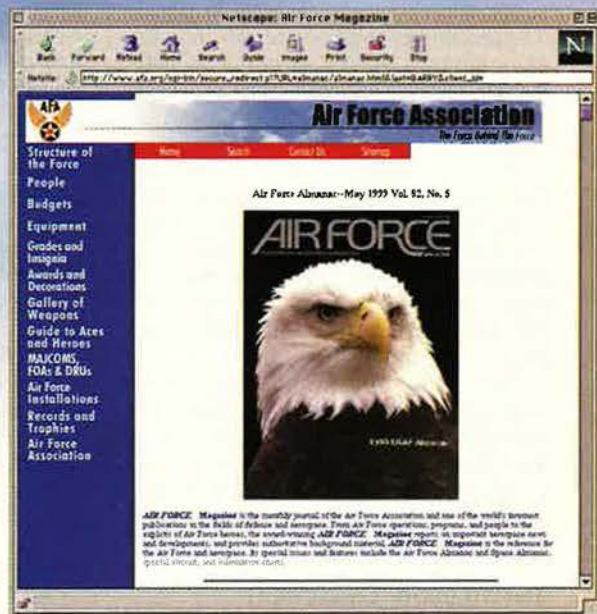
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# AFA / AEF National Report

By Frances McKenney, Assistant Managing Editor

## AFA Adds Two Regions

The Air Force Association added two more regions to its organizational structure as of Oct. 1. It now divides the US into 14 areas.

The new regions are Florida, a state with more than 12,000 members, and Texoma—comprising Texas and Oklahoma—an area having a combined AFA membership of nearly 18,000. Also moved into different regions were Arizona, Illinois, Montana, Nevada, and Wisconsin. (See "This Is AFA" on p. 68.) Each of the 14 areas is led by a region president and represented on the board of directors by at least one national director selected by the region. These changes were developed by AFA leaders, including then-vice presidents, and were adopted at the National Convention in September 1998.

### Council Creates Web Site

AFA's Reserve Council has created its own Web site as a way to collect more feedback.

Information gathered by this and the association's other councils is documented and brought up for discussion at meetings of AFA's six councils. Ultimately, input from the councils may help AFA formulate its Statement of Policy.

Reserve MSgt. Patrick J. Devine, the site administrator, pointed out that a Web site has great potential for reaching far more people than the 18 Reserve Council members can on their own. "The possibility of increasing our grassroots efforts will multiply enormously," he said.

The Reserve Council Web site is located at <http://homepages.msn.com/CapitolDr/afarc/afarc.htm>. It is also accessible through AFA's Web page, [www.afa.org](http://www.afa.org). Go to "Links" and choose "Other Military Associations and Related Links."

### The 10,000th Lieutenant

When Jon Michael Taylor graduated from the Air National Guard Academy of Military Science in August, he earned a number of distinctions.

He was the 10,000th second lieutenant commissioned by the AMS, an ANG officer training school at McGhee



*The Air Force Memorial Foundation recently received a \$2 million contribution from Boeing—the first installment on the company's \$5 million pledge. Boeing's Christopher Hansen (left), senior vice president for government relations, presents the check to Charles Link (center), Air Force Memorial Foundation president, and Thomas McKee, AFA national president.*

Tyson Airport, Tenn. Taylor was also a distinguished graduate of the class, finishing in the top 10 percent among 97 students. He won the **Gen. Bruce K. Holloway (Tenn.) Chapter's** AFA Award for Academic Achievement, presented to him by Walter J. "Bud" Bacon, the chapter's vice president for government relations. And Gen. Lloyd W. "Fig" Newton, Air Education and Training Command commander, and Lt. Gen. Russell C. Davis, chief of the National Guard Bureau, pinned on his gold bars.

The AMS, which graduated its first class in 1971, graduates about six classes a year. The Holloway Chapter's award, which was instituted this year, has been presented three times.

### Convention: Colorado

AFA National President Thomas J. McKee, National Secretary William D. Croom Jr., and then-Region Vice President Mark J. Worrick were among the AFA dignitaries at the Colorado State Convention, hosted by the **Colorado Springs/Lance Sijan Chapter** in August.

More than 60 people received recognition at the convention's awards banquet. Howard Vasina received a Regional Citation for outstanding performance as state president. Lauren Allwein from Littleton, Colo., was named State Teacher of the Year.

Among active duty recipients, Capt. Daniel Dant, of the 76th Space Operations Squadron, and MSgt. Eric Cole, 2nd SOPS, both from Schriever AFB, Colo., received Operational Excellence awards.

McKee spoke about his outreach effort in the Pacific, last May, reminding the audience that "forgotten warriors" carry out the USAF mission in that region, while most of the world's attention is focused elsewhere.

### Convention: Arkansas

It was front-page news in Fayetteville, Ark., when the AFA State Convention hosted a conference of local aerospace companies and brought in Gen. George T. Babbitt as keynote speaker and Rep. Asa Hutchinson (R-Ark.) for the awards luncheon.

The *Northwest Arkansas Times* ran



page 1 coverage, and the *Arkansas Democrat-Gazette* also featured the gathering, hosted by the **Razorback Chapter** in August.

Babbitt, Air Force Materiel Command commander, told the audience at a panel discussion on defense procurement that he would like to see USAF establish long-term relationships with contractors but cautioned that such relationships must not eliminate competition.

Other panel members were from Ozark Aircraft Systems, Space Photonics Inc., and Pratt & Whitney's Propulsion Systems Division. The panelists discussed the region's difficulties in competing for government contracts and finding skilled workers.

Babbitt also gave a presentation for the Distinguished Lecturer Series of the University of Arkansas, which co-sponsored his visit.

The second day of convention activities included an awards luncheon, where Hutchinson spoke about Air Force issues and stated his support for the F-22 and the preservation of C-130 training at Little Rock AFB, Ark.

Morris D. Cash, **Ouachita Chapter** president, received the Arkansas AFA Person of the Year award. It recognizes his leadership of a chapter noted for successfully recruiting new members and supporting the Arkansas School for Math and Sciences in Hot Springs, Ark.

Elected as state officers for the coming year were John L. Burrow, president, and Paul Bixby, treasurer, both from the Razorback Chapter; Cash, vice president; and Jerry Reichenbach of the **David D. Terry Jr. Chapter**, secretary.

### Convention: Texas

AFA National President McKee was keynote speaker at the Texas State Convention in McAllen, Texas, in July, while Lt. Gen. Donald L. Peterson, USAF deputy chief of staff for personnel, served as featured speaker for the awards luncheon.

Hosted by the **Ghost Squadron Chapter**, the gathering honored several AETC and Air Intelligence Agency members, including **Alamo Chapter**

members Col. Benton P. Zwart, Clinician of the Year, Maj. John D. Biegger, who was named Flight Commander of the Year, Capt. Andrew A. Torelli, AIA Junior Officer of the Year, and TSgt. Cassandra Y. McMillan, Airman of the Year. Other active duty award winners included Capt. Roger L. Claypoole Jr., then of the **San Jacinto Chapter**, Officer of the Year. Joan B. Lopez, from the Alamo Chapter, was named AFA Texas Person of the Year.

Clarence N. "Buster" Horlen, Alamo Chapter, was elected state president for the coming year. Dennis F. Mathis of the **Northeast Texas Chapter** is executive vice president. From the **Denton Chapter**, Robert L. Slaughter was elected state vice president north; Harold B. "Tex" Owens, **Aggie-land Chapter**, vice president southeast; Robert P. Balliett, **Panhandle Chapter**, vice president west; and

Helen S. Seidel of the **Dallas Chapter**, treasurer.

### Joint Convention

Kicking off the Washington-Oregon State Convention in July, the **McChord Chapter** hosted a golf tournament, followed the next day by a reception honoring the first C-17 received by the 62nd Airlift Wing at McChord AFB, Wash.

A Legislative Roundtable highlighted the convention's business meeting on the third day, with Rep. Adam Smith (D-Wash.) and staffers from the offices of Sen. Slade Gorton (R), Rep. Norman D. Dicks (D), and Rep. Jennifer Dunn (R). Thirteen active duty and reserve personnel and their spouses participated in the discussion, describing life in today's military. AEF President Jack C. Price also sat on the panel, which was

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## AFA/AEF National Report

moderated by McChord Chapter President O. Thomas Hansen.

Convention activities culminated with a Saturday night awards dinner, where McChord's 62nd and 446th Airlift Wings (AFRC) and the 141st Services Support Flight received Outstanding Performance awards.

John Lee was re-elected as Oregon state president.

### Convention: Mississippi

At the Mississippi State Convention held in Jackson, Miss., in June, Rep. Ronnie Shows (D-Miss.) spoke about the status of health care for veterans.

Hosted by the **Jackson Chapter**, the convention banquet also featured awards presentations made by Charles D. Wilkinson, Jackson Chapter president. TSgt. Connie Ræed, 172nd Communications Flight, Jackson IAP, was named Air National Guardsman of the Year. David Teske of Chastain Middle School in Jackson, was honored as the state's AFA Teacher of the Year. Teske has also been selected as AFA South Central Region Teacher of the Year.

ANG Brig. Gen. Harold A. Cross, state assistant adjutant general and a Jackson Chapter member, spoke to the business meeting attendees on the history and mission of the 172nd Airlift Wing (ANG).

The Jackson Chapter's Gerald E. Smith and Gene Neal Patton were elected state president and treasurer, respectively. From the **Golden Triangle Chapter**, the new state AFA vice president is Ronald J. Vaughan, with Patrick R. Ray as secretary.

### Convention: Florida

The **Brig. Gen. James R. McCarthy Chapter** hosted the 35th annual Florida State Convention in Daytona Beach in July, opening a weekend of activities with a golf tournament on the home course of the Ladies Professional Golf Association.

Business meetings at the convention featured presentations on veterans and retirees issues and aerospace education.

An evening awards banquet featured AFA Chairman of the Board Doyle E. Larson as keynote speaker. During the gathering, the **Pensacola, John W. DeMilly Jr., Hurlburt, and Central Florida Chapters** received honors as outstanding chapters.

In recognition of significant contributions to the Air Force by a civilian, AFA Florida's Gen. Lewis H. Brereton Award was presented to Robert J. Arnold, a scientist at the

Air Armament Center, Eglin AFB, Fla. He is a member of the **Eglin Chapter**. Also from the Eglin Chapter, Maj. Gen. Michael C. Kostelnik, AAC commander, was among those receiving a Special Citation, and Robert E. Patterson, AFA Florida immediate past president, was honored as AFA Florida Member of the Year. **Cape Canaveral Chapter's** Capt. Darren J. Buck, from the 45th Space Wing, Patrick AFB, Fla., received the Jerry Waterman Award.

Florida's state president is David R. Cummock of the McCarthy Chapter. The executive vice president is Eglin Chapter's Bruce E. Marshall. Marguerite H. Cummock, of the McCarthy Chapter, is secretary, and Edward A. Elbert Jr., of the Central Florida Chapter, is treasurer.

### Convention: North Carolina

A tour of Pope AFB—including briefings and demonstrations and an opportunity to check over a C-130 and A-10 on static display—highlighted the North Carolina State Convention, hosted by the **Pope Chapter** in Fayetteville, N.C., in July.

Following the tour, Brig. Gen. (sel.) Richard J. Casey spoke to the convention's luncheon gathering about the wing's operations. The new commander of the 43rd Airlift Wing at Pope, Casey began his Air Force career flying C-130s at the base.

That evening, the awards banquet featured Lt. Gen. Maxwell C. Bailey, commander of Air Force Special Operations Command. He spoke about Operation Allied Force and other current topics. He also helped present awards to Gerald V. West of the **Cape Fear Chapter**, member of the year; the **Blue Ridge Chapter's** William D. Duncan Jr., chapter president of the year; and Meritorious Service awards to Millie Hudgins and Donald W. Tanner, both of the **Scott Berkeley Chapter**.

The Pope Chapter earned the Com-

### Correction

In the September issue, p. 123, "Under an Arch of Steel," the successful rescue of an injured climber, for which the 305th Rescue Squadron received a citation at a Tucson (Ariz.) Chapter awards banquet, took place in January 1999. The pararescuemen in the photo were on the rescue team, which also included Maj. Pete Kern and TSgt. Mike Cusick.



munity Partner Chapter of the Year award, and the Cape Fear Chapter received the Membership Chapter of the Year honor.

#### Convention: Illinois

Keynote speaker Keith N. Sawyer, of the **Scott Memorial Chapter**, kept the Illinois State Convention banquet audience interested—and sometimes laughing—as he related his experiences as a forward air controller in the Vietnam War.

Sawyer was also elected state

president during the convention's business session, along with Frank Gustine, from the **Richard W. Asbury Chapter**, as vice president. John D. Bailey and Eunice L. Bailey, both of the **Greater Rockford Chapter**, were elected second vice president and treasurer, respectively, and Lt. Col. Patricia B. Bomberger, Scott Memorial Chapter, is the new secretary.

Hosted by the Asbury Chapter in Galesburg, Ill., the convention included state awards presentations.

The **Land of Lincoln Chapter** received the Community Relations Award, accepted by Frank J. Wombwell, in recognition of a successful Community Luncheon. The Outstanding Program Award went to the Scott Memorial Chapter for their Ball of Mid-America. Chapter President Larry Ackerman accepted the Outstanding Chapter Membership award for the Greater Rockford Chapter.

Eunice Bailey took home the Member of the Year award for her work as 1998–99 state secretary. ■

## Unit Reunions

reunions@afa.org

**18th Fighter-Bomber Wg Assn**, including 12th, 39th, 44th, 67th, 70th FSs, all wars; 18th Hq., No. 2 Sq, South African AF; and all attached or support units. April 13–16, 2000, at the Radisson Downtown Market Square in San Antonio. **Contact:** John W. Caldwell, 5501 Danforth Rd., Goliad, TX 77963 (361-645-2644).

**AAF Pilot Class 45-B**, all commands. May 11–14, 2000, in Colorado Springs, CO. **Contact:** Paul R. Wildes, 1054 Glen Grattan Dr., Montgomery, AL 36111 (334-263-7590) (prdvwildes@aol.com).

**AFROTC Det. 25**, Arizona State University, alumni. Nov. 12–14, 1999, at Arizona State University in Tempe, AZ. **Contacts:** Arthur Ascano (arjet@aol.com) or Sabina Noll (Sabina\_noll\_parr\_@hotmail.com).

**B-24 and PB4Y veterans**, all units. Dec. 9–12, 1999, at the Town and Country Resort Hotel in San Diego. **Contacts:** Richard Baynes, 71 Nighthawk, Irvine, CA 92714-3683 (phone: 949-552-3889 or fax: 949-551-2151) (rcbaynes@hotmail.com) or C.N. Chamberlain, 21055 George Brown Ave., Riverside, CA 92518-2815 (phone: 909-697-2644 or fax: 909-697-2232) (b24club@earthlink.net).


**Iwo Jima veterans**. Feb. 20–24, 2000, at the Imperial Palace Hotel and Casino in Biloxi, MS. **Contact:** Jim Westbrook, 594 Old Hwy. 27, Vicksburg, MS 39180 (phone: 601-636-1861 or fax: 601-636-5783).

**OCS Class 57-C**, including **OCS classes 57-B and 57-D**. April 16–20, 2000, in Laughlin, NV. **Contact:** Jack Fox, 17821 Rainier Dr., Santa

Ana, CA 92705 (phone: 714-633-0207 or fax: 714-516-1767) (jfox@clubnet.net).

**System Integration Office**. Nov. 5–6, 1999, in Colorado Springs, CO. **Contacts:** Tom Fortune, 1242 Auburn Dr., Colorado Springs, CO 80909 (719-591-0136) (tnjfortune@aol.com) or Rick Midtbo, 7159 Wintery Loop, Colorado Springs, CO 80919-1218 (719-548-1691) (rdmidtbo@aol.com). ■

Mail unit reunion notices well in advance 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.



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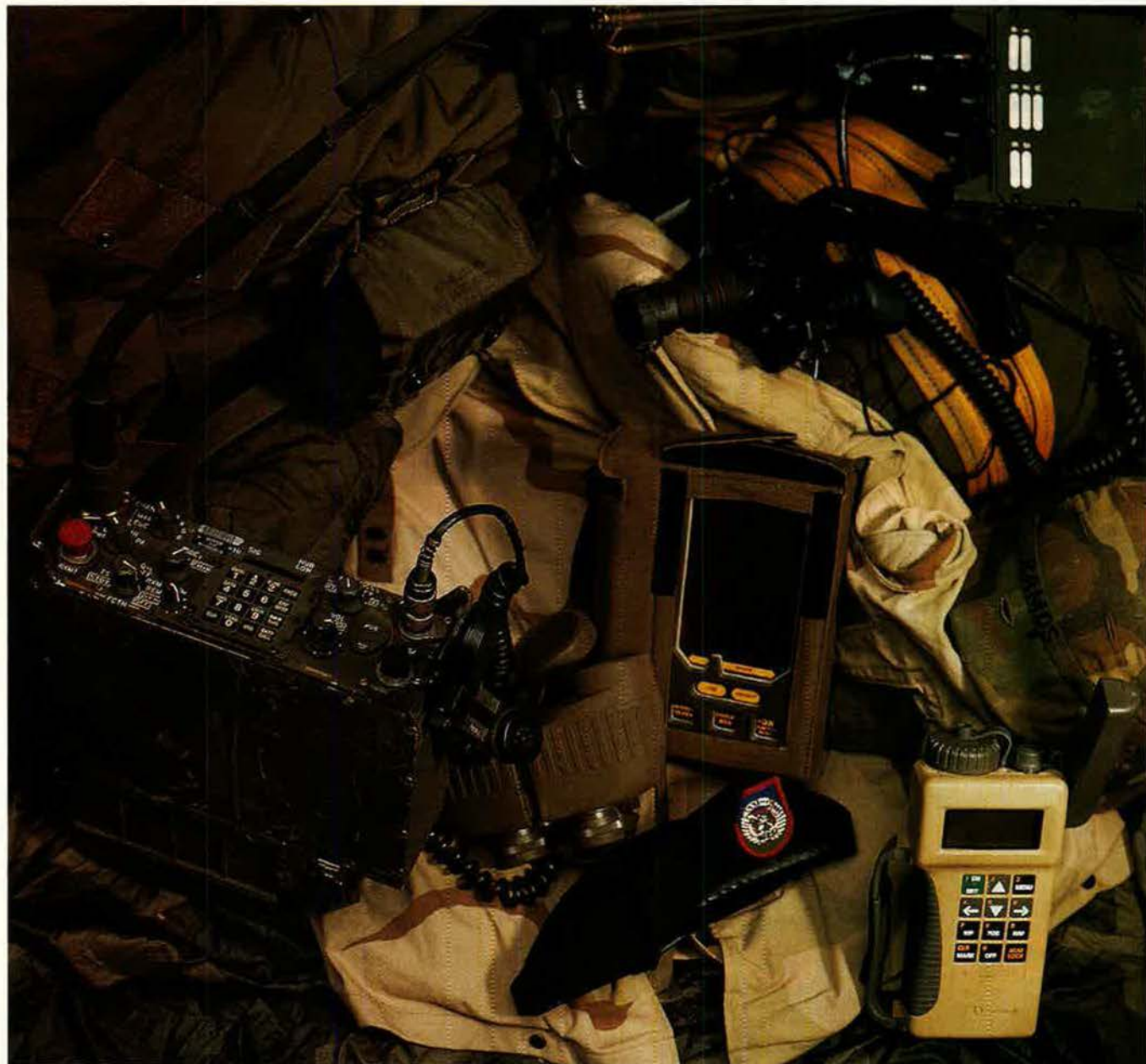
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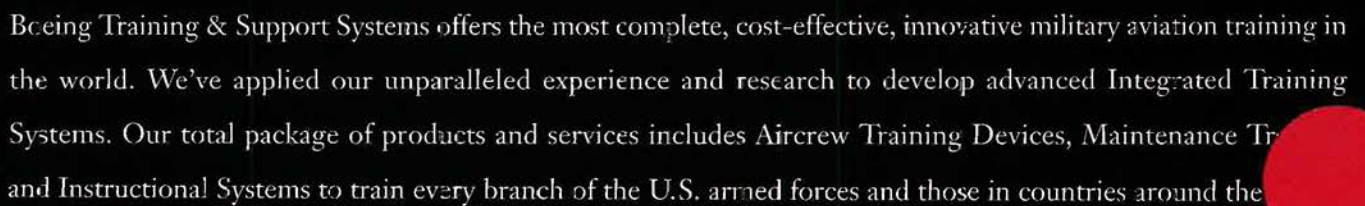
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