


February 1998/\$3

# AIR FORCE

PUBLISHED BY THE AIR FORCE ASSOCIATION

MAGAZINE



**When the POWs Came Home**  
Operation Homecoming—25 Years Ago

# Lethal, affordable and now in production.



B-2



B-52



F-16

*JSOW integration on the B-2, B-52 and F-16 is well underway.*

## JSOW.

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The AGM-154A is the first in a family of stand-off weapons not only approved for production but soon to be **ready for deployment**.

## Raytheon

### Raytheon Systems Company

- 4 Letters
- 8 Aerospace World
- 14 Senior Staff Changes
- 16 Index to Advertisers
- 17 The Chart Page
- 77 Flashback
- 78 AFA/AEF National Report
- 84 Unit Reunions
- 85 State Contacts
- 86 Bulletin Board
- 88 Pieces of History



**About the cover:** Twenty-five years ago this month, a tender embrace welcomes a POW home. See "When the POWs Came Home," p. 18.

**2 Editorial: They Call It Transformation**

By John T. Correll  
*The National Defense Panel says that air and space capabilities are critical to the future, but budget and program proposals do not follow suit.*

**18 When the POWs Came Home**

*Twenty-five years ago this month, 332 Air Force POWs held by Communists in Southeast Asia left their prison cells, boarded USAF transports, and returned home from the war.*

**28 The Epic Little Battle of Khafji**

By Rebecca Grant  
*On Jan. 29, 1991, Iraq launched its only offensive of the Gulf War—and was promptly clobbered by airpower.*

**36 The Space and Air Force**

By James Kitfield  
*At AFA's symposium, Air Force and industry leaders explored USAF's aggressive effort to push farther and faster into space.*

**41 In the Polls**

*Recent surveys track public opinion on defense issues.*

**44 Issue No. 1**

By John T. Correll  
*No matter where they live or how old they are, the overwhelming issue for military retirees is health care.*

**48 Brilliant Weapons**

By John A. Tirpak  
*The force declines in size, but awesome new munitions give it an unprecedented combat punch.*

**54 Blackbird**

*For more than 30 years, the SR-71 has been in a class all its own.*



44

**63 Going Gray**

By Peter Grier  
*The Air Force has managed to keep its aging fleet in shape, but problems are now looming.*

**68 The Evolution of Air Mobility**

By Bruce D. Callander  
*Airlift tends to get a low priority in peacetime, but that changes when conflict begins.*

**74 Security of the Russian Nukes**

*Gen. Eugene E. Habiger of US Strategic Command was the first foreigner to enter a Russian nuclear weapons storage area.*

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By John T. Correll, Editor in Chief

## They Call It Transformation

**F**OR the past two years, the armed forces and the Department of Defense have slogged through one study after another, trying to scope out the future. It began with Joint Vision 2010 in 1996. Then came the Deep Attack Weapons Mix Study, the Joint Strategy Review, and the Quadrennial Defense Review.

The most recent explication was by the National Defense Panel, created by Congress to check the work of the QDR. The title of its report, published Dec. 1, was "Transforming Defense: National Security in the 21st Century," signifying the panel's belief that minor adjustments will not be sufficient to do the job.

For the most part, though, the NDP analysis confirmed what the previous studies said. Information and long-range precision strike technologies have changed the nature of war, taking us beyond the inevitability of massive, force-on-force engagements. The NDP produced a template of critical capabilities—mobility, stealth, speed, increased range, precision strike, and a "small logistics footprint"—that will rise in importance between 2010 and 2020.

"The cornerstone of America's continued military preeminence is our ability to project combat power rapidly and virtually unimpeded to widespread areas of the globe," the report said, adding that "there is a high premium on forces that can deploy rapidly, seize the initiative, and achieve our objectives with minimal risk of heavy casualties." The report recommended "air forces with greater emphasis on operating at extended ranges with tactical air and long-range aircraft and unmanned aerial systems." It also recognized the growing potential to detect, identify, and track large numbers of targets over a large area.

From this, it might have been supposed that airpower and spacepower would be central to the plans for transformation. They are a remarkable fit with the template. When it got down to cases, unfortunately, the report trailed off in equivocal and less certain directions.

Last spring, for example, the Quadrennial Defense Review recognized the prime operational requirement to halt an enemy force rapidly, short of its objective, perhaps avoiding thereby the need for a costly ground campaign to evict the enemy from captured territory. The "halt" phase was conspicuous by its absence in the NDP report. The exclusion was the

### **The National Defense Panel says that air and space capabilities are critical to the future, but budget and program proposals do not follow suit.**

work of a faction opposed to giving airpower (obviously pivotal to the halt phase) too prominent a role.

The NDP could be specific when it wanted to be. It said that the Navy should accelerate transition to the CVX class of carriers, and that the Army should develop a 21st century tank in the 30–35 ton range.

By contrast, enthusiasm for long-range airpower was in the abstract only. NDP spokesmen were at pains to say they did not endorse the B-2 bomber, which exemplifies that capability, or a follow-on to it, such as a B-3.

For whatever reason, the panel decided not to pursue or recommend "alternative force structures," although it had been asked to do so by Congress in the charter for the study.

It is standard procedure to deny that this review or any of the others was budget driven. However, if the only issues were military threats and requirements, we probably would have accepted Joint Vision 2010 as the best judgment of the military pro-

fessionals and gotten on with it. In reality, much of what keeps these study groups churning—and what creates animosities in the conduct of them—is the question of resources and budgets. Note that the most persistent criticism of the NDP has been that it did not propose deep cuts to programs and force structure.

The NDP called for a shift in emphasis and funding to "initiatives in intelligence, space, urban warfare, joint experimentation, and information operations." Additional funding of \$5 billion to \$10 billion a year will be needed for this, the report said. As the panel surely knew, the defense program has been chronically underfunded since 1993.

The most frequently mentioned bill payers for the "transformation" initiatives are further military base realignments and closures—which would be a very tough peanut to roll up Capitol Hill—and airpower.

The NDP grouped three aircraft programs—the Air Force F-22, the Joint Strike Fighter, and the Navy F/A-18EF—into one undifferentiated lump, noted their cost, and questioned the number and mix the services intend to purchase. The point seems to be that the nation could and should divest itself of Cold War "legacy" systems, especially expensive airplanes, and use the money for something else.

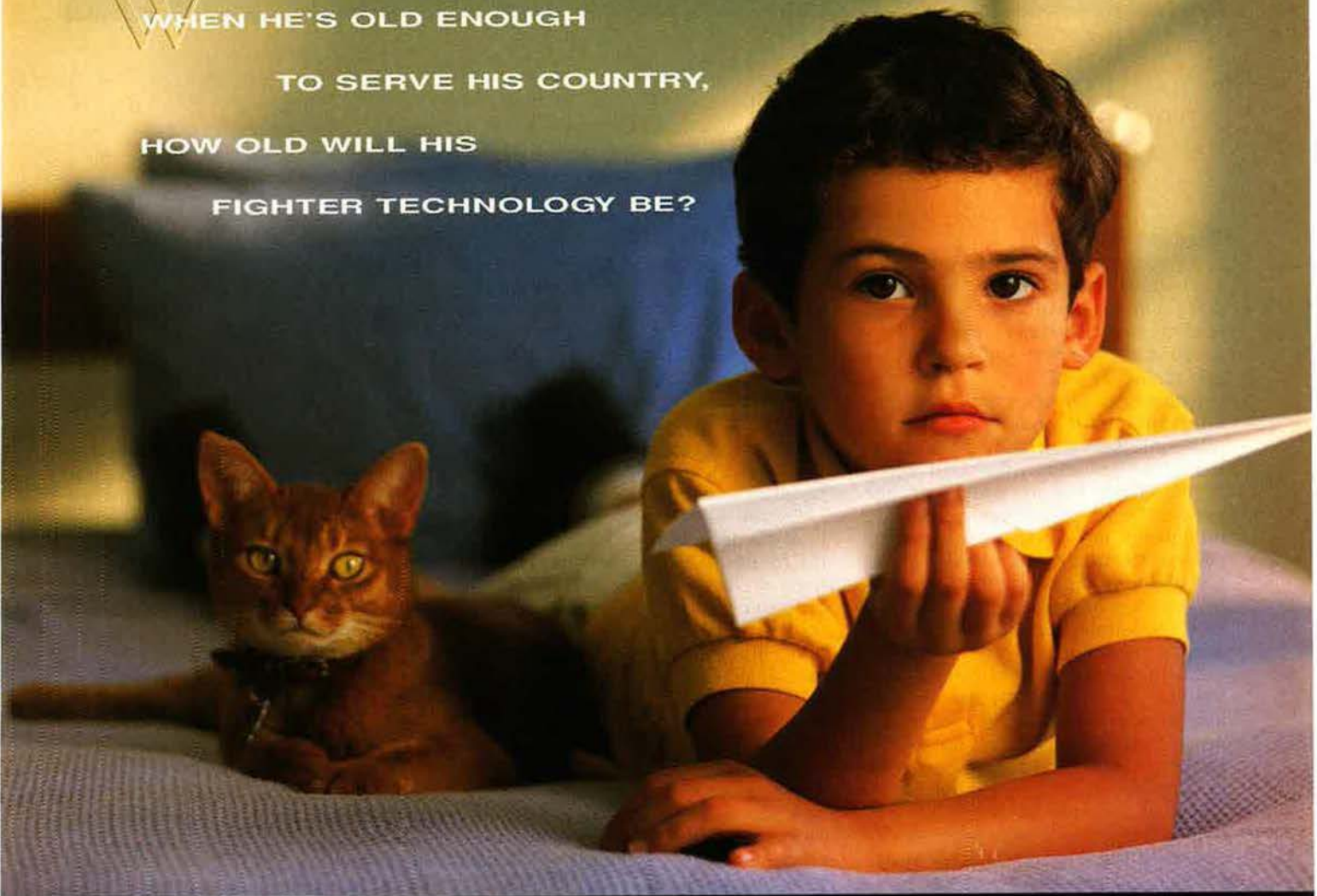
The NDP was generically in favor of innovation, experimentation, and change, but its disapproval of the present defense program was stronger and much better defined than its concept of the future. We may be headed for a transformation, but this wasn't it.

For better or worse, the NDP report wasn't the last word in the matter, any more than Joint Vision 2010 or the Quadrennial Defense Review were. Still more studies seeking to scope out the future are already in the works. The next one will be conducted by a "21st Century National Security Strategy Study Group," established by the Defense Appropriations Act in September.

Stand by. ■



WHEN HE'S OLD ENOUGH  
TO SERVE HIS COUNTRY,  
HOW OLD WILL HIS  
FIGHTER TECHNOLOGY BE?



We hope he grows up in a peaceful world. But if America needs him, will he fly 30-year-old fighters or the state-of-the-art F-22 Raptor and Joint Strike Fighter? Our Opinion: You can't stand tall if you stand still. Pratt & Whitney. *THE POWER OF READINESS.*



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# Letters

## Crossed Signals

Your editorial [*"Sending Signals and Projecting Power,"* December, p. 3] does a grave disservice, to both the Air Force and the Navy and does little to foster the overarching Joint vision advocated by DoD.

I do not know what provoked this emotional tirade against naval aviation—interservice rivalry perhaps or the advertisement by Newport News Shipbuilding. For my part, I do not believe the advertisement, in any way, denigrated the Air Force's ability to respond to crises. More likely, it was just good timing, in that the Navy has been in heated debate on Capitol Hill over the funding schedule for its last *Nimitz*-class carrier.

Certainly, the Clinton Administration was well aware of the options available to respond to Iraqi violations of the United Nations—mandated sanctions. Air Force aircraft deployed in Saudi Arabia and Bahrain were certainly capable of providing the combat firepower necessary to respond to many potential scenarios. However, irrespective of John T. Correll's views, it has been pointed out ad nauseam: Naval air is not dependent on host nation acquiescence to fly against hostile targets. For example, it is questionable whether several Gulf countries would provide the necessary clearance for US aircraft to conduct strike operations from inside their borders, as there are clear indications that the Gulf War coalition shows signs of deterioration.

Though Correll refers to Joint Task Force/Southwest Asia, it appears he has little understanding of the term "Joint Task Force." Having flown more than 30 missions in support of operations in Iraq and Bosnia alongside my Air Force counterparts, I can testify that the Air Force is supremely, yet not uniquely, qualified to perform these missions. And, on the down side, the Air Force is quickly learning the toll that these commitments take on personnel.

The Air Force can and should be proud of its performance in Desert Storm. The 41-0 kill ratio of the F-15C is testimony to the aircraft and its

crew's capability, and few would argue that it is not the preeminent air superiority aircraft in the world today. However, Correll's comparison of Air Force and Navy air-to-air kills during the Gulf War has little direct correlation to the respective services' accomplishments during the war. In fact, his comments belittle the contribution of other coalition members, particularly those who made the ultimate sacrifice in the service of their country.

Correll went on to praise the virtues of intercontinental airpower and the Air Force's involvement in operations in Libya and Iraq. The Air Force did participate in Operation El Dorado Canyon in 1986; however, it was anything but a unilateral action on the part of the Air Force. Navy aircraft from the carrier decks of *America* and *Coral Sea* provided [Suppression of Enemy Air Defenses] support for the Air Force's F-111 strike in Tripoli, as well as participating in strike operations in other areas in Libya. These operations illustrate why arguments like that put forth by Correll serve no useful purpose in serious discussions on the employment of airpower.

In the end, there is plenty of room in the uniformed services for healthy interservice rivalry; however, there is little utility in the "stovepipe" views expressed in this editorial. Perhaps Correll believes there is justification for debating our current Joint war-fighting plan. If so, he should criticize our uniformed and civilian military leaders for that but not for executing the established doctrine. As for now,

**Do you have a comment about a current issue? Write to "Letters," *Air Force Magazine*, 1501 Lee Highway, Arlington, VA 22209-1198. (E-mail: [letters@afa.org](mailto:letters@afa.org).) Letters should be concise, timely, and preferably typed. We cannot acknowledge receipt of letters. We reserve the right to condense letters. Unsigned letters are not acceptable. Include city/base and state. Photographs cannot be used or returned.—THE EDITORS**

Correll is sending the wrong message to our young men and women tasked with executing the National Military Strategy.

Lt. Cmdr. Ronald B. Moranville,  
USN

Office of Sen. John McCain  
Washington

Maybe it's all the Joint training I've been exposed to over the last couple of years, but hasn't it been proved that airpower alone is not always the "nearest effective force"? Correll's editorial myopically observes the proximity of land-based airpower, yet completely disregards the benefit of steaming a carrier battle group to the latest hot spot.

I'm tired of hearing airpower-advocate mouthpieces spout forth on the infallibility of airpower. The Air Force concept of deploying airpower [within an] Air Expeditionary Force is, in and of itself, a grand idea. The concept effectively projects combat power to a friendly host nation. Ah, but there's the rub. The words "friendly host nation" provide entree for the AEF to project power that would otherwise have to engage an adversary after flying mind-numbing sorties from bases in the US. The weakness is exposed!

Open your other eye! Seaborne airpower has a unique place in the warfare spectrum that can't be replaced by the AEF. In simple terms, an AEF is a deployment of Air Force assets that replicates a carrier air wing in design and firepower. The unique capability of the aircraft carrier is its ability to operate in international waters without the hindrance of diplomatic maneuver.

When will airpower advocates learn that the presence of a carrier battle group camped out in someone's backyard provides a bigger public relations bonus than the same firepower forward deployed to prepared airfields? "Where's the nearest carrier?" When I'm President, that's the first thing I'm going to ask, too!

Maj. William A. Turner,  
USAF

Elmendorf AFB, Alaska

■ *Carrier airpower is a valuable element in our capability to respond to crisis. The problem was in depicting the deployment of Nimitz from the South China Sea as our sole option and a sufficient one in response to the "crisis" in Iraq last September.*

*The Administration said it was sending a signal to Iraq. In devising the signal, though, it virtually ignored the 120 Air Force combat aircraft already in the Gulf area and focused on the carrier, which would require 10 days to arrive. For more than a week, the Administration was able to look and sound tough, in domestic press notices, at least, regardless of whether it was actually serious with its warning and implied threats.*

*But what signal did we send? That unless Iraq mended its ways, we would compel it to do so by the use of military force? The argument of sea-power advocates, writing to us in this and last month's issues, is that we could not or would not have used any forces except for carrier-based airpower and that everybody knew it. By that reasoning, the only action seriously contemplated, if the contemplation even reached that level, was "message" sorties from the sea.*

*If Maj. William A. Turner, Lt. Cmdr. Ronald B. Moranville, and others taking Air Force Magazine to task are correct in their assumptions, that marks a drift toward the discredited theory that military force can be tightly controlled and used in limited and tentative ways for fuzzy political purposes rather than to meet clearly defined military objectives.*

*If we employ such limited force but are not prepared to follow through, what happens if the "signal" does not work as had been hoped? And if the situation should escalate from the limited action, do we anticipate that the carriers will be able to handle a sustained regional conflict all by themselves, without participation or support from the other services or coalition partners? Not likely.*

*The handling of this matter may have been, to borrow Turner's term, a "public relations bonus" for the carriers, but strategies for response to regional crisis leave much to be desired when they conspicuously forget about the strength and the presence of the Air Force on the scene.—John T. Correll*

#### **Battle, Again**

[Regarding] your recent articles on "The Battle of Arlington Ridge" [November, p. 13, and December, p. 9] with respect to the planned Air Force Memorial site and Marine Corps supporters' opposition thereto, a few days

ago, I thought I would "tread the ground" to see for myself what the fuss was about. From the emplaced Air Force Memorial dedication plaque, I looked up the hill. The Iwo Jima Memorial was mostly (but not completely) obscured by a tall coniferous tree (singular). A smaller coniferous tree to the left of my line of sight and other deciduous trees in the area (bereft of leaves in December) were not a factor from that position. I paced the distance between sites at about 200 yards and then looked down the hill. From the monument, the trees (even bare) provided something of a screen to the right of the tall conifer—but nothing if the Air Force Memorial projects left of it, i.e., east of its foundation plaque. Unless there is some planting of additional trees of at least 50 feet in height, a 50-foot building fronting some tens of feet would certainly be visible from the base of the Iwo Jima Memorial. Even so, it would not be as visible as the existing Netherlands Carillon.

However the courts and Congress sort out the rival claims of site sanctity vs. due process, let us de-escalate any argument over topography: Regardless of the bird's-eye view of the two sites, the views from the ground are as I have described them. Perhaps your next report should include an up-to-date joint Air Force-Marine eyewitness assessment before emotion obscures judgment—on both sides.

Col. Jonathan Myer,  
USAF (Ret.)  
Alexandria, Va.

#### **Reality Check**

In "CMSAF Calls for Service Before Self" [December, "Aerospace World," p. 13], CMSAF Eric W. Benken speaks all too easily when he berates enlisted personnel for worrying about money. "Service before self" cannot be a politically acceptable answer to a very real political issue—money. Unfortunately, [Benken] made that leap, and the ones who have to live with the consequences are the forces inside USAF who do what they can every day to keep the mission alive. Benken is criticizing the rank and file for worrying about tomorrow. Maybe he should get out of his office with a clean slate when he visits the troops and leave the political issues at home. Supervisors and commanders everywhere will be glad to tell him about the problems, divorces, and food stamps that are so prevalent in our rank and file today.

When money became the issue, and when "do more with less" became the standard, the professional

# AIR FORCE

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#### **Publisher**

John A. Shaud

#### **Editorial**

#### **Editor in Chief**

John T. Correll

#### **Executive Editor**

Robert S. Dudney

#### **Senior Editor**

John A. Tirpak

#### **Associate Editor**

Tamar A. Mehuron

#### **Contributing Editor**

John L. Frisbee

#### **Managing Editor**

Suzann Chapman

#### **Assistant Managing Editor**

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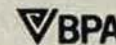
Patricia Teevan  
1501 Lee Highway  
Arlington, Va. 22209-1198  
Tel: 703/247-5800  
Telefax: 703/247-5855

#### **Industry Relations Manager**

Jennifer Krause • 703/247-5800

#### **US and European Sales Manager**

William Farrell • 847/295-2305  
Lake Forest, IL



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## Air Force Association

1501 Lee Highway • Arlington, VA 22209-1198

Telephone: (703) 247-5800

Toll-free: (800) 727-3337

Fax: (703) 247-5853

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National Defense and Congressional Issues  
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[aefstaff@aef.org](mailto:aefstaff@aef.org)

Air Force Memorial Foundation ... [afmf@afa.org](mailto:afmf@afa.org)

For individual staff members:  
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## Letters

airmen always did their best to see the mission done. People are not so concerned with "material things," but they are concerned about their families and their future. Our enlisted force keeps doing what they are trained to do and more. We fly and fight because of their ingenuity, their professionalism, and their love of the Air Force. [Benken] needs to realign his priorities and put them where they belong, on the people he represents.

Col. R.D. Carter,  
USAF (Ret.)  
San Angelo, Texas

Having served 20 years of combined active and reserve service, I am somewhat dismayed by [Benken's remarks]. As an enlisted flight crew member, I travel to many DoD facilities and am amazed at the quality of people serving our nation in the military. From flight line support crews and security personnel to medical personnel and many others that space does not permit me to list, it is very rare to hear a complaint or see unprofessional attitudes. However, as training and support funds are becoming more and more scarce, the leadership tells us we must take more out of hide. Frankly, we don't have much hide left, but we continue to do our jobs.

SSgt. Steve Robertson,  
USAF  
Modesto, Calif.

■ *The news item these readers refer to contained the key element of Benken's comments. However, he also stated that individuals often ask him for solutions to problems that they can solve themselves. "We need to realize that the state of our Air Force is the responsibility of every one of us. ... When a problem or challenge crops up, we need to engage ourselves. That includes going to the boss and asking, 'What can I do to fix the problem?'" He never downplayed the importance of maintaining adequate compensation.—THE EDITORS*

### Reserve Perspective

Bravo to Gen. Walter Kross in "Air-lift Gets a Boost" [December, p. 24] for having the courage to challenge some current assumptions about the Guard and Reserve forces. We need to get our doctrine back in order about the proper role of these forces. I'd suggest starting with the recognition that reserve forces are a means of capitalizing on the training and experience of those who leave active ser-

vice. As the active force draws down, the reserve force will have to draw down, since fewer trained people will be exiting the smaller active force.

Next, if it isn't cheaper to do it in the reserves, it makes little sense for the reserves to have it. Clearly as reserve forces are more heavily tasked, the cost quickly escalates and can easily exceed that of the full-time forces. Reserve equipment should be modernized in parallel with active equipment, but clearly the active force should have the most capable equipment.

The more times we tap the reserves, the more difficult it is for them to retain people. Civilian bosses have limited ability/willingness to cover for people on mobilized duty. The political influence of reserve forces can seriously distort rational planning. In the early 1980s, the Air Staff produced a study, which involved hundreds of people and thousands of hours, called Air Reserve Forces 2000. I think it would be wise to dust off that study.

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

### The Other Optempo

The December issue of *Air Force Magazine* contained an interview [p. 31] with the USAF personnel chief. Most interesting reading. While discussing operations tempo, one of the suggested solutions was to give all deployers two weeks off after a 90-day deployment.

When I think about the optempo problem, I envision the August–November 1997 time frame for my office. Eight of the 15 personnel in [my] office arrived in August, six directly from initial technical school. A subject matter expert, one of two that I'm authorized, returned from several months in Panama, so that the other SME could be short-noticed to Saudi Arabia. One additional individual was [also] tasked to Southwest Asia. Another individual was tasked to Florida for two weeks. I personally had to cut short attendance at a conference affecting our mission capability to go out on another TDY, because no other experienced personnel were available.

Overload, you say? We had an approved reclama for the Saudi tasking. Those remaining at home station just have to suck it up? Between Oct. 1 and Nov. 10, the home unit enjoyed a JCS–level exercise, a major command inspection, and a different major command's field training exercise; filled all our TDY taskings; and pro-



vided flawless support for a real-world 24-hour nuclear alert force.

I am blessed with a committed crew of overachievers, or we couldn't begin to cover our taskings. That's what supervisors mean when they talk about optempo. Maybe when we agree on symptom definition, we can make more progress on cures.

TSgt. James M. Livingston,  
USAF  
Minot AFB, N.D.

### F-86 Notes

I enjoyed Bruce Callander's piece in the December issue on bringing the F-86 into the USAF inventory [*"The Fielding of the F-86,"* p. 50]. One small nitpick: He says that through the 1950s improvements were made, including installation of air refueling gear. I flew the F-86H, which was the last, fastest, and most powerful version of the Sabre, and we did not have an air refueling capability. As far as I know, no version of the F-86 was air refuelable.

Col. James P. Coyne,  
USAF (Ret.)  
Ocean Pines, Md.

■ *Reader (and former Air Force Magazine senior editor) Coyne is correct.*—THE EDITORS

The author stated that the XP-86 "exceeded Mach 1 in a shallow dive" and later that, through the 1950s, "air refueling gear extended its range." I flew the F-86 from 1953-57 and the F again in 1960. The only way I ever knew of anyone exceeding Mach 1 was to climb to at least 35,000 feet and make a vertical dive. That usually resulted in a machmeter reading of about 1.02. In the article "The Long Reach of the Stratojet" [December, p. 66], the author stated that vortex generators "can be seen on most high speed aircraft." I flew most fighters, from the F-80 to the F-4, and have seen most others of that era that I did not fly. I have seen all of the current fighters. What I have not seen is a vortex generator on any fighter.

Lt. Col. Robert Vanden-Heuvel,  
USAF (Ret.)  
Shalimar, Fla.

■ *On the Mach 1 feat, at least four authors of books on the XP-86 note that the Sabre entered a "shallow dive" to achieve the supersonic speed. On the Stratojet comment, we should have said "many" instead of "most." Many high speed aircraft, including most Boeing-built transports, such as KC-135s, General Dynamics F-111s (in the inlets), Rockwell B-1Bs (about 20 on the tail), and others,*

*have vortex generators.*—THE EDITORS

[The F-86 article] was remarkable. I made that trip aboard the [USS *Cape Esperance*] and feel extra proud of the job the 51st Fighter Wing did during the "Little War." Some of the F-86 pilots had combat experience, but there were also some young tigers on board. 1st Lt. James F. Low and Capt. James A. McCulley are two examples. A perfect match of super aircraft and superior pilot skills made the difference in the air war over Korea.

CMSgt. Joseph N. LaRocca,  
USAF (Ret.)  
New Windsor, N.Y.

I was extremely pleased to see the color photo of a 62d Fighter Squadron F-80 [December, p. 52]. This aircraft is likely one of those which made the first US jet crossing of the Atlantic (to Furstenfeldbruck, Germany) as part of exercise Fox Able One in July and August 1948. Of personal significance to me is the "Fighting Bulldog" emblem appearing on the nose since it and others in the squadron were painted by my late father, Dennis O. Marote, who was the de facto squadron artist at that time. In addition to using his artistic abilities, my father also crewed on these F-80s and made the 1948 trip to Germany aboard a C-47 in support of the fighters.

Alan R. Marote  
Vero Beach, Fla.

### And the B-47

F-86 or B-47? Oops! *Air Force Magazine* did it again: misidentified another USAF aircraft. The December issue has a photo of a B-47 bomber [p. 1] announcing the Sabre jet article on p. 50. A quick scan through that article reveals that F-86s still look like F-86s. The B-47s are, however, correctly shown in their own article on p. 66, "The Long Reach of the Stratojet."

CW3 John Guzman,  
USA (Ret.)  
Tallahassee, Fla.

■ *Reader Guzman is correct. Right photo, wrong page.*—THE EDITORS

[The B-47] was a tight fit for the regular three crew members—I was the electronic countermeasures officer on a B-47 five-man crew. From 1957-59 I flew in a modified B-47E with a capsule for defensive countermeasures fitted in the bomb bay. Since the capsule slightly protruded [from] the underside, the ECM types had to take off and land in the crash posi-

tions up front. Then at 10,000-15,000 feet we had to crawl [through] the tunnel between the front cabin to the bomb bay. Midair refueling while sitting in the back was scary as our plane rocked back and forth. It felt like we were ready to stall at any moment. We had instruments but no window. All in all it was a beautifully performing plane!

Capt. Ronald Camp,  
USAF (Ret.)  
Silver Spring, Md.

[The Stratojet article] brought back many memories of my time in Air Defense Command. Some of your readers may not appreciate being reminded of it, but the interceptors that we had in those days—F-89 Scorpions and F-94 Starfighters—simply could not catch the Stratojet in a tail chase. Many a time we sat at our early warning radar scopes watching [Ground Control Intercept] "down the road" trying to set up a perfect beam intercept on the stream of bogies coming in toward the San Francisco Bay area. The interceptors of that 1953-54 era just could not keep up with the B-47.

Richard J. Warren  
Van Nuys, Calif.

At last! A comprehensive article about the good old B-47. For some unknown reason, articles about this venerable aircraft are hard to come by. I have often wondered why the B-47 has been overlooked by aviation buffs. After all, it was the granddaddy of all large multiengine jet aircraft to come. The B-52 has overshadowed the B-47 for years, and as a pilot who also checked out in the B-52, I can tell you that the B-52 does not come anywhere near the "fighter" handling characteristics of the B-47. [It carries a] bigger bomb load, maybe, but [is] nowhere near as much fun to fly as the good old "pay attention or I will bite you," porpoising, wing-flapping B-47.

Maj. John F. Windsor Jr.,  
USAF (Ret.)  
Orlando, Fla.

### Fuel News

I just read in your November issue [p. 20] that the 1st Fighter Wing at Langley AFB, Va., just became the first ACC unit to switch to JP8+100 fuel. This is incorrect. My unit, the Texas Air National Guard's 147th FW at Houston's Ellington Field, has been using JP8+100 since April 1, 1994, followed by many other Guard units.

TSgt. Michael W. Redus,  
ANG  
Ellington Field, Texas

By Peter Grier

## Joint STARS Achieves IOC

The Air Force declared Dec. 18 that the E-8 Joint Surveillance Target Attack Radar System aircraft fleet achieved initial operational capability. IOC was reached seven years after the original E-8, then a developmental aircraft, played a starring role in the Gulf War.

The announcement came as the third operational E-8C of the fleet was assigned to the 93d Air Control Wing, Robins AFB, Ga. The Joint STARS aircraft are used to track vehicle activity on the ground and relay targeting information to air and ground units.

The aircraft is a modified Boeing 707 equipped with a large, canoe-shaped radar mounted under the fuselage. The radar is capable of locating and tracking vehicles moving on Earth's surface out to a distance of several hundred miles. The data link can transmit such information to ground stations or other aircraft.

Delivery of the first production E-8C took place in 1996. Joint STARS aircraft flew more than 150 operational missions in Desert Storm and Joint Endeavor (1995-96).

Ten more Joint STARS aircraft are currently projected for delivery, which would increase the fleet to 13.

## More Joint STARS Sought

A potent group of Senate and House members are pressing DoD to procure the full Joint STARS fleet of 19 production aircraft, not the 13 currently planned.

The step, if adopted by Defense Secretary William S. Cohen, would require the Pentagon to restore the six E-8s that it cut from the Air Force program during the Quadrennial Defense Review in 1997. The Pentagon imposed the cut in the belief that European NATO nations would buy six aircraft for their own services, but these nations decided not to do so.

In a Dec. 8 letter to Cohen, Sen. Joseph I. Lieberman (D-Conn.) and 12 other Senators said DoD needed to revisit the issue. "To ensure that our forces have the operational assets they require, particularly given

NATO's rejection of the Joint STARS proposal, we strongly believe the planned buy of Joint STARS should be immediately returned to the originally programmed 19 aircraft."

Three days earlier, 88 House members sent a similar letter to Cohen, calling for inclusion of two more E-8s in the Fiscal 1999 DoD budget, which will be submitted this month.

## Panel Eyes Assignment System

An Air Force working group Dec. 10 kicked off a three-month review of the Officer Assignment System with two days of briefings about the system's evolution and the current state of the force.

The current OAS was started in January 1995 and was last modified with the addition of a More Voice/More Choice program in June 1996.

"Based on feedback from the field, I believe the time is right to initiate a thorough review to validate or make changes, if necessary, to the principles and processes of OAS, ensuring it fits our current force structure and composition," said Air Force Chief of Staff Gen. Michael E. Ryan.

The review group is made up of officers from commands and specialties throughout the Air Force. Chosen to head the group was Gen. John A. Shaud, USAF (Ret.), current executive director of the Air Force Association.

Shaud said that the service has changed a great deal in recent years, handling an increase in operations and personnel tempo with a smaller, leaner force, and if the review panel can recommend steps to help deal with this situation, it will. At the same time, said Shaud, "I don't foresee the group recommending a major overhaul that produces a system officers won't recognize."

## Arlington Cemetery Plot Thickens

In the wake of an intense political controversy over the possibility of inappropriate burials, it was agreed that the body of M. Larry Lawrence, the late US envoy to Switzerland, should be removed from an Arlington

National Cemetery grave and reburied elsewhere.

The decision to remove Lawrence's body was made by his widow, but outraged members of Congress and veterans groups were already moving toward demanding such action.

Lawrence was a major financial contributor to the Clinton campaign in 1992 and to the national Democratic Party. He was one of 69 persons granted special waivers to be buried at the cemetery over the past five years.

The waiver was based in part on Lawrence's claim—now known to be fraudulent—that he served heroically on a Merchant Marine ship during World War II and suffered grievous battle wounds in a German U-boat attack. Republicans produced documents showing that the tale of seagoing heroics was a fabrication.

Congressional leaders of both parties want the General Accounting Office to review the process for granting waivers for burial at the cemetery. Rep. Terry Everett (R-Ala.), chairman of the House Veterans' Affairs oversight and investigations subcommittee, said, "The subcommittee still has an interest in questions concerning the State Department's actions in the granting of the waiver for Mr. Lawrence."

Lawrence died of cancer in 1996 at his official residence in Bern, Switzerland.

## 366th AEW Chalks Up Firsts

According to Air Force officials, the "Gunfighters" of the 366th Air Expeditionary Wing, which is based at Mountain Home AFB, Idaho, accomplished a number of firsts while deployed to Bahrain this fall in support of Operation Southern Watch.

During the unit's time in the Middle East it underwent an Operational Readiness Inspection—marking the first ORI completed in theater during a real-world contingency. The deployment was also the first time bombers, fighters, and tankers from the same wing have flown together in support of a contingency.

And, until the Bahrain tour, the B-1B Lancers of the 34th Bomb Squadron had never bedded down with the wing in a deployed location.

"It's been said that it's historic," said Brig. Gen. Randall "Mark" Schmidt, 366th AEW commander. "What I think is historic is that all three of those things happened at the same time, and I'm glad that it was the Gunfighters."

Conducting an ORI during a real-world operation was an initiative on the part of Air Combat Command to try and lower operational tempo in a unit. The wing's checkup went well, said inspectors.

"The unit has demonstrated [its] ability to accomplish the mission [it was] sent here to do," said Col. Steve Spencer, chief of the ACC inspector general team.



DoD photo by Petty Officer 3d Class Heather Eghball



USAF photo by SSgt. Orville Desjardais

*One of several electric power company bucket trucks airlifted to Guam rolls out of a C-5 at Andersen AFB. It was part of USAF's relief effort after Supertyphoon Paka hit the island in December. The Air Force brought in more than two million pounds of relief supplies for the estimated 1,700 left homeless by the destruction of such property as the Nimitz Hill housing area (top photo).*

Inspectors themselves faced time pressure due to the decision to conduct the ORI in the Middle East. Typical preparation for such an inspection begins six months ahead of time. In this case, ACC had only 45 days.

The ORI was conducted in two phases. After the first phase, the IG marked out five days for training to prepare the unit for the second half.

### Supertyphoon Slams Andersen

Air Force personnel at Andersen AFB, Guam, weathered some 12 hours of Typhoon Paka on Dec. 16, with winds gusting to more than 230 mph and sea levels rising to 35 feet above

their normal state, the Air Force said.

Andersen officials reported no deaths and only minor injuries. However, the fury of the storm caused major damage to buildings, equipment, automobiles, and trees, the Air Force reported Dec. 19.

Flying debris smashed windows and damaged cars, buildings, and facilities. Water damage from rain penetrated many buildings on base, including upper-level floors in the dormitories.

Andersen weather officials said the highest recorded winds were 205 knots, or about 236 mph.

DoD spokesman Kenneth Bacon

announced the Pentagon was sending five C-5 transport aircraft loaded with equipment—primarily electrical generating equipment and communications equipment, such as portable telephones, to replace the infrastructure that has been destroyed by the typhoon—as well as blankets, water, and food.

Essential medical care, dining, and food facilities were spared in the storm. Running on generator power, these services, including the commissary and the Army and Air Force Exchange Service shoppette, were operational and open for business. Water service was interrupted in some areas, and television transmissions were cut off.

### Troops To Get Anthrax Shots

On Dec. 15 the Department of Defense announced that it intends to systematically vaccinate everyone in the armed services against anthrax.

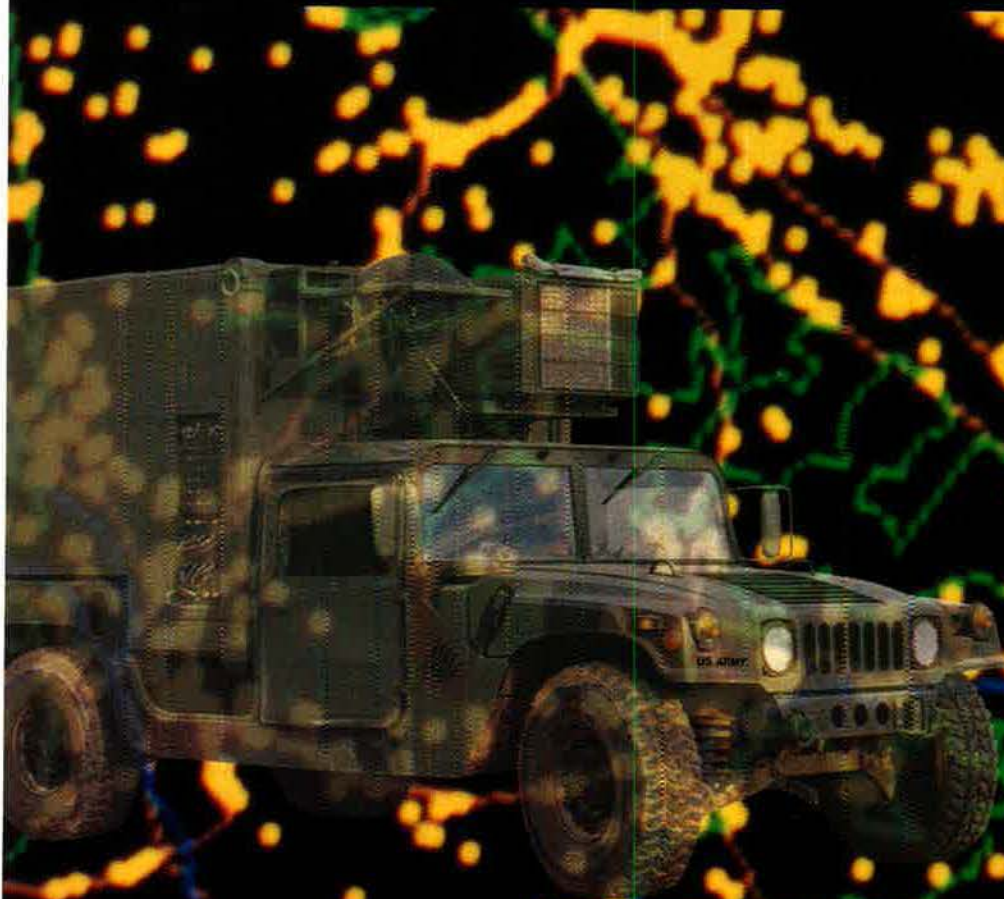
One of the most dangerous biological warfare agents known to science, anthrax is an infectious disease that normally affects animals. If placed into weapons it would be 99 percent lethal to unprotected individuals who have been exposed, according to the Pentagon.

While there is no hard evidence that any nation has ever used anthrax in battle, the US needs to take the possible proliferation of such a weapon of mass destruction seriously, said officials. Initially, the vaccinations will be given to 100,000 personnel serving in the high-threat areas of the Persian Gulf and Korea. Eventually all active and reserve military members will get the shots.

"Our goal is to vaccinate everybody in the force so they will be ready



Providing and exploiting unprecedented situational awareness make it one of America's most effective



Arms proliferation, decentralization of military power, political instability, and reduced forward presence dramatically increase the need for around-the-clock information on the location and movement of potentially hostile surface forces. Doubling the size of the currently programmed Joint STARS fleet will give our diplomats and military commanders this critical advantage—anywhere in the world, anytime, under any conditions. A revolutionary system proven in combat and peacekeeping, Joint STARS provides both moving imagery that detects, locates, and tracks vehicles in real time and high-resolution, near-real-time Synthetic Aperture

deterrents.

Radar still images to its 18 onboard workstations and to Army Ground Station Modules (GSMs). This enables the aircraft and the GSMs to perform command-and-control functions and coordinate airborne and land-based strike forces. Also, their connectivity with other space, airborne, and ground-based surveillance and reconnaissance assets makes Joint STARS one of the most effective force multipliers in our arsenal. Joint STARS—a peacekeeping, crisis-management, and war-fighting solution for the next century.



to deploy anywhere, anytime," said Deputy Secretary of Defense John J. Hamre, who will monitor implementation of the program.

The immunization program consists of an initial round of three subcutaneous injections given two weeks apart. Three additional injections are then given at six, 12, and 18 months. Annual booster shots are necessary if full-strength immunity is to be maintained.

The anthrax vaccine was first developed in the 1950s and approved by the Food and Drug Administration for public use in the 1970s. It uses dead bacteria instead of a weak, living strain of the disease. In this respect it is similar to the diphtheria vaccinations that most US children receive when they enter school.

**Panel Urges Separate Training**

A special panel appointed by Secretary of Defense William S. Cohen recommended Dec. 15 that the Army, Navy, and Air Force do more to separate men and women during basic and advanced training.

The Federal Advisory Committee on Gender-Integrated Training and Related Issues, set up in June and headed by former Kansas Sen. Nancy Kassebaum Baker, concluded that the sexes should be housed in separate barracks and train separately at operational unit levels—Air Force flight, Army platoon, and Navy division.

Currently, all the armed forces except the Marine Corps train men and women together at all levels and often house them in separate bays or floors of the same barracks building.

Drill instructors now spend far too much time simply trying to prevent cases of sexual harassment, the panel concluded. It also found that barracks integrated by sex have a higher rate of disciplinary problems.

Men and women would still work together in the field and in the classroom, under the panel's recommendations. Members also urged that all the services toughen the physical requirements for women in basic training to counter a widespread belief that they are too easy.

**Cohen Orders Review of Gender Report**

Defense Secretary Cohen on Dec. 16 instructed the military services to assess the proposals of the Federal Advisory Committee on Gender-Integrated Training and Related Issues and report back in mid-March.

"It is clear from the report that the panel shares my determination to make

sure that military training is fair, demanding, and effective," Cohen said.

The Pentagon chose to emphasize that the panel supported continuation of gender-integrated training, not the fact that it found problems.

Cohen asked the military services to "review these recommendations and report back to me within 90 days with their assessment, to include the manpower and personnel implications and the costs that might be associated with their implementation."

**Air Battle Managers in Demand**

Air battle managers who have left active service but are members of the Air Force Reserve or Air National Guard may be able to return to full-time status if they wish.

Air Force Personnel Center officials want to increase the number of ABMs in the force. These officers, formerly called air weapons controllers, are responsible for the control of aircraft on missions that involve airspace and data link management.

ABMs are assigned to E-3 Airborne Warning and Control System, E-8 Joint STARS, and EC-130E Airborne Battlefield Command and Control Center aircraft.

The Air Force is particularly interested in luring back ABM captains from the Air Force Reserve or Air National Guard. Majors may also apply.

Applicants must have a security clearance and must still be able to pass ABM physical requirements.

**Enlisted Promotion Rates Rise**

Air Force promotion rates to staff, technical, and master sergeants will increase for the second year in a row, according to service personnel officials. Meanwhile, promotion rates for seniors and chiefs will remain above the minimums laid out in the Total Objective Plan for Career Airmen Personnel.

"Last year we were able to increase promotion rates to the highest levels seen in the last 10 years for staff, technical, and master sergeants, and we are pleased to announce the 1998 promotion rates will increase for these grades as well," said Lt. Gen. Michael D. McGinty, USAF's deputy chief of staff for personnel.

The largest jump will come at the technical sergeant level. This promotion rate will be 2.5 percent higher than in 1997, making the promotion rate at this grade 17.6 percent.

The percentage of master sergeants promoted will go up 1.8 percent, to 23.4 percent. The staff sergeant rate



The implosion of a site called Hotel-11 marked the end of the last Minuteman II missile silo to be destroyed under terms of the 1991 START I accord. Located near Dederick, Mo., H-11 had been under the 351st Missile Wing's command.

will edge up from 18.5 percent last year, to 18.7 percent in 1998.

By law, senior and chief master sergeant promotions are limited to three percent of the total enlisted end strength. TOPCAP plans make sure the Air Force stays within this law's bounds.

Since end strength is a driving factor, the promotion rates for seniors and chiefs can be difficult to predict with precision. "However," said McGinty, "we anticipate the promotion rates will remain above the TOPCAP minimum promotion selection rates, which are six percent for seniors and 13 percent for chiefs."

Last year, the senior and chief promotion rates were 7.6 percent and 18.1 percent, respectively.

### USAF Astronaut Honored (Finally)

Some 30 years after his death, the late Air Force Maj. Robert H. Lawrence Jr. finally gained official recognition for being the country's first African American astronaut and received honors for his contributions to the US space effort.

During a Dec. 8 ceremony, Lawrence's name was added to the Astronauts Memorial Foundation's Space Mirror at the Kennedy Space Center in Florida. The act marked the culmination of a years-long campaign by supporters to gain official status for Lawrence, who had never been listed as an astronaut in official accounts of the space program.

Lawrence died in an F-104 fighter

crash in 1967. He never achieved the 50-mile altitude which was then a requirement for anyone seeking to wear astronaut wings. Under the different criteria of today, however, Lawrence would qualify for astronaut status, and his family has long pushed for his name's inclusion on the memorial honor roll.

### Whiteman Receives Latest B-2

The 509th Bomb Wing's B-2 fleet grew to 10 as the latest stealth bomber arrived at Whiteman AFB, Mo., from the Air Force Flight Test Center at Edwards AFB, Calif., USAF announced Dec. 8.

Air Vehicle 2 is the third Block 30 B-2 bomber to join the Whiteman fleet. It is also the first B-2 from the six original flight test aircraft to arrive at Whiteman.

Block 30 B-2s feature the latest technology and weapon carriage capability. The original B-2s were termed Block 10 while the next models were termed Block 20. Whiteman is scheduled to have 21 Block 30 B-2s by the year 2000.

The first Block 30, *Spirit of Pennsylvania*, arrived at Whiteman in August. The second, *Spirit of Louisiana*, arrived Nov. 10.

### Minuteman II Fades Away

The last Minuteman II missile silo to be destroyed under terms of the 1991 START treaty was imploded at Whiteman AFB, Mo., on Dec. 15. The site, known as H-11, had been completed in—and had been in contin-

ous operation since—May 1964, when Nikita Khrushchev headed the Soviet Union.

The silo was destroyed in a blast set off by the simultaneous turning of seven keys. The silo destruction was mandated by terms of the START I accord signed by President George Bush and Soviet President Mikhail Gorbachev on July 31, 1991. The basic goal of the Strategic Arms Reduction Talks agreement was reduction in the actual number of nuclear weapons deployed by the superpowers.

The Minuteman II site was located north of Dederick, Mo., some 90 miles southwest of Whiteman, which served as home for the 351st Missile Wing from February 1962 through July 1995, when the 351st and the last of its missiles were inactivated.

At one time, the missile field under Whiteman's control contained 150 Minuteman II launch facilities and 15 launch control facilities.

The removal of Minuteman IIs from silos began in 1991; the last missile was pulled out of its underground launcher in 1995.

### Gansler Cites IW, WMD Needs

Jacques S. Gansler, the new undersecretary of defense for acquisition and technology, said in his first remarks since taking office that the Pentagon needs to spend more on integrated information technologies and defense against weapons of mass destruction.

Future adversaries are unlikely to even attempt to match US forces airplane for airplane and tank for tank, said Gansler in a Nov. 13 address at a Phoenix symposium. Instead, they are likely to use "asymmetrical approaches" such as biological weapons strikes against US infrastructure.

"To counter these sophisticated, asymmetrical threats, the US must not only actively pursue counterproliferation efforts but also take maximum advantage of our leadership position in advanced technology—especially in the information field," said Gansler.

Specifically, the United States needs an integrated, multiservice command, control, communications, intelligence, surveillance, and reconnaissance (C<sup>3</sup>ISR) infrastructure as quickly as possible, according to the new acquisition chief. Such a network should be able to handle both tactical and strategic needs. "This is the critical element of an effective 21st century warfighting capability," he said.

US forces need to pay particular attention to development and deploy-

ment of long-range, all-weather, "smart" weapons capable of taking advantage of the C<sup>3</sup>ISR network, said Gansler. He also urged that defense against such tough threats as weapons of mass destruction, information warfare, and low-cost ballistic missiles must no longer be put into the "too hard" category.

"They must be addressed as priority issues," he said.

#### DoD Reports High-Tech Projects

The Pentagon announced nine new 1998 Advanced Concept Technology Demonstration programs on Nov. 21.

ACTDs are meant to combine new technologies with new operational concepts and are to produce deployable systems within four years.

Forty-two ACTDs are now under way. Most address operational concepts laid out in Joint Vision 2010, such as dominant maneuver and precision engagement.

Among the items on the ACTD list:

- Precision Target Identification through advanced infrared and electro-optical systems and laser radars.

- Joint Continuous Strike Environment, intended to optimize use of weapons and set priorities for the engagement of time-critical targets.

- Unattended Ground Sensors, meant

to provide better weather data and keep a round-the-clock eye on potential targets.

- Joint Biological Remote Early Warning System, aimed at testing a network system for US European Command and US Central Command.

#### New Look at UAV Needed?

The US military may need to undertake a thorough review of unmanned aerial vehicles to determine what jobs they are truly fit for and how they might best save scarce operational dollars, according to a member of the Air Force's Scientific Advisory Board.

UAVs have come a long way in recent years toward winning acceptance within the military, Peter Worch told a National Defense Industrial Association UAV symposium last fall. Integration of new technologies, such as GPS navigation, and improved endurance have helped in that regard.

But a hard look at UAV plans could help judge whether they are truly capable of such missions as serving as a relay for airborne command-and-control data. While unmanned platforms might be ready to replace Airborne Battlefield Command and Control Center C-130 aircraft, they are not yet ready to do the jobs of

such other systems as Joint STARS, AWACS, and Rivet Joint, said Worch.

#### USAF Readies JASSM Selection

The Pentagon has approved a revised Air Force acquisition plan for the Joint Air to Surface Standoff Missile. The plan calls for the selection of a prime contractor in April, instead of July as previously scheduled.

The new plan also calls for a delay of about three months in beginning engineering and manufacturing development after the choice between competitors Boeing and Lockheed Martin.

Acceleration of the program was necessitated by a Congressional cut in the 1998 JASSM budget request from \$203 million to \$128 million. JASSM will receive another \$43 million, however, if an analysis mandated by lawmakers determines that it is indeed the best choice for the Pentagon's next-generation, long-range stand-off weapon.

The Navy would prefer to end its participation in JASSM, for the most part, and put its money into a variant of the Standoff Land Attack Missile-Expanded Response instead.

#### JDAM Faces Production Delay

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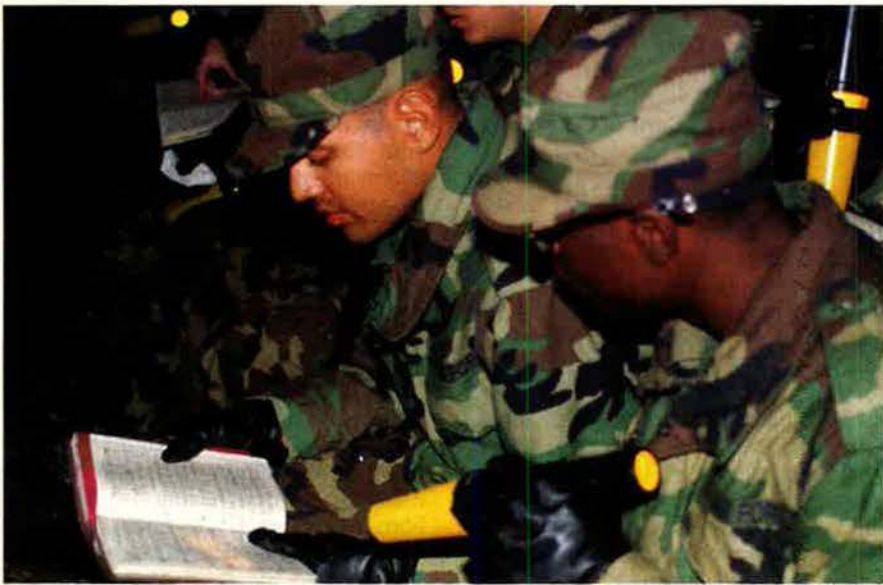
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**Flashlights came in handy at outdoor Christmas Eve services for these basic trainees on a field training exercise at Lackland AFB, Texas. For the 240 airmen huddled together on the clear but cold night, it was their first Christmas Eve in the Air Force.**

facing a one-year delay in full-rate production due to a number of design problems.

Two JDAM variants—the 2,000 lb. BLU-129/Mk. 84 and the 1,000 lb. BLU-110/Mk. 83—have had to be slightly redesigned because tests showed they were unstable at high angles of attack. In addition, JDAMs mounted on F/A-18s have exhibited excessive vibrations in some circumstances.

The delay will provide time for more operational testing, said Air Force officials. Low-rate production will continue.

Together the Air Force and Navy plan to buy 74,000 JDAM kits. Fitted on Mk 83 and Mk. 84 bombs, the JDAM precision guidance equipment is meant to give the weapons 13-meter accuracy.

#### Thurmond to Step Aside

Sen. Strom Thurmond (R-S.C.) announced that he will step down as chairman of the Senate Armed Services Committee at the end of 1998.

"I think the time has come for me to turn the reins of the committee over to the next generation of leadership," he said Dec. 4.

Thurmond, 95, is already the oldest and longest-serving senator in US history. He said he intends to serve out the rest of his term, which lasts until January 2003, and to continue as a member of the committee, despite turning over his chairman's gavel.

Thurmond became head of the panel in 1994, when Republicans won

control of the Senate. Sen. John W. Warner (R-Va.) is the second-highest-ranking GOP member of the committee and is in line to succeed Thurmond.

#### New Info Program Office

Air Force leaders have decided that the way the service buys and operates command-and-control electronics needs to change—and that has led to the establishment of a new Electronic Systems Center program office: Defense Information Infrastructure—Air Force.

The Air Force can simply no longer afford to keep acquiring and managing hundreds of separate C<sup>3</sup> systems,

said Matt Mleziva, director of the new program office.

"We were designing those systems against requirements based on previous experience and contingencies, such as the Cold War," said Mleziva. "But we were using those systems in ways the people who wrote the requirements never envisioned."

Real-world experience in places such as Bosnia has shown that operators spend an inordinate amount of time trying to get their separate data systems to work together. The Air Force leadership has charged DII—Air Force with the task of designing an integrated command-and-control system that can work with service and coalition partners.

DII—Air Force will then ensure that applications unique to particular parts of the Air Force—such as Air Combat Command mission planning for the F-117A stealth fighter—can plug into the common C<sup>3</sup> architecture.

The new DII framework is mostly in place at Hanscom AFB, Mass. The office has four product area directorates: Global Awareness, which deals with collecting information from all possible sources; Global Grid, which oversees such areas as fixed base command infrastructure; Dynamic Assessment, Planning, and Execution, which includes use of collected data in mission plans; and Modeling, Simulation, and Training, which can create a Joint synthetic battlespace.

#### VA Rule Change Aids Vets

Veterans who served in bitterly cold locations may now be eligible for Department of Veterans Affairs benefits due to a change in how VA evaluates cold-related injuries.

## Senior Staff Changes

**RETIREMENT:** Maj. Gen. Rondal H. Smith.

**CHANGES:** Lt. Gen. (sel.) Stewart E. Cranston, from Cmdr., AFDTIC, AFMC, Eglin AFB, Fla., to Vice Cmdr., AFMC, Wright-Patterson AFB, Ohio ... Brig. Gen. Paul V. Hester, from Cmdr., 53d Wg., Air Warfare Center, ACC, Eglin AFB, Fla., to LL, OSAF, Pentagon ... Maj. Gen. Silas R. Johnson Jr., from Dep. Dir. Ops., Natl. Mil. Cmd. Center, Pentagon, to Vice Cmdr., 21st AF, AMC, McGuire AFB, N.J. ... Maj. Gen. Michael C. Kostelnik, from Dir., P&P, AFMC, Wright-Patterson AFB, Ohio, to Cmdr., AFDTIC, AFMC, Eglin AFB, Fla.

Lt. Gen. (sel.) David W. McIlvoy, from Dir., Strategic Planning, DCS, P&P, USAF, Pentagon, to Vice Cmdr., AETC, Randolph AFB, Texas ... Brig. Gen. Charles F. Wald, from Spec. Asst. to C/S, USAF, Natl. Defense Review, Pentagon, to Dir. of Strategic Planning, USAF, Pentagon.

**SENIOR EXECUTIVE SERVICE CHANGES:** Garry W. Barringer, to Sr. Technical Dir., Air and Space Command-and-Control Agency, Langley AFB, Va. ... Ajmel S. Dulai, to Technical Adviser, Systems Engineering, ASC, Wright-Patterson AFB, Ohio ... James R. Speer, to Principal Dep. Assn. (Financial Mgmt.), OSAF, Pentagon ... Phillip W. Steely, to Exec. Dir., San Antonio ALC.



The US government has provided servicemen disability compensation for frostbite and cold-related injuries for years. But previous rules provided only for the rating of cold-related injuries to feet.

The new rule—based on the latest medical knowledge—revises the criteria to include injuries to any part of the body due to cold exposure. Conditions that may be related to cold injury include circulatory problems, skin cancer in frostbite scars, and arthritis of exposed parts.

Vets who believe they suffer from these problems should contact the nearest VA regional office for assistance.

### US NCOs Impress Kazakhs

Military leaders from Kazakhstan toured Andrews AFB, Md., in December to study how the US uses its enlisted force. Evidently, they were amazed by the responsibilities given enlisted personnel and noncommissioned officers.

"In the old Soviet air force, a lieutenant colonel would do the work that a master sergeant does in the US Air Force," said USAF Col. Randall Larsen, 89th Operations Group commander, who hosted the tour.

Included among the visitors was

Gen. Col. Mukhtar Altynbayev, Kazakhstan's minister of defense. Altynbayev was particularly surprised to find out that enlisted personnel maintain the vice president's and President's airplanes, said US officials. And they were impressed with one plus one enlisted personnel dormitory accommodations—which they said were of a quality reserved for field grade officers in their country.

### US Troops to Stay in Bosnia

President Clinton advised Congress on Dec. 18 that he intended to maintain US forces in Bosnia even after the June 1998 cutoff date for their participation in the peacekeeping efforts in the former Yugoslavia.

The White House announcement surprised no one. It had long been expected, despite Administration claims that no decision had been made.

Said Clinton: "It remains in the US national interest to help bring peace to Bosnia, both for humanitarian reasons and to arrest the dangers the fighting in Bosnia represented to security and stability in Europe generally. Through American leadership and in conjunction with our NATO Allies and other countries, we have seen real and continued progress toward sustainable peace in Bosnia."

The US currently maintains about 8,000 troops in Bosnia as part of the 1995 Dayton peace accords. All NATO nations and 20 others, including Russia and Ukraine, have provided troops or other support of the effort.

Clinton's announcement drew fire from several prominent members of Congress, including Sen. John McCain (R-Ariz.), who supported the original deployment in December 1995. McCain now contends that the Clinton Administration had simply lied about its intentions.

### USAF Notes Cause of B-1 Crash

In early December, the Air Force released the results of its investigation into the crash of a B-1B heavy bomber Sept. 19 near Alzada, Mont., concluding that the accident occurred while the crew was performing an off-practiced defensive maneuver.

The crash killed all four crew members. [See "B-1B Crash Claims Four," November, p. 18.]

The investigation, conducted by officers of Air Combat Command, said that the move involves evading a threat by slowing down and sharply turning. The report said that the bomber, while executing the turn, developed an excessive sink rate and was unable to recover.

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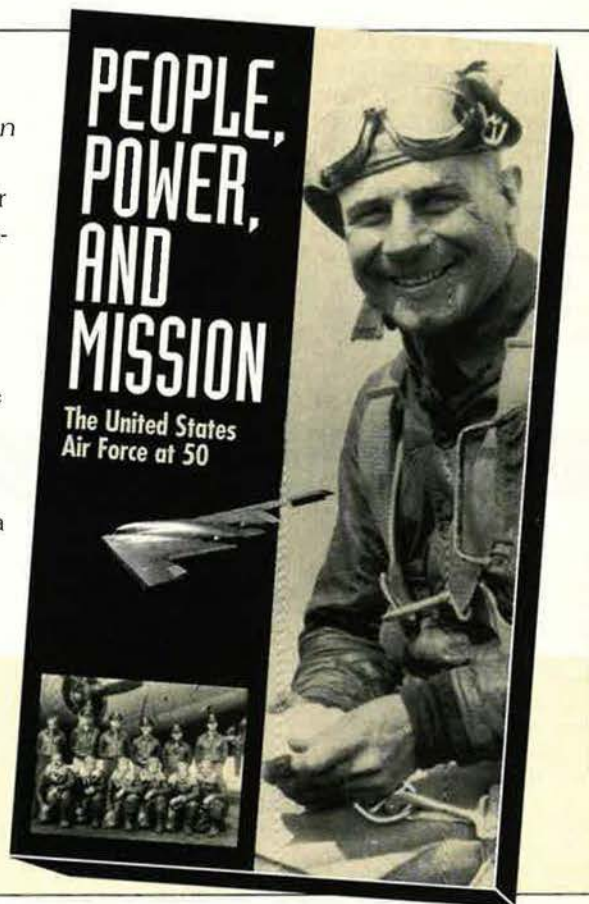
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The accident report said the Air Force was unable to determine which of the two B-1B pilots on board were actually in control of the aircraft at the time of the mishap.

At the time of the accident, the B-1B was on a training mission to perform low-level defense countermeasures and simulated bombing over the Powder River Military Operating area.

**News Notes**

■ Fiscal 1997 was the Department of Defense's safest flying year ever. There were 68 major military aviation accidents in 1997, with a toll of 76 deaths and 54 aircraft destroyed. By contrast, in 1996 the department logged 116 deaths and 66 aircraft destroyed.

■ Capt. Greg Harbin, an 11th Reconnaissance Squadron unmanned aerial vehicle operator, was recently awarded an Aerial Achievement Medal for safely landing a UAV after its engine seized 150 miles from the ground control station at Mostar AB, Bosnia. Harbin remotely guided the craft as it glided for about 30 miles, safely avoiding populated areas.

■ Gen. John P. Jumper on Dec. 5 became commander of US Air Forces in Europe. Jumper assumed responsibility for more than 32,000 active duty, reserve, and civilian members when he accepted the USAFE guidon from Army Gen. Wesley K. Clark, Supreme Allied Commander Europe, and commander in chief, US European Command. Jumper, a 30-year Air Force veteran with more than 1,400 combat flying hours, also takes over Allied Air Forces Central Europe.

■ Air Force personnel who participated in the disaster relief operation North Central United States Floods

1997 are eligible for the Humanitarian Service Medal, according to the Office of the Secretary of the Army. Those interested should contact the 319th Mission Support Squadron career enhancements office at Grand Forks AFB, ND.

■ Military personnel who lived off base and suffered losses in last spring's North Dakota floods are eligible for up to \$100,000 in personal property reimbursements, per a provision in the 1998 defense authorization bill. Officials estimate that 700 Air Force members will qualify for the aid.

■ Whiteman AFB, Mo., personnel moved 125,000 Redwing Blackbirds away from the flight line last fall in an effort to ensure safety of pilots. The birds were persuaded to roost elsewhere by the detonation of pyrotechnics.

■ Beginning as early as June, all reserve active status personnel will be issued the same color identification card as active duty forces—green. Replacement of the reserves' current red ID cards is intended to symbolize the full integration of the active and reserve military components.

■ The Chief Master Sergeant of the Air Force launched a home page on the World Wide Web in early December. The site, at <http://www.af.mil/lib/cmsaf/>, includes information about CMSAF Eric W. Benken and his current issues, speeches, and staff.

■ The Starlifter era ended at Travis AFB, Calif., with the January inactivation of the 20th Airlift Squadron. The base received its first C-141 in April 1965; the 20th AS's C-141s departed for other locations and eventual retirement.

■ The right main landing gear of an OC-135B aircraft collapsed upon touchdown at Andrews AFB, Md., on

Dec. 5. The aircraft is assigned to the 45th Reconnaissance Squadron at Offutt, AFB, Neb. None of the 15 people on board were injured.

■ The National Transportation Safety Board has concluded that poor communication on the part of air traffic controllers was a factor in an incident last year in which the crew of a civilian 727 airliner maneuvered to avoid what it felt was a dangerous approach by an Air National Guard F-16 fighter.

■ On Dec. 7, the 15th Medical Group clinic at Hickam AFB, Hawaii, was dedicated to the first Army Air Corps doctor killed during World War II. 1st Lt. William R. Schick, a 31-year-old flight surgeon, was aboard one of 12 B-17s which landed at Hickam in the midst of the Japanese attack on Pearl Harbor. He received a fatal wound from a strafing Zero fighter while escaping from his burning aircraft on the runway.

■ Concluding an intense engine competition begun in 1993, the Republic of Korea Air Force has chosen General Electric F404 turbofan engines to power its new KTX-2 advanced trainer/light combat aircraft. The aircraft, under development by Samsung Aerospace in conjunction with Lockheed Martin, is currently scheduled to enter production in 2005.

■ The American Fighter Aces Association, an organization of 550-plus US military pilots with five or more victories, will move its headquarters and memorabilia from Mesa, Ariz., to San Antonio this year. The new 23,000 square foot museum will be located near the Alamo and will contain artifacts contributed by aces of World War I, World War II, the Korean War, and the Vietnam War.

**Obituary**

Geraldine Pratt May, the first Air Force woman to attain the grade of colonel and first director of Women in the Air Force, died Nov. 2 at Menlo Park, Calif. She was 102.

May joined the newly formed Women's Army Auxiliary Corps in July 1942, receiving her commission in August 1942. In March 1943, she was one of the first female officers to be assigned to the Army Air Forces, where she served as WAC staff director of Air Transport Command.

With the enactment of the Women's Armed Services Integration Act in June 1948, May received a reserve commission in the newly created Air Force and was appointed director of Women in the Air Force, which carried the rank of colonel. ■

**Index to Advertisers**

Benchmade Knife .....	13
Bceing .....	16A-B, Cover IV
GEICO .....	Cover III
Mitchell Lang .....	87
Northrop Grumman .....	10-11
Pratt & Whitney .....	3
Raytheon-TI .....	Cover II
Rockwell .....	35
Tech Law .....	86
AFA Orlando Symposium .....	62
AFA Jewelry .....	87
Video Biography on Legends of Airpower .....	86
Video on the History of USAF .....	15

# The Chart Page

By Tamar A. Mehuron, Associate Editor

## Global Arms Sales, 1989-96

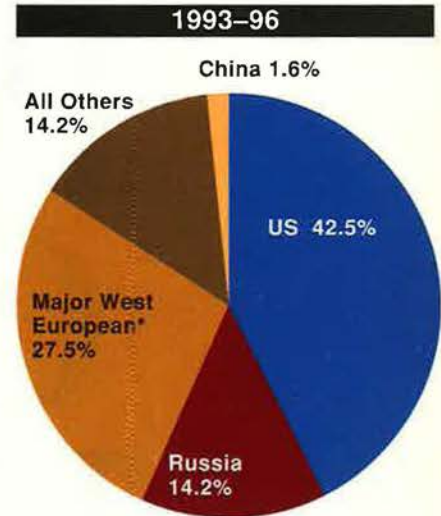
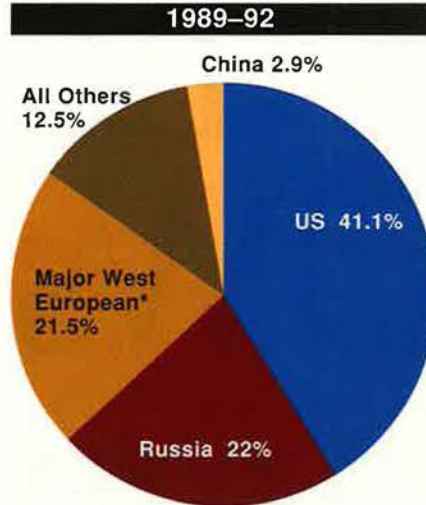
### National Shares, Then and Now

Since the end of the Cold War, the United States has dominated the global arms market, in terms of the value of arms transfer agreements and in arms deliveries. In 1996, the last year for which data are available, the value of world arms agreements was \$31.8 billion. (Actual deliveries were valued at \$30.1 billion.) The US had the largest share, with agreements worth nearly \$11.3 billion, or 35.5 percent of the total. Figure 1 shows that, from 1993 through 1996, the US posted a slight increase over the 1989-92 period. In contrast, Russia suffered a drop in share of nearly eight percentage points.

This theme of US dominance and Russian decline is reflected in the table on the dollar amounts of arms deliveries by supplier. Russia led in 1989 with arms deliveries worth \$22.8 billion, but by 1996 this had plummeted to \$2.9 billion, a drop of 87 percent. By contrast, US arms deliveries rose to \$13.8 billion.

Developing world nations continued to provide the largest customer base for arms transfer agreements and arms deliveries. In 1996, 61 percent of all arms sales were to developing nations.

Source: CRS Report for Congress: "Conventional Arms Transfers to Developing Nations, 1989-96," Aug. 13, 1997.



\*France, UK, Germany, and Italy

### Deliveries by Supplier (Millions of Constant 1996 Dollars)

	1989	1990	1991	1992	1993	1994	1995	1996	1989-96
US	9,036	10,603	10,715	11,732	11,872	10,371	13,072	13,791	91,192
Russia	22,837	17,606	6,951	2,749	3,417	1,565	3,579	2,900	61,604
France	2,900	6,103	2,467	1,979	1,174	1,356	2,250	2,900	21,130
UK	6,042	5,399	5,494	5,168	4,911	5,424	5,216	5,900	43,554
China	3,262	2,347	1,570	1,100	1,174	730	614	600	11,397
Germany	1,571	1,878	2,803	1,210	1,815	1,460	1,227	500	12,464
Italy	242	235	336	330	427	209	102	0	1,881
Europe	4,833	3,404	2,018	3,629	1,922	2,190	1,534	1,400	20,930
Other	4,108	2,582	2,242	1,979	2,242	2,816	2,557	2,100	20,627
<b>TOTAL</b>	<b>54,831</b>	<b>50,157</b>	<b>34,597</b>	<b>29,876</b>	<b>28,955</b>	<b>26,122</b>	<b>30,151</b>	<b>30,091</b>	<b>284,780</b>

\*"Europe" category comprises European nations not otherwise listed. "Other" means all non-European nations not otherwise listed. Numbers may not add due to rounding.



Twenty-five years ago this month, 332 Air Force POWs held by Communists in Southeast Asia left their prison cells, boarded USAF transports, and returned home from the war.

# When the POWs Came Home

**J**oy and privation alike show in the face of POW and Medal of Honor recipient Leo K. Thorsness, a major when captured six years earlier, as he shakes hands with a US officer when his name is called on Feb. 12, 1973. A long day of release—both physical and emotional—began with an early morning inspection at the “Hanoi Hilton,” and continued with the handover, the first step in “Operation Homecoming.”





*POWs peer between the bars of the Hanoi Hilton—within its walls some had endured eight years of torture, incessant interrogation, confession coercions, and near starvation. Communicating by tapping Morse code on the walls, the POWs were able to offer each other emotional and spiritual support and present a united front to their Communist captors.*



*Hoping to give the impression that the POWs had been humanely treated during their captivity, the North Vietnamese dressed them in brand-new clothes—provided the night before—and gave them a bag for toiletries and “personal effects.” In truth, most had tolerated years in rags, been fed poorly and intermittently, and were stripped of any possessions upon capture. Here, they step off the camouflaged bus that brought them to Gia Lam airfield outside Hanoi.*

*The POWs kept their composure during the handover process and even marched in formation toward the first American uniforms they'd seen in years. Their military bearing and sense of dignity had helped them survive and now served as a parting shot at their tormentors. Identified in this group of POWs are Lawrence N. Guarino, a major at the time of capture (at extreme left, about fifth in line), and Hayden J. Lockhart, a captain upon capture (third in line, seen between the first two POWs).*



Name/Rank	Captured	Date
Abbott, Joseph S. Jr. (Capt.)	April 30, 1967	April 15, 1972
Abbott, Robert Archie (1st Lt.)	April 30, 1967	June 27, 1972
Abbott, Wilfred Kesse (Capt.)	Sept. 5, 1966	Feb. 23, 1968
Acosta, Hector Michael (1st Lt.)	Dec. 9, 1972	April 2, 1966
Alexander, Fernando (Maj.)	Dec. 19, 1972	April 2, 1967
Alpers, John Hardesty Jr. (Capt.)	Oct. 5, 1972	April 24, 1966
Anderson, John Wesley (Capt.)	Dec. 27, 1972	Dec. 22, 1972
Andrews, Anthony Charles (Capt.)	Oct. 17, 1967	Feb. 18, 1967
Arcuri, William Youl (1st Lt.)	Dec. 20, 1972	Nov. 5, 1967
Austin, William Renwick (Capt.)	Oct. 7, 1967	July 5, 1972
Ayres, Timothy Robert (Capt.)	May 3, 1972	April 20, 1972
Bagley, Bobby Ray (Maj.)	Sept. 16, 1967	Dec. 17, 1967
Baker, David Earle (Capt.)	June 27, 1972	Nov. 7, 1967
Baker, Elmo Clinnard (Maj.)	Aug. 23, 1967	March 10, 1967
Ballard, Arthur T. Jr. (Capt.)	Sept. 26, 1966	Feb. 4, 1967
Barbay, Lawrence (Capt.)	July 20, 1966	April 28, 1968
Barnett, Robert Warren (Maj.)	Oct. 3, 1967	Nov. 7, 1967
Barrett, Thomas Joseph (1st Lt.)	Oct. 5, 1965	Dec. 17, 1967
Barrows, Henry Charles (Capt.)	Dec. 19, 1972	Dec. 2, 1966
Bates, Richard Lyman (1st Lt.)	Oct. 5, 1972	Aug. 8, 1966
Baugh, William Joseph (Capt.)	Jan. 21, 1967	Oct. 27, 1967
Bean, James Ellis (Col.)	Jan. 3, 1968	Sept. 20, 1965
Bean, William Raymond Jr. (Capt.)	May 23, 1972	Nov. 19, 1967
Beekman, William David (Capt.)	June 24, 1972	March 26, 1967
Beens, Lynn Richard (Capt.)	Dec. 21, 1972	June 27, 1972
Berg, Kile Dag (Capt.)	July 27, 1965	Feb. 17, 1972
Berger, James Robert (Capt.)	Dec. 2, 1966	June 13, 1972
Bernasconi, Louis Henry (Lt. Col.)	Dec. 22, 1972	May 12, 1967
Biss, Robert Irving (Capt.)	Nov. 11, 1966	Feb. 16, 1972
Black, Arthur Neil (Amn.)	Sept. 20, 1965	Aug. 13, 1972
Black, Jon David (Capt.)	Oct. 27, 1967	Dec. 20, 1972
Blevins, John Charles (Capt.)	Sept. 9, 1966	Aug. 23, 1967
Bliss, Ronald Glenn (1st Lt.)	Sept. 4, 1966	Aug. 7, 1966
Bolstad, Richard Eugene (Capt.)	Nov. 6, 1965	Dec. 22, 1972
Bomar, Jack Williamson (Maj.)	Feb. 4, 1967	Feb. 3, 1971
Borling, John Lorin (1st Lt.)	June 1, 1966	Dec. 28, 1972
Boyd, Charles Graham (Capt.)	April 22, 1966	Dec. 20, 1972
Boyer, Terry Lee (1st Lt.)	Dec. 17, 1967	June 24, 1972
Brazelton, Michael Lee (1st Lt.)	Aug. 7, 1966	Jan. 23, 1967
Breckner, William J. Jr. (Lt. Col.)	July 30, 1972	March 11, 1967
Brenneman, Richard Charles (1st Lt.)	Nov. 8, 1967	Dec. 20, 1967
Bridger, Barry Burton (Capt.)	Jan. 23, 1967	June 14, 1965
Brodak, John Warren (Capt.)	Aug. 14, 1966	Dec. 26, 1971
Brown, Charles A. Jr. (Capt.)	Dec. 19, 1972	Feb. 23, 1968
Browning, Ralph Thomas (1st Lt.)	July 8, 1966	March 22, 1968
Brudno, Edward Alan (1st Lt.)	Oct. 18, 1965	Sept. 27, 1965
Brunson, Cecil H. (1st Lt.)	Oct. 12, 1972	Jan. 10, 1968
Brunstrom, Alan Leslie (Maj.)	April 22, 1966	June 13, 1972
Buchanan, Hubert Elliot (1st Lt.)	Sept. 16, 1966	June 27, 1972
Burer, Arthur William (Capt.)	March 21, 1966	April 4, 1965
Burns, Donald Ray (Maj.)	Dec. 2, 1966	May 30, 1966
Burns, Michael Thomas (1st Lt.)	July 5, 1968	Feb. 17, 1972
Burrroughs, William David (Maj.)	July 31, 1966	Sept. 11, 1972
Butcher, Jack M. (1st Lt.)	March 24, 1971	May 15, 1967
Butler, William Wallace (Capt.)	Nov. 20, 1967	April 3, 1972
Byrne, Ronald Edward Jr. (Maj.)	Aug. 29, 1965	Aug. 24, 1967
Byrns, William G. (Capt.)	May 23, 1972	Dec. 18, 1971
Callaghan, Peter A. (1st Lt.)	June 21, 1972	Dec. 16, 1967
Camerota, Peter P. (Capt.)	Dec. 22, 1972	Jan. 18, 1968
Campbell, Burton Wayne (1st Lt.)	July 1, 1966	March 22, 1967
Carpenter, Joe V. (Capt.)	Feb. 15, 1968	Oct. 5, 1965
Carrigan, Larry Edward (Capt.)	Aug. 23, 1967	Aug. 17, 1968
Cerak, John P. (Capt.)	June 27, 1972	Oct. 25, 1967
Certain, Robert G. (Capt.)	Dec. 18, 1972	July 20, 1966
Chambers, Carl Dennis (1st Lt.)	Aug. 7, 1967	Dec. 26, 1972
Cheney, Kevin J. (Capt.)	July 1, 1972	May 5, 1967
Cherry, Fred Vann (Maj.)	Oct. 22, 1965	July 6, 1967
Chesley, Larry James (1st Lt.)	April 16, 1966	May 28, 1968
Clark, John Walter (Capt.)	March 12, 1967	June 24, 1972
Clements, James Arlen (Maj.)	Oct. 9, 1967	July 15, 1968
Collins, James Quincy (Capt.)	Sept. 2, 1965	Jan. 19, 1967
Collins, Thomas Edward III (Capt.)	Oct. 18, 1965	Dec. 27, 1972
Condon, James C. (Maj.)	Dec. 28, 1972	Dec. 20, 1965
Conlee, William W. (Lt. Col.)	Dec. 22, 1972	Feb. 18, 1967
Cook, James R. (TSgt.)	Dec. 26, 1972	April 30, 1967
Copeland, H.C. (Maj.)	July 17, 1967	Dec. 19, 1971
Cordier, Kenneth William (Capt.)	Dec. 2, 1966	Dec. 18, 1972
Cormier, Arthur (SSgt.)	Nov. 6, 1965	April 16, 1966
Craner, Robert Roger (Maj.)	Dec. 20, 1967	June 29, 1966
Crecca, Joseph (1st Lt.)	Nov. 22, 1966	Jan. 18, 1968
Crow, Frederick Austin (Lt. Col.)	March 26, 1967	June 20, 1965
Crumpler, Carl Boyette (Lt. Col.)	July 5, 1968	Aug. 8, 1966
Curtis, Thomas Jerry (Capt.)	Sept. 20, 1965	July 24, 1965
Cusimano, Samuel B. (Capt.)	Dec. 28, 1972	Jan. 16, 1967
Cutter, James D. (Capt.)	Feb. 17, 1972	Oct. 28, 1967
Daughtrey, Robert Norlan (Capt.)	Aug. 2, 1965	May 11, 1972
Davies, John Owen (1st Lt.)	Feb. 4, 1967	Dec. 20, 1972
Day, George Everette (Maj.)	Aug. 26, 1967	Jan. 19, 1967
Despiegler, Gale A. (Maj.)		July 29, 1972
Dingee, David B. (Capt.)		
Donald, Myron Lee (1st Lt.)		
Doughty, Daniel James (Capt.)		
Dramesi, John Arthur (Capt.)		
Driscoll, Jerry Donald (1st Lt.)		
Drummond, David I. (Capt.)		
Duart, David Henry (Capt.)		
Dutton, Richard Allen (Maj.)		
Elander, William J. Jr. (Maj.)		
Elias, Edward K. (Maj.)		
Ellis, Jeffrey Thomas (Capt.)		
Ellis, Leon Francis (Capt.)		
Everson, David (Maj.)		
Fer, John (Capt.)		
Finlay, John Stewart (Lt. Col.)		
Fisher, Kenneth (Capt.)		
Fleenor, Kenneth Raymond (Maj.)		
Flesher, Hubert Kelly (Maj.)		
Flom, Fredric R. (1st Lt.)		
Flynn, John Peter (Col.)		
Forby, Willis Ellis (Capt.)		
Ford, David Edward (Capt.)		
Fowler, Henry Pope (1st Lt.)		
Francis, Richard L. (Capt.)		
Fraser, Kenneth J. (Capt.)		
Fulton, Richard J. (1st Lt.)		
Gaddis, Norman Carl (Col.)		
Galati, Ralph W. (1st Lt.)		
Gaunt, William A. (Capt.)		
Geloneck, Terry M. (Capt.)		
Gerndt, Gerald Lee (1st Lt.)		
Gideon, Willard Selleck (Maj.)		
Giroux, Peter J. (Capt.)		
Gotner, Robert A. (Maj.)		
Gough, James W. (MSGt.)		
Granger, Paul L. (1st Lt.)		
Grant, David B. (Capt.)		
Gray, David Fletcher (1st Lt.)		
Greene, Charles E. (Capt.)		
Gruters, Guy Dennis (Capt.)		
Guarino, Lawrence Nicholas (Maj.)		
Guenther, Lynn (Capt.)		
Gutterson, Laird (Maj.)		
Guy, Theodore Wilson (Lt. Col.)		
Hall, George Robert (Capt.)		
Hall, Keith Norman (Capt.)		
Hanson, Gregg O. (1st Lt.)		
Hanton, Thomas J. (Capt.)		
Harris, Carlyle Smith (Capt.)		
Hatcher, David Burnett (Capt.)		
Hawley, Edwin A. Jr. (Capt.)		
Heeren, Jerome D. (Capt.)		
Heiliger, Donald Lester (Capt.)		
Henderson, William J. (1st Lt.)		
Hess, Jay Criddle (Capt.)		
Hildebrand, Leland (Maj.)		
Hill, Howard John (1st Lt.)		
Hinckley, Robert Bruce (Capt.)		
Hitshew, James Edward (Maj.)		
Hivner, James Otis (Capt.)		
Hoffson, Arthur Thomas (1st Lt.)		
Horinek, Ramon Anton (Maj.)		
Hubbard, Edward Lee (1st Lt.)		
Hudson, Robert M. (1st Lt.)		
Hughes, James Lindberg (Lt. Col.)		
Hughey, Kenneth Raymond (Maj.)		
Ingvalson, Roger Dean (Maj.)		
Jackson, Charles A. (1st Lt.)		
James, Gobel Dale (Maj.)		
Jayroe, Julius Skinner (Capt.)		
Jefcoat, Carl H. (Maj.)		
Jeffrey, Robert Duncan (Capt.)		
Jensen, Jay Robert (Capt.)		
Johnson, Harold E. (Capt.)		
Johnson, Kenneth (Maj.)		
Johnson, Richard E. (Maj.)		
Johnson, Samuel Robert (Maj.)		
Jones, Murphy Neal (Capt.)		
Jones, Robert Campbell (1st Lt.)		
Kari, Paul Anthony (Capt.)		
Kasler, James Helms (Maj.)		
Keirn, Richard Paul (Capt.)		
Kerr, Michael Scott (1st Lt.)		
Kirk, Thomas Henry (Lt. Col.)		
Kittinger, Joseph W. Jr. (Lt. Col.)		
Klomann, Thomas J. (Capt.)		
Kramer, Galand Dwight (1st Lt.)		
Kula, James D. (Capt.)		



**A total of 351 Air Force members were at one time or another held captive by Communists in North Vietnam, South Vietnam, Laos, Cambodia, or China. Most were returned during Operation Homecoming, which began in February 1973. What follows is a comprehensive listing of the 332 USAF returnees and one escapee. (Ranks are as of date of capture.)**

**Note: The illustration above, and on p. 18, represents the POW ribbon.**

**Source: Library of Congress database as of Dec. 15, 1997.**



**A**mong the 351 Air Force members who were at one time or another held captive by Communists in North Vietnam, South Vietnam, Laos, Cambodia, or China, 18 reportedly died during captivity. They are included at the end of this list. (Ranks are as of the date of capture.)

Name/Rank	Captured	Name/Rank	Captured
Labeau, Michael H. (Capt.)	Dec. 26, 1972	Schierman, Wesley Duane (Capt.)	Aug. 28, 1965
Lamar, James Lasley (Lt. Col.)	May 6, 1966	Schwertfeger, William R. (Capt.)	Feb. 16, 1972
Lane, Michael Christopher (1st Lt.)	Dec. 2, 1966	Seeber, Bruce G. (Capt.)	Oct. 5, 1965
Larson, Gordon Albert (Lt. Col.)	May 5, 1967	Seek, Brian J. (1st Lt.)	July 5, 1972
Lasiter, Carl William (Capt.)	Feb. 5, 1968	Sehorn, James Eldon (Capt.)	Dec. 14, 1967
Latella, George F. (1st Lt.)	Oct. 6, 1972	Shanahan, Joseph Francis (Capt.)	Aug. 15, 1968
Latham, James D. (Capt.)	Oct. 5, 1972	Shattuck, Lewis Wiley (Capt.)	July 11, 1966
Lebert, Ronald Merl (1st Lt.)	Jan. 14, 1968	Shingaki, Tamotsu (Maj.)	Aug. 19, 1972
LeBlanc, Louis E. Jr. (MSGt.)	Dec. 22, 1972	Shively, James Richard (1st Lt.)	May 5, 1967
Lengyel, Lauren Robert (Capt.)	Aug. 9, 1967	Sienicki, Theodore S. (1st Lt.)	May 3, 1972
Leonard, Edward W. (Capt.)	May 31, 1968	Sigler, Gary Richard (1st Lt.)	April 29, 1967
Lewis, Frank D. (Capt.)	Dec. 28, 1972	Sima, Thomas William (Capt.)	Oct. 15, 1965
Lewis, Keith H. (Capt.)	Oct. 5, 1972	Simonet, Kenneth Adrian (Maj.)	Jan. 18, 1968
Ligon, Vernon Peyton (Lt. Col.)	Nov. 19, 1967	Simpson, Richard T. (Capt.)	Dec. 18, 1972
Lilly, Warren E. (Capt.)	Nov. 6, 1965	Singleton, Jerry Allen (1st Lt.)	Nov. 6, 1965
Lockhart, Hayden James (Capt.)	March 2, 1965	Smith, Dewey Lee (Maj.)	June 2, 1967
Logan, Donald K. (1st Lt.)	July 5, 1972	Smith, Philip E. (Capt.)	Sept. 20, 1965
Lollar, James L. (SSgt.)	Dec. 21, 1972	Smith, Richard Eugene (Maj.)	Oct. 25, 1967
Long, Stephen G. (1st Lt.)	Feb. 28, 1969	Smith, Wayne Odgen (1st Lt.)	Jan. 18, 1968
Low, James Frederick (Maj.)	Dec. 16, 1967	Spencer, William A. (Capt.)	July 5, 1972
Luna, Jose David (Capt.)	March 10, 1967	Sponeyberger, Robert D. (Capt.)	Dec. 22, 1972
Lurie, Alan Pierce (Capt.)	June 13, 1966	Spoon, Donald Ray (1st Lt.)	Jan. 21, 1967
Madden, Roy Jr. (SSgt.)	Dec. 20, 1972	Stavast, John Edward (Maj.)	Sept. 17, 1967
Madison, Thomas Mark (Maj.)	April 19, 1967	Sterling, Thomas James (Maj.)	April 19, 1967
Makowski, Louis Frank (Maj.)	Oct. 6, 1966	Stirm, Robert Lewis (Maj.)	Oct. 27, 1967
Marshall, Marion A. (Capt.)	July 3, 1972	Stischer, Walter Morris (Maj.)	April 13, 1968
Martini, Michael R. (1st Lt.)	Dec. 20, 1972	Stockman, Hervey Studdie (Lt. Col.)	June 11, 1967
Mastin, Ronald Lambert (1st Lt.)	Jan. 16, 1967	Storey, Thomas Gordon (Capt.)	Jan. 16, 1967
Matsui, Melvin K. (Capt.)	July 29, 1972	Stutz, Leroy William (1st Lt.)	Dec. 2, 1966
Mayall, William T. (1st Lt.)	Dec. 22, 1972	Sullivan, Dwight Everett (Maj.)	Oct. 17, 1967
McCouston, Michael K. (Capt.)	May 8, 1967	Sumpster, Thomas Wrenne (Maj.)	Jan. 14, 1968
McDaniel, Norman Alexander (Capt.)	July 20, 1966	Talley, Bernard Leo (1st Lt.)	Sept. 10, 1966
McDow, Richard H. (1st Lt.)	June 27, 1972	Talley, William H. (Maj.)	May 11, 1972
McKnight, George Grigsby (Capt.)	Nov. 6, 1965	Temperley, Russell Edward (Capt.)	Oct. 27, 1967
McManus, Kevin Joseph (1st Lt.)	June 14, 1967	Terrell, Irby David (Maj.)	Jan. 14, 1968
McMurray, Frederick C. (Capt.)	Sept. 12, 1972	Thompson, Fred N. (Maj.)	March 20, 1968
McNish, Thomas Mitchell (1st Lt.)	Sept. 4, 1966	Thorsness, Leo Keith (Maj.)	April 30, 1967
Means, William Harley (Capt.)	July 20, 1966	Tomes, Jack Harvey (Capt.)	July 7, 1966
Mechenbier, Edward John (1st Lt.)	June 14, 1967	Torkelson, Loren H. (1st Lt.)	April 29, 1967
Merritt, Raymond James (Maj.)	Sept. 16, 1965	Trautman, Konrad Wigan (Capt.)	Oct. 5, 1967
Meyer, Alton Benno (Capt.)	April 26, 1967	Trimble, Jack R. (1st Lt.)	Dec. 27, 1972
Milligan, Joseph Edward (1st Lt.)	May 20, 1967	Tyler, Charles Robert (Maj.)	Aug. 23, 1967
Moe, Thomas Nelson (1st Lt.)	Jan. 16, 1968	Uyeyama, Terry Jun (Capt.)	May 18, 1968
Monlux, Harold Deloss (1st Lt.)	Nov. 11, 1966	Vanloan, Jack Lee (Maj.)	May 20, 1967
Morgan, Gary L. (SSgt.)	Dec. 22, 1972	Vaughan, Samuel R. (1st Lt.)	Dec. 19, 1971
Morgan, Herschel Scott (Capt.)	April 3, 1965	Vavroch, Duane P. (1st Lt.)	Dec. 26, 1972
Mott, David P. (Capt.)	May 19, 1972	Venanzi, Gerald Santo (1st Lt.)	Sept. 17, 1967
Murphy, John S. Jr. (Capt.)	June 8, 1972	Vissotzky, Raymond Walton (Maj.)	Nov. 19, 1967
Myers, Armand Jesse (Capt.)	June 1, 1966	Vogel, Richard Dale (Maj.)	May 22, 1967
Myers, Glenn Leo (1st Lt.)	Aug. 9, 1967	Waddell, Dewey Wayne (Maj.)	July 5, 1967
Nagahiro, James Y. (Lt. Col.)	Dec. 21, 1972	Waggoner, Robert Frost (Capt.)	Sept. 12, 1966
Nasmyth, John Herbert (1st Lt.)	Sept. 4, 1966	Walker, Hubert C. (Capt.)	Jan. 14, 1968
Neuens, Martin James (1st Lt.)	Aug. 12, 1966	Waltman, Donald G. (Capt.)	Sept. 19, 1966
Newcomb, Wallace Grant (Capt.)	Aug. 3, 1967	Ward, Brian H. (1st Lt.)	Dec. 27, 1972
Nix, Cowan Glenn (Capt.)	Oct. 1, 1966	Webb, Ronald John (Capt.)	June 11, 1967
Norris, Thomas Elmer (Capt.)	Aug. 12, 1967	Wells, Kenneth (1st Lt.)	Dec. 18, 1971
North, Kenneth Walter (Capt.)	Aug. 1, 1966	Wells, Norman Louross (Capt.)	Aug. 29, 1966
Odell, Donald Eugene (Maj.)	Oct. 17, 1967	Wendell, John Henry (Capt.)	Aug. 7, 1966
O'Neil, James W. (Lt. Col.)	Sept. 29, 1972	Williams, James W. (Capt.)	May 20, 1972
Overly, Norris M. (Maj.)	Sept. 11, 1967	Wilson, Glenn Hubert (Capt.)	Aug. 7, 1967
Padgett, James P. (Maj.)	May 11, 1972	Wilson, Hal K. (Capt.)	Dec. 19, 1972
Page, Jasper N. (TSgt.) (escaped)	Oct. 30, 1965	Wilson, William W. (1st Lt.)	Dec. 22, 1972
Parrott, Thomas Vance (Capt.)	Aug. 12, 1967	Winn, David William (Col.)	Aug. 9, 1968
Peel, Robert D. (Capt.)	May 31, 1965	Writer, Lawrence Daniel (Capt.)	Feb. 15, 1968
Perkins, Glendon William (Capt.)	July 20, 1966	Young, James Faulds (Maj.)	July 6, 1966
Peterson, Douglas Brian (Capt.)	Sept. 10, 1966	Young, Myron A. (Capt.)	Oct. 12, 1972
Pitchford, John Joseph (Capt.)	Dec. 20, 1965	Yuill, John H. (Lt. Col.)	Dec. 22, 1972
Pollack, Melvin (1st Lt.)	July 6, 1967	Zuberbuhler, Rudolph U. (Capt.)	Sept. 12, 1972
Pollard, Ben M. (Capt.)	May 15, 1967		
Price, Larry D. (1st Lt.)	July 30, 1972		
Purcell, Robert Baldwin (Capt.)	July 27, 1965		
Pyle, Darrel Edwin (1st Lt.)	June 13, 1966		
Pyle, Thomas Shaw (Capt.)	Aug. 7, 1966		
Ratzlaff, Brian M. (Capt.)	Sept. 11, 1972		
Ray, James Edwin (1st Lt.)	May 8, 1966		
Reich, William J. (1st Lt.)	May 11, 1972		
Reynolds, Jon Anzuena (Capt.)	Nov. 28, 1965		
Riess, Charles F. (Capt.)	Dec. 24, 1972		
Ringsdorf, Herbert Benjamin (1st Lt.)	Nov. 11, 1966		
Risner, Robinson (Lt. Col.)	Sept. 16, 1965		
Robinson, Paul K. (Maj.)	July 1, 1972		
Robinson, William Andrew (SSgt.)	Sept. 20, 1965		
Rose, George A. (Capt.)	June 21, 1972		
Ruhling, Mark John (Capt.)	Nov. 23, 1968		
Rumble, Wesley L. (1st Lt.)	April 28, 1968		
Runyan, Albert Edward (Maj.)	April 29, 1966		
Sandvick, Robert James (Capt.)	Aug. 7, 1966		
Sawhill, Robert Ralston (Maj.)	Aug. 23, 1967		

**The following 18 were reported to have died in captivity:**

Adams, Samuel (Sgt.)	
Atterberry, Edwin Lee (Capt.)	
Burdett, Edward Burke (Col.)	
Cobeil, Earl Glenn (Maj.)	
Dexter, Bennie Lee (A1C)	
Diehl, William C. (Capt.)	
Dodge, Ward K. (Maj.)	
Dusing, Charles Gale (SSgt.)	
Grubb, Wilmer N. (Capt.)	
Heggen, Keith R. (Lt. Col.)	
Martin, Duane Whitney (1st Lt.)	
Moore, Thomas (TSgt.)	
Newsom, Benjamin B. (Maj.)	
Pemberton, Gene T. (Maj.)	
Schmidt, Norman (Lt. Col.)	
Sijan, Lance P. (1st Lt.)	
Storz, Ronald Edward (Capt.)	
Weskamp, Robert L. (1st Lt.)	

**Note: The illustration above, and on p. 18, represents the POW ribbon.**

**Source: Library of Congress database as of Dec. 15, 1997.**



*There were no "parting gifts" or special outfits for POWs (right) who had been held by the Viet Cong. Released at a rural site in the south, away from any cities, these prisoners were handed over wearing the prison pajamas they had worn for the duration of their ordeal. Only a few of those held by the Viet Cong survived.*



*Tension is obvious as Army Brig. Gen. Stan McClellan (center), representatives of Hanoi, and international monitors hash out the details of a transfer.*

*Two USAF ground crew members direct a C-141 almost right up to the transfer table at Gia Lam, to make the last steps to freedom as short as possible. This Starlifter—tail #66-0177—still operates and, dubbed "Hanoi Taxi," serves as a flying memorial to Operation Homecoming and its precious cargo of that day.*



*Norman A. McDaniel, a captain at the time of his capture, tries to restrain a grin and a tear as he is called to board the airplane that will take him from Hanoi to the Philippines. Fresh clothes couldn't hide the gaunt faces and frail bodies of some of the POWs, many of whom suffered severe malnutrition in captivity.*



*Once their names are called, and they file past the transfer table, the POWs continue to receive greetings from US personnel as they walk to waiting aircraft at the Gia Lam airport.*

*The repatriation was an emotional experience for everyone involved. A USAF nurse offers a nonregulation, but heartfelt, welcome as Capt. Norman L. Wells comes aboard.*



*Aboard the C-141, the excited POWs start catching up on years of missed news and the simple pleasure of conversation with fellow Americans.*



*The C-141 could probably have flown on high spirits. The magic moment: A deliriously happy cheer goes up as the Starlifter departs North Vietnamese airspace and the former POWs know they're really going home.*

*The first taste of "home" was a throng of well-wishers who greeted the POWs upon arrival at Clark AB, Philippines.*



*Supporters and a red carpet greeted each arrival of a planeload of returnees, no matter the time of day or night. The tumult, usually highlighted by children chanting, "Welcome home!" brought most of the travelers to tears. The applause was followed by a real shower, clean clothes, medical checkup, and the inevitable meal—usually beginning with ice cream, followed by steak and other treats only dreamed of during years of suffering.*



*Repatriations continued through March 1973, with Travis AFB, Calif., being the usual first stop in the US. Here, 1st Lt. Melvin Pollack holds up a card noting his birthday and the greatest gift he could receive: returning to American soil after nearly seven years as a prisoner.*

*Scenes like this one at Travis, where Maj. Robert L. Stirm embraces his waiting family on the tarmac, were the happiest of Operation Homecoming, for it marked the successful conclusion of the mission.*





*1st Lt. Carl D. Chambers (above) offers a spiffy salute upon his arrival at Clark and long-delayed return from his last combat mission in Vietnam. Tearful, yet joyous family members embrace Lt. Col. Alan L. Brunstrom (left) and Lt. Col. Louis H. Bernasconi (below) as they arrive at Travis. ■*



On Jan. 29, 1991, Iraq launched its only offensive of the Gulf War—and was promptly clobbered by airpower.

# The Epic Little Battle of Khafji

By Rebecca Grant

**T**HE crew of the Air Force E-8 Joint STARS planned to spend most of the night of Jan. 29, 1991, searching for Scud sites in western Iraq and monitoring territory in front of the US Army VII Corps. Operation Desert Storm had been under way for 12 days, and the Joint STARS crew members were accustomed to dividing time along a wide arc, ranging from Iraqi forces massed on the Kuwait-Saudi border area near the coast to suspected Scud sites far to the northwest.

A few hours into their mission, at 9:30 p.m. local time, the Joint STARS

fanned its sensors over the southern part of Kuwait. Activity deep behind the lines had been building for a few days. Tonight, the moving target indicators showed clear signs of an attack in the making. Forces from Iraq's 5th Mechanized Division and 3d Armored Division were moving south to cross the border near a deserted Saudi town named Khafji. Iraq was trying to start a ground war of its own.

What the Joint STARS crew saw that night was, in fact, the beginning of Iraq's only organized offensive during the Persian Gulf War. The

main phase of the Battle of Khafji lasted less than 48 hours, but it marked a turning point in the debate over the ability of airpower to dominate enemy maneuver forces.

The Iraqi offensive at Khafji began on that January night, almost four weeks prior to the start of the main ground war in late February. Intense interest in the Desert Storm air war, and the ground offensive, overshadowed Khafji at the time and in most histories of Operation Desert Storm. However, three former USAF Chiefs of Staff—Gens. Michael J. Dugan, Merrill A. McPeak, and Ron-



*At left, an AC-130H fires into the twilight at a range in western Florida. In much the same way, a Spectre gunship and two A-10s targeted an Iraqi column of vehicles that was headed for Saudi Arabia in the early part of the Battle of Khafji.*



*F-16s, like this "Viper" getting a CBU load for a mission out of Qatar, were air-to-dirt workhorses in Desert Storm. They were among the aircraft employed in the "kill boxes" set up in the Kuwait Theater during the Khafji battle.*

ald R. Fogleman—all have recognized Khafji's significance as a marker of airpower's increasing ability to meld sensors and advanced weapons under central control to gain the advantage over enemy forces on the ground.

Studies of the airpower response to the Khafji offensive began at Air University, located at Maxwell AFB, Ala., shortly after the war. In 1995, the Air Force Studies and Analyses Agency at the Pentagon began a major reconstruction of the battle. The study, under the direction of Col. Tom Allen, produced findings that, in sum, yield remarkable evidence of airpower's effectiveness against attacking ground forces.

At Khafji, Joint airpower demonstrated something new: a heretofore unknown ability to stop moving enemy armored forces at night, on short notice, and without a synchronized ground counterattack.

### **Iraq's Objectives**

Understanding Iraq's objectives was the first step in the Air Force effort to gauge the significance of Khafji. As stated by retired Air Force Gen. Charles A. Horner, the war's Joint Forces Air Component Commander, the Battle of Khafji was downplayed at the time "because we didn't really understand what the objectives of the Iraqi army were." Complete details may never be available, but evidence suggests the Iraqi offensive at Khafji was a calculated

bid to draw coalition troops into ground combat while Iraq could still maneuver its mechanized forces in the Kuwait Theater of Operations.

After Desert Storm began on Jan. 17, Iraq made several attempts to take some initiative by employing remaining tactical strengths to change the terms of the battle. Scud attacks against cities in Israel and Saudi Arabia began on Jan. 18. Almost 50 percent of Iraq's total Scud launches occurred within the next 10 days, but they failed to start a war with Israel or fracture the coalition. On Jan. 22, Iraq set two Kuwaiti oil fields ablaze and then opened manifolds on offshore terminals to pump oil into the Gulf. Precision strikes by two F-111Fs soon shut down the pumps. Increased coalition air attacks against hardened aircraft shelters compelled Iraq to send more than 80 aircraft scurrying to Iran between Jan. 25 and 29.

After evacuating his front-line aircraft, Saddam must have realized that he had misjudged the effectiveness and persistence of the coalition air attacks. With no end to the air war in sight, the chance to use Iraqi military forces in Kuwait was slipping away. In his effort to seize the initiative, Saddam had one more option: a mechanized offensive across the Saudi border to engage coalition ground forces immediately.

During the war with Iran, Iraq's ground forces frequently launched probing attacks into Iran's lines. The

Iranians would counterattack, pursue, and end up being drawn into traps where Iraq could inflict heavy casualties from carefully prepared defensive positions. Saddam may have calculated that an Iraqi attack across the border at Khafji would work the same way. Iraq's offensive stood no chance of outright victory. However, if coalition ground forces could be compelled to engage and pursue the Iraqis, a costly battle might weaken the coalition and perhaps even prevent the Iraqis from being forced out of Kuwait.

In late January, Iraq's III Corps was still an intact force. Coalition air attacks had concentrated on taking down the integrated air defenses in Iraq, attacking weapon storage sites, and debilitating Iraq's command and control. Although coalition air attacks in the KTO were beginning to intensify, fewer than 1,000 sorties had been flown against fielded military forces during the first week of the air war. Many of these were directed at the Hammurabi Division of the Republican Guard and other front-line infantry divisions farther west. US Central Air Forces planners rated Iraq's forces at 81 to 99 percent of full strength on Jan. 29.

### **Saddam Plans the Attack**

Four days earlier, on Jan. 25, Saddam convened senior military leaders and began planning to attack. As forces from Iraq's III Corps began preparations, Joint STARS sensors detected and recorded the increased activity. Earthmoving equipment dug berms and reinforced artillery positions on Jan. 26 and 27. Armored vehicles from the 3d Armored Division moved into position on Jan. 28.

A few hours after darkness fell on Jan. 29, US Marine Corps outposts along the border made the first contact with the advancing Iraqi forces. Forward outposts and fire control teams to the west returned fire and fell back as planned to hold the line on the ground while Marine forward air controllers directed air strikes against the Iraqis. Iraqi forces quickly occupied the town of Khafji, which had been abandoned months earlier because of its vulnerable position.

The action of the Marines was a controlled, tactical response. However, the coalition next had to determine the intent of the Iraqi probes,



contain the offensive forces, and regain control over Khafji. For the US-led coalition ground forces, the Iraqi attack came at an awkward moment. The Army component was in the midst of its three-week redeployment from the coastal area to attack positions more than 200 miles west. Any disruption to the 24-hour-a-day caravan might upset the timetable for the upcoming attack. Containing the offensive and pushing the Iraqis out of Saudi territory was vital.

As the battle began, theater commander Army Gen. H. Norman Schwarzkopf told reporters, "The mere fact that they launched these attacks indicates they still have a lot of fight left in them."

Joint STARS reports of Iraqi movement on the border and behind the lines flowed into the Tactical Air Control Center that night at about 10 p.m. local time. Brig. Gen. Buster Glosston received the first Joint STARS reports and conferred with Horner. The JFACC ordered the single Joint STARS aircraft flying that night to swing back to the KTO and concentrate its arc of coverage over the border area near Khafji. Later that night—at 2 a.m. on Jan. 30—the Joint STARS sensors began to detect more movement as the 5th Mechanized

entered Khafji and elements of the 3d Armored advanced through the adjacent Al Wafra forest. To the west, the Iraqi 1st Mechanized Division probed across the border.

### Airpower Responds

Unbeknownst to Saddam, Schwarzkopf had decided not to play into his hands by launching a ground counterattack. "Schwarzkopf told us he didn't want to put any other forces over there," recalled retired USAF Maj. Gen. Thomas R. Olsen, who at the time was serving as CENTAF deputy commander. Schwarzkopf instructed his commanders to use airpower as the key element, along with Marine, Saudi, and other coalition ground forces, to stop the attack. To increase the margin of safety, the Marines embarked on a phased redeployment in their sector to put a buffer of about 20 kilometers of territory between coalition forces and the Iraqis. As long as airpower could reach deep to stop the offensive, the coalition ground forces in the area would not have to be reinforced, and Schwarzkopf would not have to reposition the redeploying Army forces.

At the Air Operations Center, the first task was to direct sorties al-

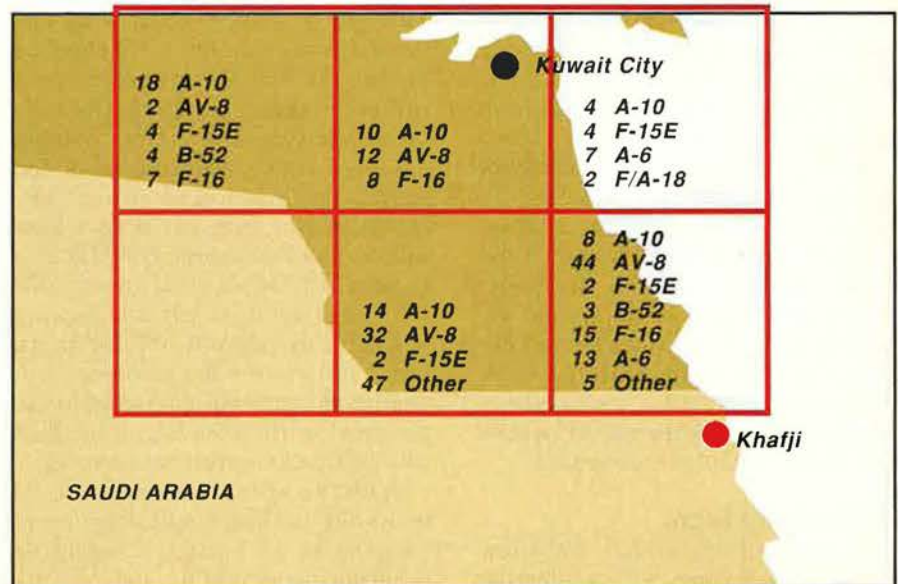
ready scheduled on the night's Air Tasking Order to strike moving Iraqi forces picked up by the Joint STARS sweep. Air attacks were funneled into the KTO from different altitudes and directions using a grid of designated "kill boxes" as a control measure. Each box measured 30 kilometers by 30 kilometers and was subdivided into four quadrants. Planners pushed a four-ship flight through each kill box every seven to eight minutes in daytime and every 15 minutes at night. In the designated area of the box, a flight lead was free to attack any targets he could identify within the allotted time.

Within the CINC's guidance to the air component, air interdiction operated independently. Hundreds of air attacks on Iraqi forces in Kuwait were already scheduled and under way. For example, more than 100 Air Force A-10 sorties were concentrated on the Republican Guards Tawakalna Division far to the northwest of Khafji. Many of the other sorties listed on the Air Tasking Order were already assigned to areas where the three divisions were gathered for the offensive. With airpower already flowing through the kill boxes, air controllers quickly diverted sorties to the Marine forward



### Khafji Kill Boxes

The enlargement below shows six of the 20 main kill boxes that divided the Kuwait Theater and the number of sorties per box during the period Jan. 29–31, 1991. Aircraft crews assigned to these six boxes flew 267 sorties—representing 17 percent of the total for those three days.





***"Like something from A-10 school": When Iraqi forces took to the road, A-10 tank killers found themselves in an ideal situation. Their destruction of an Iraqi convoy meant that Saddam's forces started the attack shorthanded.***

air controllers or sent them ahead to interdict the Iraqi forces attempting to reach coalition lines.

Pilots found the Iraqi armored vehicles were easier to identify and target once they were on the move. Near Al Wafra, an A-10 pilot described the sight of a column of vehicles as "like something from A-10 school." A-6s joined in, using Rockeye air-to-ground weapons. A-10 pilot Capt. Rob Givens later recalled with some amazement: "I, myself—one captain in one airplane—was engaging up to a battalion size of armor on the ground" and "keeping these guys pinned for a little bit." Air Force AC-130 gunships waiting on alert were scrambled after a hasty briefing. As lead elements of the 5th Mechanized with some support from the 3d Armored reached Khafji, one Air Force gunship caught the column and stopped many of them from entering the town.

Anti-aircraft fire and occasional missile launches were reported by the aircrews. However, the rapid attacks to squelch the initiative of the maneuver force also hit the Iraqis before they could bring up and assemble most of their heavier air defense guns and shoulder-fired SAMs, an important edge for the coalition that contributed to increased aircraft survivability and effectiveness.

### **The Second Night**

By the morning of Jan. 30, a few hundred Iraqi troops were occupying

the town of Khafji. Air attacks on the columns had been so effective that the objective of the Iraqi attack remained unclear to the coalition. "So few Iraqis made it across the border," Horner later recalled, "that it appeared to be some sort of minor action."

For the coalition, recapturing Khafji itself and stopping any Iraqi attempts to reinforce the town were the top priorities. Marines moved into place south of Al Wafra to hold the sector. Fixed-wing aircraft, attack helicopters, and artillery pieces joined the close-in battle around Khafji. Cobra helicopters with TOW antitank missiles cycled throughout the day to attack targets like Iraqi armored personnel carriers at close range inside the town of Khafji. Throughout the day, fixed-wing sorties scheduled on the ATO checked in with the Marine forward air controllers to seek out targets. An OV-10 spotted an Iraqi tank column moving south toward the town and passed the location to several airborne Marine F/A-18s. Pilots later told forward air controller Maj. Jim Braden, USMC, that as soon as the first Iraqi vehicles got hit, they all stopped moving and became much fatter targets for the aircrews. Toward evening, Saudi and Qatari forces assigned to the area began the first of two attacks to retake the town.

With the offensive now about 24 hours old, and Saudi and Qatari forces pressing in on Khafji, bringing up reinforcements was the only chance

for Iraq to recover the initiative or to try again to draw the coalition into a ground battle. The coalition forces engaged in and around Khafji did not know that Iraq was about to move fresh elements of the 3d Armored Division and 5th Mechanized Division under cover of darkness to reinforce Khafji and engage coalition forces.

The Joint STARS aircraft, scanning deep into the enemy's territory for moving targets, detected columns moving along the coastal road toward Khafji and at other points just inside Kuwait. Air controllers directed airborne assets to nip at the Iraqi attempts to recommence operations. One stunning example of this came at about 2 a.m. local time on Feb. 1; Joint STARS recorded an air attack in progress on a column of vehicles. In the first minutes of the attack, the lead Iraqi vehicles swerved off the road and into the desert. Multiple Joint STARS tracks of the primary and secondary Iraqi lines of communication across Kuwait confirmed that air attacks had disrupted vehicle traffic throughout the area. Instead of advancing toward the coalition forces, Iraq's forces were being stopped, rerouted, delayed, and destroyed. Iraq's forces were unable to continue with organized maneuver. By the morning of Jan. 31, the entire offensive had unraveled.

American airpower had within a short period of time destroyed enough vehicles to stifle the Iraqi III Corps' effort to regain the initiative. On one level, Khafji "proved, once again, that an unsupported army moving in the field is highly vulnerable to airpower," concluded Maj. Daniel Clevenger, one of the AFSAA study's leaders.

"From Iraq's standpoint, the Battle of Khafji was a debacle," Schwarzkopf later wrote in his memoir. A captured Iraqi soldier from the 5th Mechanized Division remarked that his brigade underwent more damage in 30 minutes of air attacks at Khafji than it had in eight years of the Iran-Iraq War.

The air response at Khafji supplied needed close support to engaged coalition forces and shaped the deep battle with the most efficient air counteroffensive against maneuvering land forces ever documented. The 1st Mechanized, 3d Armored, and 5th Mechanized divi-

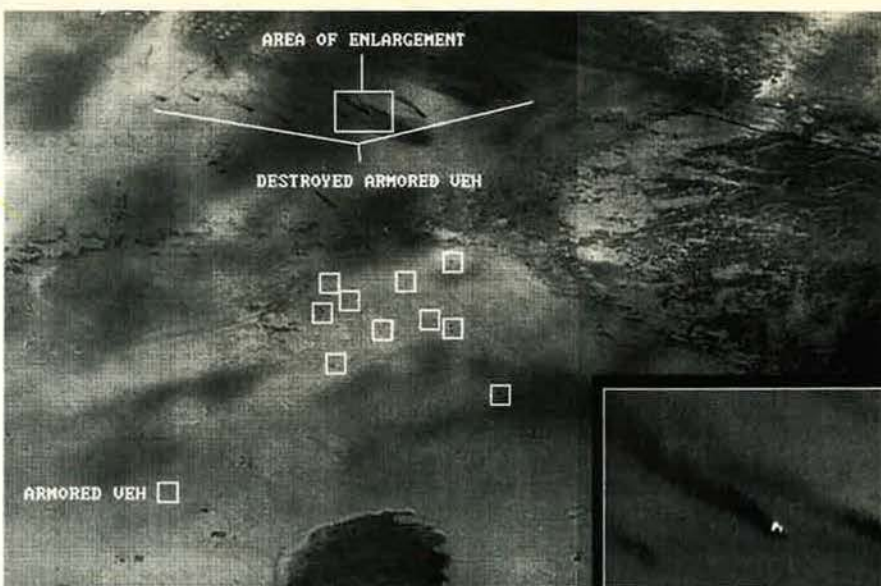
sions were located in five kill boxes when they began the offensive against Khafji. The Gulf War Airpower Survey released by the Air Force in 1993 reported that coalition aircraft flew 267 sorties in those kill boxes in the 72 hours of Jan. 29–31. The 267 sorties totaled just 17 percent of the sorties flown in the 20 main kill boxes in the KTO in those three days. Other coalition air and ground forces carried out assigned tasks unrelated to Khafji with no disruption.

### Airpower and Enemy Maneuver Forces

At Khafji, airpower's deep interdiction robbed the Iraqi maneuver forces of the initiative by attacking them as they moved. By halting the maneuver force, Coalition airpower also exposed the Iraqi forces to follow-up interdiction. In the first three days of February, sorties flown against the exposed units tallied more kills against tanks, and coalition air continued to attack the Iraqi forces that had been part of the offensive.

Airpower's response to the Iraqi offensive at Khafji suggests that there are two distinct phases involved in halting maneuvering mechanized forces.

In the first phase, the main task is to detect and respond to their maneuver quickly, and with enough accuracy, to hit the relatively small number of vehicle kills needed to disrupt the initiative of the maneuver force. Successful maneuver re-



*This image shows burning targets in the Khafji area. Intelligence work, particularly from Joint STARS aircraft, was key to the detection and rapid response marking the first phase in halting the enemy's maneuvering mechanized forces.*

quires anticipation and mental agility to bring forces to the decisive point, according to US Army doctrine. A well-executed offensive maneuver should throw a defender off balance and give an attacker the initiative to set the terms of the battle. Initiative in the maneuver force depends on high efficiency as units move and attack.

The key to halting the Iraqi maneuver was the set of air attacks that took away the maneuver force's initiative. Aircraft had to identify targets and attack rapidly. At Khafji, the air units proved they could do

this job best when enemy forces were on the move. As Olsen recalled, the mobile Iraqi forces "were lined up in columns on roads, they were easy to find, they were easy to strike." The 5th Mechanized and supporting elements lost the initiative when A-10s and A-6s attacked vehicles moving near the Al Wafra forest and when the AC-130s destroyed several vehicles in the lead brigade on the coast road leading into Khafji. At the time, CENTAF's daily tally recorded that, by Feb. 1, attacks from the air had destroyed about 44 of the 5th Mechanized's tanks, about 25 percent of its prewar inventory.

Air attacks destroyed some vehicles, damaged several more, and forced crews to abandon others. The net effect was to strip the enemy of the ability to achieve the surprise, momentum, massed effects, and dominance that are the hallmarks of successful maneuver.

Unquestionably, operating over a desert held certain advantages for the air attackers. (The same road system and open terrain made it possible for the Iraqis to charge into Kuwait in August 1990.) In the end, however, the success of airpower owed less to terrain and more to the target tracking of Joint STARS and the rapid response of centrally controlled air forces when fed near-real-time information about enemy maneuver.

Dispersed, camouflaged forces or buried targets would take longer to



*By Feb. 1—a day after the main phase of the three-day battle—25 percent of the Iraqi 5th Mechanized Division's prewar inventory of tanks had been destroyed by air attacks.*



**The Battle of Khafji proved that airpower can strip the initiative from an enemy maneuver force. In the seven years since then, airpower has become even more effective in target identification and weapons employment.**

identify and attack from the air, but by the same token, dispersal, camouflage, and entrenchment precluded efficient offensive maneuver, as the ground offensive of late February attested.

After the initial attacks, the second phase exploited the loss of initiative that made the enemy force even more vulnerable. More damage was done on Feb. 2, as air attackers picked over the identified locations of the stranded forces. Reconnaissance indicated the attack units of the 5th were trapped between two Iraqi minefields. "The 5th Mechanized, which had been rated one of their finest armored units, just a notch below the Republican Guard, was almost entirely destroyed," Schwarzkopf concluded, adding that "we monitored Iraqi reports afterward that only 20 percent of the division made it back" to pre-offensive positions.

"The only ground offensive that Saddam Hussein had mounted had been defeated," concluded the Department of Defense's official report on the conduct of the war. The use of coalition air brought home to the Iraqis that "they could not gain the initiative," said Horner. In fact, the coalition seized the initiative by using airpower to turn the tables on the attacking Iraqis. Joint STARS caught the preparations for and launching of the attack in time to spoil some of the surprise effect. Steady surveillance and the constant availability of air attacks blocked

the Iraqi commanders from sustaining the initiative because they could not execute plans beyond the initial operation.

The Battle of Khafji also suggested that the amount of attrition needed to seize the initiative from a maneuvering enemy force and stop the offensive was very different from the level of attrition commanders want to inflict on an enemy force in defensive positions. CENTAF concluded that, when the offensive at Khafji was halted, the 5th Mechanized was still at 77 percent strength, and the supporting divisions, 1st Mechanized and 3d Armored, were at 99 percent strength. In contrast, Schwarzkopf had set a goal of achieving 50 percent attrition among the infantry divisions defending Iraq's front line prior to the coalition ground offensive.

At Khafji, it took less attrition to cause the defeat of Iraq's offensive than it took to set the conditions for launching the coalition ground attack. Neither Khafji, nor any other case study, can predict precisely the number of vehicles that must be destroyed to rob the enemy maneuver force of its most precious asset: the initiative. However, Khafji's evi-

dence suggests that the number is relatively small. After the war, the CIA conducted a survey that concluded that 51 of the 5th Mechanized's 160 vehicles were destroyed by air before the ground war commenced. A total of about 90 enemy vehicles were destroyed in the vicinity of Khafji.

### **What It Means to Halt**

Khafji demonstrated to all but the most ingrained skeptic the ability of deep air attacks to shape and control the battle and yield advantages for engaged ground forces. In 1991, airpower identified, attacked, and halted division-sized mechanized forces without the need for a synchronized, ground counterattack.

The conclusion, for some, is that the US should put more emphasis on airpower and less on ground forces. "If we take to heart the lessons of Khafji," retired Air Force Maj. Gen. Charles D. Link stated recently, "we must reexamine how we spend our defense dollars."

Seven years have passed since airpower defeated the Iraqi offensive at Khafji. In that time, USAF, Navy, and Marine Corps have quintupled the number of aircraft capable of carrying laser-guided bombs. In 1998, Joint STARS will be fully operational, with synthetic aperture radar and moving target indicator sensors advanced well beyond what was available in 1991. When these forces are present, they can provide 24-hour battlespace awareness and transmit target information for strikes that can disrupt the enemy's initiative and later cause added attrition. In that situation, no enemy maneuver force stands much chance of successfully reaching its objectives. Airpower is actually more effective in target identification and weapons employment than it was in 1991. The operational lessons of the Iraqi offensive at Khafji remain intact: Dominance in the air can strip the initiative from an enemy maneuver force—and do it with an efficiency that makes airpower the decisive weight in the operational balance. ■

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*Rebecca Grant is president of IRIS, a research organization in Arlington, Va. She has worked for RAND Corp., 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 was "Closing the Doctrine Gap," which appeared in the January 1997 issue.*



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# *The Space and Air Force*

**At AFA's  
symposium,  
Air Force  
and industry  
leaders  
explored  
USAF's ag-  
gressive  
effort to  
push farther  
and faster  
into space.**

**By James Kitfield**

**A**IR Force and aerospace industry leaders have looked into the boundless expanse of space, recognizing the next frontier in military operations, and they describe the view as humbling. They can peer no farther into the space age than the Wright brothers could see into the era of flight from a windswept dune at Kitty Hawk in 1903. Few should doubt, however, that tapping the vast potential of space will require bold leadership and profound changes in the nature and culture of the Air Force.

That was the message delivered last November in Los Angeles at the Air Force Association's national symposium "National Security: The Space Dimension." Featured speakers included Air Force Chief of Staff Gen. Michael E. Ryan, who spoke of the challenges inherent in shifting from the air and space force of the present, to the space and air force of tomorrow. Gen. Howell M. Estes III, commander in chief of NORAD and US Space Command and commander of Air Force Space Command, stressed that the Air Force is at a critical crossroads in terms of its commitment to space exploitation and faces tough investment choices between weapons programs and critical space infrastructure.

Peter S. Hellman, TRW's president and chief operating officer, noted that the nation must maximize the rewards of an ongoing revolution in business practices and processes to afford the costly exploration of space.

## **Space and Air Force**

As a preface to his remarks on the challenges of becoming a space and air force, Ryan noted what many observers have called the acceleration of time. Driven largely by rapid-fire, exponential advances in computing power—which by the turn of the century will likely lead to computers capable of performing one trillion calculations per second—human knowledge is now doubling every 10 to 15 years.

"That means that we have gained as much new understanding of our world and its physical properties in the past 15 years as all the inventors in history and all the scientists in the past 5,000 years," said Ryan. It's amazing to think that man's journey into powered flight began less than a century ago, and man has gone into

and become dependent upon space just since most of us have been adults, he added.

Those warp-speed advances in technology and knowledge make it difficult, according to Ryan, to predict with any precision the impact of space exploitation technologies on military operations in the first quarter of the next century. Already, however, space has become an indispensable medium in the everyday lives of Americans. Space systems relay radio and television broadcasts, warn of dangerous weather patterns across the globe, provide expanded educational opportunities for people in isolated locations, and even help drivers navigate in automobiles.

The United States alone has more than 220 commercial, civil, and military satellites in active operation, with a combined value of over \$100 billion. In one day, the Defense Department spends about \$35 million on space programs.

The profound impact of space technologies on military operations has only become evident, however, in recent years. Six years ago, "we fought what has been called the first space-aided war, in Desert Storm. Our space-based capabilities were instrumental in the execution of the campaign that dismantled Iraq's military capability. Since then we have seen more successes in integrating space into our operations in the Bosnia campaign, [where] I can tell you from firsthand experience that space systems were vital," said Ryan. "They afforded us precision targeting, the capability to revisit those targets to avoid collateral damage, and contributed to the peace. ..."

Space systems and operations are now considered integral to all Air Force core competencies, from air superiority, long-range precision attack, and global mobility to agile combat support and information superiority. The concept of global situational awareness is by definition a largely space-based capability.

"In the future, we will achieve far better global situation[al] awareness as space capabilities become the primary means of information acquisition, processing, and distribution," said Ryan. Already, information conduits in space are giving us so much data that the challenge is not throughput but information management, Ryan emphasized, adding, "so that

we are not swamped by the quantity of [data] and [thus] miss the warnings and opportunities that are there."

### 90 Percent Solution

More than any other service, according to Ryan, the Air Force has adjusted its doctrine and directed its resources to exploit that rapidly evolving space capability. The Air Force provides 90 percent of the military's space budget, for instance, and 93 percent of space personnel. Despite a post-Cold War drawdown that has seen all of the services reduce their size by roughly a third, the Air Force satellite force has increased by 25 percent since 1991.

The Air Force has always been a responsible steward of space, stated Ryan. "Of the services, we alone have the expertise and we alone have made the investment." And he noted, "We will continue to take the lead in organizing, training, and equipping our space forces."

Key to Air Force stewardship of space is the service's "Global Engagement: A Vision for the 21st Century." That vision statement represents a commitment by the entire Air Force leadership to space as the next frontier in the aerospace continuum.

With release of that document, "the Air Force made a major commitment to the role of space in our future," said Ryan. "Our goal is to eventually evolve from an air and space force, which we call ourselves today, into a space and air force." He emphasized that that is a transition of enormous importance. "We must move beyond the stovepipes of separate space and air capabilities in operations to [operations] that are fully integrated and fully interwoven."

An important step in that evolution is the recently published Air Force doctrine manual, setting out the service's view of air and space forces and power. As part of that doctrine, deployed air operations centers will now include space experts in the strategy, plans, and operations cells. Under the operations concept spelled out in the manual, forward-deployed air and space expeditionary commanders will act as conduits for requests for national space assets and provide regional commanders in chief with a "one-stop shopping" point for air- and spacepower and expertise.

This growing reliance on space



capabilities to enhance military operations, however, will unavoidably lead to increased vulnerability to attacks on the space infrastructure.

"Our dependency on space is growing, as well as the potential for threats to those capabilities," said Ryan. He added that many nations now have access to sophisticated space resources, specifically communications and navigation. "The nations who observed how we used these capabilities very successfully will be motivated to find ways to prevent us from using them in the future." For that reason, Ryan stated the Air Force has changed its traditional mission of air superiority to air and space superiority. "This will be very important as more of our military infrastructure moves from Earth to space, as well as is true with commercial enterprise."

Though Ryan does not claim to have a clear vision of the coming space age, he sees enough promise in present trends to draw some far-sighted conclusions: This evolution toward a seamless system implies that space assets will conduct what we think of now as air missions, and perhaps vice versa. "There undoubtedly will be platforms that operate in both air and space: An air- and space-ship, a starship, an *Enterprise*. If we're going to go there, the Air Force must remain on the cutting edge of science and technology."

### Estes: At a Crossroad

To cover the uncertain ground between the Air Force of today and a future starship *Enterprise*, the service will undoubtedly have to make several bold leaps of faith in space-age technology. The Air Force today stands at the precipice of just such a leap, according to Estes, the senior military commander of space forces.

He firmly believes USAF is at a crossroad. The Air Force faces "important, time-critical decisions that [it] will need to make to assure its vitality and relevance into the next century—decisions about who we are and what we will be in the times ahead."

Estes stressed that the Air Force must not allow itself to be intimidated into taking the easy road by the demands of daily operations or immediate threats. There's a natural human tendency toward conservatism—to stick with what we know, what we are comfortable with, and what has worked in the past, he said.

"However, we must not become complacent in our conservatism," he added. "There's a balance, but ... we must overcome our fear of change and set a course to the future by taking [Robert Frost's] road 'less traveled by.'"

Certainly the Air Force has successfully negotiated such critical crossroads in the past. From the first hot air balloonists spying on enemy positions in the Civil War, those who argued the utility of airpower in military campaigns were often flying against the prevalent winds of conventional wisdom. In the years between the world wars, Estes noted, the airplane was viewed mainly as an extension of the Army's ground campaign.

"[Army commanders] did not have the expertise, the vision, or incentive ... to discern [the airplane's] awesome offensive striking power or its ability to be decisive in its own right, ... [and that] stifled the development of the airplane," said Estes. "It took nearly four decades before the true potential of airpower was realized, in World War II, and another 40-plus years before this potential was implemented to what we think was near the fullest imagined extent in Operation Desert Storm."

Estes believes the Air Force of today faces a quandary somewhat similar to that of the Air Corps in the 1940s. Constrained by declining budgets and doubted by many detractors, it has to fight for its vision of a seamlessly integrated air and space force and the power of aerospace forces.

"The Air Force has assumed the position of leadership and stewardship of the bulk of this nation's military space capability," said Estes. "[We] have labeled space superiority as one of our core competencies, but as of yet, we have very little means of ensuring space superiority. We don't even know how to define it yet. But we're working on it. ... This is the crossroad in history the Air Force has reached. ... Our actions regarding space over these next few years will set the course for the next quarter-century, and I propose we had better choose carefully."

### Hard Funding Choices

Charting a bold course will require that Air Force leaders make difficult decisions in terms of fund-

ing space programs and building a space-based infrastructure. Linchpin space programs now fighting for budget dollars include the Space-Based Infrared System, the Milstar satellite communications system, the Global Positioning System, and the Evolved Expendable Launch Vehicle. To leverage advances in space technology made in the civil and commercial sector, the Air Force also needs to form closer partnerships with private industry and organizations such as NASA and the National Reconnaissance Office.

"We need to restore funding to modernization of the launch ranges, ... [which] are eventually, in my opinion, going to become national space ports," said Estes. "We need to maintain funding on the low segment of the Space-Based Infrared System to enable effective Theater Missile Defense systems. We need to develop real-time, full-coverage, near-Earth space surveillance capabilities to enable our initial steps to do space control. ... We need to develop a real-time, space-based Earth surveillance system to provide the 'dominant battlefield awareness,' [as] set forth in [former Chairman of the Joint Chiefs Army Gen. John M.] Shalikashvili's Joint Vision 2010."

For space forces to link all Joint forces as envisioned in Joint Vision 2010, Air Force leaders will have to perform a difficult balancing act in trying to robustly modernize both air and space forces. As budget pressures continue, Estes believes the Air Force will have difficulty adequately nurturing all of its core competencies.

"Hard choices need to be made between investments in information infrastructure or the combat systems," said Estes. "We need to strike a balance between 'shooters' and 'information systems' if we are going to be successful in the future. However, I believe we must lean more in favor of finding ways to effectively use these new, rapidly expanding information systems for awhile." He added that barring some unknown external source of budgetary assistance, the Air Force must make some internal adjustments "with the objective of revolutionizing our ability to gather, process, interpret, and act on information."

If those hard choices are made, he said, "Someday in the not so distant future, space will have evolved to



the point where the movement of terrestrial forces will be accomplished only at the pleasure of space forces, much the same way that the movement of land and sea forces today can only be accomplished at the pleasure of air forces. Future battlefields will be made transparent by space surveillance systems—augmented by air, land, and sea surveillance systems. This transparency will lay bare the hostile intentions of potential adversaries.”

Estes went on to say, “In each [space] command, I have young men and women with a tireless passion for space. ... While encouraged by the rhetoric of the Air Force’s long-range plan that speaks of moving from the Air Force we know today to an Air and Space Force tomorrow and, eventually, to a Space and Air Force in the future, their view is somewhat different. In their minds the Air Force is now, and has for some time been, an Air and Space Force. They can accept no description less and, in fact, neither can I. ...

“I am also sure the flyboys of old, so instrumental to the development of our Air Force, would support the view that the time for rhetoric has passed and we must replace it with action. We will never become an Air and Space Force if we do not begin to invest greater sums in space. It is not enough to maintain the given, fixed percentage of Air Force total obligation authority for space. Space must expand and become a larger part of the Air Force budget every year. It has to be this way because it is unlikely anyone is going to give the Air Force a bigger slice of the pie to cover our expansion into space.”

### Hellman: “Lean” Thinking

To realize the lofty rhetoric of space visionaries, industry leaders believe they will have to continue an ongoing revolution in business re-engineering and processes. Adopting this mind-set of “lean thinking” is paramount if the Air Force and industry are to continually eliminate waste and maximize scarce space resources.

“The systematic transfer of lean thinking to space activities touches every task,” said TRW chief Hellman. “It changes management, organization, teaming concepts, standardization requirements, inventory handling, working empowerment,

process mapping, and root-cause analysis. It always targets the elimination of waste.”

Hellman sees many parallels between the Air Force’s challenging push into space and the “dog-eat-dog” world of automotive competition. Automotive companies today, for instance, expect their suppliers to reduce prices by five percent each year. Given the rising costs of raw materials and labor, that means TRW and other automotive suppliers must realize annual efficiency gains of eight percent. They succeed through higher productivity, technological advances, and innovative designs.

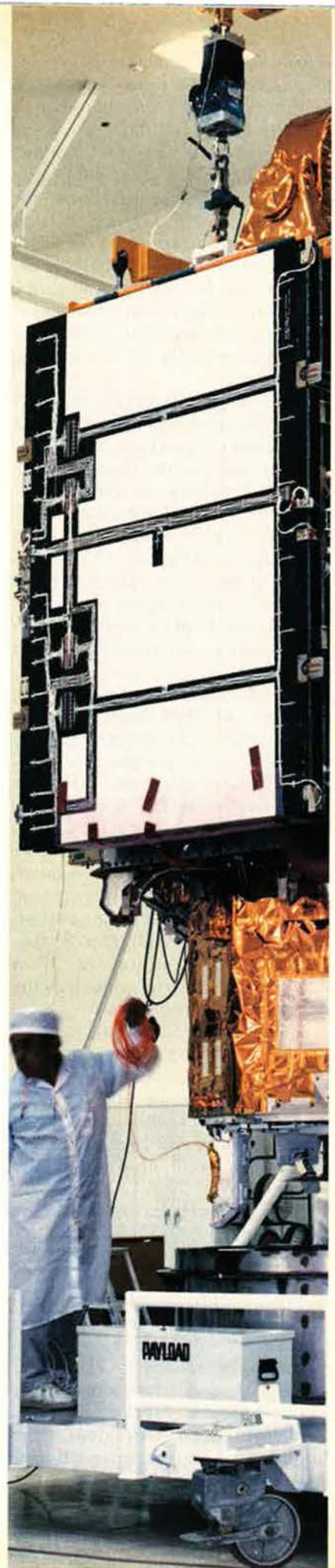
“A little-known fact is that the end-of-the-line quality is higher in the automotive industry than in the aerospace industry,” said Hellman. “The quality is manufactured in, not inspected in. When your manufacturing quality is high, you lower your inspection, rework, and warranty costs. [That kind of reliability] is vital to the Air Force. ... Look at the lifetime the satellites are achieving today and the impact of such reliability on budgets and force structures.”

Other examples of lean thinking are evident throughout the aerospace industry. In its latest annual report, for instance, United Technology’s Sikorsky Group applied lean production techniques and realized a reduction of 70 percent on its spindle rejection rates, while cutting machining time by 57 percent.

### Ramp Up, Ramp Down

In applying lean thinking to its engineering processes, TRW found that there was a start–stop–start cycle to its operations that caused its top engineers to constantly accelerate and then curtail their efforts. “We found that the productive power of our best engineering minds was sometimes on hold—a task that might require eight man-days of actual engineering work could be extended over a period of three weeks,” said Hellman. “This start–stop–start approach meant ramping up both mentally and physically many times over those weeks. It added time and cost. We reengineered that activity [and it] is now being applied to our space and defense work as well.”

There are also similarities in the push toward integrated product teams by both the Air Force and the automotive industry. Especially in large



organizations, the focus on IPTs leads to quicker cycle times and added agility. "Using IPTs, the automotive industry has gone from seven years in designing a new car to 21 months. The Air Force can point with pride to similar gains," said Hellman. "A universal lesson learned is that smaller companies or companies with commercial roots have a built-in capability for fast action and quick inclusion of developing technologies. Large companies attain it by creating carefully focused internal groups."

USAF might also benefit from the lesson of an automotive industry that has worked to open lines of communication and provide suppliers with constant feedback on their performance. Chrysler, for example, supplies TRW with a monthly report detailing exactly how it is performing in comparison with 600 other suppliers. The ratings are based on such factors as price, customer service, quality, delivery times, and warranty.

Hellman emphasized that having Chrysler tell TRW monthly where TRW stands is invaluable, because "they define the competitive landscape for us." He said, "Industry could work with the Air Force to develop a Chrysler-style rating system that would tell us all where we stand as competitors. We want to know. ... The basic data for such an evaluation exist, at least in substantial part, in the Contractor Performance Assessment Report." That would help industry see itself as the Air Force sees it, he added.

If the Air Force is to successfully transition into a space and air force, Hellman also believes it needs to give clearer coordinates to the aerospace industry. Confusion over the exact direction and pace of that effort on the part of industry will only weigh it down.

For historical reasons, USAF's close-to-the-vest tradition concerning its long-range strategy still exists, according to Hellman. With the Air Force confronting this very different post-Cold War challenge, however, "I wonder if that tradition might not be modified. The better the industry understands long-range strategy, the better it can commit its own resources and best minds to the amplification and implementation of that strategy." ■

## Stewardship of the Nuclear Stockpile

In 1993, the Department of Energy assembled leaders of the nation's nuclear weapons laboratories to assess the state of the nuclear stockpile. The situation looked bleak. Perhaps no element of national security had undergone more radical change than the nuclear arms complex, recalled Bruce Tartar, director of Lawrence Livermore National Laboratory, speaking at AFA's symposium.

The entire establishment, as a result of arms control agreements, had reversed course. Instead of designing, producing, and testing new weapons, the complex focused on the business of dismantlement. In the process, DoE had eliminated virtually all of its nuclear weapons manufacturing capability.

Most weapons already in the stockpile were nearing the end of their designed lifetime of roughly 10 to 15 years. There was no precedent to indicate exactly how they would age. The pioneering engineers and scientists who had designed the weapons were themselves reaching the end of their working careers.

To make matters worse, President Clinton had asked the scientists to ensure the reliability and safety of the existing stockpile indefinitely without the benefit of underground nuclear testing.

As Tartar recalled, a group of 25 or so were all assembled in a windowless room, and Vic Reis [Assistant Secretary Victor Reis, then the director of DoE defense programs] asked, "What in the world are we going to do?"

What the assembled scientists did was take stock of the situation and sketch the rough outlines of the Nuclear Weapons Stockpile Stewardship Program, the essential blueprint for maintaining the United States' nuclear deterrent. "We did the job ... in a couple of very intense sessions ... with [Army] Gen. John M. Shalikashvili [then Chairman of the Joint Chiefs of Staff] and the national security adviser in August 1995—we told the President, effectively, that we thought we could do this job under these [four] conditions," said Tartar.

The first step was a more regular and intrusive regime of checkups of the nuclear stockpile. Much as the plastic dashboard of an aging car will crack from prolonged exposure to ultraviolet sunlight, so too will plastic components in nuclear weapons deteriorate from constant exposure to radiation. Tartar compared the surveillance of the nuclear stockpile to the need for more regular physicals for aging people. "Once you pass 50, which I've now done, the physicals get increasingly intrusive, increasingly unpleasant, and that's what we're going to do to the bombs," said Tartar. "We don't understand the aging process very well. Step one on this is surveillance—to anticipate problems, to identify them, and then to try to find R&D solutions or system solutions."

Step two was to create a flexible manufacturing program to replace aging nuclear weapons components with upgraded variants. Given the uncertainty about how large a nuclear arsenal the national command authority will eventually require, the focus is on modular manufacturing that can be efficiently tailored to different production runs.

The third step of the Stockpile Stewardship Program—and perhaps the most complex—was designing an assessment and certification system using supercomputers and lasers that will allow scientists to create miniature thermonuclear explosions in a laboratory environment. "What we've done is create a program that replaces the full-scale nuclear explosive test by a series of component level tests," said Tartar. Those tests have enabled Tartar to sign the letter each year that formally certifies to the President that the nuclear weapons are safe and reliable.

Finally, the fourth step was to develop a source for production of tritium, a critical component of advanced nuclear weapons that has a very short shelf life of roughly a decade. Tritium is what gives nuclear weapons their punch, stated Tartar, adding that "it goes away in 10 years, so you've got to have a source of tritium."

*James Kitfield is the defense correspondent for National Journal in Washington. His most recent article for Air Force Magazine, "To Halt an Enemy," appeared in the January 1998 issue.*

# In the Polls

**T**he US public has little desire to further cut the defense budget; nearly 75 percent of all Americans want it to remain at its current level or maybe even go up. By a similarly wide margin, Americans continue to favor rendering military aid to important allies, even if they are not all that enthusiastic about protecting weaker nations from aggression.

For all that, the public evinces deeply conflicting views about just when and where to use force. Though a solid majority would approve of taking military action to defend Saudi Arabia, the same cannot be said for a treaty ally (South Korea), a traditional regional friend (Israel), and a next-door neighbor (Mexico).

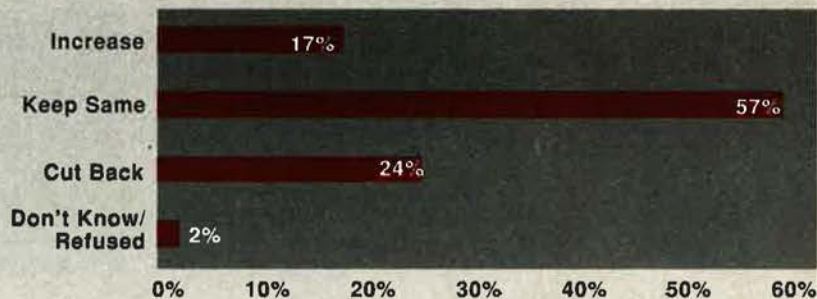
The overwhelming majority now regrets that the US didn't finish off Saddam Hussein in 1991, when it was a possibility. And most Americans are in favor of expanding NATO, though almost nobody can name the prospective new member nations.

If a survey of polls taken during the past six months is a guide, Americans are increasingly concerned about weapons of mass destruction. The public gives top priority to halting the menace posed by nuclear, chemical, and biological arms. Americans feel increasingly threatened by terrorists wielding such weapons.

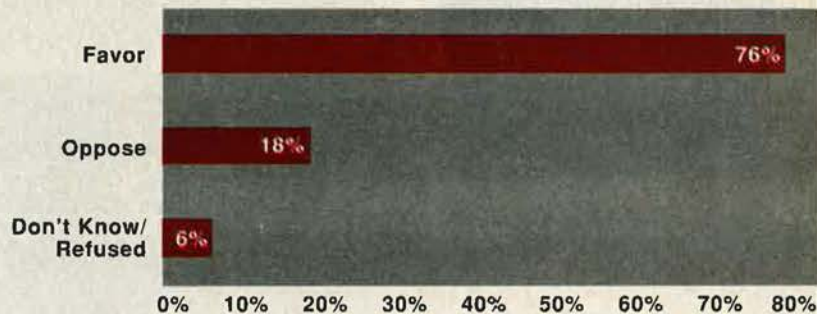
*Air Force Magazine* draws these poll results from a large sampling of recent polling data made available by the Roper Center for Public Opinion Research, located at the University of Connecticut.

## Superpower Status

*Do you think that we should increase our spending on national defense, keep it about the same, or cut it back?*



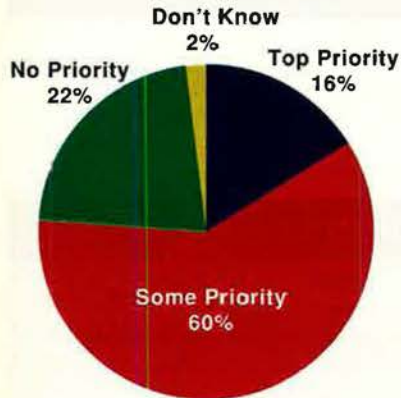
*Do you favor or oppose military aid to countries that are important allies of the US?*



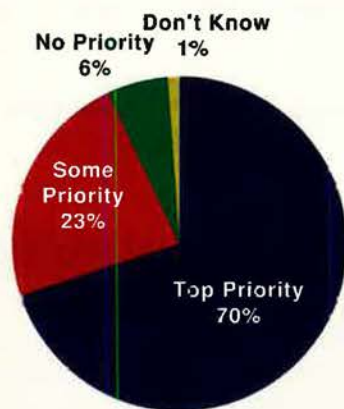
Source: Princeton Survey Research Associates for the Pew Research Center, September 1997.

## Priorities

*Tell me how much priority you think should be given to protecting weaker nations against foreign aggression, even if US vital interests are not at stake.*



*Tell me how much priority you think should be given to preventing the spread of weapons of mass destruction.*



Source: Princeton Survey Research Associates for the Pew Research Center, September 1997.

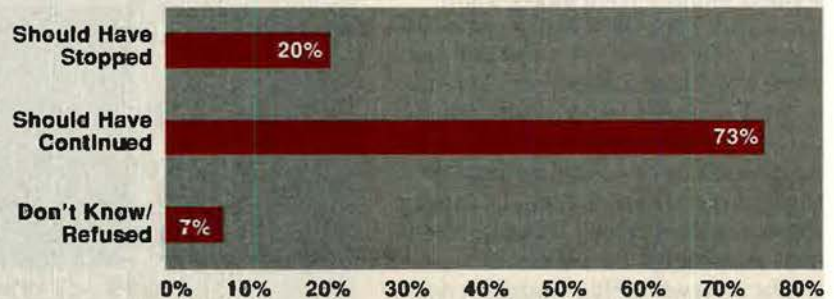
## Use of Force

	Approve	Disapprove	Don't Know/Refused
Would you approve or disapprove of the use of US forces if Iraq invaded Saudi Arabia?	54%	41%	5%
Would you approve or disapprove of the use of US forces if the Mexican government was about to fall because of revolution or civil war?	43%	49%	8%
Would you approve or disapprove of the use of US forces if Arab forces invaded Israel?	45%	47%	8%
Would you approve or disapprove of the use of US forces if North Korea invaded South Korea?	35%	58%	7%

Source: Princeton Survey Research Associates for the Pew Research Center, September 1997.

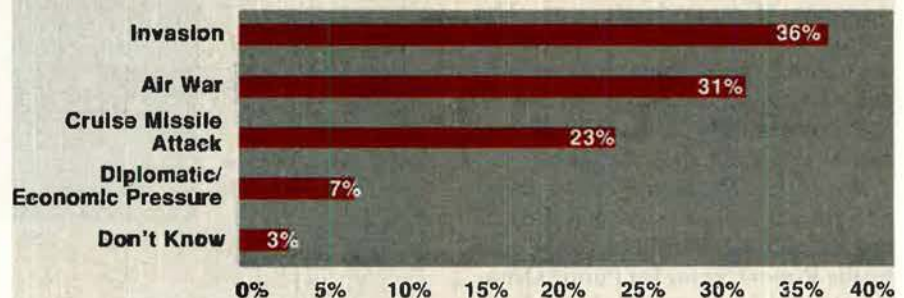
## Iraq, Past and Future

*In 1991, should the United States have stopped fighting when Iraqi troops left Kuwait, or should the US have continued fighting Iraq until Saddam Hussein was removed from power?*



Source: CBS for the CBS News Poll, November 1997.

*The American military could respond to events in Iraq in several ways. Please say which of the following would be appropriate if Iraq shoots down a US warplane.*

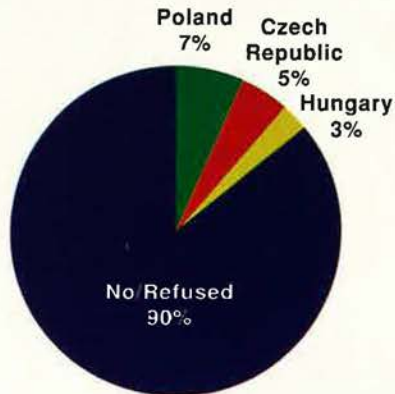


Source: Louis Harris and Associates for the Harris Poll, November 1997.

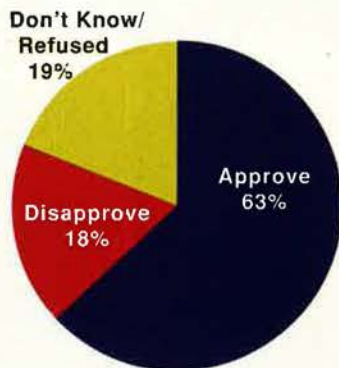
## NATO Expansion

*This summer, three countries were invited to join NATO. Do you happen to recall the names of any of them?*

Note: Adds to more than 100 percent due to overlapping responses.



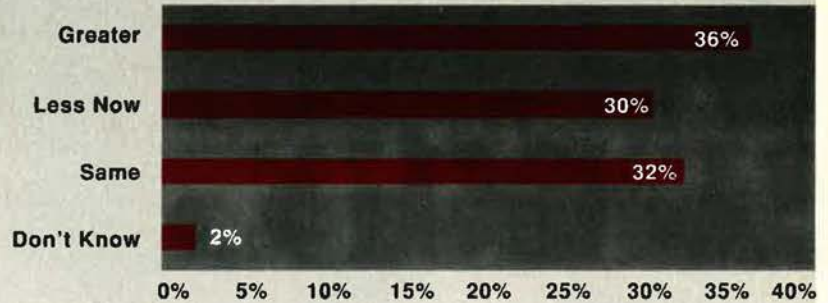
*Generally, do you approve or disapprove of expanding NATO to include Poland, Czech Republic, and Hungary?*



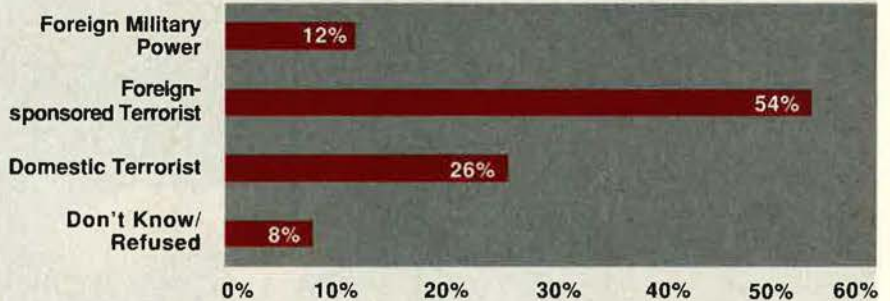
Source: Princeton Survey Research Associates for the Pew Research Center, September 1997.

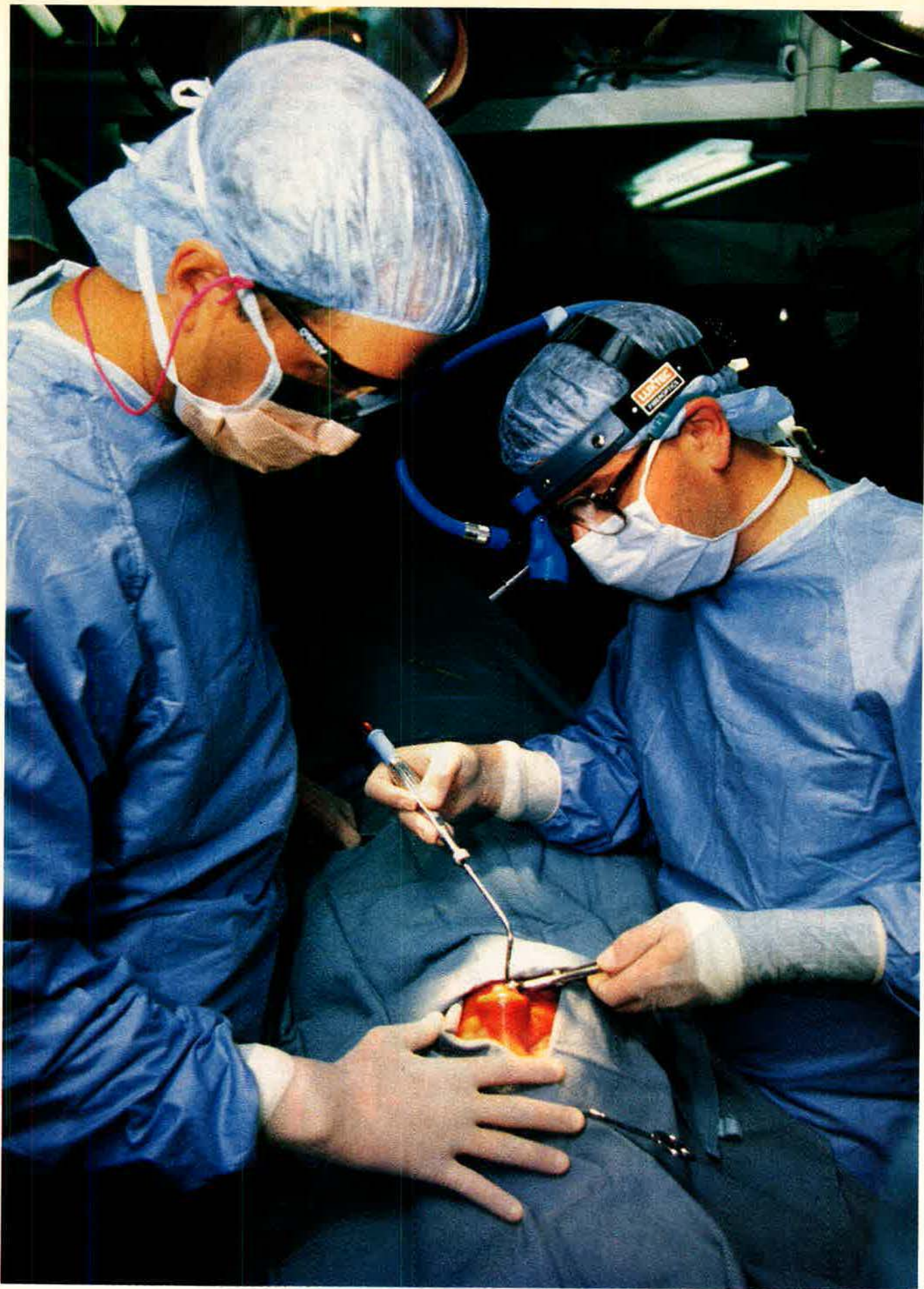
## Weapons of Mass Destruction

*Do you think the danger of attack on the United States with a nuclear, biological, or chemical weapon is greater now than it was 10 years ago, less now than it was 10 years ago, or is it about the same?*



*These days, do you think there is more of a danger of a nuclear attack on the United States by a foreign military power, by a foreign-sponsored terrorist, or by a domestic terrorist?*





No matter where they live or how old they are, the overwhelming issue for military retirees is health care.

# Issue

# No. 1

By John T. Correll, Editor in Chief

**A**FTER four days of intense deliberations and plowing through dozens of papers and proposals, the Air Force Retiree Council confirmed at its annual meeting last October that medical care is still, by a big margin, the main issue of interest to military retirees, regardless of their age or place of residence.

The council's chairman, former Chief Master Sergeant of the Air Force James M. McCoy, met in November with Gen. Michael E. Ryan, Air Force Chief of Staff, to report on the three health care subjects that led the list.

■ **Medicare Subvention.** At present, retirees at age 65 are forced into Medicare. They are not eligible for treatment in military medical facilities. Under a test program called "Tricare Senior," Medicare will reimburse military hospitals for the care of military retirees. The term for this process is subvention. The Department of Defense believes it can deliver better health care to the retirees at lower cost than is the case with the present Medicare/Medigap insurance combinations. The Retiree Council supports the Tricare Senior test program enthusiastically.

■ **FEHBP-65.** The council believes that retirees 65 and over, especially those who do not live near enough to a military medical facility to be helped by subvention, should have the option of enrolling in the Federal Employees Health Benefits Program. They could then drop their Medicare supplemental insurance, which typically costs more and covers less than FEHBP.

■ **National Mail Order Pharmacy Program.** Started in October 1997,

this program allows participants to order enough medications for a month or more for a modest co-payment. However, retirees age 65 and over are not eligible. The council wants to see the program opened for retirees of all ages in all locations.

Two nonmedical issues the council had been watching—the possibility that Cost of Living Allowance adjustments to retired pay might be reduced or delayed and proposals to cut back or shut down commissary stores—have been favorably resolved for this year at least. Both COLAs and commissaries are fully funded through 1998.

The Retiree Council was formed in 1972 to give the Air Force Chief of Staff advice and information about concerns of retirees. The council has 18 members, 15 of them representing retirees in specific areas and three of them serving at large. Until 1996, all of the chairmen had been retired general officers. McCoy, CMSAF from 1979–81, and later president and chairman of the board of the Air Force Association, is the first enlisted person to hold the position.

### **The Promise Comes Unstuck**

For many years, retirees obtained health care routinely at military hospitals. There were plenty of hospitals in those days, and the retired population was a fraction of the size of the active duty force. Seeing retirees on a space-available basis was not much of a problem. New recruits were promised that, if they served a full career, they could count on free medical care for life.

However, the promise came unstuck in the 1990s. In the force draw-down that followed the end of the Cold War, military bases began closing all over the country, and military hospitals closed along with them. Today, McCoy says, no more than 32 percent of Air Force retirees live within the catchment area (40-mile radius) of a military treatment facility.

Furthermore, in 1995, the number of retirees overtook and surpassed the number of persons serving on active duty. The retiree total currently stands at 1.9 million. (The Air Force has more retirees—673,000—than any other service.) The retired population will peak at 2.25 million about 10 years from now, McCoy says.

Confronted with statements from

old recruiting brochures and other evidence, the government no longer denies that the promise of medical care for life was made, but says there is no way it can now deliver. McCoy agrees that the promise was broken, but believes, as a practical matter, retirees will be better served by concentrating their efforts on improving the program that remains.

The military medical system now consists essentially of three options under the Tricare program. Tricare Prime covers active duty members and their families and retirees who live near bases. (The Pentagon is attempting to provide this same coverage for active duty members and their families who do not reside near a base.) It uses a combination of military hospitals and providers in the civilian community. Tricare Standard (formerly CHAMPUS, the Civilian Health and Medical Program of the Uniformed Services) and Tricare Extra (a preferred provider option) use private providers (under Extra the providers must be in the Tricare network). Under the last two options, the beneficiaries share in the cost.

Reviews are mixed for Tricare. It works well in some areas, while horror stories abound in other areas as retirees struggle with providers and insurance carriers who seem confused about how the program is supposed to work.

Retirees 65 and over are not eligible for Tricare. They must rely on Medicare and whatever additional coverage is provided by supplemental insurance they purchase. McCoy says the needs of these older retirees should get special attention “because their options are not very many. They’ve got Medicare and Medigap and that’s it. So let’s give them some more options. If they can be served under subvention, fine. If they want to look at FEHBP, fine. Expand the Mail Order Pharmacy Program to include more people.”

### **Expanding the Options**

The council would like to see subvention move beyond the Tricare Senior test status and be implemented as soon as possible, McCoy says. However, subvention will not help the 67 percent of Air Force retirees who live outside the military hospital catchment areas. Many of them would be best served by access to FEHBP.

Earlier proposals had sought to open FEHBP for all military retirees. The Administration and the Department of Defense strongly opposed that on the grounds of cost, and legislative efforts to overcome the resistance sputtered. Now, the Air Force Retiree Council, along with veterans groups and others, is focusing on the proposal to provide FEHBP for retirees 65 and over. Legislation for an FEHBP–65 test program is working in both the US Senate and House of Representatives.

According to research by the Military Coalition, the Department of Defense is the nation’s only large employer that ends retiree participation in its health plan when they become eligible for Medicare. Also, federal employees covered by FEHBP can stay in their program after they turn 65.

“We feel we have a pretty solid argument for FEHBP–65, and the surgeon generals [of the services] agree with us,” McCoy says. “We’re the only—and I hate to use the term, but we have now used it—government employees who do not have a seamless health care system. When you turn 65, you go to Medicare, Medicare supplements, Medigaps, and so on.”

The council supports legislative relief for some retirees who declined the optional Medicare Part B, which covers outpatient care, when they became Medicare eligible at 65. These are individuals who were living near a military hospital at the time and thus saw no reason to sign up for Part B coverage and the premiums it entailed. The nearby base and hospital have since closed, but the retirees cannot enroll in Part B now without paying a large penalty. The Retiree Council believes that people who lost reasonable access to a military hospital as the result of base closure should have a chance to enter Medicare Part B without penalty.

The Department of Defense National Mail Order Pharmacy Program began operating in October, offering service to all active duty members and Tricare Prime participants. Only a few over-64 retirees, such as some who live in the vicinity of a military hospital shut down in the base closures, are eligible.

A key feature of the program is the availability of up to a 90-day supply of non-narcotic medications and up



to a 30-day supply of narcotic medications. Also, the inventory of medications offered is broader than most military facility pharmacies. For eligible retirees, the co-payment is \$8 per prescription.

"We feel that the DoD National Mail Order Pharmacy Program should be expanded to cover all retirees, regardless of place of residency," McCoy says.

A dental health insurance program for retirees, also new, began Feb. 1. The premiums vary by geographic location and number of people covered, but the average for two persons will be \$23.80 a month. There is a \$50 deductible before reimbursements begin. The co-payment for patients is 20 to 40 percent, and the benefit is capped at \$1,000 a year. There is no co-payment for preventive and diagnostic care. Special work, such as crowns and bridges, is not covered.

McCoy agrees that the program is of limited value to most people, but says that "at least it's a foot in the door."

### **COLA and Commissaries**

Retirees tend to be watchful and suspicious about Cost of Living Allowances because the government has a history of making arbitrary reductions. In times past, for example, the annual COLAs for military retirees were delayed far beyond the reductions imposed on other federal annuitants.

Also worrisome is the continuing campaign by a group of budget cutters who argue that the Consumer Price Index overstates actual inflation and that the Labor Department should recompute it by a different formula. This would mean lower annual COLA adjustments to all federal benefits, including military retired pay. Also, proposals are floated perennially on Capitol Hill for COLA offsets based on retirement income means testing. For this year, though, COLA is fully funded.

There was a boomlet of concern in October when the Congressional Budget Office published a report outlining an option to end federal subsidies to commissaries and give active duty people cash allowances to offset their losses. No provision was included for compensation for retirees.

Commissaries are the nation's 10th

largest supermarket chain. They sell products at about five percent above wholesale. To operate, they require an annual subsidy which CBO estimates at \$2 billion a year. Most of that figure, though, was CBO's guess at state and local taxes not paid rather than any direct federal payout.

CBO said the commissaries are no longer needed to make up for the lack of commercial retail alternatives around military installations. Furthermore, CBO said, commissaries are not cost effective as an alternative to cash compensation, which has been the more recent justification for them.

Much money could be saved and local tax revenues generated by terminating the subsidy and paying active duty families compensation in cash, the report said. The key to the proposal, of course, was that it left out any offset for retirees. In 1993, retirees accounted for 54 percent of commissary sales in the US. With active duty force levels falling and the retired population rising, the retiree percentage of commissary sales is still on the increase.

As with COLA, though, the proposal was not adopted and commissaries are fully funded for 1998.

(Military exchanges, which constitute the nation's 12th largest general retail chain, are a different matter. Their average markup is about 20 percent. They not only cover their own costs but also provide a profit that goes to morale, welfare, and recreation activities.)

### **Survivor Benefits**

The Air Force Retiree Council paid particular attention at the annual meeting to the circumstances of surviving spouses. The total of them is at least 255,000, of which 74,000 are Air Force surviving spouses, McCoy says. The actual total is higher because of "forgotten widows" whose whereabouts are not known to the government. The Retiree Council would welcome information about any forgotten widow.

In his report to the Chief of Staff, McCoy says that many retirees are concerned about the Survivor Benefit Plan and that the council supported legislative actions that would improve it. When SBP began in 1972, the intent was to have a government subsidy pay 40 percent of the cost. Assumptions about program costs

turned out to be wrong, though, and premiums from participants were soon covering more of the expense than had been intended. In view of that, Congress lowered the premiums some years ago. At present, however, the federal subsidy covers only about 26 percent of the cost. Another adjustment to the premium is due.

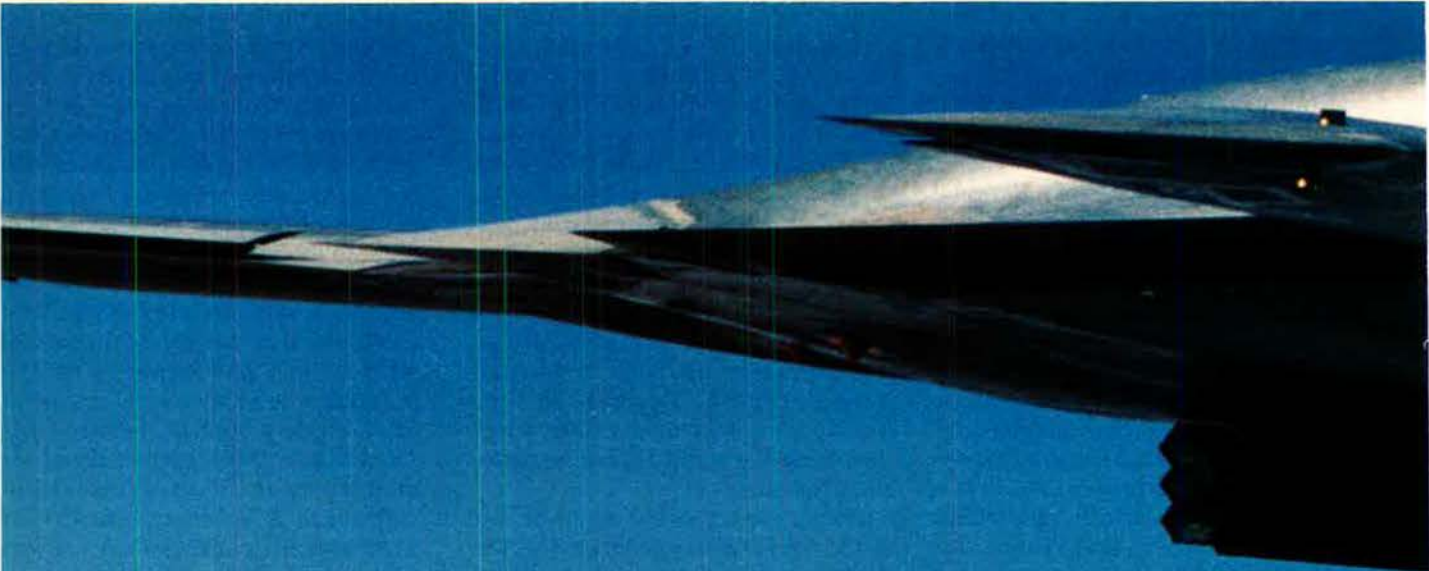
This year's defense bill made two changes to the Survivor Benefit Plan. It created an escape clause that would allow people who signed up for the program when they retired to get out of it, if they wished, between the second and third anniversaries of their retirement. The defense bill also authorized a minimum annuity of \$165 a month for forgotten widows whose husbands retired from service and died before they had an opportunity to enroll in the Survivor Benefit Plan when it was initially offered in the 1970s.

A Senate proposal, which did not make the final cut for inclusion in the defense bill, would have created a "paid up" feature, under which a retiree would owe no more premiums after he or she had paid into the program for 30 years or until age 70, whichever came later.

The Retiree Council called on the Defense Finance and Accounting Service, which had representatives present at the meeting, to be sure that SBP annuities were computed in the way most favorable to the survivor.

The basic survivor annuity is 55 percent of the amount the retiree received before he or she died. When the survivor reaches age 62, the amount is reduced to 35 percent with Social Security offsetting the difference. Prior to the adoption of this "two tier" computation system, the survivor's annuity was reduced, dollar for dollar, by the amount received as a Social Security benefit. In 1986, Congress cut the direct tie and essentially set 35 percent as a floor for the SBP annuity.

In some cases, survivors of retirees who performed most of their military service prior to 1957 when Social Security was first applied to military earnings may do better under the original formula. If so, they are entitled to that under the law, and the Retiree Council asked for extra attention to ensure that these surviving spouses are not short-changed. ■



The force declines in size, but awesome new munitions give it an unprecedented combat punch.

# Brilliant Weapons

**F**OR the last seven years, Air Force leaders have talked up precision weapons. They have noted how accurate they will be, how effective, and how inexpensive. In their speeches—dotted with references to how many aircraft have been retired—the punch line always was precision weapons. The awesome new munitions are coming, they said, and they will be the equalizers.

USAF in the wake of the Gulf War began to mothball large numbers of combat aircraft, in part to finance the development and production of these new weapons. Now, it looks like USAF's gambit is going to pay

off. Tests of new munitions suggest that they will work as advertised, and it seems that, in a future war, USAF will be able to destroy as many targets as it did in the Gulf War—and as quickly—with about half the airplanes.

These munitions come in a bewildering array of shapes and sizes, however. Each is optimized for a particular "target set." Each is designed to work at a particular distance from a target, based on postulated air defenses that could range from token to lethal.

In addition, each munition occupies its own niche in a notional air



By John A. Tirpak, Senior Editor

*GPS-aided munitions on a B-2 allow the bomber to combine long range, large payload, low observability, and near precision.*

campaign but has the flexibility to be applied to other missions. Some are adapted "legacy systems" souped up with new sensors, warheads, and sometimes rockets to bridge the gap until the most potent new missiles come on line. Others are breaking new ground in bomb technology.

You start with your expensive, standoff, complex weapons, said Col. Dennis Miner, Precision Engagement Division chief in USAF's Directorate for Operational Requirements. "Once you beat down the threat and gain air superiority, you can go to what we call a 'level of effort' weapon."

#### **AGM-86B CALCM**

Longest legged of the precision munitions is the conventionally armed Air Launched Cruise Missile. In recent years, strategic arms treaties rendered a portion of the AGM-86B nuclear ALCM inventory "excess" to requirements. When that happened, the Air Force contracted with Boeing to swap out their nuclear warheads for conventional ones.

At the same time, the conversion added Global Positioning System capability to the ALCM's terrain-following system, making for a good weapon with which to attack targets at great distances, obviat-



**Only B-52Hs from the 2d BW, Barksdale AFB, La. (above), have the capability to launch CALCMs—one element of USAF's precision weapons inventory. Block II CALCMs have extended range and almost the accuracy of LGBs.**

ing the need to send aircrews over enemy territory.

USAF has used CALCMs twice. The first instance came on opening night of the Gulf War, when CALCM-carrying B-52 bombers from Barksdale AFB, La., attacked Iraq. In fact, CALCMs were the first weapons released in the war. They struck power stations, command-and-control nodes, and other targets. The second use of CALCMs came in 1995, when they were fired as part of a punitive cruise missile strike against Iraq for its noncompliance with cease-fire requirements.

Under mutually agreed upon arms-control counting rules, the CALCMs are still regarded as nuclear weapons and are subject to limitations. About 200 ALCMs have been converted, and another 200 are "available" for conversion, Miner said. The exact size of the CALCM inventory is classified, but "the CALCM requirement will continue to outstrip ALCM availability," Miner added.

CALCM is being fitted with a differential GPS guidance kit giving it accuracy to within 13 meters of the precise aim point. This Block II version would have an accuracy comparable to that of a Laser-Guided Bomb but would have a range of hundreds of miles compared to a few miles only for the LGB. The Air Force is also studying the possibilities of using a British shaped-charge, which would give the

CALCM a deep-penetrating, bunker-busting capability.

Only specially equipped B-52Hs at Barksdale are equipped to carry and launch the CALCM.

### **Joint Air to Surface Standoff Missile**

CALCMs partly fill a gap in capability that was left when the Tri-Service Standoff Attack Missile program was canceled in 1994. TSSAM was to have been the first Joint service stealth missile, but problems in its management both at the Pentagon and at the contractor forced its termination.

The search for a way to replace the TSSAM capability led to a system called the Joint Air to Surface Standoff Missile. JASSM occupies the "high end" of the new munitions mix, Miner said.

According to the Air Force, a number of autonomous JASSMs, launched early in an air campaign, could fly undetected to attack numerous centers of gravity in enemy territory and bring down command-and-control networks and power grids, as well as hardened bunkers. It is the most expensive of the new weapons. For that reason, JASSM would likely only be used until the US achieved air supremacy in the battlespace.

"One of the things that JASSM brings to the table is that you don't have to wait for air defenses to be completely knocked down before you

start attacking other critical targets other than air superiority-type targets," said Miner, who added he was referring to "command-and-control nodes, infrastructure, ... targets you would attack in the opening days of the war."

Miner explained, "We call that parallel warfare, as opposed to a roll-back campaign, where you roll back the defenses little by little to where you can ... reach those places." With JASSM, "you have the standoff range where you can attack strategic targets without subjecting your forces to threats."

Ironically, JASSM as now envisioned will be "a significant improvement" over TSSAM, according to Harry E. Schulte, Air Force's weapons program executive officer. This is true because of technological advances that have taken place since TSSAM was designed in the mid-1980s. Also, JASSM's price may be as low as a fourth of what TSSAM would have cost. Acquisition reforms that set desired results goals—not performance specifications—helped drive the cost down, Schulte said.

He explained, "We told [the contractors], 'Here's the target set we want to kill, ... and we want to kill it with as few missiles as possible. ... Go to it.'"

Both competing versions of JASSM—one designed by Boeing, one by Lockheed Martin—would use a combination of GPS navigation and inertial navigation, coupled with an autonomous infrared seeker, and both have a 1,000-pound-class warhead. If the program proceeds as planned, the first operational missiles will be available in Fiscal 2001.

The JASSM is one of the most hotly debated weapons in the new munitions mix, however.

The Navy would prefer to fill the requirement by using a variant of its long-established Harpoon antiship missile—called the Standoff Land Attack Missile—Expanded Response. However, the Air Force has balked; it complains that SLAM-ER won't reach far enough or be stealthy enough. "We have a disagreement with the Navy on this," said Schulte, "but we just don't think it will meet the [operational requirements document]."

"Depending on whose calculation you believe, SLAM-ER either barely misses the range requirement or

barely makes the range requirement," said Schulte. When it comes to low observability, the story is much the same, he said. The Navy feels that SLAM-ER is "good enough." He added, "That's a quote from them. We are not willing to settle for 'good enough.'"

The Air Force program has encountered fiscal problems. Congress nearly halved JASSM funding this year, requiring DoD to review alternatives. Schulte attributed the Congressional action to the Navy's promotion of SLAM-ER as a cheap alternative to JASSM, but he insisted that the JASSM program "shows every promise" of producing a weapon of twice the range and actually a lower cost than SLAM-ER. Moreover, SLAM-ER is "four inches too big" to fit in the B-1B weapons bay, Schulte said, requiring modifications and testing the Navy hasn't included in its estimates.

"Our belief is that JASSM is about twice as effective as SLAM[ER]," he added. "It will be cheaper to buy, and it will clearly be cheaper to support, because it will have a 15-to-20-year warranty." Moreover, SLAM-ER wouldn't be able to take on some of the required targets because its warhead would be between half and a third as powerful as the JASSM's.

It would be a mistake to drop the JASSM program, Schulte concluded.

The JASSM will "take out key targets in the first few nights of the



Photo by Paul Kennedy

**At this Barksdale storage facility, a technician described the AGM-142 as the large, "economy-size" Maverick. Until JASSM is operational, 15-foot-11-inch AGM-142s and AGM-130s handle the standoff mission against hardened targets.**

air campaign," Schulte said. "You have to do that with something if you're then going to get in there" and attack with cheaper weapons as the air campaign progresses.

The operating requirements for JASSM are classified, but it should be able to attack targets 100 miles distant; such a range brings it well within the limitations imposed by ratified arms-control treaties.

The JASSM could be carried by all Air Force bombers, as well as the F-16, and fit checks have been done with every aircraft in the attack fleet. To get low prices from the two con-

tractors, the Air Force has promised to buy at least 2,400 JASSMs over a 10-year period, but final inventory requirements for USAF alone range from 3,300 to 10,000, depending on which study is used as the requirement driver and which assumptions are made.

While the Air Force is waiting for JASSM to arrive, it is depending on the AGM-130 and the AGM-142, which Miner described as "interim" weapons for the standoff mission against hardened targets.

The AGM-130 is a rocket-powered version of the GBU-15 2,000-pound glide bomb, while the AGM-142—also known as Have Nap—is a monster of a powered bomb that uses electro-optical guidance. Both weapons have a range of 50 to 60 miles, well short of the planned range of the JASSM.

### Joint Standoff Weapon

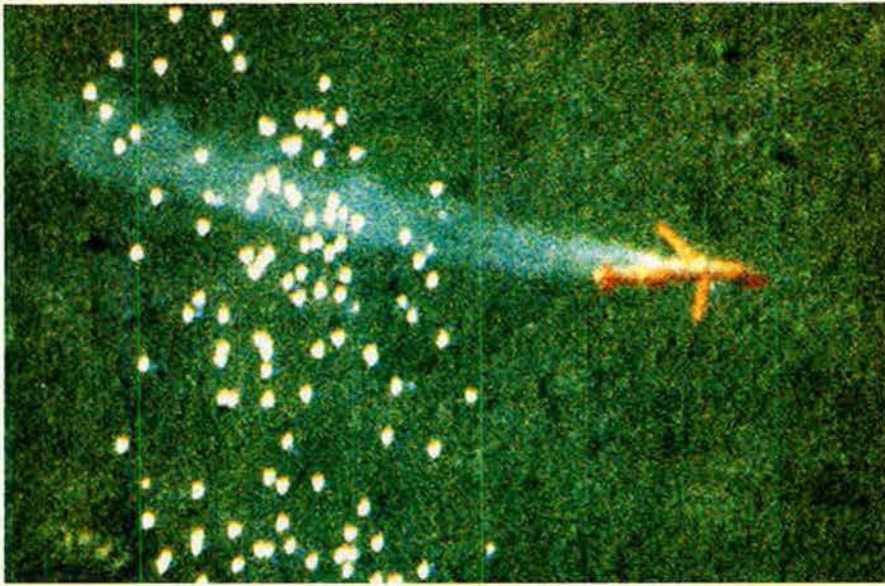
As Air Force aircraft draw closer to enemy air defenses, the next munition of choice will be the Joint Standoff Weapon.

A weapon that will be used by both the Air Force and the Navy, JSOW is managed by the Navy and has been in development since the early 1990s. A handful are already available at sea, left over from a highly successful test program.

The JSOW is a stealthy glide bomb that will be carried by all Navy and Air Force strike aircraft. Using both GPS and INS for guidance—as well



**JASSM should be able to attack targets 100 miles away. Boeing's version—in this illustration—and the version of its competitor, Lockheed Martin, both have a 1,000-lb-class warhead.**



**Launched from an F-16 and photographed during a test, this AGM-154 JSOW leaves a shower of Combined Effects Munitions over its target. BLU-97 CEMs are one of a number of payloads intended for this stealthy glide bomb.**

as an imaging infrared version with a data link in one Navy version—the JSOW will probably comprise much of the first round of attack against enemy air defenses. Depending on the altitude at which it is released, JSOW can glide 40–60 miles and either dispense submunitions or dive onto its target with a unitary warhead.

Destroying known air defense sites with JSOWs would make it easier to get closer to enemy territory where High Speed Anti-Radiation Missiles, similar to those used in the Gulf, could be employed. JSOW will cost less than HARM.

The JSOW—built by Raytheon TI Systems—can be fitted with a special version of the anti-armor submunition called the Sensor Fuzed Weapon. This submunition dispenses smaller projectiles that fire discriminately at targets on the ground. Under best-case conditions, a single SFW could knock out a column of 40 tanks; the anti-air defense version has submunitions better suited to the generally “softer” nature of air defense systems.

The JSOW replaces the troublesome Walleye and Skipper glide bombs in the Navy. That service will rely on the stealthy JSOW to be a pathfinder for its nonstealthy attack aircraft.

After outer air defenses have been suppressed, JSOW will allow US warplanes to get closer to interior targets and release without coming

within range of tough point defenses. The B-2, for example, will use JSOW to make surprise attacks from a distance, without ever exposing the airplane to a “lucky shot” from the ground.

USAF and Navy plan to acquire over 24,000 JSOWs—16,000 will be dispenser models—4,200 of which will carry the Sensor Fuzed Weapon and 7,800 a unitary warhead.

### **Wind-Corrected Munitions Dispenser**

Once enemy air defenses have been largely suppressed and air supremacy

achieved, the Air Force will be able to use the Wind-Corrected Munitions Dispenser. A tail kit which fits on existing dispensers, the WCMD will be able to correct for windage on its own, allowing the warplane employing it to avoid overflying the target. The weapon is “told” where it is before release, then uses inertial guidance to determine where it should make impact. At a 40,000 feet release, the WCMD will be able to steer to a target area about nine miles away, and about two to three miles cross range, or away from the flight path of the airplane itself. At 20,000 feet, its down-range distance diminishes to four to five miles and cross range to one to two miles. At 10,000 feet, the WCMD can guide a dispenser two to three miles down range and about a mile to either side of the airplane’s flight path.

The WCMD is planned to fit on the CBU-87 Combined Effects Munition, the CBU-89 Gator air-delivered mine, and the CBU-97 Sensor Fuzed Weapon. Production starts in 1999.

Schulte noted that, because the WCMD delivers an “area” weapon, in which a precision hit is not needed, it wasn’t necessary to buy a more expensive guidance package for it. For this reason, a common guidance kit for the WCMD and Joint Direct Attack Munition was not pursued.

All USAF strike aircraft except the B-2 would carry the WCMD.



**Undeterred by bad weather, JDAMs equipped with a tail kit for GPS guidance will land within 39 feet of a target. Except for the F-117, all attack aircraft will use JDAM, which comes in 1,000- and 2,000-lb versions.**

Staff photo by Guy Aceto

The B-2 will focus on hitting higher-value point targets requiring its stealth and range.

### Joint Direct Attack Munition

The largest program among all the precision weapons will be the Joint Direct Attack Munition. The JDAM came about out of frustration: During the Gulf War, US pilots sometimes had to return from a mission with their ordnance still on the racks, due to bad weather over the target. Especially where high precision was required—such as in the use of Laser-Guided Bombs—a weather-obscured target meant a wasted mission.

The JDAM solves the problem by equipping each bomb with a tail kit providing GPS guidance. The resulting accuracy will put the JDAM within 39 feet of its intended target—almost as good as a Laser-Guided Bomb and without having to overfly the target or wait for clear weather.

The JDAM has performed well in tests, and an early version is already equipping B-2 bombers at Whiteman AFB, Mo. All attack aircraft except the F-117 will use JDAM, and a special version of the bomb will give the F-22 air superiority fighter a secondary ground-attack role. The B-52 will be next to get JDAM, later this year.

The JDAM comes in two versions: 1,000 and 2,000 pounds.

Boeing builds the JDAM—having acquired the program when it bought McDonnell Douglas—and Schulte holds the program up as a model of acquisition reform. Originally estimated to cost around \$40,000 a round, JDAMs will now be bought for less than a quarter of that. Considering that the Air Force and Navy are buying over 87,000 tail kits—62,000 for USAF and about 25,500 for the Navy—the resultant savings is over a billion dollars.

Much of the price decrease is due to progress in reducing the size and cost of GPS receivers. At the time of the Gulf War, GPS-guided munitions were so expensive and limited in number that they were a top secret. Today, with handheld GPS receivers available in most electronics stores, the cost of precision location has dropped enormously.

### Laser-Guided Bombs

Finally, the Air Force will con-



*Still in demand for its pinpoint accuracy: the Laser-Guided Bomb like the one being loaded above on an F-16 at Hill AFB, Utah. USAF has five varieties of LGBs in its inventory.*

tinue to buy Laser-Guided Bombs for those targets that still demand pinpoint accuracy. However, the advent of JDAM means that not nearly as many LGBs will be needed as originally planned.

The LGBs work by following the reflected light of a laser beam, which can either be shone on the target by the aircraft itself, by another airplane, or by ground troops with a handheld laser designator.

Over 36,000 Laser-Guided Bombs are in the inventory today, of five different varieties, and USAF is planning to buy about 800 more. Because so many more USAF aircraft of today are capable of using LGBs than during the Gulf War, the fleet's ability to destroy point targets has increased in spite of the fleet's overall reduction in size.

Despite the tremendous improvements in accuracy offered by the new precision munitions, the Air Force is not resting on its laurels. The service is exploring new high explosives which, at half to one-quarter the weight of existing bombs, could deliver as much destructive force. Coupled with even more precise targeting, more targets could be killed per aircraft, per sortie, since each airplane could carry more bombs. This in turn would put even more distance between the Air Force and the days when it took numbers of airplanes to destroy a target. Now, it is numbers of targets destroyed per airplane, per sortie.

The intent of the Miniature Munitions Technology Demonstration, Schulte said, is to refine the JDAM tail kit to make it more accurate and put it on a 250-pound penetrator bomb.

"We found it to be pretty effective" in tests, he said.

"With improved accuracies, you could have a smaller bomb. With a smaller bomb, you can carry more of them on an aircraft, and the logistics tail associated with them is smaller."

Analyses have shown that "about 60 percent of target set you would go after with JDAM [is] vulnerable to a small bomb. So there are platforms like the F-22 and the F-117 ... where you would be better off if you could carry more, smaller bombs."

The biggest technical challenge of the program, he thinks, would be the rack that would fit inside an F-117 or F-22, not the bomb. Even that, he thinks, would not be a "major technological challenge."

"We have time" to explore the concept, Schulte noted. "We could maybe ... put it on the F-117 by 2004 and maybe on the F-22 by 2007."

Underlying such a bomb program—still unfunded for development—is the persistent question of "Could we get more kills per sortie?" Schulte said. On the F-117, which only has racks capable of carrying two bombs right now, "maybe we could get five targets in a sortie, instead of two." ■

A high-angle, close-up photograph of an SR-71 Blackbird in flight. The aircraft is dark and sleek, with its distinctive delta-shaped wings and long, pointed nose. It is flying over a vast, rugged mountain range with patches of snow and dense green forests. The sky is a deep, clear blue. The aircraft is positioned in the lower right quadrant of the frame, moving towards the upper left.

**For more than 30 years, the SR-71 has been in a class all its own.**

**Photography by Ted Carlson**

**R**etired by the Air Force in 1990, resurrected by Congress in 1994, and declared mission-ready on Jan. 1, 1997, the SR-71, known around the world as the Blackbird, flew for the last time—once again—as an Air Force operational aircraft on Oct. 10, 1997. This time the last flight came without fanfare—on its first retirement an SR-71 set four new world records.

As in its first operational life, the SR-71 was flown by crews from the 9th Reconnaissance Wing (originally, the 4200th SRW), based at Beale AFB, Calif. The two refurbished jets (#64-17971 and #64-17967) were operated by the 9th RW's Det. 2, located at Edwards AFB, Calif. A Presidential line item veto on Oct. 14, 1997, killed funding for the SR-71 program, which DoD has maintained was too expensive.



# ***Blackbird***





Unknown at the time to pilot Maj. Bert Garrison and backseater Capt. Dom Ochotorena, their routine training sortie (left) on Oct. 10 at Edwards AFB, Calif., marked the final sortie for the "Habu," as the SR-71 has been known to its operators, maintainers, and intelligence cohorts since its first operational use in 1967. The nickname came from Okinawa residents, who shouted "Habu, Habu," when they first saw the sleek black jet flying around the island. They thought it resembled an indigenous hooded viper, called the Habu. It was and is the world's fastest, highest flying production aircraft. It can fly more than three times the speed of sound (2,000 mph) and routinely cruises at altitudes in excess of 80,000 feet (15 miles).

Achieving and maintaining such speed and altitude requires a unique aircraft—one able to stand extreme heat and pressure. Maintenance personnel—at times as many as 14—require up to 30 hours to prep the airplane before a sortie. In addition to other tasks, they pore over every inch, checking fasteners and the titanium skin twice.



The maintenance burden is just as great between sorties—maintenance man-hours run into the hundreds per flight hour. At left, buckets help catch leaking fuel—a routine sight, since the fuel tanks form the exterior skin of the Blackbird. During flight as the sleek jet and its special JP-7 fuel warm up, the leaks stop. JP-7 is a low vapor pressure fuel that does not boil off even at temperatures of up to 300°.



Since takeoff with a full JP-7 fuel load was not practical, Habu crews relied on their cohorts in KC-135Ts to top off the jet's six main fuselage tanks. The "T" designation—before reengining of the KC-135s, it was "Q"—tankers are used solely for the SR-71s. Tanker crews have to be certified to refuel the black jets under a radio-silence procedure. Additionally, the KC-135Ts have special plumbing for their fuel tanks which allow them to move JP-4 and JP-7 between various tanks. The tankers themselves can burn either JP-4 or JP-7. The SR-71s, in a pinch, can also burn JP-4 or JP-5, but doing so limits the Blackbird to Mach 1.5. The one-of-a-kind JP-7 also serves as a coolant for the aircraft and various components. The KC-135T (above and right) is from the 92d Air Refueling Wing at Fairchild AFB, Wash.





Designed before the computer revolution and built in secrecy, the SR-71 and its forerunner, the A-12, are technological marvels. The A-12, which was developed by the Lockheed Skunk Works for the CIA under an August 1959 contract, first flew on April 26, 1962. Early A-12 flights were limited to Mach 1.5 until completion of the J-58 engine from Pratt & Whitney. With two J-58s, each producing 32,500 pounds of thrust with afterburner, an A-12 flew at Mach 3 for the first time on July 20, 1962. President Lyndon B. Johnson revealed the existence of the A-12 on Feb. 29, 1964. Shortly after, on July 24, 1964, he announced the Air Force was developing the SR-71. The A-12 was a single seat jet designed to take photographs from directly overhead. The SR-71, on the other hand, has a pilot and Reconnaissance Systems Officer, carries far more reconnaissance equipment, and provides peripheral coverage while flying in international airspace.





*T-38 airplanes have been used for years to maintain SR-71 pilot proficiency. Flight time in the Blackbird is expensive and, subsonic, the T-38 flies and handles in ways similar to the SR-71. The T-38s also fly "pace chase" to perform visual external checks on the SR-71s in flight whenever a crew member believes the aircraft has sustained damage. At left, pilot Lt. Col. Tom McCleary takes one more look at the Habu as Garrison and Ochotorena take #967 through its paces on Oct. 10.*

*The SR-71 first flew on Dec. 22, 1964. Beale received its first Blackbird on Jan. 7, 1966. The USAF inventory grew to 32. All were based at Beale, but the SR-71 also flew from detachments at Okinawa and in the United Kingdom. During their first 25 years, the Habu flew several thousand operational sorties, many over Cuba, Vietnam, and the Middle East, as well as flights skirting the Soviet Union and China. The SR-71 can provide coverage of 100,000 square miles within just one hour—the resolution is good enough to see a person's shoelaces.*



*The SR-71 set numerous records, which crews maintain were done within normal operating regimes. One Blackbird (#64-17972) flew from New York to London on Sept. 1, 1974, at 1,817 mph in 1:54:56.4, which cut three hours off the previous record. It set another record when it flew from London to Los Angeles in 3:47:35.8 on Sept. 13, 1974. Then in July 1976, SR-71s set still more absolute and world class records: speed over a closed circuit, more than 2,092 mph; speed over a straight course, more than 2,193 mph; and altitude in horizontal flight, more than 85,069 feet.*

To fly near the edge of space, where the atmospheric pressure is so low that fluids boil at body temperature, Habu crews wear a customized pressure suit. At right, physiological support technicians assist RSO Ochotorena into his suit. Once aboard the aircraft and secured inside their suits and helmets, the pilot and RSO breathe 100 percent oxygen. Until strapping into the cockpit, the two crew members carry portable liquid oxygen converters to breathe and stay cool.



Photos by Ted Carlison



Technicians inflate the pressure suits prior to each flight to check for leaks, but during flight the crews wear the suits uninflated. If there's a loss of cabin pressure at 80,000 feet or above, the suit inflates. At left, technicians strap pilot Garrison into the cockpit.

At right, Garrison and Ochotorena are just visible. During the first operational life of the Habu, there were 93 USAF pilots and 89 USAF RSOs. Six members, now all lieutenant colonels, from the original SR-71 crews took up the Habu mantle again. The Air Force asked original crew members still on active duty to volunteer for the reactivated aircraft to form the nucleus for a new force. The six are pilots Gil Luloff, Tom McCleary, and Don Watkins, and RSOs Blair Bozek, Mike Finan, and Jim Greenwood. The crew member with the most SR-71 flying time was retired, now deceased, RSO Lt. Col. Joseph T. Vida who accumulated 1,392.7 hours.





Following the first deactivation, several SR-71s headed for museums around the country. On the last flight, March 6, 1990, pilot Lt. Col. Ed Yeilding and RSO Vida flew from California to Washington in SR-71 #64-17972, destined for the National Air and Space Museum. On the way, they set four world speed records. Despite the end of the latest operational venture, the Blackbird continues to fly. NASA has employed two of the jets, on loan from the Air Force since 1991, as testbeds for high-speed, high-altitude aeronautical research conducted by NASA's Dryden Flight Research Center, Edwards AFB, Calif. Tests under way now using the Habu are designed to lead the way for technology for the X-33, the Lockheed Martin VentureStar Reusable Launch Vehicle—incredibly stretching the more than 30-year-old Blackbird lore another generation at least. ■





## Air Force Association's 14th Annual Air Warfare Symposium

# Global Engagement: Making the Vision Operational



## Feb. 26-27, 1998

The Buena Vista Palace Hotel,  
Orlando, Fla.

### The AFA Symposium

Strategic planning has generated new visions of air warfare requirements, weapons system modernization, and technology developments that are shaping the Air Force today. Top military leaders will explore the progress in making these plans an operational reality and give an update on how the Air Force flies and fights. Planned speakers will include:

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**Gen. Walter Kross,**  
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AMC

**Gen. Richard B. Myers,**  
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**Gen. John P. Jumper,**  
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Although the cutoff date for hotel reservations was Jan. 23, some rooms may still be available. Call Buena Vista Palace Hotel at (800) 327-2990 or nearby Grosvenor Hotel at (800) 624-4109. Mention the AFA Symposium for special rate.

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Call Jennifer Krause at the Air Force Association at (703) 247-5838, e-mail: [jkrause@afa.org](mailto:jkrause@afa.org), if you have any questions or to register. To receive registration information by fax, call our fax on demand service 24 hours a day at (800) 232-3563, and order document number 320, or visit our web site at [www.afa.org/orlsymp.html](http://www.afa.org/orlsymp.html).

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**The Air Force has managed to keep its aging fleet in shape, but problems are now looming.**

# Going Gray

By Peter Grier

**I**F USAF's T-38 trainers were cars, most would qualify for "antique auto" license plates. The first production model entered service in 1961. The last rolled off Northrop's assembly line in 1972. The average age of T-38s still flying for the Air Force is 30 years. Average flying hours per aircraft has passed 12,200 and continues to climb.

The T-38 remains a tough little airplane, but it has not aged altogether gracefully. Cracks resulted in the replacement, in the late 1970s, of lower wing skins with thicker material. Current fatigue problems include small fractures emanating from the lower wing skin fastener holes, cracking in upper cockpit longerons, and corrosion inside the horizontal stabilizer.

In fact, says a major new study of the problem, keeping the T-38s airborne will require the same kind of constant maintenance attention that it would take to keep a fleet of 1967 Chevys in good operating condition. USAF "will continue to face a major challenge to protect the safety and prolong the service life of the T-38 for another 25-plus years," concludes a new National Research Council report on aging USAF aircraft.

As the NRC found, the T-38 is not an isolated example. Many of the Air Force's aircraft have surpassed 20 years of age and yet continue to serve as backbones of critical components of the operational force. To varying degrees, all these airplanes can be expected to experience such aging problems as cracking and corrosion.

USAF's Aircraft Structural Integrity Program and other service efforts have helped keep such problems in check in the past. However, the NRC warns that continued success is not assured, for a number of reasons. These include the Air Force's maintenance manpower cuts, greater use of contract maintenance and commercial design practices, and possible complacency of Air Force management, says the report.

Keeping older aircraft safe to fly and potent for combat is nothing new for the Air Force, but it is among the top challenges it faces on the eve of the 21st century. [See "The Aging of the Fleet," June 1996, p. 14.] Even if Congress funds all the new airplanes now planned, the USAF inventory will continue to see a steady increase in the average age of its aircraft for decades to come. The Air



The C-141A (top) was extended by 23 feet four inches to create the C-141B version. At an average age of 29 years, the stretch C-141 has become increasingly troublesome—requiring extensive and frequent inspections to ensure safety.

Force has never been forced to make do with so many old aircraft.

The report was prepared by a blue-ribbon NRC panel formed specifically to take a hard look at aging-aircraft issues and to recommend a course of action. It is now urging a number of aggressive remedial steps, including more research on cracks and corrosion and establishment of an aging-aircraft “technical czar.” Furthermore, it says, the Air Force should continue to update its durability assessments of all its aircraft models.

Absent such changes, the service’s success in keeping older aircraft sound may become “rather fragile,” concludes the NRC Committee on Aging of US Air Force Aircraft.

### The Airplanes

The T-38 may be old, but it is not the true senior citizen of the Air Force. That title belongs to the KC-135 tanker, which was first introduced into service more than 40 years ago. Other venerable aircraft include the B-52H bomber, C-130 airlifter, and T-37A primary trainer, which all first flew operationally 35 to 40 years ago.

The next oldest generation comprises the C-141 and C-5A airlifters, which entered operational service 25 to 35 years ago. The F-15 air superiority fighter, A-10 attack aircraft, and the E-3 Airborne Warning and Control System aircraft clock in at 20 to 25 years of age. In contrast, the

F-16 multirole fighter and the KC-10 jet tanker are relative youngsters, having become operational within the past 20 years. The same is true of the F-117 stealth fighter.

Of all these aircraft, the C-141 is the only one whose replacement (the

C-17 Globemaster III) actually has gone into production. Other replacement aircraft, such as the Joint Primary Aircraft Training System, or T-6A Texan II (for the T-37A), the F-22 Raptor (for the F-15), and the Joint Strike Fighter (for the F-16), are in varying stages of development. The vagaries of the procurement cycle have made uncertain the delivery schedule of any new combat system. It will be at least 15 years before JSFs are on the ramp in significant numbers, the NRC points out.

The T-38 is not the only USAF model subject to cracks and other aging problems. Both the KC-135 and the C-5A had their lower wing surfaces replaced in the 1970s and early 1980s as a result of worries about widespread fatigue damage.

The C-141 has proved particularly troublesome from a structural point of view. Fatigue damage around the weep holes in lower wing risers has forced the installation of boron composite reinforcing doublers on most of the Starlifters. Further tests have shown that other critical wing parts

Aircraft Type	Years Since IOC	Years Average Age	Future Plans
C-5A/B	28	18	Retire C-5A in 10–15 years. No replacement identified.
C-130E/H	36	20	Replace one-third over 5–25 years with C-130J.
KC-135	41	35	Retain for 25+ years. No replacement identified.
C-141B	32	29	Retire over next 8 years. Replace 1-for-2 with C-17.

Aircraft Type	Years Since IOC	Years Average Age	Future Plans
E-3 AWACS	20	16	Retire in 17–25 years. No replacement identified.
E-8 JSTARS	—	20	Retire in 15–20 years. No replacement identified.
EC-135	40	35	Retain 25+ years. No replacement identified.
EC-130E/H	36	20	Retire in 15–25 years. No replacement identified.
EF-111	30	29	Retire within next 4–5 years.
T-37B	38	33	Retire in 2–12 years. Replace with JPATS.
T-38	36	29	Retain for 25+ years. No replacement identified.

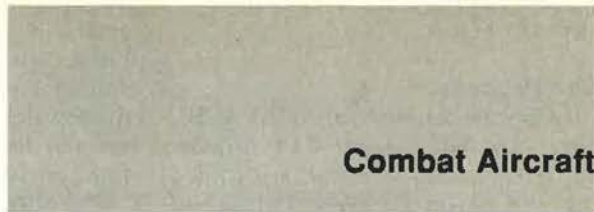
may reach the end of their life span at around 37,000 flight hours, even though USAF's current plans call for using the C-141s until they reach 45,000 flight hours and are retired.

According to the NRC panel report, any C-141 flown beyond 37,000 hours now requires "extensive and burdensome" inspections to ensure continued safety. The inspections involve looking at more than 6,000 fastener holes every 120 days. As is the case with the T-38, "the structural management of [the C-141] will continue to be a significant challenge," says the NRC.

NRC descriptions of the aging problems of other Air Force aircraft can begin to sound like a roll call of the wounded. B-52 heavy bombers are prone to fatigue cracking in flap tracks and to cracking in aft body skins. A-10 aircraft—whose low-level evasive maneuvers subject them to three times the level of stress originally assumed by its designers—can develop cracks in wing upper skin, some parts of their main landing gear, and engine nacelle hanger frames.

The E-3A AWACS, based on old Boeing 707 commercial airframes, contains many parts made from a corrosion-susceptible 7000-series aluminum alloy. F-15E dual role fighters, fully loaded with munitions on pylons beneath their wings, can produce in-flight shock waves which eventually damage some of their own skin panels.

Aircraft Type	Years Since IOC	Years Average Age	Future Plans
A-10A	20	15	Retain for 25+ years. Some replaced with Joint Strike Fighter.
F-15A	23	12	Retire in 5–20 years. Replace with the F-22.
F-16A	18	8	Retire in 10–25 years. Replace with Joint Strike Fighter.
B-1B	11	9	Retain for 25+ years. No replacement identified.
B-52H	36	34	Retain for 25+ years. No replacement identified.



### No Exceptions

Even in relatively new aircraft, design mistakes can produce structural problems. Fatigue cracking and corrosion on the B-1B appear to be minimal so far, for instance, but it turns out that the location of the B-1B tail, just above the exhaust wake of the engines, causes problems. The placement helps achieve high-performance turns at low velocity—but it also places the tail within the engine's high-acoustic-noise envelope, and it has caused some fatigue cracking fairly early in the airplane's life.

USAF aircraft models designed before the early 1970s—when military specifications dealing with damage tolerance in aircraft design were tightened—have all been the subject

of Durability and Damage Tolerance Assessments. These tests, performed by contractors and Air Force logisticians, identify critical areas where wear and tear cause fatigue damage, determine the limit of such damage the airplane can safely endure, and lay out safety inspection requirements.

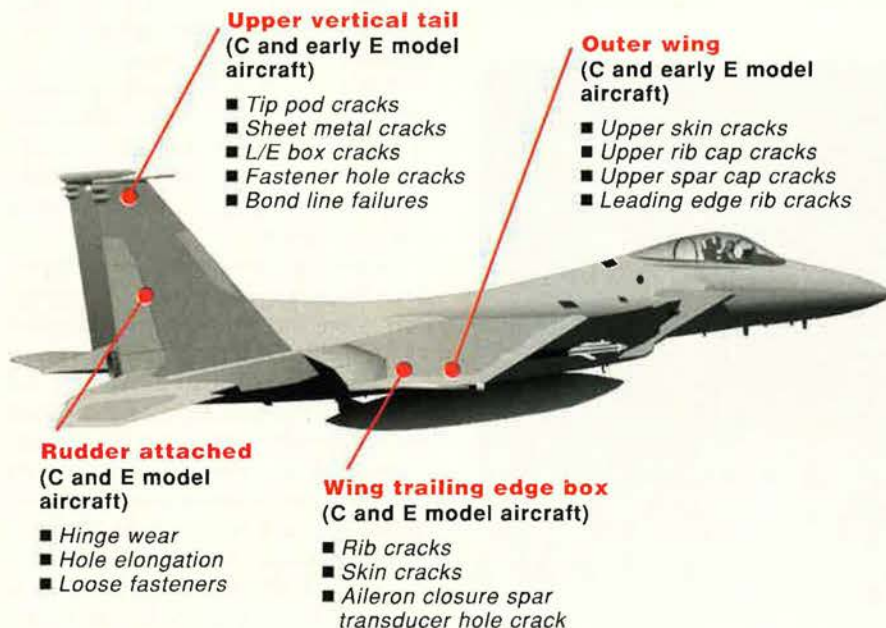
The NRC aging-aircraft committee strongly recommends that many of these DADTAs be updated. Highest priority in this regard should be given to the A-10, F-16, U-2, and T-38, it reports. "In general, an update about every five years is appropriate," says the report.

Still, not even the most rigorous inspection procedure can prevent the onset of aging problems. As flight hours increase, cracking, corrosion, and other damage will inevitably occur on all aircraft models.

Operational changes, such as better fuel management, reduced pressurization, and more extensive flight restrictions, can help ease the aging process. "For aircraft that are approaching their economic service limit, these options should be considered to allow time for modification or replacement acquisition programs," says the NRC.

However, the Air Force has no clear-cut standard for the point at which keeping an aging airplane in the air is no longer cost-effective. Another major NRC recommendation is that the Air Force significantly improve its estimates of the probable economic service life of its aging-aircraft systems.

"Lack of these tools frustrates the ability of Air Force planners to establish a realistic timetable to phase out a current system and to begin



*This illustration highlights the major buffet-induced problems—fatigue cracking—present in F-15 fighters.*

planning for replacement systems,” says the report.

### The Process

In December 1969, at Nellis AFB, Nev., an Air Force F-111 fighter experienced a catastrophic wing failure and crashed after it pulled up sharply after firing a rocket. The swing-wing aircraft had clocked only about 100 hours of flight time when the crash occurred. Eventually, investigators determined that the cause of the accident was a forging defect in the wing pivot—a problem almost impossible to detect via normal inspection methods.

To protect the fleet as it matured, Air Force science advisers recommended that all F-111s be subjected to a special, low-temperature load test developed for the Apollo space program. During the next 25 years, 11 F-111s failed the difficult test, which is conducted at minus 40 degrees Fahrenheit.

All of those aircraft would probably have broken up in the air. But thanks to the load test and the attention of engineers, logisticians, and inspectors, no F-111s since 1969 have crashed as a result of structural failure.

“The F-111 history truly represents a major success story for the Air Force structural integrity program,” concludes NRC’s study.

As this example suggests, the Air Force’s system for ensuring the structural safety of its aircraft is a rigorous one. The 1970s saw the intro-

duction of DADTAs for older aircraft as well as the advent of the Air Force Structural Integrity Program and damage tolerance requirements for new designs. Ever since that time, service losses of aircraft to parts failure have been minuscule.

The NRC report says, “The failure rate for all weapon systems that are maintained using the damage tolerance approach is one aircraft lost due to structural reasons in more than 10 million flight hours.”

This success has been based on a number of interlocking factors, among them: rigid enforcement of ASIP regulations by the Air Force’s system program offices and the Air Logistics Centers; technical oversight of the whole area by an experienced, standing Air Force committee through the mid-1980s, plus periodic reviews by Scientific Advisory Board committees; developing of competent examiners at the ALCs able to perform damage tolerance analyses and judge contractor’s work; and money for DADTAs and R&D funding the field.

The NRC believes that recent acquisition reforms, plus budget and manpower cuts, “have all adversely affected these factors.”

### Needed: A “Czar”?

Aggressive action is needed to counteract this deterioration and prevent more problems in the future, says the NRC report. For instance, the study recommends appointing

a single knowledgeable and experienced technical leader—an old-airplane “czar,” so to speak—to oversee aging-aircraft engineering and R&D activities.

The Air Force’s technical oversight should be bolstered through establishment of a resources group to examine personnel deficiencies in aging-aircraft research fields and a number of working groups to provide a technical link from basic research through solution implementation.

The NRC believes some engineering tasks should receive higher priority. These include corrosion control programs. The spectacular 1988 accident of an Aloha Airlines 737, in which the aircraft lost much of its forward fuselage skin but managed to survive, focused much civilian and military attention on this pervasive problem. The NRC, however, said civilian airlines continue to surpass the Air Force in the degree to which they inspect their individual airplanes for corrosion.

In particular, the Air Force may need to do more in the field of Stress Corrosion Cracking, according to the NRC’s investigators. SCC is a dangerous, hidden kind of corrosion, difficult to detect visually because it occurs within the very grain of the material.

“The committee recommends that the Air Force include an assessment of the vulnerability of each of their aging aircraft to structural failure caused by SCC” in their overall DADTA vulnerability updates, according to the NRC report.

When it comes to aging aircraft, the corrosion of airframe structures constitutes the single most costly maintenance problem for the Air Force, running up to \$3 billion a year in repairs.

Corrosion can occur in any number of forms, from SCC to pitting corrosion, galvanic corrosion (caused by mild electrical currents), and plain old general corrosion. Among its primary causes in Air Force aircraft are use of older, corrosion-prone aluminum alloys and exposure to such corrosive environments as humid air, salt water, and latrine leakage. Corrosion damage is typically discovered by visual inspection. However, because a fair amount of corrosion damage on older aircraft can be hidden from sight, much of it can go undetected.

Photo by Randy Jolly



*Fatigue cracking, such as that found in the F-15E, shown here carrying four 2000-lb bombs, is a direct result of use and can be caused by flight maneuver and gust loads and exacerbated by changes in use, such as new munitions.*



Among the oldest USAF aircraft, the B-52 (below) is prone to fatigue cracking in flap tracks and cracking in aft body skins. Above is a view of the boneyard at Davis-Monthan AFB, Ariz., with early model B-52s in the foreground.

In line with its view that early detection of corrosion and new control techniques should receive a high Air Force priority, the NRC suggests a number of operational needs. These include:

- New, more environmentally friendly protective coatings to replace hazardous materials now being phased out.

- Better ways of finding hidden corrosion without disassembling aircraft.

- Better understanding of rates of corrosion.

- Installation of dehumidified aircraft storage or development of techniques to dehumidify susceptible areas of particular aircraft. Studies have shown that reduction of relative humidity 30 to 40 percent would significantly reduce the corrosion of stored aircraft.

Unlike corrosion, fatigue cracking—another main problem of aging—is a direct result of use and will eventually occur in all aircraft. It is divided into two types: low-cycle fatigue (typically caused by flight maneuver and gust loads) and high-cycle fatigue (caused by vibration from mechanical, aerodynamic, or sound sources).

Low-cycle fatigue can be exacerbated by changes in aircraft use, such as addition of new armaments or the introduction of new flying tactics. Understanding the implications of such changes on wear and tear is a top priority, according to the NRC.

Similarly, changes in an aircraft's



Photo by Randy Jolly

basic configuration can affect high-cycle fatigue wear, by placing new parts in the path of vibratory energy or altering the flow of shock waves along airplane exteriors. Identification and elimination of sources of high-cycle energy, where possible, is a key technical issue in this area.

Actually finding fatigue damage poses a critical problem. In some cases cracks that can degrade a structure can be as small as a few hun-

dreths of an inch in width. Existing Non-Destructive Inspection methods for finding small cracks, such as eddy currents and ultrasound inspections, are tedious, time-consuming, and expensive. They are also less reliable when applied to the interiors of aircraft sections, such as the inner layers of a wing or fuselage joint or in interior structural members, such as stringers.

“Among the greatest NDI challenges is to develop methods that can reliably, rapidly, and cost-effectively determine, without fastener removal or disassembly, if an aircraft has widespread fatigue cracking,” says the NRC committee.

Finally, the Air Force needs a better understanding of the implications of some of its repair methods, says the NRC panel. Generally, aged-

structure repairs now consist of reinforcement doublers that are bolted or bonded over damaged areas. In recent years the Air Force has favored bonded composite patch repairs, which save weight and are easier to mold into complex shapes. Further research might improve this repair practice—and it could provide predictions for the life span of composite patches, which today are only rough estimates. ■

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*Peter Grier, the Washington bureau chief of the Christian Science Monitor, is a longtime defense correspondent and regular contributor to Air Force Magazine. His most recent article, "The Pentagon Prescribes Tricare," appeared in the January 1998 issue.*

Airlift tends to get a low priority in peacetime, but that changes when conflict begins.

# The Evolution of Air Mobility

By Bruce D. Callander



**I**N 1908, the Army contracted with the Wright brothers to develop and produce the service's first airplane. Among numerous other stipulations of this historic agreement was a requirement that the Wrights deliver a flying machine small enough to be hauled in a big Army wagon.

Today, the Air Force's airlifters are enormous, and it is they who haul the Army's biggest vehicles, rather than the other way around. Moreover, experts predict, tomorrow's transports will be able to haul massive loads to any point on Earth within an hour, defend themselves en route, and land on parking lots.

It is this striking evolution of military airlift over the past century that formed the basis of a wide-ranging Air Mobility Symposium held late last year at Andrews AFB, Md., where it was sponsored by the Air Force Historical Foundation, the Office of the Air Force Historian, and Air Mobility Command.

In three sessions, experts explored the early development of airlift, the lessons learned in operations stretching from World War II to the Gulf War, and the probable shape of mobility in the next century. The conclusion of most papers was that airlift too often has been given low

priority in peacetime and has had to play catch-up after conflicts erupt.

Roger G. Miller, a senior historian with the Air Force History and Museum Program, traced the path of air mobility from the very earliest days of flight to 1915. It was in that year that Capt. Benjamin D. Foulois took command of the 1st Aero Squadron in Texas and equipped it with eight Curtiss aircraft and 11 trucks, including a mobile machine shop. When the squadron joined Gen. John J. Pershing's ground forces for the punitive expedition into Mexico, its airplanes carried the pilots, their rations, and spares.

*Despite heavy fire, airlifters managed to deliver more than 300,000 pounds of supplies and equipment each day to support Marines at Khe Sanh during the Vietnam War. Here a C-130 drops off a load during the early days of the siege.*





**Infantrymen load a reluctant "piece" of cargo aboard this C-47, a modified commercial transport, for its flight over the "Hump." Airlift crews flew in 100 percent of the supplies used by US forces in the China-Burma-India Theater during World War II.**

Through most of World War I, surface vehicles still hauled most cargo. Despite their notable technological improvements over the war years, aircraft still had little range or carrying capacity and depended on fixed bases. During the 1920s, however, commercial aviation began to blossom, and the Army began to take a strong interest. It set up the "Model Airway" to transport government officials and priority cargo. In the beginning, most of the Army's haulers were bombers with limited capacity. When the service did finally buy commercial carriers, they were designed for passengers, not cargo.

As the aircraft began to mature, Maj. Hugh J. Knerr, who was then the chief of the field service section for Air Corps Materiel Division, launched an air resupply system. He urged the Air Corps to buy airplanes built specifically to transport cargo, and, by the mid-1930s, the Army began looking at advanced carriers, such as the Douglas all-metal DCs, for this very purpose.

### The Big War

World War II, of course, brought enormous advances. Even before the US became directly involved in the fighting, a buildup of major proportions had been launched. The Army had bought and begun construction of 600 C-47s and 50 four-engine C-54s by the time Japanese forces attacked Pearl Harbor in December 1941. However, they were far from

delivery and would not enter action for some time. Of the 12,297 military aircraft actually in the US inventory, only 254 were transports, most of them light carriers.

The world war generated an immediate demand for far more transport airplanes than planned and for more extensive uses than anyone could have imagined in the prewar days. By war's end, said Miller, air transport had been firmly established as the third leg of the nation's developing air strategy.

According to Daniel L. Haulman, a historian with the Air Force Historical Research Agency, the war also proved the need for specialized cargo aircraft. The Army Air Forces acquired more than 10,000 Douglas C-47s, 3,000 Curtiss C-46s, and some Lockheed C-69s and Douglas C-54s. However, all were conversions of commercial aircraft and as such proved to be hard to load and unsuited to oversize cargo. Germany also used a commercial carrier for its trimotor Ju-52/3M, an air transport, troop carrier, and glider tow, and it faced the same limitations.

During the war years, the US did produce one aircraft specifically designed for airlift. The low-slung Fairchild C-82 (forerunner of the C-119) had a high wing and rear door for easy loading, a high tail for parachute drops, and range and lifting capacity close to the C-54's. Unfortunately, the first delivery was in June 1945, when the European

war was over and Japan was nearing defeat.

Despite their limitations, the transport aircraft on both sides proved themselves invaluable in new forms of warfare. Germany dropped paratroopers to invade the Low Countries and air-dropped soldiers to take Crete. The Allies launched airborne strikes in North Africa and Sicily and, on D-Day in June 1944, used 900 transports and 400 gliders to deliver onto the Continent more than 13,000 paratroopers.

Airlift proved to be an effective means for sustaining armies in the field. Airdrops relieved troops pinned down at Bastogne in the Battle of the Bulge, and transports flying the Asian "Hump" supplied forces in China when seaports were blocked. In the Pacific, forces depended on regular air deliveries of fuel and supplies to sustain the island-hopping offensive.

However, the war underscored the need for centralized control of airlift, according to the symposium experts. Early on, local commanders often diverted carriers for their own purposes. In time, Air Transport Command gained more power, but the struggle between theater and global control continued, as did problems of coordination between air and ground forces. The need for better airlift scheduling was only too apparent in the Allied invasion of southern France, an operation in which several closely spaced gliders collided. Setting up multiple traffic lanes and variable altitudes and speeds helped.

Also helpful were improved navigation aids such as pathfinder aircraft to mark landing and drop zones, radar to spot ground drop targets, and en route radio stations for Hump flights. Still, better navigation aids were needed.

One overall lesson of the war, Haulman said, was the fact that air superiority is essential to the success of airlift missions. Many German transports were shot down for lack of it, and Allied efforts were almost invariably successful when they had it.

### Cold War Airlift

Airlift emerged from World War II as the most flexible component of airpower, said Roger D. Launius, chief historian of the National Aeronautics and Space Administration. Because the military role is to fur-



ther national defense and diplomatic objectives, he said, the more flexible the tool, the more useful it is. That flexibility was demonstrated in the first crisis of the Cold War, the Berlin Airlift. No other response could have maintained Allied presence and avoided conflict.

When the Soviet Union set up a blockade of land corridors into West Berlin, Brig. Gen. Joseph Smith, US military commander of Wiesbaden, West Germany, set up an air bridge and a closely timed supply schedule. Later, the new Military Air Transport Service took over and put Maj. Gen. William H. Tunner, architect of the World War II Hump lift, in charge.

As in World War II, the airlift became the center of jurisdictional battles, with Tunner's staff expecting to run an independent operation and USAFE demanding more control of the action. Despite such conflicts, the lift fell into what Tunner called a necessary steady rhythm with a logistics system to support the flow and a maintenance system to keep the airplanes running. Aircraft were assigned specific altitudes and speeds and tracked by radar. One pilot, Jack O. Bennet, said they were like pearls on a necklace.

To shorten the amount of time spent on the ground, operations and weather officers met the airplanes when they landed. Pilots unable to land visually were sent back with their loads. Time-study experts cut unloading



*The Berlin Airlift quickly settled into a steady pace despite jurisdictional battles. However, Maj. Gen. William H. Tunner was convinced of the need for a single command and larger aircraft. Here, airfield crews prepare a C-54 at Wiesbaden AB, Germany, to carry another load into beleaguered Berlin.*

time by two-thirds and refueling time by three-fourths. Turnaround time eventually dropped from one hour to 30 minutes.

Like World War II, the Berlin Airlift was a learning experience. Tunner emerged from it arguing for a single airlift command and for larger cargo aircraft, as the only way to increase the flow in saturated air corridors.

### **Korean Woes**

World War II and the Berlin Airlift had not prepared the Allies for the next Cold War crisis, however. At the outbreak of the Korean War,

MATS was better equipped to deliver troops and supplies to the theater, but, within Korea itself, airlifters faced a whole new set of problems, said William T. Y'Blood of the Air Force History Support Office. Intra-theater transport responsibilities fell to Far East Air Forces, which had only two troop carrier squadrons (with 13 C-54s each) in 5th Air Force and another with 13th Air Force in the Philippines.

Gen. Douglas MacArthur's first major order—for the evacuation of civilians—caught FEAF with most of its major carriers scattered for other duties. Commanders mustered seven of the big airplanes along with 10 C-47s and four C-46s and brought out about 850 people. The delivery of troops and supplies was harder. The C-54s proved too vulnerable and too heavy for available airfields. FEAF turned to C-47s and C-46s.

When the North Koreans pushed the defenders back, FEAF mounted an emergency airlift and called the third squadron of C-54s in from the Philippines. Still, the requirements overwhelmed the available resources. Often, demands were unrealistic. Instead of using available water transport, units wanted airlift for even routine cargo. Scheduling and maintenance became a shambles. Officials said some central agency was needed to rule on which cargo required airlift and which could move by surface transport.

Meanwhile, FEAF, helped by the



*The C-119 Flying Boxcar, one of the first military-specific transports, supported US troops during the Korean War. Maintaining a breakneck pace, the few available C-119s began to suffer maintenance problems from overuse.*

addition of newer carriers such as the C-119, supported the Inchon landing and the push into North Korea. Before long, it was delivering 800 to 900 tons per day from Japan to Kimpo, and that pace steadily increased.

When officials thought the war was about over, however, Chinese Communist forces moved in, UN forces fell back, and FEAF mounted a massive support effort. Through the winter of 1950–51, Combat Cargo Command airlifted ammunition and other supplies to ground forces at a breakneck pace. At one point, it air-dropped an eight-span bridge so that retreating Allied troops could bring out their equipment.

Eventually, UN forces recovered and headed north again. Airdrops tapered off and landings increased. The C-119 became the transport of choice, but FEAF had a limited number of them. Overuse produced maintenance problems. USAF sent newer C-124s, but their weight limited them to a few fields, and they developed fuel leaks and generator problems.

The Korean War again underscored the need for specialized aircraft. The available airplanes (from C-47s to C-124s) often were unsuited for the demands of small wars. USAF began development of new airlifters such as the Fairchild C-123 and the Lockheed C-130 Hercules. This still did not settle the old questions of jurisdiction. Both the Army and some elements of the Air Force wanted

control over airlift for their own purposes.

After Korea, some basic airlift problems were still papered over, said retired Air Force Col. Raymond Bowers, director of the Southeast Asia Branch in the Air Force History Support Office. Vietnam, a war without fronts, exposed the shortcomings and posed new difficulties.

In the late 1950s, USAF airlift doctrine had put troop carriers under Tactical Air Command in the US and under theater commanders overseas. It called for landing troops onto prepared runways and gave little attention to developing aircraft for rough terrain, for which the Army's answer was organic transport with helicopters. The Army and Air Force often were at odds over the best aircraft to use, and both largely ignored problems of aerial port, medical evacuation, communications, and control.

### The Vietnam Experience

As US efforts grew in Vietnam, USAF used C-47s and C-123s, both of which had limitations. Army helicopters proved inadequate for heavy hauling. Its fixed-wing Caribou airplanes were better suited to the primitive airfields but had little capacity.

With the major buildup after 1964, airlift requirements increased sharply, and, fortunately, USAF now had Lockheed C-130s. The services agreed that the Hercules should be used routinely and the availability

of airstrips suitable for them became an element in planning operations.

The Army and Air Force also worked out effective operations at various levels, but some problems remained. As Bowers said, the stage was set for a postwar decision to organize tactical and strategic airlift under a specified command.

While the services were working out their tactical airlift problems in Korea and Vietnam, they struggled with the equally important challenge of strategic transport.

With the World War II demobilization, it was clear that future wars would require even more massive airlifts and that smaller peacetime forces would not have enough in-house transports to meet them all. Col. Ronald N. Priddy, USAF (Ret.), vice president for safety operations with the National Air Carrier Association, described the evolution of what would become the Civil Reserve Air Fleet.

As early as the 1930s, Brig. Gen. William L. Mitchell had proposed that all aviation developments be led by the military, but the US chose to encourage a separate commercial carrier system that could be drawn on in emergencies.

Even before it entered World War II, Army Air Corps Ferrying Command contracted with Pan American Airways to deliver some lend-lease aircraft to Britain. After Pearl Harbor, the AAF bought or commandeered transports from the airlines, which also provided training for military transport pilots and continued to fly airlift while the AAF built its own resources. During the Berlin Airlift, airlines replaced military transports on many intercontinental routes, and in Korea, they supplied much of the initial airlift.

In the 1950s, a government commission studied a more permanent program for using civilian resources in national emergencies. The result was CRAF. By the Gulf War, it represented more than 50 percent of the nation's airlift capability, and, for the first time in its nearly 50-year history, it was activated for a combat operation.

### The Desert War

The Gulf buildup, Operation Desert Shield, soon became the most massive airlift in the history of airpower, said John W. Leland, senior



*The huge C-5 (background) and the C-141—each undergoing extensive modernization efforts over the years to extend their useful lives—have been “modern” mainstays of USAF’s airlift fleet.*



**USAF airlifters, such as this C-141, are in near-constant demand as the Pentagon engages in increasing numbers of Military Operations Other Than War, like this humanitarian airlift to Africa.**

historian of Air Mobility Command. CRAF and USAF airplanes flew more ton-miles in six weeks than during the entire 15-month Berlin Airlift.

To support the 7,500-mile pipeline to the Gulf, the Air Force used not only its own carriers and en route tankers but commercial airline elements of the reserve forces.

For all its efforts to be prepared, however, Military Airlift Command did not have an approved transportation plan to fit Desert Shield. Gen. H.T. Johnson, commander in chief of US Transportation Command and MAC, later said a major result was that too many airlift users wanted to move troops and cargo quickly and MAC tried to satisfy them all. Often, too much or too little airlift was scheduled or the wrong type was used.

MAC set up a Requirements Validation Cell to recheck with requesting units to determine their true needs, but it was effective only to a point. Requirements changed quickly with developing operations, and officials later admitted some changes were inevitable.

Another complication was the lack of a staging base on the Arabian Peninsula so incoming crews could rest. MAC assigned extra pilots to the carriers and set up pilot pools at other bases to spell off the incoming crews. But a RAND Corp. study later reported that lack of an in-theater staging base had reduced the strategic airlift capability by 20 to 25 percent.

MAC fought many small fires. It

set up one-day express services in the US and Germany for high-priority cargo. When cargo piled up at US bases, it set up teams with representatives from all services to divert low-priority items to sealift. When CRAF airlines had problems getting war-risk insurance MAC cut the red tape, and when they refused to send crews within Scud range without chemical warfare gear and training, MAC provided both at en route stops.

But, again, Leland said, the operation showed the need for a single organization to control airlift and tanker forces, a need finally answered in 1992, with activation of Air Mobility Command.

Since the Gulf War, new problems have arisen. Some overseas bases have closed and others have been put on standby status so future operations may depend more on in-flight refueling. Some CRAF resources have been affected by airline failures, consolidations, and foreign funding.

On the bright side, the new C-17 offers advantages USAF did not have in the Gulf War. It carries twice the payload of the C-141, hauls outsize cargo, and uses austere airfields, freeing more ramp space for fighters.

Other recent contingencies have

given the services experience in supporting combat operations for the kind of post-Cold War situations they are likely to encounter in the future—those Maj. James Ayers of the Air Force Doctrine Center described as Military Operations Other Than War.

In Bosnia, Somalia, and Haiti, USAF carriers supported multinational forces and nongovernment organizations such as the Red Cross and CARE. From those experiences, Ayers said, leaders learned that even peacetime operations require security.

To increase safety, USAF now varies flight schedules, routes, and billeting arrangements. It uses Terrorist Assessment and Awareness Teams to provide force protection and anti-terrorist training at AMC locations and supplies trained teams called Ravens to accompany aircraft into high-risk areas.

Security will become even more important in the future, when even Third World nations gain more sophisticated strike platforms, said Maj. John R. Stafford, a former C-141 pilot now assigned to the Pentagon.

Future airlifters may well use everything from stealth technology to laser or microwave directed energy. AMC already has modified some C-141s with defensive flare systems, and countermissile missiles are another possibility being discussed. The use of pilotless airlifters also has been considered, but Stafford said it appears unlikely, particularly in aircraft carrying passengers.

Nor will future carriers necessarily be much larger, the major said. Rather, they are likely to be lighter and fly faster and, because of increased fuel efficiency, farther. Thus, they will deliver more goods faster than present carriers without added size per airplane.

One promising idea calls for a reusable launch vehicle able to reach orbit with a single stage. Even in suborbital flight, such vehicles could reach Mach 25, deliver payloads of up to 50,000 pounds anywhere on Earth within an hour, and land vertically on pads no larger than 300 square feet. ■

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*Bruce D. Callander, a regular contributor to Air Force Magazine, served tours of active duty during World War II and the Korean War. In 1952, he joined Air Force Times, serving as editor from 1972 to 1986. His most recent story for Air Force Magazine, "A Talk With the Personnel Chief," appeared in the December 1997 issue.*

# Security of the Russian Nukes

**Gen. Eugene E. Habiger of US Strategic Command was the first foreigner to enter a Russian nuclear weapons storage area.**

*Gen. Eugene E. Habiger, USAF, is commander in chief of US Strategic Command, Offutt AFB, Neb., which comprises the nation's nuclear deterrent forces. On Nov. 4, 1997, he met with reporters in Washington. He had just returned from Russia, where, at the request of Defense Secretary William S. Cohen, he examined the security of Russia's nuclear weapons. Here is how Habiger replied to questions posed by the press.*

## **Nuclear Weapon Safety**

"I've just experienced something that I never thought possible. ... As a Cold War warrior, I spent most of my adult life sitting alert with B-52 bombers. For a period of five days last week, the Russians showed me a great deal, specifically about their Strategic Rocket Forces, from their command and control to allowing me [to be] the first, as I understand it, non-Russian to ever go into a nuclear weapons storage area and to see how they keep their nuclear weapons secure and safe."

## **Genesis of the Visit**

"I first met Gen. [Igor D.] Sergeyev [Russia's minister of defense] in October of last year, when Dr. [William J.] Perry, then Secretary of Defense, asked me to accompany him to Moscow for some high-level talks. ... I extended an invitation to him [Sergeyev] to come visit me at ... Offutt, and in late March, early April of this year, he did come. I spent six days with him. ... I showed him my headquarters in some depth, and I took him to one of our nuclear weapons storage facilities at F.E. Warren AFB in Cheyenne, Wyo., the first time that a Russian has ever been in one of our weapons storage areas. ...

"During [NATO meetings in October], Secretary of Defense Cohen ... asked Sergeyev's view of the safety and security of their nuclear weapons and, as I recall, General Sergeyev said that his nuclear weapons were as safe and secure as those in the United States. Secretary Cohen said, 'Well, General Habiger is going to be visiting you within the next few weeks. Could you perhaps show him how you go about doing that?' General Sergeyev said yes."

## **Questions Asked and Answered**

"I was ... not expecting ... to actually go into a nuclear weapons storage site. On Friday, two weeks ago [Oct. 24], that's exactly what I did. I went to a nuclear weapons storage

site at ... [an] SS-24 missile base at Kostroma, which is a little over 300 kilometers northeast of Moscow. I was taken into the facility. I was shown the security.

"I went into a nuclear weapons storage bunker and saw an operational nuclear weapon. Actually, there were eight of them on an SS-24 missile. I went in to talk to the security people who were guarding the facility, as a matter of fact, and every one of my questions was answered."

### Three-Person Policy

"I was shown a lot of things that I was impressed with.

"For example, in the United States we have a two-person policy involving nuclear weapons. In other words, you have to have a minimum of two people in order to get close to a nuclear weapon. In Russia it's the three-person policy. ... I'm talking about access to a nuclear weapon itself. The launching of a nuclear weapon is very complicated. It is very—the controls are very robust. There are a lot of safeguards built in. Trust me. ...

"At our [weapon storage] sites, you need two people to go do that, who understand what they are doing, whatever tasks they are going to do. In Russia you need three people. And, oh, by the way, in Russia, when you open up that igloo, you have to have a written order signed by the full colonel, who is the special technical unit commander, whereas we don't have those specific kinds of requirements."

### Other Safeguards

"In the United States, we have a thing called a personnel reliability program where we monitor our people medically for any kind of abnormal behavior that would make them unstable around nuclear weapons. The Russians do not have a program that's exactly like ours, but they have a similar program. Before missile crew members or before security personnel go on their alert tours, which are three- or four-day cycles, they are personally interviewed by a medical doctor and a psychologist.

"I actually saw a demonstration of the capability of their security forces. It was not something that was planned; it was something that I asked for at the spur of the moment, and I

was very impressed with these nine young men, the security force that was tasked with guarding this particular facility. The detachment of nine individuals was commanded by a senior lieutenant, all very professional. They knew what they were doing."

### Representative or Unique?

"Now, the caveat I would give you is that I saw one facility. Was it representative? I'd like to think so. They made it very clear that the facility I was in at Kostroma was very representative of the missile bases in Russia.

"As a result of what I saw, I had further discussions with Gen. Col. [Vladimir N.] Yakovlev, who is the commander in chief of the Strategic Rocket Forces, who replaced General Sergeyev, and we agreed to exchange security specialists from our respective commands. ... We also agreed that we would establish a shadow program where we would take the equivalent of a wing commander and squadron commander, a flight commander, and a missile crew member from one of his missile bases to come to the United States and shadow their respective counterparts for a one-week period—meetings, fitness center, dining facilities, everything—and then he would reciprocate with a team from my command."

### Low Tech

"On the down side, we tend to use high-technology devices much more than the Russians do. For example, we use television sensors, low-light television cameras, to monitor certain areas. The Russians have not made that capital investment. Manpower is relatively inexpensive for them, and they use more eyeballs, if you will. I specifically asked if they use things like night-vision goggles, and I was assured that they do.

"During the course of this little exercise, when I asked what would you do if this were to happen, the two-star Russian Strategic Rocket Forces general who was accompanying me directed them to show me exactly what they would do, and they went to the extremes of not only getting their weapons out but issuing the ammunition and then pulling out an armored personnel carrier that was in a garage right behind the fa-

## Nuclear Warheads

Type	Cold War 1990	Current 1997	Change 1990-97
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### United States

ICBM	2,450	2,400	-50
SLBM	5,760	3,776	-1,984
Bomber	2,353	1,781	-572
<b>Total</b>	<b>10,563</b>	<b>7,957</b>	<b>-2,606</b>

### USSR/Russia/CIS

ICBM	6,612	4,544	-2,068
SLBM	2,804	2,480	-324
Bomber	855	922	67
<b>Total</b>	<b>10,271</b>	<b>7,946</b>	<b>-2,325</b>

cility where the troops were bedded down—an experience that I was impressed with.

"We have a lot more work to do, a lot more transparency, a lot more details, but from my observations, I was impressed and have confidence that the Russians, from what I saw at that one base, have a program which is ensuring the safe, secure processes involved regarding nuclear weapons."

### Fail-Safe

"I was also exposed to their command centers, from the national level command center down to the command center in a road-mobile missile, and also a rail-mobile missile, and at all levels [I] saw the individuals on duty, talked to them, asked them questions. Every question I asked was answered in depth, and the thing that struck me about going into their command centers, command-and-control centers, is that they are very much geared to a fail-safe mode. And what I mean by that is that any one of the command centers, from the national level down to the unit level, can inhibit the launch of an intercontinental ballistic missile."

**Safe as in the US?**

"I saw one site, and I was assured by General Yakovlev and General Kirillov, who is the commander of the 27th Rocket Army [and] who accompanied me on this leg of the trip, that what I saw was representative. And if what I saw was representative, yes, I have confidence in the safety and security of their nuclear weapons stockpile.

"They are deadly serious about this. This is a very valuable resource. It is something that in the wrong hands would be a very dangerous resource, and they go to great lengths. The security personnel, I was told, and just from what I saw, I would tend to believe, that they are elite. They call themselves the 10-Alpha Force. They are regularly tested by an anti-terrorist group that comes around to these kinds of facilities and attempts penetration."

**Subs and Bombers**

"[There was no discussion of submarine-launched or bomber-launched nuclear weapons], and that's one of the things we need to do. When I gave my debrief to the Secretary, [I said] we need to now start looking at the long-range aviation, the bomber folks, and the submarine folks to make sure that these kinds of measures are in place at the other nuclear-weapon legs of their triad."

**"Comforting" Answer?**

"I did ask them ... about the accountability of the weapons. In other words, how did they know they had all of their weapons where they are supposed to?

"I got back a very comforting response. At the wing level, there is a section called the 6th Directorate, and it's a shop of three or four officers, and their sole function is to make sure they know where every nuclear weapon in that wing is. At the Rocket Army level there is a similar kind of organization.

"At the Headquarters, Strategic Rocket Forces, there is a 6th Directorate, and then, for whatever reason, the Ministry of Defense is called the 12th Directorate, and their sole function is this accountability issue.

"General Yakovlev was very open to me. As a matter of fact, we spent almost three hours just talking one-on-one with a Russian interpreter.

General Yakovlev showed me, for example, his computer screen, which is tied to a local area network, and he sees the equivalent of up to top-secret information. Now, I do not speak Russian, do not read Russian, and when he showed me what was on his computer screen, it was in Russian, but he told me what was on there, and as a very senior officer in the Russian military, I believed him. He showed me, for example, the page that listed the whereabouts of every nuclear weapon in his command. ...

"Whenever the Russian Rocket Forces move a weapon, whether it's 30 yards from a bunker to a facility to do maintenance or from a missile field back to the home base, which may be 30 or 40 miles, a minimum of a two-star on the Rocket Forces staff approves that."

**Organized Crime Theft?**

"From what I saw, if what I saw is representative of the Strategic Rocket Forces, organized crime getting their hands on a weapon out of their facilities would be extremely remote. I cannot speak to other facilities, but

**Strategic Nuclear Weapons**

Type	Cold War 1990	Current 1997	Change 1990-97
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<b>United States</b>			
ICBM	1,000	720	-280
SLBM	672	464	-208
Bomber	574	321	-253
<b>Total</b>	<b>2,246</b>	<b>1,505</b>	<b>-741</b>

<b>USSR/Russia/CIS</b>			
ICBM	1,398	872	-526
SLBM	940	648	-292
Bomber	162	124	-38
<b>Total</b>	<b>2,500</b>	<b>1,644</b>	<b>-856</b>

it gets back to the point of under START III we really need to start getting some transparency into their tactical nuclear weapons stockpile."

**Russian Modernization**

"They are building a new follow-on to their [SS-25] mobile missile. [It is designated SS-27]. It will be either road-mobile or they can put it in silos. It will be [a] START II-compliant, single warhead.

"The initial operational capability of that missile has been slipped significantly over the past two years, and I think it's just a matter of coming up with the funds to get that system on the streets. Because of some very, very wise investments, I do not see the United States even thinking about having to modernize any of our forces until the year 2020.

"It [the initial operational capability of the SS-27] depends on whom you talk to. I'd say the middle of [1998] some time. ... They just test fired one here not too long ago, a successful test. They are proceeding with the construction of a silo to put it in. They have done some work on the Transporter Erector Launcher, the TEL. The program is going along well.

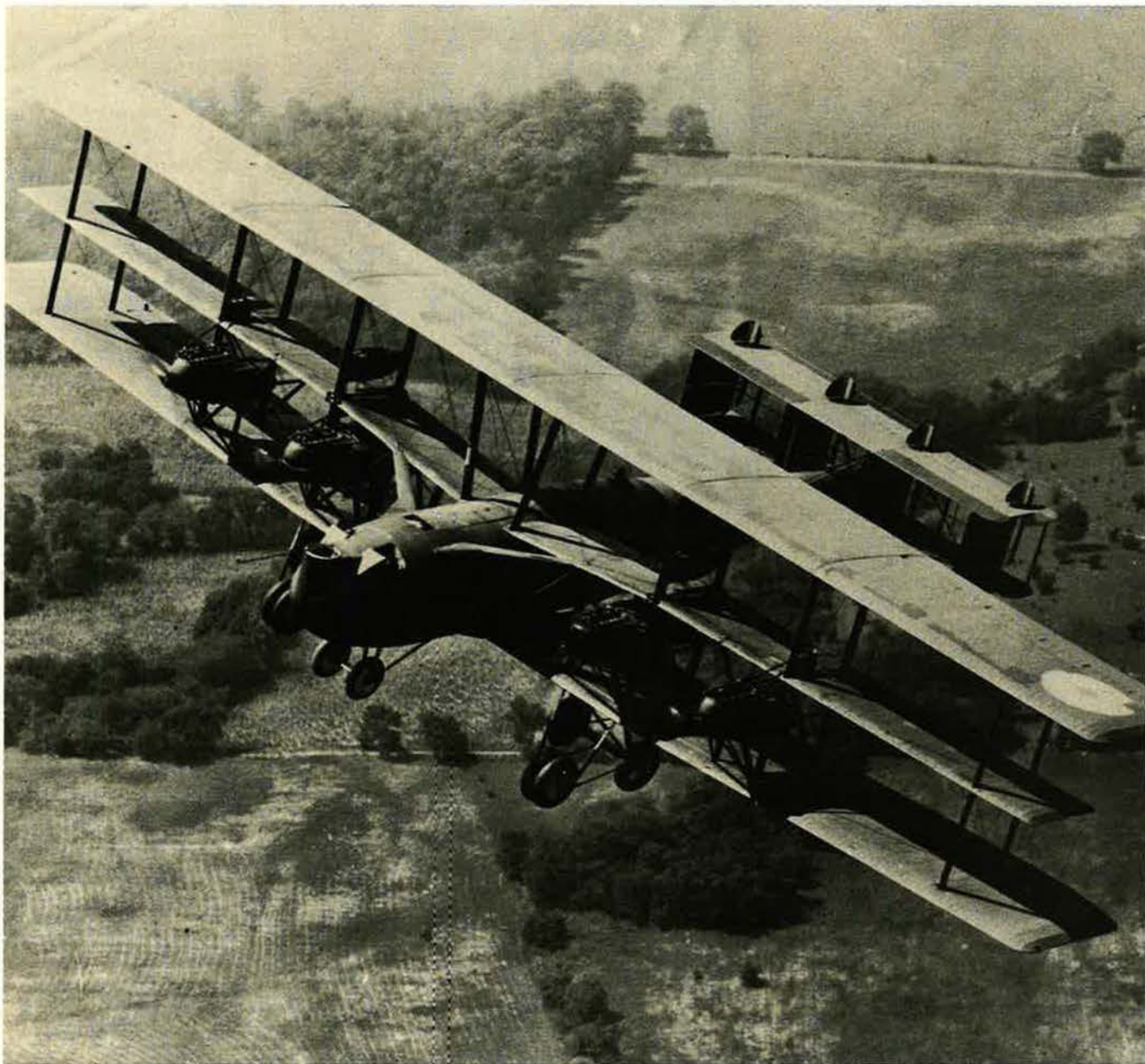
"They just laid the keel for a new Borey-class, ballistic-missile submarine here last fall [1996], and we don't expect to see that operational until the year 2005 or so."

**Out of Life**

"They are doing a research and development program on a new, air-launched cruise missile for their bombers. You know, we've seen on occasions, for example, the Blackjack. Apparently they have got some that are still undergoing construction and should be rolling out of a plant here before too much longer.

"We made some very wise investments back in the 1980s. ... The Russians weren't modernizing their forces as we were during that time frame, and what's happening is that the service life of their systems is coming to an end, and that's one of the reasons why, in my view, the Russians very much want to get down to START III levels very quickly, because the SS-18, for example, which is their heavy ICBM with 10 warheads, the thing is just flat, you know, running out of service life." ■

## The First Big Bomber



*It was supposed to be the greatest bomber of its time, yet the XNBL-1, or "Magnificent Leviathan," brainchild of Brig. Gen. "Billy" Mitchell, was obsolete before its first flight in 1923. Mitchell asked aircraft engineer Walter Barling to design a bomber that could carry bombs large enough to sink a battleship. When Congress finally learned of the Barling bomber, about eight months after*

*Mitchell demonstrated bomber capability using existing aircraft to sink the German battleship Ostfriesland and three smaller warships in 1921, its reaction was negative. Lawmakers objected to its enormous size, which early critics claimed limited it to just two airfields, as well as staggering cost overruns. Built with surplus World War I 400-hp Liberty engines, it was also*

*grossly underpowered, but Congress refused to fund newer engines. Despite innovations in construction and throttle controls, plus establishment of a weight/altitude record, the single prototype was dismantled in 1927 and finally burned.*

# AFA / AEF National Report

By Frances McKenney, Assistant Managing Editor

## AFA Helps Christen Ship

North Carolina State President Bill M. Dyer represented the Air Force Association in a November ceremony at Southport, N.C., to rechristen a US Navy vessel after Air Force Medal of Honor recipient Capt. Steven L. Bennett.

Even before the champagne bottle smashed against the ship's hull, however, AFA had ensured some special highlights for the ceremony. In October, the Navy contacted AFA, asking for help in preparing the original Medal of Honor for a re-presentation to Bennett's widow, Linda Bennett Wells. The association responded by providing a new shadow box for the medal. Wells also wanted to give a large, painted portrait of Bennett to the ship, and AFA arranged for it to be cleaned, matted, and framed. At the ceremony, the portrait was mounted in front of the speaker's podium.

Bennett earned the Medal of Honor in Quang Tri, Vietnam, in 1972, as a forward air controller with the 20th Tactical Air Support Squadron. Pilot of an OV-10 severely damaged by a SAM, he ditched the aircraft in the Gulf of Tonkin—knowing that the pilot of an OV-10 had never survived such a maneuver—to save the life of his backseater, Marine Capt. Mike Brown. Because of damage to the cockpit when they hit the water, Bennett was unable to escape and died. He had been in combat for three months.

Brown, now a retired major, spoke at the dedication ceremony, along with Lt. Gen. William P. Hallin, deputy chief of staff for installations and logistics, Vice Adm. James Perkins III, Military Sealift Command commander, and Jan Scruggs, president of the Vietnam Veterans Memorial Fund.

Dyer then re-presented the Medal of Honor to Wells. (She had originally accepted it from President Gerald R. Ford in 1974.)

Next, Bennett's daughter, Angela, who had led the effort to rename the



At West Point, Miss., in December AFA National President Doyle Larson convened a leadership conference with AFA's national vice presidents. Attending the meeting were (left row, top-bottom) Jack Steed (Southeast Region) and Dolores Vallone (Northeast Region). Second row (t-b): Anton Brees (Great Lakes Region), Arthur Trost (Far West Region), I. Fred Rosenfelder (Northwest Region), and Frank Swords (Special Assistant Europe). Third row (t-b): Chairman of the Board Gene Smith, Mark Worrick (Rocky Mountain Region), George Masters (North Central Region), Charles Thomas (Southwest Region), and Larson. Fourth row (t-b): Ivan McKinney (South Central Region), Executive Director John Shaud, and John Politi (Midwest Region). Fifth row: R. Donald Anderson (Central East Region). Unable to attend were Ronald Palmer (New England Region) and Ken Manako (Special Assistant Pacific).

ship, christened *Capt. Steven L. Bennett*. As the champagne flowed down the hull, Dyer said, four F-15s flew overhead. "Blew them away," he said proudly.

The ship, formerly *TNT Express*, is chartered by the Navy's Military Sealift Command and is used to preposition ammunition and supplies. Dyer reported that the day after the dedication ceremony, the ship left port, where, according to an MSC press release, it headed for the Mediterranean Sea. MSC operates 30 similar prepositioning ships.

### LA Ball Salutes 50th Anniversary

In November AFA's Los Angeles Ball, a powerful fund-raiser for education for over a quarter of a century, honored USAF's 50th anniversary. It also recognized the longtime contri-

butions of the movie and entertainment industries in support of the armed forces.

The ball, now in its 26th year, has raised more than \$2 million for the Aerospace Education Foundation and other educational endeavors.

The general chairman of the ball was Kent Kresa, chairman, president, and CEO, Northrop Grumman. The military cosponsors were Lt. Gen. Roger G. DeKok, commander of the Space and Missile Systems Center, and Lt. Gen. Charles T. Robertson Jr., commander of 15th Air Force. Presentation of the colors was by the color guard from Los Angeles AFB, Calif.

In addition to a number of leaders from the entertainment and aerospace industries and AFA/AEF, attendees included: Rep. Jane Harman (D-Calif.); Undersecretary of the Air Force





(and Acting Secretary) F. Whitten Peters; USAF Chief of Staff Gen. Michael E. Ryan; Gen. Howell M. Estes III, the head of NORAD, US Space Command, and Air Force Space Command; and Gen. Lloyd W. "Fig" Newton, commander of Air Education and Training Command.

The first award presented was a new AFA national award, sponsored by the **Gen. B.A. Schriever Los Angeles Chapter**. The Gen. Thomas D. White Award, named for the fourth Air Force Chief of Staff, recognizes those who lead in the conquest of space. The award was originally established in 1961 by the National Geographic Society, and the original trophy is on permanent display in the National Air and Space Museum in Washington. The presentation is made annually to that person, civilian or military, who made the most outstanding contribution to the nation's progress in aerospace that year.

This year's recipient was retired Lt. Gen. Patrick P. Caruana, former

vice commander of Air Force Space Command. His citation noted his superior leadership in efforts to "operationalize and normalize space forces within DoD and institutionalize numerous cooperative initiatives among civil and commercial space interests." The award was presented jointly by AFA National President Doyle E. Larson, Schriever Chapter President E. Robert Skloss, and Donald L. Cromer, a previous Thomas D. White Award winner, who now is chairman of the board of the Schriever Chapter.

Next, an AFA Special Award was presented to the Space and Missile Systems Center for exceptional leadership and skill in supplying satellites and ground systems for America's military and national space programs. Innovative programs developed by the talented men and women of the center were cited as key in giving the nation "essential capabilities, at reduced costs and on time." SMC head DeKok accepted the award, which was presented by Larson and Harman,

who was the recipient of the first award of this type—superior service by a government agency or individual—two years ago at the ball.

After a dance intermission, emphasis switched to recognition of the some 70 years that Hollywood has contributed time, talent, and attention to the support of the armed forces. As the ball master of ceremonies, Emmy Award-winning news anchor, producer, and television host—and Air Force Reservist—Tim White recalled it really began with the first presentation of the Academy Award for best picture which went to "Wings"—a stirring and silent 1927 tribute to those who fly. Since then, there has been a deep and complex continuing relationship between Hollywood and the military, especially the air service. In the 1930s films such as "Dawn Patrol," "West Point of the Air," and "Men With Wings" brought audiences to the edge of their seats.

In the 1940s, White observed, the world was at war, and so were the movies. Some of Hollywood's biggest stars marched off in uniform—many, such as Clark Gable, Ronald Reagan, and Jimmy Stewart, to the Air Corps. Others also brought stories of Air Force heroes to the screen—most notably, Spencer Tracy portraying Jimmy Doolittle in "Thirty Seconds Over Tokyo" or, in a film that many in the audience had probably seen as an Air Force training film, Gregory Peck facing the responsibilities of military leadership in "Twelve O'Clock High."

At this point the LA Ball audience saw a video, introduced by the "Unofficial Mayor of Hollywood," Johnny Grant, about a Hollywood star and Air Corps volunteer who also was one of the 12 founding members of AFA—the late Brig. Gen. Jimmy Stewart, USAF (Ret.). This was followed by the introduction by actor—and AFA Life Member—Richard Anderson of a video that highlighted the significant contributions of the Walt Disney Co. to the training film libraries of World War II.

Roy E. Disney, vice chairman of the Walt Disney Co., then accepted an

Photo © Carl Cox



**AEF Chairman of the Board Thomas McKee (second from right) met (l-r) Dorla Kemper, president general, National Society Daughters of the American Revolution; Rep. Marcy Kaptur (D-Ohio); former Sen. Bob Dole; and George Searle, national president, American Merchant Marine Veterans, at a luncheon in Washington, where Dole updated veterans organizations on the World War II Memorial scheduled to be built on The Mall.**



**No heartburn, here:** The Northern Utah Chapter's third annual Chili Cook-off at Hill AFB, Utah, raised \$2,400 for Hill's Family Support Center. The donation helps enlisted, single parents, and a parent whose spouse is deployed pay for babysitting. National Director Dan Hendrickson said he hopes this idea will be adopted by other chapters as a way to raise awareness of AFA.

AFA Distinguished Service Award, presented by Larson. The citation read: "For a succession of projects over the years that have dramatically highlighted the importance of aviation and our United States Air Force to the world. AFA salutes the Walt Disney Co. for its extraordinary contributions in promoting an inspiring depiction of the Air Force in motion pictures viewed by millions around the world. We especially recognize its distinguished record, from World War II onward, in creating cartoon drawings of unit emblems and patches, aircraft nose art, and animated training and motivational films. This patriotic effort is truly without peer."

Ball chairman Kresa concluded the evening by presenting a check for \$25,000 to AEF Chairman of the Board Thomas J. McKee and AEF President Walter E. Scott.

This year's event will take place in November.

*James A. McDonnell Jr.*

### Sign 'em Up

On an extended visit to Puerto Rico, Central Florida Chapter's Richard A. Ortega, AFA Florida's vice president for aerospace education, found time to promote AFA and AEF in meetings with the local Civil Air Patrol Wing Commander Col. Edward Marshall, the island's Assistant Secretary of Education Isidra Albino, AFROTC unit leaders, and students at local high schools.

His efforts resulted in 11 new mem-

bers signing up for the Central Florida and the **John W. DeMilly Jr. (Fla.)** chapters. They include Capt. Elizabeth Almeida, commandant of cadets at Det. 755A, University of Puerto Rico, Mayaguez, and 10 cadets from her unit.

Ortega first traveled to Puerto Rico in September and in meetings on that trip emphasized AEF's direct grants, Visions of Exploration program, and educator awards, such as the Christa McAuliffe Memorial Award and the regional and local teachers of the year awards. He also steered high school students toward stateside universities having AFROTC units and helped them apply for US Air Force Academy appointments and AFROTC scholarships.

In addition, he helped Almeida secure a \$250 AEF grant that enabled five of her cadets to attend an aerospace education function at Eglin AFB, Fla.

In November, he returned to Puerto Rico and was invited to speak to the Det. 755A cadets. He said his talk stressed AFA's history and mission and the contributions it makes to the active and reserve Air Force. "My extemporaneous speech must have been convincing and motivational," he wrote, because the 10 cadets and their instructor signed up for AFA on the spot.

### Breakfast With the Partners

With support from the 910th Airlift Wing (AFRC) at Youngstown-War-

ren Regional Airport/ARS, Ohio, the **Steel Valley (Ohio) Chapter** hosted a breakfast in October for its Community Partners.

More than 30 guests joined wing commander Col. Peter K. Sullivan and his staff at the event, held in the Eagle's Nest Club at the AFRC facility. At the breakfast, Sullivan, who is also a chapter member, spoke to the visitors about the wing's mission.

Afterward, he took the Community Partners on a tour of the base. They stopped at the fire department—which also provides crash and rescue service for the regional airport—toured a C-130, and listened to a presentation at the base's aerial spray maintenance facility.

Jack L. Ventling, the state and chapter vice president for membership, was the primary organizer of the Community Partners' breakfast and expressed great appreciation for the support received from the business sector. "These people really help get the word out about this base and the Air Force mission," he said.

### Jefferson Cup

In Charlottesville, Va., the **William A. Jones III Chapter** held a reception and dinner in November, marking the chapter's 10th anniversary, with Lois Jones as guest of honor.

The chapter is named for her late husband, an Air Force colonel who received the Medal of Honor for actions Sept. 1, 1968, near Dong Hoi, North Vietnam. At the time an A-1H

pilot with the 602d Special Operations Squadron, Nakon Phanom RTAB, Thailand, Jones was severely burned when his Skyraider was hit and burst into flames as he attempted to rescue a downed US pilot. Despite his injuries, he flew the aircraft back to base and passed on information that allowed the downed pilot to be rescued later that day.

As part of the anniversary commemoration, Lois Jones was presented with a Jefferson Cup—named after Thomas Jefferson—a memento that Chapter President Allan M. Van Wickler said is a Charlottesville tradition.

Among the more than 50 guests were Charles G. Durazo, past national vice president (Central East Region); John E. Craig II, former Virginia state president; and Jones' daughter, Anne Gilfillan and her husband, Rusty, of Midlothian, Va.

A barbershop quartet of retired University of Virginia professors, led by chapter member Dr. White M. "Ken" Wallenborn, performed for the audience. UVA AFROTC cadets presented the colors and participated in a Code of Conduct-POW/MIA ceremony, conducted by Col. Kermit B. Boschert, the detachment commander and a chapter member.

Earlier in the month, as a chapter service project, charter member William L. Anderson addressed a group of almost 300 Air Force, Army, and Navy/Marine ROTC cadets at UVA. A retired USAF colonel, Anderson's speech was part of the university's traditional, weekend-long World War II commemoration.



*The Breakfast Club: To thank its Community Partners, the Steel Valley Chapter arranged a breakfast for them at the 910th Airlift Wing (AFRC) at Youngstown-Warren Regional Airport/ARS, Ohio.*

According to Van Wickler, Anderson delivered a "stirring challenge" to the cadets. "A truly professional force will always be the mainstay of combat effectiveness," Anderson told the students. "It does not come easy, and therein lies your challenge."

Along with Van Wickler, Robert K. McCutchen, past chapter president, and 36 Arnold Air Society cadets were among the audience. Led by chapter members Boschert and Maj. Gary C. Keller, the UVA cadet cadre includes Paul G. Dambrauskas and Matthew A. Bartlett, members of the chapter's executive committee.

### Honoring "Fig"

Gen. Lloyd W. "Fig" Newton, commander of AETC at Randolph AFB, Texas, received the annual Tennessee Ernie Ford Distinguished Achievement Award at the **Tennessee Ernie Ford (Calif.) Chapter's** black-tie gala in November.

Newton was honored for achievements during a 31-year USAF career that began in 1966, when he was a distinguished graduate of the ROTC program at Tennessee State University in Nashville, Tenn. Gerald S. Chapman, chapter vice president for membership, reported that Newton was also selected for the chapter's award because of his role in 1997 in overseeing USAF's preparations for the Air Force Fifty celebration in Las Vegas.

Beverly Ford, wife of the late Tennessee Ernie Ford, presented Newton with the large trophy before a crowd of more than 200. Some of these special guests, gathered at a Radisson Inn in Sunnyvale, Calif., were Arthur F. Trost, national vice president (Far West Region); Paul A. Maye, California state president; Scott Norwood, a former state president; Mervyn Silberberg, **Golden Gate (Calif.) Chapter** president; John F. Wickman, Tennessee Ernie Ford chapter president; and Kathryn G. Chapman, state vice president for communications.

Famous for his 1955 hit song "16 Tons," Tennessee Ernie Ford enlisted in the Army Air Corps in December 1941 and became a B-29 bombardier on the same crew with Russell E. Dougherty, now an AFA national director. Ford was active in AFA and



*In recognition of his distinguished career, Gen. Lloyd Newton received the 16th Tennessee Ernie Ford Distinguished Aerospace Achievement Award from Beverly Ford and Gerald Chapman (center) of the Tennessee Ernie Ford Chapter.*

entertained at the National Conventions. He died in 1991.

**Callahan Scholarship Winner**

1st Lt. William T. Rondeau Jr., **Big Sky (Mont.) Chapter** president, won the first Jodi Callahan Memorial Graduate Scholarship, formally presented by AEF at the National Convention.

An ICBM deputy crew commander in the 341st Missile Wing, Malmstrom AFB, Mont., Rondeau competed against nine applicants for the \$1,000 scholarship, granted to a USAF active duty AFA member pursuing a master's degree in a nontechnical area. Rondeau is studying aeronautical science, management, and operations through Embry-Riddle Aeronautical University, based at Daytona Beach, Fla.

In an especially strong letter of recommendation, William L. Sparks, past state president for Florida, a **Brig. Gen. James R. McCarthy Chapter** member, and currently Embry-Riddle's assistant to the vice president of institutional advancement, noted that as an undergraduate at Embry-Riddle, Rondeau was active with AFA, the Arnold Air Society, and AFROTC and earned both a bachelor's degree with three minors and a private pilot's license. Rondeau has been an AFA member since 1993.

The award that he was selected for is named after USAF Capt. Jodi L. Callahan, who was an AFA under-40 national director and AEF trustee when she died in November 1996. Her family—National Director James



Photo by Lynn Davis

*Alabama State President Roy Boudreaux presented Montgomery Chapter member SSgt. Yuvonne Fischer with an Eagle Grant in November. Now a Community College of the Air Force administrator, Fischer earned an associate degree in applied science in criminal justice. As a senior airman, Fischer was one of the 1996 Outstanding Airmen.*

E. Callahan, New York State President Bonnie B. Callahan, and Jamie L. Callahan Fabian of the **Thomas W. Anthony (Md.) Chapter**—was on hand for the award presentation.

**Aamodt Scholarship Awarded**

ROTC cadet Eric D. Theriault of Det. 060A at California State University, San Bernardino, received the first Duane "Monk" Aamodt Memorial Scholarship, awarded by the **Bob Hope (Calif.) Chapter**.

A physics major, vice commander of an Arnold Air Society squadron, and a color guard commander, Theriault is also a member of the **Edward A. Stearn (Calif.) Chapter**.

Jerry J. Busch, Bob Hope Chapter president, and Arthur M. Butler, chapter secretary, made the presentation to the cadet.

The \$500 scholarship is one of three that will be awarded by the Bob Hope Chapter each year. It is named for the late Duane A. Aamodt, a former president of the chapter. Capt. Larry Page, chapter member, said Aamodt singlehandedly managed the group's annual golf tournament for years and had received an Ira C. Eaker Fellowship in 1995.

**Wisconsin Winner**

The AFROTC cadets from Det. 925 at the University of Wisconsin, Madison, burst into applause when, in a surprise presentation at one of their weekly roll calls, cadet Nicholas P. Grimm was awarded \$100 by the **Madison (Wis.) Chapter**.

The award is given every semester to an AFROTC cadet at the school and is funded by chapter member Stuart S. Wright, who provides it in the memory of his father, Maj. Gen. Stuart Wright.

Joseph M. Lustgraaf, chapter president, and Raymond J. Thurber, treasurer, made the presentation.

A member of the AFROTC color guard, Grimm had organized the intramural sports program for the Air Force,



*With a color guard in the lead, Civil Air Patrol cadets from the 297th Composite Squadron, Homestead, Fla., promoted the John W. DeMilly Jr. Chapter when they marched in the city's Veterans Day Parade.*

Army, and Navy ROTC units on campus. He also volunteered as a youth coach for his alma mater's basketball team at James Madison Memorial High School in Madison and worked full time to finance his education.

### Marching for AFA

Playing key roles in the Veterans Day Parade at Homestead, Fla., several **John W. DeMilly Jr. (Fla.) Chapter** members helped organize the march and one served as announcer.

A large red Cadillac was the chapter's entry in the parade, which began with a flyby of four F-16s from the 482d Fighter Wing (AFRC) at Homestead ARS. Community Partner Elita Crow, who provided the car, and Cadet Lt. Col. David Cabrera perched on the Caddy's back deck, while chapter member Calvin T. Morton took the wheel. Cabrera earned his place on this "float" as winner, last May, of an AFA Bronze Medal that recognized him as Homestead High School's outstanding AFJROTC cadet.

The chapter's banner was carried in the parade by a color guard of Civil Air Patrol cadets from the 297th Composite Squadron.

Several AFJROTC cadets from Homestead High School served as the parade's color and honor guards, while others marched together as one of the largest group entries. Richard J. O'Neil, a member of the chapter's Aerospace Education Committee, is their senior instructor and supervised their performance.

Organized by the local Military Affairs Committee, the parade benefited in many other ways from the AFA chapter's active involvement: Chapter members Michael E. Richardson, Frank "Ron" Webb, and James S. Atkins helped marshal the parade's participants. Robert J. Jensen, former chapter president, served as announcer on the main reviewing stand. Morton coordinated the chapter's wide-ranging participation in the festivities.

### Hoosier State Vets

Also representing AFA in their town's celebration of Veterans Day was the **Falls Cities (Ind.) Chapter**.

Unlike their shirt-sleeved counterparts in Florida, however, John Dietrich, chapter president; Charles L. Sibert, vice president; James A. Humbert; and Anthony J. Kupferer braved wind and temperatures in the low 40s as they laid a commemorative wreath at the veterans monument in New Albany, Ind. Dietrich reported that he wore his USAF service blouse, Sibert wore the Ike jacket-style uniform, and

## Gen. Edwin W. Rawlings (1904–1997)

Gen. Edwin W. Rawlings, USAF (Ret.), for whom an AFA chapter of more than 1,000 members is named, died at a nursing home in December in Auburn, Wash., at age 93.

A native of Milroy, Minn., Rawlings graduated with an economics degree from Hamline University, St. Paul, Minn., and became a flying cadet in February 1929. Almost 25 years to the day later, he became one of USAF's youngest generals, confirmed for a fourth star at 49. He had also, by then, earned an MBA from Harvard.

Eugene M. Zuckert, Secretary of the Air Force from 1961 to 1965, credits Rawlings with building a "mature, business-like" image for the newly established Air Force. Zuckert said Air Force Secretary Stuart Symington asked him back in 1945 why he had to "send out a search party" whenever he needed Army Air Forces statistics. Zuckert remembered a memo suggesting the creation of a comptroller position and passed the idea on to Symington.

In November 1946 Symington named Rawlings as air comptroller, helping to organize the office. The position "was so successful and struck such a note—Rawlings did such a magnificent job—they adopted the idea of a comptroller for all three services," Zuckert said. "This was a very important step in the development of a postwar Air Force."

In 1951, Rawlings became commander of Air Materiel Command at Wright-Patterson AFB, Ohio, leading USAF's procurement and logistics efforts for seven years.

Air Force Chief of Staff Thomas D. White credited him with "spectacular increases in the effectiveness of the Air Force logistics, ... accomplished through new management methods, concepts, and philosophy, and thus the Air Force has been able to match the tempo of the jet, missile, and space era."

Rawlings was a command pilot and combat and aircraft observer, whose decorations included the Distinguished Service Medal and Distinguished Flying Cross, which he received in 1930 for his role in the rescue of an aircrew downed in the Pacific. He also received the Soldier's Medal in 1954 for rescuing his pilot who was lying underneath a B-17 that caught fire after landing at Wright-Patterson. After retiring from USAF in 1959, he went on to a career with General Mills, rising to become president and board chairman.

Based in St. Paul, AFA's Gen. E.W. Rawlings Chapter was chartered in August 1982. Also in his name, AFA and AEF in 1981 established the Gen. Edwin W. Rawlings Award initially to recognize energy conservation achievements within USAF. Now the award recognizes an outstanding technician or manager in environmental matters.

Humbert and Kupferer opted for even warmer dress—USAF uniform trench coats.

Earlier in the fall, several chapter members crossed the Ohio River into Louisville, Ky., to join the **Gen. Russell E. Dougherty (Ky.) Chapter** and other area AFA chapter members for a dinner meeting, at the invitation of James B. Brown, former chapter president. The combined-chapter meeting viewed a video taped speech by Rep. Anne M. Northup (R-Ky.), covering the importance of a strong national defense and the role that associations such as AFA have in achieving it. Northup's field director, Stacye Bouchillion, handled a brief question and answer session afterward.

The meeting was the third event that the Dougherty Chapter has invited the Falls Cities Chapter to participate in, Dietrich noted.

### Begin at the Beginning

**Mel Harmon (Colo.) Chapter** President David Thomson called it "getting in on the ground floor."

With an eye toward "growing" new members, the chapter has been promoting the establishment of a JROTC unit at a brand-new high school in Pueblo West, Colo.

Thomson and Boyd J. Baldauf, vice president of aerospace education, recently made a presentation on JROTC to the local school board. Thomson said the board members liked the idea that JROTC promotes science and technology and especially liked its focus on space. He said the next step is to prepare an application, which will be only the beginning of a lengthy process to establish a unit.

Thomson added that his chapter—numbering 137 members as of last June—promised the school board that it would provide the JROTC unit with volunteer help, from manpower to money, if the unit becomes a reality.

Pueblo West High School opened in September and will encompass grades nine through 12, with students being phased in grade by grade over the coming years.

**Eagles**

Richard G. Griffis and Executive Vice President Debbie Canjar White, of the **Colorado Springs/Lance Sijan (Colo.) Chapter**, presented Eagle Grant scholarships and AFA Certificates of Excellence to the top Community College of the Air Force graduates at the US Air Force Academy, Colorado Springs, and at Peterson AFB, Colo., in October and November. The recipients were SSGts. Eric Gerritson and Rodney Owen from the Academy and MSgt. Gary Oldham, SSgt. Shannon Manley, and Senior Airmen Jennifer Bowker, Lisa Padres, and Amphone Phommachanh from Peterson.

Eagle Grants are \$250 scholarships sponsored by AEF.

**Last One**

Closing the 1997 state convention season: New Hampshire.

The **Pease Chapter** and **Amoskeag Chapter** met Dec. 7 in Portsmouth, N.H., for the first Granite State convention in several years. ANG Brig. Gen. Anthony L. Liguori, state assistant adjutant general (air), was guest speaker at the luncheon.

Among the 47 attendees were Winston S. Gaskins, Massachusetts state vice president; Eugene M.

D'Andrea, **Metro Rhode Island Chapter** president; local members of military organizations such as the Air Force Sergeants Association and the Pearl Harbor Survivors Association; and cadets from Spaulding High School in Rochester, N.H., and the University of New Hampshire, Durham.

In the business session, the following state officers were elected: Baldwin M. Domingo, president; John J. Brooks Jr., vice president; Herbert E. Follansbee Jr., treasurer; and Purnell "Fred" Ross Jr., secretary. Chapter officers were also finalized at this time, with Albert J. Sambold to serve as Pease Chapter president; Domingo as vice president; and Follansbee as treasurer. The Amoskeag Chapter president-treasurer is Rick Fawcett, with Edward W. Cliver serving as vice president and Lesley M. Fawcett as secretary.

Along with the luncheon speaker, the convention's program included a color guard performance by the Highlander Squadron—Civil Air Patrol cadets from Berwick, Maine; a POW/MIA remembrance ceremony; and presentation of an AFA plaque and mementos to the outgoing mayor of Portsmouth, Eileen Foley, and the incoming mayor, Evelyn Sirrell.

**Coming Events**

March 6-8, **Louisiana State Convention**, New Orleans; May 15-16, **Tennessee State Convention**, Nashville; June 6-7, **Arizona/Nevada State Convention**, Laughlin, Nev.; June 12-13, **Arkansas State Convention**, Jacksonville, Ark.; July 17-19, **Texas State Convention**, San Angelo, Texas; Aug. 6-9, **California State Convention**, Vandenberg AFB, Calif.; Aug. 14-15, **Oklahoma State Convention**, Oklahoma City; Aug. 22, **Indiana State Convention**, Indianapolis; Sept. 14-16, **AFA National Convention and Aerospace Technology Exposition**, Washington.

**More Chapter News**

Civil Air Patrol Maj. John L. Hosp received AFA's Outstanding CAP Senior Member of the Year Award in August at CAP's national convention. Hosp is now a member of the **Colin P. Kelly (N.Y.) Chapter**. CAP Brig. Gen. Paul M. Bergman, a member of the **Lester W. Johnston (Ind.) Chapter** helped make the presentation. ■

**Unit Reunions**

**2d BW Assn.** April 30-May 3, 1998, at the Hilton Desoto in Savannah, GA. **Contact:** John B. Connor, 8 Pribner Ln., Savannah, GA 31411-1328 (912-598-1414).

**4th Ferrying Gp Assn.** Air Transport Command (WWII). May 14-16, 1998, in Nashville, TN. **Contact:** Robert H. Pitts, 4623 Rosemont Dr., Columbus, GA 31904.

**19th BG Assn.** May 6-9, 1998, at the Innsuites Hotel in Tucson, AZ. **Contact:** Robert E. Ley, 3574 Wellston Ct., Simi Valley, CA 93063-1145 (818-703-7717).

**33d Troop Carrier Sq.** 374th TCG (WWII). April 27-29, 1998, in Las Vegas. **Contact:** Art Merman, 2800 Lotus Hill Dr., Las Vegas, NV 89134 (702-242-0379). Joe Macis, 2508 Via Di Autostrada, Henderson, NV 89014 (702-263-4010).

**351st BG Assn.** Polebrook, UK (WWII). June 3-7, 1998, Park Tucson Hotel and Conference Center in Tucson. **Contact:** Clint Hammond, PO Box 281, Mechanicsburg, PA 17055 (717-766-1489).

**494th BG (H) Assn "Kelley's Kobras."** May 27-31, 1998, at the Little America Hotel and Towers in Salt Lake City. **Contact:** Richard C. Keller, 213 Mallard Dr., Camillus, NY 13031.

**623d Aircraft Control and Warning Sq** (Okinawa). Seeking members to plan a reunion in

**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.**

1998. **Contact:** Ray Walker, 9149 Millertown Pike, Mascot, TN 37806 (423-932-3111).

**765th Radar Sq.** former units, and all former personnel of Charleston AFS, ME. July 18-19, 1998, in Bangor, ME. **Contact:** Woody Breedlove, 211 Maple St., Bangor, ME 04401 (207-947-6426).

**B-47 Stratojet Assn.** May 21-24, 1998, at the Embassy Suites in Omaha, NE. **Contact:** Sigmund Alexander, 12110 Los Cerdos Dr., San Antonio, TX 78233-5953 (210-653-5361 or fax 210-653-1001) (76521.467@CompuServe.com).

**BAD 2 Assn.** Warton, UK (WWII). Aug. 27-30, 1998, in Savannah, GA. **Contact:** Dick McClune, 527 Quarterfield Rd., Newport News, VA 23602 (757-877-3826).

**Casper AAF, WY,** personnel. July 6-8, 1998. **Contact:** Jean Ludwig, Military Affairs Committee, Casper Area Chamber of Commerce, PO Box 399, Casper, WY 82602 (307-234-5311 or fax 307-265-2643).

**Freeman AAF, IN,** personnel. June 5-7, 1998. **Contact:** Ted Jordan or Jane Henley, Freeman Municipal Airport, PO Box 702, Seymour, IN 47274 (812-522-3607). Mayor John S. Burkhart or Martha McIntire, City Hall, 309 N. Chestnut St., Seymour, IN 47274 (812-522-4020).

**Jolly Green Assn.** April 24-25, 1998, at the Ramada Beach Resort in Fort Walton Beach, FL. **Contact:** Jolly Green Association, PO Box 965, O'Fallon, IL 62269-0965.

**Pilot Class 43-K** (Central Flying Training Command). April 13-15, 1998, at The Menger Hotel in San Antonio. **Contact:** Harold A. Jacobs, 17545 Drayton Hall Way, San Diego, CA 92128-2032 (619-485-9422) (Jakes43k@aol.com).

**RAF Station Manston, UK,** including 513th and 514th FIS and 92d FBS members. May 9-15, 1998, New York-Bermuda cruise. **Contact:** Milton J. Torres, 11200 SW 99th Ct., Miami, FL 33176 (305-238-3342).

**RF-101 pilots.** June 4-7, 1998, in Austin, TX. **Contact:** Don Karges, 730 Golf Crest Ln., Lakeway, TX 78734 (512-261-8991). ■

# 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, Gadsden, Huntsville, Mobile, Montgomery): **Roy A. Boudreaux**, P.O. Box 1190, Montgomery, AL 36101-1190 (phone 334-241-2739).

**ALASKA** (Anchorage, Fairbanks): **Carl W. Bradford Jr.**, 8040 Evans Cir., Anchorage, AK 99507-3248 (phone 907-753-7143).

**ARIZONA** (Green Valley, Phoenix, Prescott, Sedona, Sierra Vista, Sun City, Tucson): **Raymond D. Chuvala**, 5039E N. Regency Cir., Tucson, AZ 85711-3000 (phone 520-747-2738).

**ARKANSAS** (Fayetteville, Hot Springs, Little Rock): **John L. Burrow**, 409 E. Lafayette St., Fayetteville, AR 72701 (phone 501-751-0251).

**CALIFORNIA** (Apple Valley, Bakersfield, Edwards AFB, Fairfield, Fresno, Los Angeles, Merced, Monterey, Orange County, Pasadena, Riverside, Sacramento, San Bernardino, San Diego, San Francisco, Sunnyvale, Vandenberg AFB, Yuba City): **Paul A. Maye**, 1225 Craig Dr., Lompoc, CA 93436 (phone 805-733-5102).

**COLORADO** (Colorado Springs, Denver, Fort Collins, Grand Junction, Pueblo): **Howard R. Vasina**, 1670 N. Newport Rd., Ste. 400, Colorado Springs, CO 80916-2700 (phone 719-591-1011).

**CONNECTICUT** (Brookfield, East Hartford, Middletown, Storrs, Stratford, Torrington, Waterbury, Westport, Windsor Locks): **Harry C. Levine**, 14 Ardmore Rd., West Hartford, CT 06119 (phone 860-292-2456).

**DELAWARE** (Dover, New Castle County, Rehoboth Beach): **Stephanie M. Wright**, 5 Essex Dr., Bear, DE 19701-1602 (phone 302-834-1369).

**DISTRICT OF COLUMBIA** (Washington): **Rosemary Pacenta**, 1501 Lee Hwy., Arlington, VA 22209-1198 (phone 703-247-5820).

**FLORIDA** (Avon Park, Broward County, Cape Coral, Daytona Beach, Fort Walton Beach, Gainesville, Homestead, Hurlburt Field, Jacksonville, Leesburg, Miami, New Port Richey, Orlando, Palm Harbor, Panama City, Patrick AFB, Port Charlotte, St. Augustine, Sarasota, Spring Hill, Tallahassee, Tampa, Vero Beach, West Palm Beach, Winter Haven): **Robert E. Patterson**, 95 Country Club Rd., Shalimar, FL 32579-1610 (phone 850-651-4830).

**GEORGIA** (Athens, Columbus, Peachtree City, Rome, St. Simons Island, Savannah, Valdosta, Warner Robins): **Edward I. Wexler**, 8 E. Back St., Savannah, GA 31419-3343 (phone 912-966-8252).

**GUAM** (Agana): **Dion W. Johnson**, P.O. Box 12861, Tamuning, GU 96931 (phone 671-646-0262).

**HAWAII** (Honolulu, Maui): **Richard M. May Jr.**, P.O. Box 6483, Honolulu, HI 96818-0483 (phone 808-422-2922).

**IDAHO** (Boise, Mountain Home, Twin Falls): **Chester A. Walborn**, P.O. Box 729, Mountain Home, ID 83647-1940 (phone 208-587-9757).

**ILLINOIS** (Addison, Belleville, Champaign, Chicago, Moline, Rockford, Springfield-Decatur): **John D. Bailey**, 6339 Cotswold Ln., Cherry Valley, IL 61016-9379 (phone 815-226-6932).

**INDIANA** (Bloomington, Columbus, Evansville, Fort Wayne, Grissom ARB, Indianapolis, Lafayette, Marion, Mentone, New Albany, Terre Haute): **James E. Fultz**, 3915 Baytree Ln., Bloomington, IN 47401-9754 (phone 812-333-8920).

**IOWA** (Des Moines, Marion, Sioux City, Waterloo): **Louis M. Rapier**, 2963 29th Ave., Marion, IA 52302-1367 (phone 319-373-1036).

**KANSAS** (Garden City, Topeka, Wichita): **Jean M. Clifford**, 2070 Millford Ln., Garden City, KS 67846 (phone 316-275-4317).

**KENTUCKY** (Lexington, Louisville, Paducah): **Bradley C. Young**, 636 Grabruck St., Danville, KY 40422-1764 (phone 606-748-4655).

**LOUISIANA** (Alexandria, Baton Rouge, New Orleans, Shreveport): **Michael F. Cammarosano**, 4500 Sherwood Commons Blvd., Apt. 302, Baton Rouge, LA 70816 (phone 504-925-4911).

**MAINE** (Bangor, Caribou, North Berwick): **Gerald Bolduc**, 130 Clark Ave., Bangor, ME 04401-3502 (phone 207-990-7250).

**MARYLAND** (Andrews AFB, Baltimore, College Park, Rockville): **Robert D. Gatewood Jr.**, 5102B Lahm Ct., Andrews AFB, MD 20762-5885 (phone 301-981-9411).

**MASSACHUSETTS** (Bedford, Boston, East Longmeadow, Falmouth, Hanscom AFB, Taunton, Westfield, Worcester): **Francis F. Carmichael Jr.**, 14 Carmichael Way, West Wareham, MA 02576-1486 (phone 508-295-9167).

**MICHIGAN** (Alpena, Battle Creek, East Lansing, Kalamazoo, Marquette, Mount Clemens, Oscoda, Traverse City, Southfield): **James W. Rau**, 466 Marywood Dr., Alpena, MI 49707-1121 (phone 517-354-2175).

**MINNESOTA** (Duluth, Minneapolis-St. Paul): **Coleman Rader Jr.**, 6481 Glacier Ln. N., Maple Grove, MN 55311-4154 (phone 612-943-1519).

**MISSISSIPPI** (Biloxi, Columbus, Jackson): **Billy M. Boyd**, 107 N. Rosebud Ln., Starkville, MS 39759 (phone 601-434-2644).

**MISSOURI** (Richards-Gebaur ARS, St. Louis, Springfield, Whiteman AFB): **Graham Burnley**, 112 Elk Run Dr., Eureka, MO 63025-1211 (phone 314-938-6113).

**MONTANA** (Bozeman, Great Falls): **John M. Wallace**, 1700 W. Koch St., Ste. 10, Bozeman, MT 59715 (phone 406-587-8998).

**NEBRASKA** (Lincoln, Omaha): **Robert M. Williams**, 6014 Country Club Oak Pl., Omaha, NE 68152-2009 (phone 402-572-7655).

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**WEST VIRGINIA** (Charleston): **Samuel Rich**, P.O. Box 444, White Sulphur Springs, WV 24986 (phone 304-536-4131).

**WISCONSIN** (Madison, Milwaukee, General Mitchell IAP/ARS): **Gilbert M. Kwiatkowski**, 8260 W. Sheridan Ave., Milwaukee, WI 53218-3548 (phone 414-463-1849).

**WYOMING** (Cheyenne): **Irene G. Johnigan**, 503 Notre Dame Ct., Cheyenne, WY 82009 (phone 307-773-2137).

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## Bulletin Board

Seeking information on and patches, photos, and history of the **17th TRS, 45th TRS, and the 476th TS**, George AFB, CA, and **405th FW**. **Contact:** Paul A. Subbie, 22316 6th Dr. SE, Bothell, WA 98021-8288.

Seeking photos or movies of the raid on **Helmstedt, Germany**, Feb. 20, 1944. **Contact:** John J. Kennedy, 12 E. Walter St., Summit Hill, PA 18250-1517.

Seeking information on **Roy Moullen, Ira Noisman, and Robert Buckley**, 305th BG, who crashed near Berlin, Feb. 3, 1945. **Contact:** Ed Kueppers Jr., 8th Air Force Historical Society, PO Box 7215, 711 S. Smith Ave., St. Paul, MN 55107 (800-833-1942).

Seeking information on and photos, history, and crew members of **B-52Ds #60660, #60676, and #60694**. **Contact:** Robert Krokkel, PO Box 116, Mound City, SD 57646.

Seeking photos and crew members of B-24s who served with **Paul L. Aikin**, 703d BS, 445th BG, March-August 1944, UK. **Contact:** Robert Payton, 6134 DeSoto Dr., Colorado Springs, CO 80922 (719-596-4786).

Seeking WWII-era leather or cloth **pilot's helmet/headcover**. **Contact:** Nicholas Snow, 2302 Bittersweet Dr., #8, Columbus, MS 39701 (601-329-1398).

Seeking information on pilot or crewman **Theodore ("Teddy" or "Eddy") Hoover**, sta-

tioned in Albany, Australia, 1942-43. **Contact:** Phillip Maywald, 1530 Short Springs Rd., Tullahoma, TN 37388.

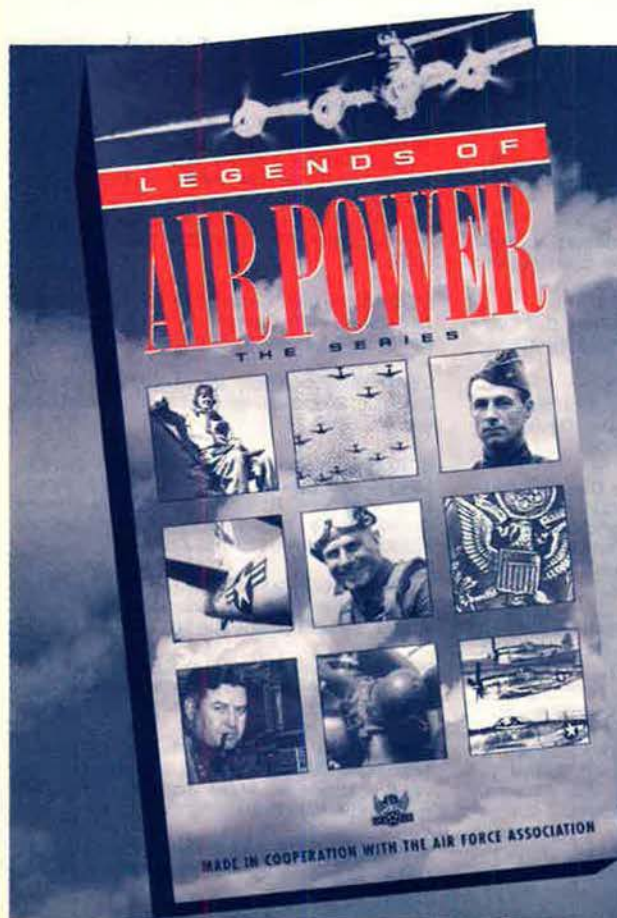
Seeking members of **518th FIS**, Klamath Falls, OR, in the 1950s. **Contact:** Ralph Koslin, 5619 Jackwood St., Houston, TX 77096.

Seeking information on or contact with **Asian Americans and Native Pacific Islanders** who received the DSC in WWII for service in the Army ground or air forces. **Contact:** Commandant, DLIFLC & POM, ATTN: ATZP-MH (Welch), Presidio of Monterey, CA 93944-5006 (408-242-7864) (welchs@pom-emh1.army.mil).

Seeking **Charles Miller and Martha Nell Reed Miller**, who may have been at Nellis AFB, NV, 1948-50, and who lived in Mobile, AL, around 1975. **Contact:** Kenelm C. Winslow, PO Box 927, El Prado, NM 87529-0927 (505-758-9226).

Seeking former military personnel experienced with the **FMA FileSearch** machine used by the Combined Documents Exploitation Center in Vietnam. **Contact:** Michael E. Unsworth, PO Box 6253, East Lansing, MI 48826-6253 (517-432-3976) (unsworth@pilot.msu.edu).

Seeking information and anecdotes from aircrew and ground personnel associated with **MATS C-135s; VIP C-135s/C-137s** with Headquarters Command; **SAC KC-135s**, 1950-70; test **NC/NKC-135s** at Kirkland AFB, NM, and with Rome ADC, NY. **Contact:** Bob Archer, Coverack, Chapel Ln., Brockley, Bury St. Edmunds, Suffolk IP29 4AS, UK.



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Seeking the brother of **Lt. George E. Jones**, MIA April 11, 1945, 493d FS, 48th FG. **Contact:** Roland L. Burns, 243 Plantation Rd., Houston, TX 77024-6217.

Seeking **52d Air Rescue and Flt B, 6th ARS**, members who served at Ernest Harmon AFB, Newfoundland, Canada. **Contact:** Roger A. Coelho, 44 Sinnott St., West Bridgewater, MA 02379 (508-587-9741) (ehafb53@aol.com) (apo864@aol.com).

Seeking information on and unit histories, photos, and ANG patches of **F-4, F-105, and F-86** operations. **Contact:** Robert Anthony Jr., 5158 Nuangola Rd., Mountain Top, PA 18707-9500.

Seeking information on **1st Lt. David A. Redin**, communications officer, 14th FCS, San Diego, CA, 1943-45, originally from Rockford, IL. **Contact:** James B. Bosley, 9336 Horton Dr., La Mesa, CA 91942.

Seeking information on **TSgt. Jesse N. Rice**, jet engine mechanic, stationed in Houston with the 111th FS, 147th FG, 1957-62. Also seeking anyone who knew him at Camp Chaffee, AR, 1950-57. **Contact:** Gary D. Rice, 5026 Valleyview Dr., La Porte, TX 77571.

Seeking alumni of **Wheeler AFB High School or Junior High**, Wheeler AFB, Libya, for reunion in 1998. **Contact:** Wheeler Ex-Students Association, PO Box 703, Friendswood, TX 77546. Joseph Northrop (219-356-5672).

Seeking photos, stories, and patches from personnel stationed at any air force base in **Maine**. **Contact:** Scott Grant, 46 Pine St., Portland, ME 04102.

Seeking information on **MSgt. Eddie M. Harris**, flight engineer in WWII, who was at Carswell AFB, TX, and Chenault AFB, LA, 1950-60. **Contact:** Roy L. Harris, PSC 2, Box 5856, APO AE 09012 (roy.harris@ramstein.af.mil) or Eddie M. Harris Jr., 2635 Greenbriar St., Houston, TX 77098 (713-527-4617) (eharris@rice.edu).

Seeking USAAF members who were stationed at **Pisa, Italy**, during WWII. **Contact:** Paolo Bartoletti, Associazione Arma Aeronautica, Lungarno Galilei 21, 56125 Pisa, Italy (aaba@tin.it).

Seeking photos, memorabilia, and members of the **702d FBS** (1952-57) and the **702d TCS** (1957-65). **Contact:** George Bennett, 702d Air-lift Squadron, Bldg. 2216, McGuire AFB, NJ 08641 (201-393-6700 ext. 252).

Seeking **Robert Bogue**, 4144th AFBU, Squadron A, Muroc AFB, CA, 1947-48. **Contact:** Donald K. Rizer, 640 Geron Dr., Springfield, OH 45505-2808.

Seeking crew members of B-17 **Baby Butch**, 510th BS, 351st BG, Polebrook, UK, 1944. **Contact:** Edward J. Hennegan, 1198 Brookridge Trace, Fort Walton Beach, FL 32547-1294.

Seeking information on and photos and serial numbers of USAF aircraft given to **Saudi Arabia** under Military Assistance Programs, 1950-60. **Contact:** Alastair J.L. Robertson, 2 Barnford Hall, Stockport Rd., Hyde, Cheshire SK14 5EZ, UK.

Seeking information on **L-5 #42-99441** and other L-5s that participated in Operation Sandstone, 1947-48 atom bomb tests at Enewetak atoll, and returned to Hickam AFB, Hawaii. **Contact:** Earl Root, 11615 252d Ave. E., Buckley, WA 98321.

Seeking a **USAF service blouse**, shade AF84, 1950s-issue, tropical wool, size 50, extra long sleeves. Also seeking trousers, same shade, tropical wool, size 42 X 30. Will trade for USAF

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blouse, shade AF84, size 38, extra long sleeves, and trousers, same shade, size 34 X 31. **Contact:** James Haroulakis, 808 W. Mishawaka Rd., Elkhart, IN 46517-1737.

Seeking information on **1st Lt. Conrad J. Arnel**, **1st Lt. Donald E. Bell**, and **A2C John M. Hickey**, MIA in Korea, Jan. 25, 1952. Also seeking contact with anyone who served at Kunsan AB, Korea, January 1952. **Contact:** Norbert S. Gallant, 43 Howard St., Mexico, ME 04257 (207-364-4725).

Seeking contact with USAF pilots who fired rockets at German tanks during battle at **Dompaire, France**, Sept. 14, 1944. **Contact:** Gilles Lyon, 50 rue d'Assas, Paris 75006, France.

For a reunion in May 26-28, 1998, seeking WWII veterans who are 1941-45 alumni of **Manual Training High School**, Brooklyn, NY. **Contact:** Anthony Agoglia, 51 Andover Dr., Deer Park, NY 11729 (516-667-6585) or Ed Carrai (718-945-4086).

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