October 1998/$3

AIR FORCE MAGAZINE

PUBLISHED BY THE AIR FORCE ASSOCIATION

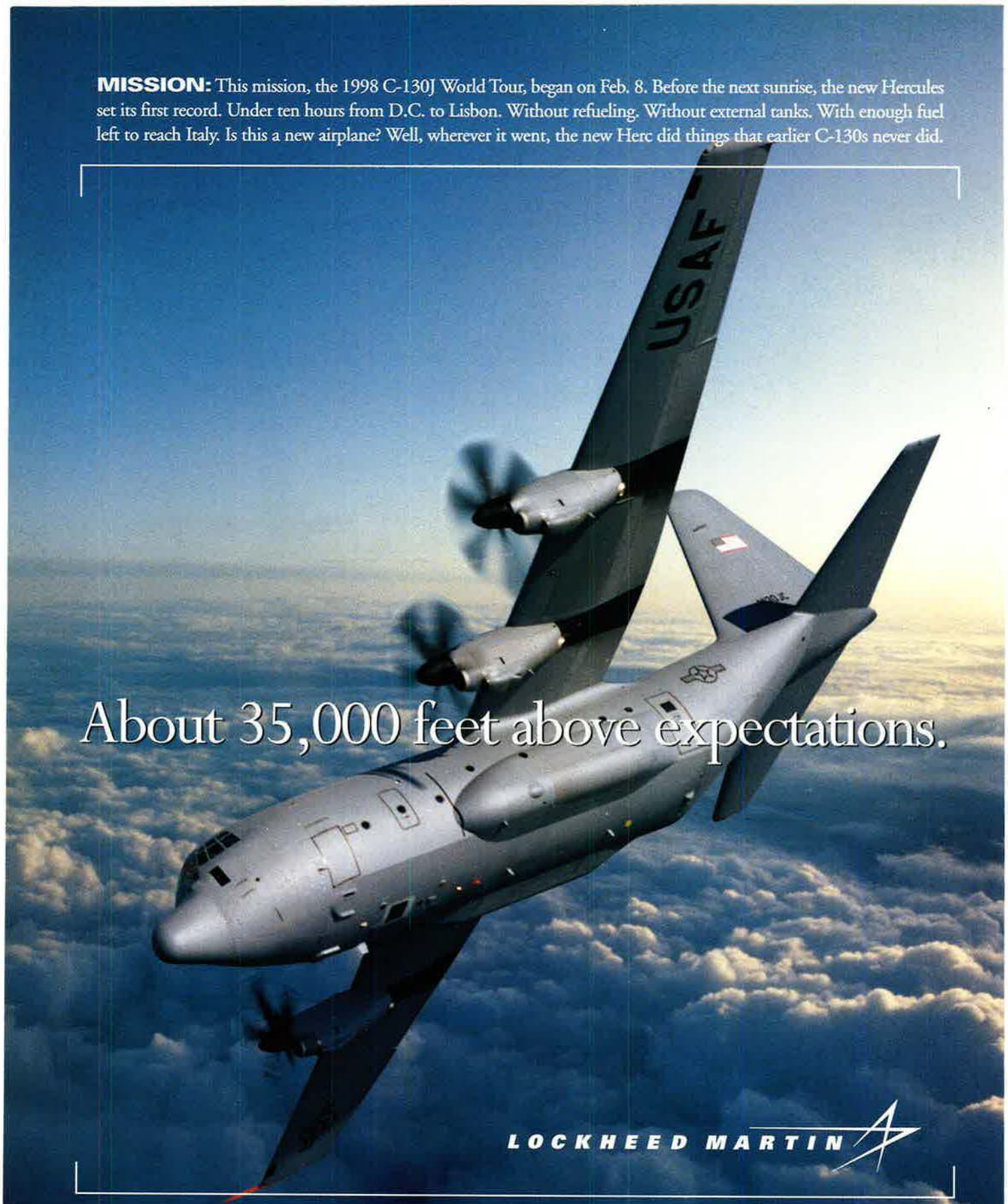
Baltic Guard
Deployment to Lithuania

Missile Threats and Defenses

Scoping Out the New Strike Fighter

The Access Issue

MISSION: This mission, the 1998 C-130J World Tour, began on Feb. 8. Before the next sunrise, the new Hercules set its first record. Under ten hours from D.C. to Lisbon. Without refueling. Without external tanks. With enough fuel left to reach Italy. Is this a new airplane? Well, wherever it went, the new Herc did things that earlier C-130s never did.



About 35,000 feet above expectations.

LOCKHEED MARTIN

SUCCESS: Turkey to Israel, 40 knots faster than ever. In Saudi Arabia, higher (33,000 ft.) sooner (in 22 minutes) than ever. And everywhere, take-offs in half the previous C-130 distance. 380 guest pilots, 380 *very* big smiles. Who else was amazed? We've been touting the "J" as higher, faster, farther and smarter. But to succeed so well so quickly surprised even us.

www.lmasc.com

October 1998, Vol. 81, No. 10

AIR FORCE MAGAZINE

PUBLISHED BY THE AIR FORCE ASSOCIATION

About the cover: High above the Baltic Sea, this C-130 from the Maryland ANG's 135th Airlift Squadron heads for the NATO exercise Baltic Challenge. See "Baltic Guard," p. 26. Staff photo by Guy Aceto.

AIR FORCE Magazine (ISSN 0730-6784) October 1998 (Vol. 81, No. 10) is published monthly by the Air Force Association, 1501 Lee Highway, Arlington, VA 22209-1198. Phone (703) 247-5800. Second-class postage paid at Arlington, Va., and additional mailing offices. **Membership Rate:** $30 per year; $75 for three-year membership. **Life Membership (nonrefundable):** $450 single payment, $475 extended payments. **Subscription Rate**: $30 per year; $25 per year additional for postage to foreign addresses (except Canada and Mexico, which are $9 per year additional). Regular issues $3 each. Special issues (USAF Almanac issue and Anniversary issue) $5 each. **Change of address** requires four weeks' notice. Please include mailing label. **POSTMASTER**: Send changes of address to Air Force Association, 1501 Lee Highway, Arlington, VA 22209-1198. Publisher assumes no responsibility for unsolicited material. Trademark registered by Air Force Association.

Masters of Airborne Video Technology

IT'S NOT A COINCIDENCE THAT WE FLY ON 75% OF THE WORLD'S FIGHTER AIRCRAFT OR THAT THE RELIABILITY OF OUR AIRBORNE VIDEO TAPE recorder systems dramatically exceeds the nearest competitor. Or that we deliver the lowest life-cycle costs in the industry. TEAC engineering developed the technology specifically for the harsh cockpit environment. We didn't convert a living room VCR or a consumer video camcorder. TEAC engineers specifically developed our Hi-8mm technology for the harsh operational environment of fighter aircraft. And since we own our own technology, we guarantee production, configuration control, spares and logistics support for the life of your program. In airborne video, if it's worth a mission, it's worth a TEAC.

TEAC®
AIRBORNE PRODUCTS DIVISION

TEAC Airborne Products Division 7733 Telegraph Road , Montebello, CA 90640 (213) 727-4866, Fax (213) 727-7621 Web site: www.teac.com E-Mail: airborne@teac.com

Editorial

By John T. Correll, Editor in Chief

Degraded Benefit

TWENTY years ago, the military retirement system was the No. 1 benefit that kept people in service for a full career. Members could retire after 20 years of active duty at half of their base pay, or at three-quarters of base pay after 30 years.

It was a good benefit, unquestionably. It sort of evened things up for the family separations, the hazardous duty, the frequent moves, the tours in undesirable locations, and the other "exigencies of the service." In trying times, military people reminded themselves that "it all counts for 20."

Outsiders often perceived the benefit as being too good, and there were periodic attempts to whittle it down. In a notable example, Congress in 1958 ended the recomputation of retired pay every time the active duty force got a raise and then, in 1963, linked increases in retired pay to the Consumer Price Index instead. That trick backfired when double-digit inflation sent the CPI soaring in the 1970s.

Congress did not change the basic formula for the retirement system until Sept. 8, 1980, though. For those entering service after that date, retirement pay would be computed on an average of their highest 36 months of base pay rather than on final base pay. That hurt, but the killer was the next step.

The stage was set in 1984, when Congress switched the system from a "pay as you go" basis to accrual accounting, under which the services had to fund the full cost of future retirement pay the same year that future retirees earned the benefit with their service.

Among those thinking the military retirement system was too generous was Rep. Les Aspin (D–Wis.), who became chairman of the House Armed Services Committee in 1985. The shortfall that year in the military retirement trust fund was $2.9 billion, which gave Aspin the leverage to override the objections of the Joint Chiefs of Staff and impose cost-saving "reform" in 1986.

Under the "Redux" plan—the Military Retirement Reform Act—people entering service on or after Aug. 1, 1986, and serving less than 30 years would have their retired pay computed on the basis of 40 percent (rather than half) of their High-3 average. Furthermore, cost of living adjustments would not keep pace with inflation. That made three retirement systems, and the differences were huge.

The military retirement system is no longer the incentive it used to be for people to stay in service.

According to the Fleet Reserve Association, initial retired pay in 1998 dollars for an E-7 (a master sergeant in the Air Force) with 20 years of service in 2006 would be $14,366 a year under the old system, $13,486 under High-3, and $10,813 under Redux.

That initial $3,553 gap between the old system and Redux then widens because MRRA takes away one percentage point from the annual cost of living adjustment until the retiree reaches age 62, when a one-time catch-up with inflation is granted. *Army Times* estimates the difference for an E-7 in expected lifetime retired pay between the two systems to be about $130,000 in constant dollars.

Now, with the first of those affected by the changes coming up on 20-year retirement in 2000, a consensus is beginning to form that it was a mistake to depart from the old system. Retention of mid-career veterans is a problem for the armed forces. That is precisely the group once held in service most effectively by the retirement system.

The retirement system is no longer the retention incentive it was. Today, less than half the Air Force officers and less than a third of the enlisted force rate the cut-down program as a "very important" factor in their career decision. Only 12 percent of the enlisted force regard the retirement system as "fair and equitable."

There is some recognition of the problem in Congress. Sen. Trent Lott (R–Miss.), the Senate majority leader, supports a return to the system in which military members can retire at 20 years with 50 percent of their base pay.

"It is my intention to work with the leaders here in Congress and the Secretary of Defense to put us on a track to fix the retirement system," Sen. Ted Stevens (R–Alaska), chairman of the Senate Appropriations Committee, said in July. "There is no higher defense funding priority, for it has led to a rise of decisions by men and women in the services not to continue because of their feeling about the unfairness of retirement policies."

This year's defense authorization bill from the House of Representatives said the retirement system was "seriously degraded" as a retention incentive and directed the Secretary of Defense to examine the harm done by the 1980 and 1986 changes and turn in his findings and recommendations by June 30, 1999.

There is formidable opposition to repealing Redux and High-3. In the past four years alone, there have been 17 proposals to cut the military retirement system further and divert the savings to other uses.

Restoration of the retirement program to pre-1980 form will cost billions. However, that expense is also a measure of how much military members have lost, which explains why the retirement system has lost so much of its retention value.

Les Aspin and others were wrong in the assumption that the retirement system was too "generous" and that a bargain-basement plan would retain experienced people just as well. It is time to correct the mistake. ■

Letters

Space Destiny

John T. Correll's "Destiny in Space" *[August, p. 2]* addresses a real concern for our future. We must defend our interests in space. Using space for ballistic missile defense is our best option for both national and theater missile defense. Space-based ballistic missile defenses will have global coverage and a boost phase defense capability. Ground-based missile defenses lack a boost phase defense capability.

Countries such as Russia, Iran, Iraq, and North Korea have decided their future lies in building extensive underground complexes for nuclear weapons, ballistic missiles, and command posts. Our future lies above the Earth.

Defending our interests in space will motivate us to open up space with low-cost launch access. This, in turn, will let us develop space to its fullest for commerce, industry, and science. Better launch access will give us better mobility for defenses in space.

The sooner we act to defend ourselves in space, the better off we will be to meet the ballistic missile threats of rogue nations and countries like Russia and China that are armed and dangerous. Our future is in space.

James H. Hughes
Englewood, Colo.

No Lengthy Explanations

With all due respect to [retired] Maj. Gen. [Charles] Link, his reply *["Letters," August, p. 4]* to Maj. [Mike] Spehar's letter begs the question. If the design were genuinely inspiring and truly captured the idea of the Air Force, we'd all know it—and lengthy explanations of its message would not be necessary. You can bet that there are far more than 25 people out there who are left deeply unmoved by this design. It conveys nothing.

You'd have to mount a similar lengthy explanation of what it means on plaques all around the site. It would be a great and irrevocable mistake to build this Air Force Memorial ashtray for the ages. Let's go back to the drawing board.

An aesthetic, inspiring design that genuinely conveys the Air Force's heroism and sacrifice will elicit a resounding wave of approval. This one misses the mark by a mile. It's a dud.

Lt. Col. James L. Beavers III,
USAF (Ret.)
Shalimar, Fla.

At Khe Sanh

The box titled "Debacle at Dien Bien Phu" which accompanied the "Airpower at Khe Sanh" article *[p. 82]* in the August issue overlooked another facet of this battle which has never been fully told. USAF had transferred surplus 3d Bomb Wing B-26s to the French air force in late 1953, along with some C-47s and a few C-119s. The aircraft were transited through Clark AB [Philippines] where USAF markings were painted out and the French roundel added. After checkout, [they] were flown to French Indochina.

A certain number of C-119s, however, had French markings added but were flown by USAF crews on TDY from Japan. These aircraft were stationed and flown from Cat Bi outside of Haiphong by USAF crews who actually made resupply drops and napalm crops over Dien Bien Phu. When the AAA began to get heavy, "civilian" pilots from [Civil Air Transport] in Formosa were contracted to make the drops, resulting finally in the loss of some of the CAT pilots and crews.

In February 1954, USAF established detachments of maintenance personnel at both Tourane AB (later to be renamed Da Nang) and Do Son AB (at the mouth of the Red River east of Haiphong). Tourane provided [Inspection-and-Repair-As-Necessary] capability for the B-26 and Do Son for the C-47s. These detachments, and the C-119 detachment at Cat Bi, were all manned by TDY Air Force personnel from Japan and Clark.

I have never seen anything written about these operations, although you did publish a photo of Tourane in the April 1997 "Flashback."

Lt. Col. Jack E. McDonald,
USAF (Ret.)
Fairfax, Va.

This letter is not intended to take issue with [Walter J.] Boyne's fine article but is an effort to give credit where credit is due. Boyne makes reference to a grid system used by the B-52s called "Bugle Note," a name, incidentally, I had never heard before. The grid system was the brainchild of then-Maj. Lewis F. Acker of the Arc Light Command Post at MACV. There were in fact two grids, Khe Sanh Green and Khe Sanh Red, which were superimposed, one upon the other. The target boxes in KS Green were oriented SE–NW, and the boxes in KS Red ran SW–NE.

The determination of which grid was used for a particular strike was dictated by the origin of the strike force, i.e., Guam went to Green and U Tapao [Thailand] went to Red. All target boxes were identified by number and color, e.g., KS 124 Green. The advantage of the system was that all concerned parties, the Marines, the SAC people, and the Combat Skyspot sites—or, as we knew them, "Mis-Q" [derived from the MSQ radar they used] sites —all had the grid, and we were all singing from the same page. With the grid in the hands of the Mis-Q site, we could change target boxes, within reason, almost up to "bombs away."

Boyne is quite correct there were a number of occasions when, at the request of the Marines, we "accidentally" laid strikes inside the 1,000-meter line. The development of the

Do you have a comment about a current article in the magazine? Write to "Letters," *Air Force* Magazine, 1501 Lee Highway, Arlington, VA 22209-1198. (E-mail: letters@afa.org.) Letters should be concise and timely. We cannot acknowledge receipt of letters. We reserve the right to condense letters. Letters without name and city/base and state are not acceptable. Photographs cannot be used or returned.—THE EDITORS

grid may not rank very high in the annals of greatest tactics, but without it the ability of the B-52s to respond to a rapidly changing tactical situation would have been seriously limited.

Lt. Col. Neil V. Mesler,
USAF (Ret.)
Canton, Ga.

I was one of the C-130B pilots who participated in 14 of the airdrops to the besieged outpost. Most of our drops were Container Delivery System drops using [the] Low Altitude Parachute Extraction System [for] up to 35,000 pounds of cargo on pallets.

For many drops, we were vectored in by Marine GCA controllers until we had visual contact with the drop zone or runway. The CDS drops were made just a bit north and west of the runway center onto a (hopefully) Marine controlled drop zone.

The GCA controllers were real pros. We often were stacked in holding patterns of four to eight aircraft at 1,000-foot altitude intervals, directed when to descend into the next lower altitude, and directed when to commence our drop run. The guidance was superb, and, invariably, we were on or very near the centerline of the drop axis when we encountered visual conditions.

For the LAPES releases, we were brought into GCA touchdown (we configured the aircraft for drop on our own and without Marine prompting), touched the wheels to the intact part of the runway, elevated the aircraft six (or so) inches off the aluminum planking, and, on our own cue, released our loads near the center of the runway.

I am not aware of any C-130 outfit that was using the [Ground Proximity Extraction System] tactic for aerial delivery of materials at Khe Sanh. Most of the C-130 crew members I knew were very quick to admit that they did not want to "hook" onto anything that was firmly connected to the ground—especially near Khe Sanh.

As I mentioned earlier, our preferred delivery methods were CDS (until the perimeter became too small to fly over and turn out of traffic) and LAPES. The paragraph of Boyne's article that indicates GPES was the preferred method appears to be in error.

While my recollection of the battle seems crystal clear and sharp, the 30 years that passed undoubtedly dimmed the memories. I can still remember the thrill of breaking out of the clouds, seeing the target area (runway environment), and watching an F-4 scream through the target area (en route to who knows where)—all of this while knowing a half-dozen of my friends were stacked up behind me in the clouds, ready to drop much needed supplies to the Marines.

Col. Simon A. Danigole Jr.,
USAF (Ret.)
Bellevue, Neb.

"Airpower at Khe Sanh" brought back some memories of the exceptional support provided by USAF airlifters throughout the Vietnam conflict. During this particular resupply operation I was chief, Aerial Delivery and Combat Control, 315th Air Division, at Tachikawa AB, Japan, and would like to clarify a few comments made in the article.

The 834th AD was not the airlift unit directing the C-130 resupply operations. That was accomplished by the 315th AD at Tachikawa. The 315th AD had 13 squadrons of C-130s assigned at that time and they were PACAF assets.

Another point was the use of the Ground Proximity Extraction System vs. the Low Altitude Parachute Extraction System. The GPES was a fixed system imbedded in the ground and took approximately 20 minutes to reset after each single platform extraction. As a result, it became a known, fixed target for the attackers' mortars and artillery.

The LAPES, both ARC (single platform) and 1528 (multiple platforms), was much more advantageous tactically and was used for the vast majority of resupply heavy airdrops accomplished by the C-130 fleet.

Col. David A. Powell,
USAF, (Ret.)
Colorado Springs, Colo.

In February 1968 I was an A-26 pilot and scheduling officer for the 609th Air Commando Squadron (call sign Nimrod) stationed at Nakhon Phanom RTAB, Thailand. Our assigned mission was night interdiction (truck killing) along the Ho Chi Minh Trail (Steel Tiger) and night support for the Laotian offensive in northern Laos (Barrel Roll).

On the afternoon of Feb. 7, Col. Lee Volet approached me, wanting the names of five aircrew [members] available to fly a special daylight mission the next day. This mission was in addition to the nine sorties scheduled each night. I selected Lt. Col. Howard "Bill" Farmer, Maj. Ed Robinson; the operations officer, the scheduling officer (myself), the standby crew, and Maj. Dick Mendonca, who just happened to wander into the [Officers'] Club right on cue.

The special mission turned out to be Khe Sanh. The weather had turned

AIR FORCE MAGAZINE
PUBLISHED BY THE AIR FORCE ASSOCIATION

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
Frances McKenney

Director of Production
Robert T. Shaughness

Art Director
Guy Aceto

Assistant Art Director
Teresa Jameson

Research Librarian
Pearlie M. Draughn

Editorial Associates
Shea McLaughlin
Chanel Sartor

Administrative Assistant
Juliette Kelsey

Advertising

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

Industry Relations Manager
Nicola C. Whitlock • 703/247-5800

US and European Sales Manager
William Farrell • 847/295-2305
Lake Forest, Ill.

BPA Circulation audited by Business Publication Audit

Air Force Association
1501 Lee Highway • Arlington, VA 22209-1198

Telephone: (703) 247-5800

Toll-free: (800) 727-3337

Fax: (703) 247-5853

To select documents and receive them **by fax:** (800) 232-3563

E-mail: information@afa.org

Internet: http://www.afa.org/

AFA's Mission

- To promote aerospace power and a strong national defense.
- To support the needs of the Air Force and Air Force people.
- To explain these needs to the American people.

Telephone calls to (703) 247-5800 or (800) 727-3337:

If you know your party's extension, **press 1.**

For a customer-service representative, **press 3.**

Or stay on the line and an operator will direct your call.

Customer Service

For questions about membership, insurance, change of address or other data changes, magazine delivery problems, or member benefit programs, select the "Customer Service" option.

E-Mail Addresses

Communications/news media/*Crossfeed* **com@afa.org**

Customer Service ..... **custserv@afa.org**

Eaker Institute ..... **eaker@afa.org**

Industry Relations/Advertising ..... **irl@afa.org**

Information ..... **information@afa.org**

Magazine Editorial Offices ... **afmag@afa.org**

Magazine Letters..... **letters@afa.org**

National Defense and Congressional Issues **ndi@afa.org**

Field Services ..... **fldsvcs@afa.org**

Aerospace Education Foundation **aefstaff@aef.org**

Air Force Memorial Foundation ... **afmf@afa.org**

For individual staff members: **first initial, last name, @afa.org** (example: jdoe@afa.org)

Letters

sour and the fast movers were unable to provide close support to the base, due to their speed and the low ceilings.

On Feb. 8, we staggered our takeoffs in order to provide maximum time/support in the target area. My aircraft had a weak TACAN, but with some excellent work by my navigator, Douglas Hawkins, we broke out between mountain peaks and spent the rest of the mission working right on the treetops with Covey [Forward Air Controller] 048.

I will never forget those Marines standing out on the concertina wire cheering us on and waving their unit banners while I laid out four canisters of [napalm], four canisters of CBU 14, 12 frag clusters (72 bombs), and 2,700 rounds of 50 caliber from those eight guns in the nose of the A-26. We hated to fly off and leave at the end of the mission, but my bird was badly in need of repairs before it could fly again that night, and we had expended all available ordnance. We were alerted to fly a second day, but due to a combination of factors, and an improvement in the weather in the Khe Sanh area, the mission was scrubbed.

The purpose of this letter is to reiterate that the aircrews and men of the 609th Air Commando Squadron were highly honored to have been able to assist those brave Gyrines during the siege of Khe Sanh and add a little more to the history and lore of the victory at Khe Sanh.

Maj. Ben L. Heathman,
USAF (Ret.)
Cedar Creek, Texas

As an honored airpower historian, Boyne had to be faithful to all the records he researched for this article. But, having been intimately involved—as chief, In-Country Strike Plans, 7th AF—with directing all airpower applied at Khe Sanh from start to finish, I'd have to put a little different slant on the story.

I don't deny that a B-52 was showing up every three hours, but we had a flight of fighters (USAF, Navy, or Marine) coming off the "perch" every 10 minutes around-the-clock, so there wasn't a minute the bad guys were safe from "falling objects." There were lots of flying heroes during this battle but mainly the FACs and airlift crews. Above all else, the real credit for saving the lives of 5,000 Marines belongs to this 7th AF "chain": Gen. [William W.] "Spike" Momyer (first and foremost!), Maj. Gen. Gordon Blood, Brig. Gen. "Jonesy" Bolt, and Col. Harry Moreland. They cut all the red tape and did the "pushing" which let the lower level troops operate as one big team, which worked and set a standard for joint air ops.

It all started when Momyer came back from MACV to announce to the assembled 7th AF staff, "Gentlemen, there are 5,000 Marines with their a— in a crack at Khe Sanh. We are going to get them out! Just tell me what you need" (or words to that effect).

When I first called the colonel in charge of Marine air, he had a fit when I told [him] I was sending him "frag" orders. Since there was no time to argue, I told him I'd be sure to spell his name right if he chose to ignore the orders (he didn't!). If just having a Marine sign Marine frag orders was important, I suggested he send me two good air ops officers. He did—two sharp majors who immediately understood the urgent need for conducting air support without concern for who got credit. They became two of the best joint air strike planners ever!

This apparently allowed some Marine historian to write his account of Khe Sanh without having to admit that an Air Force major was directing Marine air to drop what, when, and where!

Brig. Gen. John Rollston,
USAF (Ret.)
Lago Vista, Texas

My version of Khe Sanh differs [from Boyne's]. I was an intelligence officer at 7th AF during Khe Sanh. The reports I read indicate that the North Vietnamese led us down the garden path, again, at Khe Sanh. They made us think they were planning an attack, while they set the stage for the Tet Offensive. We played into their hands. Boyne's account may be the "official" point of view, but that is not true. This attitude in SEA—the "official" view vs. [the] truth—defeated us. Why can't we be truthful now?

Maj. C. Daniel Lohnes Jr.,
USAFR (Ret.)
Arlington, Va.

I was a C-130E pilot during that period and made many trips carrying either howitzer ammunition or 55 gallon drums of gasoline. You mentioned that the C-123s could land and turn off at the first taxiway while the C-130s had to use the entire runway. Not necessarily so. A C-130 touching down "on the numbers" could usually make that first taxiway.

There was a unique and interest-

ing feature to this operation. The Marines were given the Outstanding Unit Award for their service during the siege, and this award could also be worn by those of us providing direct support. The ribbon had three colors which ran horizontally, not vertically as in all other ribbons. Therefore, the ribbon stood out from the others and immediately identified those Air Force flight personnel [who] earned their combat wings at Khe Sanh.

Lt. Col. Jarvis M. Adams,
USAF (Ret.)
Greenfield, N.H.

Not So, Blackbird

In the August issue, [retired] Col. Richard H. Graham has given his opinion on the capabilities of the SR-71. *[See "Letters," p. 8.]* From an aircraft performance viewpoint the SR-71 is fantastic. But the airplane was not competitive when compared to other intelligence-gathering platforms (i.e., satellites and even data-linked U-2s). Responding to a crisis took too much time (crew had to dress and prebreathe oxygen) and retrieving information was slow (film had to be unloaded, processed, and exploited).

I was an imagery exploitation officer in the 9th SRW from 1976–78 and a Reservist assigned there from 1984–88. During the Gulf War, I was called up for duty and saw firsthand the whole range of intelligence gathering and exploitation. Many air-breathing reconnaissance assets were of limited value in that conflict, and the SR-71 would have been a great waste of taxpayers' money. Activities happened at such a fast pace that an airplane such as the SR-71 could not react and change flight plans to meet the requirements.

A satellite doesn't have sex appeal like the "Habu," but it's efficient, timely, and provides a great product.

Lt. Col. Duane M. Cossalter,
USAFR (Ret.)
Phoenix, Ariz.

MiG-15s Over Berlin

[Retired MSgt. David W.] Menard doubted that MiG-15s could have been seen forcing a C-54 to land at Tempelhof during the Berlin Airlift. *[See "Letters," August, p. 6.]* This incident took place some time after the airlift which officially ended in September 1949.

My best recollection is that it was the summer of 1951, because the Korean War began in the summer of 1950, and it was then that we saw film of MiGs over Korea. They were recognized easily, especially when I got a final look at them on their low pass at 60–70 feet above the ground and about a hundred yards from my location on top of the GCA trailer. The C-54 had been on a local flight out of Tempelhof and wandered over the Soviet area.

Capt. Bill L. Cooley,
USAF (Ret.)
Miami, Fla.

My friend Menard has been keeping authors honest for decades with his encyclopedic knowledge of aircraft. [He] is probably correct that Soviet MiG-15 fighters could not have threatened a C-54 transport during the Berlin Airlift. However, he is mistaken [when he says] that the prototype MiG-15 did not fly until summer 1949 and that the first units were operational in 1950.

Russian and American published sources agree that the prototype MiG-15 made its first flight on Dec. 30, 1947, at Ramenskoye (Zhukovskii), piloted by Viktor Yuganov. There was a regiment of MiG-15s in service by summer 1949.

Robert F. Dorr
Oakton, Va.

Where's Doolittle AFB?

I agree with Dave Menard *["Letters," July, p. 6]* that Eglin AFB, Fla., should be renamed in honor of Gen. Jimmy Doolittle. It was at Eglin and its auxiliary fields that Doolittle and his gallant Tokyo Raiders secretly trained for their historic B-25 raid against Japan in April 1942. The Doolittle raid provided a tremendous boost to America's morale during the dark early months of World War II when all the war news was bad. This accomplishment, together with Doolittle's countless contributions to aviation technology and his superb leadership at all levels of Air Force command, certainly warrant the renaming of this base in his honor.

But let's do it soon, while a few of the general's brave Raiders are still with us to appreciate—and hopefully help dedicate—Doolittle AFB.

MSgt. James B. Walker,
USAF (Ret.)
Dayton, Ohio

Corrections

In the September issue, the photo on p. 116 is reversed. Ribbons are still worn on the left side of the uniform. On p. 76, the commander of the Air Force Technical Applications Center, Patrick AFB, Fla., should be Col. Harold J. Beatty.

Aerospace World

By Peter Grier

F-22 Flies Cross-Country

On Aug. 26, Raptor 4002, the second F-22 fighter, flew nonstop from Dobbins ARB, Ga., to Edwards AFB, Calif., where it joined the first F-22—Raptor 4001—for flight testing.

Arrival of 4002 at Edwards represents the USAF fighter program's next major flight test milestone. To date, the program has met all its requirements, DoD said. Many have been met earlier than expected.

Taken together, Raptors 4001 and 4002 have flown 39 test flights totaling 59.4 hours at Edwards and Dobbins. Thus far, F-22 test pilots have flown at altitudes up to 40,000 feet, at 16 degrees angle of attack, and at .95 Mach.

The Air Force plans to buy 339 of the stealthy, supercruising fighters to replace the F-15 as the world's premier air superiority fighter.

Visit to Moody Opens Cohen's Eyes

Defense Secretary William S. Cohen spent Aug. 17 at Moody AFB, Ga., getting an up-close look at problems the military is facing and why many officers and airmen are leaving the service.

Moody is one of the Air Force's busiest bases. Members of the resident 347th Wing deploy regularly to Bosnia, the Persian Gulf, and other temporary duty sites. Some 12.5 percent of its people were deployed for more than 120 days last year, said the Air Force, and some were gone for more than 160 days.

This plays havoc with pilot training, Professional Military Education schedules, and family plans.

Acting Air Force Secretary F. Whitten Peters, Chief of Staff Gen. Michael E. Ryan, and CMSAF Eric W. Benken joined Cohen. The Secretary of Defense heard numerous personal stories, including that of a security forces specialist who said she has deployed overseas 14 times in recent years and currently is doing four different jobs to cover for other security troops who are deployed now. "I need stability," she complained. "I'm going to separate."

USAF photo by SrA. Justin W. Leach

Defense Secretary William Cohen leans close to catch the words of A1C Mitchell D. Vance, a 41st Rescue Squadron pararescueman at Moody AFB, Ga. Many airmen expressed concerns about the ongoing pace of deployments.

Cohen declared that the problem was serious and that DoD is determined to do something about it.

US Strikes Terrorist Targets

US cruise missiles on Aug. 20 slammed into terrorist-related targets in Afghanistan and Sudan. US officials said the attacks were mounted both for retaliation for the earlier bombings of US embassies in East Africa and to pre-empt and disrupt imminent terrorist acts.

The sites, a training camp in the Afghani desert and a suspected chemical weapons materials factory in Khartoum, were both linked to the alleged terrorist mastermind Osama bin Laden, a renegade Saudi exile. Secretary of Defense William S. Cohen claimed to have "compelling" evidence that bin Laden was behind the Aug. 7 bombings of embassies in Kenya and Tanzania.

Pentagon officials were more guarded than usual in discussing operational details. However, it was known that the attacks entailed firings of 75 to 100 of the Tomahawk Land Attack Missiles from submarines and surface warships in the Red Sea and the Arabian Sea.

US officials said the weapons caused "moderate to heavy" damage. One of the TLAMs went off course and fell into Pakistan, after which the unexploded weapon was retrieved by authorities. Pakistan protested the attack for, among other reasons, violations of its airspace. The cruise missiles fired into Afghanistan would have overflown Pakistani territory.

Rockets Explode, Payloads Lost

Twice within weeks, two Expendable Launch Vehicles exploded shortly after liftoff from Cape Canaveral, Fla.

The first was an Air Force Titan IVA Aug. 12; the second, Boeing's new Delta III, on its inaugural flight Aug. 26. No one was injured in either blast, but both payloads were destroyed.

The Titan was thought to carry a $1.3 billion intelligence satellite. The Delta carried a $225 million commercial communications satellite.

This was the 25th launch for USAF's Titan IV, since the heavy-lift ELV first took to the skies in 1989. It veered

out of control seconds after liftoff. Range safety officers quickly destroyed the rocket, which had reached about 20,000 feet, to prevent possible damage from falling debris, according to 45th Space Wing officials.

The launch was the last for the A series of the rocket, which is being replaced by a new B model with an improved solid-fuel booster.

The disaster—which ranks among the most expensive unmanned launch failures ever for the US—was the second failure for the heavy-lift ELV. In August 1993, the rupture of a solid-fuel booster destroyed a Titan just after launch.

Initial investigation by Boeing into the Delta III launch is focusing on the new booster's control system, stated company officials Aug. 28. The Delta III, with its nine solid-fuel strap-on boosters and more powerful upper-stage engine, can carry twice the payload of the Delta II, which launches USAF's Global Positioning System satellites.

Boeing initially postponed launch of a Delta II set to boost five commercial satellites from Vandenberg AFB, Calif., Sept. 1. The Delta II was then rescheduled and successfully sent the five Iridium communications satellites into orbit Sept. 8.

USAF photo by SSgt. Angela Stafford

Gen. Michael E. Ryan (right), Air Force Chief of Staff, walks with V-22 Osprey chief test pilot Tom Macdonald Sept. 1 at NAS Patuxent River, Md. Ryan, who took the controls of the new joint service helicopter for about an hour, said that the transition between hover and fixed-wing flight was smooth.

Adultery Rules Upheld ...

The Pentagon announced July 29 that, after a year-long examination, top defense officials had decided to leave basically unchanged the military's policy regarding adultery.

The way the armed services handle adultery in their ranks had been a subject of controversy ever since the Air Force sought to court-martial B-52 copilot 1st Lt. Kelly Flinn for lying about an adulterous affair she had with the husband of an Air Force enlisted woman.

In response to the national uproar, Secretary of Defense William S. Cohen ordered a review of military social mores in June 1997.

The re-look culminated in a proposal that adultery remain "unacceptable conduct" in the military, under the Uniform Code of Military Justice. Commanders should bring adultery charges only when the offense interferes with good order and discipline or discredits the military, under the proposal. This essentially recapitulates the current guidelines.

"There have been no changes in the code, and there will be no lowering of standards," said Cohen.

Though these guidelines largely restate long-standing policy, the new proposal does attempt to clarify the factors commanders can consider when weighing the gravity of someone's adulterous conduct. These include whether the action included misuse of government resources, whether it had an impact on anyone's ability to carry out their duties, and the accused's marital status and rank. Following publication in the Federal Register, the proposed guidelines face a period of public comment before becoming final.

... Fraternization Rules To Agree

The same year-long examination led to a determination that rules on fraternization between officer and enlisted should be standardized and toughened—a move which could affect hundreds of relationships, primarily in the Army.

On the fraternization issue, Cohen directed that the Army needs to bring its policy regarding relationships across the divide of rank into line with the other services.

The Air Force, Navy, and Marines largely prohibit fraternization between officers and enlisted members. The Army has not, permitting such relationships if the two involved members were not in the same chain of command and order and discipline were not affected.

The new tougher standard could force unmarried cross-rank Army couples to make a choice: get married or break up.

"Breaches of good order and discipline in the all volunteer force are not widespread," said Cohen, "but perceived and actual inconsistencies in policies and practices addressing those breaches must be remedied."

EAF Not a "Quick Fix"

The Expeditionary Aerospace Force, far from being a "quick-fix" solution to high optempo levels, has taken years to develop, according to Gen. Michael E. Ryan, USAF Chief of Staff.

"In fact, the EAF concept was [nearly] eight years in the making," Ryan argued in an Aug. 24 statement.

Ryan and F. Whitten Peters, acting Secretary of the Air Force, announced Aug. 4 a plan to transform the Air Force into the EAF, comprising 10 standing Air Expeditionary Forces drawing forces from bases around the United States.

"Since the end of the Gulf War, we've been wrestling with various ways to respond to the increasing number of contingencies that require us to deploy forces around the world while maintaining high-quality service at the bases from which these forces have deployed."

This activity, said Ryan, "has taken a high toll on our people, both on those we send to remote locations as well as those whose workload at home station is expanded to make up for the absence of their teammates."

Ryan said that, in early 1998, he commissioned a six-month study by a small group of planners to use lessons of the past eight years to devise a new framework. "Eight years of experience and six months of intensive study—this was anything but a quick fix," said Ryan.

Missile Defense Proponents Play Offense

Congressional proponents of na-

An Army helicopter on Aug. 11 prepares to drop a 90-percent scale version of USAF's Space Maneuver Vehicle. The SMV is a reusable, unmanned vehicle intended for potential use for reconnaissance, surveillance, or communications, stated Air Force Research Laboratory officials.

tional defense against ballistic missiles pushed their issue forward on a number of fronts this summer.

On Aug. 5, a bipartisan group of 48 House members introduced legislation that would make deployment of a National Missile Defense system the official policy of the US. Such a move would toughen the current US position, formulated by the Clinton Administration, which calls for developing NMD technology to the point where a decision whether to deploy within three years can by made in the year 2000.

Meanwhile, the House passed a spending bill amendment intended to force the Administration to submit negotiated changes in the Anti-Ballistic Missile Treaty to the Senate for ratification.

The changes, hammered out in talks between the US, Russia, Kazakhstan, Ukraine, and Belarus, include such items as a limit on the speed of theater defense missiles. NMD proponents think such alternations would hobble future missile defense deployment.

A poll released by the pro–NMD group Coalition to Defend America found 86 percent of respondents in favor of a missile shield deployment. Seventy-five percent of respondents supported spending $3 billion on the system.

Robot SMV in Successful Test

On Aug. 11, Boeing successfully drop tested a subscale prototype of the Air Force's proposed X-40A Space Maneuver Vehicle.

An Army Black Hawk helicopter hoisted the 22-foot-long uninhabited vehicle to an altitude of some 9,000 feet over Holloman AFB, N.M. Cut loose, the prototype SMV glided down to a runway landing using autonomous onboard guidance systems.

"We wanted to validate low-speed handling qualities and demonstrate autonomous approach and landing capability," said Boeing Project Manager John Fuller. "We did that today."

If it enters production, the space shuttle–shaped vehicle would be launched into orbit 22,000 miles high and loiter there for up to a year. It would travel to different trouble spots—a malfunctioning satellite, say—before gliding to Earth on its stubby delta wings.

The Air Force will probably decide within a year whether it wants to pursue the SMV concept. If it does, the service is likely to call for a competition to build a demonstrator vehicle, with Boeing, Lockheed Martin, and Orbital Sciences likely participants.

Panel Moves to Ban Explicit Material

Military retail services in August began the process of eliminating all sales of sexually explicit magazines, videotapes, and audio tapes.

Under Pentagon instructions, an eight-member Resale Activities Board of Review met Aug. 13. The board had asked all of the military exchanges to provide for its review materials that might be affected by the new law.

The resulting review list includes more than 100 publications. The board will announce findings later this year. Once the board determines that a particular item is sexually explicit, it will be removed and not offered for sale.

The Pentagon was responding to a ruling last June by the Supreme Court, upholding the 1996 Military Honor and Decency Act by refusing to review an appeal of a lower court ruling. The law requires DoD to remove all sexually explicit materials sold or rented by the exchange services, commissaries, and US Navy ships' stores.

More B-1 Upgrades in Store?

The Air Force is considering a new B-1B upgrade program that would give the big bombers improved data links and avionics, among other things.

Right now the B-1 program is in the midst of an extensive upgrade program that is adding precision guided conventional weapon capability to the Lancer fleet. This December will see delivery of the first B-1s able to handle the Joint Direct Attack Munition. Seven JDAM–ready aircraft should be on the flight line at Ellsworth AFB, S.D., by February.

The new Block G program, if funded, would begin in 2002 or 2003, after the current effort has largely ended. Proposed Block G components would include the Link-16 data link and an upgraded PGM targeting system. Officials are also weighing the virtues of including the Small Bomb System in the next round of B-1 modifications.

ABL Team Gets Biggest Glass Ever

The contractor team developing the USAF Airborne Battle Laser has accepted delivery of the largest piece of high-quality optical glass ever made, according to team officials.

The 994-pound piece of glass, made by Heraeus Quarzglas of Germany, will eventually become the turret window through which the ABL will produce a high-energy laser beam capable of tracking and destroying ballistic missiles in flight.

The task of producing the final window entails much more than simply slapping glass in place, as if it were a windshield or replacement window pane. Corning, Inc. of Canton, N.Y., is now processing the high-quality glass into a sphere. Then a Pittsburgh firm, Contraves–Brashear Systems, will polish the window. It will be optically coated by yet another con-

tractor, Optical Coating Laboratories, Inc., of Santa Rosa, Calif.

The window will have to show its stuff in 2002, when Team ABL—made up of Boeing, Lockheed Martin, and TRW—is scheduled to run a test against an airborne theater ballistic missile.

Short Circuit Downed THAAD

The May crash of the Theater High Altitude Area Defense anti-missile interceptor—the high-profile program's fifth straight intercept test failure—was caused by a short circuit in its booster, according to investigation results.

The short occurred when a high voltage wire came in contact with a low voltage one on the back of a connector plug in the booster's thrust vector control. Possible causes included a loose wire, metallic debris, or booster exhaust residue.

Ironically, the tough preflight inspections the THAAD booster underwent may have helped caused the problem, said program officials. The checks were meant to guard against the failures which dogged previous test shots, but frequent handling of the now four-year-old booster hardware may have shaken the wire or dislodged a foreign object.

The test failures have raised serious questions about the future of the $14 billion program. THAAD's designers point out that many other weapons, such as the Tomahawk cruise missile, had multiple failures in testing. They say they are confident they are gradually shaking out the bugs in the system.

B-2s Take Precautionary Time Off

The Air Force fleet of B-2 bombers suspended normal flying operations Aug. 6–10. The cause of the standdown was a potential problem with the initiators that help power the aircrew ejection system.

The glitch was discovered by the manufacturer, O.E.A. Aerospace, during routine acceptance testing. Each B-2 has eight initiators, and all were replaced as a safety precaution.

Aviano Airmen Support Albanian Exercise

Eight USAF airmen from the 31st Fighter Wing, based at Aviano AB, Italy, deployed to Albania on short notice to support a NATO exercise dubbed Cooperative Assembly '98, the Air Force announced Aug. 21.

The exercise was intended to display NATO displeasure at Serbian military actions against civilians in Kosovo, a restive, predominantly Albanian province of Yugoslavia.

The USAF contingent comprised seven air traffic controllers from the 31st Operations Support Squadron and one ground radio maintainer from the 31st Communications Squadron. The airmen were called in on an emergency basis after the unexpected deployment of US Marine controllers to Africa.

Forces participating in this exercise came from Albania, Belgium, Canada, France, Germany, Greece, Italy, Lithuania, Netherlands, Russia, Spain, Turkey, UK, and United States.

Russian Engine, US Rocket

Lockheed Martin on July 29 started a Russian-built RD-180 engine in the first of a series of tests of the propulsion system for the new Atlas IIIA rocket.

The test marked the first time such Russian hardware has ever been fired up at a US government facility—in this case, a NASA stand at Marshall

Space Flight Center, Huntsville, Ala., originally built to test the first stage of the Saturn V.

The RD-180 throttled up to more than 90 percent power during its run, which lasted 70 seconds. The engine, tanks and feedlines, avionics, electronics, and hydraulics were all tested.

RD-180s produce 860,000 pounds of thrust and are produced by Russia's NPO Energomash and Pratt & Whitney for Atlas contractor Lockheed Martin. Use of the Russian hardware allows the Atlas IIIA to fly with 15,000 fewer parts than the Atlas IIAS.

"This test was an important milestone in our development of the new Atlas III and EELV rockets that will enable us to reduce assembly time and improve operational capability while cutting costs," said Raymond S. Colladay, president of Lockheed Martin Astronautics.

First launch of the Atlas IIIA is currently scheduled for March 1999.

Assignment System Changes for New Pilots

On July 31, the Air Force handed out assignments to its newest class of pilots at Vance AFB, Okla., under a revamped assignment system.

The assignment modifications mean that an individual's desires have less weight when it comes to that first cockpit—but the needs of the service will be better met, say Air Force personnel officials.

The new pilot assignment system also foreshadows what other Air Force officers will see when the overall Officer Assignment System is changed in January.

In the past, graduating pilots were ranked by a combination of flying and test scores. Students then ran a sort of reverse draft, with the top scorer getting first pick of the aircraft he or she wanted to fly, the No. 2 the next pick, and so on. Choices were rotated among the Air Force's three pilot training bases.

Under the new system, students fill out a "dream sheet" of assignments they would like to have. Taking these desires into account, flight, squadron, and operations group commanders, with input from Instructor Pilots, then determine what they think is an appropriate slot for each new set of Air Force wings.

"The old system was based strictly on numbers," said Col. Dale "Muddy" Waters, 71st Operations Group commander. "We added up all the flying and academic scores to determine a class ranking, then let the students pick assignments based on how they ranked. There was a transparent sort of purity to that system, but it did not always match students with assignments in a way that was best for the service."

Mismatches were fairly common under the old way. Sometimes IPs would tell commanders that a student was not ready to become a first-assignment instructor, but under the rank system the top levels had no control over a student's selection.

"I know there is some concern among the students about how the new system will affect them," said Waters. "I believe they will find out that the net result will probably not be too much different than when the students picked the assignments themselves. How you perform in training will still be the biggest factor in determining your assignment."

New Early Retirement Program Opens

The Air Force is offering another early retirement program in Fiscal 1999. The only incentive is early departure; no money, such as the Special Separation Bonus, is offered.

Only officers need apply. With the end of large-scale force reductions, waiver programs and other specialized personnel management tools are helping the Air Force shape the force it needs, say personnel officials.

Basic eligibility criteria include completion of at least 15 years—but less than 20 years—of federal commissioned service.

Eligible officers include:

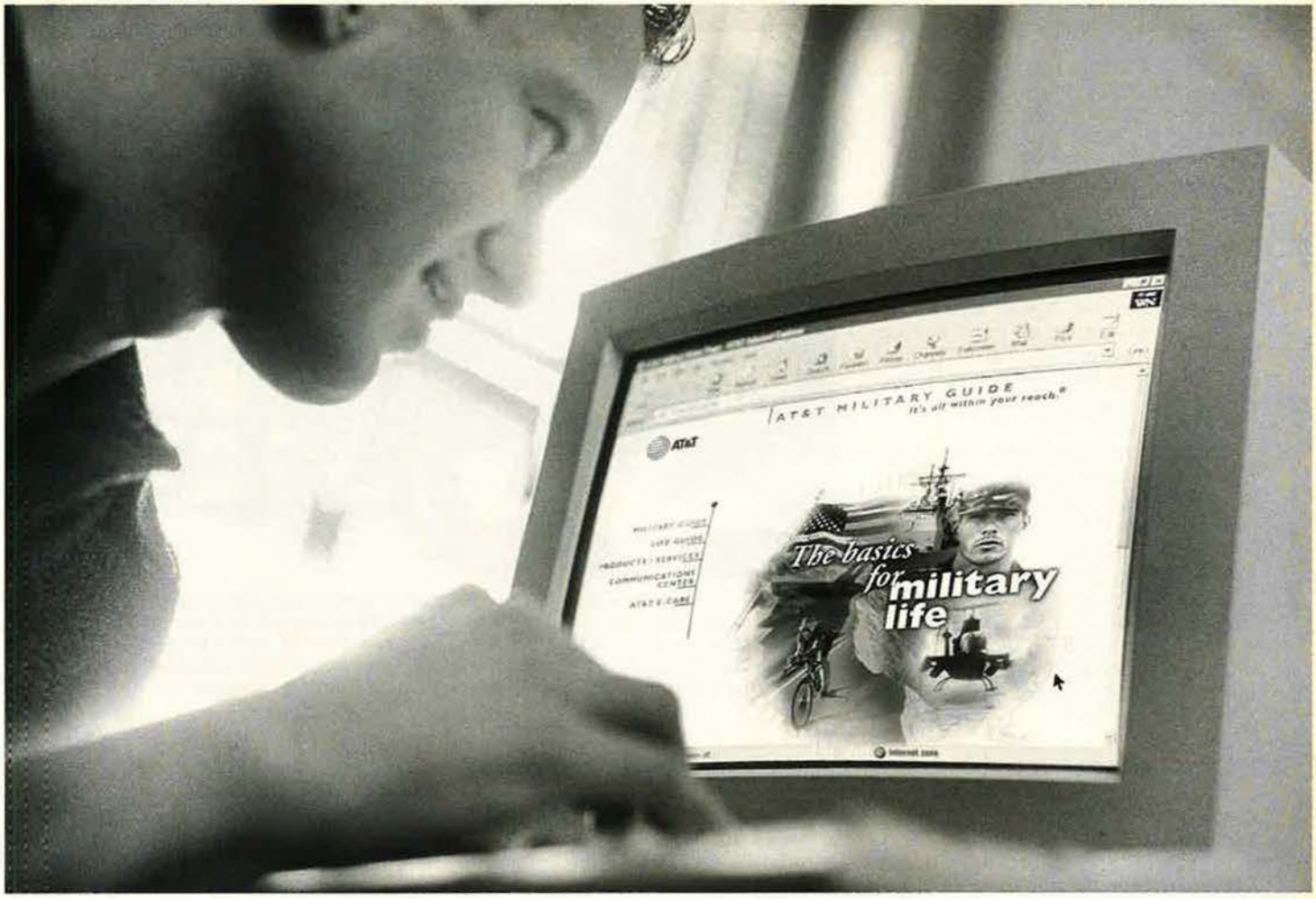
- Deferred Biomedical Sciences Corps captains, majors, and lieutenant colonels in all specialties and nondeferred BSC captains, majors, and lieutenant colonels in Air Force specialties 42BX, physical therapist; 42EX, optometrist; 42FX, podiatrist; 42NX, audiology/speech pathologist; 42TX, occupational therapist; 43BX, biomedical scientist; 43DX, dietitian; and 43YX, health physicist.
- Nondeferred and deferred Nurse Corps captains, majors, and lieutenant colonels in Air Force specialties 46AX, nurse administrator; 46GX, nurse–midwife; 46NX, clinical nurse (without shredouts); and 46PX, mental health nurse.
- All Medical Service Corps deferred captains, majors, and lieutenant colonels; and Chaplain Corps nondeferred and deferred captains, majors, and lieutenant colonels.

Operation Flipper Drop

In an airlift that some participants dubbed "Operation Flipper Drop," an Air Force Reserve Command C-141 Starlifter flew five US military dol-

USAF photo by MSgt. Linda Beth

The Air National Guard's Col. James M. Skiff captured the A-10 flying-time record with 4,425 hours Aug. 28. Skiff is the commander of the 111th Fighter Wing, Willow Grove ARS, Pa. The flight he led Aug. 28 also set a four-ship record for the A-10—more than 13,000 total hours between Skiff, Lt. Col. Steve Sischo (3,000+ hours), and Majs. Jeff Hoying (2,400+), and Mitsu Murphy (3,400+).



Now the Information Age has a military installation.

www.att.com/mil

Point, click, and you're in command. Our new Web site is your worldwide link to all the latest helpful information we provide to all military personnel and their families. It also gives you the ability to create personal Web pages and community centers via chat rooms and bulletin boards. We built it just for you. So check it out and let us know how you like it.

Wherever you're stationed, we stand ready to serve.℠

It's all within your reach.

AT&T

phins to Lithuania to participate in a Partnership for Peace exercise in early July. *[See "Baltic Guard," p. 26.]*

The bottle-nosed dolphins, Tacoma, Wenatchee, Cinder, Spetsnaz, and Punane, are all members of the Navy Explosive Ordnance Disposal Mobile Unit Three, based in Coronado, Calif.

The "teenagers," as some of their handlers call them, are trained to locate and mark mines and other munitions on the ocean floor. During Baltic Challenge '98, an 11-nation joint land, sea, and air exercise, the dolphins did their stuff on the floor of the Baltic Sea.

Airlifting the marine mammals required more care than is lavished on the usual C-141 cargo. A C-141 crew from the 445th Airlift Wing, Wright–Patterson AFB, Ohio, flew to NAS North Island, Calif., to pick up the animals and their handlers July 8. They were flown to Lithuania in carriers that resembled big blue bathtubs on wheels. When filled with water and a dolphin, each carrier weighed 1,900 pounds.

USAF photo by TSgt. David Lipp

Recruits, late for basic training because of a commercial airline strike that left many in North and South Dakota and Minnesota stranded, board an Air National Guard C-130 from the 133d Airlift Wing, Minneapolis–St. Paul IAP/ARS, Minn., Sept. 3. The Guard flew them to Chicago where they took commercial flights or ground transportation to various military basic training facilities.

Electric Starlifter Unplugs

The C-141 Electric Starlifter program came to a successful close at Edwards AFB, Calif., July 29.

Electric Starlifter testing marked the first time in aviation history that a large military cargo aircraft has both been fitted with electric flight controls and flown more than 1,000 operational hours.

The program went beyond fly-by-wire techniques, in which electrical signals trigger hydraulic systems to move ailerons and other controls. It used power-by-wire techniques, in which the flight control surfaces are moved by electrical, not hydraulic, motors.

The program's purpose was to demonstrate the feasibility of such fly-by-wire/power-by-wire control systems for future platforms, under the Air Force's More Electric Aircraft program.

"The major benefit is the elimination of the central hydraulic systems," said Lockheed Martin Program Manager Walt Porter. "This will enhance reliability and safety; it eliminates the numerous requirements posed to maintain a central hydraulic system, and it greatly reduces the weight of the aircraft."

The Electric Starlifter—the second C-141 platform ever manufactured—was put through an exhaustive flight qualification test program, including temperature, shock, vibration, and electromagnetic interference exams. The program brought the technical readiness level of the electric actuator to flight-qualified status.

The plane's 1,000 hours were amassed in routine cargo and passenger-carrying missions for Air Mobility Command. The electric actuator unit was also bench-tested to over five million cycles.

The Joint Strike Fighter, the F-22, and the next-generation C-130J transport are among the aircraft that could benefit from the program's results, said Air Force officials.

Strikers Squeeze Incirlik

US Air Force fighters based at Incirlik AB, Turkey, continued to carry out operations over northern Iraq despite the outbreak of labor strife that all but closed base services and restricted US personnel throughout Turkey.

On July 23, some 1,400 unionized Turkish employees went out on strike, demanding more pay and benefits. By late August, the strike had begun to affect the more than 7,000 American military members, DoD civilian workers, contract employees, and family members at installations in Ankara, Izmir, Incirlik, and several smaller sites in Turkey.

Index to Advertisers

Union members continued picketing at facilities throughout Incirlik AB, near Adana in southeastern Turkey. Turkish law permits unions to strike and gives striking workers access to their work sites to picket.

About 5,300 Americans are stationed at Incirlik, a Turkish air force facility that houses the US Air Force's 39th Wing and the 39th Air and Space Expeditionary Wing. The American units, along with British and French allies, enforce the UN–mandated no-fly zone over northern Iraq.

About 45 US and Allied aircraft continue to fly daily sorties as part of Operation Northern Watch. "Military operations have not suffered at all," DoD spokesman Kenneth H. Bacon said at the Pentagon Aug. 11.

People at Incirlik are operating under difficult circumstances, Bacon said. To avoid conflict with striking union members, Air Force officials have restricted travel to the local community to official business only. People who live off base, however, are allowed to travel back and forth.

Since the closure of the base commissary, base officials have arranged for small groups to shop at an off-base supermarket each day in the company of US military and Turkish national police. Field kitchens have been set up to feed service members supporting Operation Northern Watch.

Gen. John P. Jumper, the commander of US Air Forces in Europe, visited Incirlik in August to answer questions about the situation. The USAFE commander then went to Ankara, the capital of Turkey, to discuss the strike with Turkey's senior military leadership and the American ambassador. He said his intention was to persuade leaders to help resolve legal issues associated with the strike.

News Notes

- On Aug. 4, the Air Force announced that its staff sergeant promotion rate for the latest cycle was 22.65 percent—the highest promotion rate to that rank in 27 years.
- Undermanned security forces could get a boost from new recruiting incentives that went into effect Aug. 12. Four-year enlistees entering active duty now receive a $1,000 bonus for choosing the security forces career field. Six-year enlistees receive a $3,000 bonus.
- NORAD plans to expand its duties to include cruise missile threats. The command, which has operations located in Cheyenne Mountain, Colo., has long watched for ICBM launches that could threaten the US but has become increasingly concerned that cruise missiles could be launched at North American cities from ships or through other clandestine means.
- Gen. Richard B. Myers took command of NORAD, US Space Command, and Air Force Space Command at a Peterson AFB, Colo., ceremony Aug. 14. Myers took over from Gen. Howell M. Estes III, who had been the commander since August 1996.
- Following its 1996 order for four Boeing KC-135R Stratotankers, Singapore has set up a KC-135 training detachment at McConnell AFB, Kan. The unit will use KC-135 transporters leased from USAF until its own aircraft are delivered next year.
- A new Milstar satellite ground station was installed at Elmendorf AFB, Alaska, this summer. This important link in the new secure next-generation space communications system should be operational Oct. 1. Half of the planned fleet of six Milstar satellites will be in orbit by the end of the year.
- USAF marked the 10th year of delivering humanitarian aid to the impoverished former Soviet republic of Armenia with an August delivery of $8 million worth of medical supplies and equipment. Lack of infrastructure at Armenia's Zvartnots Airport led to an assembly line of forklifts and baggage carts to off-load the

140,000 pounds of donated supplies.

■ An Air Force F-16CJ crashed on the end of a runway at Misawa AB, Japan, July 24. The pilot, 1st Lt. Melvin B. Simpson, ejected safely, but his parachute carried him into the plane's burning wreckage. A USAF staff sergeant and five members of the Japanese self-defense forces pulled Simpson to safety, although he remained hospitalized for burn treatments as of mid-August.

■ The pilot of an Air Force F-16 based at Shaw AFB, S.C., was rescued July 22 after he crashed into the ocean about 13 miles southeast of Murrells Inlet. A Coast Guard helicopter plucked the pilot from the water and delivered him, largely unharmed, to a Charleston hospital for a checkup.

■ On Aug. 1, a C-5 from Air Force Reserve Command's 433d Airlift Wing, Kelly AFB, Texas, delivered 30 pallets of medical and educational supplies to Guatemala City, Guatemala. The donated items included books, desks, strollers, mattresses, sheets, cabinets, and playground equipment meant to benefit orphans along the Rio Dulce River, six hours by road from Guatemala's capital.

■ The Air Force delivered aid to flood-ravaged central China in August. A C-141 from McChord AFB, Wash., hauled 20 tons of water, blankets, tents, and plastic sheeting to the region, where an estimated 2.9 million people have been left homeless by fierce rains.

■ AFRC officials opened the new Eastern Regional Flight Training Facility at Dobbins ARB, Ga., July 24, ushering in a new era of better ground training for C-130 crews. The highlight of the facility is a state-of-the-art C-130H2 weapon system trainer. "It absolutely mirrors what our weapon system is like," said Maj. Gen. James E. Sherrard III, 22d Air Force commander (nominated as chief, Air Force Reserve), after trying it out.

■ During an Aug. 16 visit to Ramstein AB, Germany, Assistant Secretary of Defense for Health Affairs Dr. Sue Bailey lauded Air Force medical units that helped evacuate victims of the US embassy bombings in Africa. Ramstein-based USAF specialists evacuated 15 patients—10 Americans and five Kenyans—two days after the Aug. 7 attacks. Three days later they returned to gather up seven more Kenyan patients. "The senior leadership in Washington understands the job and how well it was done," said Bailey. "It's been said that they were heroes bringing out heroes. This is military medicine at its very best."

■ Civil Air Patrol searchers from the Rapid City, S.D., CAP squadron found a downed civilian airplane Aug. 1. The aircraft, which had been missing since July 26, was located in a mountainous region west of Deadwood, S.D. Owner/pilot Peter Torino of Brookings, S.D., and his wife, Sandra, were killed in the crash.

■ An Air Force Research Laboratory civilian assigned to the Directed Energy Directorate has been awarded the rank of fellow by the Optical Society of America. LaVerne A. Schlie, a research physicist in the directorate's laser application branch, was recognized for pioneering continuous wave and pulsed photolytic iodine lasers with excellent optical properties.

■ The late Maj. Gen. Harry G. Armstrong, founder of the Air Force Aerospace Research Laboratory at Wright–Patterson AFB, Ohio, was inducted posthumously into the National Aviation Hall of Fame in a Dayton, Ohio, ceremony. Among the items Armstrong personally developed during his long career, which ended with his retirement in 1958, were soundproof flying helmets, aircraft oxygen systems, shoulder-type safety belts, and the human centrifuge.

■ Twenty-four crew members from the 3d Airlift Squadron and 9th AS made a world record C-5 airdrop at Yuma Proving Ground, Ariz., this summer. The 42,000-pound load was slowed by parachutes 156 feet in diameter—the largest recovery chutes ever used.

■ US Air Forces in Europe will conduct a demonstration of its new Humanitarian Expeditionary Force concept some time next year, according to Gen. John P. Jumper, USAFE commander. The HEF will be composed of C-130 and possibly C-17 transports and medical, engineer, security forces, command-and-control, and civil affairs units.

■ The Armed Forces Service Medal has been approved for US military members who participated in Operation Provide Comfort, according to Air Force Personnel Center officials. Eligibility is limited to those who participated in the designated area of OPC for at least one day between Dec. 1, 1995, and Dec. 31, 1996. ■

Senior Staff Changes

RETIREMENTS: Maj. Gen. Gary L. **Curtin,** Gen. Howell M. **Estes** III, Lt. Gen. Lawrence P. **Farrell** Jr., Maj. Gen. Kenneth R. **Israel,** Lt. Gen. Michael D. **McGinty,** Brig. Gen. James E. **Miller,** Lt. Gen. Richard T. **Swope.**

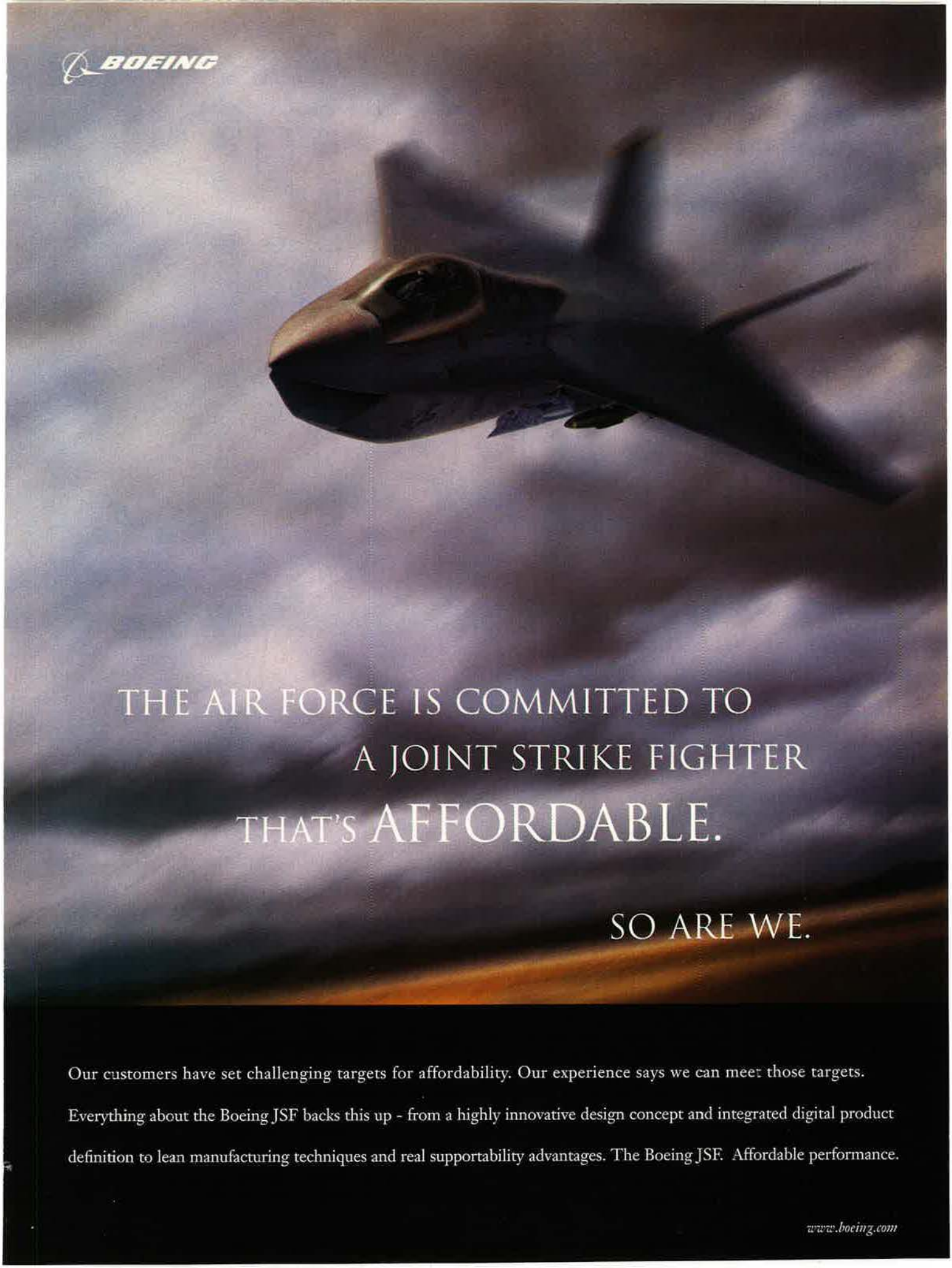
NOMINATION: To be **Major General:** William A. **Moorman.**

CHANGES: Brig. Gen. Walter E.L. **Buchanan** III, from Dep. Dir., Reaction Force Air Staff, Allied Command Europe, NATO, Kalkar, Germany, to Cmdr., 325th FW, AETC, Tyndall AFB, Fla. ... Maj. Gen. Donald G. **Cook,** from Cmdr., 20th AF, AFSPC, F.E. Warren AFB, Wyo., to Dir., Expeditionary Aerospace Force Implementation, Air & Space Ops., USAF, Pentagon ... Brig. Gen. Robert R. **Dierker,** from Dep. Dir., Intl. Negotiations, Jt. Staff, Pentagon, to Cmdr., 51st FW, PACAF, Osan AB, South Korea ... Brig. Gen. Paul R. **Dordal,** from Cmdr., 51st FW, PACAF, Osan AB, South Korea, to Vice Cmdr., 7th AF, PACAF, Osan AB, South Korea ... Brig. Gen. Howard J. **Mitchell,** from Dir., Space Sys., and Dir., Natl. & Scientific Sys., Asst. SECAF for Space, Pentagon, to Natl. Security Space Architect, USD for Acq. & Tech., Alexandria, Va.

Maj. Gen. Thomas H. **Neary,** from Dir., Nuclear & Counterproliferation, Air & Space Ops., USAF, Pentagon, to Cmdr., 20th AF, AFSPC, F.E. Warren AFB, Wyo. ... Brig. Gen. Norton A. **Schwartz,** from Cmdr., Spec. Ops. Command Pacific, PACOM, Camp H.M. Smith, Hawaii, to Dir., Strategic Planning, P&P, USAF, Pentagon ... Maj. Gen. Charles F. **Wald,** from Dir., Strategic Planning, P&P, USAF, Pentagon, to Vice Dir., Strategic Plans & Policy, Jt. Staff, Pentagon ... Maj. Gen. Herbert M. **Ward,** from Dep. Dir., Ops., Tng., & Space Integration, Air & Space Ops., USAF, Pentagon, to Dir., Spec. Prgms., USD for Acq. & Tech., Pentagon.

SENIOR ENLISTED ADVISOR CHANGES: CMSgt. Ronald W. **Crowl** to PACAF, Hickam AFB, Hawaii ... CMSgt. Dennis **Fritz** to AFSPC, Peterson AFB, Colo. ... CMSgt. Kenneth F. **Van Holbeck** to AMC, Scott AFB, Ill.

SENIOR EXECUTIVE SERVICE CHANGES: William K. **At Lee** Jr., to Dep. General Counsel, Mil. Affairs, USAF, Pentagon ... Robert E. **Corsi** Jr., to Dep. Dir., Manpower, Orgn., & Quality, USAF, Pentagon ... Brendan B. **Godfrey,** to Exec. Dir., HSC, Brooks AFB, Texas ... Vincent J. **Russo,** to Exec. Dir., ASC, Wright–Patterson AFB, Ohio ... Margaret **Zook,** to Chief, Aircraft & Missile Spt. Div., Directorate of Supply, USAF, Pentagon. ■



Our customers have set challenging targets for affordability. Our experience says we can meet those targets. Everything about the Boeing JSF backs this up - from a highly innovative design concept and integrated digital product definition to lean manufacturing techniques and real supportability advantages. The Boeing JSF. Affordable performance.

www.boeing.com

The threat of ballistic missile attack is growing much faster than had been anticipated by US intelligence agencies.

Missile Threats and Defenses

By Bill Gertz

THE threat of long-range missile attack against the United States continues to grow, and Washington now is moving quickly to prepare to field defenses against such systems. This campaign comes on top of the existing efforts to deal with theater range missile threats to deployed American military forces.

The threat was highlighted recently by three flight tests of new medium-range missiles—in Iran, North Korea, and Pakistan—and development of new intercontinental-range weapons in China and Russia.

A new report prepared by a blue-ribbon congressional panel presents an alarming picture of a "no warning" missile threat emerging around the world, created by states that see missiles as premier weapons for power projection and war.

For the Pentagon, the bottom line is this: The threat of short-range missile attack on deployed US forces is here now. The even more dangerous threat of long-range missile strikes against US territory will

The use of an actual Scud missile launcher, shown here in New Mexico, adds a touch of realism to military exercises. Counteracting such theater missiles is still the Pentagon's first priority despite evidence that the long-range missile threat is escalating.

DoD photo by PH1 (NAC) Stephen Baliz

emerge in the not too distant future.

The Pentagon's Ballistic Missile Defense Organization will be spending billions over the next few years on theater missile defense programs to thwart short- and medium-range missiles fired in terror attacks or during major regional warfare.

BMDO this spring took a major stride toward building a National Missile Defense system with its award of a $1.6 billion contract to Boeing as the "lead systems integrator" for a three-year program to put together all the pieces of a complex NMD system.

The most alarming news from Washington was the July report of the Commission to Assess the Ballistic Missile Threat to the United States, a bipartisan, congressionally appointed panel of experts headed by former Defense Secretary Donald H. Rumsfeld. Members had unlimited access to all US intelligence data on emerging missile threats. After reviewing this top secret material, the panel concluded that nations like Iran and North Korea are much closer to fielding long-range missiles than US intelligence agencies had previously estimated.

Little or No Warning

"We see an environment of little or no warning of ballistic missile threats to the United States from several emerging powers," Rumsfeld said. He noted that missile development is getting a boost from technology sold by established missile powers like Russia and China.

The Air Force's National Air Intelligence Center, which specializes in tracking worldwide ballistic missile developments, made much the same point. In a report issued in May, the center asserted that more than 25 nations have ballistic missiles and that future conflicts involving US forces likely will involve missile exchanges. The center also issued a warning about the proliferation of ground-hugging cruise missiles. It said that, though these systems are not yet spreading at the same rate, many nations will field them in the next decade.

For many nations, missiles are attractive weapons, inasmuch as they provide effective attacks against nations with formidable air defenses or where aircraft strikes are impractical or costly. While Russia and China are building new strategic systems, North Korea and Iran are working on missiles with ranges of more than 1,000 miles. The expectation is that these latter systems will be fitted with Weapons of Mass Destruction, the center states.

In April, Pakistan test fired its new Ghauri missile, an 800-mile-range weapon that US intelligence officials say appears identical to North Korea's No Dong. "It looked like they took a No Dong and painted it green," said one official.

Then in July, Iran sent shock waves throughout the Middle East with its first test firing of the new Shahab 3 medium-range ballistic missile. Only days earlier, the Rumsfeld commission warned that a Shahab 3 test was

imminent and that its deployment would follow soon thereafter. The Shahab 3 can strike nations and US forces throughout the Mideast.

From the Far East came a warning from a US commander of forces in Northeast Asia. He claimed North Korea has completed development of the No Dong missile, with its 800-mile range, and that the system is now fielded. The missile now threatens US troops based in Japan and Okinawa, he said. North Korea made a successful launch Aug. 31 of a new, 1,000-mile range Taepo Dong 1.

National Missile Defense Elements

Ground-based Interceptor. State-of-the-art, cost-effective, lightweight, nonnuclear, hit-to-kill system. Has two major elements—Exoatmospheric Kill Vehicle and fixed, land-based EKV booster.

Ground-based radar. X-band, phased array sensor for target tracking and discrimination.

Upgrades to early warning radars. Modification of existing forward-based attack warning system to complement operation of an NMD system.

Battle management/C^3. Integration of interceptor and sensor operations communications architecture.

Space sensor. Long wavelength, infrared early warning satellite such as Space Based Infrared System.

Theater Missile Defense Programs

Patriot Advanced Capability 3 (PAC 3). Army system for low-altitude interception of short- and medium-range warheads fired at troops and fixed assets.

Navy Area BMD Program. Low-altitude interception system based on Navy AEGIS cruisers and destroyers, using AN/SPY-1 radar and AEGIS Combat System computers and Standard Missile 2 Block IV. Defense against short- and medium-range missile attacks.

Theater High Altitude Area Defense. Ground-based Army system for interception of longer-range missiles at high altitude. Exo- and endoatmospheric hit-to-kill engagements.

Navy Theater Wide BMD Program. Sea-based system using Navy AEGIS system and improved, longer-range interceptor missile for exoatmospheric engagement of missiles.

Airborne Laser. Air Force program to integrate a high-power laser on a wide-body aircraft to attack ballistic missiles in boost phase.

No Patriot anti-missile systems have been deployed at Japanese sites to defend against the new threats, though Patriots are based in South Korea as shields against shorter range Scud missiles. "No Dong is now a viable system," the officer said.

The CIA reported in May that 13 of China's 18 long-range missiles are targeted on US cities. The report, circulated within government, contrasted sharply with statements by President Clinton that no missiles are pointed at the United States.

As if to highlight its growing missile capabilities, China conducted a rocket motor test of its new DF-31 ICBM on July 1 as the President visited China. US intelligence agencies detected the ground test of the motor that will power China's new mobile ICBM, which is expected to be deployed in the next two years.

"Significant Threat"

The ICBM will give China new strategic capabilities, according to Air Force intelligence sources, that will be difficult to counterattack at any stage of its operation. They predict the DF-31 will pose a significant threat to US forces deployed in the Pacific theater, portions of the continental United States, and many US allies. The missile will be extremely hard to detect because of its mobility and will be able to hit portions of the western United States.

A Pentagon official also noted recently that DoD had detected a surge in Chinese production of its CSS-4 Mod 2 ICBM. In the first four months of the year, Beijing produced six new ICBMs and will produce two more before temporarily closing operations as part of a two-year defense industry restructuring.

China also is building a second new ICBM called the DF-41 with an estimated range of more than 7,000 miles that is expected to be deployed, on mobile launchers as well, soon after the DF-31 is fielded. The threat from China was revealed in a new defensive strategy report released by Beijing in July.

Russia, too, is modernizing its ICBM force. The NAIC report noted that the first new silo-based SS-X-27 was deployed in recent months and that future variants will go on mobile launchers. The center's report states that Russia continues to invest heavily in its strategic missile force, and most of its ICBMs are still on alert, capable of being launched within minutes of receiving a launch order. Russia, despite severe economic problems, expects to maintain the largest force of land-based strategic missiles in the world, according to the center.

Air Force Lt. Gen. Lester L. Lyles, the BMDO director, spoke recently to *Air Force* Magazine about emerging threats and planned responses. The general said the recent medium-range missile tests and the Rumsfeld commission assessment of emerging threats have not altered the Clinton Administration's current "3+3" National Missile Defense program.

The program called for spending three years developing technical capabilities for a nationwide American defense system and then, in 2000, making a decision about whether the threat warrants a three-year drive to actually deploy a limited system (by 2003). This initial system could handle attacks from only a few missiles; it could not withstand an all-out missile assault of the kind that could be generated by Russia.

The Hedge Program

"In some respects, 3+3 was always devised as sort of a hedge program," Lyles said, when asked how recent developments have affected his work. "We've always considered that a threat may materialize very quickly. So the first three years of our program of development and testing really is not impacted. We don't think we can go any quicker. It's already high-risk."

The international missile danger was highlighted by CIA's annual missile threat estimate earlier this year. The assessment stated that

North Korea's longest-range missile, the Taepo Dong 2, could be flight-tested by 2002—a full year before anti-missile systems could be deployed under the 3+3 plan.

The Taepo Dong 2, with a range of 2,500 to 3,700 miles, is capable of hitting Alaska and Hawaii. With a smaller payload, the missile's range could be extended to 6,200 miles, placing at risk an arc of US territory extending from Arizona to Wisconsin.

"There is evidence that North Korea is working hard on the Taepo Dong 2 ballistic missile," the Rumsfeld commission report notes. "Once the system is assessed to be ready, a test flight could be conducted within six months of a decision to do so." If the test is a success, the Taepo Dong 2 "could be deployed rapidly," warned the Rumsfeld report.

In addition, the North Koreans are active proliferators of their missiles and could be expected to transfer the Taepo Dong 2 or its technology to states such as Iran or Iraq. North Korea's communist government recently admitted that its missile sales are a major source of hard currency for the cash-strapped regime.

The National Missile Defense architecture calls for a system that will cost about $8 billion to develop and deploy. It will be designed to have a very high probability of success of protecting all 50 American states against a limited long-range missile attack by systems with nuclear, biological, or chemical weapons.

One key NMD component is the ground-based interceptor. It will be deployed to fire at incoming missile warheads and destroy them in space by force of impact. A warhead "kill vehicle" packed with sensors, motors, guidance, and computers will sit atop the interceptor booster. The booster will propel the kill vehicle to an area close to the incoming enemy warhead and it will then maneuver itself to ram the target.

For the interceptor, Boeing is looking at using a converted Minuteman III booster outfitted with new upper stages and a totally new booster. However, Pentagon officials say the company's likely choice will be a completely new missile for the ground-based interceptor.

The NMD will include networks of advanced radars to perform a variety of functions. Key elements will be X-band radars deployed in Alaska, California, and on the East Coast to provide acquisition, tracking, warhead discrimination, and kill assessment. The X-band systems will use high frequencies and advanced radar signal processing technology with the goal of improving the defense system's ability to hit incoming warheads, even in the presence of debris and penetration aids designed to fool missile defenses.

Cold War Systems

US early warning radar systems, set up during the Cold War, would be upgraded to improve capabilities for tracking ballistic missiles. Upgraded early warning radars are intended to be used as stopgaps until the Air Force's Space Based Infrared System is deployed. The mission of the early warning radars is to detect and track missiles during their midcourse phase to provide cueing data for the more precise X-band radar.

A constellation of SBIRS satellites will be deployed in two modes—Low Earth Orbit and High Earth Orbit—and will replace the current Defense Support Program satellites missile detection system. SBIRS Low satellites will acquire and track missiles throughout flights and will provide the National Missile Defense with over-the-horizon capability which will increase warning and reaction time for the battle management component of the system. SBIRS High will provide complete missile-launch detection throughout the northern hemisphere and most of the southern hemisphere. Its functions will include warning of missile launches, missile tracks through engine burnout, launch point, and initial impact point prediction, and target handover to ground-based radar.

Battle management systems will serve as the brains of the entire NMD system and will be located within Cheyenne Mountain AS, Colo. Should a long-range missile be fired, the North American Aerospace Defense Command commander in chief will set in motion everything needed to shoot out a warhead in space. NORAD will have extensive decision support systems, battle management displays, intelligence reports, tracking data, and communications networks.

Gen. Howell M. Estes III is the former commander in chief of NORAD and US Space Command. The officer in that position is the one who would be the chief missile defense warfighter in charge of the NMD. Now retired, Estes said he sees the threat of long-range missiles coming sooner rather than later.

"I would tell you that, in the year 2020, the issue of ballistic missiles is going to be upon us," the retired four-star Air Force general said. "It will be in the hands of people who are not going to be deterrable." The large US arsenal deterred an attack by Russia during the Cold War, but rogue states are not likely to be held at bay by the threat, he said.

With missile threats growing, the American people will eventually demand to be defended, said Estes. "I don't think the American public is going to stand for the notion that they are under risk from somebody [who] actually might use one of these things against us," Estes said, "and the time to sort that out, to have a protective system in place, is not after we have an impact here on US soil, whatever part."

Don't Be Late

He is cautious in calling for immediate deployment of a National Missile Defense—a step which the Clinton Administration opposes—and said he favors the 3+3 program, as long as it is not built too late. "It can't be late to need," he said. "We've got to get the thing out there, and that is what 3+3 is all about."

The current budget for all ballistic and cruise missile defense programs is $3.8 billion. The Fiscal 1999 budget request is $3.6 billion.

Now looming over the NMD program is the delicate political issue of the 1972 Anti-Ballistic Missile Treaty. Administration officials have called the treaty the "cornerstone" of US–Russian strategic relations. Clinton's top arms advisors have set out to protect the pact from what they see are efforts by missile defense advocates to jettison the treaty as a Cold War relic that does little except hamstring construction of effective defenses.

The Administration has engaged in protracted negotiations with Moscow to clarify whether theater defense is covered by the treaty, even though the original treaty limited its provisions to strategic defenses against long-range missiles. Last year, President Clinton and Russian President Boris Yeltsin agreed on a

"demarcation" agreement that sought to clarify what US theater defenses are allowed.

Critics among Republicans in Congress see the demarcation agreement as hindering development of effective missile defenses, both theater and national.

The ABM Treaty prohibits deployment of nationwide defenses against strategic missiles and bars certain testing of components of what could be a nationwide defense. As theater missile threats increase and ballistic missile defense becomes more sophisticated, weapons designers are encountering problems that were not anticipated by the treaty.

Defense Department officials said the US can develop and possibly deploy an NMD within the treaty's limitations and, if it cannot, then Washington will seek to change the pact. "We will do the development in a treaty-compliant manner," Lyles said. "But when it comes time [for] a decision to deploy, we will do whatever is necessary to provide protection for the United States. That's the guidelines under which we're working."

For Boeing, the ABM Treaty poses no restrictions on what it might choose to study. As for whether the 3+3 system would be located at a single, ABM Treaty–compliant site, Lyles said the number of sites will be based on where the threat emanates. A single treaty-compliant site for NMD interceptors could protect the entire United States but only from "some threats," he said.

Options under consideration include putting a single site at Grand Forks, N.D.; a single site in Alaska to deal with the most immediate threat of a North Korean Taepo Dong 2; or multiple sites on both US coasts. "We're developing the program to be flexible to respond to wherever the threat might be," Lyles said.

Pentagon planners are looking at the Rumsfeld commission's findings as they would relate to the deployment years of the plan, Lyles said. "We're obviously looking at various options relative to funding the program."

Tough Deadline

Lyles acknowledged he is facing a tough deadline for the National Missile Defense plan and he also recognizes the urgent need to push ahead with the theater defenses, despite five intercept test failures of the newest and first dedicated anti-missile system, known as THAAD for Theater High Altitude Area Defense. The THAAD test failures are a setback, but the Pentagon plans to keep going and BMDO took steps to restructure the program recently in order to keep it on track for a target deployment of 2006. The system is urgently needed by commanders in South Korea and Japan.

Martin S. Indyk, assistant secretary of state for Near Eastern Affairs, sees a bigger threat emanating from Iran: a longer-range version of its Shahab 3 missile, one known as Shahab 4.

"We have to be concerned not only about the Shahab 3 but about the Shahab 4 as well," said Indyk. He said it is "a long-range ballistic missile system which would present an even greater threat and which will require foreign technology of a more sophisticated nature than the Iranians were able to acquire for the Shahab 3."

US intelligence agencies estimate that the Shahab 4 will have a range of up to 1,240 miles, enough to hit targets as far away as Central Europe. More alarming is the fact that Iran also has undertaken an active and clandestine nuclear weapons program, Indyk said.

BMDO's Joint Program Office awarded the three-year NMD contract to Boeing, which beat out a consortium of contractors headed by Lockheed Martin for the job of piecing together an NMD. The program is headed by Boeing's John Peller, a vice president who handled several major programs for the aerospace giant, including the space shuttle and development of commercial airliners.

Peller said the program is off and running. The company built a staff of about 1,200 and is pushing hard to keep itself on the aggressive schedule for an integrated NMD system test in late 1999 or early 2000. Aside from the tough schedule, said Peller, "I have no doubt about the technical ability of this system to work."

Boeing's job will be to develop and put together all the elements of the nationwide missile defense, including a ground-based missile interceptor that will launch on demand and destroy attacking missiles in outer space.

Not a Program—A Mission

Peller is well aware of the threat driving the program. "Most Americans believe the United States is protected against an enemy attack by intercontinental ballistic missiles, but it isn't," he said. "While our troops overseas have some protection against such attacks, our homeland doesn't. Because of that, this is not just another program to us. We look at it as a mission."

Strategic Ballistic Missiles

Missile	Producer	Exports	Fuel	Range	Basing
SS-18 Mod 4	Russia	n/a	liquid	5,500+	silo
SS-18 Mod 5	Russia	n/a	liquid	6,000+	silo
SS-19 Mod 3	Russia	n/a	liquid	5,500+	silo
SS-24 Mod 1	Russia	n/a	solid	5,500+	rail mobile
SS-24 Mod 2	Russia	n/a	solid	5,500+	silo
SS-25	Russia	n/a	solid	7,000+	road mobile
SS-X-27	Russia	n/a	solid	7,000+	silo/road mobile
SS-N-6	Russia	n/a	liquid	1,500+	submarine
SS-N-8	Russia	n/a	liquid	5,000+	submarine
SS-N-18	Russia	n/a	liquid	3,500+	submarine
SS-N-20	Russia	n/a	solid	5,500+	submarine
SS-N-23	Russia	n/a	liquid	5,000+	submarine
SS-NX-28	Russia	n/a	solid	5,000+	submarine
CSS-3	China	n/a	liquid	3,400+	silo/mobile
CSS-4 Mod 1	China	n/a	liquid	8,000+	silo
CSS-4 Mod 2	China	n/a	liquid	8,000+	silo
DF-31	China	n/a	solid	4,500+	road mobile
Unnamed	China	n/a	solid	7,000+	mobile
CSS-NX-3	China	n/a	solid	1,000+	submarine
JL-2	China	n/a	solid	4,500+	submarine
Sagarika	India	n/a	unknown	180+	submarine

To counter the immediate threat of short- and medium-range missiles deployed in areas where US troops are based overseas or that threaten US allies that are under US protective agreements, BMDO has several theater missile defense systems under way. They include THAAD, which will be deployed and operated by the US Army, the Patriot Advanced Capability 3, which will be a hit-to-kill version of the Patriots used during the Persian Gulf War to stop incoming Iraqi Scud missiles, and two sea-based US Navy defenses.

"We still have some very, very strong and big technical challenges ahead of us in all our programs, particularly ones that have a hit-to-kill lethality methodology, like THAAD, the new PAC 3, even Navy Upper Tier," Lyles said.

The current Army PAC 2 system, being deployed, relies on an explosive warhead detonating close to an incoming missile. All future missile defenses will be nonexplosive kinetic energy systems.

The Navy Area Ballistic Missile Defense Program, aimed at providing lower tier defense, is based on ship-fired interceptor missiles (Standard Missile 2 Block IV) controlled by the sophisticated AEGIS battle management system, found on most modern cruisers and destroyers. The AEGIS battle management system is built around a large phased array radar system that is capable of tracking objects hundreds of miles, including objects in space.

The upper tier Navy system is called Navy Theater Wide BMD Program, which will be the sea-based equivalent of THAAD and which will be able to provide defense against medium- and long-range theater missiles over wide areas. It will also make use of AEGIS–equipped ships and the Standard Missile 2 modified with a kill vehicle. When linked with tracking and cueing information supplied by space-based sensors, such as the SBIRS, the Navy Theater Wide is expected to be one of the most formidable missile defense weapons. Rear Admiral Rodney P. Rempt, the Navy's program executive officer for theater air defense, believes a complete Navy Theater Wide system could be deployed with the fleet by 2005 or 2006 and that with an additional $2 billion to $3 billion a well-engineered wide area missile defense at sea could be built in 36 to 40 months. The first units of the system could come on line as early as 2003.

The Air Force is in charge of one of the most revolutionary regional missile defenses—a high-powered Airborne Laser. In July, the Air Force announced it is moving into the next phase of designing the laser weapon and is on target for a test missile shoot down in 2002. Lyles said the ABL is a very important part of the theater missile defense efforts because it is the sole boost-phase element in what should be a layered defense against the missile threat.

"I think it has the potential of not only revolutionizing some part of missile defense, particularly the boost-phase capability, but that kind of technology has the potential of revolutionizing air warfare," he said. "To me, it portends what we are going to be doing in war, more so in the future."

Estes also sees space weapons as one potential way of countering missiles, but he recognizes the political realities as well. "Our nation is not going to put weapons in space until the national security is threatened," he said. What would lead to the use of space weapons? "When there is a threat to our country and the best way to handle it is to go to space," Estes said. "When does that happen? I don't know, but I can sure see one out there: the proliferation of ballistic missiles.

"If in fact we find that at some point in the future ballistic missiles have been proliferating sufficiently that the limited system we are developing—which is a 'catch' system, a system of last resort—then we're going to decide that if our national security is threatened, then we might be better off moving to space for this mission," he said. ■

Substrategic Ballistic Missiles

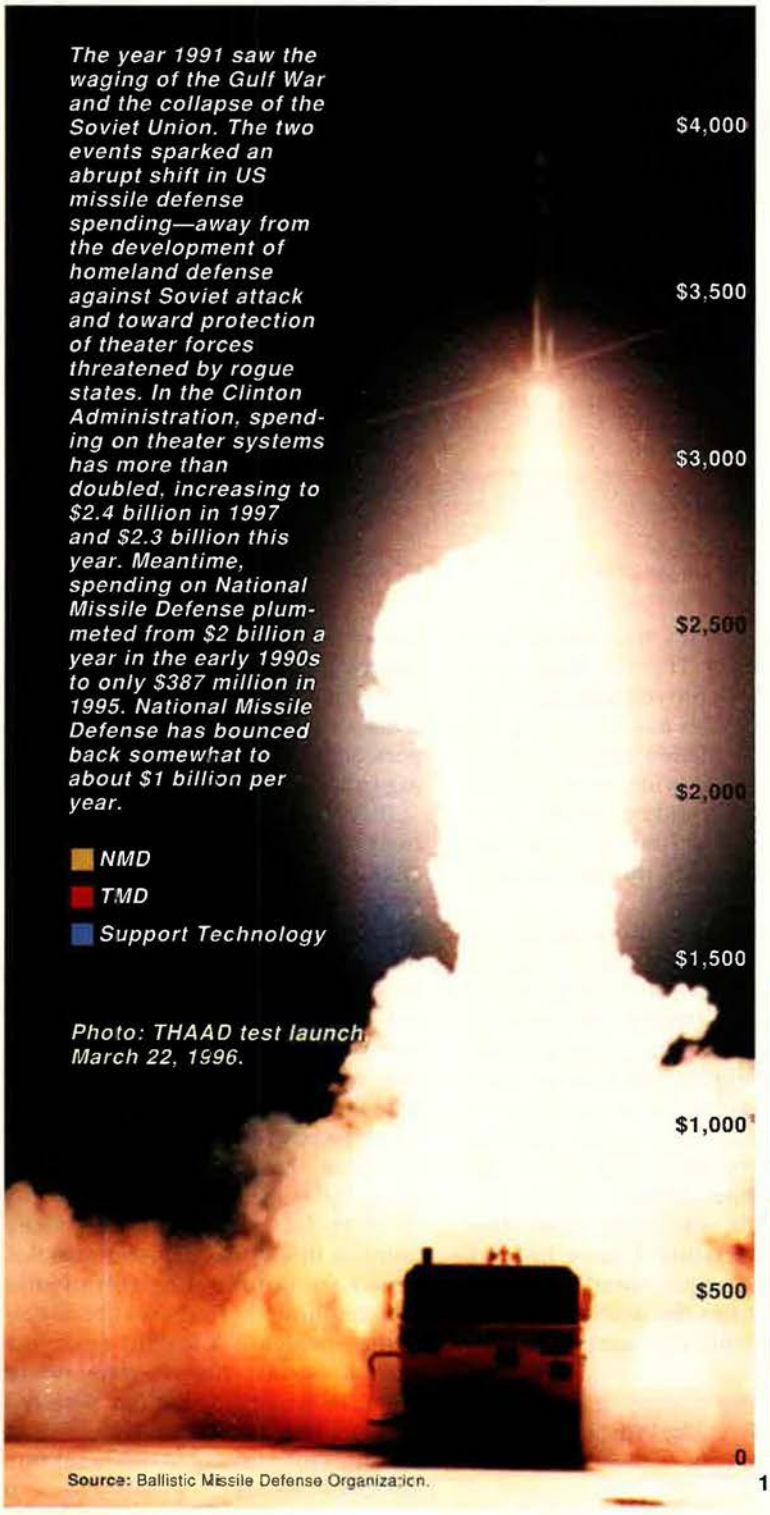
Missile	Producer	Exports	Fuel	Range	Basing
SS-1c Mod 1	Russia	many	liquid	185	road mobile
SS-1c Mod 2	Russia	many	liquid	150+	road mobile
SS-21 Mod 2	Russia	many	solid	47	road mobile
SS-21 Mod 3	Russia	many	solid	75	road mobile
SS-23	Russia	many	solid	185+	road mobile
SS-X-26	Russia		solid	185+	road mobile
CSS-2	China	Saudi Arabia	liquid	1,750	unknown
CSS-5 Mod 1	China		solid	1,100+	road mobile
CSS-5 Mod 2	China		solid	1,100+	road mobile
CSS-6	China		solid	370	road mobile
CSS-X-7	China	Pakistan	solid	185	road mobile
CSS-8	China	Iran	mixed	93	road mobile
No Dong	N. Korea		liquid	600+	road mobile
Taepo Dong 1	N. Korea		liquid	925+	unknown
Taepo Dong 2	N. Korea		liquid	2,500–3,700	unknown
Scud B	N. Korea	many	liquid	185	road mobile
Scud C	N. Korea	Iran, Syria	liquid	310	road mobile
Agni	India		mixed	1,250	unknown
Unnamed	India		solid	1,250+	road mobile
Prithvi I	India		liquid	93	road mobile
Prithvi II	India		liquid	155	road mobile
Unnamed	Pakistan		liquid	700+	road mobile
Hatf 1	Pakistan		solid	50	road mobile
Unnamed	Pakistan		solid	350+	road mobile
Vector	Egypt		solid	425+	road mobile
al Hussein	Iraq		liquid	350+	road mobile
al Samoud	Iraq		liquid	90+	road mobile
Shahab 3	Iran		liquid	700+	road mobile
Shahab 4	Iran		liquid	1,000+	unknown

Bill Gertz covers national security affairs and defense for the Washington Times. *His most recent article for* Air Force *Magazine, "The Chinese Buildup Rolls On," appeared in the September 1997 issue.*

The Chart Page

By Tamar A. Mehuron, Associate Editor

Theater vs. Homeland

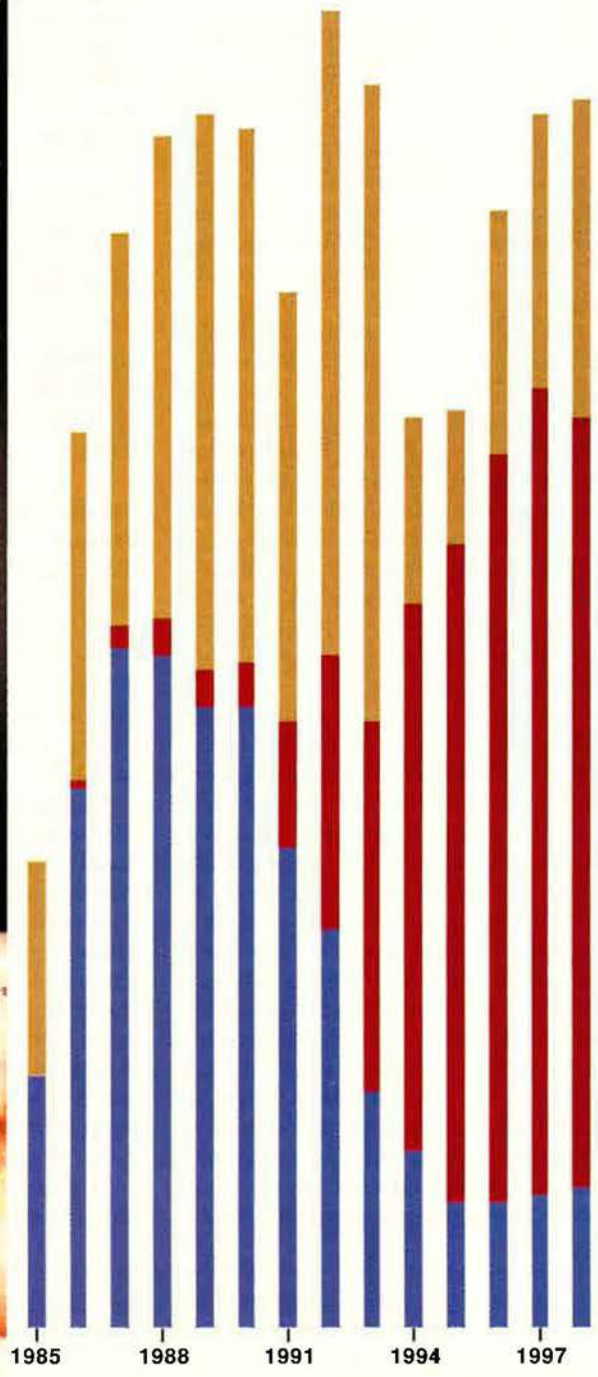


The year 1991 saw the waging of the Gulf War and the collapse of the Soviet Union. The two events sparked an abrupt shift in US missile defense spending—away from the development of homeland defense against Soviet attack and toward protection of theater forces threatened by rogue states. In the Clinton Administration, spending on theater systems has more than doubled, increasing to $2.4 billion in 1997 and $2.3 billion this year. Meantime, spending on National Missile Defense plummeted from $2 billion a year in the early 1990s to only $387 million in 1995. National Missile Defense has bounced back somewhat to about $1 billion per year.

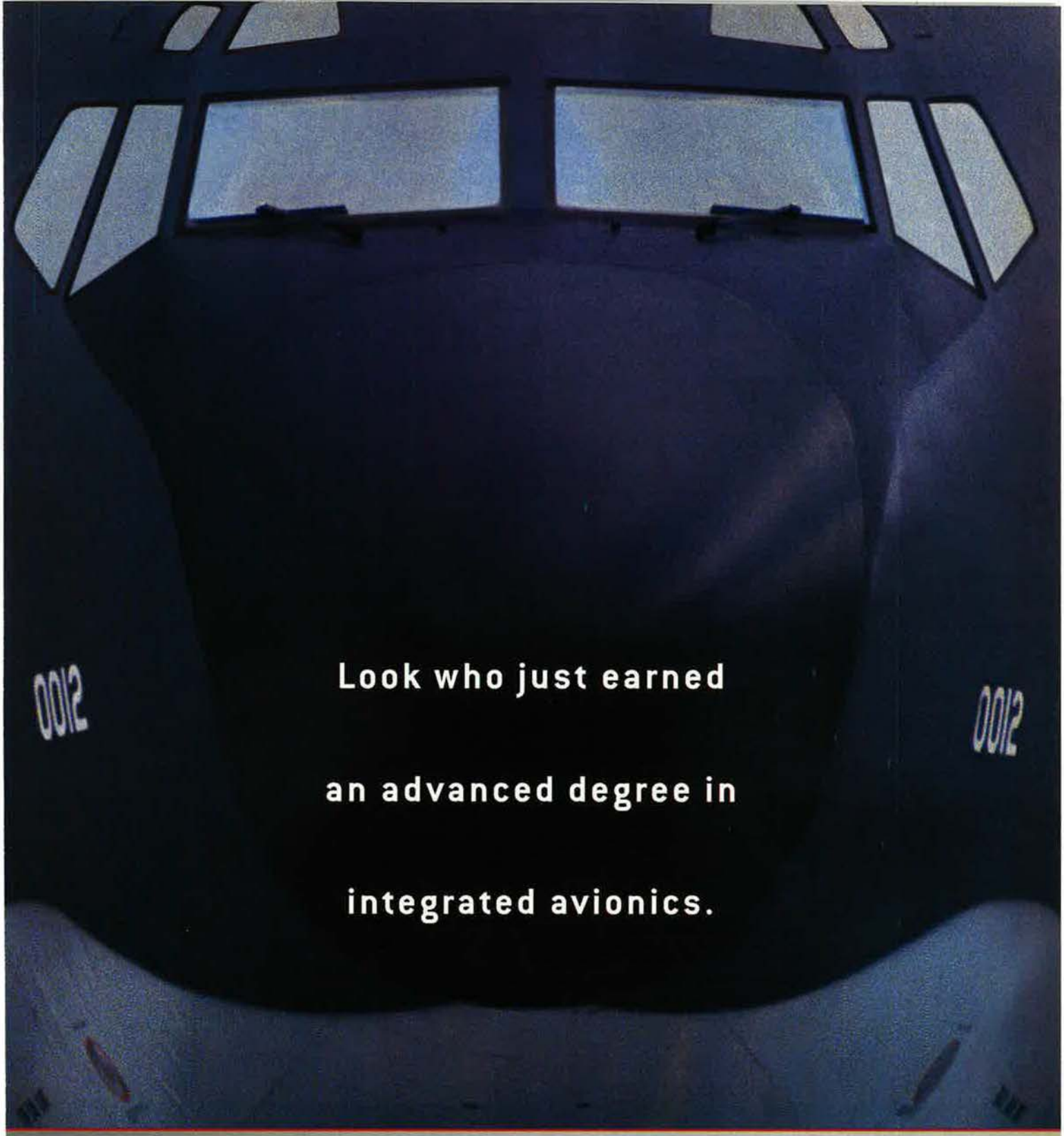
NMD
TMD
Support Technology

Photo: THAAD test launch, March 22, 1996.

US Spending on Ballistic Missile Defenses Since 1985 (millions)



Source: Ballistic Missile Defense Organization.



Look who just earned an advanced degree in integrated avionics.

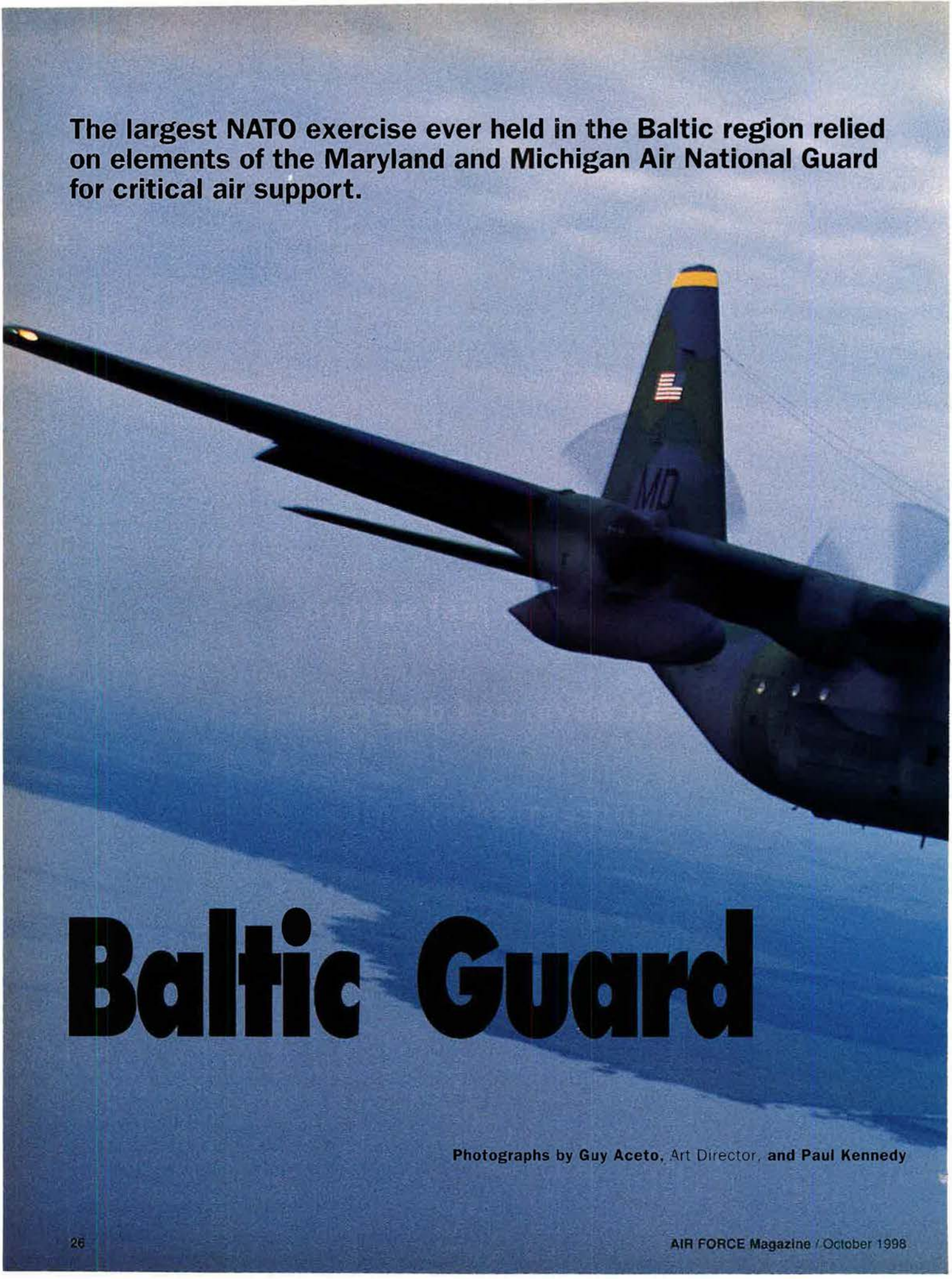
THE KC-135 HAS MOLDED HISTORY. Today it defines the future. Under the Air Force's Pacer CRAG program, we're retrofitting 600 KC-135s with our integrated, flexible FMS-800 flight management system. The only MIL-qualified FMS in existence to undergo FAA certification. To give pilots greater awareness. To reduce workload. To enable a seamless merge into tomorrow's GATM environment. In addition, the upgrade includes color flat-pane displays, forward-looking color weather radar and an embedded INS/GPS navigation system. With standard interfaces and an open architecture for COTS. We're integrating similar systems on a variety of other platforms. Including tankers, transports, bombers and surveillance aircraft. So, graduate to a flight deck that's mission ready for the next generation. And the generation after that.

Call 319.295.5100.

www.collins.rockwell.com/government-systems

Rockwell Collins

The largest NATO exercise ever held in the Baltic region relied on elements of the Maryland and Michigan Air National Guard for critical air support.



Baltic Guard

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

Over the coast of the Baltic Sea, a Maryland Air National Guard C-130 joins up on the wing of another Hercules from the 135th Airlift Squadron, wrapping up a mission during Baltic Challenge '98. The transports were based at the small airport at Palanga, Lithuania, for the two-week multinational peacekeeping exercise, in which Air Guard units played an essential tactical lift role. Baltic Challenge '98 was conducted under the auspices of the Partnership For Peace, which creates cooperative opportunities for the militaries of prospective and established NATO members.

Staff photo by Guy Aceto

Photos by Paul Kennedy

It's a long haul from Martin State Airport, just east of Baltimore, to Lithuania, especially if you're doing it in a C-130. Two transports from the Maryland Air Guard made the trip in July, hooking up with Michigan ANG crews. Together, they provided a significant part of the airlift component of this year's Baltic Challenge. The exercise brought together about 4,500 troops from 11 European countries and the US for training in peacekeeping and support, making it one of the largest exercises in Europe this year. The multinational force practiced everything from defense against snipers to mine countermeasures and paradrops of military and humanitarian supplies.

Getting there was no small achievement. It was a seven-plus-hour flight from Maryland to Keflavik, Iceland, and, after an evening of crew rest, another five hours to Palanga. The trip was long and tiring, especially for the flight deck crew, which had to navigate much of the way over the featureless North Atlantic. Capt. Scott Pinkham, above, checks fuel consumption tables, while 1st Lt. Gary Bernard, right, consults a map for the next waypoint. Veterans of deployments like this know the drill: a succession of snacks and attempted catnaps, lulled by the drone of the C-130's turboprops.

Staff photos by Guy Aceto

From time to time, the clouds broke, and passengers took turns at the window to enjoy one of the few perks of military cargo seating: Spectacular views that most airline customers will never see. At left, glaciers on the southern tip of Greenland surrender icebergs to the ocean.

Staff photos by Guy Aceto

The two C-130s finally reached their destination: an alert strip turned regional airport, just north of Palanga. At left, one taxis to a parking spot, aided by a Michigan Air Guardsman, who, with fellow Guardsmen, had arrived a few days earlier to set up support for the two transports.

Before long, the airport buzzed with activity as airplanes ferried in the exercise participants. Airborne troops from Estonia and Latvia arrived alongside members of the Michigan and Pennsylvania Army National Guard. The ANG aircraft shared ramp space with Antonov cargo airplanes and helicopters as well as Czech trainers and US Army Black Hawks. At right, a C-130 takes on fuel as it gets ready for its next sortie.

Photo by Paul Kennedy

Jointness: A five-man Combat Control Team from the Kentucky ANG—lofted by a Lithuanian Mi-2 helicopter—jumped ahead of other forces to establish control at the drop zones. Here, TSgt. William Hill inspects the Mi-2, while SSgt. Stephen Danforth checks out the seating arrangements within. The exercise provided many such unique opportunities to get closely acquainted with foreign gear. The Kentucky team also jumped from a number of other aircraft types.

Photo by Paul Kennedy

There was no shortage of volunteers when it came time for the jump segment of the exercise. On a drop such as this, loadmasters worked closely with jumpmasters as the aircraft neared the drop zone. Below, TSgts. Erik Stone (left) and Scott Demarco work out the details, and at left, Stone signals that it's time to "rack 'em up."

Staff photo by Guy Aceto

The loadmasters watched carefully over their charges: Safety was their paramount concern as the cargo door opened and, at right, the eager paratroops hook up. They were part of a "Baltic Brigade"—a joint Lithuanian, Latvian, and Estonian unit that had already deployed on a number of peacekeeping missions. There was a mix of uniforms and equipment, but everyone kept his assault rifle tucked in front for easy access.

Photo by Paul Kennedy

Staff photo by Guy Aceto

The C-130s flew nearly every day during the exercise. At left, a Maryland ANG Hercules skirts the coast near the ancient port town of Klaipeda, which served as headquarters for Baltic Challenge '98. Most exercise scenarios centered on peacekeeping and humanitarian relief after a notional "earthquake" in the region. Paratroops practiced dropping in to restore order and distribute supplies brought in by the transports.

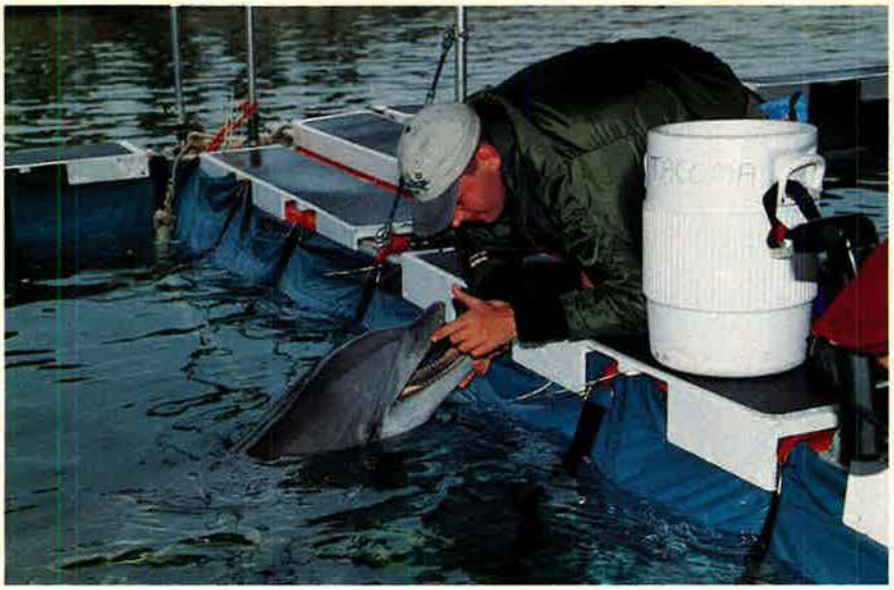
Photo by Paul Kennedy

Above, members of the Baltic Brigade hook up to a static line, which will pull their parachutes open at a preset distance from the airplane. As the C-130 approached the drop zone, it slowed, the green light came on, and in a flurry of shouts, out they went! In a few seconds, the airplane was empty except for the loadmasters and photographers. Troops made jumps both from the cargo ramp (these photos) and the rear side doors of the C-130. The opportunity to jump from new types of aircraft elevated the excitement and camaraderie among the troops, who also compared notes on how they approach their jobs. One jumpmaster made his 2,000th jump, choosing a US C-130 for this special event since he had never jumped from a US aircraft.

Staff photos by Guy Aceto

On the ground, Baltic Challenge '98 was intended to get Allied troops working together at the platoon level, to make things easier when they encounter each other in real-world peacekeeping situations. Besides the air and paratroop elements, there were naval exercises, mine-clearing practice, and convoy operations.

Photos by Paul Kennedy



One component of the US Navy's "Mark 7 Marine Mammal System," at left, goes by the name "Tacoma." He's a bottle-nosed dolphin trained to detect mines. Along with four other dolphins, Navy handlers, and two weeks' worth of fish, Tacoma and his fellow dolphins were airlifted to the exercise by a C-141 from Air Force Reserve Command's 445th Airlift Wing out of Wright–Patterson AFB, Ohio. Working alongside divers, the dolphins secured the waters around Klaipeda for the naval participants in the exercise, including the hospital ship Comfort.

Count on the unexpected. Michigan Air Guard members had to make an unscheduled engine change on a C-130. Nice though Palanga was, these guys wanted to go home. They worked nonstop to reattach the prop and complete repairs in time to depart on schedule.

For many Baltic soldiers, the exercise was the first contact with American troops, once portrayed to them as "the enemy." Interest in getting to know each other was high, and everyone took advantage of the hands-on access to equipment from the various countries. At left, Latvian troops line up for a chance to ride a US C-130.

Staff photos by Guy Aceto

The exercise offered benefits to all participants, many of whom may participate in Baltic Challenge '99, wherever it may take them. For the ANG C-130 crews, one of the rewards was the open cargo door, offering a panoramic view of a part of the world long closed to the West. Above, an unmatched vista of the Lithuanian coast is revealed as a C-130 returns to Palanga. At right, Stone—a Harford County, Md., police lieutenant when he's not serving as a loadmaster—takes in the scene.

Below, Lithuanian and Maryland state flags fly together from the open cockpits of the Guard C-130s. Besides the professional training gained from exercises like these, troops on both sides benefitted from the cultural exchange. The military-to-military crosstalk is one of the main objectives of such an operation. Among the participants may be the future leaders of the various militaries present at Baltic Challenge '98. Someday, they may be able to fix a problem or avoid a crisis just by picking up the phone and chatting with a friend they met years ago on a windy Baltic tarmac. ■

Verbatim

Dark Days

"The situation is worse than in 1917 [year of the Bolshevik seizure of power during World War I]. ... The situation in Russia is catastrophic."

Alexander Lebed, ex-general and presidential aspirant, in a Sept. 2, 1998, Moscow press conference at a time of Russian economic collapse.

Even Darker Days

"Given the disastrous state of things in Russia, we'd be foolish not to worry [about security of Russian nuclear weapons]. They're sloppy, they're starving, they're stupid, they're mean, and they do maintenance with sledgehammers."

***Ralph Peters, ex–US Army intelligence officer, quoted in the Aug. 28, 1998,* Wall Street Journal.**

Death Spiral

"I am increasingly concerned that our military has begun a downward spiral that, if left unchecked, will lead to a weakened military no longer able to underwrite our interests. This spiral results from fewer and fewer military people and less and less [military] equipment and supplies being called to do more and more around the world. This in turn causes more wear and tear on people and equipment, which results in fewer people and less equipment."

Senate Majority Leader Trent Lott (R–Miss.), in an August 1998 letter to Senate Republican defense leaders.

The Chiefs Speaketh ...

"The [Rumsfeld] Commission points out that, through unconventional, high-risk development programs and foreign assistance, rogue nations could acquire an ICBM capability in a short time and that the intelligence community may not detect it. We regard this as an unlikely development."

Gen. Henry H. Shelton, JCS Chairman, in an Aug. 24, 1998, letter to Sen. James M. Inhofe (R–Okla.), giving the JCS response to findings of a commission headed by former Defense Secretary Donald H. Rumsfeld.

... And Inhofe Respondeth

"I am not particularly reassured that the Joint Chiefs think the emergence of an unexpected long-range missile threat is 'unlikely.' The recent nuclear tests in India and Pakistan were also 'unlikely.' The recent bombings of our embassies in Africa were considered 'unlikely.' The survival of Saddam Hussein as a menace to world security once seemed 'unlikely.' That a threat is 'unlikely' is no longer, by itself, a good enough basis on which to formulate national security policy affecting the lives of millions of Americans."

Sen. James M. Inhofe, Senate Armed Services Committee, in an Aug. 26, 1998, reply to Shelton's letter.

Operation "Significant Disruption"

"With respect to the terrorist [training] camps in Afghanistan: ... [T]he camps which comprised the Khost complex [have] sustained moderate to severe damage. The attacks have significantly disrupted the capability to use these camps as terrorist training facilities."

Samuel Berger, White House national security advisor, in an Aug. 21, 1998, press briefing about US anti-terrorist attacks.

Ritter's Condemnation

"I fought in the [Gulf] war. Americans died in the war. I was told by my government in April 1991, in a UN Security Council resolution the United States sponsorec, that Iraq was going to disarm. ... I've poured my heart and soul into disarming Iraq, and this means I was wasting my time. It means we lost the Gulf War. ... The whole world should be shamed by this."

Scott Ritter, ex–chief UN inspector tracking down Iraqi arms, in a* Washington Post *interview published Aug. 27, 1998—a day after he resigned to protest US efforts to interfere with planned inspections.

Biden's Wisdom ...

"[I]n terms of whether the secretary of state has no more to consider than you do as the arms inspector—you didn't get in, 'Didn't get my job done; get me in! ... Scott Ritter, I'm ready to go!' That's not how it works. ... I respectfully suggest, Scott—Major—I respectfully suggest they have responsibilities slightly above your pay grade ... to decide whether to take the nation to war. That's a real tough decision. That's why they get paid the big bucks. That's why they get the limos and you don't. ... Their job is a hell of a lot more complicated than yours."

Sen. Joseph R. Biden Jr. (D–Del.), in a Sept. 3, 1998, Senate Foreign Relations Committee hearing, held to examine Ritter's charges about Administration duplicity.

... And McCain's Rejoinder

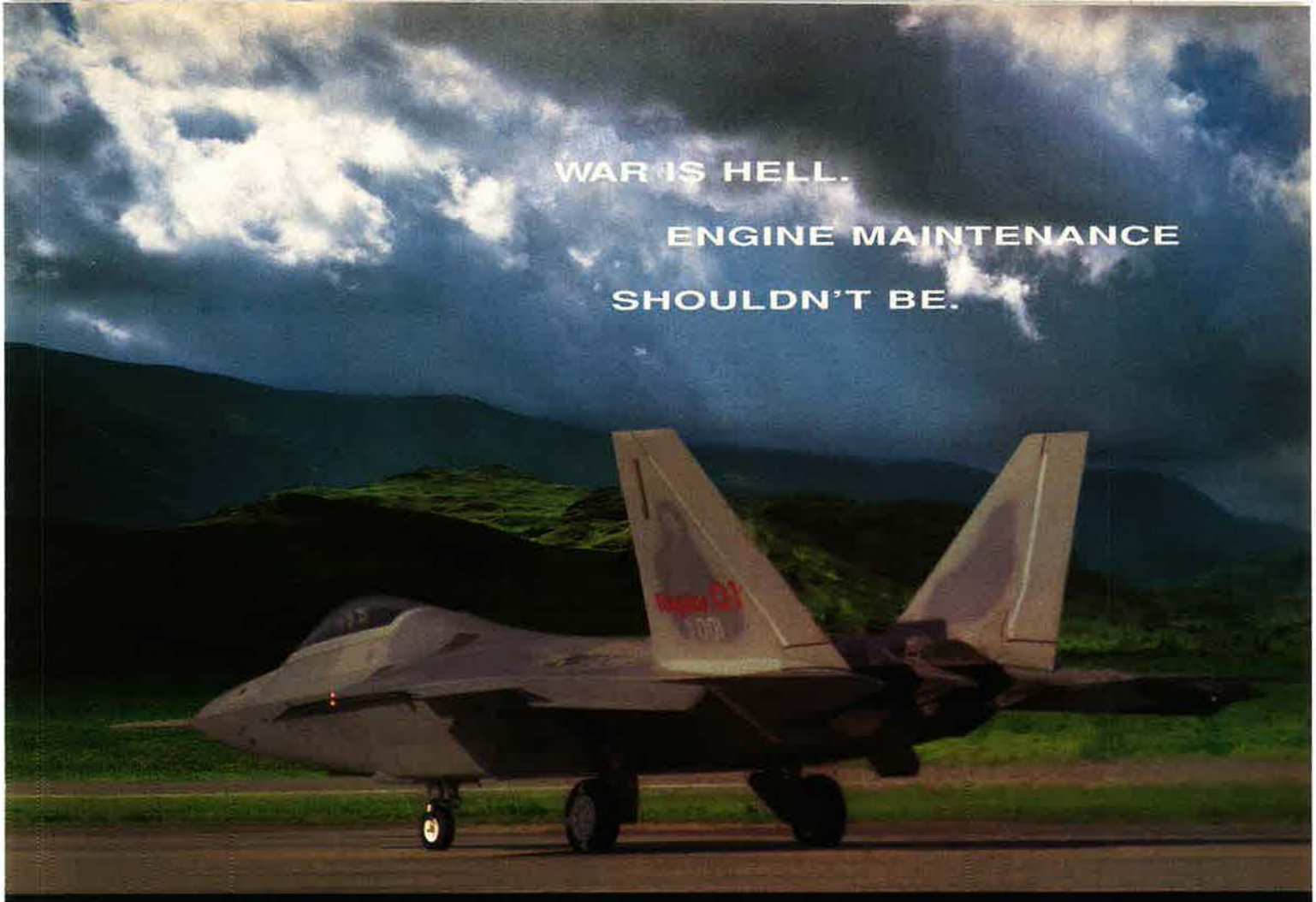
"Some of us who fought in another conflict wish that the Congress and the American people had listened to someone of your pay grade, ... and perhaps there wouldn't be quite so many names down on the [Vietnam Memorial] Wall."

Sen. John McCain (R–Ariz.), a Vietnam veteran, addressing Ritter at the same Senate hearing.

More Like a Slippery Slope?

"The worst case is, we're on a kind of a slow slide here, and we can't go a whole lot farther before it will in fact begin to impact on our ability to close quickly on a two-Major-Theater-War scenario. It's not like a cliff we're going to drop off, but it's certainly not a situation where you simply sit idly by and say things are fine."

F. Whitten Peters, acting Air Force Secretary, quoted in an Aug. 13, 1998,* Washington Post *article about readiness. ■



The F119 is designed for quick, easy servicing – as proven on the F-22. On the Joint Strike Fighter, the F119 sets an even higher standard for advanced engine support. And advanced technology. That's Pratt & Whitney. *THE POWER OF READINESS.*

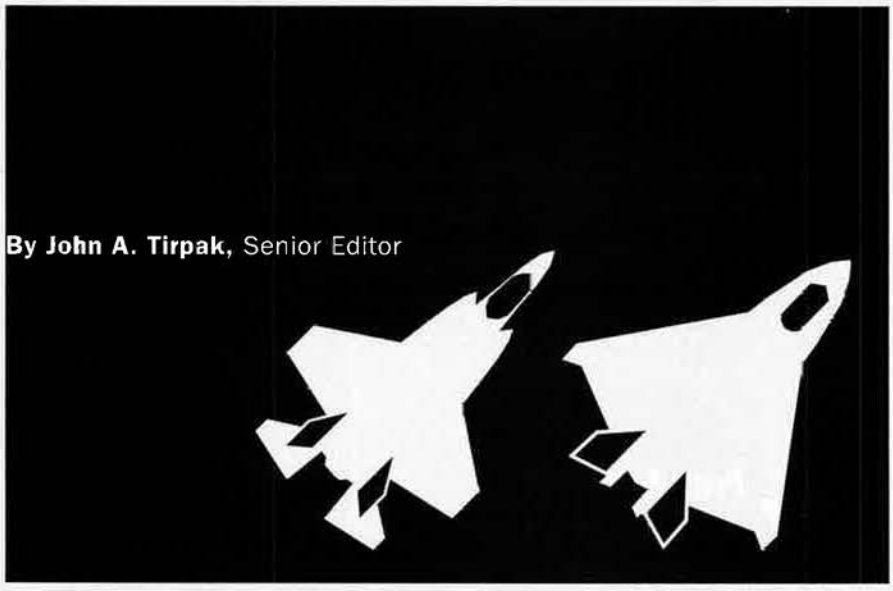
Pratt & Whitney
A United Technologies Company

www.pratt-whitney.com

The Joint Strike Fighter is moving from concept studies and designs toward real hardware.

Scoping Out the New Strike Fighter

By John A. Tirpak, Senior Editor



THE Joint Strike Fighter *won't* set any records for speed or altitude, nor will it pioneer revolutionary new forms of air combat. It isn't meant to.

In fighter design, the last few percentage points of performance are usually the hardest and most expensive to obtain, and they are capabilities rarely, if ever, used in actual combat. For the JSF's makers, the challenge is to build a state-of-the-art precision strike airplane that can do the job very well, be flexible enough to be relevant for the next 40 years of warfare, and cheap enough to be bought and operated within the budget allowed.

It's a tall order, but all indications are that the Air Force, Navy, and Marine Corps which will buy the JSF, and the contractors competing to build it, are pursuing efficiency with fervor. They realize that, no matter how good the design turns out to be, it will never be built in the numbers required—nearly 3,000 aircraft—if it won't fit within the budget top line.

The last few years have been spent in perhaps the most intense process of requirements definition and risk reduction yet seen in aircraft development. There have been thousands of hours of simulated combat to determine the optimum mix of stealth, speed, range, and weapons. New manufacturing processes have been invented. Specifications—which often lead to unnecessary weight and cost—have been all but abolished. Commercial practices have been substituted for the old, lumbering style of federal procurement. "Streamlining" has taken on a whole new meaning, and the process isn't over yet.

There has been unprecedented cooperation among the armed services. Since commonality is the No. 1 cost-cutter on the JSF, each service has had to refrain from demanding capabilities in the airplane that can't be reconciled with those of the other branches, lest the price get out of

hand or one of the partners break ranks. So well has the interlocking Air Force and Navy management of the program worked so far that its director, Maj. Gen. Leslie F. Kenne, reports that other programs have come calling to watch and learn "how you do a good joint acquisition."

Harmonizing requirements has been a problem for services accustomed to buying systems unique to their own needs, but Kenne reports that the process "is working entirely well." Kenne, an Air Force officer, works for the Navy's acquisition executive, and her deputy is a Marine two-star general. When the Marine succeeds Kenne at the head of the program, he will report to the Air Force acquisition executive, and his deputy will be a USAF two-star. Kenne's predecessor was a Navy two-star admiral.

The Air Force needs 1,763 Joint Strike Fighters to replace its A-10s and F-16s. The JSF is to have better range, stealth, and reliability than the F-16 but won't necessarily be faster or more agile. Lockheed Martin's offering is shown here.

What USAF Needs

The Air Force holds the biggest JSF requirement. It needs 1,763 airplanes to replace its A-10s and F-16s. Replacing the F-16s is a pressing matter: Bought in big lots through the 1980s and 1990s, these single-engine fighters will start to wear out in large numbers in seven years. The first JSFs won't arrive for 10 years. In the interim, there will be shortfalls, but USAF may be able to bridge the gap with F-16 life extension modifications or other "work-arounds."

Like the F-16, the JSF will be the relatively inexpensive "low end" Air Force strike fighter complementing the more costly "high end" F-22 air dominance fighter. As then–Air Force acquisition executive Arthur L. Money told Congress earlier this year, "The F-22 is the force enabler; the JSF is the force."

The Navy is in dire need of a so-called "first-day-of-the-war" medium bomber. The sea service some years ago retired its A-6 Intruder because of advanced age. The intended replacement, the stealthy A-12, was canceled in 1991 because of major technical, schedule, and cost problems. Subsequent efforts known as A-X and A/F-X were dumped as unaffordable, forcing the Navy to rely on an assortment of F/A-18 Hornet variants until JSF reaches carrier decks around 2010. The Navy needs 480 JSF carrier-based variants as the "high end" complement to the F/A-18E/F Super Hornet fighter, now in production.

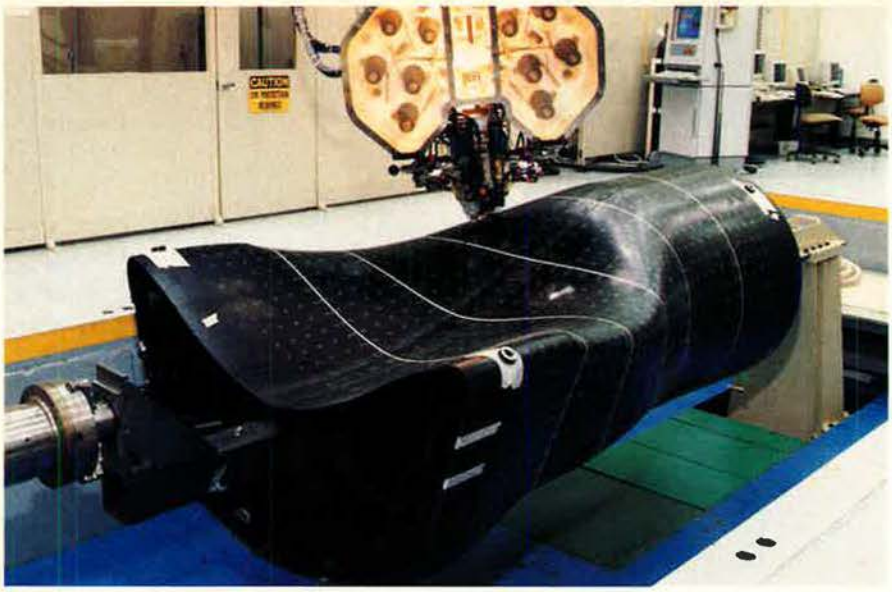
The Marine Corps wants a Short Takeoff/Vertical Landing "jump jet" JSF variant to fly off amphibious ships or from small forward strips ashore. The STOVL variant happens to be the most technically difficult version to build, in that it will have to operate vertically, go supersonic, and still carry a credible weapon payload—a feat never before achieved in an airplane at any price. The Marine Corps needs 609 JSFs to replace their AV-8B Harrier IIs and F/A-18s.

All told, the services need 2,852 JSFs, a number that is down marginally from the originally planned 2,978. The modest cut stemmed from analysis by the 1997 Quadrennial Defense Review.

The British Royal Navy is also committed to buying 60 of the STOVL variant to replace its Sea Harrier airplanes and is a full partner on the project.

The services want an airplane that, at a price scarcely higher than that of today's F-16, has lots more capability—be it in range, payload, ease of maintenance, or stealth. In most

The JSF will reduce cost by limiting parts count. Almost the entire wing/upper fuselage of the Boeing design is a single piece of thermoplastic composite, the same for all variants. Commonality—avoiding unique parts—cuts unit cost.



No longer just a "paper" airplane, the JSF is taking shape as a technology demonstrator aircraft. Not quite prototypes, the X-32 and X-35 will prove out flight characteristics and controls. Boeing's X-32 will use this inlet duct.

cases, the planned improvement tops 30 percent.

Half the Cost?

By buying together, the military services not only save the cost of designing separate airplanes but also get the benefits of spreading overhead costs over a much larger number of aircraft. Then, by keeping the airplanes highly common in design, they save by having many identical spare parts, common maintenance, and common software and upgrades. Doing it this way, the services hope to modernize their air fleets for about $100 billion over 20 years—roughly half of what it would cost the old way.

The JSF has moved on from being just a "paper airplane." Lockheed Martin and Boeing, the finalists in the competition, now have begun to bend real metal to build flying test beds to further refine and prove out their concepts. Boeing's version has been dubbed the X-32 and Lockheed Martin's the X-35.

"It's important to note that these are ... 'X-planes' and not prototypes," Kenne said. She noted that the demonstrators will lack the avionics, weapon systems, and other insides that would be expected in true prototypes, because their purpose is to prove that the design—or Preferred Weapon System Concept, as the program office calls it—will have the predicted flying qualities.

Only the winning design will advance to the stage of full-up prototype. The X-planes will be rough drafts, relying on off-the shelf parts and other cost-saving features to the greatest extent possible. For example, Rick Baker, X-35 product manager and assembly boss at Lockheed Martin Skunk Works in Palmdale, Calif., said his airplane will use the nose gear from an F-15E, the main gear from an A-6, actuators from an F-15C, and so on.

Each company will build two aircraft. The first will be representative of the Air Force version, with Conventional Takeoff and Landing characteristics. The second will be the STOVL version to be used by the Marine Corps and UK's Royal Navy. Later, the CTOL versions will be modified to show how they will perform as carrier aircraft. Thus, three types of airplanes will be demonstrated with only two airframes. Again, it's part of the JSF's constant cost avoidance and drive to squeeze more out of the dollars available.

Kenne prefers to call the X-planes "technology maturation flight demonstrators." They are intended to "ensure that we lower the risk" such that the eventual choice between the competitors can be made with high confidence that the riskiest parts of the proposed airplanes will really work.

Risky Business

She said that, for both the X-32 and X-35, the riskiest element of all will be the "integration of the flight controls and propulsion system."

The two teams have each selected the Pratt & Whitney F119 engine core as their basic power plant. The F119 also powers the F-22; besides its advanced design, it offers engine commonality and, presumably, savings. Each of the two X-planes will use a different, uniquely configured F119 derivative engine, however.

"Clearly, two new derivative engines ... are a risk," Kenne continued, but the JSF office is "quite pleased" with initial testing of the two power plants, she said.

This Lockheed Martin STOVL wind tunnel model is defining the thrust generated by its lift fan concept. The lift fan, not needed for conventional takeoff, would be deleted on the USAF version and replaced by a fuel tank.

Like the F-16, the JSF will have but a single engine. Originally, the Navy wanted the JSF to have a pair of engines, so as to keep single engine failure from causing an over-water disaster. The single-engine JSF is a reality that the Navy accepted after years of flight data showed that today's single-engine jets have safety comparable to that of older twin-engine types such as the F-14 Tomcat.

Lockheed Martin's X-35 STOVL version couples the single engine to a shaft-driven lift fan behind the cockpit. The lift fan hoists up the front of the airplane and the rear nozzle swivels down to push up the rear. Small exhausts under the wing will provide roll control. The approach adds 4,000 pounds to the Lockheed Martin JSF. Even so, "we get much more than the 4,000 pounds back ... in what we can lift," according to Fran Ketter, the company JSF manager for propulsion integration. The lift fan delivers 60 percent more lift than an F119 relying on direct lift, Ketter claimed.

In a post–Cold War irony, Lockheed Martin consulted with the Yakovlev design bureau of Russia early in the JSF design process because the Yak-141 used a similar approach, though that airplane never made it to series production.

Boeing's X-32 STOVL version will employ two downward "posts" of thrust in front and a vectoring nozzle for the back. It, too, uses under-wing nozzles for roll control—though these are not directly connected to the engine—as well as small nozzles in the rear for yaw control.

Kenne explained that the Air Force CTOL versions "will demonstrate up and away" performance, the Navy aircraft carrier version will demonstrate low-speed handling required for carrier approach, and the Marine STOVL version will demonstrate short takeoff, make a transition to wing-borne flight, and then another transition to vertical landing.

The contractors are to conduct government-funded explorations of cost-lowering technologies in manufacturing, avionics, weapons integration, materials and structures, flight systems, propulsion, and supportability. The resulting body of knowledge "will be available to both contractors," Kenne said, to allow each to make the lowest-possible cost proposal for the all-up system. "We're interested in ... any technology that can reduce parts count and life-cycle cost," she said.

The X-planes will fly sometime in 2000 and be flight-tested for about a year.

JSF Costs

The three services need the JSF to come in at a cost only marginally higher than that of the F-16 and lower than that of the F/A-18E/F. Unit recurring flyaway cost is as follows:

	Base Year (FY94 $)	Current Year (FY98 $)
USAF (CTOL) variant	$28 million	$30 million
Navy (CV) variant	$31 million–$38 million	$33 million–$41 million
USMC (STOVL) variant	$30 million–$35 million	$32 million–$38 million

JSF Requirements

Size	Must fit in "deck spot" of F/A-18E/F Super Hornet
Dry weight	CTOL/STOVL, about 22,000 lb.; CV, about 24,000 lb.
Max takeoff weight	All variants, 50,000 lb.
Internal fuel	CTOL/STOVL, 15,000+ lb.; CV, 16,000+ lb.
Payload	CTOL/STOVL, 13,000+ lb.; CV, 17,000+ lb.
Combat radius	600+ NM for all types

CTOL stands for Conventional Takeoff and Landing and STOVL for Short Takeoff/Vertical Landing; CV designates the aircraft carrier version.

Buy Ins and Buyouts

Even as flight tests take place, the companies and program office will continue to conduct computer simulations pitting the JSF contenders against a wide variety of threats to gather more data on how they stack up. Sometimes, the simulations show that spending a little extra on some aspect of the design—a sensor or an extra weapon station, perhaps—yields a disproportionate increase in effectiveness. For that reason, JSF is not entirely about cutting cost.

"Anything can 'buy' its way onto this airplane," said Kenne, though she noted that every add carries a price of some kind. The ongoing modeling and simulation effort is geared toward finding the optimum mix of performance, capabilities, weapons, supportability, durability, and cost.

About the time flight demonstrations begin in 2000, the final Joint Operational Requirement Document will end its long evolution, and the list of capabilities detailing must-have and "desired but not required" features on the JSF will at last be released to the contractors for bid.

Armed with this requirements list, the manufacturing and other risk-reduction knowledge generated by the program, and flight data, the contractors will make their proposals, and a winner will be chosen in 2001. Development would take about four additional years and production would begin around 2005. The first operational aircraft would be delivered in 2008.

Paul G. Kaminski, the former undersecretary of defense for acquisition and technology, and Gen. Ronald R. Fogleman, retired USAF Chief of Staff, both suggested that the Air Force may buy some examples of the STOVL version for Air Expeditionary Force operations out of austere fields.

However, Kenne said, no one up to this point has altered USAF's part of the program in order to accommodate this proposal, and she gave little indication that it would happen anytime soon. "The Air Force is studying that," she said, but has made no decisions to proceed. She added, "In all honesty, there's no sense of urgency" about an Air Force STOVL buy. "If they want to opt for a STOVL version ... it will be available."

Lockheed Martin's proposed JSF bears some family resemblance to the company's F-22. It has a conventional wing and tail configuration, which company program manager Frank Capuccio said was a conscious choice.

"We felt ... this configuration offered the most flexibility" for the various missions JSF will have to

perform, Capuccio said. The program office told Lockheed Martin that its concept made it to the final round of JSF competition "because they thought we had a much lower-risk approach to the STOVL requirement," he claimed. "We did not require a technical miracle" to achieve the required short takeoff performance. The Lockheed Martin airplane is also "mostly aluminum rather than composite," again, in order to lower risk. The X-35 design philosophy dictates that "we'll only get exotic if we have to," he added.

In the USAF and Navy versions of the Lockheed airplane, the lift fan behind the cockpit is deleted, and the vacant space is used for fuel or avionics.

With Boeing's STOVL airplane, the chin intake can be expanded substantially to take in the huge amounts of air necessary to feed the voracious vertical-lift flight requirements. In the conventional versions, the STOVL hardware is eliminated.

The Lockheed Martin design philosophy in its JSF, Capuccio said, is that "it can be easily 'tuned' as the government modifies its requirements." He maintained that his team embraced the program's mantra of "cost as an independent variable" early on and kept things flexible because of it.

Creep Control

Unlike previous programs, in which legions of acquisition workers could all insert costly requirements simply because they were traditional boilerplate, the JSF's computer-aided design and single design database make that almost impossible now, Capuccio said. "Some major can't add a change without my catching it," he observed. Computer design has sharply curtailed "requirements creep," he observed.

Frank Statkus, Boeing's JSF program manager, said his company was told by the government it made it to the final round because "we had a good configuration with a lot of potential, because of the technological innovation in the airplane itself." Boeing's design involves extensive use of new materials such as thermoplastics, which make not only large, single-piece manufacturing possible but hold out the prospect for extended life expectancy.

Boeing also strives for parts commonality by starting with basic structures and adding "thickeners" for strength only as they will be needed for a given variant. This permits commonality while carrying only as much weight as necessary. If testing shows more strength is needed in a given area, Boeing can add it without going through a major redesign, Statkus said.

Using three-dimensional computer modeling—as Lockheed Martin is also doing—is making the JSF tradeoffs and refinements process possible, Statkus added. "All the wiring, tubing, and fasteners have all had to go together before" any real-world parts were made, he observed. "By the time you assemble the airplane, you've already 'built' it a number of times."

Engine War II

In the 1980s and 1990s, the Air Force conducted a major competition between Pratt & Whitney's F100 and General Electric's F110 to provide power plants for the F-15 and F-16 fighters. The competition was credited with saving billions and inspiring constant improvement and innovation. Kenne said the JSF program will try to repeat this process.

A team of GE, Allison, and Rolls-Royce is working on a derivative of GE's F120 power plant, which lost out to the F119 in the F-22 program, as an alternative fighter engine for the JSF. The team has been given some seed money for the project but

What About UCAVs?

Gen. Ronald R. Fogleman, the former USAF Chief of Staff, was fond of speculating that Uninhabited Combat Aerial Vehicles might become so pervasive in the next 20 years that the Block 50 version of the JSF might be a robot with no humans aboard.

Boeing JSF program manager Frank Statkus said, "It wouldn't surprise me a bit" if, at some point, "you pull the man out of the fighter to prove you can" run a complex fighting aircraft by remote control. Lockheed Martin JSF program manager Frank Capuccio said Fogleman's robotic JSF is "theoretically feasible," given that the airplane's avionics architecture will accommodate such a conversion.

However, both men expressed skepticism about such a thing happening anytime soon.

Said Capuccio, "What the Air Force has to come to grips with is, who is really going to commit to release ... a missile or drop a JDAM" without a human being in the cockpit to "look the target over?" He held out the possibility of an uninhabited JSF as a wingman for a piloted JSF, or such an airplane serving as a relay of targeting data, but as for "dropping iron on the target? Not in my lifetime. You won't see an operational commander who will authorize that when our troops are on the ground."

A STOVL airplane has a voracious appetite for air. Boeing's Marine version cranks its mouth open extra wide to gulp it in. The STOVL versions will handle just like the CTOL variants; controls will be "transparent" to the pilot.

won't be funded to do detailed design until an airframe winner is announced. Again, the JSF program is seeking to avoid unnecessary—or premature—expenditures.

The competition will only affect the JSF; the F-22 won't be built in great enough numbers to justify a second production source for the engine. Moreover, the GE–led team will not be given the F119 design to copy; it will offer strictly an F120 variant.

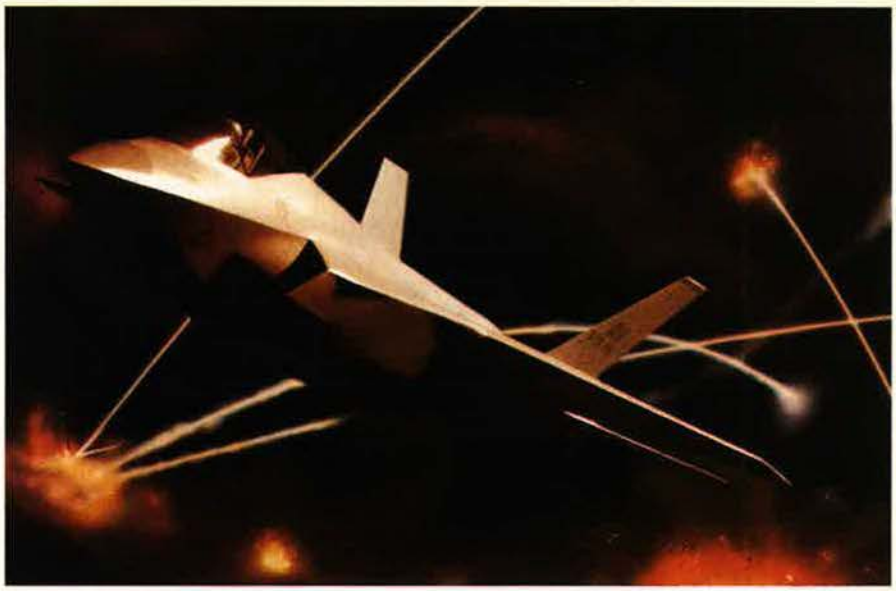
Although requirements on the JSF program are not hard-and-fast—the government does not want to specify solutions and thus rule out a potential cost-saving innovation—the target for commonality between the three types of airplanes is over 80 percent. Both Boeing and Lockheed Martin claim to be able to beat that figure by a wide margin.

As the JORD evolves, more and more of the blank spaces in the final requirement are being filled in. For instance, it was thought as the program began that much of the sensor requirement—radar, infrared, target designation, and so on—could be done offboard, meaning that information could be piped into the JSF from satellites, Joint STARS, AWACS, and other platforms, thus saving the weight and cost of having the systems onboard. That idea has been discarded, according to David Sundstrom, Lockheed Martin's director of JSF systems and software integration.

While initial versions of the requirements document allowed for reliance on offboard sensors, more recent versions call for the airplane to carry out its mission autonomously if downlinks are cut. Moreover, the "field of regard" and self-protection requirements clearly call for a "fully capable system," Sundstrom said. "No one is ready to commit to an airplane that's not full-up in its own right," he observed. The use of offboard sensors exclusively "has yet to be proven."

Sundstrom noted that the JSF will be able to take advantage of sensor software written for the F-22, as well as some legacy software from the weapon systems aboard the F-16. Again, the goal is to avoid the cost of doing anything new unnecessarily.

The JSF will likely employ many technologies unfamiliar to aviators of even 10 years ago. Fiber optics will be present in large quantity, not only for their lightness but because they're unjammable. Digital strain gauges will run along spars and other key components and tell the onboard diagnostics system how fatigued certain parts are and when they will need repair or replacement. Innovations such as these will save millions in maintenance previously done on a recommended schedule but which may or may not have been necessary. Both teams will make greater use of unified parts, or single-piece castings of complex pieces that previously would have required numerous parts, fasteners, welding, testing, and "lots of touch labor," Capuccio noted.



Despite a family resemblance, Lockheed Martin's JSF is no F-22 carbon copy. Manufacturing and avionics technologies—even stealth—have progressed since the F-22 was designed and will advance further by the time JSF rolls out.

Global Reach

There are no restrictions on foreign partnerships on the JSF, Kenne said. Indeed, foreign teaming is encouraged in the program's charter, and contractors have been encouraged to make "full use of the global market" in seeking the best and lowest-cost designs, parts, or manufacturing capabilities.

The United Kingdom is a full partner in the program, Kenne noted. That means the UK has contributed money to the development program and may have a direct say in influencing requirements. Denmark, Norway, and Netherlands—all users of the F-16—are also involved as associate partners, Kenne continued. They have contributed less money and can suggest requirements, but these will not be added "unless they provide a benefit to all," she said. Canada is on board as an informed partner, meaning it likely will buy the final product of the JSF program but cannot influence the requirements process.

More than 20 countries fly the F-16; a half-dozen more fly the F/A-18 and AV-8B, so the prospects for foreign sales of the JSF are excellent. In fact, the program charter recognizes that, in addition to being the force-building airplane of the US armed forces, it will also be the nation's export fighter in the early 21st century. Officials from both JSF contractors peg the overseas market conservatively at 1,500–2,000 airplanes, with a value of $50 billion to $65 billion.

Capuccio said stealth is well understood in the US fighter industry. "Low observables is really a commodity now," he said, and "signature reduction is almost ... free," since the knowledge that makes stealth possible is no longer exotic and is incorporated right into an airplane's basic design. The lessons learned from making doors, cracks, windows, and antennas stealthy on the F-22—on which Lockheed Martin and Boeing are partnered—means that on JSF, these techniques will be greatly improved.

"It's good on the F-22," Capuccio said. "We'll do an even better job on this airplane." ■

So far, "lockout" problems have never stopped an operation to which the US was seriously committed.

The Access Issue

Special Report by *Air Force* Magazine

In the Persian Gulf crisis of early 1998, Saudi Arabia did not give permission for US Air Force fighters based on its soil to take part in the limited strikes that were being contemplated against Iraq. Military planners shifted emphasis and brought in bombers and an additional carrier. Negotiations ensued, the crisis faded, and the forces slowly stood down, but not before news media and other commentators had rekindled debate about whether the Air Force, in a future crisis, might face "lockout" from key bases.

This is the prime example of the so-called "access issue." It has been raised repeatedly by naval partisans quick to make what they deem a key point: "The carrier battle group, operating in international waters, does not need the permission of host countries for landing or overflight rights," reads an official Navy statement. "Nor does it need to build or maintain bases in countries where our presence may cause political or other strains."

To date, though, lockout problems have never stopped a significant military operation to which the United States was seriously committed. Air Force and other US forces work most efficiently when they can use choice in-theater ports, bases, and facilities. Allies can deny access or impose operational limitations and have done so; the prospect of combat can produce disagreement and limit the extent of host-nation support. There is concern that the spread of Weapons of Mass Destruction may pose added access problems.

However, these are not showstoppers for land-based airpower. The United States military has a large stake in theater access, requiring cooperation with allies and capabilities to deter or defeat anti-access denial efforts. Complex calculations of theater access will be one of the major security issues for Washington in the next decade, but the public debate so far has lacked perspective. The recent Gulf crisis offers a notable case in point.

Lockout or Not?

In late 1997, Iraq, having spent months harassing United Nations weapons inspection teams, banned them outright from Saddam Hussein's "presidential palaces" and other sites. As the Clinton Administration planned a response in early 1998, the question was whether US–led air forces would get permission to launch strikes from Prince Sultan AB, Saudi Arabia. Riyadh had allowed continued enforcement of the no-fly zone over southern Iraq but signaled unwillingness to let its bases be used for attacks on Iraqi targets. Kuwait gave its approval, and other Gulf states offered help. USAF units in those countries were joined by B-52s sent to Diego Garcia and naval aircraft aboard a second carrier sent to the Gulf region.

Did Riyadh's action constitute lockout? The best evidence is that it did not. In fact, it seems clear that Riyadh was fully prepared to permit US Air Force fighters to strike from its bases if the US planned a serious attack on Saddam. The *New York Times,* in a Feb. 4 dispatch from Washington quoting top officials,

said, "The Saudis have privately signaled support for an American attack, as long as it inflicts significant damage on President Saddam Hussein's ability to threaten his neighbors."

Bradley Graham, defense correspondent for the *Washington Post,* noted in a story from Saudi Arabia, "The Saudis have told US and other Western officials that they would have no problem with using force against Iraq as long as any attack were not merely symbolic but really hurt Saddam Hussein, whom they regard as a menace." The hang-up, Graham continued, was the suspicion in Riyadh that the US attack would not be a serious one. The limited US operation then in the planning stage, the Saudis concluded, was "not likely to finish off the Iraqi dictator" and would leave him in place and "vengeful" toward the desert kingdom.

Saudi concerns were not without merit. The US for years had maintained a military force in the Gulf region to "contain" Iraqi aggression. Over the years, the Administration mounted several symbolic, "pinprick" strikes having no military impact, along with many ineffectual verbal threats and warnings. Then came the 1998 crisis, and US policy goals kept changing. In January, it was to "deny" Iraq the capacity to build and use mass destruction weapons. A month later, the goal was to "substantially reduce or delay" Iraqi access to such weapons.

On Feb. 3, several days before making an official visit to Saudi Arabia, Defense Secretary William S. Cohen warned Congress not to have "unreasonable expectations about what can be achieved." The goal of the military operation concerning Saddam, he said, "would be very much concentrated toward limiting, curtailing, really preventing him from reconstituting his [WMD] capability, in the near future, at least." Secretary of State Madeleine K. Albright opined that getting rid of Saddam "requires a far vaster commitment of military force and a far greater risk" than Washington was prepared to undertake.

Not Enthusiastic

Saudi officials had no enthusiasm for joining such an adventure. Moreover, as the prospect of real war drew closer, it was obvious that the US, without use of the major, 100-aircraft Air Force component in Saudi Arabia, didn't have sufficient power on hand to strike a sustained, effective blow against Iraq.

Eventually, Washington settled for a promise from Saddam to let the inspectors back in, a pledge that Iraq abrogated in August.

Retired Gen. Michael J. Dugan, a former USAF Chief of Staff, contended that the two carriers then on hand were insufficient to generate the kind of sustained air campaign that would have been needed had matters gone beyond a limited operation or a show of force. The carriers "can fight for two or three days, then they have to stand down to replenish," said Dugan. He added, "Access is not an on/off switch. It is a routine operating condition that adds to, or subtracts from, the timeliness, survivability, and weight of effort that can be produced by a given military force."

Moreover, the carrier itself requires access to land bases, according to Dugan. "It needs to be replenished from bases, which have access issues," he said. "Fuel, munitions—the things that constitute the output end of air operations—are stored on land, and to get 'em off land requires access. ... Over a period of one, two, or three days, there are a lot of things that carrier operations can do. On the other hand, carriers and carrier operations have access limits. They have to get from wherever they are at to wherever the action is. That's an issue of timely access, too."

Maritime advocates are not always eager to concede this point. For example, the Navy's official 1998 Program Guide, issued last August, lauded the alleged ability of "self-reliant and self-sustaining—expeditionary—naval forces to operate in forward regions without the need for an extensive network of land bases and other support facilities." The report went on, "The Navy and Marine Corps carry their own infrastructure when they deploy, and they arrive ready for immediate operations. As the Iraq–UN sanctions crisis of 1997–1998 proved, an aircraft carrier air wing comes not only with aircraft, crews, and weapons, but provides its own airfield ... secure, supplied, and ready when and where it is needed. An amphibious ready group has its own command-and-control systems, air support, and sea-based troop billeting that is protected from terrorist attacks and free from Status of Forces Agreements and sovereignty constraints. ... At a time when 'expeditionary' has become a military adjective-of-choice, the Navy and Marine Corps—as they have for more than 200 years—continue to provide its most fundamental and accurate definition."

The access issue had come to the fore 18 months earlier in the so-called "Irbil Crisis." On Aug. 31, 1996, the Iraqi Republican Guard forces, in league with a faction of Kurds, occupied the town of Irbil in the predominantly Kurdish northern Iraq, an area that officially was under UN protection. Under UN decrees, no Iraqi forces were to move north of the 36th parallel, and Irbil's location north of the line made Iraq's move into the town a clear violation. The US formulated a response calling on strikes with US and Coalition airpower based in Turkey and Saudi Arabia. However, both nations as well as Jordan denied requests to launch strikes from their territory. These countries tended to view the incident as an internal Iraqi matter and were loath to intervene. Washington turned to the Air Force's cruise-missile-carrying B-52 bombers and the Navy's Tomahawk land attack cruise missiles launched from submarines and surface ships. Range and survivability constraints ruled out naval air strikes.

Clueless

Afterward, former Secretary of Defense Caspar Weinberger praised the military action but criticized overall US policy in the Gulf as "inept." In his view, incoherence in US policy led to the allied nations placing limits on the use of in-country facilities and to less-than-optimum force employment. He argued that Turkey and Saudi Arabia refused to let US forces use their bases because "neither ... have a clue as to what our intentions are in Iraq." Moreover, though Iraqi transgressions took place in the northern part of the country, Washington struck in the south. Weinberger said such attacks only caused confusion and worry among allies.

As Dugan sees it, the problem still exists. "The Saudis do not know the extent of our objectives nor the

firmness of our policy," he said. "We have not posed an end result—an outcome of the military operation—that has captured the Saudi imagination. I don't know exactly how we approach the Saudis, but I suspect we talk to them about a one- or two-day demonstration and not about a comprehensive policy and a supportive campaign to achieve specific changes in the political landscape."

Dugan sees a big difference between today and 1990, as the United States began its buildup in Saudi Arabia for the Gulf War. "We had some very clear objectives," he said. "We told the Saudis that we were going to preserve their territorial integrity and we were going to eject the Iraqis from Kuwait. ... I don't believe we've ever gotten the same kind of clarity in our policy since. ... We haven't been able to decide what we want. The Saudis have told us a couple of times over the past six or eight years, 'If you're going to go out and do something useful, we're with you. If you're going to do another pinprick, you're on your own.' "

Access to bases in overseas theaters has been a prominent feature of US policy since World War II. Lend–Lease agreements with Britain entailed the delivery of destroyers and war supplies in return for 99-year access rights to key facilities such as Diego Garcia in the Indian Ocean. In the aftermath of the war, the US enjoyed access to bases in places ranging from the Persian Gulf and the Mediterranean to Britain, France, and Germany.

Access concerns are nothing new. Even during the Cold War, US access to overseas bases was subject to negotiations between Washington and friendly nations. For example, the US lost basing rights in Saudi Arabia in 1962. The biggest "access crisis" came in 1966, when President Charles De Gaulle led France out of NATO's integrated command structure and ordered Allied forces to leave France. Numerous facilities—including NATO headquarters—had to be relocated to accommodate the political change. None of these events caused the US to change policy goals or abandon supporting military strategies.

The post–Cold War drawdown of US bases in Europe reflected diminished needs for permanent basing access on the Continent. In the early 1990s, however, Desert Storm and contingency operations in other regions—especially Africa—raised anew the question of access to bases and facilities.

Open Spaces

Despite concerns about lockout, US forces operate routinely in more countries than ever before. They regularly have appeared in countries where access was once unthinkable. Formerly communist Albania permitted USAF to base reconnaissance assets at its facilities during and after Operation Deliberate Force in 1995. Taszar AB, Hungary, once part of the Warsaw Pact basing system, became a hub of theater airlift for implementation of the Dayton peace accords in Bosnia. In the Gulf, Kuwait has welcomed a permanent complement of USAF aircraft.

DFI International, a Washington, D.C.–based defense consulting firm, recently conducted a major study of the issue of US access and its effect on US deployments and presence missions. The study, requested by the Air Force, concluded that access issues affected less than 1 percent of USAF deployments during the period 1990–97.

Given the diverse political views that prevail among Washington's allies and friends, it should be expected that even longtime regional partners might under certain circumstances refuse to lay out a welcome mat as quickly or completely as Washington would prefer. When pressures to act get ahead of the diplomatic process, some allies can choose to limit access for US forces, place restrictions upon the ways in which they can be used, or both.

These disagreements with regional partners underscored the fact that access may not always be granted exactly when, where, and to what degree it is needed—and for optimum force packages. According to Paul Nagy and Harry Ozeroff, authors of the DFI report, access problems usually stem from "failure of diplomacy," not from military factors.

When allies and partners do not concur on the form of a crisis response, they find it hard to agree on what forces can be brought to host-nation bases and for what purposes. US forces in Saudi Arabia do not operate under a Status of Forces Agreement—a fact that underlines extreme sensitivities about hosting Western troops and signals that differences on the use of force will be a constant irritant, especially when threats are ambiguous.

Merging American and local perspectives into a coherent position is crucial to all access agreements, from overflight and landing rights to long-term forward basing. Gen. John P. Jumper, commander of US Air Forces in Europe and a prime architect of the Air Expeditionary Force concept, noted that access "depends on how much a country feels truly threatened." According to Jumper, "The more they are threatened, the quicker the access comes." The challenge for the Air Force and other services is to find ways to tailor forward deployed forces to provide maximum capability yet still respect regional political sensitivities.

In the view of Dugan, there is an absence of logic in the claim that US forces could be completely locked out of a region in which it has allies and vital interests. "Lockout [is] not associated with every location within reach of Point X," said the former Chief of Staff. "Clearly, that doesn't make sense. Individual nations have individual interests. Some of them have interests converging with those of the United States, and some have different interests. All have differing internal domestic situations. Finding the convergence and creating the conditions for supporting options—military or otherwise—is at the heart of statecraft."

Fishy Claims

"The issue of access is a red herring," declared Col. James R. Callard, an Air Staff officer who has worked on this issue. "Is access a problem when our vital interests are threatened? The short answer is no. ... When our vital interests are threatened, we will have access. The American people will demand it. ... The American people will not allow us to protect an ally that refuses to allow us access."

Callard added, "We should not permit our zeal for carrier air to convince our prospective allies that we are interested in fighting on their behalf without using their territory."

Different operations have distinct access needs. Disaster relief usu-

ally means lifting heavy equipment and supplies to the affected region and requires access for a long continuous period. Humanitarian action is almost guaranteed to get swift political backing from the affected nation or from neighboring nations. In contrast, a single offensive aircraft strike against a target in a neighboring country may be too visible and risky for a regional ally. The operation might then have to be conducted from other regional bases, with sea-based or US–based air forces, or both.

A recent study by the Institute for Defense Analyses in Alexandria, Va., found that access to theater bases, though it is useful in all types of operations involving land-based aircraft, is vital for two. These are noncombatant evacuations and strikes against time-urgent targets—notionally, targets which must be hit within 24 hours of their discovery.

IDA looked at three theaters—the Mediterranean, Indian Ocean, and Western Pacific. For each, it postulated four types of crises—noncombatant evacuation, disaster relief, urgent strikes against perishable targets, and nonurgent strikes against point targets. IDA analyzed each of the resulting 12 scenarios in light of assumptions that the US (1) had access to in-theater bases, (2) had no access, or (3) used only maritime forces.

The upshot of the IDA analysis: Land-based aircraft flying from in-theater bases provide the most efficient responses in all four types of crises in all three theaters. IDA found that land-based aircraft, based in theater, are able to carry out all four types of operations within a single day. In contrast, reported IDA, maritime forces—Navy warships and Marine amphibious forces—usually would require two or three days of continuous effort to meet the same goals.

How would that picture change in event of a lockout? According to IDA analysts, total denial of in-theater facilities would prevent land-based aircraft from carrying out strikes against time-sensitive targets. However, not even a full base lockout could prevent land-based aircraft from mounting attacks against point targets. Long-range bombers based either in the US or in forward bases such as Guam or Diego Garcia could hit such targets within a day.

Where Are Those Carriers?

IDA analysts found that, in a lockout situation, the responsiveness of maritime forces hinges on where these warships are deployed at any given time. If they happen to be operating near a crisis zone when a problem erupts, they could respond expeditiously. However, if carrier battle groups or amphibious ready groups are not on scene, it could take days and possibly weeks to get them into position to do much good.

Maritime forces could eventually get naval airpower into position where they would be able to attack time-urgent targets, should they pop up. They could not do so right away, though. Getting naval aviation forces on station close enough to conduct such attacks would take, on average, at least two days in the Western Pacific, three days in the Mediterranean, and four days in the Indian Ocean. In worst-case scenarios, times go much higher.

USAF Air Expeditionary Forces are highly attuned to access considerations. USAF launched AEF deployments in 1995 as a means for putting 30 additional fighters and six bombers into Southwest Asia during gaps in Navy carrier visits. Since then, AEFs have helped prevent potential access problems. Regional partners have reached a comfort level with AEF deployments, which have provided a setting where questions and problems can be resolved under noncrisis conditions. AEF planners worked hard to reduce the force sizes and shorten response times.

The AEF concept has greatly reduced the sheer numbers of forces that nations have to accommodate. USAF has practiced the concept of rapid response with a lean package, and moves to streamline the AEF packages may well reduce requirements even further. In a recent study, USAF's Scientific Advisory Board found that the minimum requirement for an AEF mission actually is quite small: a runway, taxiway, ramp suitable for airlift and mission operations, and nearby fuel and water. Everything else can be brought in.

Early AEF deployments provided a test environment for a diplomatic "surge" aimed at gaining access to foreign bases. The first AEF deployment (to Bahrain in October 1995) was a special challenge. Jumper, who was then the three-star commander of 9th Air Force, later conceded, "We've had access problems." He meant that the Bahrainis "wanted to see how this was going to work before they made any larger commitments." When the US and a regional ally reach an understanding on the purpose, size, duration, and objectives of deployments, access follows. Jumper said, "I think now you'll find that we're welcome back to Bahrain any time."

In a recent speech, Jumper elaborated: "Access is an issue until you begin to involve the vital interests of the nation that you want and need as a host. Then access is rarely an issue. ... If you are engaged with these countries in an aggressive exercise program instead of a prolonged rotational presence, if your maintenance people are involved at the grassroots level teaching them how to maintain airplanes, if you make yourself valuable as a training asset to these countries in ways that are definable and measurable, then you add a dynamic of regional stability that otherwise would not be there, of familiarity, of comfort, that makes those decisions easier when you have to ask to deploy in a real situation."

Anti-Access Concerns

Political lockout is but one aspect of the access issue. Another is the military "anti-access" threat that could be posed by regional powers. In the view of some, anti-access attacks could slow or turn back large-scale US deployments by disrupting the logistics and supply system. Among the prominent proponents of this thesis was the National Defense Panel which, in its final report in 1997, warned that forward deployed forces would have to operate in a different way in order to cope with the threat.

According to the NDP, land-based air forces would have to operate from more-distant points, outside the immediate range of threats in the theater of operations. Sea-based forces would have to disperse and avoid close-in threats. Some analysts argue that long-range ballistic missiles and Weapons of Mass Destruction increase the risk to key targets such as supply dumps, airfields, and ports. John Collins, an analyst with Congressional Research Service, observed, "In the Gulf War, we sent 96 percent of our tonnage through two ports. If Saddam had had three

nuclear weapons, he could have destroyed our warfighting capability."

This problem may be overblown. One skeptic is Dugan, the former USAF Chief of Staff, who believes that enemies will be deterred from taking such a fateful step. "It is clear in my mind that the American public would not accept an attack on American troops without an overwhelming, violent response on the part of US forces," said Dugan. "Not very many Americans would have to be killed or incapacitated with Weapons of Mass Destruction before the American public would demand that we respond—not in kind, but by 10 times. National entities around the world know that. So I think there is great deterrent value still in ... the American posture."

The Panel to Review Long Range Airpower was specifically tasked to review "the potential of a biological or chemical lock-out of tactical assets" and determine whether the US should buy more bombers to offset the danger. The LRA panel, led by retired Gen. Larry D. Welch, a former USAF Chief of Staff, gave a mixed answer. On one hand, it said, "the ability [of bombers] to strike from longer range reduces some of the constraints associated with basing restrictions." However, it also noted that "bombers ... must be deployed forward to generate the sustained high sortie rates needed in major contingencies."

Don't Concede

The bottom line for the panel was that the United States shouldn't concede on the access issue but keep working "to provide the means to continue effective operations [land-based tactical aircraft], even in the face of chemical or biological attacks."

Dugan echoed this view. "US forces go where they need to be in order to pursue the national foreign policy objectives—and the associated military operations—in an effective manner," he said. "The CINCs take all practical steps to mitigate the risks, and then we rely on a strong military deterrent posture and the long-standing national policy that the US will use all necessary means to protect its people and its forces from the threat of WMDs." The whole matter, he concluded, is "overstated" by analysts. "I think the US still has, on a national basis, great credibility in its deterrent posture." In any event, he said, Weapons of Mass Destruction "are no less effective over water than they are over land."

For some naval officials, the Clinton Administration's decision to send *USS Independence* to join *USS George Washington* during the 1998 Iraq crisis spotlighted naval forces as a possible alternative to land-based fighter forces. Marine Gen. Anthony C. Zinni, commander in chief of US Central Command, said just after the crisis that naval forces might have to play a bigger role in his region in the future. "In an era where access will be problematic," he said, "sea-based air may be the only option."

For government officials, the idea of dispensing with the messy access issue is attractive, but closer examination reveals problems. Naval forces offer joint commanders only limited force employment options. Naval expeditionary task forces may provide certain highly specialized capabilities without land support for a limited period. However, all evidence is that naval forces have "access" problems all their own.

In fact, said DFI, now that USAF has reduced its permanent overseas presence, "The Navy and Marines now rely on more overseas bases and facilities in foreign nations than the Air Force—making the Navy and Marine Corps more vulnerable to political access denial than the other services."

The carrier battle group, built around a 90,000-ton Nimitz-class nuclear powered carrier and its embarked air wing, can sustain two to three days of operations relying on its own underway resources. Without land-based tanker support, its F-14s and F/A-18s are limited. The relative scarcity of aviation fuel and weapons would undercut any effort to conduct sustained air combat operations at sea.

The Land Tether

After a few days, a carrier must stand down for underway replenishment. Without land-based carrier onboard delivery aircraft, land-based P-3 patrol aircraft, or land-based Air Force tankers, force employment options diminish greatly. In the words of a 1992 Center for Naval Analyses report: "Sustained [carrier] operations almost inevitably require the establishment of regular [resupply] flights to and from a forward base. Thus, even the most modern carrier must maintain at least a minimal connection to a land base if it is to operate efficiently for any length of time."

Some surface ships and attack submarines embark with a capability to launch Tomahawk land attack cruise missile strikes at targets as far away as 1,000 miles. The problem is that such strikes usually must be limited to preplanned targets. For sustained operations, the surface fleet needs theater facilities for repair or replenishment. When warships deploy to far-off regions on a long-term basis, port facilities like those in Bahrain are indispensable.

The amphibious ready group, or ARG, features a Wasp-class "little deck" carrier with a complement of 2,500 embarked Marines. It provides the nation's only long-loiter response force for evacuations and small-scale contingencies. A Wasp-class ship can carry AV-8B Harriers but more often carries helicopters, which are useful only in environments with minimal or nonexistent air threats. The ARG offers no major strike options.

The anti-access threat to surface ships in littoral operations has been underappreciated, said Air Force officers, noting the danger of anti-ship missiles and mines. "Ships have continued to fall victim to lethal countermeasures as they attempted to move closer to land in littoral regions to project power on to land," said one. He noted the cases of *USS Samuel B. Roberts* in 1988—a victim of mines in the Gulf—and two mining incidents in the Gulf during Desert Storm which required an AEGIS cruiser and Marine helicopter carrier to be withdrawn from action and repaired in dry dock in Bahrain.

Except for a handful of single-strike scenarios, the capability of the nation to act alone over extended periods using only naval forces constitutes a myth. To achieve response times similar to those of Air Force aircraft operating from in-theater land bases, the Navy would have to either double the size of its current 12-carrier fleet at immense cost or permanently forward deploy carriers overseas, creating a new type of access problem, not to mention political opposition of US home port communities. ■

Delivering Quality Solutions To Your Modification Requirements

Aircraft Modification and Heavy Maintenance

Over 2000 C-130s completed

Engineering

Avionics/Structures/Modification/Design

C-130, DC-10, DC-9, DC-8, B-727, B-737

Inventory Management and Supply

World's largest independant parts inventory

Manufacturing

Engine and airframe components and flight controls

6905 N.W. 25th Street
Miami, FL 33122-1898
Phone: 800-756-0785
Attn: Maj. Gen. Richard F. Gillis, USAF, Ret.

Fax: 305-599-6728
e-mail: gillisr@avsales.com
web site: www.avsales.com

AVIATION SALES COMPANY

Aviation Sales Company is:
Aero Corp • Aerocell Structures • AeroCorp Macon • Aircraft Interior Design • Apex Manufacturing • Aviation Sales Distribution Company • Aviation Sales Leasing Company Caribe Aviation • Dixie Aerospace • Kratz-Wilde Machine Company • TIMCO

Fifty years later, the Task Force Chief of Staff reflects on Operation Vittles.

Inside the Berlin Airlift

By Gen. T. Ross Milton, USAF (Ret.)

THE spring of 1948 began quietly enough. New cars were once again in the showrooms, a chaotic demobilization had ended, and the main excitement ahead, it appeared, would be the presidential election. On June 24, the Republican Party confidently nominated Thomas E. Dewey for the White House. The Democrats, having failed to attract Dwight D. Eisenhower, resigned themselves to Harry S. Truman and defeat.

That same day, Soviet forces had halted all surface traffic into Berlin, citing "technical difficulties." They also shut down electricity for the Allied sectors in the German city. Allied currency reform provided the proximate cause for this new Soviet provocation, but it was plain that dictator Joseph Stalin intended to end the curious status of Berlin, which had become a Western outpost deep inside Soviet-controlled territory.

Gen. Lucius D. Clay, commander of US forces in occupied Germany and Europe and a steadfast figure if there ever was one, announced that no Soviet action short of war would force the Americans out of Berlin. The question was how to make good on that promise, for the Western sectors of the city had a total of less than two weeks of critical supplies, and the small American force in Germany could not have put down the mighty Red Army.

The author, not long before what some thought was the first step toward World War III

Some farsighted fellow at the Potsdam Conference had inserted a provision for three air corridors into Berlin, and Clay now asked Lt. Gen. Curtis E. LeMay, the commander of US Air Forces in Europe, to exploit them with an emergency airlift. Looking around for someone to do just that, LeMay tagged Brig. Gen. Joseph Smith, Wiesbaden (Germany) Military Post commander. As he assembled this ad hoc operation with about 100 C-47 "Gooney Birds" left over from Sicily and Arnhem and pilots pulled away from their desks and other duties, a distinct chill settled over occupied Germany.

Life up to that point had been relatively pleasant for the Western occupying forces, with nice old houses

requisitioned as family quarters and cheap cigarettes, coffee, and other items widely, if unofficially, used as currency. A few cigarettes could get your laundry done, a carton or so might fetch a hunting rifle or even a piano. Cigarettes were far too valuable for the occupied, the Germans, to smoke until, that is, they reached the farmers. They, having life's necessities, smoked them.

No Compromise

British officials agreed with Clay's uncompromising stand and had, in fact, been a little ahead on preparations for an airlift. The other concerned ally, France, initially distanced itself from this challenge but only briefly. France, preoccupied with its struggle in Indochina, had almost nothing in the way of air transport available in Europe. They would make a significant contribution later on, however.

The West's improbable answer to the hostile Soviet action got under way June 26. On July 4, with a maximum effort, US airlifters delivered 675 tons. It was clearly an all-out performance, one that could not be continued for long. An assortment of Dakotas (British C-47s) and converted bombers were delivering a similar amount. Since Berlin required a minimum of 2,500 tons of food per day to sustain the lives of the two million inhabitants in the Allied sectors, any serious long-term effort would require some major commitments.

One of the few persons on earth who truly believed air transport could solve this problem was Maj. Gen. William H. Tunner, and he was chafing to get involved. There was no similar enthusiasm to be found within the Air Staff. Any major diversion of air transport to Berlin would have a serious effect on combat capabilities, and there was a general view that this blockade might very well lead to war.

Tunner left on an inspection swing around Military Air Transport Service bases, leaving me with instructions to haunt the Pentagon and find out what was going on. He called each night, and he was not happy with my news, for there appeared to be no sentiment for a major effort and no mention of Tunner going over to run it.

Tunner had commanded "the Hump" operation from India into China during the last year of World War II. Army Lt. Gen. Albert C. Wedemeyer, Defense Department director of plans and operations, remembered this as he surveyed the situation in Europe. He, seconded by the undersecretary of the Army, William H. Draper Jr., urged that Tunner be sent without delay to take over the airlift to Berlin.

It was a persuasive recommendation. Tunner was ordered to proceed to Wiesbaden, along with whomever he needed, and assume command of the airlift under the overall command of CINCUSAFE. He left almost immediately in a C-54 with his longtime pilot and friend, Col. Red Forman, at the controls. I was to follow with the people Tunner decided were needed. We left a few days later with a few secretaries and various staff officers. Our orders called for 30 days of temporary duty.

No room for us was available in the existing USAFE headquarters building, a rambling structure in downtown Wiesbaden, so we located some apartments on Taunusstrasse, facing a small park featuring hot sulfur baths. The Schwartzerbach Hotel, where Tunner and I lived, was just a block away. The Rose, home for most of the staff, was even closer. And so, barely adjusted to the local time, we set out to survey the situation.

Coal-hauling C-54s from Fassberg being unloaded at Gatow—where even coal dust was bagged for use

Edge of Exhaustion

Wiesbaden AB, undamaged and with fine permanent structures, was one of two bases that Smith was using for the Berlin run. The sight that greeted us there was not encouraging. It was evident that everyone—pilots, supervisors, everyone—was on the edge of exhaustion. The same was true at Rhein–Main AB, near Frankfurt. Operation Vittles, as Smith had dubbed his operation, had been a heroic effort, but the end was clearly in sight, barring major reinforcements.

Some of these reinforcements, in the form of C-54 troop carrier wings, were already on the way. However, US authorities had registered no specific requirement. We had made only tentative calculations.

At about this time, a call came from LeMay's office, and Tunner sent me over to see what the general wanted. He wanted to know how many C-54s we would need for the mission. I told LeMay I would hustle back to airlift headquarters and get right on it. He had a different idea. LeMay, direct as always, motioned to a chair and table in the corner of his office and told me to do it there. Maj. Gen. August Kissner, LeMay's chief of staff, came in with pencils, paper, and a slide rule, and I was left to my thoughts while LeMay entertained some foreign visitors.

I scratched away and came up with a total of 225 C-54s, using some planning figures that I knew to be in Tunner's mind. Clay was waiting for the answer. LeMay took my work sheet and placed a call to Berlin, meanwhile giving me a wave of dismissal. I lingered in the outer office long enough to hear LeMay give Clay not my total, but my

subtotal. I didn't dare barge back in. Instead, I hurried back to Tunner and told him what had gone on. He approved the figure of 225 and ordered me back on the run to correct the inaccurate statement that I had overheard. LeMay then placed a second call to Clay, said something to the effect that we had made some corrections, and gave Clay the right number. Hanging up, he said: "Thanks, Milton"—a rare encomium from that taciturn man.

That summer, the C-47s were retired in favor of the augmented force of C-54s, and Tunner began to eye bases in the British zone, where the distance was a third shorter and the flat terrain allowed for shorter climbs. British authorities readily agreed to make room for the more productive C-54s and chose Fassberg, an old Luftwaffe training base on the Lueneburg Heath. Our initial reactions were favorable. The base had fine permanent buildings, a gymnasium with an indoor swimming pool, and a visiting officers' quarters, complete with a huge armchair, rumored to have been reserved for Hermann Goering, the Luftwaffe chief and No. 2 Nazi official in Hitler's Germany.

Fassberg in Danger

The initial results at Fassberg more than justified the move. However, as initial enthusiasm ran down, real difficulties began to develop. The combination of depressing surroundings, divided authority, and an impersonal functional organization patterned after the airlines—one that worked against any sense of unit esprit—proved too much. The operation at Fassberg began to come apart.

The cure was simple and the results dramatic. The Air Force reorganized the pilots and mechanics into squadrons and started to make recreational runs to Hamburg and Copenhagen. The Royal Air Force turned Fassberg over to the US Air Force, with Col. Theron "Jack" Coulter assuming command. His wife, movie star Constance Bennett, showed herself as one of the most formidable scroungers in any service. The mess halls and the barracks were spruced up with new furniture and the latest movies shipped by USAFE supply services. Fassberg, very nearly a Berlin Airlift disaster, became a showpiece.

Britain followed up its gift of Fassberg with an offer of another base at Celle, an attractive town near Hanover. An old fighter base, Celle was without runways or, it seemed, room for a runway, but the facilities were excellent. The British said not to worry and, dragooning the locals, gave an insight into how the British Empire came about.

As the summer went on, the airlift began to lose the happy informality of its early days. One horrendous foul-up over Berlin put an end to the sleepy air traffic control system that had served Berlin well enough before the blockade. The weather was bad that Friday, Aug. 13, and Tunner was due in Berlin. He was, in fact, overdue, as his airplane milled around in the stack with an undetermined number of others. Meanwhile, new arrivals were en route along the corridors, generating a chaotic condition that infuriated Tunner.

As it turned out, the day was a blessing. Given such an unmistakable warning, the Air Force moved when it still had time to straighten out the procedures before the bad weather set in around Berlin. The job was splendidly done by Maj. Sterling Bettinger, who got some professional air traffic controllers back in uniform before the weather turned really sour.

Tunner's Rules

Admittedly, the new procedures instituted after that infamous Friday were calculated to make any air traffic controller's job easier. Exact airspeeds were specified for climb, cruise, and letdown. Tunner declared a new rule forbidding second tries at a Berlin landing. This made for a smooth and continuous circuit, eliminating the need for holding patterns. These factors, plus the arrival of the new CPS-5 radar, made it in all likelihood the best ordered air traffic situation in history.

Another edict required all pilots to make their approaches under instrument conditions, regardless of the weather. The Ground Control Approach teams, given this continual exercise, became wonderfully proficient. There was a particular final approach controller, a Sergeant McNulty as I remember, who could make you believe, by gentle corrections interspersed with compliments, that your rotten job of flying into Tempelhof was one of aviation's milestones.

Across town, at Gatow, things were no different except for the accents. There the RAF was in charge and thus host to the C-54s from Fassberg and Celle. Sometimes the long nights in the Gatow tower were lightened by some irreverent American radio calls. There was the anonymous poet who gladdened the British traffic controllers with his inbound report:

Here comes a Yankee
With a blackened soul
Heading for Gatow
With a load of coal.

With the exception of December's battles against a heavy fog, one that brought back memories of the Great Fog of 1944 and the Battle of

C-54 taking off past the Ground Control Approach units at Rhein–Main AB

the Ardennes, the airlift became almost routine. Visitors who came for a look at this famous defiance of Stalin were slightly disappointed by the orderly and measured way the airplanes came and went through Berlin.

There was, however, one bit of excitement, and it was provided by the French.

The Allies had constructed a third airfield, located on a former panzer drill ground in the French sector. The labor force which carried out this project was recruited from the local populace, and it was made up of a most unlikely mix of women and men, young and old, most of whom gave no indication of having ever before done manual labor. However, no group had ever worked harder and with such goodwill. Aggregate for the runways came from the rubble of air raids, and the heavy machinery, too large for our aircraft, had been sliced up by acetylene torch at Rhein–Main, carefully marked, and welded back together at Tegel. At last, everything was ready for the start of operations, except for one thing. In the midst of the traffic pattern stood a 200-foot-tall radio tower, one that belonged to Soviet controlled East Berlin.

C-47s lined up to unload at Tempelhof in Berlin where residents needed 2,500 tons of food per day

British and American diplomats proposed a diplomatic solution to the problem. It called for the Soviets, in return for compensation, to dismantle the obstructing tower.

French forces thought this notion preposterous. And so, one morning, soon after Tegel opened for business, Brig. Gen. Jean Ganeval had a platoon of engineers march to the tower, lay some charges, and blow it flat. Direct action, the French said, is what the Russians understand. Tegel made a substantial contribution to the airlift and is today, in its modern form, Berlin's principal airport.

Early in the airlift, Britain agreed to the concept of a unified command structure with Tunner commanding and Air Commodore J.W.F. Merer as his deputy. One RAF officer, Group Capt. Noel Hyde, an unforgettable fellow who had spent four years of the war engineering escapes from Axis POW camps, came down to represent RAF interests and act as chief of plans. The rest of our staff remained as before, and there was never a time when there was any friction between the two Allies. Relations between the temporary duty Airlift Task Force and USAFE were not quite as congenial after the arrival of LeMay's successor, Lt. Gen. John K. Cannon, but it wasn't important. It was just one of those things.

Still Vivid

Even after the passage of 50 years, it is easy to remember the tension of that period. Scarcely three years had passed since we had thought of Germany as enemy territory. It still caused a flinch to lumber across, at vulnerable altitudes, those dangerous places we remembered so well. Now we had a new adversary with 300,000 troops within a day's march of the border separating East and West Germany and nothing to stop them if they invaded.

Well, almost nothing. The United States did have a monopoly on the atomic bomb and the means—B-29s—to deliver it. Indeed, early in the crisis, Washington had deployed a squadron of B-29s to the UK, without fanfare. Even so, it was evident that Moscow got the message. Our strategy, as it would be for many years to come, was one of all or nothing if it came to war.

For reasons that have never been made clear, the Soviet Union made no serious attempt to sabotage the airlift. Fighters occasionally made passes at the lumbering transports, but that was it. It would have been simple to jam the GCA frequencies and the navigational beacons, but it was never done. For want of a better answer, we have to credit the presence of those American B-29 bombers in the UK.

The Berlin Airlift was the first real event of the Cold War. Many people in high places thought it was the first event in World War III. It gave credence to the need for the NATO Alliance and it was reassuring evidence that the United States had a firm ally in Britain. Berlin, a shattered city in 1948, was an island under siege. Now, it is once more the elegant capital of a unified Germany. And while there are many things that contributed to this present happy state in Berlin, the airlift, 50 years ago, was a vital show of Allied resolution and competence at a very dangerous time. ■

Gen. T. Ross Milton, USAF (Ret.), is a longtime contributor to Air Force *Magazine. He graduated from West Point in 1940, completed pilot training in 1941, and served in Eighth Air Force. In addition to leading the October 1943 raid on Schweinfurt, Germany, he led the first daylight raid on Berlin and various other missions. He later served as chief of staff, Combined Berlin Airlift Task Force in 1948–49, commander of 41st Air Division and of 13th Air Force, USAF inspector general, and USAF comptroller. In 1985, he received the Thomas D. White National Defense Award.*

Russian Military Almanac

By Tamar A. Mehuron, Associate Editor, **with Harriet Fast Scott, William F. Scott, and David Markov**

Organization of the Russian Armed Forces

As an attempt at military reform began, Russia's armed forces, from July 1997 onwards, underwent major organizational changes. The Defense Council was abolished, Troops of Air Defense were absorbed by the Strategic Rocket Forces and Air Forces, and the Ground Forces High Command was eliminated.

The President retains control over "power" ministries and the Ministry of Foreign Affairs. At the top level, overall guidance of Russian uniformed forces was provided by the Security Council, chaired by the President. It has six permanent members: the President, Prime Minister, Secretary of the Security Council, Minister of Foreign Affairs, Minister of Defense, and Director of Federal Security Service. Among other members were other power ministries, the head of the Federal Protection Service, the Director of the Federal Border Guard Service, Minister of Internal Affairs, Director of Foreign Intelligence Service, and Minister of Civil Defense and Emergency Situations.

In March 1998, when the Defense Council was abolished, the Security Council was combined with the State Military Inspectorate to form a new Security Council. It became the only body between the President and the Russian power ministries. The Secretary of the Security Council and head of the State Military Inspectorate had responsibilities for all of the power ministries that had armed troops. The Security Council's National Security Concept, which focused on Russia's internal threats and the nation's dependence on nuclear weapons for providing security against external foes, was approved.

Armed forces under the Defense Ministry consisted of four military services: Strategic Rocket Forces, Air Forces, Navy, and Ground Forces. With the exception of certain units of the Strategic Rocket Forces and Airborne Troops, these services were described by the State Duma's Deputy Defense Committee Chairman, Aleksey Arbatov, as being "hungry, without clothing or housing, with shattered morale, and with increasingly obsolescent systems, although with nuclear weapons in service." The monthly initial pay of a military draftee was slightly more than three dollars; the highest monthly pay for noncommissioned officers and petty officers was less than seven dollars.

Strategic Rocket Forces (RVSN), "Russia's shield," increased in size and importance. This service, given priority in funding, got both the Military Space Forces and the Space Missile Defense Forces, which previously were part of the Troops of Air Defense. The Topol-M missile was considered the RVSN's general purpose ICBM. In early December 1997, Minister of Defense Igor Sergeyev announced that two new SS-27 Topol-M launch silos and a launch control center would be operational.

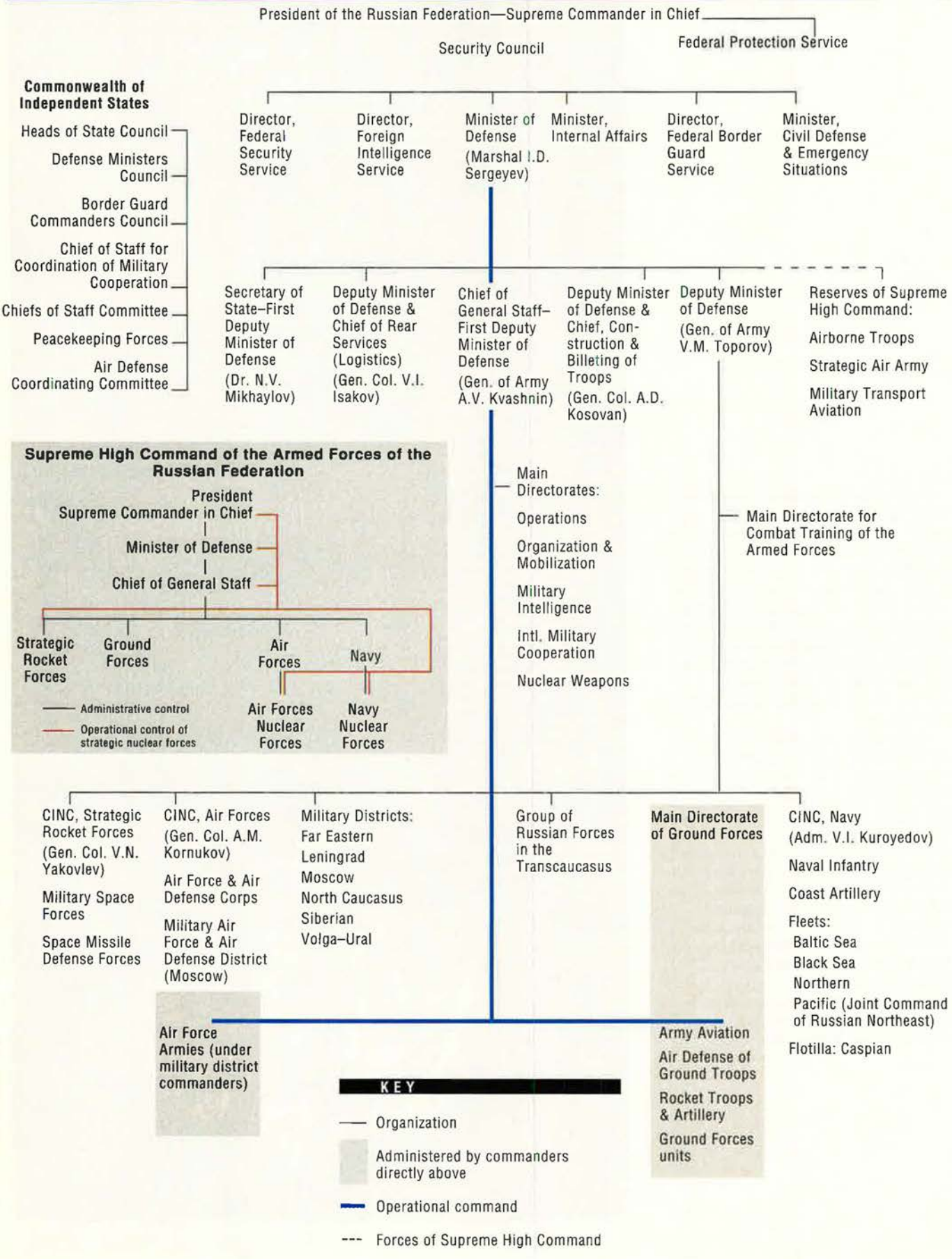
Air Forces (VVS) acquired interceptor aircraft, surface-to-air missiles, and radio–technical troops as they merged with the air defense troops. This integration was under way, but the final organizational structure had not been determined. Long-range aviation and military transport aviation commands were reorganized as air armies of the Supreme High Command: Strategic Air Army and Military Transport Aviation. Frontal aviation air armies were scheduled to be replaced by air force and air defense armies, operationally subordinate to commanders of military districts. (The restructured Air Forces were tasked "with conducting military operations in aerospace, which includes the entire space extending above the earth's surface; its boundary goes to infinity.")

Navy (VMF) maintained four fleets: Black Sea, Baltic, Northern, and Pacific, although its size declined from 308 to 112 ships. Baltic and Pacific fleets are experimenting with new joint structures. Testing of the heavy rocket cruiser *Peter the Great* was completed. Work continued on the *Borey*, Russia's new fourth-generation submarine. President Boris Yeltsin re-emphasized that half of the nation's strategic nuclear forces would be aboard vessels of this type.

Ground Forces (SV) continued to be downsized and neglected. The High Command and the Main Staff of the Ground Forces ceased to exist at the end of 1997. Their place has been taken by the Main Directorate of the Ground Forces and the Main Directorate of Combat Training of the Armed Forces. These structures were subordinated to a Deputy Minister of Defense. Training of conscripts was minimal. **Airborne Troops** were re-emphasized as a special reserve force answerable directly to the President and the Defense Minister. They remained Russia's only mobile forces.

Photo by Paul Kennedy

Structure of the Russian Armed Forces
As of July 27, 1998



Lineup of Russian Aerospace Power, 1997

Strategic Forces

Includes deployable Russian and deactivated Ukrainian strategic forces.

822–Intercontinental Ballistic Missiles
SS-18 (RS-20): 180. SS-19 (RS-18): 188. SS-24 (Silo) (RS-22): 56. SS-24 (Rail) (RS-22): 36. SS-25 (RS-12M): 360. SS-27 (RS-12M2): 2*.
**Two units placed into service in December 1997.*

114–Long-Range Bombers
Tu-95(MS6) Bear-H6: 33. Tu-95(MS16) Bear-H: 56. Tu-160 Blackjack: 25.

424–Submarine-Launched Ballistic Missiles
SS-N-18 (RSM-50): 192. SS-N-20 (RSM-52): 120. SS-N-23 (RSM-54): 112.

25–Strategic Ballistic Missile Submarines
Delta-III (Kalmar): 12. Delta-IV (Delfin): 7. Typhoon (Akula): 6*.
**Two Typhoons are not in operational service.*

Air Defense Forces

780–Interceptors
MiG-23 Flogger: 100. MiG-25 Foxbat: 60. Su-27 Flanker: 300. MiG-31 Foxhound: 320.

25–Airborne Early Warning and Control Aircraft
A-50 Mainstay: 25.

100–Strategic Anti-ballistic Missile Launchers*
ABM-3 (SH-11) Gorgon: 32. ABM-3 (SH-08) Gazelle: 68.
**System taken off-line in December 1997; future is uncertain.*

2,450–Strategic Surface-to-Air Missile Launchers
SA-2 (S-75): 50. SA-5 (S-200): 200. SA-10 (S-300P): 2,100. SA-12 (S-300V): 100.

Air Forces

58–Medium-Range Theater Bombers
Tu-22M Backfire: 58.

755–Tactical Counterair Interceptors
MiG-23 Flogger: 170. MiG-25 Foxbat: 30. MiG-29 Fulcrum: 460. Su-27 Flanker: 95.

560–Ground-Attack Aircraft
MiG-27 Flogger: 100. Su-24 Fencer: 265. Su-25 Frogfoot: 195.

206–Reconnaissance/ECM Aircraft
Tu-22MR Backfire: 10. MiG-25 Foxbat: 50. Su-24 Fencer: 80. Il-22 Coot: 20. An-12 Cub: 20. An-26 Curl: 20. Tu-134 Crusty: 6.

30–Tanker Aircraft
Il-78 Midas: 30.

940–Aircraft of Military Transport Aviation
An-2 Colt: 135. An-12 Cub: 170. An-22 Cock: 25. An-24 Coke: 25. An-32 Cline: 50. An-72/74/ 79: 20. An-124 Condor: 24. An-225 Cossack: 1. Il-76 Candid: 300. Tu-134/154 Careless: 15. YaK-40 Codling: 25. L-410UVP Turbolet: 150.

Navy

1–Aircraft Carrier
Kuznetsov-class CTOL ship: 1.

74–Bombers and Strike Aircraft
Tu-22M Backfire: 74.

50–Fighter/Interceptors
Su-27 Flanker: 30. Su-33 Flanker: 20.

130–Fighter/Attack Aircraft
Su-24 Fencer: 60. Su-25 Frogfoot: 40. MiG-27 Flogger: 30.

59–Reconnaissance/Electronic Warfare Aircraft
Tu-95 Bear: 24. Tu-22MR Backfire: 8. Su-24 Fencer: 20. Il-20 Coot: 2. An-12 Cub: 5.

286–Anti-submarine Warfare Aircraft
Tu-142 Bear-F: 55. Il-38 May: 36. Be-12 Mail: 50. Ka-25 Hormone-A: 50. Ka-27 Helix-A: 85. Mi-14 Haze-A: 10.

185–Helicopters
Ka-25 Hormone: 20. Ka-29 Helix: 25. Ka-31 Helix: 5. Mi-6 Hook: 10. Mi-8 Hip: 70. Mi-14 Haze: 55.

Russian Military Emblems

These are emblems of the Russian armed forces approved in December 1995. They depict the services, plus service branches and rear services. The Air Defense Troops were amalgamated with the Air Forces and Strategic Rocket Forces. The Navy emblem has been added.

Photo © Lance S. Cheung / Arms Communications

The Su-27 is Russia's principal air superiority fighter and also performs as escort for attack aircraft on deep penetration missions. Here, a single-seat Su-27P Flanker-B (foreground) and a two-seat Su-27UB Flanker-C (middle) share the tarmac with a Su-24 Fencer. The Fencer serves as the major element of the Russian theater strike/attack forces. Both aircraft can be found in the Air Forces and Navy inventories.

Russian and US Grades

Naval grades in italics

Russia	US
Five Stars	
Marshal of Russian Federation	General of the Army General of the Air Force *Admiral of the Fleet*
Four Stars	
General of the Army	General (USA)
General of the Army	General (USAF)
Admiral of the Fleet	*Admiral (USN)*
Three Stars	
General Colonel	Lieutenant General
Admiral	*Vice Admiral*
Two Stars	
General Lieutenant	Major General
Vice Admiral	*Rear Admiral (Upper Half)*
One Star	
General Major	Brigadier General
Rear Admiral	*Rear Admiral (Lower Half)*
O-6	
Colonel	Colonel
Captain (1st Class)	*Captain*
O-5	
Lieutenant Colonel	Lieutenant Colonel
Captain (2d Class)	*Commander*
O-4	
Major	Major
Captain (3d Class)	*Lieutenant Commander*
O-3	
Captain	Captain
Captain Lieutenant	*Lieutenant*
O-2	
Senior Lieutenant	First Lieutenant
Senior Lieutenant	*Lieutenant Jr. Grade*
O-1	
Lieutenant	Second Lieutenant
Lieutenant	*Ensign*

Minister of Defense Sergeyev currently holds the rank of Marshal of Russian Federation. Four Marshals of Soviet Union are alive today: S.L. Sokolov, V.G. Kulikov, V.I. Petrov, and D.T. Yazov. All four are officially listed as advisors to the Russian Federation Minister of Defense.

Active Duty Military Population, 1997

As of Dec. 31, 1997

Force element	Authorized	Actual
Ground forces	600,000	480,000
Air forces	170,000	136,000
Naval forces	200,000	160,000
Strategic defensive forces	175,000	140,000
Strategic offensive forces*	150,000	120,000
Command and rear services	205,000	164,000
Total	**1,500,000**	**1,200,000**

According to Russian MoD spokesmen, Russia's armed services were staffed at 80 percent of their authorized levels. Several Russian MoD spokesmen claimed authorized strength numbers which varied from 1.7 million to 1.5 million men. Since it was announced in 1996 that the authorized strength would drop to 1.5 million, it was selected as the authorized strength for 1997.

*Strategic offensive forces include Strategic Rocket Forces and strategic nuclear elements of the Air Forces and Navy.

External Deployments and Peacekeeping Forces

As of Dec. 31, 1997

Armenia (group of forces)	4,300
Bosnia (peacekeeping)	1,400
Croatia (peacekeeping)	850
Cuba	800
Georgia/South Ossetia (peacekeeping)	500
Georgia (group of forces)	8,500
Iraq/Kuwait (peacekeeping)	10
Moldova/Trans–Dniestria (peacekeeping)	500
Syria	50
Tajikistan (peacekeeping)	6,000
Vietnam	700
Western Sahara (peacekeeping)	25
Total	**23,635**

Russian Defense Ministry

As of July 1, 1998

Marshal of Russian Federation Igor Dmitriyevich Sergeyev

Born 1938 in Ukraine. Russian. Russian Federation Minister of Defense since May 1997. Member of the Security Council. Black Sea Higher Naval School (1960). Dzerzhinskiy Military Engineering Academy (with distinction, 1973). Military Academy of the General Staff (1980). Sergeyev transferred from coastal artillery to Strategic Rocket Troops in 1960. Chief of Staff, then Division Commander (1975). Chief of Staff and First Deputy Commander, Rocket Army (1980–83). Deputy Chief of Main Staff of Strategic Rocket Forces (1983), then First Deputy (1985). Deputy CINC, Rocket Troops, USSR, for Combat Training (1989–December 1991). Deputy Commander, Strategic Forces, Joint Armed Forces, CIS (April 1992), and Deputy Commander, Strategic Rocket Forces for Combat Training (January–August 1992). Commander in Chief, Strategic Rocket Forces, Russian Federation (August 1992). Promoted November 1997. Married, one son.

Gen. of the Army Anatoliy Vasilyevich Kvashnin

Born 1946. Chief of the General Staff of the Armed Forces of the Russian Federation and First Deputy Minister of Defense since June 19, 1997. Kurgan Engineering Institute (1969). Malinovskiy Military Academy of Armored Forces (1976). Military Academy of the General Staff (1989). Served in command posts in Czechoslovakia, Central Asia, and Belarus. Commander of a tank division (1978). First Deputy Commander, then Commander of an army (1989). Deputy Chief, then First Deputy Chief of the Main Directorate of Operations of the General Staff (1992–95). Commander of Military Operations in Chechnya (December 1994–February 1995). Commander of the Troops of the North Caucasus Military District (February 1995), in charge of Russian armed forces in the Chechen conflict. Acting Chief of the General Staff from May 23. Promoted November 1997. Married with two sons.

Gen. Col. Aleksandr Davydovich Kosovan

Born 1941. Deputy Minister of Defense and Chief of Construction and Billeting of Troops since April 1997. Novosibirsk Construction Engineering School. Worked in Special Construction until 1984. Assigned to the Volga Military District, then again to the Main Directorate of Special Construction. Deputy Commander for Construction and Billeting Troops of the Transcaucasus Military District (1988). First Deputy Chief of Construction and Billeting of Troops (1992). Honorary Builder of Russia. Promoted 1996.

Dr. Nikolay Vasilyevich Mikhaylov

Born 1937. Secretary of State–First Deputy Minister of Defense (since September 1997). The only civilian in the top echelons of the Ministry of Defense. Responsible for the reform of defense industry and science. Graduated from Moscow Bauman Institute of Technology (1961). Until 1986, in defense industry as director of a leading scientific research institute working on anti-missile defense. Headed the Vympel Central Research & Production Association, after 1991, the Vympel Interstate joint stock corporation. Became a Deputy Secretary of the Security Council in July 1996, responsible for the military industrial complex, assuring technological independence, and ecological safety. Doctor of Sciences (Economics) and Grand Doctor of Philosophy. Professor. Full member of a number of national and international academies. Government prize winner (1984, 1997) for creating an early warning system, a space control system, and a system of anti-missile defense.

Gen. Col. Vladimir Il'ich Isakov

Born 1950. Deputy Minister of Defense and Chief of Rear Services (Logistics) since June 30, 1997. Moscow Military School of Civil Defense, Military Academy of Rear Services and Transport, Military Academy of the General Staff. Deputy Commander of an army for Rear Services. Served in Afghanistan (1984–86). Chief of Staff of Rear Services, Western Group of Forces (Germany, 1991). Deputy CINC–Chief of Rear Services, Western Group of Forces (Germany, 1992). Promoted 1997.

Gen. of the Army Vladimir Mikhaylovich Toporov

Born 1946. Russian. Deputy Minister of Defense, Russian Federation, since June 1992. Under the military reform, main directorates replacing the Ground Forces were subordinated to Toporov in January 1998. Member of Commission on the Social Affairs of Servicemen and Others Discharged from Military Service and Their Families (December 1996). Odessa Artillery School (1968). Frunze Military Academy (1975). Military Academy of the General Staff (1984). Twenty years in Airborne Troops. Chief of Staff and First Deputy Commander, Far Eastern Military District (1989–91). Commander of Moscow Military District (September 1991). Coordinator for sales of military equipment through *Voentekh* (1992–95). Promoted 1996. Married, two sons.

Uniformed Chiefs of the Military Services

Commanders in chief are listed in the same order of service precedence as applied in the days of the Soviet Ministry of Defense. However, these commanders are no longer deputy ministers of defense.

Gen. Col. Vladimir Nikolayevich Yakovlev

Born 1954. Commander in Chief, Strategic Rocket Forces, since June 30, 1997. Kharkov Higher Military Command Engineering School (1976). Dzerzhinskiy Military Academy (command faculty) (with gold medal, 1985). Candidate of sciences (military). Commander of a missile regiment (1985). Deputy Commander (1989), Commander of a missile division (1991). Chief of Staff–First Deputy Commander of a missile army (1993). Commander of a missile army (1994). Chief of the Main Staff–First Deputy CINC of the Strategic Rocket Forces (December 1996). Married, two daughters.

Gen. Col. Anatoliy Mikhaylovich Kornukov

Born 1942. CINC of the Air Forces since January 1998. Chernigov Higher Aviation School for Pilots (1964). Military Command Academy of Air Defense (1980). Military Academy of the General Staff (1988). Commander of Air Forces fighter division (1980–85) and an Air Forces fighter corps (1985–87). First Deputy Commander of Air Defense Aviation (1988). First Deputy Commander of a detached Air Defense Army (1989), later Commander. Commander of the Moscow Air Defense District (September 1991).

Adm. Vladimir Ivanovich Kuroyedov

Born 1944. CINC of the Navy since November 1997. Pacific Ocean Higher Naval School (1967). Naval Academy (1978). Military Academy of the General Staff (with gold medal, 1989). Pacific Fleet (1967–76). Flotilla Commander in the Pacific Fleet (1989). Chief of Staff and First Deputy Commander of the Baltic Fleet (1993). Commander of the Pacific Fleet (February 1996). Chief of the Main Naval Staff and First Deputy CINC of the Navy (July 1997). Promoted in 1996. Married, one son.

Strategic Nuclear Warheads, 1991–97

Nation	USSR 1991	1992	1993	1994	1995	1996	1997
Russia		7,644	6,766	6,902	5,961	6,410	6,414
Ukraine		1,408	1,264	1,594	1,056	0	0
Kazakhstan		1,360	1,260	1,040	0	0	0
Belarus		54	54	36	18	0	0
Total	**11,159**	**10,466**	**9,344**	**9,572**	**7,035**	**6,410**	**6,414**

Strategic Nuclear Weapons of Russia and the Other Nuclear-Armed Former Soviet Republics, 1997

	Russia	Ukraine	Kazakhstan	Belarus	Total
ICBMs	756	66	0	0	**822**
Warheads	3,630	0	0	0	**3,630**
Bombers	70	44	0	0	**114**
Warheads	560	0	0	0	**560**
SSBNs	25	—	—	—	**25**
SLBMs	424	—	—	—	**424**
Warheads	2,224	—	—	—	**2,224**
Total vehicles	**1,250**	**110**	**0**	**0**	**1,360**
Total warheads	**6,414**	**0**	**0**	**0**	**6,414**

All data are current as of Dec. 31, 1997. On June 1, 1996, Ukraine returned all nuclear warheads to Russia. Adjustments in Russian strategic forces reflect START deployable delivery systems as noted in the January 1998 MOU on Data Notification.

It is thought by many analysts that all Delta I and Delta II SSBNs with their SS-N-8 SLBMs have been withdrawn from active deployments and are not counted as operational forces.

Zero indicates that that particular nuclear weapon type was deployed in that country at one time but is not deployed there now; a dash indicates that a weapon was never deployed in that country. All nuclear warheads have been returned from Ukraine, Belarus, and Kazakhstan.

Moscow's Active Duty Military Forces, 1989–97: USSR and Russian Federation

	Theater forces—ground, air, naval	Strategic forces—offensive/defensive	Command and rear services	Total forces
1989	2,690,000	890,000	1,450,000	**5,030,000**
1990	2,187,000	876,000	925,000	**3,988,000**
1991	2,150,000	755,000	650,000	**3,555,000**
1992	1,205,000	366,000	180,000	**1,751,000**
1993	1,082,000	230,000	100,000	**1,412,000**
1994	1,045,000	245,000	105,000	**1,395,000**
1995	923,500	279,200	176,000	**1,378,700**
1996	985,000	274,000	175,000	**1,434,000**
1997	776,000	260,000	164,000	**1,200,000**

The active military population of the Soviet Union peaked in 1989, the year the Berlin Wall fell and the Warsaw Pact collapsed. Moscow initiated major force reductions. In late 1991, the USSR itself collapsed, leaving Russia with a portion of Soviet forces while large numbers of troops stayed in newly independent nations. Moscow's active duty forces continued to decline during the first four years of the Russian Federation.

Strategic offensive forces include Strategic Rocket Forces and strategic nuclear elements of the Air Forces and Navy. This table does not include Border Guards and other nontraditional uniformed services.

Strategic Nuclear Forces, 1989–97: USSR and Russian Federation

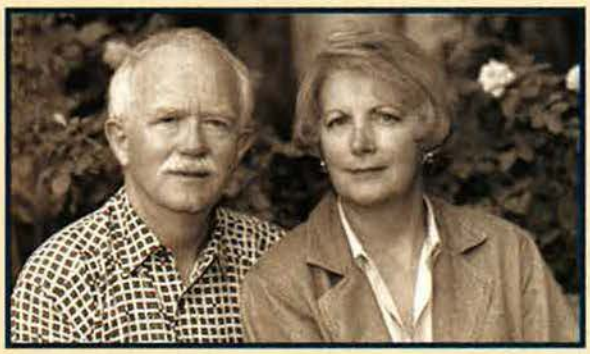
	ICBMs	Long-range bombers	Submarine-launched ballistic missiles	Ballistic missile submarines
1989	1,378	150	954	70
1990	1,373	155	924	61
1991	1,393	141	912	59
1992	1,031	135	864	57
1993	884	74	788	52
1994	773	95	732	47
1995	671	69	524	33
1996	747	69	440	26
1997	756	70	424	25

The USSR collapsed in late 1991. Russia retained all of the sea-based strategic weapons. Russia also retained most of the ICBM and bomber forces, though a significant number of these weapons came under control of Ukraine, Kazakhstan, and Belarus. None of the forces of these nations are counted in the table at left after 1991.

The Difference A Care Advisor Can Make

Navigating Through the Choices and Options of Long-Term Care

Terry and Janet Lowell learned the hard way how valuable Care Advisory services could have been to Janet's mother who needed around-the-clock help for 16 years. "I kept thinking surely there must be some kind of service that can come in and appraise the situation and make recommendations. We did try a visiting nurse service, but I was concerned, because I wanted professional help and it seemed that there was a limit to what they were able to provide," says Janet.



Terry and Janet Lowell

The Unfortunate Reality

Like the Lowells, many people aren't prepared for the day when they or a loved one need long-term care. Most people believe that they will never need long-term care. However, here are some key facts about long-term care:

- 60 percent of all Americans over age 65 will need some type of long-term care.[1]
- Long-term care is not just for the elderly; of the 13 million Americans who need long-term care, 40 percent are under the age of 65.[2]

What is Long-Term Care?

Long-term care is the extended care you may need when, because of a chronic illness, injury or old age, you need help with basic activities of daily living, like eating, bathing and dressing.

Finding the best options for care can be overwhelming. The choices are not always easy for the family to make without help. *That's when an experienced Care Advisor can make an important difference.*

AFA's Long-Term Care Program Care Advisors — the AFA difference.

AFA will make Care Advisor services available in your long-term care program.

What is a Care Advisor?

- A nurse or social worker from your local community.
- Someone who knows your local community and the services it provides.

How can a Care Advisor help?

- At no additional charge, a Care Advisor can suggest services and resources that you may not have known about.

Your Care Advisor: How It Works

Your Care Advisor understands your plan of benefits and your individual circumstances. Your care advisor will make a recommendation, which best suits your specific needs. Since most people prefer to remain at home, your Care Advisor will do everything possible to make that happen.

It's Your Choice

Your Care Advisor will be available to you to help lighten the emotional burden of long-term care decisions. Ultimately, the final decision on care and choice of providers will rest with you and your family.

AFA Cares

AFA is designing a customized long-term care program specifically for its members that addresses the most important features of a long-term care plan, including:

- Quality care
- Staying at home
- Making the right decisions for you
- Finding the right services

Remember

You could need long-term care at any time. Planning ahead may make a difference. Watch for more information about AFA's Long-Term Care Program starting in 1999.

1 Project Report for HIAA, 1990
2 U.S. General Accounting Office, 1995

PA-8935-8c(1877)98

Too many Air Force people are deciding life might be better out of the service.

The Retention Problem Spreads

By Peter Grier

THEY have been ground down by endless weeks on temporary duty in the Arabian desert and at other remote sites. When they get home, after missing everything from children's birthdays to holiday family gatherings, they must work longer hours than ever to meet performance standards. They see the Air Force getting smaller and budgets tighter. Then they are tempted by lucrative civilian job offers.

Air Force pilots? Yes—but not them only. More and more, the Air Force's rank and file members are being battered by the same problems that afflict fliers, and too many are deciding that life might be better outside military service.

Retaining motivated and technically adept enlisted men and women is becoming more and more difficult for Air Force personnel officials. The situation is not as acute as the pilot problem. Still, service leaders find it harder than ever to keep mid-level specialists in key jobs. These range from experienced F-16 crew chiefs to Serbo-Croatian linguists.

In a recent message to the force, Gen. Michael E. Ryan, Chief of Staff, warned, "One of the Air Force's major challenges today is to retain the high-quality people we need." Ryan has pushed for a multipronged effort to improve enlisted retention. It includes steps ranging from the reduction of operations tempo, where possible, to increased use of videophone communication between families and airmen overseas, to a thorough overhaul of the very structure and operations concept of the post–Cold War Air Force.

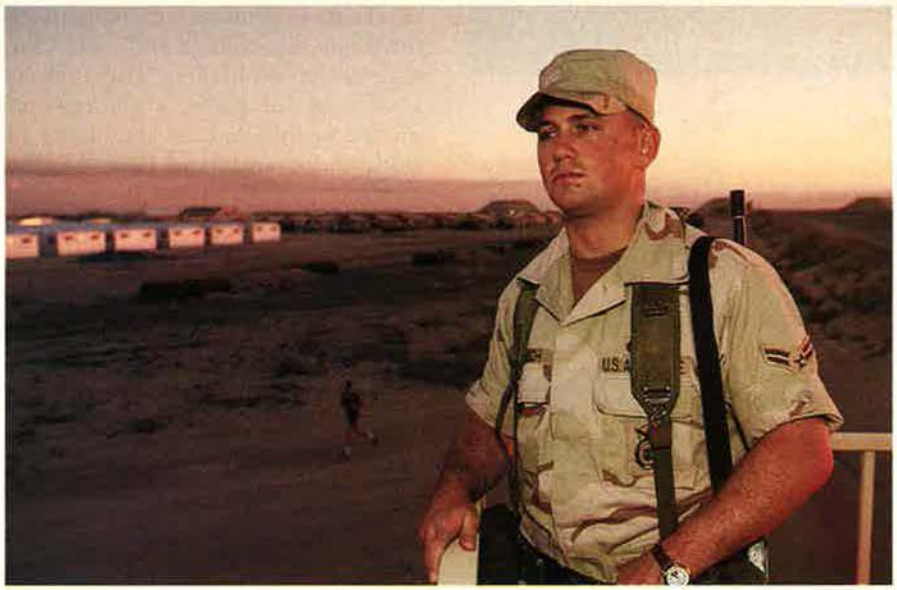
Use of video links may sound like a minor detail, but it represents the kind of attentiveness that can tip a re-enlistment decision in the Air Force's favor. The service had conducted successful video link tests at more than 40 operating locations. "This initiative met with a positive response," Lt. Gen. Michael D. McGinty, then–deputy chief of staff for personnel, said in a status report to Congress. Regarding the video experiment, McGinty noted, "A deployed first sergeant said, 'I've never seen a better morale booster.' "

Pilot Exodus

Without question, the pilot shortage remains USAF's most serious and difficult retention problem. Too many deployments to Southwest Asia, plus a boom in airline hiring that shows no sign of slowing down, has sent many Air Force aviators practically rushing for the exits.

Projections based on data collected through July show the Air Force is on pace to lose many more pilots in the next several years and suffer an actual shortage of some 2,300 in 2002. That projected 2002 shortfall, moreover, is nearly 30 percent higher than the figure projected only a few months ago. In early 1998, service officials said, they calculated USAF would be short 1,800 pilots when 2002 rolls around. Worsening conditions through 1998 have forced them to revise that projection.

Fixes such as an increased pilot bonus and reduced training tempo could cause this trend to turn around, though they have yet to do so, Air Force personnel officers note.



USAF photo by MSgt. Val Gempis

On the Air Force Personnel Center's Top 10 Re-enlistment Watch List are security forces personnel like A1C Charles Wunsch from the 4406th Support Squadron, here on duty on the perimeter of tent city at Al Jaber AB, Kuwait.

Retention problems being experienced in the enlisted force may be less dire, but they are serious and have become the source of major concerns. As far back as late 1997, Air Force officials were sounding an alarm. CMSAF Eric W. Benken delivered a memo to the top brass in which he warned bluntly that enlisted retention "is going south on us."

The concern of Air Force leaders is focused narrowly on second-term re-enlistment rates, which is an area of difficulty in an otherwise strong personnel picture. (See box on p. 63.) The decision about whether to opt for civilian life at the end of two tours is a crucial one. Those who re-up are often dedicated to long-term military careers. Most have already demonstrated they are valuable to the Air Force itself just by reaching the two-term point. The US government has invested thousands of dollars—sometimes hundreds of thousands of dollars—in their specialized training. Many are hard to replace.

The Air Force goal is to entice 75 percent of its two-termers to continue their time in service. Through the end of the third quarter of Fiscal 1998—that is, through June 30—the actual figure was just 70 percent.

The Air Force's overall second-term re-enlistment rate has been slowly declining for three years. "We have a caution light on in terms of second term enlisted," says Lt. Col. Lisa Firmin, chief superintendent of retention policy at Air Force Personnel Center, Randolph AFB, Texas. "I wouldn't say the red light's on."

Beneath the Surface

Maybe not, but the overall second-term retention rate, not yet a major concern, appears to be masking pockets of far deeper problems. Many crucial job specialities have much lower second-term re-enlistment numbers than would be apparent judging from the overall rate, according to USAF figures.

Examples, large and small, abound. So far in 1998, the second-term re-enlistment rate for air traffic controllers hovers around 52 percent, for instance, well below the 75 percent goal. For space systems operators, the rate is 51 percent. For communications–computer systems controllers, it is only 31 percent.

Other skills listed on AFPC's Top 10 Re-enlistment Watch list, with their first-through-third-quarter 1998 second term re-enlistment rates, include: F-16 crew chiefs (66 percent), security forces (66 percent), pararescue jumpers (55 percent), airborne battle management personnel (64 percent), combat controllers (100 percent, but remain on the list based on prior year activity), cryptolinguists (53 percent), and computer operators (61 percent).

"These are not the only skills we're concerned about," reports MSgt. Tony Patterson, superintendent of retention policy at AFPC. "These are ones that we've picked out as being particularly important to the Air Force."

In Fiscal 1997, the last full year for which data are available, the Air Force failed to meet second-term re-enlistment goals in 114 of 378 enlisted specialty codes, or nearly a third of the total. And the situation has only gotten worse.

The main reasons for retention woes are well-known. Increased operations tempo is the culprit that many departing airmen cite as the push that shoved them out the door. As Air Force leaders often point out, four times as many personnel typically are deployed away from home

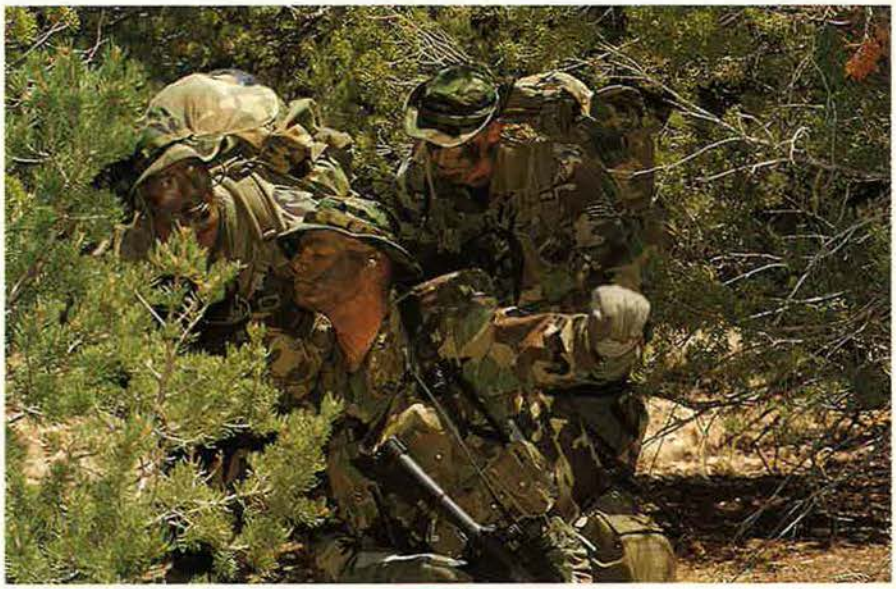


Photo by Paul Kennedy

Though USAF has had the highest retention rate among the services, retaining key mid-level specialists is now harder. On the list of skilled enlisted members with a worrisome re-enlistment rate are pararescue jumpers like these.

Top 10 Watch List, Enlisted Retention

Year	1st Term	2d Term	3d Term
Combat controllers	43%	100%	95%
F-16 crew chiefs	68%	66%	92%
Airborne BM personnel	40%	64%	100%
Com–computer operators	57%	61%	88%
Pararescue jumpers	56%	55%	85%
Air traffic controllers	41%	52%	89%
Space systems operators	52%	51%	88%
Security forces	38%	66%	93%
Cryptolinguists	41%	53%	94%
Com–computer systems controllers	42%	31%	85%

Source: USAF. Fiscal 1998 figures are for first three quarters only.

Air Force Enlisted Retention Rates

Fiscal Year	1st Term	2d Term	3d Term
1990	52%	69%	93%
1991	59%	77%	95%
1992	58%	76%	96%
1993	61%	82%	97%
1994	59%	81%	96%
1995	63%	77%	96%
1996	59%	76%	95%
1997	56%	71%	95%
1998	55%	70%	93%
Goal	**55%**	**75%**	**95%**

Source: USAF. Fiscal 1998 figures are for first three quarters only.

today as were on a usual day in the late 1980s. For many skill specialties the goal of no more than 120 days TDY per year remains nothing but a vague dream.

The cryptolinguist field, for example, has become a major retention problem because members of that specialty operate in a very high-tempo environment. Enlisted personnel who can speak Farsi (the native tongue of Iranians) or Serbo-Croatian (spoken in many areas of the Balkans) are in tremendous demand overseas.

Similarly, air traffic controllers are shuttling all over the world, running temporary Air Force traffic operations in places as diverse and widely separated as Tuzla in Bosnia and Mogadishu in Somalia.

The high optempo of today affects more than just the folks on deployment. Those left behind often must pick up more of their base's daily workload. A Chief of Staff quality-of-life survey showed the average number of hours worked by Air Force personnel increased from 47 to 50 per person over the course of 1997.

Such workload issues were not that much of a problem back when the majority of the force was not married. In the 1970s, about 70 percent of airmen were single, and deployments were a chance to see the world. Today the situation is reversed. Only 35 percent of the force is single, whereas 65 percent are married, and the state of an enlisted member's family is very important to his or her re-enlistment decision. Base housing conditions are now crucial to keeping good people. So are the number of base clinics and ease of access to child care.

Moreover, the long, slow decline in resources demoralizes many in the force and has contributed somewhat to retention problems. "The kids see a shortage of parts, a shortage of trained people, and an abundance of work to do," observed Gen. Richard E. Hawley, the head of Air Combat Command and an outspoken advocate for easing the strain on the troops.

Squeeze on Benefits

Airmen no less than officers perceive that the resource squeeze has caused a serious erosion of their own benefits. Those who entered the force after 1986 are now well aware that Congress in that year altered the military retired pay formulation to their disadvantage. The congressional move reduced retired pay from 50 percent of average basic pay over the last three years of service to 40 percent of that final three-year run.

These irritants might not cause too much difficulty were it not for another factor: the strong US job market. Civil airlines are not the only US industrial entities eager for USAF–trained personnel. Contractors such as Boeing are snapping up technicians from nearby bases. Computer systems operators are in tremendous demand all across the country. Space systems operators are leaving the service in droves for private work.

"Even in the civilian economy things are moving towards space and satellites," AFPC's Patterson points out.

According to Ryan, the Chief of Staff, the Air Force game plan to

Staff photo by Guy Aceto

Several changes, ranging from decreasing the optempo to overhauling USAF's structure and operations may help to meet the challenge of retaining personnel like these crew chiefs on the flight line on a Southwest Asia deployment.

retain high-quality people has four major areas of focus. They are: reducing operations tempo, improving care for families of deployed people, improving quality of life, and improving personnel programs.

A number of the optempo initiatives are already in place. Ryan has ordered a 5 percent reduction in Air Force and joint training exercises through 2000, for instance. Quality Air Force Assessments ended Jan. 1. There has been a 10 percent reduction in the length of inspections and number of inspectors used for Operational Readiness Inspections this year, with further such cuts to follow.

To improve care for families, the Air Force is pursuing an ombudsman program. Wing commanders will charge these Readiness NCOs with serving as personal advisors to spouses and dependents of absent Air Force men and women.

The service is also looking to bolster family ties through better means of communication. That is where the deployable videophones—which operate over standard phone lines—come in. Some commands are taking further action on their own. Example: Air Mobility Command is moving to equip base operations aircrew lounges with Internet-connected personal computers.

Real Quality of Life

Officials know that better pay is the best way to bolster enlisted quality of life. In that regard they are happy that this year, in the defense authorization bill, Congress has given the nod to a 3.6 percent compensation boost—a bigger increase than the Pentagon requested.

To help increase quality of life in the area of enlisted housing, the Air Force this year is updating 3,800 family housing units and 21 dormitories. It is building three child development centers, two education centers, one family support center, and one fitness center.

Personnel program improvements include greater opportunity for promotion. With end strength and requirements more stable now than they have been in past years, the service is now better able to predict how many senior NCOs it will need in the years ahead.

"We've increased the promotion percentage for master sergeants, staff sergeants, and tech sergeants," Patterson said. "In fact, the most recent staff sergeant promotion list ... had the highest promotion rate in 27 years." That rate was 22.65 percent.

Many of these improvements are aimed at increasing the Air Force's overall retention. "Rifle shot" efforts—those aimed at keeping individual specialists depend on something else: bonuses. Air Force officials said that the No. 1 tool for retaining targeted enlisted skills is the Selective Re-enlistment Bonus program.

The growth in such SRBs mirrors the growth of the second-term re-enlistment problem. In 1995, 41 skills were eligible for SRB status, in a program that overall doled out $24 million in re-up cash. Since then, the number of eligible skills has more than doubled. The latest review of the program, effective in late July, added to the list another 18 skills, bringing the total to 107.

The SRB program will cost the Air Force about $48 million in bonuses this year, figure AFPC officials. They believe that even though the cost of the program has doubled in recent years, it is cheap at the price. "We are starting to see some impacts where the bonus money is starting to work," says Patterson.

Historically, the Air Force has had the highest retention rates of all the US military services. That is one record that Air Force officials intend to keep. High-level attention to the problem can be seen in the very existence of the AFPC retention policy office, which was created in December 1996. Prior to that, personnel officials were struggling to deal with a drawdown in personnel numbers.

"We're out of the drawdown, and we're into force shaping," according to Firmin. "We're concerned with shaping and building the force."

Some of the most affected major commands, such as Air Combat Command, have established mirror-image retention offices and set up extensive Internet web sites that provide information on bonuses and optempo reduction efforts. Eleven NCOs met with Brig. Gen. John F. Regni, Air Force director of personnel resources, at the Pentagon earlier this year to discuss ways of keeping more enlisted personnel from walking. Enlisted retention was a focus at a top brass Corona meeting earlier this year.

"The message is we care about our enlisted folks. We care about all our personnel," says Firmin. ■

The Pain Is Concentrated

The developing problem in second-term re-enlistment is a somewhat isolated phenomenon.

For example, Air Force recruiting is strong. The task of attracting high-quality personnel into the force has not proved to be a problem—not yet. Officials point out that the Air Force easily met its 1997 recruiting goals. USAF's former personnel chief, Lt. Gen. Michael D. McGinty, noted to lawmakers that the Air Force brought in 30,200 first-time enlistees, 99 percent of whom are high school graduates. Fully 79 percent of the new airmen scored above average on the Armed Forces Qualification Test.

Similarly, Air Force officials do not see first term re-enlistment rates as a big problem at the moment. At the end of their initial tour of duty, many enlisted personnel from all the armed services decide that military life is not for them. Service personnel plans have long been adjusted accordingly. Through the end of the third quarter of Fiscal 1998, the Air Force first-term re-enlistment rate was 55 percent. That figure is right at the service's goal for the year, although it represents a slight dip from 1997's 56 percent rate.

Meanwhile, the career rate remains strong. It stands at 93 percent for the year so far, slightly below the 95 percent goal.

Thus, second-term retention has become the focus of Air Force concern. About the only other potential difficulty on the horizon concerns recruiting. Officials point with concern to the steadily declining interest among young Americans in entering the nation's military service. Poll numbers show that the slice of 16-to-21-year-old Americans who say they have a "propensity to enlist" in the military has dropped from 17 percent in 1989 to around 12 percent today.

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, "From the Battlelabs," appeared in the September 1998 issue.*

Psychological warfare, as conducted by ANG's Commando Solo unit, means taking control of the airwaves.

Do Not Adjust Your Set

Photos by John Rossino

"What the heck is that?" Such, invariably, is the way onlookers react whenever an EC-130E Commando Solo arrives on the scene. The Air Force has only six of these aircraft, and they all belong to the 193d Special Operations Wing, an Air National Guard outfit at Harrisburg IAP, Pa. "You have to admit," Maj. Dave Lively, a 193d SOW navigator, told an interviewer, "the aircraft are pretty strange looking."

Aboard their highly sophisticated aircraft, special ops crews broadcast "alternate programming" into world hot spots, using 10-kilowatt transmitters to overwhelm "competing" TV or radio signals anywhere. They also receive and monitor signals.

The 193d SOW conducts psychological warfare, usually done in the shadows. The 193d is the only ANG unit in Air Force Special Operations Command and one of the most heavily used; it participates in 12 to 15 major exercises or deployments a year. The 193d (named best ANG unit for 1997) also rates as one of the most specialized units in the Air Force.

The EC-130E itself is unique. It features four fin-mounted, TV–antenna pods, two ax-head-shaped blade antennas slung under the outer wings, and two bulky pods containing VHF/UHF broadcasting equipment. Those unfamiliar with the aircraft sometimes mistake the latter for pontoons.

Photos by John Rossino

The primary mission of the 193d is to provide an airborne broadcast platform for virtually any contingency, whether it is a state or national crisis, natural disaster, or military emergency, on a moment's notice, anywhere in the world.

The Commando Solo fleet carries out psychological operations and civil affairs broadcast missions in the standard AM, FM, HF, TV, and military communications bands. The aircraft fly at maximum possible altitudes to achieve optimum propagation patterns, and they do equally well in day or night. Secondary missions include command-and-control communications countermeasures and limited intelligence gathering.

In early 1998, during the crisis over Iraq's defiance of UN weapons inspectors, DoD ordered deployment to the Gulf of two EC-130E Commando Solo aircraft. In September 1997, it sent three Commando Solos to Brindisi, Italy. From there, they flew missions around Bosnia to help curb the broadcast of violent rhetoric on Serb TV and radio. DoD gave advance notice of the deployment in what turned out to be a successful effort to influence the Serbs. It was an uncharacteristically public display for a unit that usually does things much more quietly.

The 193d also took part in Operation Urgent Fury in Grenada in 1983, Operation Just Cause in Panama in 1989, and the Gulf War of 1991. In 1994 it was one of the lead units to deploy and conduct operations over Haiti during Operation Uphold Democracy.

Commando Solo is a heavy aircraft—118,000 pounds dry. Usually, the aircrew members take off with less than a full load of fuel. Shortly after takeoff, they rendezvous with an orbiting tanker and fill up. System automation is such that, if the initial broadcast emanates from the right of the airplane, equipment automatically switches the broadcast to the left side on the next leg of the pattern. Missions can last up to 14 hours, requiring an augmented flight crew and aerial refueling.

While the aircrew flies a racetrack pattern at an altitude of 18,000–20,000 feet, the mission crew either broadcasts a message or engages in passive surveillance.

Photos by John Rossino

The mission crew sits on each side of a central aisle in what is, in effect, a broadcast studio located in the aircraft's cargo hold. All of the broadcast equipment is purchased off-the-shelf, and thus the Guard can upgrade the equipment relatively easily as the technology improves. The aft two-thirds of the hold is filled with rows of transmitters, power supplies, and related equipment that go all the way to the paratroop door. Space is at a premium.

On deployments to Saudi Arabia and Turkey during Desert Storm, the Commando Solos broadcasted the US–produced "Voice of the Gulf" and other programs intended to convince Iraqi soldiers to give up and helped bring about mass Iraqi defections and surrenders. In Grenada, these airborne radio stations kept US citizens on the island informed about the military action. The wing conducted similar types of missions in Panama and Haiti. The fast pace of operations seems sure to continue. ■

In many languages and various forms—jacket patches, cards, letters—they were official IOUs to those who helped downed fliers.

Blood Chit

REMEMBER those photos of Lt. Gen. Claire L. Chennault's Flying Tigers, having cloth patches depicting the Chinese flag and some Chinese lettering sewn onto their flight suits and A-2 jackets? Those pieces of fabric were known as rescue patches, later called "blood chits." They identified the wearers as Americans helping China fight the Japanese and requested the Chinese people to assist them. They represented a pass to safety for those who crashed or bailed out in areas occupied by the enemy.

Blood chits were not only cloth patches. They also were cards or sometimes letters with a promise of

By C.V. Glines


Photo by Paul Kennedy
ARABIC
PERSIAN
GERMAN
TM 30-306
GERMAN
USSIAN
PHRASE BOOK
DECEMBER 4, 1943

The American Volunteer Group "Flying Tigers" wore this type of rescue patch in December 1941. The Chinese text asks for help for an American who has come to China to fight the Japanese. The red seal is the "chop" of the Chinese aeronautical commission.

reward directed to anyone who would assist a downed flier. In the early days of World War II, the British routinely issued blood chits to their aircrews, including several types in 1940 to fliers in Ethiopia. When the US entered the war, the American air services adopted the practice and they were eventually issued in all theaters of combat operations by all the western Allies. Blood chits were duly honored and the helpers were rewarded with money or gifts. Later, chits were printed in nearly 50 languages, including many European, North African, and Asian tongues. Not all of them contained the same statements, but all were bona fide government IOUs promising to reward those who assisted Allied airmen.

The concept of using chits did not originate with Chennault's units in China. Royal Air Force units serving in India and Mesopotamia during and after World War I were the first to use them in a systematic way. Originally called "ransom notes," these were cards or certificates given to pilots and observers. They were written in Urdu, Farsi, Pashto, Arabic, and other local languages. They were sometimes handwritten and promised considerable monetary rewards for the safe return of airmen to the nearest British outpost. Blood chits were often issued along with phrase cards containing short phonetic or written Arabic phrases. All legitimate chits presented for reward were promptly paid in cash or "in kind."

A Debt Is Owed

When Chennault became an advisor to China's air force in 1937, foreign pilots were issued the rescue patches called "hu chao." They bore the Chinese Nationalist flag, the chop of the Chinese air force headquarters, and Chinese lettering that read: "This foreign person has come to China to help in the war effort. Soldiers and civilians, one and all, should rescue, protect, and provide him medical care," implying that a debt was owed to anyone who helped save an Allied airman from capture by the Japanese. The rescue patches issued to the Americans in the Flying Tigers in 1941 were identical except that the chop was that of the Chinese aeronautical commission.

Robert E. Baldwin and Thomas W. McGarry, authors of the book *Last Hope: The Blood Chit Story,* noted that the lack of literacy among much of China's rural population often presented a problem in reading the Chinese characters. Ken Jernstedt, former Flying Tigers member, noted that the majority of the peasants were illiterate, and the residents of the next valley over the mountains from Kunming were not even aware of the existence of oceans, let alone what an American or Japanese person looked like.

(Baldwin is the director of the International Blood Chit Museum in Berkeley, Calif., dedicated to "the preservation of the artifacts and documentary history of the Escape and Evasion efforts of the United States, Britain, and the Commonwealth nations." Baldwin provides consultation and lends escape and evasion artifacts to other museums for temporary exhibit.)

The realization of the need for more detailed communication between downed airmen and native peoples led to the publication of small Pointie Talkie booklets. These were first made by US and British escape and evasion agencies in Asia.

Printed in English and the languages most likely to be needed, phrases, questions, and answers were listed side by side in both languages so an airman could point to a question and a native could point to an answer. Some had colorful illustrations to use with natives who could not read. These would identify a downed crew member as an Allied flier and show that he desired assistance in returning to American or Allied hands and assure the rescuer he would be generously rewarded for his aid.

Phrase books were also issued to flight crews for countries they were likely to fly over. As the war progressed, the Office of War Information produced thousands of leaflets, dropped by aircraft, that instructed the indigenous population in some of the war theaters how to assist Allied crew members.

Money Bags

There was no better incentive to provide help than for a downed crewman to produce some currency or coins on the spot. Small pouches containing paper money and silver and gold coins were issued before each mission to American, Australian, and Dutch airmen operating over

the Netherlands East Indies. They were to be opened only when the user was forced down and needed the contents to gain assistance and reward his helpers.

Other NEI kits contained blood chits, glossaries, letters to village chieftains, and promissory notes to be filled in by the airman with name, rank, serial number, and description of the assistance he received. In areas where money was not used, barter kits were provided that contained small objects like pearl buttons, razor blades, twist tobacco, safety pins, and plastic trinkets. Emergency Currency Certificates, called "guerrilla currency," promising payment when the war was over, were among the currencies included in survival kits for operations in the Philippines.

Evasion kits issued to Army Air Forces and Navy crews in the Pacific became more sophisticated as the war progressed. Robert S. McCarter, a P-51 pilot in Fifth Air Force recalled: "The escape kit was carried only on long missions and was given back to the personal equipment officer afterwards. I first used the kit in early 1945 when we were based in Luzon. This was for missions to Hong Kong or to Formosa. ...

"The kit contained a silk blood chit with the American flag and another silk chit with the Chinese flag. There were three paper items: one is a picture of a downed flier facing a Chinese coolie and showing his open flight jacket with the chit of the American flag; another shows the insignia of the Fifth, Thirteenth, and CBI air forces surrounding a paragraph written in Chinese; the third is a typewritten sheet of 10 questions in English and Chinese. These items were folded and placed in a clear plastic packet. In addition to the above, my packet contained two cloth maps of the area we were to cover."

Many tests of various inks and fabrics were conducted on the cloth chits during World War II to make them waterproof and fade proof. Cotton eventually became the recommended material, but this information was lost when wartime records were destroyed in 1945 and rayon acetate continued to be used after World War II until 1961.

One of the important aspects of the American-made blood chits for use in China was their authenticity: They had to include the chop of the Chinese ambassador to the United States to make them official. The chits were made by four companies, and the chop of the ambassador was laboriously stamped on thousands of chits by US military intelligence specialists at the Nationalist Chinese Embassy in Washington.

British and American crews who flew on Operation Frantic shuttle missions over Soviet-controlled territory from Italy and the UK were issued blood chits and language aids in English, Russian, and Eastern European languages. Red Army troops were notorious for being trigger-happy and would often shoot first and then check for identification later. An excerpt from an intelligence briefing cautioned that crews should "be familiar in a general way with the front lines," carry an identification card, and "try to memorize some phrases of Russian." To aid in their identification, some crews were issued arm bands showing the American flag, similar to those used by American troops in the Normandy invasion.

"If down in [a] zone of operations of the Red Army," a mission briefer was instructed to state, "do not arouse suspicion of Red Army troops by any overt action, do not attempt concealment, and do NOT bear arms in your hands. Raise your hands on the approach of Red Army troops. Indicate or display your identification card."

By the Korean War a rayon blood chit was part of UN evasion kits that included items such as a Pointie Talkie, rayon evasion map, compasses, and a burning glass. A combination ID card and blood chit in English, Japanese, and Korean is shown at the bottom.

Prompt Payment Required

A vital factor in the World War II blood chit program was prompt payment when chits were presented by indigenous personnel and their stories authenticated. The awards at first varied among the war theaters and their commanders. Payment of $50 in equivalent local currency for each bona fide chit was eventually established as standard payment for France, Belgium, Holland, Denmark, Norway, New Guinea, and the Philippines. For reasons not explained, the standard payment in the CBI, Greece, and North Africa was a $100 equivalent.

These payments were in addition to expenses incurred for lodging, food, and transportation of downed airmen. Payments were made by Allied occupying forces in some cases or postponed until the enemy was defeated to prevent retribution against the helpers or their families.

When the war was over, US claims commissions were sent to the European war-torn areas to screen and approve the claims after checking the authenticity of the promissory notes and other types of blood chits that were presented. One summary report shows that 65,000 persons were rewarded for aiding American airmen in Europe. During the Korean War, 95 aircrew men evaded capture and returned to friendly forces, aided in some cases by their blood chits and Pointie Talkies. In World War II cases where persons who assisted evaders had died, the British and US governments rewarded them posthumously with appropriate decorations "commensurate with the services rendered," according to a 1957 report.

Much information regarding payment for chits is still classified to protect those who might suffer grave consequences even today for helping American airmen. According to Baldwin and McGarry, the highest payment ever made was $100,000 in 1993 to the son of a Korean fisherman who in July 1950 aided a B-29 crew to avoid capture by North Korean forces. The payment was based on the established payment in effect at that time, plus more than 40 years of interest.

While the use of blood chits and other escape and evasion materials is commonly associated only with World War II, they have been issued in one form or another often as part of evasion kits to airmen during the Korean and Vietnam Wars, the Cuban missile crisis, the Gulf War, and operations in Panama, Grenada, Somalia, and Bosnia. The kits generally consist of a blood chit, evasion charts, a compass, and sometimes a Pointie Talkie and currency.

During the Gulf War, a serial number was stamped on each corner of a blood chit, so four helpers could be rewarded for their aid. Central Command's Gulf War Pointie Talkie was a two-sided, waterproof, folded card in four languages. In the background: a third evasion kit item, a chart of Baghdad.

UN Blood Chits

Following World War II, as war planners envisioned future conflicts, blood chits were printed in anticipation of their need. In fact, however, few chits seem to have been issued on a strictly war emergency basis since 1945. For example, blood chits were made for US operations in the Far East before 1950, although special United Nations blood chits were issued during the Korean War. In 1951, a series of three chits was prepared, covering Europe, the Far East, and the Soviet Union and its satellite countries.

Blood chits were printed in 1960 in anticipation of possible operations in Latin America when Cuba nationalized American companies; these were available during the Bay of Pigs invasion of 1961 and the missile crisis a year later. Meanwhile, blood chits were made for Southeast Asia and the Pacific area in 1961. These were reprinted during the Vietnam War, and dates as late as 1968 appear on them.

Chits for the Gulf War were made in November 1990 for use during Operation Desert Shield/Storm, and these are still being used by aircrews in the Persian Gulf area. These chits have serial numbers in each corner so the corners can be given to four different helpers who can turn them in for rewards.

During World War II the US Army's Military Intelligence Service, Evasion and Escape Section, and the British escape and evasion organizations MI9 and IS9 directed the blood chit program. The Joint Services Survival, Evasion, Resistance, and Escape Agency is the present-day organization responsible for US blood chit policy and for authorizing the production, distribution, and use of blood chits. The JSSA establishes payment limitations and provides or appoints an individual in-theater as its representative to adjudicate all claims. The production of blood chits and evasion charts is accomplished by the National Imagery and Mapping Agency operation in St. Louis.

Although most activities of today's evasion and escape program are classified, the blood chit program is not, although the chits are controlled and accountable items. "We want the world to know that we will pay well to get our people back," Baldwin says, "in the hope that the publicity of rewards will enhance the probability of actually getting them back."

Blood chits have become increasingly valuable as collectibles as these artifacts, available from veterans of past operations, become more scarce. Hundreds of American airmen owe their lives to them. ■

C.V. Glines's most recent article, "Victory in the Bismarck Sea," appeared in the August 1996 issue. The assistance of R.E. Baldwin on this article is gratefully acknowledged.

With an extra 8% off our already low rates, your AFA dues could pay off handsomely.

Want to get more for your AFA dues? All it takes is a quick call to GEICO Preferred. By switching to GEICO, you could **save 15% or more** on your car insurance. And, as an AFA member, you may be entitled to even greater savings. Mention your membership when you call, and in most states, GEICO will give you an **extra 8% discount.**

In addition to savings, you'll have the convenience of **complete 24-hour service.** Whenever you call GEICO to get a rate quote, file a claim, or simply ask a question, you'll reach a living, breathing insurance professional. And because we value the relationships we build with our policyholders, we offer **renewal to over 98%** of them every year.

So enjoy the privileges of your AFA membership. Call GEICO at **1-800-368-2734** today for a free rate quote. And find out just how much you could be saving.

1-800-368-2734

www.GEICO.com

GEICO

The sensible alternative.℠

Discount is 10% in DC and IL; 3% in NY; not available in all states. Discount not available in GEICO Indemnity Company or GEICO Casualty Company. Government Employees Insurance Co. GEICO General Insurance Co.• GEICO Indemnity Co. • GEICO Casualty Co. These shareholder-owned companies are not affiliated with the U.S. Government. GEICO Auto Insurance is not available in MA or NJ. GEICO: Washington, DC 20076

AFA/AEF National Report

By Frances McKenney, Assistant Managing Editor

Photo by Paul Kennedy

During their August gathering, AFA's senior advisors attended the Tuskegee Airmen Convention. Here, John Alison (left), senior advisor, and Thomas McKee (right), now AFA National President, chat with (l–r) Harry Ford, from the Tuskegee Airmen's Gen. Daniel James Chapter, and Harvey Sanford and John Roach of the New England Chapter.

AFA's Senior Advisors Meet

A briefing on the Air Force's new expeditionary aerospace force concept, presented by Lt. Gen. David L. Vesely, USAF assistant vice chief of staff, highlighted the second meeting of the Air Force Association's senior advisors at AFA headquarters in Arlington, Va., in August.

Two days of information sessions and special activities for the senior advisors also covered the reorganization initiatives under way in AFA and past, present, and future association policies.

In addition, Walter E. Scott, who was then Aerospace Education Foundation president, and Thomas J. McKee, then AEF chairman of the board, provided information on their organization. Charles D. Link, Air Force Memorial Foundation president, gave a progress report on the monument.

The nine advisors, who received appointments to their positions in November 1997, come from the ranks of AFA's national directors emeriti. The "elder statesmen" of AFA are John R. Alison, Russell E. Dougherty, George M. Douglas, Jack B. Gross, Martin H. Harris, H.B. "Buzz" Henderson, William V. McBride, Julian B. Rosenthal, and William W. Spruance.

Honors for an Enlisted

Air Force Space Command dedicated its Enlisted Heritage Room at its Peterson AFB, Colo., headquarters in the name of Charles P. Zimkas Jr., president of the **Colorado Springs/Lance Sijan Chapter** and an AEF trustee. He was the command's first senior enlisted advisor, serving from September 1982 to October 1984. He is now chief operating officer for the US Space Foundation in Colorado Springs, Colo.

The August ceremony was attended by AFSPC officials and AFA's William D. Croom Jr., national secretary; Howard R. Vasina, Colorado state president; Joan Sell, state secretary; and Deborah S. Canjar–White, Colorado Springs/Lance Sijan Chapter executive vice president.

Once called the Sword Room, the CMSgt. Charles P. Zimkas Jr. Enlisted Heritage Room has as its centerpiece a sword, flanked by displays of 14th and 20th Air Force memorabilia and Air Force enlisted insignia.

Conventions: In the "Centennial State"

The Colorado State Convention, hosted by the **Mile High Chapter,** honored two quick-acting Aurora, Colo., citizens who nabbed a man suspected of setting fire to a B-52 outside a museum at Lowry Field, Colo., in July.

Driving past the Wings Over the Rockies Air and Space Museum at the former Air Force base one Sunday morning in July, Lee Depew spotted the suspect starting a fire on the bomber's front fuselage. He chased the man, on the way enlisting help from Carl Evans. Depew and Evans held the man in custody until police arrived.

The Rocky Mountain Region and Colorado state AFA organizations joined with the Mile High Chapter to invite Depew and Evans and their spouses to the state convention's awards dinner to receive AFA certificates of appreciation and three-year memberships in AFA.

Michael J. Dugan, national director, was the dinner's guest speaker, addressing the changing roles of the US military's branches of service.

Outstanding military personnel of the year were Capt. Alberto Moreno–Bonet of the 50th Space Wing at Schriever AFB, Colo.; MSgt. Wayne A. Pennington, 50th Security Forces Squadron, Schriever AFB; TSgt. Hector H. Warner Jr., Hq., Air Force Space Command; and SrA. Dean Kim, 821st Medical Squadron, Buckley ANGB, Colo. SSgt. Michael Dorombozo of Grand Junction, Colo., was named Outstanding Recruiter of the Year.

Four Colorado Springs/Lance Sijan Chapter members were elected to state offices: Vasina, president; Larry D. Fortner, vice president south;

Rayetta Lantzy, treasurer; and Joan Sell, secretary. James S. Strickland of the **Long's Peak Chapter** is vice president north.

In the "Sunflower State"

Convention-goers in Kansas gathered in Garden City, with the **Contrails Chapter** as host, for an event that spotlighted a unique part of its state history.

Linda F. McCaffery, a history and anthropology instructor at Barton County Community College in Great Bend, Kan., delivered a luncheon speech on a Kansas-based B-29 wing's experiences in World War II China, from 1944 to 1945. She said that the 58th Bomb Wing, with headquarters at Smoky Hill AAF in Salina, Kan., trained four bomb groups at Pratt, Great Bend, and Walker AAFs before going to China. Their mission was Operation Matterhorn, a B-29 offensive against Japan.

During the convention's business session John J. Politi, then national vice president (Midwest Region), spoke about current AFA issues. Also, Tom A. Thomas Jr., a retired USAF colonel from Oklahoma City, described his work with the Civil Air Patrol and his donations of aircraft to the Mid America Air Museum in Liberal, Kan. Mike MacGee from *USA Today* made a presentation on the Visions of Exploration program, sponsored jointly with the Aerospace Education Foundation to benefit schoolchildren.

In elections Dr. William S. Clifford of the Contrails Chapter became the new state president. The other state officers were re-elected: Lt. Col. David W. Jensen and Bill F. Myers from the **Lt. Erwin R. Bleckley Chapter,** vice president and treasurer, respectively; and Eileen M. Gardner of the Contrails Chapter, secretary.

In Texas

Hosted by the **Concho Chapter** in San Angelo, Texas, more than 100 attended the Texas State Convention in July.

Doyle Larson, AFA's outgoing National President, was the keynote speaker.

In a convention highlight, **Fort Worth Chapter's** Thomas J. Kemp, immediate past state president, received the AFA Person of the Year award, and a Benjamin Foulois First Flight Award went to the **Denton Chapter's** Peter B. Lane, state vice president of scholastic awards.

Lt. Col. Ralph Charlip, of the **Alamo Chapter,** and SMSgt. Arthur Fernandez received the Officer and Airman of the Year awards, respectively. The Alamo Chapter also took back to San Antonio the Chapter of the Year award.

In the convention's business session, Henry C. Hill, of the **Aggieland Chapter,** was re-elected as state president, with C.N. "Buster" Horlen of the Alamo Chapter to serve as executive vice president. Elected as area vice presidents were Edward L. Bailey of the **San Jacinto Chapter,** Edward E. Kirkham Jr. of the Alamo Chapter, Robert P. Balliett from the **Panhandle Chapter,** and Ronnie W. Beezley from the Fort Worth Chapter. Helen S. Seidel of the Denton Chapter was elected state treasurer.

In the "Sooner State"

William P. Bowden of the **Central Oklahoma (Gerrity) Chapter** was elected state president at the Oklahoma State Convention, attended by about 150 people in Oklahoma City in July.

Other new officers elected were Jo Smith, executive vice president, and LaVerne J. Shaw, treasurer, both from the Central Oklahoma (Gerrity) Chapter, and Virginia G. Stewart, secretary, from the **Tulsa Chapter.**

In other highlights, principal guest speaker Dennis Haun, director of preservation and restoration at the Strategic Air Command Museum, described the relocation of 33 aircraft and several missiles to the facility's site at South Bend, Neb.

Major awards at the convention honored TSgt. Michael T. Blunt, of the Central Oklahoma (Gerrity) Chapter, as Chapter Officer of the Year; Chromalloy Oklahoma, of Midwest City, as Community Partner of the Year; and the 97th Support Group, from Altus AFB, Okla., as Group of the Year. Awards for Ex-

(L–r) Eldon Turner, of the Lubbock Chapter, George Weinbrenner, Alamo Chapter, E.F. Faust, national director emeritus, and then–AFA National President Doyle Larson enjoyed the Concho Chapter's hospitality at the Texas State convention.

ceptional Service went to Blunt, Shaw, Tom Howell, MSgt. Brian Schultz, Dennis Smith, Jack Black, Capt. Paige H. Newsom, Rhonda Trent, Bennie G. Drake, and Robert H. Ottman.

In the "Bay State"

Winston S. Gaskins of the **Pioneer Valley Chapter** received the Person of the Year award at the Massachusetts State Convention at Hanscom AFB, Mass., in July.

With the **Paul Revere Chapter** as host, the convention also recognized the **Minuteman Chapter** with a Community Service Award. The Pioneer Valley Chapter received the Small Chapter of the Year award, while the Paul Revere Chapter received the award for Large Chapter of the Year. John M. Franco of the **Boston Chapter** was honored with an Outstanding Individual Support award. Francis F. Carmichael Jr. collected the Past State President Award, culminating his three years in office.

The awards luncheon also paid tribute to the Bay State's six national-level award winners, and Carmichael and Paul Revere Chapter member Col. Peggy Shaw, 66th Support Group commander from Hanscom, presented a dozen medals of merit.

New officers for the coming year are Thomas P. O'Mahony, president, and Harry I. "Buzz" Gillogly III, secretary, both from the Paul Revere Chapter. Gaskins will continue as vice president and Franco as treasurer.

A week after the convention, the Paul Revere Chapter worked the Boston Air Show at Hanscom.

According to Robert B. Kennedy, chapter president and also honorary marshal for the air show, chapter representatives served on the air show's executive committee and helped select, organize, and host an exhibit of vintage warbirds from World War II, the Korean War, and the Vietnam War. More than 100 aircraft, contemporary and historic, participated in the annual air show.

The chapter also shared their concession stand with ROTC and JROTC cadets so all three groups could raise funds by selling rootbeer floats.

In the "Old Dominion" State

The **Leigh Wade Chapter** received the Chapter of the Year award at the Virginia State Convention, held in Hampton, Va., in July.

Glen E. Thompson, chapter president, accepted the honor. Centered in Petersburg, Va., the Leigh Wade Chapter has earned numerous awards, increased its membership in 1997, and, among several events, sponsored a visit by an aeronautical science exhibit from the Science Museum of Virginia.

James T. Hannam of the **Donald W. Steele Sr. Memorial Chapter** received an Outstanding Support Award, recognizing his work in running the state's hospitality suite at the AFA National Convention.

Thomas G. Shepherd of the **Northern Shenandoah Valley Chapter** was elected state president, with Lawrence A. Shellhammer of the **Langley Chapter,** vice president for administration and organization; William L. Anderson of the **William A. Jones III Chapter,** vice president for programs; Clement P. Moore of the Langley Chapter, treasurer; and James M. Dellaripa Sr., from the **Tidewater Chapter,** secretary.

The Langley Chapter hosted the convention.

Khobar Memorial

The **Cape Canaveral (Fla.) Chapter** is leading a $90,000 fund-raising drive for a memorial at Patrick AFB, Fla., to the five Air Force personnel from that base who died in the bombing of Khobar Towers in Dhahran, Saudi Arabia, in June 1996.

The memorial was originally expected to be built with government funding. When that did not work out, the Cape Canaveral Chapter stepped in. It donated $4,000 from its annual golf tournament in July, held in conjunction with the state convention, and opened a fund at a local bank for donations from the public. As of mid-August, $17,000 had been collected.

Christopher G. Bailey, chapter president, has written to the chapter's Community Partners, corporations, civic leaders, and veterans organizations, asking for donations for the monument, which will be located near the base.

The chapter's efforts received strong backing from the *Florida Today* newspaper. The publication donated $5,000 and published an editorial on the topic, with prominent mention of AFA.

Bailey commented, "This is not just something for those associated with the military; these airmen were on duty for all of us."

The five USAF service members from Patrick who were among the 19

USAF personnel killed in the Khobar Towers blast were Capts. Christopher Adams and Leland Haun, MSgt. Michael Heiser, SSgt. Kevin Johnson, and A1C Justin Wood.

Birthday in Baltimore

The **Baltimore Chapter** celebrated its 52d birthday in June with Russell Dougherty, former AFA executive director, as guest speaker.

The evening also acknowledged the 50th anniversary of the Berlin Airlift through the presentation of Glenn L. Martin aerospace awards to Fred Hall and Jake Schuffert.

Hall was a C-54 flight mechanic and flight engineer during the airlift that brought provisions to the beleaguered German city in 1948–49.

Schuffert, a retired master sergeant, was a C-54 radio operator in 1948 and was handpicked to fly with Gen. William H. Tunner, who commanded the airlift.

The anniversary dinner included a posting of the colors by the Maryland Wing's Civil Air Patrol honor guard, and music was provided by the wing's fife and drum and bugle corps. SSgt. Charles Rubin, of the 694th Intelligence Group at Ft. Meade, Md., sang the national anthem. His unit's honor guard also helped set up the evening's program and presented awards and gifts.

The birthday celebration was one in a series of events Julie E. Petrina, chapter president, has planned in her project of recreating historic milestones in the past of this first AFA chapter.

A-2 Jacket A Success

The **Savannah (Ga.) Chapter** decided on a cookout as a method of attracting potential members from the local 165th Airlift Wing (ANG), Savannah IAP.

But to finance the cookout, the chapter needed money. They turned to the A-2 jacket.

The chapter purchased one of the popular USAF goatskin flying jackets and raffled it during a two-day period. Chapter members sold 350 tickets for $2 each, raising over $500 for their cookout.

TSgt. Janet L. White–Ford from the 165th Logistics Squadron, won the leather jacket, presented to her by Edward I. Wexler, then Georgia state president, Michael J. Bolton, chapter president, and Matthew Dunn, chapter vice president for membership.

Bolton reported that wing participation and the publicity generated by the A-2 raffle led to 10 new members for the chapter.

At the Florida State Convention in July, the West Palm Beach Chapter presented Thomas McKee (center), then AEF chairman of the board, with a $3,000 donation in support of AEF's programs. Making the presentation were (l–r) Gary McCurry, Edward Costigan, James Shipman, and William Quigley.

More Chapter News

■ At a **Diamond State (Del.) Chapter** meeting, William Spruance, AFA national director emeritus, presented an original drawing by cartoonist Milt Caniff to chapter member Lt. Col. Hugh T. Broomall, 166th Support Group (ANG) commander. The artwork pays tribute to Lt. Col. David McCallister, a Delaware Air National Guardsman who died in a T-33 crash at Scott AFB, Ill., in 1961. Spruance sustained severe injuries in the crash. The drawing will hang in the 166th Airlift Wing's McCallister Hall.

Additionally, Spruance received the AFA Delaware State Award in recognition of his 1,500 briefings on safety and for his support for AFA.

■ James I. Wheeler, **Tucson Chapter** president, attended the graduation ceremony at Davis–Monthan AFB, Ariz., in June to present eight Community College of the Air Force graduates with AEF Eagle Grants.

Earlier in the year, the chapter held its annual awards dinner at the Davis–Monthan Officers Club.

The President's Award was a surprise presentation to Stewart R. Gable. Wheeler selected him for the award because of his efforts in coordinating AFA's participation in Davis–Monthan's March air show. Gable had also served as chairman for the chapter's golf tournament in May.

■ Several ROTC and AFJROTC cadets received the prestigious AFA Award in ceremonies at schools around the US. **Hurlburt (Fla.) Chapter's** president, Mark Andrews, presented the award to cadet Sara Underwood of Gulf Breeze High School in Gulf Breeze, Fla.

■ In Massachusetts, David A. Zamorski, **Pioneer Valley Chapter** president, presented the award to cadet Melissa Santiago of Putnam Vocational Technology High in Springfield.

■ In Minnesota, cadet Shelly Hilliker from the University of St. Thomas at St. Paul, Minn., received the award from James W. Goodman of the **Gen. E.W. Rawlings Chapter.**

■ **Brandywine (Pa.) Chapter's** Stephen D. Rudloff, president, presented an AFA Medal to Jesse Migdel, the outstanding AFJROTC cadet at Coatesville High School, in Coatesville, Pa. Vincent F. Gallagher, chapter vice president for communications, also attended the presentation.

■ During the AFJROTC cadets' Superintendent's Review, an AFA Medal also went to cadet Chester Skinner of McDowell Senior High School in Erie, Pa., presented by Frank V. Juliano, **Erie (Pa.) Chapter** treasurer.

■ In Florida, Robert B. Stiastny from the **Indian River Chapter** presented an AFA Medal to cadet Kolaleh Torkaman at Vero Beach High School in Vero Beach, Fla. He also presented two Aerospace Awards from the chapter to Vero Beach cadets Leonard Ovens Jr. and Kelly Schwartz.

■ At the University of Notre Dame in South Bend, Ind., Lyle W. Marschand, Indiana state and Great Lakes Region vice president for governmental relations, presented an AFA citation to cadet Marc S. Tubay. ■

Unit Reunions

2d Air Div Assn, Eighth AF (WWII). Jan. 23, 1999, in Orlando, FL. **Contact:** Teddy Egan, 2619 Lafayette Ave., Winter Park, FL 32789-1372 (407-644-5439).

19th BS, 22d BW, B-29s & B-47s. March 23–28, 1999, at March ARB, CA. **Contact:** Carl Waag, 3700 Buchanan Ave., #166, Riverside, CA 92503-4875.

21st and 22d Troop Carrier Sq (WWII). Oct. 8–10, 1998, at the Best Western Swiss Chalet Inn in Ruidoso, NM. **Contact:** George E. Stover, PO Box 7837, Ruidoso, NM 88355 (505-258-3000).

36th TFW (FW, FBW, etc.). Oct. 26–29, 1998, at the Palace Station Hotel & Casino, Las Vegas. **Contact:** Ray Collins, 241 Bahama Rd., Las Vegas, NV 89128(702-363-3003) (raymo77644@aol.com).

46th FIS (Dover AFB, DE, 1952–58). Sept. 10–12, 1999, at the Settle Inn in Branson, MO. **Contact:** George W. Peckham, 8415 S. Pebble Creek Way, #101, Highlands Ranch, CO 80126-3259 (303-741-1421).

446th BG (H), Eighth AF (WWII, Bungay, UK). May 19–23, 1999, in Tucson, AZ. **Contact:** Bill Davenport (714-832-2829) or Marv Speidel (732-680-0274).

447th BG, Eighth AF. Oct. 21–31, 1998, in Savannah, GA. **Contact:** Pete Petrillo, 965 N. Pasadena Ave., Elyria, OH 44035 (216-365-2561).

464th TCW (Pope AFB, NC, 1954–71). April 21–24, 1999, in Fayetteville, NC. **Contact:** Bob Straub, 1225 5th St. SW, Winter Haven, FL 33880-3728 (941-299-3596).

Aviation Cadet Class 54-G (Lackland AFB, TX). July 21–25, 1999, at the Holiday Inn North in Dayton, OH. **Contact:** Maurice Cea, 157 Green Valley Dr., Howard, OH 43028 (740-392-7750) (ecea@bright.net), or John Schaefer, 18894 N. 69th Ave., Glendale, AZ 85308-5751 (602-561-5000) (gizmo@futureone.com).

OCS Class 57-D (57-C and 58-A are welcome). June 17–20, 1999, at the Four Points Sheraton Riverwalk North in San Antonio. **Contact:** Orson Kinney, 5534 Merlin Dr.,San Antonio, TX 78218 (210-653-1946) (oaktree@stic.net).

Pilot Training Class 44-I (Williams AAB, AZ). Oct. 11–14, 1998, in Lakeland, FL. **Contact:** Thomas R. Shaw, 1340 Edgewater Beach Dr., Lakeland, FL 33801 (941-686-0888).

Pilot Training Class 55-I. Oct. 26–30, 1998, at Laughlin, NV. **Contact:** Ron Weinert, 1310 Riverside Dr., Buhl, ID 83316 (208-543-8925) (rweinert@magiclink.com).

Seeking members of **OCS Class 58-B** for a reunion in 1999. **Contact:** John Quinn, PO Box 8541, Calabasas, CA 91372 (818-718-6544) (saggi@aol.com). ■

Bulletin Board

Seeking pilots who trained at **Ryan Field,** CA, during WWII. **Contact:** Maure Solt, 5001 W. Florida Ave., #176, Hemet, CA 92545-3542 (909-658-2716).

Seeking Air Force personnel who served with the **351st BG,** Eighth AF, Ecberry, UK. **Contact:** Bob Straub, 1225 5th St. SW, Winter Haven, FL 33880-3728 (941-299-3596).

Seeking anyone who served with **Col. Bernt Balchen** and knows of his Greenland Air Rescue flying and OSS exploits in Sweden and Norway and of his recommendation for the Congressional Medal of Honor. **Contact:** William B. Taylor, 3209 N. Columbus St., Arlington, VA 22207 (703-536-6908) (fax: 703-536-6970).

Seeking B-17 crew members of the 532d BS, 381st BG, who knew copilot **Jack H. Fournier** and tail gunner **Harvey H. Reeves. Contact:** Bob Korkuc, 8 Pilgrim Ave., Merrimack, NH 03054 (rek@korky.mv.com).

Seeking a Vietnam veteran with first name **Joseph, Jossen, or Joeson,** who was stationed at Nha Trang, Vietnam, 1963–64, and knew Bong Thi Thanh Phan. **Contact:** Jaclyn P. Thoms, PO Box 770977, Eagle River, Alaska 99577 (907-694-4438).

Seeking anyone who knew **SSgt. Francis Vincent Johnston,** a control tower operator who served in Saipan and Okinawa during WWII. **Contact:** Carol Johnston, 527 Woolley Ave., Staten Island, NY 10314.

Seeking **Pvt. Stanley Naughton,** Squadron X, 4000th BU AAF, Air Technical Service Command, Wright–Patterson AFB, Ohio, 1946, who knew "Elgar." **Contact:** Edward L. Koenig, 33 Stone Fence Rd., Bernardsville, NJ 07924.

Seeking **Eighth AF artifacts** from the Korean, Cold, Vietnam, and Gulf Wars, as well as clothing and flight equipment from the **Soviet, Chinese, Vietnamese, Warsaw Pact, and Iraqi air forces.** Also seeking WWII personal flak armor and helmets, aircraft and aircraft parts, Willys jeep parts, POW related material, and Luftwaffe ground and flight gear. **Contact:** Jeffrey Bilderback or Jeff Reed, Mighty Eighth Air Force Museum, Attn: Collections Department, PO Box 1992, Savannah, GA 31402 (800-421-9428, ext. 119).

Seeking anyone who knew **Lt. James Potfin,** who was shot down over the Mediterranean on a mission with Earthquarters, 434th BS, 12th BG, during WWII, out of Africa. **Contact:** Ben Wright, 2730 Foxgrove Ct., Colorado Springs, CO 80906 (719-579-0165).

Seeking war stories, information, and photos from all **2d BW** squadrons, 1948–63, for fall '98 newsletter. **Contact:** Kyle Barnes, 2440 Foxhead Way, Clearwater FL 33759-1112 (727-797-3881) (kdbarnes1@aol.com or @juno.com).

Seeking **TSgt. Forrest Hollister,** 77th FS, 20th FG, who served in Eighth AF in the UK during WWII. **Contact:** Lowell Rothbart, 517 5th Ave., #14, DeWitt, IA 52742.

Seeking the book ***To Fly and Fight,*** by Col. Clarence E. "Bud" Anderson. **Contact:** Fred W. Benenati, 4012 Quail Dr., Norman, OK 73072 (405-366-7391) (Drfredfly@aol.com).

Seeking information on and current address of **Seabee** units that extended the runway at Swan Islands, Honduras, 1984–88, or that are now stationed there. **Contact:** Gale J. Raymond, PO Box 228, Sugar Land, TX 77478-0228.

Seeking information on or contact with the family of **Capt. Sidney Hantman,** 322d BS, 91st BG, Eighth AF, based in the UK in 1943. **Contact:** Isaac Hantman, 4306 Rosedale Ave., Bethesda, MD 20814 (301-656-4306) (IXH@CDRH.FDA.GOV).

Seeking **James E. Wicker,** who was stationed at Westover AFB, MA, in 1956, and **William C. and Mildred A. Henry,** who were stationed at Vance AFB, OK, in 1958. **Contact:** Ray Brindle, 927 E. Highland Rd., Red Oak, TX 75154 (972-617-3846) (rbrindle@flash.net).

Seeking anyone who served with **MSgt. Donald A. "Willie" Williams** at radar sites with the 789th AC&W, Omaha, NE; 552d AEW&C, McClellan AFB, CA; 776th Radar Sq, Point Arena, CA; 664th Radar Sq, Bellefontaine, OH; and 753d Radar Sq, Sault Sainte Marie, MI. Also seeking information on Stead AFB, NV. **Contact:** Loretta Williams, 3271 State Rt. 508, Bellefontaine, OH 43311 (mamadoll@loganrec.com).

Seeking information on or contact with **"Mickey" Rose,** as he was known when he graduated from Madrid Dependents High School, Torrejon AB, Spain, in 1962. He was the stepson of CWO Rose, stationed at Torrejon, but entered the Air Force as **Frank Michael McGraw. Contact:** Verleen Rohrer Kiewiet, 805 Lisa Dr., Waterloo, IA 50701.

Seeking contact with anyone who served with **Franklin Roosevelt Kidd,** originally from Columbia, VA, who served with the 406th Motor Vehicle Sq, Manston UK, between August 1953 and January 1957. **Contact:** Michele Denton, 44 Victoria Ave., Westgate-on-Sea, Kent, UK CT8 8BJ.

Seeking photos of and information on B-24 Liberator ***Rough and Ready,*** of the 783d BS, 465th BG, Fifteenth AF, WWII, with Stan Pace, pilot, and Joe Coote, navigator, shot down Aug. 3, 1944, near Imst–Innsbrook, Austria, returning from a raid on Friedrichshafen, Germany. **Contact:** Jack Coote, 633 Westwood Ave., River Vale, NJ 07675-6219 (201-664-6655).

Seeking **Dave Elliott** of Roswell, NM, a B-29 gunner, Lowry AFB, Colo., 1952–53, who went on to pilot training. **Contact:** Bill McElman, 203 Rainmaker Run, Lake in the Hills, IL 60102.

For the USAF Museum, seeking photos of Distinguished Service Cross recipients **Sgt. 1st Class Harold O. Nicholls (1919), Pfc. Desmond R. Wilkerson (1951), and TSgt. James H. Ledford (1953). Contact:** Wesley B. Henry, 1100 Spaatz St., Wright–PattersonAFB, OH 45433-7102 (937-255-4644,ext.737) (whenry@afmsmtp.wpafb.af.mil).

Seeking information from anyone who worked with **Lt. Col. Warren W. Luce,** command pilot, 1964th Comm Gp, and director of flight facilities and chief of NOTAMS for SEA during the Vietnam War, 1969–70. **Contact:** S.W. Luce, PO Box 8961, La Jolla, CA 92038.

Seeking information on **Ragnar "Rags" Albrektson** who had a flying service at San Francisco Airport before 1941 and served with Air Transport Command during WWII. **Contact:** Douglas Ogilvie, 30118 Vanderbilt St., Hayward, CA 94544-7239.

Seeking information on **Capt. Burnham Mason Irwin** and a picture of the C-130 he was flying on a night reconnaissance mission. Also seeking a photo of a 1956 Mack crash fire truck. **Contact:** David D.Wines, Indian Head North, 22 Sassafras Ct., New Brunswick, NJ 08902-1091.

Seeking USAF mechanic named **Thomas** who was stationed at AB 105 Evreux–Fauville, France, 1966–67, and who knew Monique Levasseur. Also seeking **Edwing Lee "Scotty" Scott, Richard Darton, Curtiss Hammond, and Thomas Lee Campbell. Contact:** Sandy Levasseur, 12 rue des Tisserands, Apt. 611, Louviers, France 27400.

Seeking **Sgt. Thomas Sweeter, SSgts. Thomas Campbell, Richard Darton, Curtiss Hammond, and Edwing Lee Scott** who were stationed in Evreux–Fauville, France, 1962–67. **Contact:** Charlie Valdez, 98-02 31st Ave., East Elmhurst, NY 11369.

Seeking contact with or information on B-26 pilot **Capt. John H. Alderson,** 449th BS, 322d BG, Ninth AF, WWII. **Contact:** Bill Markley, 1435 Robinwood Rd., Alliance, OH 44601 (330-823-9151) (marklewa@muc.edu).

Seeking all cadets who attended flight school at **Cimarron Field, OK, and Mustang Field, OK,** 1942–45, and whose Primary Flight Instructor was Elvin M. Amen. **Contact:** Elvin M. Amen, 2140 South Dewey Ave., Bartlesville, OK 74003 (918-336-3898).

Seeking former **F-16 pilots and ground crews** for the F-16 Alumni Assn. **Contact:** Rick Mitchell, 730 White Oaks Ave., Baltimore, MD 21228.

Seeking contact with or infomation on **SSgt. Roger Sylvester Reeves,** who was stationed at RAF Woodbridge, UK, 1959–61, and who knew Jack and Olive Pratt. **Contact:** Gary Pratt, 44 Munsons Place, Feltwell, Norfolk, UK IP26 4DF.

Seeking information on **Lt. J.R. "Fergy" Ferguson,** who flew P-38s in Europe and North Africa in WWII.**Contact:** Duane Carney, 1 Hingham Ln., Berlin, MD 21811.

Seeking members of the **563d TFS** at George AFB, CA, from 1978–81. **Contact:** Terri Blackburn, 18870 Madrone St., Hesperia, CA 92345.

Seeking contact with **A-26** aircrews from WWII, the Korean War, and the Vietnam War. **Contact:** Larry Cox, 8 N. Crosstimber Trail, Edmond, OK 73034–7033 (405-359-8882) (larcox@aol.com). ■

An Air Force Association
National Symposium
and Annual Air Force Ball

"Partnerships in Space: Government and Commercial"

Nov. 13, 1998

Beverly Hilton Hotel
Los Angeles, Calif.
(310) 274-7777

The AFA Symposium

America's capabilities in space have been a unique source of national strength, enabling us to project power and influence around the world and to sustain our position of leadership in world affairs. We are seeing a massive migration into space of military, civilian, and commercial functions and dependencies. Space is an area of vital national interest and requires a strong government and commercial partnership to defend and protect our interests. Military and commercial leaders will address these important issues at the Air Force Association–sponsored symposium.

Invited Speakers

The Honorable F. Whitten Peters,
Acting Secretary of the Air Force

Gen. Ralph E. Eberhart,
Air Force Vice Chief of Staff

Gen. Richard B. Myers,
Commander in Chief, NORAD & US Space Command, and Commander, Air Force Space Command

Gen. George T. Babbitt Jr.,
Commander,
Air Force Materiel Command

Lt. Gen. Lester L. Lyles,
Director, Ballistic Missile Defense Organization; Panel Moderator

Lt. Gen. Ronald T. Kadish,
Commander, Electronic Systems Center; Panel Member

Maj. Gen. Eugene L. Tattini,
Commander, Space & Missile Systems Center; Panel Member

Plus two leaders from industry; Panel Members

The Air Force Ball

The 27th annual Air Force Ball will also be held this year at the Beverly Hilton Hotel, Nov. 13. We will celebrate the partnership in space of government and commercial interests with special recognition of pioneers of both communities. For additional information on the ball and to reserve tickets or a table, please call Henry Sanders at (310) 645-3982. E-mail: Sandersh@pacbell.net.

Symposium

The cost to attend the symposium is $350 for AFA members and $400 for nonmembers. The registration fee includes a continental breakfast, refreshments, and lunch. Additional lunch tickets are available at $40 each. To register, call Nikki Whitlock at (800) 727-3337 ext. 5838, e-mail: nwhitlock@afa.org, or, for information 24 hours a day, call ext. 2030. To have information faxed to you, call AFA Fax Reply service at (800) 232-3563, and order document #0340. Visit our web site at: www.afa.org/asymp.html.

Beverly Hilton Hotel

Please identify yourself as an AFA member when you call the Hilton at (310) 274-7777 or (800) HILTONS to make reservations at the special rate plus tax of $157 per night, single, or $177 double. Reservations at this rate will be accepted through Oct. 9, 1998.

Sponsorship

The Air Force Symposium and Air Force Ball are sponsored by the Air Force Association and its Los Angeles chapters: Gen. B.A. Schriever/Los Angeles Chapter, the General Doolittle Los Angeles Area Chapter, and the Orange County/Gen. Curtis E. LeMay Chapter.

Pieces of History

Photography by Paul Kennedy

From Bombs to Pallets

Memorabilia courtesy members of the 756th Squadron Association

From Walt Disney's Goofy to the present-day Tiger poised in front of the Washington Monument, these patches and other "pieces" reflect the rich lineage of Air Force Reserve Command's 756th Airlift Squadron. The unit has been based at Andrews AFB, Md., since its Reserve activation as the 756th Troop Carrier Squadron in 1954. In World War II it was the 756th Bombardment Squadron and flew B-24s out of Italy. During this time, unit aircraft mechanic John F. Devney (with permission from Disney) drew a rendition of Goofy holding a bomb that became the squadron's official patch. After the war, the unit switched from bombers to transports—with a corresponding patch change to the 'Toothless Tigers." Over the years, the unit has operated C-46s, C-119s, C-124s, and C-130s. In more recent years, the 756th Tigers have flown C-141 transports to locations such as the Soviet Union, following a 1988 earthquake, and Southwest Asia, for Desert Storm and succeeding operations.

WING COMMANDER

Designed for military pilots.

- Seven hands, four dials, three push-buttons
- Solid stainless steel case & band with double-lock security clasp
- Screw-in back & crown
- Distortion free mineral lens
- Revolving E6B flight computer bezel
- Calendar date window
- 1/20th Sec, split second & 6 hour elapsed time
- Luminescent hands
- W/R to 330 feet
- Precision SEIKO YM55 quartz movement.
- Money back guarantee
- 5 Year limited Int'l warranty
- Same day shipping
- Deluxe gift box

$400 value **NOW ONLY $199** + $6 s&h

Credit Cards Call: 1-800-544-4365 Ask for Operator 682

PILOT COMMANDER

The Fighter Pilots' Choice

- Seven hands, four dials, three push-buttons
- Solid stainless steel case & band w th double-lock security clasp
- Screw-in back & crown
- D stortion free mineral lens
- Revolving E6B flight computer bezel
- Calendar date window
- 1/20th Sec, split second & 6 hour elapsed time
- Luminescent hands
- W/R to 330 feet
- Precision SEIKO YM55 quartz movement.
- Money back guarantee
- 5 Year limited Int'l warranty
- Same day shipping
- Deluxe gift box

$350 Value **NOW Only $179** +$6 S&H

Send check or money order for either watch
to: **Chase Durer**
270 North Canon Drive Dept 1402-682 • Beverly Hills, California 90210
Fax: 310-550-0830 / www.Chase-Durer.com

BOEING

The C-17

proves itself every day.

It delivers to some of

the world's shortest, most

austere airfields. It's the

most versatile airlift aircraft

ever built. And it's the plane

America will continue to rely on day

in and day out, in crisis and in peace.

www.boeing.com

OF ALL THE THINGS IT CARRIES,

FREEDOM

IS THE MOST PRECIOUS.