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AIR FORCE MAGAZINE

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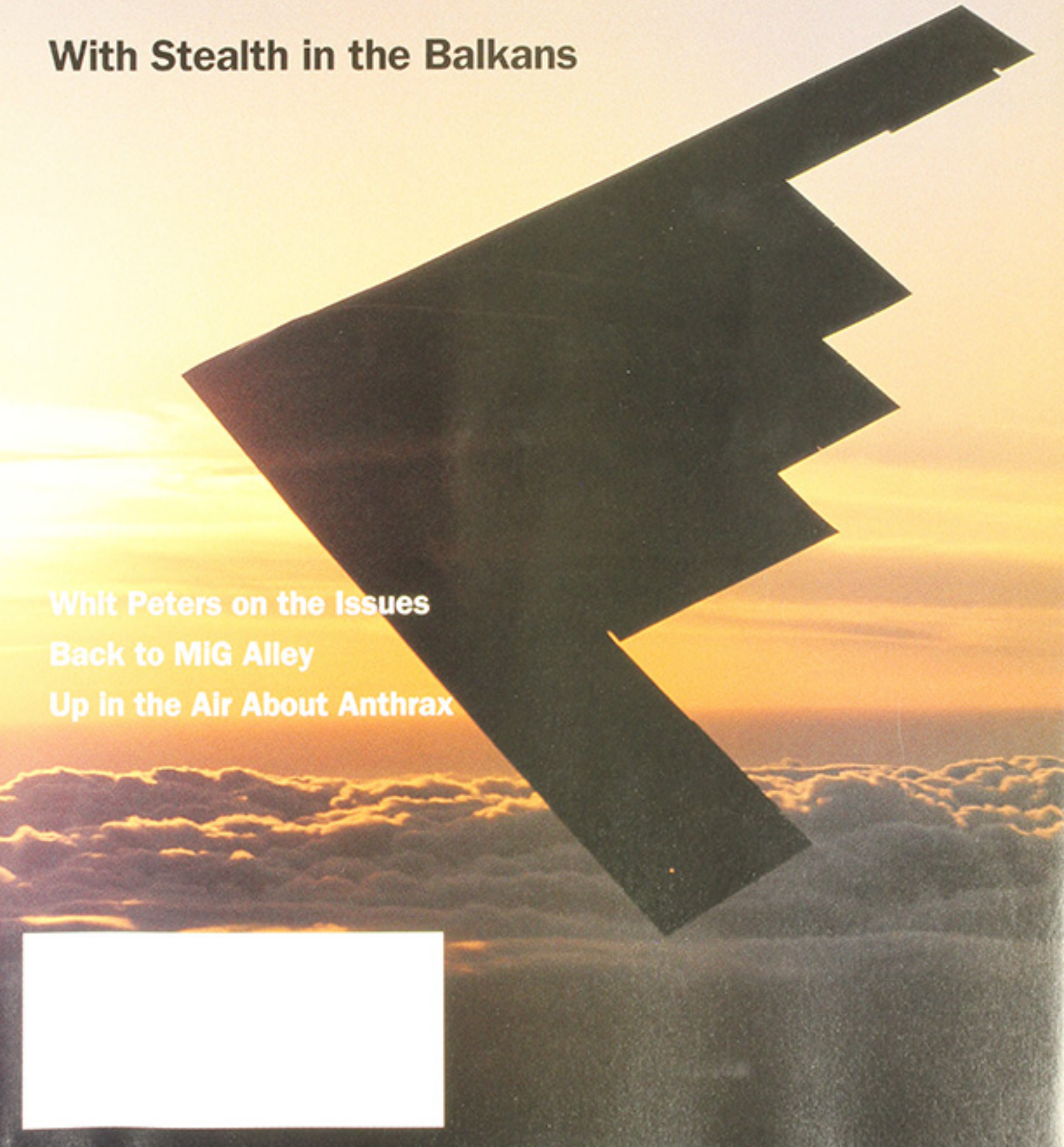
With Stealth in the Balkans



Whit Peters on the Issues

Back to MIG Alley

Up in the Air About Anthrax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October 1999, Vol. 82, No. 10

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About the cover: A B-2 stealth bomber f ies into a Midwest sunset. In its first combat test, the B-2 proved the critics wrong. See "With Stealth in the Balkans," p. 22. USAF photo by MSgt. Keith Reed.

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Editorial

By John T. Correll, Editor in Chief

Back to Win–Hold–Win

A DRAFT revision to the National Security Strategy would eliminate the standard by which US armed forces are sized—in theory, anyway—to fight two Major Theater Wars at the same time. The draft, written by the National Security Council staff in the White House, discounts the possibility that two conflicts might occur simultaneously, or nearly so.

It says that "a second foe would need time to decide to take advantage of heavy US military engagement in the first theater and then to mobilize and deploy its forces for an attack" and that "our strategy is to seek to halt the second aggressor's advance, while concluding operations in the first theater. Our focus would then shift to the second theater, including, if necessary, a counteroffensive."

That idea, then called "Win–Hold–Win," was floated as a trial balloon in June 1993 by Secretary of Defense Les Aspin. It ran into withering criticism and was ridiculed as "Win–Lose–Lose" and "Win–Hold–Oops." After 26 days, Aspin decided that the notion was untenable and withdrew it.

Now that the National Security Council is again digging up Win–Hold–Win, it is worth remembering what happened the first time around.

By the summer of 1993, Aspin and the new Clinton Administration had worked themselves into a real mess. In March, they had announced a massive cut to the defense budget—without calculating either the feasibility or the impact of it.

Their big budget cut had been predicated, unfortunately, on flawed analysis done by Aspin's staff in 1992 when he was chairman of the House Armed Services Committee. Among other mistakes, that analysis had understated by almost a third the number of US Air Force fighter squadrons employed in the Gulf War.

In search of a defense program to match the arbitrary budget cut, Secretary Aspin launched the notorious "Bottom–Up Review." The force options in the Bottom–Up Review were to be calibrated in "Major Regional Conflicts." An MRC ranked around the midpoint on the spectrum of conflict. The Persian Gulf War, for example, had been an MRC.

The Joint Staff calculated various force configurations. The two–MRC option called for 24 fighter wing equivalents, 12 active Army divisions, and 12 carriers. That did not reduce the force enough to support the budget cut, though, so Aspin tried Win–Hold–Win. When it was hooted down, he said he would size the force instead to fight two MRCs "nearly simultaneously."

The White House staff has dug up an old idea that was shot down for good cause in 1993.

Four months later, Aspin announced his force structure: 20 fighter wings, 10 divisions, and 12 carriers. Incredibly, except for the addition of two carriers, this was exactly the same force structure that had been calculated for Win–Hold–Win. The configuration, thus reduced, was—and still is—the "two–MRC" force structure.

Aspin left office that winter. In July 1994, his successor, William J. Perry, admitted what everybody already knew: that the force could not handle two MRCs in close succession.

Nevertheless, the Pentagon and the Administration continued to espouse the two–MRC force requirement. In 1997, the Quadrennial Defense Review changed the terminology to "Major Theater War" and said the US position of international leadership depended on "its ability to defeat aggression in more than one theater at a time."

Nobody doubts the need to cover at least one MTW. In addition, though, there must be a reasonable reserve and forces for such other missions as strategic nuclear deterrence and commitments in Europe and Asia. Even without a second conflict, the cumulative requirement is for a force sized approximately to two MTWs.

The force is undeniably stressed by the demands of a single MTW. The air campaign in Yugoslavia, along with other deployments, tied up more of the force than the Vietnam War did. Stateside units were stripped of equipment and crews. Training suffered. Airpower was so stretched that there was some concern about its capability to meet requirements in other theaters. At the end of the Kosovo operation, the Air Force needed an extended period in which to reconstitute.

The "two-war strategy," often referred to, is a misnomer. It is not a strategy. It is a force-sizing standard, and one that would serve us reasonably well if it were met.

The only rational argument against the two-war standard is that we cannot meet it—but that is a commentary on the inadequacy of resources, not on the legitimacy of the requirement.

The proper measure of the armed forces is their preparedness to fight and win the nation's wars. The two–MTW standard is the minimum level to which the force ought to be sized.

The White House draft was leaked in late August to the *Washington Times* and other news outlets. Perhaps the ensuing criticism will sink Win–Hold–Win again, just as it did in 1993. Let us hope so.

It is foolish to assume, as the National Security Council staffers did, that an adversary could not move fast enough on a second front to take advantage of heavy US engagement on a first front.

Had they chosen to do so, for example, the North Koreans almost certainly could have gone on the offense within the 78-day time span of the operation in Yugoslavia. From the invasion of Kuwait in 1990 to the end of the Gulf War in 1991, almost six months elapsed.

Win–Hold–Win started out as a budget maneuver based on faulty analysis. It has not improved much with age. ■

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Letters

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Provocative Visions

John T. Correll's editorial "Visions and Countervisions in Space" *[August, p. 2]* was thought provoking. He addressed two issues that deserve comment—air and space integration and the relationship between space operations and Information Operations.

Correll reported an upcoming Air Force air and space integration white paper [is expected to emphasize that] "air and space are inextricably linked and complementary, not competitive." Inextricable means "not to be disentangled from." Air and space are not inextricably linked because they are two different mediums that require different technologies to operate in, just as air operations require different technology from either land or sea operations. Space power should not be treated as simply higher altitude airpower, any more than airpower should be treated as simply longer range artillery. However, air- and space power are highly complementary because space power enhances airpower (and land and sea power as well) and makes airpower more efficient and effective. If air and space are competitive in any way it is in the budget arena.

[Correll implies] that within the Air Force budget, space systems are taking away budget dollars from other Air Force systems. This is faulty logic. Congress budgets money specifically for space systems. In fact, on p. 17 of this same issue, Secretary of the Air Force F. Whitten Peters [said] launch range modernization [programs are at risk] "because we keep taking the money for more high priority programs." Unfortunately, [this gives] Congress the perception that the Air Force does not give its stewardship of space a very high priority.

Correll is correct when he says that in the near term the military space program will be defined by information. This is because USSPACECOM's maturest mission area is force enhancement. Force enhancement provides weather information, navigation, missile warning, and intelligence, surveillance, and reconnaissance, which can logically be viewed as an extension of Information Operations. However, not all space operations overlap with IO and not all of IO overlaps with space. Given the emphasis in [computer operations and security], why isn't the Air Force looking at either reorganizing [the Air Force Communications and Information Center] into a command or placing it under Air Force Space Command in the same manner the Air Intelligence Agency might be placed under AFSPC?

Maj. Tom "Dingo" Doyne, USAF
School of Advanced Warfighting
Marine Corps Base Quantico, Va.

■ *Your suggestion that Congress gives the Air Force extra money to cover the space mission is wrong. The Air Force still receives approximately the same share of the defense budget it did before it took on 90 percent of the cost of the military space program, from which all of the services benefit. That same share of the budget must also continue to cover airpower capabilities that are indispensable to the nation's defense. Nevertheless, Sen. Bob Smith, chairman of the Armed Services Strategic Forces Subcommittee and a leading Congressional advocate of the space program, said last year that the Air Force must embrace space power by "shedding big chunks of today's Air Force" to pay for tomorrow's space force. The idea that space power can be achieved only at the expense of airpower is nonsense, as is the claim that space requirements can be funded adequately and without harm by internal reallocations of the Air Force budget at existing levels.*—JOHN T. CORRELL, EDITOR IN CHIEF

Lessons, What Lessons?

I would like to take issue with one of [John A. Tirpak's] "indisputable" facts. *[See "Lessons Learned and Re-Learned," August, p. 23.]* To assume [airpower alone forced Serb withdrawal] is to assume a very flawed lesson. Recent reviews of damage assessments within Kosovo have shown that the destruction of military hardware was not as extensive as we believed.

The assumption that airpower alone made the Serbs lose resolve ignores two important contributing factors. The first factor was the Kosovo Liberation Army, which contributed significantly to bringing the Serbian army out into the open in certain areas along the Albania–Kosovo border. This allowed Allied aircraft to more effectively attack Serbian assets. The second factor was the British political campaign to rally support for a ground intervention. The Serbians watched this debate and knew eventually, that if push came to shove, ground troops would have intervened.

I feel that it is very dangerous to believe that one of the lessons learned was that airpower alone can achieve political objectives. This may lead future leaders to view airpower application as a "low cost" means for enforcing political settlements.

Michael L. Kordus
Yardley, Pa.

What's missing from the article and from the quotes taken from Gen. Michael E. Ryan is the recognition that space assets, operators, and support personnel were critical and integral to this success. Airpower without space power is incapable of achieving decisive control of a theater of war. The capabilities space offers, while not unique in their existence, are unique in their scope, immediacy, and universal applicability. It was, after all, the application of these assets that made the application of airpower a success.

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

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The high ground that space occupies gives our ground, sea, and air forces the ability to wage war in four dimensions. To overlook this is to prepare for failure in future warfare. This is the lesson to be learned now and, with luck, not one we'll have to re-learn in the future.

1st Lt. Robert B. Riegel
Cheyenne Mountain AS, Colo.

It is totally irresponsible of both our military commanders and our Congressional leaders to disregard that a sound, future military program should be based upon the now proven fact, as recently expressed by the Joint Chiefs, that "lessons over the last 50 years have taught us that air superiority is the prerequisite for successful military operations."

Obviously, because of this, it is no longer necessary to have a huge, immensely costly Navy and Army to conduct future wars. Speed, versatility, and vastly reduced unit size in future warfare is a given. Therefore, the Navy should be shrunk to about 30 percent of its present unwieldly and expensive configuration. Similarly, the Army should be dissolved into a military organization with Marine–like capabilities and size.

Moreover, according to our highest military authorities, our air forces were 99.6 percent accurate in the dropping of over 20,000 bombs in [Allied Force]. Why then do we need the same multitude of aircraft, pilots, support systems, etc., as we did in WWII or the Cold War period, when our capabilities were not as powerful or accurate? As William D. Hartung stated in "[Ready for What?] The New Politics of Pentagon Spending," [*World Policy Journal,* Spring 1999], our present military buildup is political and economic, not military.

Simpler, more versatile, and more numerous, easily replaceable weapons are being designed that will be vastly more efficient and cheaper to produce and maintain. Most important of all, future military operations must be commanded by Air Force types—not Navy or Army commanders whose decisions are based upon past military precedents—which in every case are obsolete.

Lt. Col. Louis J. Kaposta,
USAF (Ret.)
Southlake, Texas

Failure in Requirements Process?

With all due respect to Gen. [John Michael] Loh *[Letters: "On Bombers," August, p. 4],* I must take issue with his [statements]. First, since when is the "stellar performance of the bomber fleet in the Balkans" a given? One leg

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Letters

of the "bomber triad" took out the Chinese Embassy, but then if you consider pure lethality as the only measure of effectiveness, I guess that one goes in the plus column.

Let's not forget the thousands of civilian fatalities and billions in collateral damage to the Balkan infrastructure that precision guided weapons were supposed to minimize. And finally, there's the early departure of [US Army] Gen. Wesley K. Clark [Supreme Allied Commander Europe]. Clark was one of a small minority who put together a pretty good case that airpower alone wouldn't win the day. This and other evidence points out that the US bomber fleet in the Balkans, as an extension of foreign policy, was a miserable failure.

However, what concerns me more is Loh's call for a billion dollars a year to modernize and expand the bomber fleet. That sounds too much like a dedicated public servant turned lobbyist for the aerospace industry. Moreover, this is clear evidence of the sustained failure of the DoD requirements process. In my opinion, much of those billion dollars would be better spent on developing an [anti-ballistic missile] system or improving degraded morale and readiness. And what about re-balancing the top-heavy pay scale that causes 17,000 GIs to qualify for food stamps?

My training as a DoD acquisition officer taught me that cost, schedule, and performance should be paramount throughout all phases of defense acquisition. But even more important is a cohesive, objective process to define and prioritize appropriate requirements in the first place.

Lt. Col. John R. Mitchel,
USAF (Ret.)
Beavercreek, Ohio

Hoooah, He Said

I am glad you quoted me in your "Verbatim" section *[August, p. 64].* Two and a half lines of quotes and six to explain who (or what) I am. In addition to all the stuff you said, you forgot the most important two things: I won the Air Force Association 1992 Hoyt S. Vandenberg Award, and I have a cat named "Clausewitz." Hoooah.

Earl Tilford
Army War College
Carlisle, Pa.

■ *We appreciate the reminder that Dr. Tilford received the Vandenberg Award in 1992. Dr. Tilford's views—which are consistently critical of the Air Force and airpower and enthusiastic about land power—are of interest in significant part because he is a former editor of* Air University Review *but now on the staff of the Army War College. Our regards to the cat.—* THE EDITORS

What Wasn't Said

The pictorial spread on the 3rd [Air Expeditionary Group] indicates that the group was deployed to fill the gap caused by the deployment of a Navy carrier out of the region. *[See "Forward Deployed," August, p. 76.]* Not stated anywhere that I could find was the statement that was included in the press release announcing the deployment that there was insufficient air refueling capability available to support a deployment in the event of a contingency. In the same time frame, the Air Force touted the ingenuity of its maintainers who managed to fix an engine that had ingested a foreign object. The bottom line to the story was not the ingenuity of the maintainers but the fact that there were no spare engines available and removal of the engine would have resulted in an airframe out of service.

The story that needs to be told is that high optempo, reduced force structure, and low funding levels are severely impacting the ability of the service to perform all the missions assigned.

Robert B. Roit
Poolesville, Md.

Step Into the Real World

When I read William H. Washburn's letter, I thought to myself: Here is a man that really needs to get out and see the real world. *[See "Letters: Truly Lost," August, p. 5.]* When I retired from the Air Force in 1978, I applied for a job with civil service in the field that I had spent 20 years working in. The reply was that I was not qualified for a job in that field.

While I have remained in good health, my wife has had various medical problems, sometimes requiring specialists, and for several years CHAMPUS really did a good job of helping out. That is, until they became Tricare. When that happened, many doctors and medical services started refusing to take Tricare, and when I asked why this was they said that they had too many problems trying to get paid and, in some cases, didn't get paid for the services they provided. I asked my local US representative to check into it and received a booklet from Tricare explaining how it was supposed to work right.

There is a fairly high percentage of retired military living in this area ex-

periencing the same problems, including a retired Army four-star general. I truly believe in working for what I get, but I also believe in getting what I have worked for. If the people in the executive, judicial, and legislative branches had to contend with what we have to contend with, there would be some major changes made in the system. We don't want welfare and food stamps, we want health care we can live with.

TSgt. Donald A. Smith,
USAF (Ret.)
Thayer, Mo.

Obviously, Washburn has no idea what he's talking about. He is unaware that military medical benefits have been stripped from those who earned them.

Our medical benefits were stripped from us and if we want to use a military medical facility, we have to pay outrageous fees. And this is after we received many annual statements from our government explaining what our compensation was worth and why our pay, although lower than the civilian sector, was actually better, overall, because of our lifetime medical benefits for ourselves and our spouses. Since we have lost that benefit that we "earned," then pay me the difference that I lost over those 20 years.

Washburn thinks military retired pay is more than enough to purchase medical coverage. Again, he's wrong. Military pay is below industry standards as it is, and retired pay is only half of the base pay amount, which is much less than half of the active duty pay. Most retirees must get civilian jobs just to make ends meet. I did.

Military personnel have long needed welfare and food stamps just to survive. They don't want them; they need them! It might soon apply to retired personnel, also. They don't want something for nothing, but they should receive what has been promised and earned. That did not happen. What would Washburn say if his medical benefits from his civil service job were suddenly taken away? I think his tune might change.

Capt. Tom Garrett,
USAF (Ret.)
Tucson, Ariz.

Just the Facts, Please

This responds to the letter from Robert W. Fuehr *["Northrop on Symington," August, p. 6]* concerning the Northrop flying wing.

There would indeed be grounds for legitimate concern, if the facts were as alleged in the Roberts broadcast. However, the facts were very much different and the criticism of the Air Force and my father unwarranted. For those interested, the full story is told in detail in the PhD dissertation of Francis J. Baker at Claremont Graduate School (copyright 1984), entitled "The Death of the Flying Wing: The Real Reasons Behind the 1949 Cancellation of Northrop Aircraft's RB-49." The author's in-depth research revealed "no improprieties in the Air Force's flying wing acquisition program" (p. ii).

Stuart Symington Jr.
St. Louis

Correction

In the July issue, the article "The Midnight Crossing" *[p. 68]* incorrectly considered the Aleutian Islands as west of the international date line. They are, in fact, east of the date line and so will be among the last US sites to cross into the new year. Thanks to Robert B. Sligh, 3rd Air Force historian, RAF Mildenhall, UK, for spotting the error.

Aerospace World

By Peter Grier

North Korea Missile Work Worries Neighbors

By openly developing a new long-range missile, North Korea is threatening to alter the military balance of power in a region of the world that is crucial to US security.

US officials were hopeful that Pyongyang would postpone a prospective test firing of the new weapon, an advanced version of the Taepo Dong rocket it launched last year. North Korea, for its part, remained ambiguous about its plans but said it was willing to discuss the issue with the "hostile nations" of Japan, South Korea, and the United States.

"We are always ready for negotiation if the hostile nations honestly ask for it," said a North Korean foreign ministry spokesman Aug. 18.

The updated Taepo Dong 2 has greater accuracy and range than the model that unexpectedly soared over Japanese heads in August 1998. Theoretically, it could reach Alaska or Hawaii.

In some ways the missile has already changed East Asia's strategic situation, whether it is ever tested or not. Japan, startled at the sudden threat, has explored ways to toughen a military stance long based on pacifism and US protection.

Japanese officials have agreed to take part in a theater missile defense system with the US and are pushing ahead with plans for their own satellite surveillance system. The Japanese self-defense forces may get air refueling and attack capabilities that would allow retaliatory strikes against the North Korean heartland.

South Korea, for its part, has indicated to Washington that it wants to improve its own ballistic missile capability. Under a 20-year-old agreement, Seoul needs to seek Washington's permission to build missiles with a range surpassing 112 miles.

US officials don't want to see a missile development arms race erupt on the Korean peninsula and have emphasized that it is in North Korea's best interests to lay down its boosters and cooperate with the rest of the world.

USAF photo by A1C April D. Blumer

Shortly after taking the reins officially as Secretary of the Air Force, F. Whitten Peters headed for a fall—a free-fall parachute jump. Peters, at left, is under the watchful eye of TSgt. Gregg Pittman, 24th Special Tactics Squadron, Pope AFB, N.C. The Secretary was at Pope to talk with combat controllers and pararescuemen, members of a critically undermanned field.

"Pyongyang can take advantage of the opportunities for new economic and political openings, or it can reject those opportunities by launching a missile and taking other actions that signal a preference for confrontation over cooperation and isolation over integration with the world," said Secretary of Defense William S. Cohen during a late July visit to South Korea.

F-22 Starts High-Alpha Tests

The F-22 Raptor has recently moved into a new testing phase by successfully completing a sortie in which the aircraft flew beyond 26 degrees angle of attack. The sortie marked the beginning of a rigorous new series of high-angle-of-attack flight profiles, said Air Force officials.

"The flight-test team has worked extremely hard to position the Raptor for this important next phase of testing," said Brig. Gen. Michael C. Mushala, F-22 program director.

Such tests—also called high-alpha tests—are meant to verify the F-22's predicted agility. The aircraft is the first fighter designed to maneuver at high angles of attack, said officials.

The F-15 can only fly at about 30 degrees angle of attack. The F-22, meanwhile, will be tested at more than 60 degrees angle of attack.

High-alpha testing entails controlled flight at very slow speeds. To ensure an extra measure of safety, maintenance crews from the F-22's Combined Test Force at Edwards AFB, Calif., have installed a stabilization recovery chute on the aircraft that will undertake the flights, Raptor 02.

USAF Wants B-2 Shelters for Overseas

The Air Force is moving to acquire a support structure for operating the B-2 bomber from overseas bases.

According to a recent notice to contractors, the Air Armament Center's Air Base Systems Program Office wants to buy a shelter system to accommodate maintenance on the B-2 aircraft when forward deployed.

The 20,000-square-foot shelter should have heating, air conditioning, and an electrical power unit that

can be loaded onto a C-130 for relocation within a theater, said an Air Force spokesman. The service wants to buy six of the 100 foot-by-200 foot, PVC fabric–coated shelters, which it will pre-position at key spots around the globe.

The shelters are not meant to allow permanent overseas deployment of the stealth aircraft. They will simply facilitate forward-basing rotations at locations other than the B-2 home, Whiteman AFB, Mo.

For Boeing JSF, Power Is On

Boeing has taken a major jump toward flight testing its Joint Strike Fighter X-32A concept demonstrator by connecting electrical power to the aircraft, firm officials announced July 30. The X-32A is currently in final assembly and systems installation at Boeing's Palmdale, Calif., facility.

Cockpit interior lighting, multifunction displays, heaters, and several display panels were the first systems powered by an external source. Each was fully operational.

"Running power into the aircraft is important because we can now verify all of the systems being installed," said John Priday, X-32 assembly manager. "We're powering up systems as they come online and testing their functionality."

Boeing is competing against Lockheed Martin to build the JSF under a four-year concept demonstration phase contract.

Airborne Laser Taking Shape

On Aug. 10, a Boeing–led industry team began major assembly operations on the first Airborne Laser flying platform, a 747-400 freighter, at Boeing's Everett, Wash., assembly plant.

Assembling the freighter main-deck floor grids was the first order of business. Major assembly of the wings, and then the body sections, was to come next.

The aircraft, with ID #00-0001, will be the first airplane of any kind purchased and accepted by the Air Force in the next century. It is currently scheduled to roll out at Everett in December 1999. It will then fly to Wichita, Kan., for an 18-month modification program.

The ABL's preliminary design and risk reduction phase is supposed to culminate with a planned attempt to destroy a Scud–type missile in 2003.

"I'm impressed with Team ABL's progress; the design is rock solid and the technology proven," said Lawrence J. Delaney, assistant secretary of the Air Force for acquisition.

USAF Ends Stop-Loss Order

Air Force Stop-Loss measures, implemented to stem the flow of crucial personnel out of the service during Operation Allied Force, were set to end Aug. 27, with the redeployment of the last affected active duty member, an intelligence officer.

The program began June 15. It suspended normal separations and retirements for airmen in career fields deemed important for preserving mission capability. Some 6,000 personnel were ultimately affected by the order.

"The Stop-Loss decision is the hardest I've had to make, and it certainly was one I made with General Ryan very, very carefully," said Secretary of the Air Force F. Whitten Peters. "One of the things we wanted to do was make sure people didn't think we were trying to use it simply to deal with a personnel shortage."

The move did have a small, positive effect on retention, however. Most of those affected by Stop-Loss were given the option of withdrawing separation or retirement papers. Officials say 47 retirement and five separation packages were withdrawn by officers under this program. Comparable figures for the enlisted ranks were unavailable.

DoD Modifies "Don't Ask, Don't Tell"

On Aug. 13, Department of Defense officials announced that they were clarifying their "don't ask, don't tell" policy regarding homosexuals in the military.

The move came in the wake of the July beating death of an Army private who was allegedly targeted because he was gay.

DoD officials say they want all harassment—of anyone, not just homosexuals—to stop. Under the new guidelines, recruits will receive training explaining that harassment of any service member is unacceptable.

"The bottom line is to treat all others with respect and dignity," said DoD spokesperson Army Lt. Col. Catherine Abbott.

The new policy also recommends that installation staff judge advocates consult with senior legal officers prior to the initiation of an investigation into alleged homosexual conduct. If commanders want to begin an investigation into whether a service member made a statement about his or her homosexuality just to get out of military service, they must get approval from higher headquarters.

The Department of Defense discharged 1,145 service members in 1998 under the "don't ask, don't tell" policy. Most were discharged because the individuals themselves came forward to declare their orientation.

USAF Mounts Turkey Relief Effort

The Air Force moved quickly to transport relief personnel to western Turkey in the wake of the killer earthquake that struck Aug. 19.

A team from Incirlik AB in the southeastern part of the country left Aug. 20 to survey the wreckage and recommend military aid that might be needed. Airmen trained in water assessment, structures assessment and construction, and radio communications were on the team. A USAF flight surgeon from RAF Lakenheath, UK, deployed as part of a joint medical assessment team to provide immediate care to casualties and scope out further needs.

A C-5 from the 436th Airlift Wing, based at Dover AFB, Del., ferried a 70-person team sponsored by the US Agency for International Development to the hard-hit region. The USAID team included five search and rescue dogs, 56,000 pounds of equipment, and three vehicles.

Turkish officials requested USAF firefighting airplanes to help contain oil refinery blazes that threatened to burn out of control in the days immediately following the temblor. The move was canceled, however, after Turkish firefighters brought the situation under control themselves.

THAAD Moves Forward

After an 0-for-6 slump, the Theater High Altitude Area Defense missile system is now 2-for-2. On Aug. 2, a THAAD interceptor streaked above the Earth's atmosphere and destroyed a Hera target missile.

THAAD had previously notched a successful interception June 10. Prior to that, it had failed six consecutive tests—each time for different technical reasons.

In some ways, the latest test was the most difficult one THAAD has yet attempted. It was exoatmospheric, while the previous hit had taken place within the atmosphere. The Hera target was mimicking an incoming Scud missile with a separating warhead. THAAD thus had to distinguish the warhead from the booster, to find the correct target—and do so against the cold background of space.

Initial indications were that not only did THAAD hit its target, it did so with a tip-to-tip intercept, said program officials. Yet closing velocities were so high, it was as if THAAD had traveled from New York to Washington in less than two minutes.

Jumper: NATO Lucky Serbs Didn't Have Better Equipment

If Serbia's fighters and air defenses had been only a bit more advanced, Operation Allied Force probably wouldn't have been the NATO walkover that it turned out to be.

That is the view of Gen. John P. Jumper, commander of US Air Forces in Europe and NATO's Allied Air Forces Central Europe.

Jumper contended that even a relative handful of more powerful systems—such as the Russian-built Su-35 fighter or SA-10 Surface-to-Air Missile system—might have posed a formidable challenge to NATO forces. Congress might now be criticizing the Air Force for not having already fielded the F-22 fighter rather than questioning its worth, Jumper told *Air Force* Magazine.

He also discussed the impact of Allied Force on his command and some of his own "lessons learned" from the conflict.

"It [Serb deployment of better systems] would have vastly complicated our ability to roam the skies of Serbia at will, as we were able to do," Jumper asserted, adding that the course of the war would have been "greatly skewed" if NATO had faced "those sort of weapon systems to counter."

He pointed out that it was only a matter of "political decisions" and "resource constraints" that prevented Serb leader Slobodan Milosevic from obtaining the advanced hardware, in that all these systems were available "before this conflict started."

The most advanced Russian fighters now available for export "are very, very capable aircraft," Jumper said, adding, "in many cases, [the frontline Russian aircraft are] certainly more capable than the best thing that we have."

Cause for Concern

Jumper said that US pilots have had the opportunity to fly advanced Russian types in simulated combat against the most modern deployed US types and came away impressed and concerned.

"We have seen, through firsthand experience, that our guys flying *their* airplanes can beat our guys flying *our* airplanes," said Jumper. The general declined to be more specific except to say that the airplanes evaluated were more advanced than the MiG-29s that Germany inherited from the former East Germany.

Given the export availability, "someone like Saddam Hussein is only an embargo decision away from him having these kinds of weapons," he said.

Had Serbia possessed advanced equipment, "we would have put ourselves in a position where the debate may well have been, 'Why didn't we have the F-22 sooner?' " Jumper remarked, adding that the Raptor is "the system we are counting on to be able to deal with that level of sophistication."

The USAFE commander noted Serbia launched some 700 SAMs at NATO warplanes during the war. "We were incredibly fortunate" that no NATO aircrew members were lost to such enemy fire, said Jumper. He also said that NATO was never "completely comfortable" that Serbia didn't have more-advanced SAMs; there was suspicion that Milosevic may have been hiding them for later use.

Jumper argued that getting the F-22 is key to maintaining American aerospace leadership of NATO. "The next generation of fighters that will show up, that will be flown by many of our [allies], will have the sort of integrated capabilities that will be more sophisticated than what we have on the street today," he said. Jumper confessed that he worries "about the vision of 10 years from now—roughly the distance between Desert Storm and Kosovo—having to send our people into combat against these next-generation systems, with the same things we fought with in Kosovo."

USAFE was "absolutely maxed out" by Allied Force, Jumper said. "From an asset point of view, we had up to 80 percent of our people and more than 70 percent of our hardware deployed from their normal bases to other bases." He said the bases vacated were quickly "reoccupied by those who were deployed in from the States."

Virtually all of USAFE headquarters staff were deployed to the Combined Air Operations Center in Italy, he said, adding that they worked seven days a week "almost a year" from the time planning began for Allied Force in May 1998.

"It will take us fully six months to recover, ... to get families reacquainted, get equipment back in shape, and get training back up to speed, so that we can get back to our normal readiness rate," Jumper said.

He declined to speculate on how long it will take the Allies' forces to recover, though he observed it will "vary from country to country" because "some were stretched more than others in this air campaign." However, he continued, "What I can say about the Allies is, the training and interoperability of the past 40 years paid off in a big way."

A Little Would Go a Long Way

He has heard comments—especially by Lt. Gen. Michael C. Short, the joint forces air component commander in the conflict—that some European Allies that failed to invest in more state-of-the-art equipment might be relegated to a backseat in a future conflict. Jumper maintained that those Allies can quickly get up to par by investing in secure voice communications, identification, friend or foe systems, and a "modest" precision-strike capability, all of which, he said, are "not sexy or new" but can be acquired at a modest cost.

"I think it's within the reach of our Alliance members to do those fundamental things, at least as a start," said Jumper.

New members of NATO contributed—or at least offered—airspace, airfields, and beddown of Alliance aircraft. "Every Alliance member who participated was able to give something of significance," he said. It was, however, "not always airplanes or things that go 'boom.' "

Jumper said Allied Force dispelled a few myths, the "most important" one being that airpower could not put enemy airfields out of commission. Jumper said NATO's forces clearly demonstrated that they could bottle up Serbian airfields, destroy everything of value on them, and then carry out restrikes so often as to make it pointless to try to repair them.

Jumper said Allied Force also exploded the myth that a force needs 72 hours to plan and execute an air tasking order.

"We can turn in near real time," Jumper asserted. "It's not 72 hours; it's minutes for changing a target, down to hours for changing weapons."

Also dispelled, in Jumper's estimation, was a myth that "bombers are not flexible." The general said, "We proved with our B-1 that that's simply not true, and we're going to take steps with our B-52 to put significantly more flexibility into the CALCM [Conventional Air Launched Cruise Missile] system."

Jumper pointed out that B-1 bombers, already airborne, were shifted to new targets and, "if they were loaded with a mix of weapons," would attack different types of targets. Some B-1s were loaded with a mix of iron bombs and cluster bombs for this purpose. Bombers showed "incredible flexibility," said Jumper.

Jumper said one myth that was "probably reinforced" among those not directly involved in the operation was that an altitude of 15,000 feet conferred some sort of immunity from enemy fire or that it was "no risk" to operate from there.

"There was nothing safe about 15,000 feet," he said. "Nor was 15,000 feet the altitude in all cases. In many cases, it was much lower than that in order to do the job."

It was reported that the A-10 couldn't use its huge 30 mm cannon at such an altitude, but Jumper said, "The A-10 used the 30 mm extensively, and with great effect."

"The other profound lessons are going to have to do with the tying together of our ISR [Intelligence, Surveillance, and Reconnaissance] and communications platforms, so that the product of those transcends the stovepipes that they're in today," Jumper said.

Already under way is an effort to get into the cockpit targeting and bomb damage assessment information that has been automatically selected from the product of available sensors. The goal: Provide a pilot the most complete, up-to-date, and accurate data without regard to source.

The Life Span Issue

Jumper said that US airplanes performed very well, considering the stress of operating over such a prolonged period without respite. "Due to the marvelous

efforts of the people on the flight lines, [the aircraft] held up very well," he noted. "But you do have to worry about the life span ... issue."

He referred specifically to the F-16s with the LANTIRN [Low-Altitude Navigation and Targeting Infrared for Night] pod, which, "by their nature," fly with very heavy loads and in the war flew more than 2,500 sorties. "It's a great stress on the airframe and we do have to worry about it," said Jumper.

While there are no immediate signs that airplanes were broken or worn out, Jumper noted that "some of these airplanes are 10 or 15 years old, and it has to be a going concern" as to how much they have aged.

It would have been very difficult deciding what units to pull out of Allied Force and re-deploy elsewhere to another Major Theater War, should one have erupted, Jumper said.

"Everything we had in there was critical to the need," he said. He argued that pulling out half the F-15E force, for example, "would have had a severe impact on our ability to deal with, say, the SAM threat, because our F-15Es were largely dealing with that threat."

If the choice had been made to pull out of the Balkans and go to a more urgent contingency, "it would have been no more difficult than pulling yourself together for a deployment to go back home. ... With airpower, redirecting assets is something we do."

Jumper said he'd have wished for more Joint Direct Attack Munitions and would have suggested they be put on other JDAM–capable airplanes besides the B-2 bomber, if they were available. He clearly understood, though, that the acquisition phase of the program was still in its infancy, and only a limited number of the GPS–aided bombs were available. More JDAMs are now being rapidly acquired.

He also would have liked to have seen more self-protection mechanisms available for the C-130, AC-130, and C-17 and would have been happier if all NATO crews could have had night vision goggles along with the training and cockpit lighting necessary to use them.

Asked what was most needed that wasn't readily available in Allied Force, Jumper replied, "Patience."

"We needed patience to get this job done," said Jumper. "As an airman, I had every confidence that we would get the job done, but I knew it would take a while. What we needed less of was, after the fifth day of the war, people asking us why we hadn't won yet. ... We lacked the patience to give this thing the time needed to take effect, because we were in a very difficult situation with regard to the weather and the threat of collateral damage. It took time to get around these things."

—John A. Tirpak

"Today was probably one of the watershed events in the technological history of our country," Air Force Lt. Gen. Ronald T. Kadish, director of the Ballistic Missile Defense Organization, told reporters.

The radar directing the THAAD interceptor is so powerful, said Kadish, "you can see a basketball over Washington National Airport from Huntsville, Ala."

Lockheed Martin was breathing easier after the success. If THAAD had missed, the company would have had to pay DoD a $20 million penalty, on top of a $15 million charge already levied for a missed test March 29.

In the wake of the Aug. 2 experiment, the Pentagon dropped its previous demand that the THAAD system complete three successful tests in a row before proceeding to the Engineering and Manufacturing Development stage of the acquisition cycle.

THAAD could now enter EMD as early as next year, officials said Aug. 20, though the program must face an independent cost analysis before it can proceed.

"This will ... accelerate the ultimate fielding of THAAD," said Pentagon acquisition chief Jacques S. Gansler in a letter to Congress announcing the change. A series of up to 40 flight tests would likely be part of any THAAD EMD effort. Rockets and other system components could be manufactured as tests progress.

"Last year ... we had stated that we had confidence in the basic design of the missile but that the failures were attributed to poor missile quality," Army Maj. Gen. Peter Franklin, BMDO deputy director, told reporters. "The contractor put considerable talent and effort into testing of these missiles, and their efforts have been proven successful by these recent tests."

DoD Restructures Anthrax Vaccine Contract

On Aug. 5, the Department of Defense announced that it is restructuring its contract with BioPort Corp., the sole US manufacturer of the anthrax vaccine. Under the restructuring, the Pentagon has agreed to double the price it pays for the vaccine and advance funds to the cash-strapped Michigan firm, in an effort to keep it from going out of business.

BioPort had requested some sort of financial relief in June after it determined that it did not have enough money to keep operating after Aug. 1 and that it would not be able to borrow funds in private capital markets. A Pentagon review board looked at BioPort's books and decided they were right.

"That board concurred and believed that BioPort was in fact in financial distress," said an Army official who spoke to reporters about the move on condition his name not be used. "It also made a decision at that time [that] what we needed to do was go back and renegotiate the contract."

The recent business history of the anthrax vaccine facility is a convoluted one. It was a state-owned institution called Michigan Biologic Products Institute. Its price for a dose of anthrax vaccine was $4.36.

In September 1998, Michigan sold MBPI to BioPort Corp. for $25 million. BioPort officials negotiated a contract with the Pentagon to provide enough vaccine to protect the total force against anthrax—all at the previous price of $4.36 a shot.

Six months into that contract BioPort discovered that its costs were much higher than it thought, said Pentagon officials. They found that Michigan state employees had provided such services as grounds and janitorial maintenance. Those costs had been on the state's payroll, not that of MBPI.

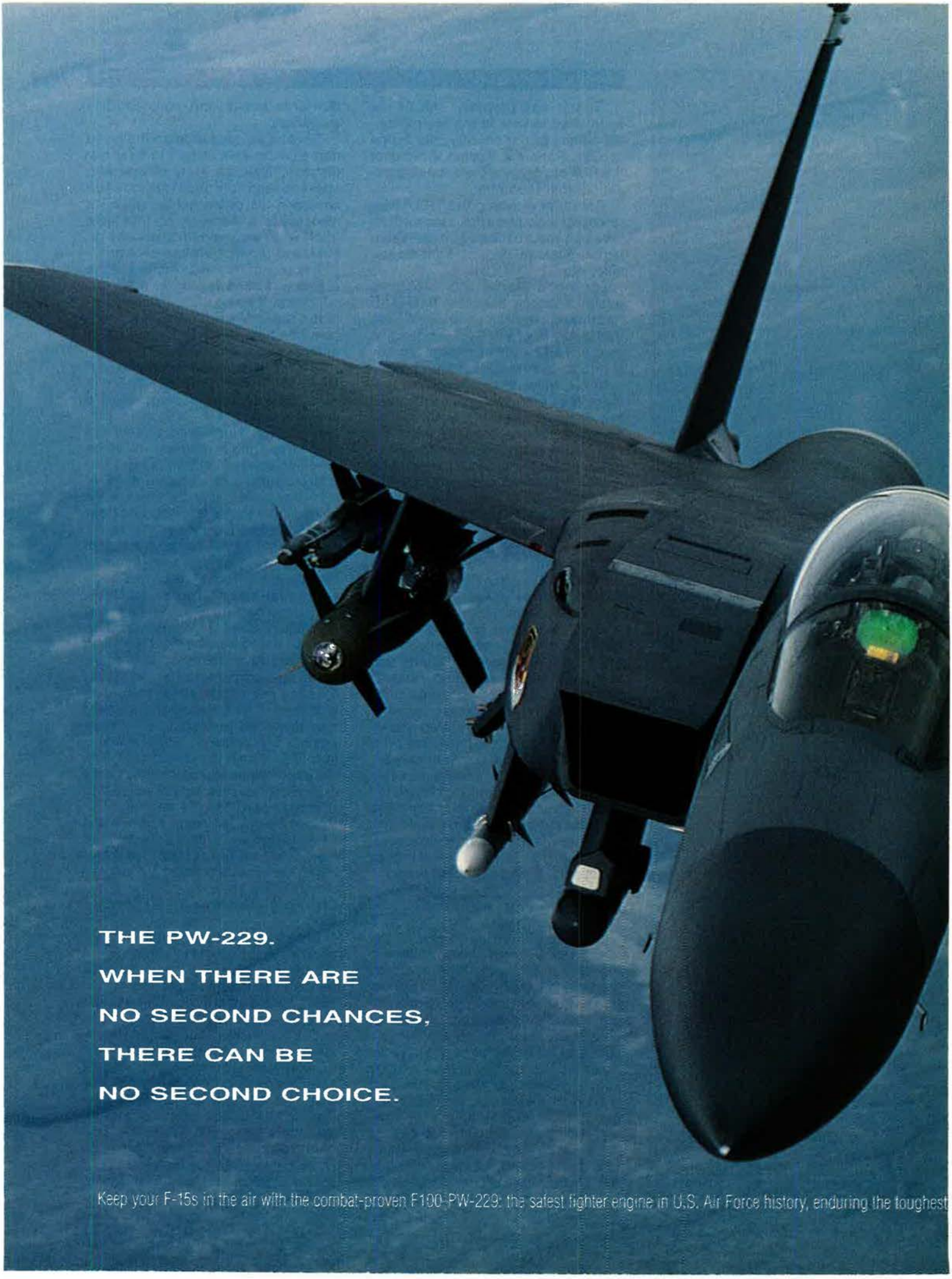
The restructuring will ensure that the facility does not cease production at a time when the Pentagon is in the midst of vaccinating the entire force, said officials. Under the move, the price-per-shot has been increased to $10.64. The Defense Department has advanced BioPort $18.7 million against the costs of future production. To protect its investment, the US government will have liens on all of BioPort's assets, as well as on-site auditors, said the Pentagon. "The Defense Contract Audit Agency will do a follow-up audit in six to nine months to ensure that BioPort is working as we expected," said the official.

Cleaning—Not Whale—Harmed C-17

A design flaw and metal fatigue caused by grit blast cleaning were the causes of a C-17 landing gear failure at an Iceland airport Sept. 10, 1998, according to a recently released Air Force accident board report.

The Charleston, S.C.–based Globemaster was touching down at Vestmannaeyjar Airport, Iceland, as part of a mission that transported the killer whale Keiko from Oregon to a new Iceland home. No humans or marine mammals were injured in the incident, but damage to the right main landing gear was extensive.

The Air Force and contractor Boeing have known for years that the part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which broke, the trunnion collar spud, was inadequately designed. The spud is a bolt-like component that helps hold together the trunnion, a circular steel part that allows the main landing gear post to rotate when wheels are being raised or lowered.

A short-term fix has already been applied to affected C-17s. But Air Force officials did not know that grit blast cleaning could leave microscopic flaws in the steel and weaken the fix, concluded the accident report.

New Law Mandates Funeral Support

Under just-passed Congressional legislation, the Department of Defense must provide military funeral honors—including two uniformed service members—for all eligible retirees or veterans, beginning Jan. 1, 2000.

Both members of the honor guard must come from either the active or reserve component of a uniformed service. At least one must represent the service branch of the deceased.

The new law, which was part of Fiscal Year 2000 defense authorization legislation, also directs DoD to provide, at a minimum, a ceremonial flag-folding, presentation of the flag to next of kin, and the playing of taps at military funerals.

If a bugler is unavailable, a recording of taps will meet requirements, according to the law.

Veterans' organizations said they would keep a close eye on the new funeral mandates.

"We view the new legislation as a positive step," said Mike Wiswell, Ohio American Legion internal affairs director. "Like many mandates from Congress, we will watch the implementation process and how it works."

Currently, about 89,000 Air Force veterans die every year. That works out to about 240 USAF veterans a day eligible for service military funeral honors.

Last year, Air Force base honor guards were present at more than 6,000 funerals. But veterans' deaths are projected to increase 25 percent annually. By 2002 honor guard requests will reach 48,000, according to Air Force projections.

DoD Names Pharmacy Test Sites

On Aug. 5, the Department of Defense announced that Okeechobee County, Fla., and Fleming County, Ky., are the sites that have been selected for a Tricare pharmacy benefit pilot study.

The study was mandated by the Fiscal 1999 National Defense Authorization Act. It is intended to make retail and mail-order pharmacy benefits available to DoD beneficiaries in the demonstration areas who are Medicare–eligible, age 65 and older, and who have Medicare Part B.

"This new pharmacy demonstration program helps solve the problem of high out-of-pocket health care costs for our age-65-and-older beneficiaries who do not have access to a [Military Treatment Facility] and who do not have a prescription benefit through other health insurance," said Dr. Sue Bailey, assistant secretary of defense for health affairs.

Okeechobee and Fleming were randomly chosen from counties that lacked an established MTF. In addition, under the legislation establishing the program, one test had to have a major Health Maintenance Organization presence, while the other required a low prevalence of HMO membership.

Test participants will be charged an enrollment fee and co-payments for drugs purchased. Enrollment is expected to begin next spring. Those interested in participating may call their Tricare Service Center to see if their ZIP code falls within the area of the pilot program.

Tape Caused Titan IV Failure

A bit of thermal wrap and some tape caused the April 9 failure of a Titan IVB rocket, according to an Air Force Space Command accident investigation report released Aug. 17.

Following a successful takeoff, the rocket's Inertial Upper Stage 1 separated incompletely from IUS Stage 2,

GPS Rolls Over Smoothly

Experts called it a preview of the Y2K transition, and it went smoothly—at least, smoothly enough. The synchronized clocks of Global Positioning System satellites rolled back to zero at approximately 8 p.m. on Aug. 21, and the system stayed up and functioning.

Some older GPS navigation equipment was affected by the rollover, however. In Japan, hundreds of onboard car navigation systems went blank. Fourteen Australian Navy patrol boats lost their directional equipment. The US Coast Guard reported a few instances of civilian boaters who were unprepared for the changeover and lost their way.

For its part, the US military had no problems. "Military and civilian GPS users worldwide can continue to depend on accurate information from the GPS satellites," said Air Force Space Command, in a statement.

The rollover was necessary because of memory space limitations on GPS satellites. The system was designed to count up to 1,024 weeks, from a Jan. 6, 1980, start, and then reset itself to zero.

Counting would then commence anew, as the odometer of a car would continue to count miles after rolling over from 100,000 to zero.

The looming Y2K problem stems from similar date-specific computer memory problems, noted experts.

"To the extent we see organizations meeting the GPS challenge, it bodes well for their ability to meet the Y2K challenge," said Jack Gribben, a spokesman for the White House's Council on Year 2000 conversion.

New Man at the NSC

Hans Binnendijk, who has served in many positions in government and academia, is the National Security Council's new point man for defense matters.

Samuel R. Berger, President Clinton's national security advisor, announced Aug. 13 that he had appointed Binnendijk to the post of special assistant to the President and senior director for defense policy and arms control. The appointment became effective Aug. 15.

Binnendijk replaces Robert G. Bell, a former Air Force officer who left the White House post a day earlier to take a new NATO job in Brussels.

During the Clinton Administration, the holder of the post has tended to focus mostly on arms control, proliferation, and military space matters.

Since 1994, Binnendijk has served as the director of the Institute for National Strategic Studies at the National Defense University in Washington, D.C. Prior to that he was principal deputy director of the State Department's policy planning staff (1993–94). He also served as deputy staff director of the Senate Foreign Relations Committee (1980–85).

In academia, he was director of the Institute for the Study of Diplomacy at Georgetown University and director of studies at London's International Institute for Strategic Studies.

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because an interstage electrical connector plug failed to release, said the report. The plug had been wrapped in thermal material and tape, per detailed instructions included in the rocket's design documents. However, the documents, which dated from 1978, omitted "unique requirements for the separation function," according to Space Command, and the tape prevented proper plug disconnection. The sticky plug resulted in a cascading series of events that left a $250 million Defense Support Program satellite in a useless orbit.

TRW, Spectrum Astro Win SBIRS Low Contracts

On Aug. 16, the Air Force announced that TRW and Spectrum Astro won $275 million contracts for the program definition and risk reduction phase of the Space Based Infrared System Low program.

During their 38-month efforts the contractors will define affordable requirements, produce preliminary system designs, and carry out ground demonstrations of critical systems, said the Air Force officials.

The SBIRS program is meant to provide precision tracking for national and theater missile defense, following possible incoming ballistic weapons throughout their trajectory. It is split into high orbit and low orbit satellite elements.

A-OK for Y2K?

DoD is just about ready to face the Y2K computer problem, said Secretary of Defense Cohen on July 22.

Military officials have made an enormous effort—their largest series of tests ever—to make sure that critical computer systems don't malfunction when Jan. 1, 2000, rolls around. More than 92 percent of DoD's 2,107 mission critical systems have now been certified as Y2K compliant. Ninety-four percent of its 4,749 nonmission-critical systems have been similarly checked. Over 99 percent of the Department of Defense's 637 installations have been swept and checked for the coming of the new data year.

Among the few systems that have not yet been tested are the U-2 and RC-135 spy airplanes, which were deployed overseas in support of Operation Allied Force. They will be scrubbed upon their return from Europe, said officials.

As a final measure, the Air Force is preparing to carry out what officials call "Guam Watch," by tracking the progress of computer results as the Jan. 1, 2000, date line sweeps across the world.

AMC Reconstitutes

With the victory of Operation Allied Force behind it, Air Mobility Command is moving toward a new phase of activity—reconstitution.

Robert McNamara and the Expendable Pilot

The following is a condensed version of an article that appeared in the July 1999 issue of Proceedings, *journal of the US Naval Institute in Annapolis, Md. It was written by Cmdr. Glenn Tierney, a retired US Navy fighter pilot.*

It was a quiet Sunday afternoon in Hawaii on 5 June 1964. ... I was the assistant current air operations (Navy, J-3116) on the staff of the commander in chief, Pacific (CinCPac), Adm. Harry D. Felt. ... My four-digit designator put me well down on the totem pole. As one of the few Navy pilots on the staff with any recent fleet experience, however, I wound up in the middle of things when the air war in Southeast Asia expanded. ...

After many months of indecision, on 23 May 1964 the Joint Chiefs of Staff (JCS) finally authorized the Navy to conduct low-altitude photographic reconnaissance flights over the Plaine des Jarres [in Laos].

Within days, Photographic Squadron (VFP)-63 pilots began flying missions from the USS *Kitty Hawk* (CVA-63), which was operating from Yankee Station in the Gulf of Tonkin. Along with the authorization came orders that the RF-8 Crusader photo planes were to operate without armed escorts—even though the practice had been standard operating procedure since World War II. ...

The major potential problems with the flights were their frequency and Times Over Target (TOTs), which were specified by the Secretary of Defense. For these missions, the TOTs were specified as every other day at 1 p.m. (Laotian time). Anyone could see that such a pattern created a built-in opportunity for the Pathet Lao to spring an ambush. ...

Robert S. McNamara briefs news media at a Pentagon press briefing, circa January 1966. In this article, a retired Navy fighter pilot provides a glimpse of how then–Defense Secretary McNamara looked after the welfare of the troops in Southeast Asia.

The telephone in my quarters rang late on that Sunday afternoon: "You asked me to call you whenever we had a problem with one of your projects [meaning overt and covert aerial reconnaissance]. We have a bad one," said Army Master Sergeant Duncan, in charge of communications in the CinCPac Command Center. ...

I automatically assumed that we had lost a Navy photo plane and pilot in the Plaine des Jarres; that day's TOT had been about an hour earlier. Duncan confirmed my fears: The pilot had been shot down and the escort pilot had seen him moving about. The Rescue Combat Air Patrol (ResCAP) from the ship had launched, he added quickly, but had been recalled because the "word" had come down that there was to be "no round-eye" [American] effort to rescue the pilot.

I could not believe it. We had two Air America helicopters stationed on a hill

AMC aircraft and crews took part in more than 1,800 airlift and 900 air refueling missions during the Allied air war over Yugoslavia. Now command planners are moving to relax their forces and repair the fraying of capabilities that such demands inevitably cause.

"We can't come home and sit down because there are still other customers out there," said Col. Edward McPhillips, Tanker Airlift Control Center vice commander. "We have to pace ourselves so we can recover the training that we lost, give people some time off, and still keep the rest of the airlift running globally."

Reconstitution is a three-part process, according to McPhillips. It involves resting the troops, retraining units, and maintaining aircraft.

Though it may seem counterintuitive that crews need training after months of hard operational activity, there are a number of training requirements involving simulators, air refueling, and airdrops that many missed.

"Now it's going to take us three or four months to get all those crews back up to speed," said McPhillips.

Day-to-day operational commitments will be reduced by 10 percent for three months to facilitate this process, said AMC officials. After that, the commitment rate will be ratcheted up by 5 percent, putting the command at a 95 percent operational rate for all forces.

"We'll operate at that rate for one more month to make sure reconstitution is complete," said Col. Robert Owen, chief of policy and doctrine for the plans and programs directorate.

Better Times on Way, Says Engine Boss

The 1990s have been a difficult period for the aircraft logistics and maintenance community, but better times are on the way, said the commander of the San Antonio Air Logistics Center at a recent meeting of senior commanders at Luke AFB, Ariz.

Recent years have been marked by significant budget cuts, base closures, and a high operations tempo with aging aircraft. This has led to parts shortages, increased aircraft cannibalizations, and long working hours for maintainers, said Maj. Gen. Paul L. Bielowicz.

"This is not business as usual," he said. "We are faced with a situation now where the combination of ops tempo and funding shortfalls have created a bow wave of requirements for aircraft engines."

The good news is that money is on the way, said Bielowicz, who directs the acquisition and sustainment of all Air Force engines. The Air Force leadership is working aggressively to get the funds needed, particularly for F-16 power plants.

"The Secretary and the Chief know this is not just a parts issue—it is a quality-of-life issue," said Bielowicz.

The maintainers of Luke AFB were a receptive audience for the engine chief's words. More than 200 F-16s call Luke home, and six Fighting Falcon crashes since last October have put their maintainers under a micro-

about 20 miles away, on alert for just this purpose. ... The ridiculous aspect of the order was that there were no other forces available. ... For all practical purposes, at this point the photo pilot had been abandoned by the government that had sent him in harm's way.

I called the JCS on the secure telephone and spoke with the Army brigadier general who was the duty flag officer. He confirmed the order. When I literally demanded to know who had issued such an order, he said he was not sure. I respectfully suggested that he find out as soon as possible and we would be calling him back, also ASAP. As I dropped the secure phone, I called my immediate boss, Marine Brig. Gen. George Bowman, our J-3/ operations officer, but he was not at home.

To hell with this, I said to myself, and I called Admiral Felt on his private line at his quarters in Makalapa, just down the hill; I was bypassing at least three other senior flag officers. The line was not secure, so I told him briefly that we had a serious problem in the PDJ. ... "I'm on the way," he replied.

Less than 10 minutes later, the JCS brigadier general was telling the admiral that the order had come from the Secretary of Defense himself. (Before he called the JCS, Admiral Felt had instructed me to pick up a second secure phone and admonished me: "You listen; you do not speak.") ... Admiral Felt spoke quietly: "General, get me the Secretary of Defense on this line immediately." ...

Several minutes later, sounding very wide awake, and almost jovial, Robert McNamara came on the line and asked Admiral Felt the reason for the call. Admiral Felt was never one to mince words. "Mr. Secretary, I have been told that you are aware that we just had a Navy photo pilot shot down in the Plaine des Jarres and that an order had been issued by your office that there was to be no 'round-eye' effort to rescue the pilot. Is that correct?"

"That is correct, Admiral," McNamara answered. At this point Admiral Felt interrupted him: "May I ask by whose authority this order was issued?"

"The recommendation came from State," McNamara replied, "and the Secretary of State and I discussed it and agreed that this is the best course of action." ...

Admiral Felt turned slightly to look at me. ... He spoke again, very quietly but in a short clipped tone that I had never heard him use before.

"Mr. Secretary, that is not a decision that can be made by the Secretary of State or the Secretary of Defense. The decision to rescue this pilot or not to rescue him can be made only by the Commander in Chief of the United States armed forces, and I am asking you to put me through to the Commander in Chief—now, sir." ...

After a few seconds, McNamara started almost mumbling; he didn't argue the point, or refuse the request, but he made a big point that it was very late and that the President had just retired after a long evening. ...

Again, Admiral Felt quietly repeated his previous statement word for word. ... McNamara, without another word on the subject, said, "All right, I will ring the President." Within 30 seconds President Johnson came on the line. ...

"Good morning, Admiral Felt, what can I do for you?"

"Mr. President, we just had a Navy photo pilot shot down over the Plain des Jarres in northern Laos, but the Navy and Air America rescue effort has been called off by the Secretary of Defense as recommended by the Secretary of State. I just spoke to the Secretary of Defense and told him that this is a critical military decision that cannot be made by the Secretary of Defense or the Secretary of State, but one that can be made only by the Commander in Chief of the United States armed forces, and I am asking your permission to go in and rescue this pilot."

Without hesitation, President Johnson came back, "Well, I'll be damned. Of course, go in and get him—and let me know how it comes out."

Note: The unfortunate Navy photo pilot was Lt. Charles F. Klusmann. He was not rescued but was captured. It was several hours before Air America helicopter crews reached the scene. Heavy ground fire drove off the lead aircraft; Klusmann waved off the second helo because it, too, was flying into an ambush.

The Kitty Hawk's *ResCAP never did show up; they had been recalled. The author writes that, in all probability, they would have neutralized the area by the time the helicopters arrived and the Air America crews would have been able to make the pickup.*

Klusmann, captured on June 6, escaped from his captors on Aug. 31. He is now a retired US Navy captain living in Pensacola, Fla.

scope. Four of the Luke crashes stemmed from material failures on different parts of the aircraft's Pratt & Whitney engine, according to accident reports.

In total, 16 Air Force F-16s have crashed this fiscal year.

"We know where we need to go—replacement parts," said Brig. Gen. John L. Barry, 56th Fighter Wing commander. "Until then, we must continue to manage risk by a more intrusive and frequent regimen of inspections."

Two of the accidents at Luke were caused by the separation of the engine augmenter from the aircraft. In late March, the 56th Wing commander ordered Luke jets grounded until every PW-220 engine augmenter could be removed, cleaned, and inspected for cracks—a 15-hour process.

Base maintainers checked 218 augmenters, in the end. Twenty-four had cracks that required repair or replacement. "That is an incredible feat," said Bielowicz.

Hart Probe Investigator Exonerated

A veteran Department of Defense investigator won't be suspended for asking about ex-Sen. Gary Hart's sex life during a routine security clearance check. David Kerno of the Defense Security Service was notified Aug. 20 that proposed disciplinary action had been withdrawn, said his lawyer, Daniel Minahan.

Last September, Kerno was assigned to check out Hart for a security clearance. The former Colorado lawmaker needed to read secret documents for his role in the National Security Study Group, which is reviewing US defense needs.

As part of his investigation, Kerno asked Hart's partners at a Denver law firm about the former senator's private life. Within hours, Hart spoke to Cohen's chief of staff and complained. Kerno lost his badge, was assigned to a desk job, and faced a 30-day suspension without pay.

House Republicans charged that Kerno was being railroaded for asking appropriate questions and that Hart was receiving favorable treatment simply because of his longstanding ties to the defense chief, himself a former senator from Maine.

DoD spokesmen gave no explanation for the abrupt dropping of charges. "The bottom line is nothing will happen to Dave Kerno," said department spokesman Glenn Flood.

News Notes

■ On Aug. 4, the North Atlantic Treaty Organization named UK Defense Secretary George Robertson as the new NATO secretary general and chairman of the North Atlantic Council. He succeeds Javier Solana.

■ US and German officials signed a preliminary agreement July 27 detailing plans for the withdrawal of US forces from Rhein–Main AB, Germany. The proposed agreement must now undergo a review process by both the American and German governments before a final withdrawal pact can be reached.

■ Northrop Grumman delivered the fifth Joint STARS aircraft to the Air Force on Aug. 13, more than two months ahead of schedule. Company officials said they will use the extra time to complete some important upgrades requested by the customer, including onboard system enhancements.

■ Film director Steven Spielberg received the Pentagon's highest civilian award from Secretary of Defense Cohen in a Washington ceremony Aug. 11. Spielberg won the DoD Distinguished Civilian Public Service Award for his 1998 film "Saving Private Ryan," which Cohen said sparked national awareness of the World War II generation's sacrifices and helped reconnect the US public with its men and women in uniform.

■ On Aug. 12, Air Force officials announced that they have selected 16,053 of 44,109 eligible senior airmen for promotion to staff sergeant for the 1999 E-5 cycle. That represents a 36.39 percent selection rate—the highest such figure since the inception of the Weighted Airman Promotion System nearly 30 years ago.

■ SrA. Glenn O. Wright is receiving Air Force–wide recognition for the value of his suggestions about improving the service. Wright, of the 33rd Fighter Wing, Eglin AFB, Fla., has been named the Air Force Chief of Staff's 1998 Submitter of the Year. Over the past two years, he has forwarded more than 50 suggestions to the Air Force Innovative Development Through Employee Awareness program, covering everything from technical order changes to changing repair codes on certain pieces of equipment.

■ A US Transportation Command Air Force major received the Cheney Award for heroism at a Pentagon ceremony July 28. Maj. Jeffrey Stephenson, a mobility operations officer in USTRANSCOM's Mobility Control Center, saved a pilot from a burning T-34B that crashed at Maxwell AFB, Ala., on May 14, 1998.

■ A partially latched canopy caused

Senior Staff Changes

RETIREMENT: Lt. Gen. John B. **Hall Jr.**

CHANGES: Brig. Gen. Brian A. **Arnold,** from Dir., Rqmts., AFSPC, Peterson AFB, Colo., to Dir., Space & Nuclear Deterrence, Asst. SECAF, Acq., Arlington, Va. ... Maj. Gen. John W. **Brooks,** from Vice Dir., Log., Jt. Staff, Pentagon, to Dir., Ops. & Log., USTRANSCOM, Scott AFB, Ill. ... Brig. Gen. Carol C. **Elliott,** from Vice Dir., Intel., Jt. Staff, Pentagon, to Vice Cmdr., AIA, Kelly AFB, Texas ... Brig. Gen. Edward R. **Ellis,** from Commandant, AFOATS, AU, AETC, Maxwell AFB, Ala., to Dep. Cmdr., 5th ATAF, Allied Air Forces, Southern Europe, NATO, Vicenza, Italy ... Brig. Gen. Thomas J. **Fiscus,** from Staff Judge Advocate, ACC, Langley AFB, Va., to Dep. JAG, Pentagon ... Lt. Gen. Robert H. **Foglesong,** from Asst. to the Chairman, JCS, Pentagon, to Cmdr., 12th AF, ACC, Davis–Monthan AFB, Ariz. ... Lt. Gen. Charles R. **Heflebower,** from Vice Cmdr., PACAF, Hickam AFB, Hawaii, to Cmdr., 7th AF, PACAF, Osan AB, South Korea ... Brig. Gen. (sel.) Peter J. **Hennessey,** from Dep. Dir., P&P, AFMC, Wright–Patterson AFB, Ohio, to Vice Cmdr., Oklahoma City ALC, AFMC, Tinker AFB, Okla. ... Brig. Gen. (sel.) Thomas P. **Kane,** from IG, AMC, Scott AFB, Ill., to Cmdr., 60th AMW, AMC, Travis AFB, Calif. ... Brig. Gen. Paul J. **Lebras,** from Vice Cmdr., AIA, Kelly AFB, Texas, to Vice Dir., Intel., Jt. Staff, Pentagon ... Maj. Gen. Richard C. **Marr,** from Dir., Ops., AETC, Randolph AFB, Texas, to C/S, USACOM, Norfolk, Va. ... Brig. Gen. (sel.) Henry A. **Obering III,** from Sys. Prgm. Dir., Expeditionary Forces Experiment SPO, ESC, AFMC, Hanscom AFB, Mass., to MAD, Info. Dominance, Asst. SECAF, Acq., Arlington, Va. ... Brig. Gen. Donald P. **Pettit,** from Dir., P&P, AFSPC, Peterson AFB, Colo., to Cmdr., 45th SW, AFSPC, Patrick AFB, Fla. ... Brig. Gen. Regner C. **Rider,** from Vice Cmdr., 8th AF, ACC, Barksdale AFB, La., to Dep. Dir., ISR, DCS, Air & Space Ops., USAF, Pentagon ... Brig. Gen. Ben T. **Robinson,** from Dep. Dir., C^2, DCS, Air & Space Ops., USAF, Pentagon, to Vice Cmdr., 8th AF, ACC, Barksdale AFB, La. ... Lt. Gen. Lansford E. **Trapp Jr.,** from Cmdr., 12th AF, ACC, Davis–Monthan AFB, Ariz., to Vice Cmdr., PACAF, Hickam AFB, Hawaii ... Brig. Gen. William M. **Wilson Jr.,** from Vice Cmdr., Warner Robins ALC, AFMC, Robins AFB, Ga., to Vice Cmdr., SMC, AFMC, Los Angeles AFB, Calif.

SENIOR EXECUTIVE SERVICE CHANGE: Frank O. **Tuck,** to Prgm. Dir., Air Combat SPO, ASC, Wright–Patterson AFB, Ohio. ■

CIA Pulls Deutch's Security Clearances

The CIA announced on Aug. 20 that it has stripped former Director John M. Deutch of his security clearance after concluding that he had mishandled classified information. Before he moved to the CIA, Deutch had served as deputy secretary of defense, the Pentagon's No. 2 post.

The suspension—which was for actions that occurred during Deutch's tenure as the nation's spy chief—was the first such action the CIA has ever taken.

Even though an investigation by the agency's inspector general "found no evidence that national security information was lost," it did find "the potential for damage to US security ... as a result of [Deutch's] actions," said a statement issued by current Director George J. Tenet.

The charges against Deutch arose in the days after he stepped down as director in 1996. Federal government technicians reviewing equipment at his Maryland home found highly classified data on a computer.

Although the computer was CIA–issue, it was not equipped with the level of security necessary to safely hold the data in question.

According to published reports, the files included documents relating to Iraq and the 1996 terrorist bombing of the Khobar Towers complex in Saudi Arabia that killed 19 US troops.

Deutch will now be unable to continue his current role of unpaid consultant to the agency. Such a post requires access to classified material.

Deutch, for his part, expressed remorse at the incident.

"I want to make it clear that I never considered the information to be at risk or intended to violate security procedures," he said in a statement. "But good intentions are simply not good enough. Strict compliance is the standard."

For the CIA, the Deutch situation has uncomfortable echoes of the Wen Ho Lee case, in which a Los Alamos National Lab physicist transferred classified computer files to his personal computer.

Lee has been a prime suspect in the suspected leak of nuclear secrets to China. Though it now appears unlikely that he will be charged with espionage, his infraction was such that Deutch's action could not be ignored.

Now a chemistry professor at the Massachusetts Institute of Technology, Deutch served for nearly 40 years in a variety of national security positions.

the March 17 Class A mishap of a U-2S reconnaissance jet based at Osan AB, South Korea, according to a just-released accident investigation board report. The accident occurred when the canopy blew open, damaging the aircraft structure and engine. The pilot landed the aircraft and no injuries were associated with the incident.

■ Loss of situational awareness by the aircrew was the primary cause of a June 2 crash of an MH-53J near Camp MacKall Military Reservation, Fayetteville, N.C., according to an accident board report released Aug. 2. The aircraft was on a normal landing approach when it was enveloped in a downwash-generated dust cloud, and the disoriented crew allowed the helicopter to hit the ground with a high rate of right drift. One crew member, SSgt. Kurt Upton, was killed in the accident. *[See "Aerospace World: Helo, Fighter Crashes Claim Lives," August, p. 19.]*

■ Wet weather played a major role in the F-16 mishap that occurred on landing at Kimhae IAP, South Korea, on March 18, according to an accident investigation report. The lack of braking action on the wet pavement, combined with hydroplaning from standing water and pilot errors, caused the crash. The pilot escaped without injury.

■ Two F-16Cs from the 8th Fighter Wing, Kunsan AB, South Korea, collided while returning from a training mission Aug. 11. One aircraft landed uneventfully, while the pilot of the second F-16 ejected safely. The second airplane crashed at the southern end of the Kunsan runway.

■ A technical sergeant from the 630th Air Mobility Squadron, Yokota AB, Japan, was sentenced to 18 months of confinement, reduced to the rank of E-1, and given a bad-conduct discharge for filing nearly $9,000 in false travel claims. TSgt. Harry Slye pleaded guilty to larceny and fraud on July 28. He was ordered to pay back the money and forfeit an additional $3,000 in pay.

■ An F-15 from the 131st Fighter Wing of the Missouri Air National Guard crashed Aug. 19 after touching another F-15 during a routine training mission in south central Missouri. The pilot ejected safely.

■ Air Force Maj. Kimberly Markland, who works in a clinical laboratory at Lackland AFB, Texas, and was the top female finisher of the 1998 Marine Corps Marathon, won a bronze medal in the marathon at the 2nd Military World Games in Zagreb, Croatia, in early August.

■ Air Force swimmers did well at the Military World Games, also. 1st Lt. Shannon Goff took the gold, and 2nd Lt. Connie Cann finished second, in the 200-meter Swim With Obstacles event. Goff also took second in the women's 100-meter Saving-a-Dummy-With-Fins lifesaving event.

Obituary

Retired Air Force Gen. James E. "Jim" Hill, a pioneer figure who pushed the service to look toward space for its future, died of cancer May 20 in Colorado Springs, Colo. He was 78.

Hill had served as commander of 8th Air Force, Barksdale AFB, La., and commander in chief of NORAD in Colorado. He was a driving force behind the subsequent organization of Air Force Space Command. He retired in 1980. ■

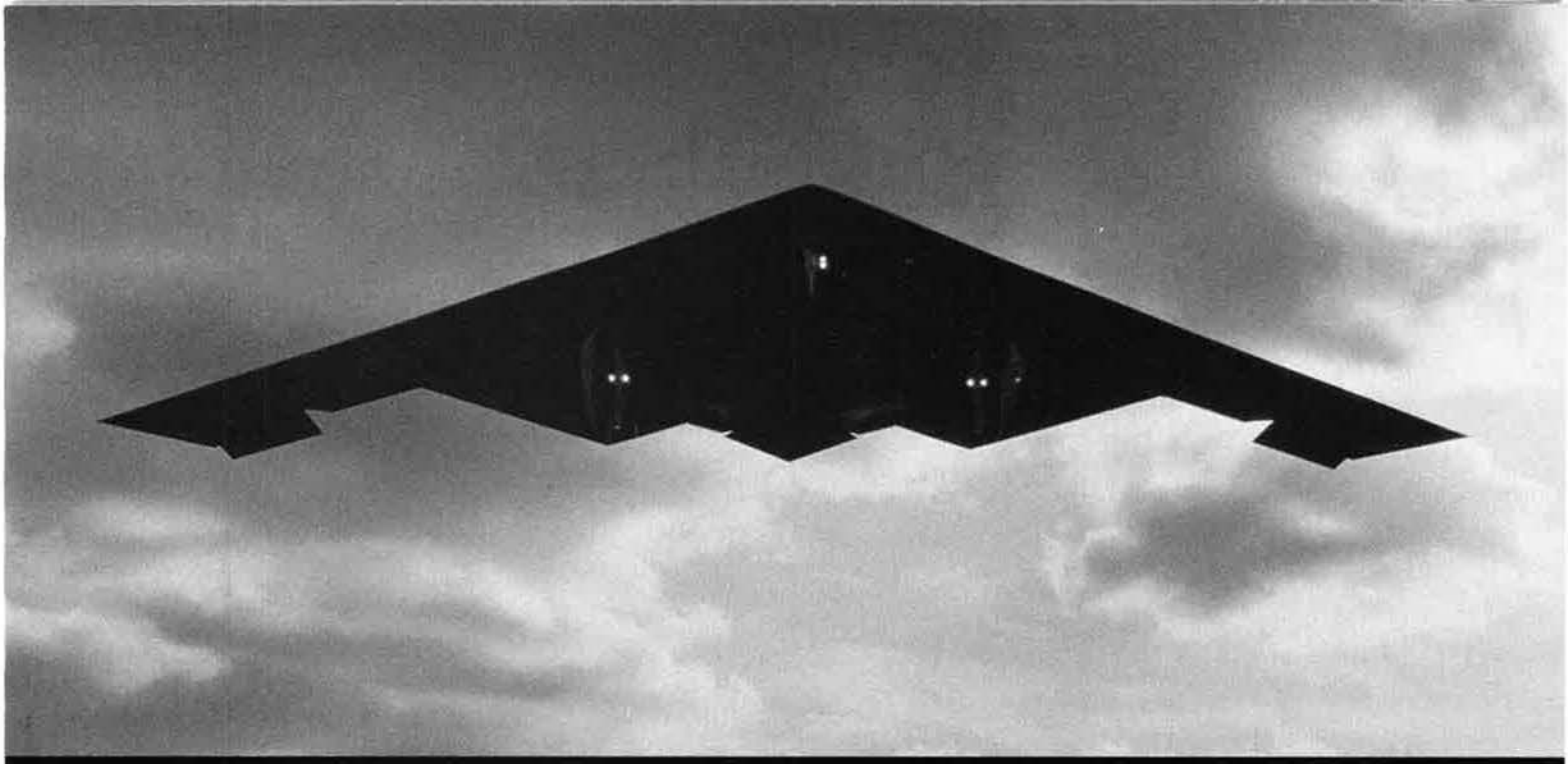
Index to Advertisers

The Chart Page

By Tamar A. Mehuron, Associate Editor

The War According to Serbia

Originally appearing on a Serb Web site, this map shows locations of NATO aircraft allegedly shot down by Serb forces, as of June 8. According to this map, 63 NATO warplanes, 13 helicopters, and 12 unmanned aerial vehicles were shot down. In reality, NATO lost only two aircraft, an F-117 and an F-16, out of approximately 1,433 aircraft deployed and 35,000 sorties. NATO aircraft dominated Serbian airspace and shut down the Serbs' integrated air defense system. There were no Allied combat casualties. Two US Army helicopter pilots died in a training accident. Three US military personnel who had been captured by Serb forces near the Macedonian border were later returned to NATO.



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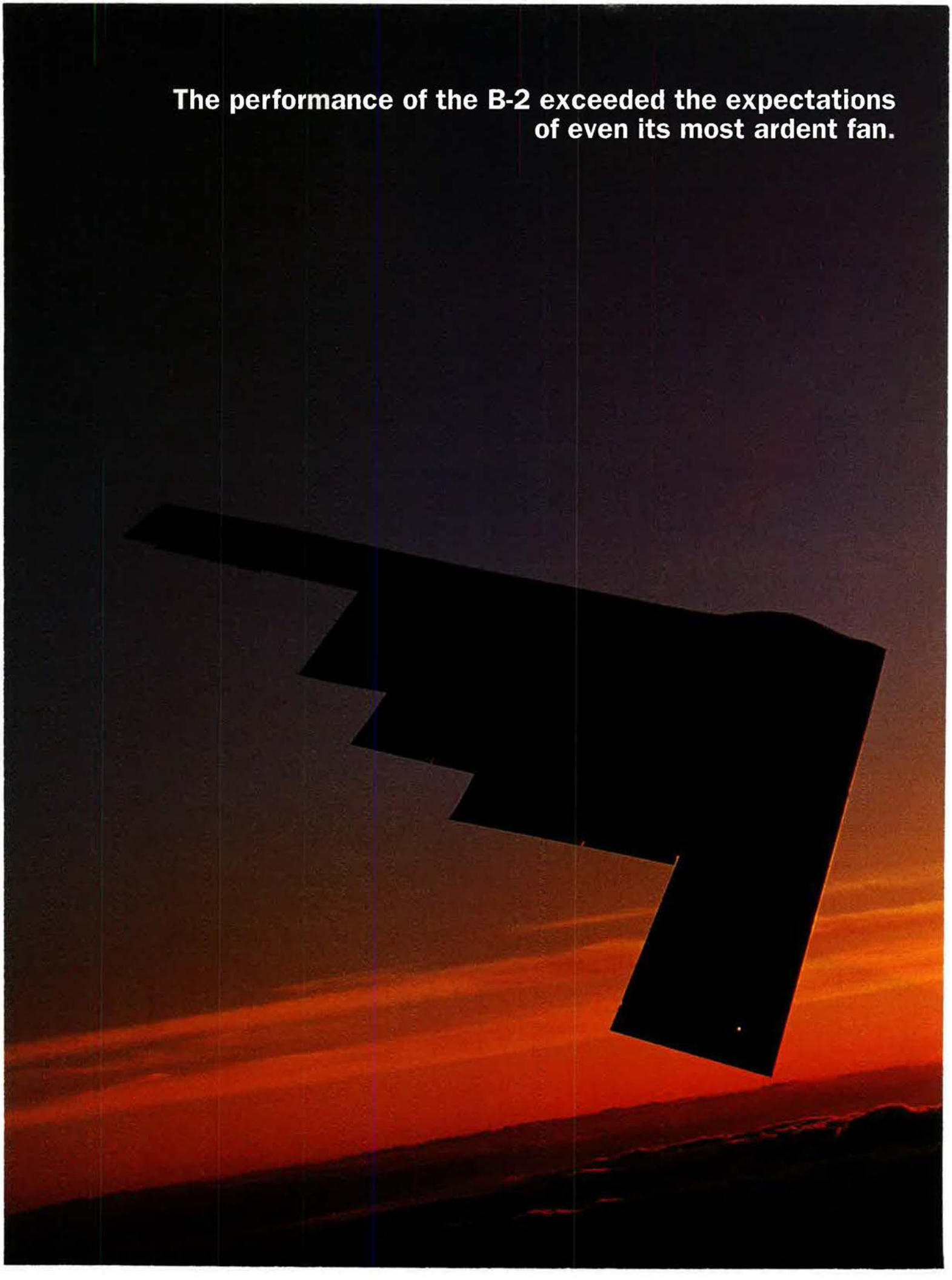

The performance of the B-2 exceeded the expectations
of even its most ardent fan.

With Stealth in the Balkans

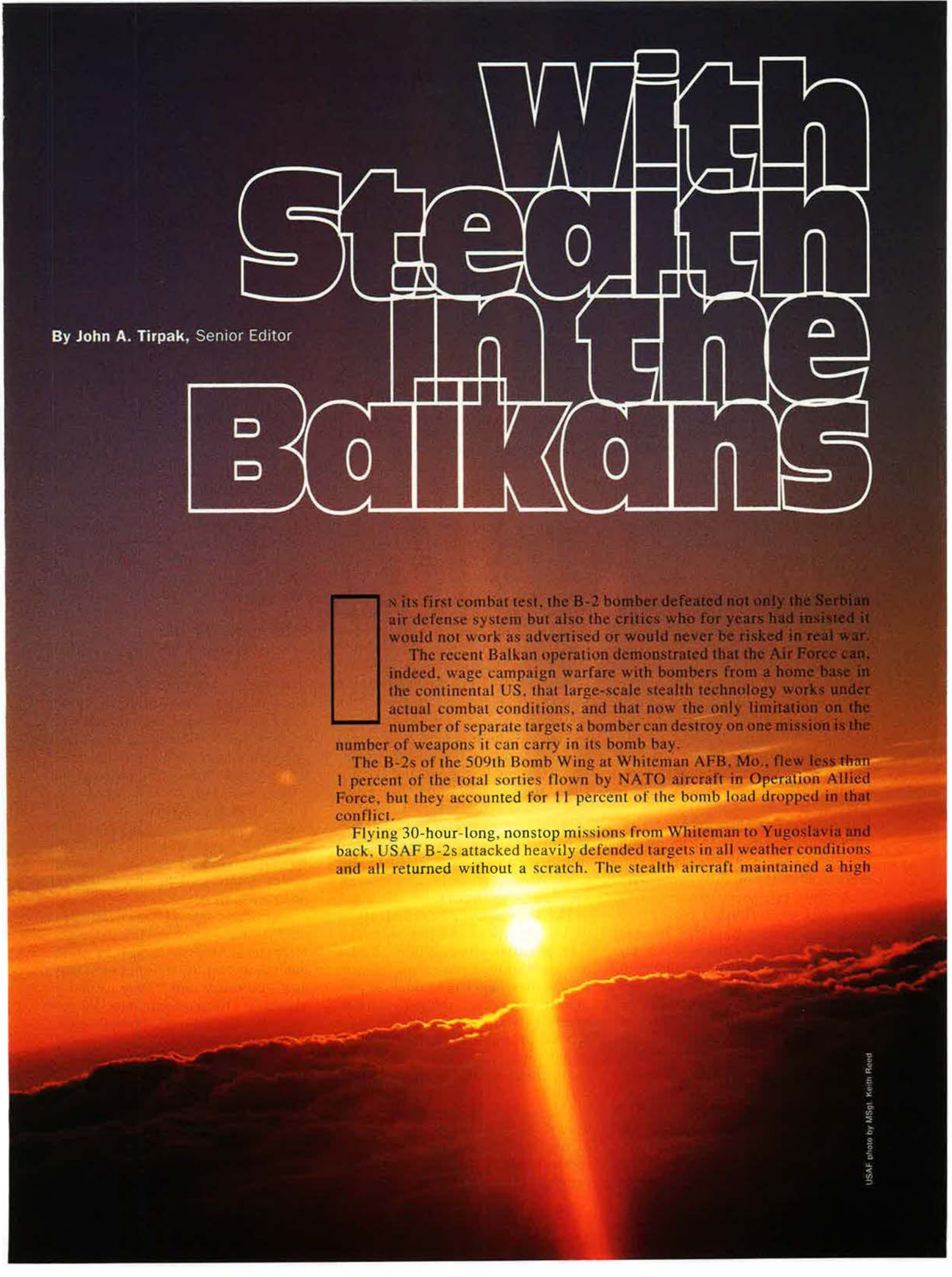
By John A. Tirpak, Senior Editor

In its first combat test, the B-2 bomber defeated not only the Serbian air defense system but also the critics who for years had insisted it would not work as advertised or would never be risked in real war.

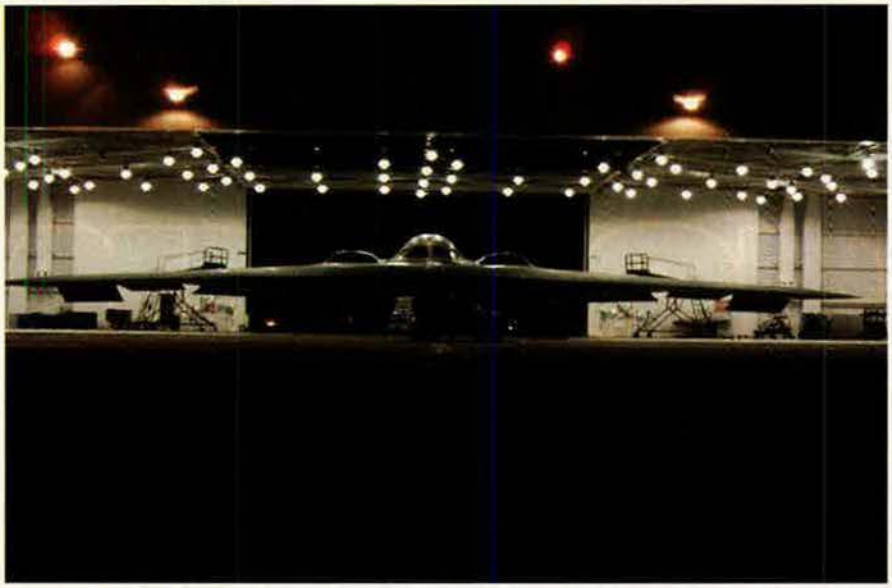
The recent Balkan operation demonstrated that the Air Force can, indeed, wage campaign warfare with bombers from a home base in the continental US, that large-scale stealth technology works under actual combat conditions, and that now the only limitation on the number of separate targets a bomber can destroy on one mission is the number of weapons it can carry in its bomb bay.

The B-2s of the 509th Bomb Wing at Whiteman AFB, Mo., flew less than 1 percent of the total sorties flown by NATO aircraft in Operation Allied Force, but they accounted for 11 percent of the bomb load dropped in that conflict.

Flying 30-hour-long, nonstop missions from Whiteman to Yugoslavia and back, USAF B-2s attacked heavily defended targets in all weather conditions and all returned without a scratch. The stealth aircraft maintained a high



USAF photo by MSgt. Keith Reed



USAF photo by SSgt. Michael Gaddis

Despite years of criticism that its stealth and avionics systems were too tempermental for real combat, the B-2 proved in Operation Allied Force that it could fly halfway around the world, dish out stunning damage, and come back without a scratch.

readiness rate, given the small number of airplanes available. Of the total 53 air tasking orders in the conflict, B-2s were part of 34, but only one mission was scrubbed because of mechanical problems.

The B-2s of Allied Force put 90 percent of their bombs well within the prescribed 40 feet of their targets. Most of the B-2's bombs hit the bull's-eye, and the rest fell only a short distance beyond. The bomber dropped more than 650 Joint Direct Attack Munitions, chiefly of the 2,000-pound variety. It also dropped four heavyweight, 5,000-pound "bunker busters."

Exceeding Expectations

"The performance of the plane and the Joint Direct Attack Munition, both separately and in synergy with each other, far exceeded everyone's expectations," 509th Commander Brig. Gen. Leroy Barnidge Jr. said in reporting the statistics to an Air Force Association briefing held in Washington, D.C.

Technically, the B-2 remains a new asset, having only recently achieved operational capability with the Block 30 model. Barnidge observed that, even after one week of operations over the Balkans, "we were still developing confidence" that the B-2 would perform as planned. As the campaign went on, however, it became clear that the B-2 was living up to its promise. Barnidge told *Air Force* Magazine that he soon became fully confident that the B-2 could be counted on to deliver ordnance with startling accuracy even through bad weather.

Lt. Gen. Michael C. Short, the commander of NATO's air component for Allied Force, said he quickly came to expect "16 quality DMPIs [Designated Mean Points of Impact]" from each B-2 mission and that it was the main success story of the operation.

The stealth bombers were used against Serbia's integrated air defense system, command and control sites, runways and airfields, communications facilities, factories, bridges, and other elements of infrastructure. The first airplanes launched in Allied Force were B-2s, lifting off from Whiteman 14 hours ahead of the aircraft in-theater.

The B-2s operated exclusively at night, sometimes in a two-ship mission, but often alone. While they did not, as Barnidge put it, fly "arm in arm" with other NATO assets as part of a strike package, the B-2s stuck to carefully scripted timing for their arrival in and departure from the target area, sometimes serving as the opening round of a multipronged assault.

For example, B-2s sometimes were used to precisely crater intersections of runways and taxiways on an airfield. Boxed in on those fields and prevented from escaping, Serb warplanes were later destroyed by nonstealthy B-52 or B-1B bombers dropping large numbers of unguided iron bombs. A single B-2 destroyed two airfields on the same mission. For Barnidge, the operation showed that the B-2 can "be folded in, in a seamless fashion, with other assets in-theater."

Barnidge readily admitted that B-2s took advantage of jammers that were operating in the theater but said that this tactic was driven more by a desire to provide extra protection for crews than by a critical operational need. "You want to give your crews as much help as you can," he explained.

Barnidge said that he frequently receives questions about whether stealth aircraft need electronic countermeasures support. "The answer is no," he asserted. It was "beneficial and useful [to have EA-6B Prowlers and other jammers in the area, but] we operated in an autonomous fashion," said Barnidge. As the Balkan campaign wore on, mission planners became increasingly confident about sending B-2s against targets without any support.

First to the Fight?

Barnidge maintained that Allied Force proved the B-2 is a ready asset that could easily become the first weapon called on in a crisis. At some point, he said, the US might have to prepare for battle in a foreign area without the benefit of on-hand, forward-based forces. This situation could result from a number of factors—strategic surprise, space constraints, and political constraints, to name but three. In such a situation, Barnidge pointed out, the United States would still have a powerful military option.

"We have validated that we can reach out from the continental US and begin to prosecute the air campaign while other assets are flowing into the theater," Barnidge said. "That's a pretty big deal. I think people have fundamentally changed—broadened—their perspective of the capability of American airpower. And certainly the B-2 is an American asset, instead of just an Air Force asset."

The B-2 has taken considerable heat because of the labor intensity of maintaining its stealth surfaces, but Barnidge said the low-observables required "minor extra effort [during

the campaign], compared to what we expected."

He said the B-2's fastest turn time—the interval between landing and being ready to launch on another mission—was about four hours. The longest was four days. The longer intervals were chiefly caused by the need for curing time, meaning that low-observable paint and tape required time to set and harden. The overall average, he reported, was about one day per mission flown.

The Balkan conflict also yielded positive news on another important front—pilot endurance. At the start of the action, even B-2 pilots had concerns about being able to continue the long Missouri–Yugoslavia round-trips beyond a couple of weeks. The end of the 78-day conflict, however, found them convinced that they could have kept up the bombing campaign as long as necessary.

"We're pretty confident now," Barnidge said.

Exactly 51 pilots flew the B-2 in combat. Most of them flew one mission; a handful flew two, and one pilot flew three times. Barnidge said he insisted that pilots get at least three days of rest between missions, but he was impressed that, as they landed, they seemed alert and ready to get back in the rotation for another mission. He said he would only begin to worry about pilot fatigue on missions lasting more than 40 hours.

The B-2 mission capable rate during Allied Force, not counting low-observable maintenance, averaged about 75 percent. When such maintenance is included, the figure was about 60 percent. However, not a single B-2 mission started late, and only one airplane had to abort its mission for an in-flight mechanical problem. Once it landed, a repair was made, and it was ready to go again in 15 minutes, Barnidge reported. Two other missions were canceled after takeoff because NATO partners withdrew permission to attack the intended targets.

During Allied Force, the 509th had nine operational B-2 bombers on the ramp at Whiteman. USAF assigned eight B-2s to combat missions—six were available at any given time. The bombers not in action were used to continue training of new B-2 pilots, conduct aircraft tests, or carry out mandatory inspections.

"Piece of Cake"

The pace was easily manageable, Col. Donald P. Higgins, Barnidge's deputy, observed. "It ended up being a piece of cake," Higgins said. "And the evidence for that is we launched all of our sorties on time. [In] this particular conflict," Higgins continued, "we had the assets to be perfectly prepared for every mission." Sufficiency of airplanes, pilots, and maintainers enabled the 509th to generate all the missions required.

"Had the requirement for sorties been in excess of what it was, perhaps we wouldn't" have achieved the performance attained, he said.

The B-2 did not deploy to a forward base, partly because planners did not require the force to generate large numbers of sorties. "Six airplanes ... was plenty to fill the tasking [given by the Supreme Allied Commander Europe, Army Gen. Wesley K. Clark]," Higgins reported. Had the SACEUR requested substantially more sorties from the 509th, Higgins said, forward basing would have become a higher profile issue. The decision not to deploy the B-2s forward—along with their spare parts, equipment, personnel, and other gear—spared the US airlift fleet another big mission and permitted the US to assign its lift to other needs.

However, Higgins said, the Air Force was prepared to use forward basing—and in a novel way. The option given most serious consideration was called "employ on the deploy." A stealth bomber could take off from Whiteman, fly directly to a combat area, bomb its targets, and then recover at a forward base. At that base, the B-2 could rearm, take off for a new combat zone, attack more targets, and then return to Whiteman. This type of employment would have permitted more sorties but still kept the B-2 support train mostly back at Whiteman.

Barnidge said the B-2's wartime operating pace was not routine, but neither was it crisis management. The B-2 proved to be far more hardy than even its most ardent fans expected, he said. "You put gas in it, and it kept on running."

The commander remarked, "[As Operation Allied Force went on] we were willing to sign up to increased sortie numbers, should the requirement exist, ... because we had learned how robust the airplane was and indeed how good we could be." At no time was the bomber unit asked to do anything it could not do, he said.

Salesmanship

The process of getting the B-2 into Allied Force began months ahead of the start of the war. A B-2 pilot was assigned to Short's staff to familiarize on-scene planners with the bomber's capabilities and to perform what the pilot called "some sales-

USAF photo by SrA. Jessica Kochman

The other part of the B-2 success story was the Joint Direct Attack Munition, a 2,000-pound version of which is shown here being loaded in the B-2's bomb bay. Global Positioning System coordinates guide the JDAM to the target in any weather.

manship" on behalf of the system. (For security purposes and at the request of the Air Force, names of all B-2 pilots and their call signs have been withheld.) This pilot then served throughout the war as a liaison between the Combined Air Operations Center at Vicenza, Italy, and operators at Whiteman.

When it became apparent that NATO might have to use force against Serbia, the 509th began practicing for what would probably be its first combat missions. Fixed targets in the region had already been cataloged; these were programmed into the B-2's weapon system trainers, or simulators. The initial strikes were rehearsed many times on the simulator before they were flown. In fact, the B-2 sorties resembled space missions in their duration, requirement for physiological preparation, constant simulations, and incessant verification of checklists.

Mission planning was done over several days. Barnidge explained that, about four days in advance of the launch, pilots received Global Positioning System coordinates of a target, along with imagery of the target area, particularly any radar-significant structures. All these would be checked against synthetic aperture radar imagery just before weapons release.

"Then," said Barnidge, "it was up to us to build the flight plan," which included refuelings, how to fly through all the defenses to the target area, and the set up to drop the bombs and put the target out of commission.

During these few days before the start of a mission, the pilots familiarized themselves with prevailing conditions in the Balkans—tanking procedures, jamming operations, weather conditions, and the combat situation. "We would get 'up' on what's happening," one pilot said. Then the pilots started shifting to a night cycle of waking and sleeping, because takeoffs would be at night and bombs would be released at night. Getting into phase for the mission might include extra sleep or getting away from possible distractions by staying in visiting officer quarters.

Every B-2 pilot has had extensive training for long-endurance missions and has developed a unique physiology profile of diet, sleep, and other factors. Each does whatever works best for him as an individual, said one pilot, such that he can remain fully alert at the most important times of a mission.

Every aspect of a mission's combat phase was practiced several times. The B-2s actually spent only an hour or two in hostile airspace, so it was possible to simulate the attack a number of times. Even when the specific mission could not be exactly simulated, pilots flew one that had already been flown, using the data actually collected on that run. "It helped us get the sense of timing and a feel for threat location," said one pilot.

On the night prior to their mission, aircrew members would serve as a "spare" for that night's primary strikers. Usually, the spare was not needed.

Finally, on the day of the mission, the 509th carried out the preflight inspection and final mission planning for the B-2s going into action. These tasks were conducted by others on behalf of the pilots, who were in crew rest and not to be disturbed until just before the flight. Then, the assigned crews got into their airplanes, taxied, and took off.

Even if they were headed for targets in entirely different parts of Yugoslavia, the B-2s taking off on the same night usually flew together from Whiteman across the Atlantic, their goal being to provide mutual support on the long overwater trip. They refueled twice en route—once over the Atlantic and again just before entering the battlespace.

Practice Makes Perfect

During the flight, crew members reviewed their checklists, studied imagery of the target, got weather updates, and monitored the health of the aircraft, endeavoring to make sure everything was perfect on the first pass. They also slept in shifts.

"There is some amount of sleep an individual needs in the form of a 'power nap,' " Higgins said. "If he gets less than that or more than that, he ends up groggy, but if he gets just the right amount, he's good to go."

The power naps were actually factored into the mission planning. A crew member took his snooze on a beach lounge purchased at the local variety store. The lounge just happened to fit perfectly in the space behind the mission commander's station.

Other techniques for freshening up included changing clothes, eating warm meals, or wet-toweling.

Upon entering the battlespace, crew members went through a ritual of getting ready for combat—putting on long johns, winter-weight flight jackets, a survival vest, and other gear not necessary during other portions of the mission. They "power[ed] up the weapons [and made sure] the computer was talking to the bombs," said one.

On approach to the designated tar-

USAF photo by TSgt. Lance Cheung

All B-2 strikes feature elaborate planning—including a dress rehearsal in the simulator—to help crews avoid enemy guns and missiles. Planning is done in a secure facility housing a comprehensive database on world air defenses.

USAF photo by SSgt. Ken Bergmann

other NATO airplanes were deconflicted through the mission planning process and the air tasking order. However, Barnidge insisted that no jammers were specifically sent to protect the B-2s. Rather, the bombers took advantage of assets in the theater. "I never sent an airplane in that I wasn't confident could handle all the threats it would encounter," Barnidge asserted.

A B-2 pilot said that he was glad to have the extra protection but that he was also confident he would have been successful without it. "It's a basic principle of war," he said. "Apply mass if you have it."

As to whether any B-2s had close calls, Barnidge said, "We didn't have any that scared our pilots to death."

get area, the B-2 generated a synthetic aperture radar picture almost photographic in its detail and quality, one pilot said. This was checked against intelligence photos, and the target was identified. Next, the GPS coordinates were verified via the B-2's unique GPS–Aided Targeting System, or GATS. The GATS permits the B-2 mission commander to choose aim points on the target, even if it is obscured by clouds. Barnidge referred to this procedure as "taking out the location error in the coordinates."

The coordinates were updated, if necessary, then fed into the JDAM weapon via an electronic umbilical cord. At the appropriate moment, once for each bomb, the bomb bay doors opened, a JDAM dropped clear of the aircraft, and then steered to the target.

At top, a B-2 takes on fuel from a KC-135 during an Operation Allied Force mission. Above, a Block 20 B-2 uses the GPS–Aided Targeting System to guide a munition during testing. In Allied Force, the combination of the Block 30 B-2's GATS with the JDAM produced outstanding accuracy.

Never Detected

Each B-2 could—and, in some cases, did—attack 16 targets in 16 different locations per mission. Pilots reported they were apparently never detected. One said he was amused, moments after touching down at Whiteman, to see a Serb leader on television, standing in a crater and complaining about NATO's use of cruise missiles. "It wasn't a cruise missile," he said. "It was us. That showed they never knew we were there."

"[The JDAMs proved] outstandingly reliable and accurate," remarked one lead pilot. Barnidge offered a statistic of well above 95 percent reliability of the JDAM, adding that "there were no stupid munitions [dropped by the B-2]."

Rep. Duncan Hunter (R–Calif.), a member of the House Armed Services Committee who had been briefed on the B-2's first combat sorties, confirmed the outstanding war record of the JDAM. "This simple weapon," said Hunter, "cost only $15,000 a copy to buy, but, combined with the radar and accuracy of the B-2, it performed flawlessly and demolished almost every target it was assigned to destroy."

"Like all the aircraft in the operation, we coordinated with the other aircraft in the vicinity," one pilot observed, meaning that the B-2 and He acknowledged that a few things of interest took place, but "the airplane took care of its pilots." He did not elaborate.

Once out of the theater, the B-2s took two more refuelings en route to home. On the ground, they got back in the rotation to fly another mission.

The most experienced B-2 pilots flew the first B-2 sorties. As missions continued, pilots were selected in order, until nearly all pilots qualified to fly the airplane in combat actually did so.

The 509th worked up many plans for stepping up the pace of operations, or for even more rigorous missions, but these "never materialized

only because [the SACEUR] chose not to exercise them," Barnidge reported.

"We had a lot of capability available here at Whiteman, should it have been needed, especially toward the latter part of the war," he added.

Great Airplane, But ...

Despite the B-2's success in the Balkans, the Air Force has no plans to alter its mix of aircraft to include more bombers or to accelerate moves toward a new stealthy bomber. "[The operation] validated our vision for long-range bombers," USAF said in response to an *Air Force* Magazine query, and the service will continue with its plan to modernize and sustain the force as laid out in its Bomber Roadmap, released early this year. *[See "The Bomber Roadmap," June, p. 30.]*

However, it will make adjustments to its schedule for buying new munitions—necessary to replenish depleted stockpiles—and will shift its design emphasis for new ones now on the drawing board.

"The top priority in the near term is accelerating the production rate of JDAM," the Air Force said. "USAF is seeking funding to increase production ... from 500 per month to 700 per month." That will bring 10,500 JDAM kits into the inventory by Fiscal 2002 and move up the full planned buy to 2005. The service is also looking at speeding up purchases of the Joint Standoff Weapon and the Joint Air-to-Surface Standoff Missile—a stealthy glide bomb and long-range missile, respectively.

The Air Force reports that the next generation of precision guided munitions will emphasize "longer range to minimize crew risk; miniaturization to enable more kills per sortie; and increased accuracy to ensure destruction with a smaller weapon and to minimize the chances for collateral damage."

The B-2 force maintained its role as a nuclear bomber throughout the Balkan conflict and now is preparing for a nuclear surety inspection in November, Higgins reported. "[The Single Integrated Operation Plan is] something we take very seriously," he said, and despite the B-2's conventional success, the nuclear role carries at least equal weight.

Asked to sum up lessons learned from the B-2's first combat experience, Higgins said, "We don't think it's particularly a challenge to fly from Whiteman anywhere in the world anymore. [In Allied Force,] it just so happened we could do it all from here."

Staff photo by Guy Aceto

The precision achieved by the B-2 and the JDAM in Operation Allied Force is a taste of things to come. Increased accuracy will allow future bombs to be smaller, increasing the load a B-2 can carry and expanding the list of targets it can destroy on a single mission.

However, getting money for prepositioned spares and JDAM kits and deployable aircraft shelters is still a priority, should a more aggressive sortie rate be required in a future conflict, he said.

Higgins also said the Balkan air operation had "opened our eyes" to new possibilities for the B-2. A stealth bomber standing conventional alert might be a valuable capability to have, he said, if a crisis erupts somewhere in the world and "you don't have a carrier within a couple of weeks' steaming time." In the absence of overflight rights or forward-basing privileges in the region, "you have to rely on something like the B-2 [to provide the wherewithal for a quick attack]," he added.

For that, the Air Force would like to give the B-2 crews a more sophisticated capability to do mission planning in real time, en route to the target. Such capabilities are being developed and will add a powerful punch to the system, he said.

"Stealth [equipment] is not invisible," Higgins pointed out. "Stealth is low observable. ... We have tremendous dependence on mission planning. We have to know where the threats are; we have to compare those threats with our stealth capabilities and what our vulnerabilities are. [The Link 16, a secure digital data-sharing system planned for the B-2 and many other combat airplanes,] will help us do that." Though "flex" targeting—changing targets en route—was done in Allied Force, none of the 509th personnel were willing to discuss the particulars.

Higgins said an obvious lesson learned from Allied Force is to pursue smaller weapons with more precision. Greater precision in a smaller bomb will allow each bomber on a single mission to hit more targets—possibly as many as 84—with no sacrifice in per-target effectiveness. Most of the explosive effect of a 2,000-pound JDAM is needed to ensure a kill in the event that the bomb falls some distance from the bull's-eye.

"Accuracy means you can use a much smaller warhead and still assure destruction of the target," he said.

The 509th will receive its 20th B-2 a year from now, and the 21st airplane—dedicated to test and assigned to Edwards AFB, Calif.—will be available in September 2002.

"A lot of people were really pleased that we finally got a chance to show what this weapon system can really do," Higgins said of the B-2's combat debut. "I think the American people have some measure of satisfaction that they got their money's worth." ■

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The 51st Fighter Wing still patrols the skies of the Korean peninsula.

BACK TO MIG ALL

Low over the rice paddies and farms near Osan AB, South Korea, this A-10 and F-16 of the 51st Fighter Wing represent the formidable deterrent of US airpower on the Korean peninsula. Tensions between the two Koreas are nearly at their highest state since the armistice was signed in July 1953.

EY

Photography by Guy Aceto, Art Director, and Paul Kennedy

Still photo by Guy Aceto

Staff photo by Guy Aceto

Korea is often called the "land of the morning calm," a description that belies the dangers just over these rugged hills. Osan AB is only 38 miles south of the South Korean capital of Seoul and a mere 60 miles from the border with North Korea.

In the last year, the two Koreas have engaged in several skirmishes, which included fatalities. Despite an economy in collapse and chronic famine, North Korea has been testing intermediate range ballistic missiles and pursuing a nuclear weapons program, all the while spouting threatening rhetoric. Osan, home to 7th Air Force and the 51st Fighter Wing, has all the trappings of a Stateside base, but the sense of being on the "front lines" is never lost on those assigned here.

Staff photo by Guy Aceto

Photos by Paul Kennedy

Nuclear, Biological, Chemical warfare training is mandatory and taken seriously at Osan. Above and right, TSgt. Mike Reed sponges off SrA. Klint Fritz, demonstrating decontamination procedures in one of many specially prepared shelters on base for protection against NBC warfare.

Designed as safe havens in the event of attack, the shelters are stocked with food, water, and communications gear. Those entering must pass through a maze of checkpoints and decontamination stations, to ensure they are "clean." During such exercises, all normal duties around the base must be performed in full chem gear. Practice makes perfect and focus on the mission is evident at USAF's most forward-deployed base—just minutes in flying time from "MiG Alley," as the skies over the area between the Yalu and Chongchon Rivers in northwest Korea were known during the Korean War.

Staff photos by Guy Aceto

The 51st FW includes two fighter squadrons—the 25th Fighter Squadron and 36th FS. The 25th FS flies the A-10, designed in the 1970s to be a potent destroyer of enemy armor. The A-10s fly low over the terrain where they may have to fight, their pilots memorizing every nook and cranny of the South Korean countryside. Above is a specially marked 25th FS "Warthog."

Photo by Paul Kennedy

The 51st FW traces its lineage to World War II, when the 51st Pursuit Group flew P-40s in India. As the 51st Fighter–Interceptor Group, the unit operated from bases in Japan and Korea during the Korean War. The unit settled at Osan permanently in 1971 as one of the guarantors of the cease-fire.

Above, SSgt. Michael S. Bell clears an A-10 to taxi out on a training sortie. At left, a seemingly unlikely pairing—a 25th FS A-10 and 36th FS F-16. The two dissimilar types train together closely for the fast and slow interdiction and close air support missions.

Photos by Paul Kennedy

A $3 million runway renovation at Osan, earlier this year, brought changes in flying training. Osan's A-10s, F-16s, and a U-2 detachment moved to Suwon, a South Korean air force base to the northwest.

The flying schedule was adjusted to account for the bus rides to Suwon, by flight and ground crews alike, but everyone put in long hours to maintain the sortie generation rate. After seven weeks, Osan was back in business. At right, a ground crew pushes an F-16 into a concrete-and-steel protective revetment at Suwon.

At left, an F-16 provides an impromptu desk for a crew chief conference.

Living space at Osan is at a premium, but efforts are under way to upgrade the enlisted dormitories to the new DoD 1+1 configuration. An improved quality of life is a recognized morale booster and sortie generator.

Photos by Paul Kennedy

Force protection takes on a sharp edge at Osan. Defensive strong points ring the base and look more than a little odd adjacent to the golf course and movie theater. Above, SrA. Michael Williams runs an M113 armored personnel carrier from the driver's cupola, while, below, SrA. Kevin Schmuck takes the vehicle's machine-gun station.

Air Force troops from career fields other than security forces also receive training in small arms and defensive tactics to deepen the base's protection in the event of war.

In one of the many defensive positions around the base, left and above, SSgt. Jessica Simon on the .50-caliber machine gun and Schmuck on the M-16 demonstrate readiness for anything.

Staff photos by Guy Aceto

An F-16 pops off flares to distract a heat-seeking missile threat in an exercise. Crews from Osan can get realistic training in many places on the peninsula and also deploy to Pacific Air Force exercises, such as Cope Thunder, for training with a wide variety of US and allied air units.

Capt. Todd Dozier performs his preflight walkaround while crew chief A1C William Harrison keeps an eye on "his" jet. Unlike most USAF pilots, those at Osan know that if they fight, it will be right where they live. Col. Tom Poulos, who was 51st Operations Group commander, said wing airplanes are watched by the North every time they take off. "We're looking at the enemy, [and] they're looking at us—every day."

Photo by Paul Kennedy

Photo by Paul Kennedy

Anyone who joined the Air Force to "see the world" need go no farther than just outside the main gate at Osan. Restaurants and shops cater to personnel at the American air base, which is an anchor of the local economy. Osan's Korean hosts are quite friendly to the airmen and soldiers assigned here, and a taste of the Korean culture is a major benefit of any tour of duty on the peninsula.

Staff photos by Guy Aceto

The 36th FS—the "Flying Fiends"—operate the F-16CG, which is capable of carrying the Low-Altitude Navigation and Targeting Infrared for Night system. LANTIRN is a set of pods mounted under the F-16—one for seeing in the dark, the other for designating targets for laser-guided bombs.

A multirole fighter, the F-16 can perform precision attack, counterair dogfighting, and close air support. At top, a "Fiend" on final approach to Kunsan AB, about 70 miles from Osan. The Osan F-16s often train with fighters from the 8th Fighter Wing at Kunsan. During the Korean War, the 36th was a unit of the 8th FW's predecessor and, as such, was one of the first to see action in Korea.

The Korean War never really ended, and the tentative, 46-year "peace" on the peninsula is an extended cease-fire. For that reason the 51st is constantly ready to head back to MiG Alley. ■

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EQUAL HOUSING LENDER

An Eaker Institute panel weighs the implications of Operation Allied Force.

Another Look at the Air War That Was

By James A. Kitfield

IDENTIFYING the proper lessons of Operation Allied Force will be a difficult task. For starters, it was a complicated war. Campaign planning went on for a year, and actual operations lasted for 78 days. The typical day in the latter stages of the war saw some 500 airplanes taking off from 47 bases scattered across Europe, in all sorts of weather, refueling in mid-air, striking targets or flying other missions, then refueling again and returning, again in all kinds of weather, often at night. Other complications stemmed from American and European political realities, as well as Washington's own determination to avoid casualties.

At a recent colloquy hosted by the Eaker Institute, the public policy arm of AFA's Aerospace Education Foundation, four noted airpower authorities set about the task of drawing some preliminary lessons from a conflict that for the Air Force amounted to a major theater war.

Gen. Michael J. Dugan, USAF (Ret.), a former Chief of Staff, moderated a panel that included Gen. John P. Jumper, commander of US Air Forces in Europe; retired RAF Air Vice Marshal R.A. "Tony" Mason, director of the Center for Studies in Security and Diplomacy at the University of Birmingham, UK; and Edward N. Luttwak, senior fellow at the Center for Strategic and International Studies and a member of the National Security Study Group.

"We heard the word 'victory' used," observed Dugan. "How should we think about victory? There is opinion in the United States that says, 'The battle was never actually joined. It wasn't exactly a war at all. It began without a formal declaration and it ended without complete victory. It had ended not with unconditional surrender but only a cease-fire.' Are Americans so narrow that they only view unconditional surrender as an appropriate end to a war?"

Dugan went on to note, "For the first time in some 5,000 years of military history—5,000 years of history of man taking organized forces into combat—we saw an independent air operation produce a political result. What that means for the future we will still have to divine. ... This kind of utility can do nothing but place greater demands on air and space forces for the future."

The Eaker colloquy revealed that airpower experts are already seriously studying the implications of the very military strategy and operational concept that characterized Allied Force. It was a limited, virtually "air-only" war, fought under severe political constraints by a sometimes unwieldy alliance of 19 NATO nations.

Some Problems

Allied Force marked a dramatic advance in USAF's ability to deliver destructive force with great precision, routinely—even as certain problems were revealed. Glaringly evident, for example, was a widening gap between the capabilities of the US Air Force and its Allies in Europe and Canada. The nation's Electronic Warfare assets were also stretched dangerously thin and could represent a future weak link in force structure.

weather was bad and the terrain was bad, there were many things against us. [The fact that] we were able to do this without the loss of one single airman speaks to the incredible professionals involved, but it also speaks to damn good luck."

All of the panelists generally agreed that the Western governments calculated that Milosevic would fold after a few days of relatively light bombing attacks. They also agreed that the political consensus-building process within NATO severely limited the types and number of targets that could be struck in the early weeks of the war. These two factors seriously diluted the shock effect of the initial air operation, they said.

"I think maybe we went [at] too few targets, with too few aircraft, for almost too long a period," Mason argued. "You had the spectacle of the commander in chief one day threatening to destroy the Yugoslav military, but asking for triple reinforcements over just a couple of weeks, which suggests there were question marks to be raised over initial planning assumptions."

Mason cautioned against drawing the wrong conclusions from the troubled first weeks of the operation. The existence of heavy political constraints that initially hamstrung the air campaign does not necessarily mean that airpower cannot, or should not, be employed in limited fashion as part of coercive diplomacy, he said.

"If we have to operate in a coalition, we have to be prepared for coalition interference," Mason maintained. "You really can't say, 'Airpower don't do coalitions.' ... Let's not reject the concept of airpower in support of, or in cadence with, diplomacy. I don't think that was a mistake. The mistake, I believe, was underestimating the amount of airpower needed to support the diplomacy."

"Our problem with all of this is **we make it look too easy,**" said Jumper. "We set the bar fairly high when we fly more than 30,000 combat sorties, and **we don't lose one pilot.**

It makes it look as if airpower is indeed risk free and too easy a choice to make."

In the view of a number of panel members, the Air Force's increasing ability routinely to hit targets with great accuracy has not been matched by a commensurate understanding of exactly which targets to hit to achieve specific outcomes—what is now called "effects-based targeting."

Finally, a number of panelists saw a trend toward greater emphasis on force protection and casualty avoidance that, if left unchecked, could have troubling implications for the use of US military forces in future conflicts.

"Our problem with all of this is we make it look too easy," said Jumper, who also commands NATO's Allied Air Forces Central Europe. "We set the bar fairly high when we fly more than 30,000 combat sorties, and we don't lose one pilot. It makes it look as if airpower is indeed risk free and too easy a choice to make."

Jumper went on to say, "In an environment where the

Stop Grumbling, He Said

He went on, "The military must respond to political decisions. There is no point, really, for airpower exponents grumbling about escalation or gradualism. If we are going to maximize airpower responsiveness, we will have to turn it on and turn it off. The important thing is to make sure we reach the necessary impact before we turn it off and establish hard-nosed rules for gaps."

Jumper, who was a key airpower advisor to US Army Gen. Wesley K. Clark, Supreme Allied Commander Europe, noted that, after the Washington summit in April, the Alliance reached consensus behind a major intensification of the air campaign, with the end result being that the Serbs ultimately capitulated to NATO demands. He said that military commanders will need to argue persua-

sively for the latitude necessary to accomplish future missions, but he also noted that Coalition wars in the future will likely feature similar political constraints.

"From the air campaign planning point of view, it is always the neatest and tidiest when you can get a political consensus of the objective of a certain phase, and then go about [achieving] that objective with [the] freedom to act as you see militarily best," said Jumper. "[But that] is not the situation we find ourselves in. We can rail against that, but it does no good. It is the politics of the moment that is going to dictate what we are able to do. ... If the limit of that consensus means gradualism, then we are going to have to find a way to deal with a phased-air campaign with gradual escalation. ... Efficiency may be sacrificed. ... We hope to be able to convince [civilian politicians] that is not the best way to do it, but in some cases we are going to have to live with that situation."

Certainly the risks and limitations of coalition warfare were on clear display during Operation Allied Force. To minimize the constraints dictated by political requirements, Mason suggested that allies consider approaching future conflicts not necessarily as an alliance of 19 nations, but rather in a smaller and more united "coalition of the willing."

Luttwak maintained, "The largest dramatic fact is that NATO could have failed. ... When the bombing started, and if Milosevic hadn't moved and hadn't expelled Albanians, I believe two crucial European governments [of Germany and Italy], without which the war could not be pursued, would have insisted on the suspension of the air war. ... If Milosevic hadn't solved the problem for us by sending out the Albanians, this war could have ended and been a fiasco. ... In other words, there were big risks in this war."

A number of panelists were also disturbed by the widening gap in capabilities between the air forces of the United States and its NATO Allies that was revealed during Allied Force. The American forces shouldered the lion's share of the operational burden in areas as critical as Intelligence, Surveillance, and Reconnaissance; command and control; airlift; and Electronic Warfare.

Focus on Targeting

"We know there are two kinds of airpowers—the United States' airpower and ... everybody else's," Mason said. "When we talk about what airpower can do and what airpower can't do, we've really got to decide whose airpower we are talking about. When we look at Kosovo and the air campaign, General Jumper has made some very complimentary comments about the contribution of X number of air forces, but we all know what proportions were done by the United States Air Force. We also know what kind [of] bombs were [dropped] by the United States Air Force.

"Europeans spend over $160 billion a year on defense, and you better ask what you get for it. We spend, for example, less than one-half of the United States on aircraft and less than one-third on R&D. ... Unless we in Europe do get our act together, we are going to finish up as spear carriers to the United States."

There's also a somewhat deeper issue of what the US Air Force is looking for from its coalition partners. How far is the United States willing to go in sharing its technology with Europe?

No one knows for sure which attacks, or combination of attacks, were the most influential in persuading Milosevic to accede to NATO demands. Some—such as Lt. Gen. Michael C. Short, the NATO joint force air component commander—argue that strategic attacks on power grids, broadcasting stations, and bridges brought the war home to everyday Serb citizens and ultimately proved the most effective types of operations.

Others suggest that attacks on Serbian forces massed to counter an offensive by Kosovo Liberation Army forces in the latter days of the war were most important in convincing the Serbian army to relent. The dawning realization that Allied air forces were able to intensify the attacks while suffering virtually no casualties of their own—coupled with the obvious cohesion of the Alliance through 78 days of bombing—may have finally convinced Serbian officials that they could not prevail, said panel members.

Some panelists believed that, if coercive diplomacy and limited war factor into future conflicts, the Air Force will need to have a better understanding of the critical aim points and centers of gravity of potential adversaries.

"The central problem is this: If we are going to make it with this kind of precision airpower in very low volume, akin to acupuncture, we really have to know where to put the needle," said Luttwak. "To make the other guy back down, you must understand his politics, his soul. You can't photograph his soul."

"**I have grown to despise the word 'targeting,'**" said Dugan. "Targeting is a terrific concept for the captain and for the sergeant. In my mind it is not a useful concept for the colonel and the general. They need to be thinking about **what is the outcome of having targeted** and destroyed or degraded or otherwise disposed of this spot on the ground **where somebody puts the crosshairs.**"

Luttwak continued, "The Serbian population forced Milosevic to call the war off when the life of the Serbian population was made very uncomfortable. ... [In the case of Iraq], you cut the bridges in Baghdad, you cut off the power supply, you cut off the television, and you make the population completely miserable, then ... we have made it easier for Saddam Hussein to stay in power by forcing his population into a survival mode." The difference between the Serbs and Iraqis is a matter of culture, he stated. "The US Air Force needs a department of culture."

Effects, Not "Targeting"

Because many of the highest value targets will have dual military and civilian uses and are located in urban areas, they are also likely to prove the most politically sensitive. The accidental bombing of the Chinese Embassy also indicates the risks the Air Force assumes when it relies on other agencies for sensitive targeting intelligence.

Both Dugan and Jumper believe the discussion too often focuses on targeting as opposed to desired outcomes.

"I have grown to despise the word 'targeting,' " said Dugan. "Targeting is a terrific concept for the captain and for the sergeant. In my mind it is not a useful concept for the colonel and the general. They need to be thinking about what is the outcome of having targeted and destroyed or degraded or otherwise disposed of this spot on the ground where somebody puts the crosshairs. Somehow we ought to be talking about the objectives of this when we get in public and are trying to explain ourselves."

Within Air Force ranks, the issue is referred to as effects-based targeting, and it has emerged as a hot topic of conversation. "Effects-based targeting has to be the objective of the air campaign planners, as opposed to campaign by target-list management, which means that you take a list of approved targets, and you sort of manage them on a day-to-day basis," said Jumper.

Effects-based targeting is a sophisticated target analysis, he said, that ties destruction of targets and critical nodes to desired outcomes measurable in hours, days, and weeks. "That assumes that you have the freedom to go after all those targets in a near simultaneous way, and the political sensitivities to one or two of those targets might disrupt the whole plan," said Jumper. "We have to find a way to get the political consensus behind the effect, rather than focused on the target."

Few have argued with the premise that Allied Force created a new benchmark in air warfare. During 78 days of operations, NATO conducted 35,000 sorties with a nearly 99 percent accuracy rate in precision strikes and zero friendly combat casualties. In the process, the US Air Force demonstrated that it had made a quantum leap in its ability routinely to put ordnance on target with great precision.

One obvious advance over the force that carried out Desert Storm in 1991 was the ability to get nearly real-time targeting intelligence into cockpits. "We are getting one hell of a lot better," said Jumper. This time, for instance, he noted, "We had U-2s [reconnaissance aircraft] that allowed us to dynamically retask to take a picture of a reported SA-6 [surface-to-air missile site], beam that picture back to Beale AFB [Calif., command and control center] for a coordinate assessment within minutes, and have the results back to the F-15E as it turned to shoot an AGM-130. ... It wasn't all like that, but that is the capability we demonstrated more than once."

Through the Clouds

Another major advancement was represented by the extensive use of the Predator Unmanned Aerial Vehicle. Especially on the many days of bad weather and low cloud cover, Predators were able to loiter under the cloud ceiling and identify mobile and camouflaged targets.

"You have to remember that the Predator [program] only in April of 1999 delivered its first fully operational system. ... From 1994 until 1999 we had the system deployed in Bosnia with preproduction equipment," said Jumper. "What we can say here is we were just able to conclude a very extensive test and evaluation over the skies of Kosovo."

Jumper was especially impressed by the UAV's potential in actually designating targets with onboard lasers. "[The idea is to] put the UAV below the clouds with a laser spot and drop the laser bomb through the clouds," he said. "We were just about to start doing that with a laser-equipped UAV when the war ended. ... We will put the UAV much more in the targeting loop than in the collection loop."

Indeed, the day may be dawning when the Air Force is able to seamlessly combine information from U-2s, UAVs, and other ground- and space-based sensors. "We will be where we need to be in the ISR world when we have transparent linkages ... among our platforms," said Jumper. "When the amalgamation of these and the product of these sensors are presented in a way that ... is in targetable, quality data, that is when ISR will have come of age."

Until that time, Jumper conceded, the Air Force will have problems hitting mobile targets in bad weather.

Perhaps the biggest shortfall glimpsed in the Allied Force air campaign, however, concerned Electronic Warfare assets that were reportedly stretched precariously thin. That prompted more than one panelist to second-guess the Air Force's decision to phase out the EF-111 Raven escort jammer and rely almost exclusively on the Navy's EA-6B Prowler.

"I was uneasy and said so, and wrote so, when I heard of the decision. ... I was even more uneasy when I saw this small number of US Air Force crews to be cross-trained into the Prowler," said Mason. "I assumed—and I still hope I wasn't entirely wrong—that somewhere there was a [classified] UAV program existing to make up for the deficiency. I believe that deficiency in Kosovo was particularly significant."

Dugan said that, after reviewing the matter recently, he concluded that the dearth in Electronic Warfare assets may be the unintended consequence of personnel decisions made nearly a decade ago.

EW in Trouble

"I have been spending a few days with [the] Air Force Scientific Advisory Board here in the past month or two, looking at the intersection between stealth vehicles and electronic combat," said Dugan. "After listening to a lot of briefings and doing a little bit of thinking, it seemed to me that electronic combat in general and the Raven program

"Milosevic really wanted [NATO] to get into ravines and into gorges," said Mason. **"He really wanted to relive** the Serbian situation **[fighting the Nazis] in the 1940s again."**

in particular got in trouble—probably on my watch—in 1990, ... when we did not replace a couple of the senior officers both in the acquisition community and in the operational community that looked at the contribution of electronic combat to the warfighting output. ...

"There was nobody at the table to argue [for electronic combat]—and there is a huge debating society that argues priorities and argues relative importance and argues for ideas and for resources. ... The natural consequence of that was for the resources to go away, and we've made a serious misstep. I don't know how to build that back."

While endorsing a fundamental reassessment of the Air Force's needs in Electronic Warfare, Jumper cautioned against preconceived answers. "Do we have to take a look at this again?" asked Jumper. "The answer is yes." He added, however, "The focus has to be on the best way to get airplanes or the platforms in and out safely in a high-threat environment. Is it defensive systems that you put on board the airplanes? Is it a combination of stealth and defensive systems? Or is it the sort of offensive electron-bashers that are represented by the [Prowler], and formerly the Raven, community? We have to reopen [the debate] and re-ask ourselves the question. ... The answer is not necessarily another platform."

Another question some panelists felt needed to be asked is whether casualty avoidance and force protection have been elevated as operational goals to the point that they have a major negative impact on mission accomplishment. The United States is misdirecting huge amounts of defense resources on such assets as ground forces and Apache helicopters, Luttwak suggested, if it will not use them for fear of casualties.

"I was under the impression that I paid for Apaches with my taxes so when they wanted to go and hit these armored vehicles, I wanted the Apaches to go into action," said Luttwak. "When they told me they couldn't send them into action because they might get shot down, I had no sympathy for that." He added, "At the political level, on the other hand, something new: The rule is that Americans can kill themselves bungee jumping, skydiving, and canyoneering, but they are not allowed to kill themselves in the country's interest."

By causing the US to assign a disproportionate amount of assets to Suppression of Enemy Air Defenses and forcing pilots to fly at relatively high altitudes, Mason argued, the focus on avoiding casualties is having a real impact on operational effectiveness.

"It looks to the outside that consequently SEAD drew a disproportionate amount of shooter sorties, priorities further emphasized by the conscious decision to seek zero casualties," he said. "I know it is very easy for me to sit here a long way from the F-16 squadrons and bang on about casualties. Force preservation must be a major concern for any commander. My own view is that, if St. George's first priority with tackling dragons had been force protection, I don't think he would now be the patron saint of England."

Mason said, "It [the conduct of the war] gave an impression to the world at large that an unfortunate minimum of civilian casualties was an unavoidable and acceptable feature of a war waged for humanitarian causes, but the loss of professional military aircrew was not. That was the unfortunate impression that was given." Even so, said Mason, "There is obviously nothing dishonorable in seeking to minimize one's own casualties. I am somewhat at a loss, if I may say so, when I see some military formations apparently still thinking in terms of putting very large numbers of troops on the ground, regardless of national inclinations in their area or direction."

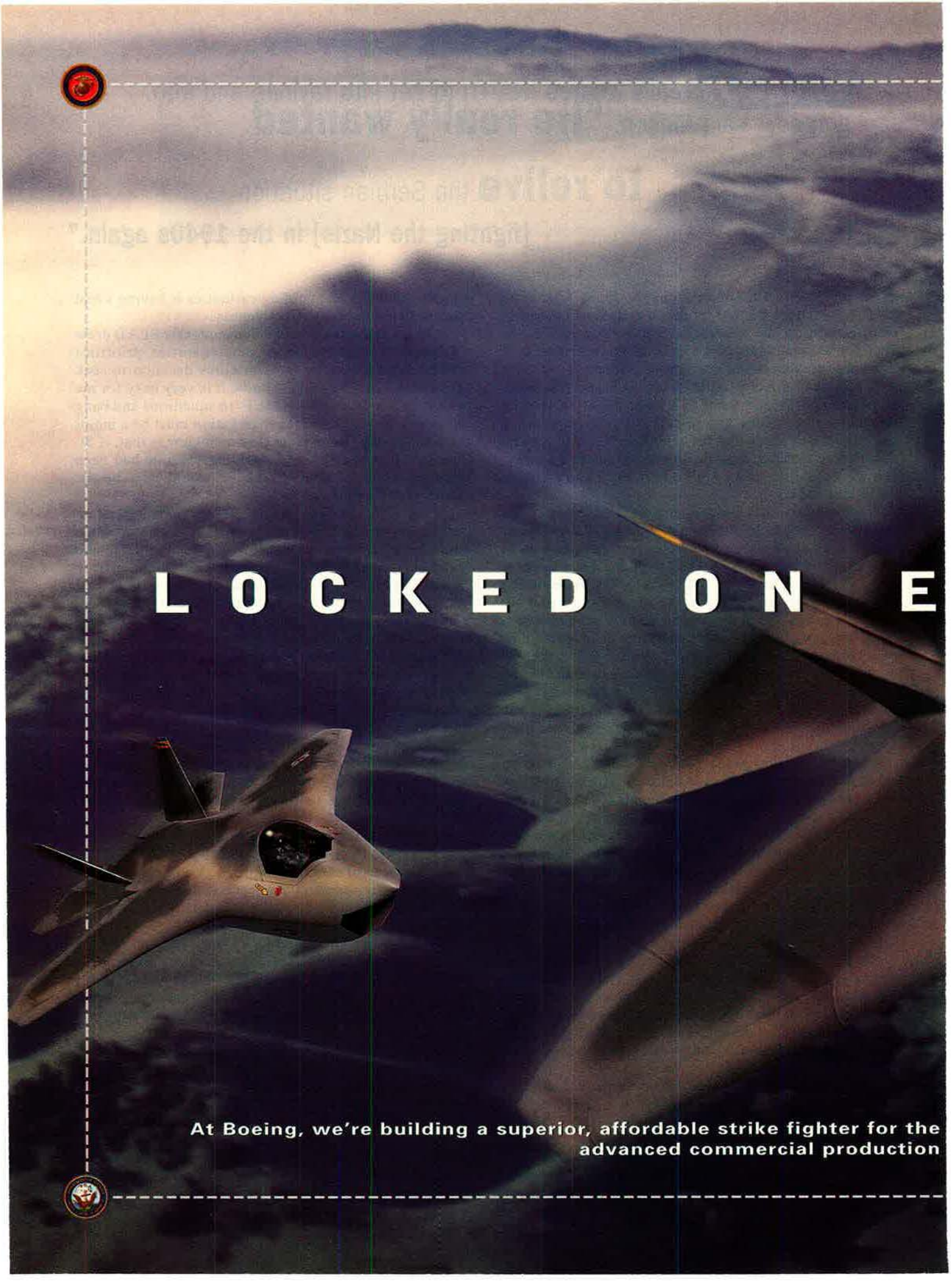
As many saw it, the overriding lesson of Allied Force and other recent conflicts was that modern airpower as wielded by the Air Force has become an indispensable tool in shaping the battlespace to the United States' advantage.

As Mason summed up the situation: "Back through Desert Storm, through Bosnia, and to Kosovo, you can identify a series of common themes. ... You have airpower shaping an environment, you have it denying an opponent the strategy of his choice, and imposing our strategy and capitalizing on Western advantages."

"Milosevic really wanted [NATO] to get into ravines and into gorges," said Mason. "He really wanted to relive the Serbian situation [fighting the Nazis] in the 1940s again." Instead, airpower was able to ultimately achieve Coalition objectives, he emphasized, even while minimizing casualties.

He added, "In a society like yours and ours, which sets a high premium on individual life, it seems to me to be a very noble aspiration to seek a way of war which not only reduces our casualties to a minimum but reduces the opposition's casualties to a minimum as well." ■

James A. Kitfield is the defense correspondent for National Journal *in Washington, D.C. His most recent article for* Air Force *Magazine, "The Midnight Crossing," appeared in the July 1999 issue.*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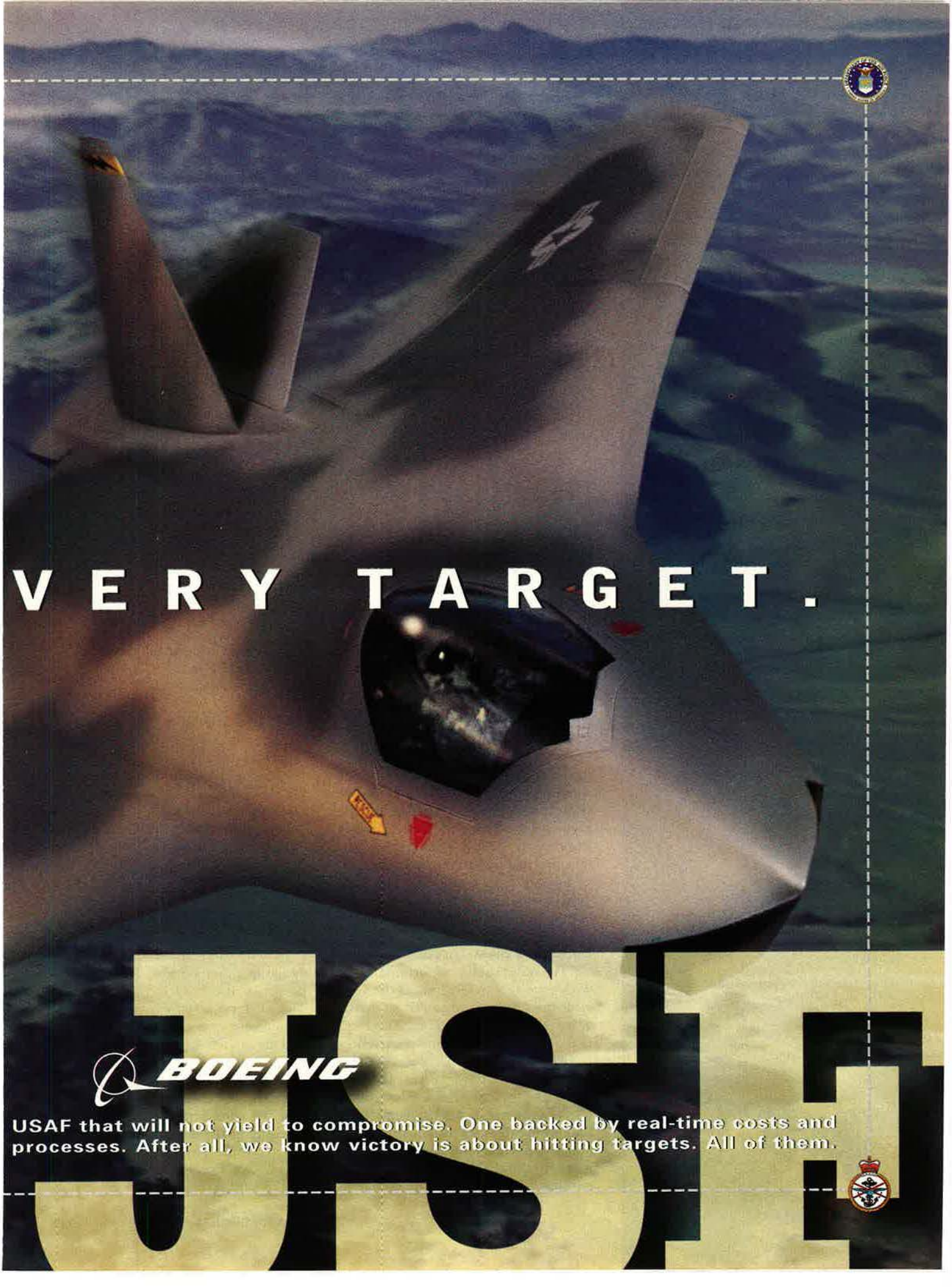
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In his confirmation hearing, the new Secretary of the Air Force answered an array of questions from Congress.

Whit Peters on the Issues

F. Whitten Peters is the 19th Secretary of the Air Force, having been confirmed in that post after serving as the acting Secretary for nearly two years. On July 21, 1999, Peters appeared before the Senate Armed Services Committee. Following are excerpts from his answers to questions asked by panel members.

The Global Fighter Problem

"The technology exists in the world today, in the Su-35 and some of the other [former] Soviet airplanes, which were sold around the world, to defeat the F-15. And, in fact, five years from now in a contest between the F-15 and an Su-35 in the hands of a competent pilot, the F-15 would be shot down. The F-15 would not be able to see the Su-35 before it was shot out of the air. That is the problem that we have. We have aircraft which are today at parity but five years from now will be at a disadvantage."

Emerging SAM Threats

"The other really important threat, which we saw in Kosovo, is the very widespread distribution of sophisticated air defense systems. The F-22 is the only aircraft that we currently have in inventory which, unassisted, can take out an SA-10 [Surface-to-Air Missile] or an SA-12 without itself being in grave risk. And I think that's the threat we are most worried about. Those systems are on the world market, they're available for sale, and have been sold in places like—Cyprus for example just bought SA-10s—They're in places like Iran. So that threat is out there."

F-22 and JSF Synergy

"There has been much discussion ... about whether the Joint Strike Fighter could perform the same role [as the F-22], and the answer is, it really cannot.

"The Joint Strike Fighter is affordable in large numbers because it is optimized for the air-to-ground role. That doesn't mean that it can't shoot down other airplanes. It can. But by comparison, the Joint Strike Fighter will carry two air-to-air missiles. The F-22 will carry six, even when it is carrying other bombs. So, the firepower of the F-22 is much greater. The altitude at which the F-22 can effectively operate is much greater, and the maneuverability at altitude is much greater.

"So, for all of these reasons if we were to take F-22 out of the inventory we would be looking at a massive change of direction, it seems to me, on Joint Strike Fighter, at least on the Air Force piece of the Joint Strike Fighter."

The F-22 Assumption

"All of the tactical air—not only Air Force, but Navy and Marine fix-winged air as well—is built around the assumption that we will have an aircraft like the F-22 10 to 15 years from now which can operate in a very high-threat environment in the very early days of any conflict. ...

"Serbia [was] able to track and fire upon an F-117 aircraft, one of our stealth aircraft, you know, our first-generation stealth. F-22 brings fourth- or fifth-generation stealth to the battlefield. Coupled with its very high speed and its ability to operate at very high altitudes, it is much more defensible against the modern air-to-ground threat that the Soviet Union has created and which is readily available in the world market."

The B-2 and Other Bombers

"We continue to see the B-2 as an absolutely critical platform. As you can see from what happened in the war, it has the capability to strike from the United States to anywhere around the globe, and it has the capability to strike very precisely. Indeed, the JDAMs [Joint Direct Attack Munitions] that came off the B-2 were among the most precise weapons we can drop.

"We see that as an absolutely critical capability in future warfare. We also need the B-1 and the B-52 to follow up. In the early days of the war, when we need to get the tight spots and you need to get into a defended environment, the B-2 and, ultimately, the F-22 are the two platforms that can do that."

Pilot Retention

"One of the few bright spots [regarding] the retention and recruiting field that we have is that we are, in fact, retaining about 43 percent of our pilots who are coming up for the first time for the bonus. We have had no trouble recruiting pilots, even though we have gone to a 10-year active duty service commitment. My sense is that the greatest problem we have with all of our forces, and particularly pilots, is the optempo, that going to EAF [Expeditionary Aerospace Force] will help that.

"The other problem we have is that the pilot bonuses stop at the 14-year point, and all of a sudden people are leaving at the 14-year point. We need to restructure that bonus, in our view, so it goes through the colonel level, [the] O-6 level, and continues out to at least 20 years. ...

"The difficulty we have is that you can be forced out of that by too much work and too little pay. So everything we can do to even out the optempo, which is what we're working on, and increase the pay to be more competitive, helps pilots stay."

Anthrax Vaccination

"It [opposition to the vaccination program] is, in fact, a very important problem. It's really our problem to educate our forces on the anthrax vaccine. We think that anthrax is one of the most lethal threats we face. It has been weaponized, and we know it is deployed in about 10 countries around the world. Our view is that it is unconscionable to allow our pilots and aircrews to fly into those countries, which are high-threat countries, without being inoculated against anthrax, just as we would inoculate people against smallpox.

"We have not gone into this without great thought. ... We believe that it is, in fact, a safe vaccine and that our burden is to convince all of our fine pilots and aircrews and men and women in the Air Force, and particularly the air component, that it is both safe and effective and there is a need. I think people understand that if you get anthrax, ... you are effectively dead."

Pay, Benefits, Retention

"When we survey Air Force men and women who leave the force, inadequate pay and inadequate retirement benefits are always high up on the list of reasons that they have left the Air Force, so certainly one of the best solutions—in fact, the best solution—to recruiting shortfalls is to retain more of our highly trained and highly skilled men and women."

The Two-War Force?

"I think everyone has agreed that what we did in Kosovo was equivalent to a single Major Theater War. The impact of that on our forces is, first of all, to tire people out and, second, to tire equipment out. Much of the equipment we had over there had some deferred maintenance with it. Another thing that happened was we were required to shut down a fair amount of training, actually. So we need a period of time to get our people back up to the level they need to be.

"Now, having said that, during the time in Kosovo, one of the reasons we did the Stop-Loss order was to make sure that we could operate, essentially, simultaneously in Kosovo, Southwest Asia, and Korea if it came [to] that. And we do have forces that we basically lock down at their home base so that they can stay trained and ready so that if we had another MRC [Major Regional Conflict] we could, in fact, respond."

Few in Number, Ridden Hard

"One of my continuing concerns is that we have these things called low density–high demand assets, like the U-2. And the pilots of the U-2 are never home because today it is not two Major Theater Wars we usually do. It is global surveillance in five, six, seven locations simultaneously. And we will not be able to afford enough Joint STARS [Joint Surveillance Target Attack Radar System aircraft] to do that.

"So, we need to start looking at other platforms which are consistent with the optempo of the people who have to fly them, or work with them, [that] can give us this kind of global awareness capability. That's why I had thought the Discoverer II program was an important science and technology program to look to see if we could do that in space affordably. We are also [looking] at UAVs [Unmanned Aerial Vehicles] to see whether they could be used to supplement Joint STARS."

Stress on the F-117

"The -117 community is really one of the hardest-tasked communities we have. Those pilots tend to be away from home—I suspect this year it will be over 200 days. We really don't have a current substitute for F-117, and ... it is really a weapon of choice because it can operate very early in a battle area when the IAD [Integrated Air Defense] system is still up and running.

"We have a long-term solution in our view. [It] is the F-22 and Joint Strike Fighter, both of which can take on some of the roles that the F-117 has today, and obviously the B-2 has now taken some of the role as well. But for now, we are trying to look for ways to use those other

forces, but I think it's only really probably a long-term solution. ...

"I think the EAF construct will help somewhat on that, but because of the uniqueness of that asset, it will be difficult."

Expeditionary Aerospace Force

"We need to get there [to the EAF format]. Gen. [Michael E.] Ryan and I ... set Oct. 1 of this year as the point where we're going to go into a full expeditionary aerospace structure, which means that we will take our force and divide it into roughly 10 pieces, and that people will be on rotation [with] those 10 pieces, kind of like a carrier battle group or one of the Marine Corps expeditionary groups.

"The purpose of that is multifold. One is to make sure that people are trained for the area in which they are going and, second, to make sure that people can get a much more stable and predictable life. And ultimately, it will allow us to reduce optempo, we believe, as we demonstrate we can get out there and do the work and then come home. Key components of that are C-17 and satellite communications, all the things you saw us use in Kosovo, where we actually set up 14 expeditionary bases, from the Budapest airport to tent cities in Aviano to tent cities in other spots in Italy."

More Fighters, Troops

"We are going to move out as EAFs number one and two on the first of October, and this is really an experiment to make sure we kind of know what we're doing. Then, the first of January, EAF three and four will move out.

"Right now, there are no real financial barriers to doing this. Ultimately, there is going to be a cost, and we realize as we've done this that we are going to need some additional equipment. We started to purchase an additional F-16 Block 50s, which is one of the costs. We see we need additional manpower, which will be another cost, but, at this point, there is no barrier to moving out."

C-130J Program

"Nobody wants the demise of the C-130J program. We clearly need to buy -130Js at some point, and we clearly need to avoid shooting ourselves in the foot by allowing the line down there to close. But as I say, we have been pushing very hard on Lockheed. I have personally met with Lockheed, I guess, over the last 20 months, a number of times to say, 'Look, there are no international sales. This is all I can afford. You'd better get your act together and be able to run at a profit on what we can afford.' And I think they pretty much got in there. ... We now are where we think we can really try to work a program with Lockheed that is affordable, if you look at Navy, Marine Corps, Coast Guard, and all the other requirements for the -130. And that's really now the next issue: to try to work that out."

The C-130X

"We need to move to a common configuration of the C-130 aircraft, which we call the C-130X. That is basically an aircraft with a completely new electrical system and digital avionics. That program will go into its first engineering contract later this year. Ultimately, we see that we will put those avionics modernization items into all those C-130s which still have life left in them. A C-130 has a lifetime of over 30,000 hours, and most of them are not over 20,000 hours to date. So we foresee having 400 or 500 in the current fleet, in that modernization profile. We also see buying the -130J to replace those aircraft which are really too far gone to warrant being improved."

Slighting Space?

"We have had studies for the last 10 years [on] how to do space. I finally put together a team and said, 'Go out and read all the studies and tell me what we actually should do. Let's go do something and stop studying it.'

"Over the period since the Berlin Wall fell, our budget has gone down about 40 percent, but our space budget has gone up 3 percent, at the same time that tac air, lift, housing, and everything else has gone down by 40 percent. So I think it is not fair to say we have a program which has favored nonspace activities. Space is, in fact, I believe, our only single growth area in terms of total budget expenditure."

Space Based Lasers

"We doubled our contribution, and we worked with BMDO [Ballistic Missile Defense Organization] to double its contribution to Space Based Laser in the '00 budget to try to come up with a program which our technical people, our outside advisors, tell me was an executable program. ... What we tried to put together, in discussions with folks on the Hill who care about this a lot, was a program which was executable and which in my view would produce technology that would be more closely akin to what could actually be fielded.

"I know that there are views up here that we should go another way, and that is try to move faster with what we currently have and then do the development afterwards. We certainly are willing to listen to those views."

Air and Space Integration

"We need to look hard at the organization of our personnel in space. I think many in the Colorado Springs [Colo.] area [where US and Air Force Space Commands are located] are very attracted to a separate space force, but General Ryan and I feel it is actually more attractive to the nation, and more attractive to those men and women, that we integrate them with the rest of the Air Force. We've been trying very hard to do that.

"We've had an aerospace integration program ongoing for over a year. One of the early fruits of that program was the ability to target [Serbian targets] right off of Predator video, which required us to merge Predator video with national satellite data, moving electrons up and through space very quickly to be able to actually target what the Predator was seeing in a matter of minutes—or, indeed, seconds, by the time we really got it up and working.

"So space, in our view, is one of the places that we need to be working. It needs to be integrated with a few other components."

USAF the Key in Space

"We have 90 percent of the people in DoD and in national defense in general who work in space. We spend 85 percent of the budget that is spent on national security space, and with [the National Reconnaissance Office], our partner, we spend about 95 percent of the budget that has been spent on space. Both NRO's budget and our budget, as I said, have been increased in a time of general declines. There's no question that the future lies in space for many applications." ■

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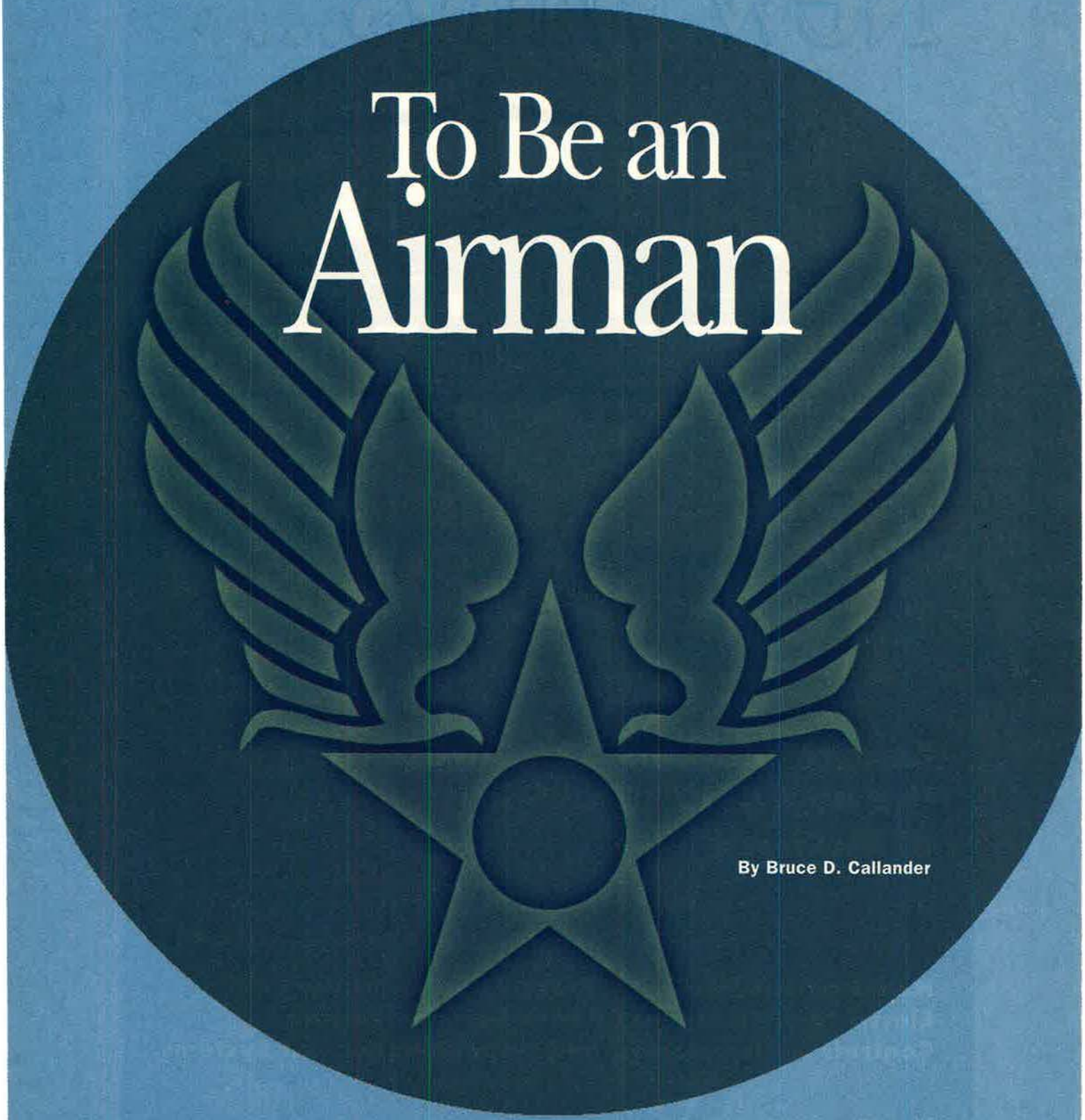

By Bruce D. Callander

Newly commissioned Air Force officers, despite having just completed years of academic and military training, are being sent back to school. This time, their objective is to learn what it means to be "an airman."

During 1999, more than 1,000 second lieutenants will attend the four-week Aerospace Basic Course under Air University at Maxwell AFB, Ala. The Air Force hopes that, by the Year 2002, it will be able to send all new officers to the school, along with selected civilian employees.

The course, unique in AU's catalog, is designed to teach the students where they fit into the Air Force and where that service fits in among the nation's other armed forces. The curriculum is weighted heavily toward USAF's Core Values and Core Competencies and reinforced with problem-solving exercises, wargames, computer simulations, and simulated joint operations.

An obvious question is why new officers, including those coming directly from the Air Force Academy, should need yet another course in being officers.

The answer, said Lt. Col. Douglas R. Lengenfelder, ABC commandant, is that the course is intended as a leveling process to focus officers from various commissioning sources on a common goal. "Even though an individual may get a fair amount of this information in the academy and other officer training courses," he said, "those teach at the knowledge level. We teach at the comprehension and application levels. So, even if they may have heard the terms, how they are expected to use the information has changed considerably."

Roots of the Project

The idea of a basic training course for officers had its roots in a series of reports on the state of the force. In 1989, an internal USAF study, titled "A View of the Air Force Today," found a growing concern and frustration among service members. In 1994, Carl H. Builder, a researcher at RAND, issued another report, titled the *Icarus Syndrome*, that drew on the earlier study and pinpointed specific causes for the problem.

Builder said that the contributing factors included the air arm's long infatuation with technology, narrow "occupationalism" of members, and the lack of an overarching service vision.

USAF leaders took both reports seriously, but, at the time, they had even more fundamental problems with which to deal. Gen. Merrill A. McPeak became Chief of Staff in October 1990 and presided over a major restructuring and consolidation of the force. During his tenure, the service began implementing a new philosophy known as "Global Reach, Global Power," but the main emphasis was on managing the post–Cold War drawdown and preserving the effectiveness of the surviving force.

In October 1994, when Gen. Ronald R. Fogleman became Chief, he shifted the focus to some of the internal problems that had begun to appear. During his tenure, the Air Force emphasized personal accountability for members' actions, laid down a list of Core Values, and defined Core Competencies (things the Air Force does—or is expected to do—best). Fogleman emphasized a "back to basics" approach.

The 1996 Corona Conference of senior USAF leaders also took a critical look at the force and found a number of shortcomings. One was that young officers lacked an understanding of core values, core competencies, and the importance of teamwork. They were too preoccupied with their own careers, the leaders concluded, and had little appreciation for the role of aerospace power in joint operations.

Needed, the conferees agreed, was a training program, similar to the Marine Corps Basic Course, to indoctrinate new officers with the culture of the Air Force.

The following year, Fogleman ordered Air University to set up a single test course to explore the possibilities. Called the Air and Space Basic Course, it ran seven weeks and trained 312 new officers representing all commissioning sources and a variety of Air Force specialty codes.

The results were encouraging, and the Corona Conference of 1998 approved the training as part of the Professional Military Education package for officers.

Its length and name now shortened, the four-week Aerospace Basic Course is scheduled to run two classes this year and train 1,014 students. AU plans to bring in seven classes in 2000, nine in 2001, and enough in 2002 for all newly commissioned officers. Lengenfelder said he expects the current faculty of 24 to roughly double over the same period.

Not unexpectedly, the ABC curriculum is built around the now-familiar core statements. The Core Values—"integrity first, service before self, and excellence in all we do"—are the subject of a "Little Blue Book," which the Air Force supplies to members. The Core Competencies—"air and space superiority, global attack, rapid global mobility, precision engagement, information superiority, and agile combat support"—speak more to the attributes the service itself is trying to attain or maintain.

Translating such concepts into

academic subject matter is not easy, Lengenfelder observed. "There is a difference between living Core Values and just reading them," he said.

Working Through Scenarios

To make the point, the course uses a variety of tools, from simulation to role-playing. One example the colonel likes to cite is a digital video disk titled "What Now, Lieutenant?" It presents a number of hypothetical problems and requires the student to work through scenarios to a solution.

Lengenfelder explained, "Let's assume you pull up a scenario in which a young lieutenant says, 'I think it's wrong that my wing commander won't let me hang glide. It's my time and my body and I do it on the weekends. This isn't fair.'

"Then he starts going through a decision matrix where he's gathering information. He can click on his peers, his boss, his wing commander, and the [judge advocate general]. He keeps learning more information. If he gets to the end of the scenario and doesn't like the answer, he can back himself out of the decision tree and go down another branch, re-explore, discuss, and work through it again.

"There are no right or wrong answers, but we want them thinking about these questions. In this scenario, the officer finally clicks on the wing commander, who says, 'We've lost three people already to hang gliding. We deploy in another month and I can't afford to lose another person and I'm ordering my troops not to hang glide.' So now the lieutenant starts thinking not just how this affects him or her but how it affects the team and the Air Force. We push team really hard in our course. We have no individual awards. The only thing we reward in our course is team."

Like any college-level course, ABC encourages students to study related materials. It draws on reading lists approved by the Chief of Staff and has worked up another specifically for newly commissioned officers. This last list includes Builder's *Icarus Syndrome* and three works by historian John Keegan which examine historic battles and commanders. Other books cover subjects as wide-ranging as the evolution of warfare and the Linebacker II offensive of the Vietnam War.

Students also receive lists of recommended movies including everything from contemporary films ("Top Gun" and "The Right Stuff") to World War II films ("The Battle of Britain," "Tora, Tora, Tora," and "Patton") to history epics ("Gettysburg," "Glory," and "Braveheart").

Eye Exercises

"This is a visual generation," Lengenfelder said. "If there is a movie out there that has a demonstration of Core Values or Core Competencies, we recommend they watch it. Even though it may not come out and say, 'This is about integrity first' or 'You are going to learn about service before self,' they're still learning and dealing with these issues as they watch these movies. We're trying to get them to think about these tough issues before they, as officers and senior civilians, have to deal with them."

A third list includes computer wargames normally sold for entertainment. "If there is a commercial off-the-shelf wargame that teaches Core Competencies," said Lengenfelder, "we recommend they play it. In fact, we use some commercial off-the-shelf software in class to teach several of the Core Competencies."

Course officials insist they provide a good workout for the students' minds and allow them to make their early mistakes without paying the penalties of erring in actual combat. Like the movies, the wargames cover both history ("Red Baron 2" and "A Bridge Too Far") and contemporary combat ("Total Air War" and "M1 Tank Platoon 2"). The student can experience Pickett's ill-fated charge at Gettysburg, command an armored unit in Desert Storm, or traverse centuries of geopolitical history, from 3000 B.C. to the future launch of colonists to a distant galaxy ("Civilization II").

ABC is more than videos and computer games, however. A substantial part of the curriculum involves developing mock war plans and then applying them in simulated combat. The idea here is to help young officers understand their roles in the Air Force and USAF's responsibilities in joint-service and international operations.

As Lengenfelder said, "Our course uses the building-block approach. We start out with foundations, where we give them a little theory, doctrine, and strategy, but the real concentration is on what it means to be an airman. We also talk about what the Air Force brings to the joint warfighting table.

"Then, we move to forces, functions, and Core Competencies. Here, we bring in the Navy, the Army, and the Marines, and we let the students know the strengths and weaknesses of each of the services and what each brings to that joint warfighting partnership. We talk about the importance of having different forces, but, again, what we really stress is, know your business and what it means to be an airman. And, when they think they understand each of the Core Competencies, we make them wargame them. We use simulations extensively in our program so that they understand how to use those attributes."

Lengenfelder went on, "Our final wargame is called Blue Thunder. What they do there is a full joint aerospace operations plan. They have to work through all the phases of planning an actual war, including analysis, picking targets, and making sure that national security strategy is met. And, having planned it, they war-fight their plan in the field."

Jump Out

The three-day Blue Thunder exercise is a mixture of reality and virtual reality. Students are in battle dress and occupy tents set up at Maxwell. One recent class was "flown" to the site by an Air Force Reserve unit on the base. "We stuck them in a C-130," said the colonel, "flew them around the pattern for a while and did an engine-running off-load right into our deployed location. Then, we started the war."

If the war is synthetic, it has the feel of the real thing, said Lengenfelder. "We have simulated attacks on the base with machine guns that are run off propane and that sort of thing. They hear the attack going on. They're required to respond according to wing operations check lists and standard operating procedures. They learn what sort of forces are brought to bear when there's an airplane crash or an attack on the field or even something such as a riot or a demonstration outside the gate.

"They don't deal with every problem perfectly, but we want them to

have an understanding of the big picture. What does it take to get our mission done? Who really makes this happen? They learn the significance of civil engineering, the security forces, the hospital, and how all of these different organizations interact to make our mission work. It isn't just airplanes and pilots."

The rest of the warfighting is largely done by simulation. In the process, AU hopes, the students will develop a greater appreciation for where aerospace power fits into the community of forces and where they, individually, fit into the overall picture.

The course puts heavy emphasis on the "airman" as the basic element of the force. That term has been used narrowly in the past, officials admit, usually to mean any enlisted member but sometimes to identify one in a specific enlisted rank. Only rarely has it been applied to officers, too. The Air Force would like to use it as the generic term for all USAF members, including members of the Guard and Reserve, and, in the broad sense, civilian employees.

In effect, this would make it the USAF equivalent of the Army's soldier, the Navy's sailor, and the Marine Corps' Marine.

Some years ago, the Air Force began speaking of its members as "warriors" and trying to develop the concept that not just aircrews, but all of them, are fighters. To underscore the point, units had members wear battle dress uniforms to work and operate under simulated field conditions. Again, the results were spotty, but the term "warrior" now appears at a number of points in the ABC course material.

Producing warriors may be a tall order for a course dealing with everybody from future fighter pilots to civil engineers and administrative officers, but ABC has one important thing going for it: Most students are just beginning their careers. Those marked for rated specialties, for example, will attend ABC before going to flight training. Others may already be selected for various support jobs but, as yet, most know little about the demands of their specialties.

Big Picture First

"We give them the big picture first," said Lengenfelder. "Then, when they go off and learn their specialties, they understand the significance of what they do and how that fits into the Air Force mission."

The aim is to get the young officers to think of their service as something more than an occupation. "We emphasize that rather than looking at it just as a job," the colonel said, "they should think of it as a profession or even in the concept of a calling."

Because the new officers come from different commissioning sources—Air Force Academy, Officer Training School, and Reserve Officer Training Corps—some presumably might be more receptive to this idea than others. In fact, studies of the first test class to take the course confirmed that there were some differences as the officers began their training. Interestingly, however, tests among the same officers as they finished the course showed that their attitudes had become more similar.

The study also asked graduates for their reactions. Most were positive. As one officer put it, "The greatest strength was getting to meet people from different commissioning sources. Also, all the things I 'blew off' in ROTC, I actually learned here and I think I'll even retain most of it."

Another said, "As a support officer, I now feel much more qualified to articulate the objectives and capabilities of my service."

A third said, "There was no Distinguished Graduate program. This was good because the environment inspired teamwork and unity instead of just competition."

The graduates also were asked to cite course weaknesses, and most focused on the lectures as being too long and repetitious. By contrast, a number praised the less traditional tools, particularly the interactive CD-ROM, and the Blue Thunder exercise.

Youth in the Saddle

One strength of the course may be that many of the instructors are not much older than the students. The teaching positions call for captains, but because of USAF–wide shortages in that grade, the school has substituted lieutenants in many of them. The teachers attend a four-month training program that stresses how younger people learn today. Students and teachers alike are comfortable with using videos and interactive wargaming, the colonel said.

What the course does not cover, said the commandant, is politics. "We don't discuss whether we can use weapons in space or things like that," he said. "What we do is say, 'Here are the current laws and here are some future things that you'll probably see.' Congress already has authorized the military to look into developing weapons in space. And, so, we're having them think about it but we don't get into the morals issue with space.

"Along those same lines, not only do we teach a futures block in our course but we give them future weapons systems to wargame with. Within Blue Thunder, they actually get to 'use' an airborne laser and other advanced weapons. Some still are being developed but, eventually, they are going to come online. If that's 10 years from now, that's not when we want these folks to start thinking about them. We want them thinking about them today so that they're ready for tomorrow's Air Force."

How well the training works may not be immediately evident, said Lengenfelder. "The value of our course probably won't even be seen until maybe 15 years down the road," he said. "It could start around the 10-year point, when they start having to deal with joint issues and being able to deal with what the Air Force does in terms of the joint area and our national security.

"I would hope that it would help them do their jobs better now because they have that big picture," said Lengenfelder. "I would hope that they are more effective officers. But the real value comes when, let's say 10 years from now, they're planners at a joint table and have got all the different colors around the table. Somebody has to sit there and explain why we do the things we do. I would hope that, by then, these officers would have been thinking about that for most of their careers." ■

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In the fierce competition for the spectrum, the armed forces are up against broadcasters, cell phone users, satellite link operators, and many others.

the battle for BAN

By Theresa Foley

PENTAGON officials call it "the lifeblood of the battlefield," but they are not referring to fuel, water, food, or any other traditional commodity. Rather, they are talking about the electromagnetic spectrum—the range of natural radiation used by radios, radars, televisions, and the like to send signals over vast distances at lightning speed.

Information systems undergird today's dominant American military, and anything that threatens access to the spectrum generates immediate and serious concern.

However, the electronic spectrum is a finite resource, and it has become precious. The United States military, as one of the world's most voracious consumers of the spectrum, increasingly finds itself battling a formidable foe—a spectrum-hungry commercial telecommunications industry eager to expand its range of services and increase profits.

In this war for the spectrum, the stakes are high. The civilian economy has been pitted against the needs of US national security, with the Defense Department fighting on the political and regulatory front to assert its rights to large swaths of the spectrum. Asserting its own claim is a coalition of business interests comprising major satellite, broadcasting, and cellular telephone associations in Washington, D.C.

The commercial sector argues, with considerable success, that its claim to spectrum access is as compelling as that asserted by the armed forces. Its spokesmen maintain that US firms need access to greater and greater portions of the spectrum to foster telecommunications growth and indirectly fuel the modern global economy.

A Crowded Arena

Spectrum issues are complex, involving federal auctions, international regulators, and technical coordination of hundreds of systems operated by users of every imaginable sort. DoD has been forced to square off against social and economic interests as diverse as the American Indian lobby, emergency 911 services, and Africans who want satellite-delivered radio programming.

Few are more familiar with the problem than Col. Richard Skinner, a USAF officer serving in the office

of Arthur L. Money, the senior civilian official named to be assistant secretary of defense for command, control, communications, and intelligence. "DoD [realizes] the importance of access to spectrum," said Skinner. "People want wireless technology. They want multiple phones, [and] wireless computers that operate at high speeds. It is generating tremendous demand for spectrum."

To no one's surprise, Congress has become deeply involved in the dispute, with some members lining up behind the Pentagon and others taking the side of commercial business interests.

Hear the words of one senior Congressional staffer who is sympathetic to the DoD cause and involved in spectrum issues on a daily basis: "It's essential to protect military access to frequencies. ... The current process has resulted in short-term fiscal considerations taking priority over national security and led to the long-term loss of taxpayer investment."

This person warns that, if industry aggressively expands into spectrum bands that are to be shared with the military, then commercial users eventually will complain about interference from the military systems, and the Pentagon will be ordered to stop operating those systems. He pointed out that, in California, civilians forced the Navy to stop using some radars close to the coast. Reason? Aircraft radar signals had the unintended effect of opening garage doors and messing up cordless telephones. Residents complained.

DoD and commercial interests share the spectrum in countless areas. Civilian cellular phones share bandwidth with DoD radar and satellites. Commercial satellites in virtually all bands, in current use and planned for the future, share the spectrum with DoD satellites and military radar. Satellite home television services use the same band as the Pentagon's new Global Broadcast System.

The Defense Department has "nearly 900,000 spectrum dependent systems," according to a DoD report to Congress setting out the military's spectrum requirements. Although many of the details of DoD spectrum usage are classified, systems generally include communications, radar, electronic combat, and navigation. Additionally, spectrum access is needed for training, testing, security, and fire control at military installations.

A single military fighter aircraft will carry many systems dependent on the spectrum. The list could include:

- Radar altimeter
- Joint Tactical Information Distribution System
- Global Positioning System
- Instrument landing system
- Fire-control radar
- Electronic warfare systems for jamming or detection of enemy radars

The range of the spectrum required for one platform is broad. The more systems carried, the more intense the need for the spectrum. As DoD platforms have become more complex to support the need for more mobility and precision in operations, the chance for radio interference with systems has gone up, further complicating the problem of sharing or agreeing to reallocation of the spectrum to commercial users.

Keeping a Distance

As DoD's report to Congress

stated, "Our forces must have enough spectrum to allow multiple systems on multiple platforms to operate on frequencies far enough away from each other to prevent mutual interference."

More advanced military systems have even higher spectrum requirements. Designing new systems with technological advances to use the spectrum more efficiently, and thereby reduce the need for the spectrum, or to share the spectrum, raises design costs, causing another problem for DoD planners.

DoD's dependence on the spectrum became clear during the Gulf War in 1991 and in operations in Bosnia in 1995.

"The massive military machine that won the Gulf War could not have functioned without unfettered access to the RF [Radio Frequency] spectrum," noted DoD's report to Congress. "Gulf War operations used nearly every major military RF system in the US arsenal." The report implied that the US moved right away to destroy Iraqi systems that might impede or compete with US use of the spectrum.

Operations like the rescue of downed USAF pilot Capt. Scott F. O'Grady in Bosnia, and subsequent sustained military airstrikes against Bosnian Serb positions, resulted in a sharp upswing in the intensity of US spectrum usage. "The success of [the O'Grady] rescue mission might very well have been [thwarted] without ready access to the spectrum required," said the Pentagon report. "Future rescue missions will require similar resources."

More recently, effective spectrum management turned out to be a major challenge in NATO's military operation in the Balkans. In the view of Skinner, the problem was the sheer number of systems expected to work together. "There are all sorts of opportunities for interference that is unintentional," he explained, noting that there could be conflicts between two military systems or between a military and a commercial system. Interference occurred during the Kosovo operation, but it was resolved without any serious damage, according to Skinner.

The Pentagon's attempts to assert dominance on spectrum matters coincide with a boom in the wireless telecommunications industry. Cellular telephones, satellites, and terrestrial wireless services for broadband, Internet, and other uses all are growing at astounding rates. These powerful commercial interests also require new spectrum access to expand, with future growth having a direct impact on the US economy.

What DoD Won't Say

Industry officials complain that the Pentagon refuses to spell out what it needs in terms of future spectrum assignments. "DoD either won't tell people, or they don't know what they need the spectrum for," said an experienced consultant to several major satellite firms. "It's problematic for commercial operators to not interfere with them on shared bands."

GPS and its spectrum assignments are frequently at the center of controversy. In 1997, a block of European countries led by Britain made an attempt to change GPS spectrum allocations, with London proposing to international regulators that some spectrum used by GPS be turned over to commercial use. The move caught Washington off guard, and ultimately Secretary of State Madeleine Albright had to personally intervene to convince the Europeans to back off, according to industry sources.

DoD first became seriously concerned about commercial encroachment on its spectrum in 1993. In that year, Congress decided to auction off spectrum access to commercial users to bring billions of dollars into government coffers. Much of the spectrum made available for auction to the private sector had formerly been allocated to DoD, and the military was forced to move out of some bandwidths.

Doing so has a high cost, said Money. Precisely how much, he could not say. In 1993, it cost the Pentagon between $247 million and $1.2 billion to carry out the spectrum reallocation in the 235 megaHertz area. In another case, a 1997 Congressional reallocation smacked the Pentagon with $436 million to $2.5 billion in unanticipated costs.

Money said DoD and US taxpayers should not have to bear those costs. "There is an essential need to balance the national security needs of the nation with commercial interests when considering spectrum reallocation," Money contended to Congress. "A national blueprint for future spectrum reallocations could mitigate impacts to the department. For example, if reimbursements of displacement costs were mandated, commercial entities gaining spectrum access would incur the reallocation costs instead of the department and the American taxpayers."

In testimony to the Senate Armed Services Committee, Money pointed out that spectrum access is essential to gaining the kind of information superiority that wins wars. "Furthermore, there are future threats. Physical threats to the United States are probably going to be more and more low observable. ... As the low observable ability of [an] object gets lower and lower, you need more bandwidth to, in fact, detect it."

Money conceded that new modulation techniques and other technology advances would allow more sharing of the spectrum, but he said that "the department desperately needs [the spectrum allocated to it]," or DoD will incur higher costs and degradation of weapon system performance.

Warner's Gambit

The issue of sharing, and who would have priority, came to center stage this spring. Sen. John Warner (R–Va.), chairman of the Senate Armed Services Committee, proposed a measure to give DoD priority access to frequency bands in the United States. If approved, the bill would have changed the way the spectrum has been allocated in the US for decades. Today, spectrum allocation is handled by the Federal Communications Commission and the National Telecommunications and Information Administration, with 93 percent of the spectrum between 30 mHz and 300 gigaHertz shared by federal and nonfederal users.

A chorus of loud protests ensued, with opponents charging that Warner's provision would give DoD a superprimary status in all shared bands where they operate. The commercial companies would have been denied access to some frequencies. For others, the uncertainties about sharing would have discouraged commercial usage. DoD was portrayed as using heavy-handed tactics against the telecommunications industry.

In August, a Congressional conference committee changed the provisions to try to get more coopera-

tion among defense and nondefense spectrum users and eliminated provisions like the one that would have forced commercial firms to pay for interference with military systems. Spectrum sharing and reallocation promises to remain a controversial issue.

"In a lot of bands, DoD is a secondary user," said Clayton Mowry, executive director of the Satellite Industry Association, part of a coalition of seven commercial associations that protested the move to give DoD favored status. "We think it is critical for any new law to encourage sharing. Legislation that takes away any incentive for DoD to share spectrum or work out interference problems will hurt the development of new commercial satellite systems. Ultimately, we think the Pentagon will become a major user of those commercial satellite systems."

In the meantime, conflict between military and commercial spectrum users continues to grow. In June, FCC Chairman William E. Kennard wrote to members of Congress opposing the Warner provision that would give DoD more spectrum power. The White House also sent letters establishing the official Administration position as maintaining the status quo in how allocation is managed; it would not give DoD an elevated status.

In the Balanced Budget Act of 1997, Congress called for slicing out and making available at auction another 15 mHz of the federal government's spectrum. DoD has been asked to give much of the blood in this effort. (A more recent version calls for 12 mHz to be reallocated.)

Actual interference cases also are on the rise.

Overlapping Signals

A dispute has run for many months between WorldSpace, a commercial satellite operator, and the Defense Department. WorldSpace wants to use a three-satellite constellation to broadcast radio programming to billions of people living in poor, remote parts of Africa, Asia, and the Americas. The frequencies chosen by WorldSpace for its broadcasts are essentially identical to those that the Defense Department uses for range telemetry.

WorldSpace has raised more than $1 billion to pay for its fleet of three

Conflict on the Electromagnetic Spectrum

Military Uses	Competing Uses
4400–4990 mHz	
fixed wideband communications	fixed satellite service
mobile wideband communications	general wireless communications
command links	public safety
data links	
3100–3650 mHz	
high-power mobile radars	multipoint distribution system
shipboard air traffic control	wireless local loop
missile links	fixed satellite service
airborne station keeping	
2200–2290 mHz	
guided missile telemetry	personal communications system
DoD satellite tracking, telemetry, command	wireless local loop
point-to-point microwave	multipoint distribution system
1755–1850 mHz	
point-to-point microwave	personal communications system
DoD satellite tracking, telemetry, command	multipoint distribution system
air combat training systems	
tactical communications	
tactical data links	
1435–1525 mHz	
telemetry supporting aerospace industry	digital audio broadcast, land
	digital audio broadcast, satellite
	Mobile Satellite System
1215–1390 mHz	
long-range air defense	Mobile Satellite System
medium-range air defense	Global Positioning System
radio navigation	general wireless communications
air route surveillance radars	wind profiler radars
tactical communications	
test-range support	
air and fleet defense	
drug interdiction	
Global Positioning System	
remote satellite sensors	
nuclear detection	
420–450 mHz	
ballistic missile surveillance radars	auxiliary broadcast
ballistic missile early warning radars	commercial mobile radio service
shipboard early warning radars	biomedical telemetry
airborne early warning radars	wireless local loop
missile flight termination	
air vehicle flight termination	
air vehicle command links	
troop position location	
anti-stealth radar	
foliage penetration radar	
400.15–401 mHz	
Defense Meteorological Satellite Program	Mobile Satellite System
225–400 mHz	
tactical air data links	little Low Earth Orbit satellites
tactical air/ground data links	public safety
satellite communications	digital audio broadcast, land
military air traffic control	commercial mobile radio service
search and rescue	
executive communications	
tactical communications	
138–144 mHz	
tactical air data links	little LEO satellites
tactical air/ground data links	public safety
land mobile radio	

satellites. One of them, called AmeriStar, would hover in a fixed position above the Western hemisphere and cover the Americas. Some of its beams would cover the US, posing what DoD has deemed as a serious risk to telemetry collection.

WorldSpace operates in the L-band, in frequencies 1467 through 1492 mHz. According to the Pentagon, 86 important flight test centers use the same frequencies to collect data on military and civil aircraft, missiles, and Unmanned Aerial Vehicles. Some 50 programs, including the B-2 bomber, C-17 airlifter, F-22 fighter, Joint Strike Fighter, and Global Hawk UAV would be affected.

"Billions of dollars in delays are likely as programs reconfigure and reschedule telemetry use," charges a Pentagon assessment of the problem.

DoD has broken off negotiations with WorldSpace after failing to reach an agreement to "deconflict" the spectrum usage, and WorldSpace's AmeriStar satellite has been placed in storage until a technical solution can be reached that will not interfere with the military operations.

Kennard, the FCC chairman, and the Defense Department also clashed over spectrum access that Kennard wanted to use to bring better telecommunications service to Indian reservations in the American southwest. In pursuit of that goal, Kennard wanted to use a fixed wireless spectrum band, 3400–3700 mHz, but it is already used by the Air Force's E-3 Airborne Warning and Control System aircraft radar and various Navy radars.

Kennard wanted DoD to share the spectrum. Skinner, the Pentagon official, said DoD agreed to an experimental license to demonstrate a system to a limited number of terminals. However, Nortel, a big telecom firm, has asked for frequency allocation to serve far more than the initial 200 terminals. The service no longer looks temporary or experimental to the Pentagon, and DoD, according to Skinner, "has to go back, analyze this, make a judgment, and decide based on technology and policy whether the license ought to be granted."

The concern is simple enough. "Eventually," said Skinner, "you get pushed out of the bandwidth. Every time AWACS flies and someone's telephone doesn't work, it will generate a lot of complaints, even though we are primary users [of that particular frequency]."

A new emergency service called E911, which lets the rescue personnel know where a caller is, would incorporate Mobile Satellite System and GPS satellite receivers into the same equipment. Skinner said as long as the low-powered GPS signals aren't overpowered by noise from the nearby MSS bands, this initiative would be great. Commercial global mobile telephone handsets from Iridium and Globalstar will operate at a frequency just above GPS, which did bring up military concerns of interference, but they seem manageable.

Ultrawideband Radar

More recently, a technology called ultrawideband radar, a low-powered radar that has found a use in commercial systems, has raised concerns about interference with GPS signals. Ultrawideband radar is used for detection and ranging, but in the most simple terms, it has found its way into a stud finder device to help carpenters and homeowners to determine the precise location of two-by-four studs in walls by locating nails hidden in covering wallboard.

Skinner said the technology and devices are new and unlicensed, and a debate has begun about what might happen to GPS signals when a large number of them are being used, covering a lot of the bandwidth.

The loss of spectrum access and the lack of standards are some of the most pressing issues facing DoD as it prepares to fight in a modern day digitized military engagement, said Mary Ann Elliott, president and CEO of Arrowhead Space and Telecommunications, Inc., of Falls Church, Va. "The loss of spectrum impacts [DoD] investment in equipment and technology which they have today and will have a major impact on future budgets which must meet the costs of replacement telecommunications equipment. The lack of standards and interoperability between the numerous proposed broadband systems will create havoc in the future."

Skinner said that he expects to see additional commercial attempts to raid the areas of the spectrum currently used by DoD. Notably, the next-generation cellular telephone, being developed under an initiative known as IMT–2000, needs a large chunk of continuous spectrum on a worldwide basis, and either broadcast or military radar frequencies could be targeted for use.

Skinner warned, "The competition for spectrum will be keen, and we need to figure out how to protect national security and critical services. We will have to migrate some services to a higher frequency, but that is not a panacea. ... We will try to cooperate, but in cases where we don't have an alternative, where the cost is high to move to another part of the spectrum, or where there's a high impact on users, we will make clear ... the kind of damage spectrum allocation will do." ■

The Spectrum, in Brief

Visible light is one form of electromagnetic radiation. Others types include radio waves, microwaves, infrared radiation, ultraviolet rays, X-rays, and gamma rays. Collectively, these forms of radiation make up what is known as the electromagnetic spectrum.

These components of the spectrum have a basic similarity: All travel at 186,000 miles per second—the speed of light. What makes each unique is its wavelength, which is directly related to the amount of energy that the waves carry. The shorter the wavelength, the higher the energy.

The colors in visible light represent only a very small portion of the total spectrum. On one end are radio waves whose lengths are billions of times longer than those of visible light radiation. On the other end of the spectrum are gamma rays. These have wavelengths millions of times shorter than those found in visible light.

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Valor

By John L. Frisbee, Contributing Editor

Crisis in the Cockpit

The copilot, John Morgan, had two alternatives: pull the plug on a wounded friend or fight him for control of the stricken B-17.

Even after receiving a Medal of Honor, presented here by Lt. Gen. Ira Eaker, Lt. John Morgan returned to flying combat missions over Germany.

At mid-1940, with war raging in Europe and the United States sure to become involved, it looked as though John C. Morgan was never going to be an Army flier. The 6-foot-2-inch, 210-pound Texan had been classified 4-F by his draft board as a result of an earlier accident in which he had broken his neck. But the Royal Canadian Air Force, more interested in willing warriors than in medical history, welcomed Morgan into its pilot training program. A year later, he was in England, wearing the RCAF uniform but flying bombers for the Royal Air Force.

In May 1943, Morgan transferred to the US Army Air Forces as a flight officer and was assigned to the 92nd Bomb Group's 326th Squadron, based at Alconbury, UK. Sixty days later, on July 28, Morgan sat in the right seat of a B-17 as copilot for 1st Lt. Robert Campbell, a huge, muscular Mississippian, as they climbed out over the North Sea and headed for Hanover, Germany, and one of the most remarkable bomber sorties of the war.

Before the bomber stream reached the Dutch coast, it came under heavy attack by Luftwaffe fighters. The intercom of Morgan's airplane was shot out, the tail, waist, and ball turret guns ceased firing, a cannon shell shattered the windshield on the copilot's side, and a machine gun bullet struck pilot Campbell in the head, splitting open his skull. Campbell, semiconscious and in a crazed condition, fell forward, locking his arms around the control column.

Morgan knew that if the B-17 dropped out of formation it would be easy prey to German fighters. Flying with his right hand, he dragged Campbell off the controls, holding him back in the pilot's seat with his left arm. The wounded pilot continued to fight instinctively for the controls as Morgan maneuvered back into formation. He now had two alternatives: pull Campbell's oxygen mask off, which, at 26,000 feet, would have been fatal to the wounded man, or fight the crazed pilot for control of the B-17 as long as his strength lasted, hoping that another crew member might come up to the cockpit and help. He chose the latter alternative.

Once again enemy fighters came in. As they pulled up over the riddled B-17, the top turret gunner fell to the floor, one arm shot off at the shoulder. The navigator, Keith Koske, unable to apply a tourniquet, got the gunner into a parachute and pushed him out the lower hatch, believing correctly that the minus 50-degree Fahrenheit cold would stop the bleeding. The gunner survived, was cared for by German surgeons, and was repatriated in late 1944.

The navigator, bombardier, and engineer were aware from the B-17's erratic flight that something was wrong in the cockpit, but all were too busy fighting off attackers to leave their stations. For two hours, Morgan held formation, all the time fighting to keep the irrational Campbell off the controls. Finally, after bombs away, navigator Koske came up to the cockpit and, though shocked by the grisly scene, helped Morgan get Campbell out of the pilot's seat.

As the formation let down over the North Sea, the gunners Morgan had believed to be dead appeared on the flight deck. Their oxygen system had been knocked out in the first fighter attack and they had been unconscious until the bombers descended to lower altitude. Campbell died minutes after Morgan landed the battered bomber at an RAF base near the English coast.

On Dec. 17, 1943, Lt. Gen. Ira C. Eaker, commander of Eighth Air Force, presented Lt. John C. Morgan the Medal of Honor in recognition of his heroic acts over Germany that July day. Eaker directed Morgan to fly no more combat. But Morgan decided that if the war was not over for the Allies, it wasn't over for him. He volunteered for several more missions, including the first Berlin raid of March 6, 1944. On that day, Morgan's war against Nazi Germany came to an end. His B-17 was shot down and he remained an unwilling guest of the Luftwaffe until V-E Day.

Morgan must surely be the only draft-classified 4-F to serve with the air forces of three nations, fly 26 combat missions (he says it really was only 25 and a half) with the RAF and the AAF, earn this country's highest decoration for valor, and spend 14 months as a POW. No American who survived World War II paid his dues more fully than that tough, tenacious Texan. ■

First appeared in January 1984 issue.

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

Russia's armed forces underwent more organizational changes during the past year. A new plan assigned the military districts a new status. There are now six operational strategic commands related to the military districts:

- Southwestern Operational Strategic Command (related to the North Caucasus Military District)
- Western OSC (Moscow Military District)
- Northwestern OSC (Leningrad Military District)
- Central Asian OSC (Volga–Ural Military District)
- Siberian OSC (Siberian Military District)
- Far Eastern OSC (Far Eastern Military District)

In the event of hostilities, the military district commander in each district would have operational control of all military personnel in each command, including those of the Border Troops and other "power" ministries, aside from forces directly subordinate to the President: the Strategic Rocket Forces, Air Armies (strategic and transport), and Airborne Troops.

The General Staff would exercise overall coordination and direction. This new operational responsibility is in addition to the military district commander's coordinating administrative and logistical responsibilities for all forces. The new plan would give him operational control of forces during peacetime exercises and training, as well.

In June 1999, after the end of NATO air operations in Kosovo, Russian forces conducted a strategic command and staff exercise, West-99, on a scale not seen since 1985. Command structures of five of Russia's military districts and three of the four fleets participated, as well as the Strategic Rocket Forces. Belarus defense forces also took part. Defense Minister Marshal Igor D. Sergeyev stated that Russian military doctrine would change as a result of NATO's military operation in Yugoslavia.

Russia's President retained control over the power ministries (which have their own military troops) and Ministries of Foreign Affairs and Justice. Overall direction of Russia's military forces was provided by the Security Council, a body chaired by the President. There were five permanent council members: the President, Prime Minister, Secretary of the Security Council (who was also the director of the Federal Security Service), and Ministers of Foreign Affairs and Defense. Other members included the Directors of the Federal Security Service, Foreign Intelligence Service, Federal Border Guard Service, and the Ministers of Internal Affairs and Civil Defense and Emergency Situations.

Armed forces under the Ministry of Defense consisted of four military services: Strategic Rocket Forces, Air Forces, Navy, and Ground Forces. Their authorized personnel strength totaled 1,200,000. A general officer in the General Staff complained that while the Ministry of Defense forces were being reduced, military units of other power structures increased, and their cumulative strength totaled 3,500,000. The situation throughout the armed forces remained grim. "Untouchable reserves" of supplies, meaning those for wartime use only, were used to help meet current needs. Only one-third of the weapons in the armed forces were considered modern. The Russian military–industrial complex continued to develop state-of-the-art precision weapons but only in the experimental design and testing stage, not production. Aleksey Arbatov, a Duma member, said the state "is almost completely oriented toward strategic nuclear forces for maintaining the nuclear shield. There are no funds left for anything else."

Strategic Rocket Forces (RVSN), had 10 of the new SS-27 Topol-M missiles operationally deployed in 1998, up from two deployed at the end of 1997. In 1998, the Strategic Rocket Forces acquired strategic anti-ballistic missile launchers from the transfer of Air Defense Forces assets into the Strategic Rocket Forces and Air Forces. At the same time, military space forces and missile space defense forces, including satellites for communications, navigation, and intelligence, and systems for obtaining and processing information, became less effective due to lack of funding.

Air Forces (VVS) acquired airborne early warning and control aircraft and SA-5, SA-10, and SA-12 Surface-to-Air Missile launchers from the consolidation of Air Defense Forces into Air Forces and Strategic Rocket Forces, a process that was completed in late December 1998. Throughout the year, more than 30 air regiments were disbanded, resulting in the elimination or movement to reserve status of more than 600 aircraft. The MiG-23 fighter inventory was removed from operational service, and the inventories of MiG-29 and Su-27 fighters were reduced. As a result of the reduction in aircraft units, the newly merged Russian Air Forces was able to distribute spares and place additional aircraft into operational units. This improved the dismal operational service rates from lows of 30 to 40 percent to more than 80 percent for tactical aviation, 70 percent in strategic aviation, and approximately 50 percent for transport aircraft. Reductions in the SAM inventories made the SA-5 and the SA-10 the backbone of the Russian Air Forces' SAMs and eliminated the older SA-2s and SA-3s from operational service. Work continued on the creation of a coordinated air defense system. **Airborne forces,** reserve forces directly subordinate to the Supreme High Command, were to be

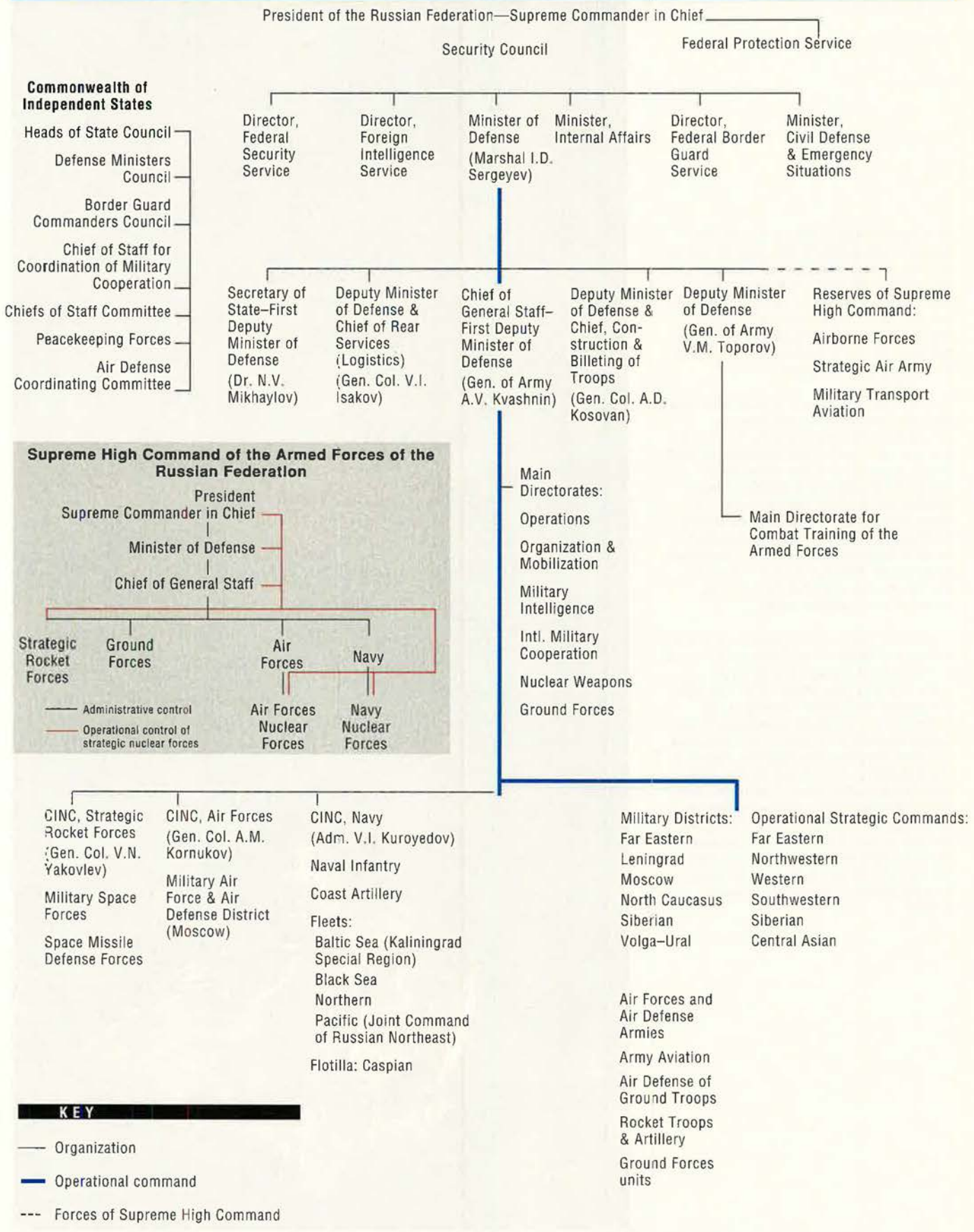
ncreased from to 32,000 to 37,600. As Russia's only mobile forces, they served as peacekeepers in a number of hot spots on the Russian rim, such as Abkhazia and South Ossetia, and with the United Nations. In June 1999, an advance party of 200 Russian airborne troops made an unexpected push into Pristina airport in Kosovo to serve as peacekeepers.

Navy (VMF). Currently in production are two new-generation nuclear-powered submarines: the *Severodvinsk*, the first of the new-generation attack submarines, and *Yuriy Dolgorukiy*, the first of the Borey (*Arctic Wind*)–class fleet ballistic missile submarines. In 1998, joint conventional forces were formed in Kaliningrad and the northeast (Kamchatka) and were subordinated to Baltic or Pacific Fleet commanders, respectively. This was done in order to provide greater protection to these two geographically isolated areas.

Ground Forces (SV) Main Directorate was subordinated to the General Staff when its head became a deputy chief of the General Staff in December 1998. The Main Directorate for Combat Training of the Armed Forces remained subordinated to a deputy minister of defense. Four motorized rifle divisions and three separate motorized rifle brigades of the Ground Forces were considered combat ready. Twenty divisions and 10 brigades were manned at from 10 to 50 percent of wartime strength. Personnel strength of the Ground Forces consisted of approximately 360,000 troops, including forces deployed for peacekeeping duties outside Russia. Conscript training was minimal.

Photo by Paul Kennedy

Structure of the Russian Armed Forces
As of July 27, 1999



Lineup of Russian Aerospace Power, 1998

Strategic Forces

Includes deployable Russian and deactivated Ukrainian strategic forces.

800–Intercontinental Ballistic Missiles
SS-18 (RS-20): 180. SS-19 (RS-18): 160. SS-24 (Silo) (RS-22): 54. SS-24 (Rail) (RS-22): 36. SS-25 (RS-12M): 360. SS-27 (RS-12M2): 10.

113–Long-Range Bombers
Tu-95 (MS6) Bear-H6: 33. Tu-95 (MS16) Bear-H: 56. Tu-160 Blackjack: 24.

90–Medium Range Bombers
Tu-22M Backfire: 90.

20–Tanker Aircraft
Il-78 Midas: 20.

368–Submarine-Launched Ballistic Missiles
SS-N-18 (RSM-50): 176. SS-N-20 (RSM-52): 80. SS-N-23 (RSM-54): 112.

22–Strategic Ballistic Missile Submarines
Delta-III (Kalmar): 11. Delta-IV (Delfin): 7. Typhoon (Akula): 4.

100–Strategic Anti-Ballistic Missile Launchers
ABM-3 (SH-11) Gorgon: 36. AMB-3 (SH-08) Gazelle: 64.

Air Forces

910–Fighter–Interceptors
MiG-25 Foxbat: 10. MiG-29 Fulcrum: 200. MiG-31 Foxhound: 320. Su-27 Flanker: 380.

550–Ground-Attack Aircraft
MiG-27 Flogger: 60. Su-24 Fencer: 295. Su-25 Frogfoot: 195.

200–Reconnaissance/Electronic Countermeasures Aircraft
MiG-25 Foxbat: 40. Su-24 Fencer: 150. Tu-22MR Backfire: 10.

20–Airborne Early Warning and Control Aircraft
A-50 Mainstay: 20.

425–Aircraft of Military Transport Aviation
An-12 Cub: 45. 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: 220. Tu-134/154 Careless: 15.

2,400–Strategic Surface-to-Air Missile Launchers
SA-5 (S-200): 200. SA-10 (S-300P): 2,100. SA-12 (S-300V): 100.

Navy

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

60–Bombers and Strike Aircraft
Tu-22M Backfire: 60.

55–Fighter–Interceptors
Su-27 Flanker: 30. Su-33 Flanker: 25.

35–Fighter–Attack Aircraft
Su-24 Fencer: 35.

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

270–Anti-Submarine Warfare Aircraft
Be-12 Mail: 25. Ka-25 Hormone-A: 50. Ka-27 Helix-A: 85. Il-38 May: 35. Mi-14 Haze-A: 20. Tu-142 Bear-F: 55.

135–Helicopters
Ka-25 Hormone: 15. Ka-29 Helix: 30. Ka-31 Helix: 5. Mi-6 Hook: 10. Mi-8 Hip: 35. Mi-14 Haze: 40.

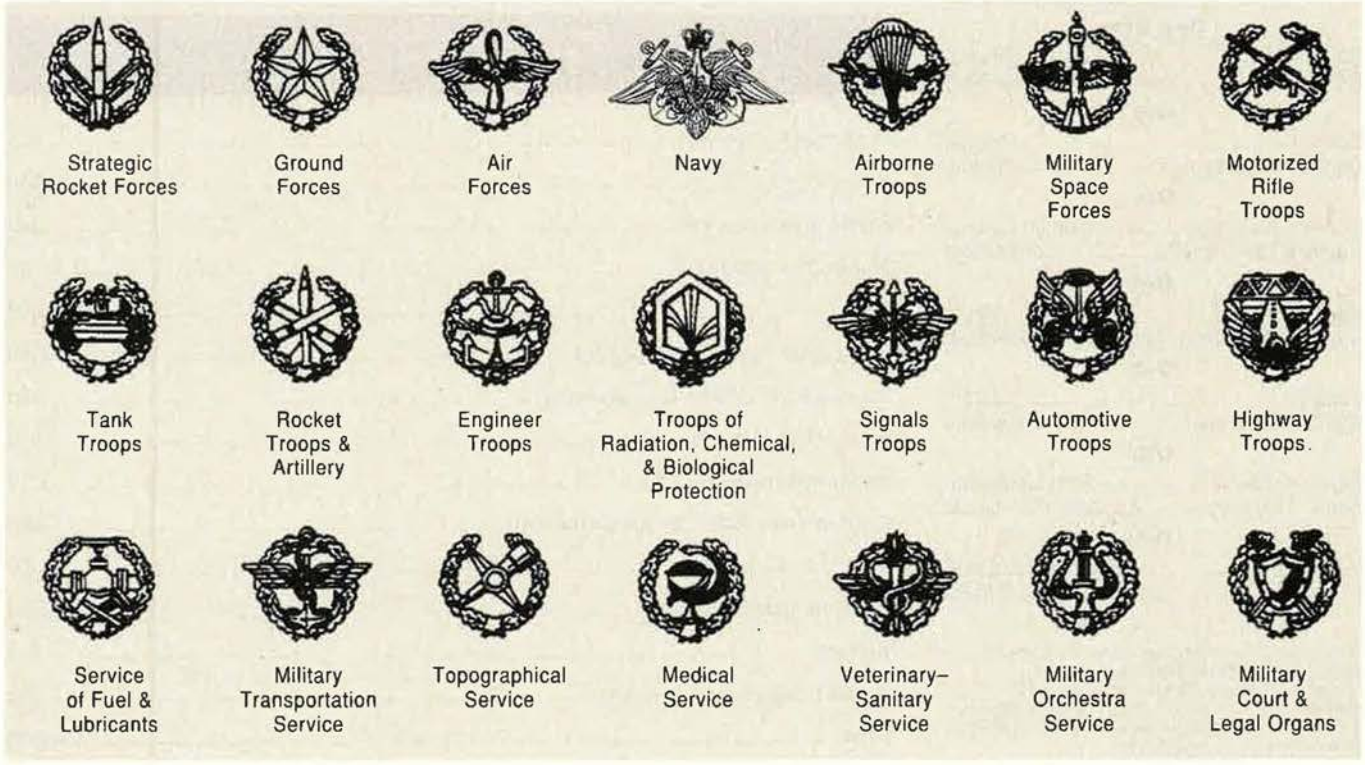
Russian aviation was restructured in 1998. Three commands—the Strategic Forces, Air Forces, and Air Defense Forces—were merged into two. The Strategic Forces and Air Forces survived, but the Air Defense Forces disappeared. Our table reflects the changes.

The Strategic Forces absorbed all medium-range theater bombers and aerial tankers (formerly part of the Air Forces) and the 100-launcher Moscow ABM system (formerly part of Air Defense Forces). The Air Forces picked up all strategic SAMs, interceptors, and airborne early warning aircraft (formerly part of Air Defense Forces).

The merger eliminated more than 30 air regiments and 30 SAM regiments. More than 600 fighter–attack and interceptor aircraft were scrapped, used for parts, placed in reserve, or otherwise taken out of active service. The aviation structure of the Navy was unchanged.

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.



AP photo / Amal Emric

A US soldier (left) converses with a Russian counterpart at a Russian checkpoint in Sapna, Bosnia, in the long-running Bosnian peacekeeping mission. Every NATO nation has been taking part in the mission, as well as 20 non–NATO countries. Russian soldiers have been part of the NATO–led operation since January 1996.

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 *Fleet Admiral*
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 (2nd Class)	*Commander*
O-4	
Major	Major
Captain (3rd 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 Ministry of Defense.

Active Duty Military Population, 1998

As of Dec. 31, 1998

Force element	Authorized	Actual
Ground forces	440,000	360,000
Air forces	210,000	185,000
Naval forces	200,000	180,000
Strategic offensive/defensive forces	150,000	149,000
Command and rear services	200,000	200,000
Total	**1,200,000**	**1,074,000**

External Deployments and Peacekeeping Forces

As of Dec. 31, 1998

Angola (peacekeeping)	135
Armenia (group of forces)	4,000
Bosnia (peacekeeping)	1,300
Croatia (peacekeeping)	30
Cuba	800
Georgia/Abkhazia (peacekeeping)	1,500
Georgia/South Ossetia (peacekeeping)	500
Georgia (group of forces)	9,000
Iraq/Kuwait (peacekeeping)	10
Moldova/Trans–Dniestria (peacekeeping)	2,500
Syria	50
Tajikistan (peacekeeping)	8,000
Vietnam	700
Western Sahara (peacekeeping)	25
Total	**28,550**

Russian Defense Ministry

As of July 1, 1999

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. **Service:** 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. **Training:** Black Sea Higher Naval School (1960). Dzerzhinskiy Military Engineering Academy (with distinction, 1973). Military Academy of the General Staff (1980).

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. **Service:** 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 (May 23, 1997). Promoted November 1997. **Training:** Kurgan Engineering Institute (1969). Malinovskiy Military Academy of Armored Forces (1976). Military Academy of the General Staff (1989).

Gen. Col. Aleksandr Davydovich Kosovan

Born 1941. Deputy Minister of Defense and Chief of Construction and Billeting of Troops since April 1997. **Service:** 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). Promoted 1996. Honorary Builder of Russia. **Training:** Novosi-birsk Construction Engineering School (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. **Service:** 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. **Training:** Graduated from Moscow Bauman Institute of Technology (1961). 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. **Service:** 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). Instructor at Academy of the General Staff (1994). Chief of Staff of Rear Services (1996). Promoted 1997. **Training:** Moscow Military School of Civil Defense, Military Academy of Rear Services and Transport, Military Academy of the General Staff.

Gen. of the Army Vladimir Mikhaylovich Toporov

Born 1946. Russian. Deputy Minister of Defense, Russian Federation, since June 1992. Plans and organizes Ground Forces combat training (December 1998). Member of Commission on the Social Affairs of Servicemen and Others Discharged from Military Service and Their Families (December 1996). **Service:** 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). Under the military reform, main directorates replacing the Ground Forces were subordinated to Toporov (January 1998). Promoted 1996. **Training:** Odessa Artillery School (1968). Frunze Military Academy (1975). Military Academy of the General Staff (1984).

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. **Service:** 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). Promoted 1997. **Training:** Kharkov Higher Military Command Engineering School (1976). Dzerzhinskiy Military Academy (command faculty) (with gold medal, 1985). Military Academy of the General Staff (1999). Candidate of sciences (military).

Gen. Col. Anatolly Mikhaylovich Kornukov

Born 1942. CINC of the Air Forces since January 1998. **Service:** 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). Promoted 1991. **Training:** Chernigov Higher Aviation School for Pilots (1964). Military Command Academy of Air Defense (1980). Military Academy of the General Staff (1988).

Adm. Vladimir Ivanovich Kuroyedov

Born 1944. CINC of the Navy since November 1997. **Service:** 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 1996. **Training:** Pacific Ocean Higher Naval School (1967). Naval Academy (1978). Military Academy of the General Staff (with gold medal, 1989).

Strategic Nuclear Weapons of Russia and the Other Nuclear-Armed Former Soviet Republics, 1998

	Russia	Ukraine	Kazakhstan	Belarus	Total
ICBMs	756	44	0	0	**800**
Warheads	3,590	0	0	0	**3,590**
Bombers	70	43	0	0	**113**
Warheads	560	0	0	0	**560**
SSBNs	22	—	—	—	**22**
SLBMs	368	—	—	—	**368**
Warheads	1,176	—	—	—	**1,176**
Total vehicles	**1,194**	**87**	**0**	**0**	**1,281**
Total warheads	**5,326**	**0**	**0**	**0**	**5,326**

All data are current as of Dec. 31, 1998. Adjustments in Russian strategic forces reflect START deployable delivery systems as noted in the Jan. 1, 1999, MOU on Data Notification. All Delta Is and Delta IIs, as well as three Delta IIIs and three Typhoons, have been withdrawn from active deployments and are not counted as operational strategic 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.

Strategic Nuclear Warheads, 1991–98

Nation	USSR 1991	1992	1993	1994	1995	1996	1997	1998
Russia		7,644	6,766	6,902	5,961	6,410	6,414	5,326
Ukraine		1,408	1,264	1,594	1,056	0	0	0
Kazakhstan		1,360	1,260	1,040	0	0	0	0
Belarus		54	54	36	18	0	0	0
Total	**11,159**	**10,466**	**9,344**	**9,572**	**7,035**	**6,410**	**6,414**	**5,326**

Moscow's Active Duty Military Forces, 1989–98: 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**
1998	725,000	149,000	200,000	**1,074,000**

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, which have continued throughout the 1990s. 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. After 1991, none of the forces of Ukraine, Kazakhstan, and Belarus (or any other former Soviet republic) are counted in this table.

Russian aviation was restructured in 1998. Many of the troops of the Air Defense Forces (formerly counted in the second column, "Strategic forces—offensive/defensive") went to the theater forces or command and rear services or left the military altogether. This accounts in part for the large one-year 1997–98 changes in strength in this table.

Strategic Nuclear Forces, 1989–98: 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
1998	756	70	368	22

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 this table after 1991.

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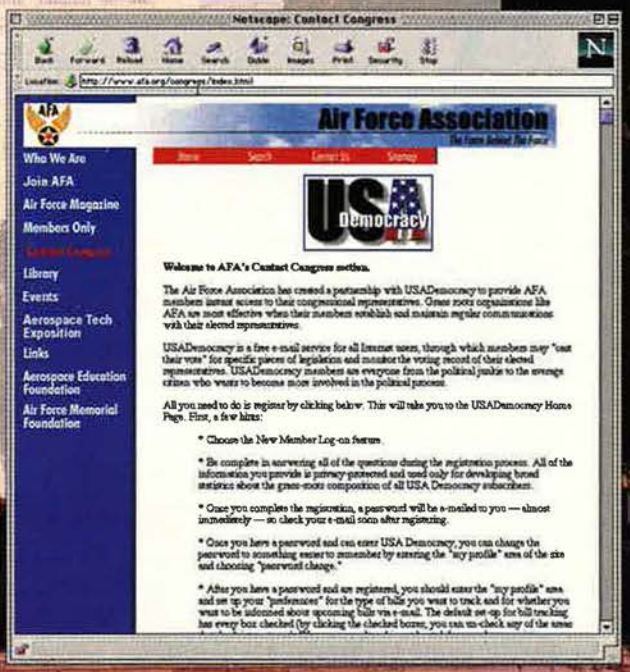

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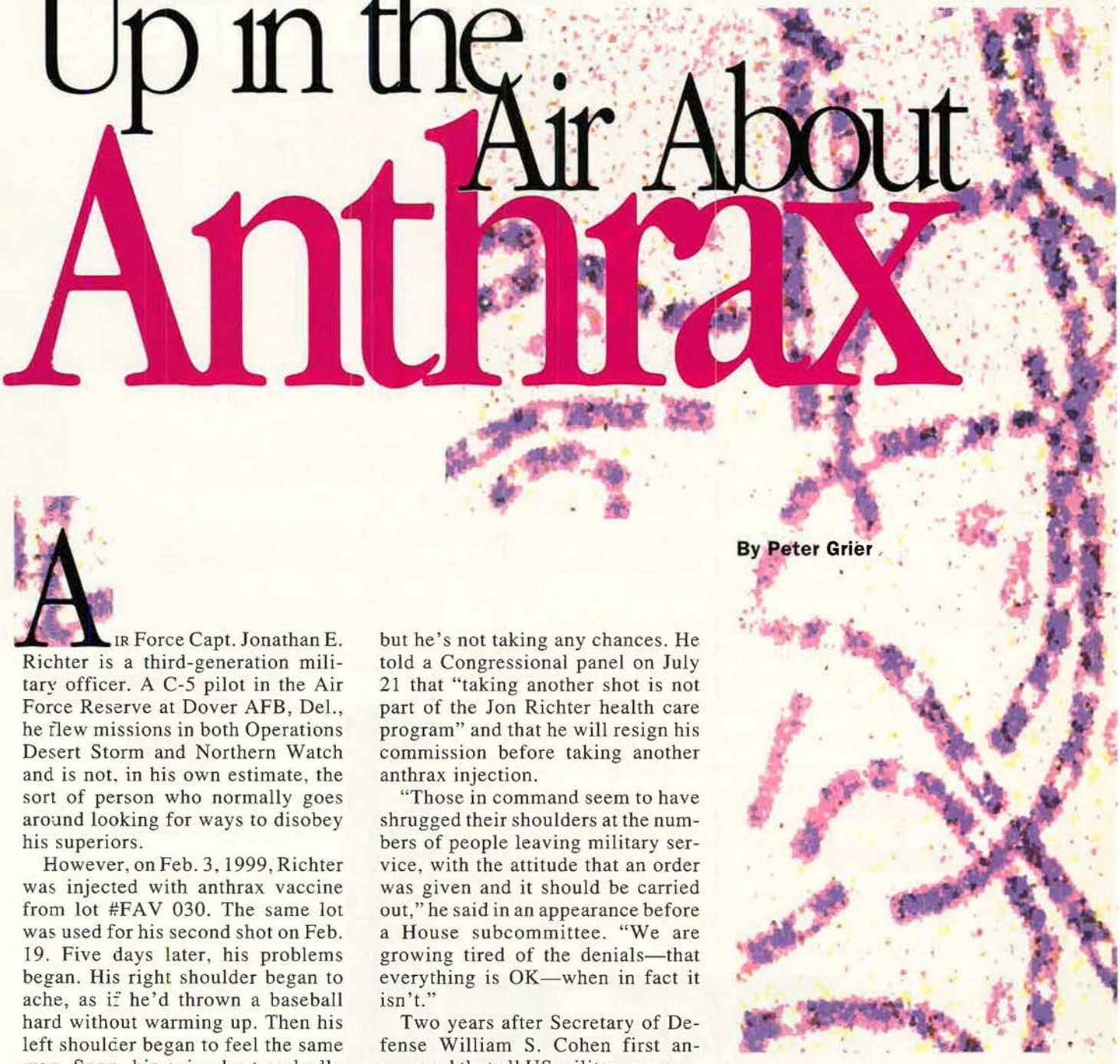
A growing number of troops, especially in the Guard and Reserve, are refusing to take their anthrax shots.

Up in the Air About Anthrax



By Peter Grier

Air Force Capt. Jonathan E. Richter is a third-generation military officer. A C-5 pilot in the Air Force Reserve at Dover AFB, Del., he flew missions in both Operations Desert Storm and Northern Watch and is not, in his own estimate, the sort of person who normally goes around looking for ways to disobey his superiors.

However, on Feb. 3, 1999, Richter was injected with anthrax vaccine from lot #FAV 030. The same lot was used for his second shot on Feb. 19. Five days later, his problems began. His right shoulder began to ache, as if he'd thrown a baseball hard without warming up. Then his left shoulder began to feel the same way. Soon, his spine hurt so badly that he could hardly get out of bed in the morning.

Since then, his arthritis-like symptoms have stabilized mostly in his feet and left hand. He has no way of proving that the vaccine is the cause, but he's not taking any chances. He told a Congressional panel on July 21 that "taking another shot is not part of the Jon Richter health care program" and that he will resign his commission before taking another anthrax injection.

"Those in command seem to have shrugged their shoulders at the numbers of people leaving military service, with the attitude that an order was given and it should be carried out," he said in an appearance before a House subcommittee. "We are growing tired of the denials—that everything is OK—when in fact it isn't."

Two years after Secretary of Defense William S. Cohen first announced that all US military personnel would be vaccinated against the deadly biological agent anthrax, the Pentagon is facing a growing revolt against the program. Around 200 active, Guard, and Reserve members of the armed services have re-

fused to take part in the six-shot vaccination program, according to DoD's own records. However, the Pentagon admits it doesn't have a formal tracking system. The numbers refusing to take the shots in the Guard and Reserve may be greater than DoD reports, based on Congressional testimony from reservists and news articles around the country.

Some of the active duty holdouts have been court-martialed. Reservists face not courts-martial but a sudden end to their military careers.

Morale at "All-Time Low"

For instance, Richter claims that many pilots—by his count, about 60 percent of those in the unit—plan to resign rather than face the anthrax vaccine needle. He said, "I can only assume that the people in the other specialties required to execute the mission of an airlift airplane such as the C-5 are leaving as well. Word travels fast. Morale is at an all-time low."

US military health officials find this development frustrating. They claim that the vaccine is safe and effective and that many reluctant members of the military are being frightened by outdated and inaccurate information.

Furthermore, anthrax is a deadly threat that terrorists could well employ against US forces in the years ahead. It is, in the words of the Pentagon, "a clear and present danger to US service personnel." Declining anthrax vaccinations is akin to refusing to wear a helmet in combat, top officials argue.

"If you get anthrax, ... you are effectively dead," Secretary of the Air Force F. Whitten Peters told the Senate Armed Services Committee during his July 21 confirmation hearing.

Moreover, virtually every senior uniformed and civilian military leader has either begun or completed the full series of six anthrax shots required for complete protection. Inoculees include Cohen, Peters, Deputy Secretary of Defense John J. Hamre, Army Gen. Henry H. Shelton (Chairman of the Joint Chiefs of Staff), USAF Gen. Joseph W. Ralston (JCS vice chairman), and all four chiefs of the uniformed services, including USAF's Gen. Michael E. Ryan.

Pentagon health officials acknowledge that they have been somewhat taken aback by the sudden squall of resistance to anthrax vaccinations. They felt that the rise of unconventional means of warfare and regional conflicts would make only too obvious the need for such a program of protection.

The program's foundation was laid in 1993. In that year, Defense Department officials issued a directive on immunizations for biological warfare defense, which established government policy, responsibilities, and procedures for the stockpiling of biological agent vaccines. Military planners are studying the virtues of a dozen or more different kinds of shots to safeguard US troops from attacks by the Saddam Husseins of the future.

From the outset, say planners, it was clear that anthrax would be the biggest near-term biowar danger. It is cheap, easy to produce, and easy to load into a long-range weapon. The Iraqi military knows all about it.

Anthrax is a disease that occurs naturally in herd animals, such as cows. Humans can catch it by eating contaminated meat, handling contaminated animals or animal products, or directly inhaling anthrax germs.

In their natural state, anthrax germs live in spores, which can survive for decades if buried. To turn the disease into a weapon, these spores are milled into a fine-ground dust that can be sprayed over a wide area through the use of any number of delivery methods.

How It Kills

Once inhaled, anthrax reproduces and releases toxins that attack the lungs. The victim's first indication that he or she has been poisoned is the onset of vague flu-like symptoms, notably high fever and chest pain. Death comes abruptly, through oxygen depletion, shock, and respiratory and cardiac failure.

Absent vaccination, anthrax is virtually always fatal.

At least 10 potential US adversaries have worked on anthrax weapons, according to US intelligence data. The reaction of law enforcement authorities to anthrax hoaxes has been extraordinary. In one recent incident, the presence of a suspicious envelope caused a virtual shutdown of downtown Washington, D.C., for hours and sent office workers into the streets to be cleaned by paramedics. These reactions show how seriously the US government takes the threat.

"[Anthrax] has been weaponized and we know it is deployed in about 10 countries around the world," Peters told the Senate panel. "Our view is that it is unconscionable to allow our pilots and aircrews to fly into those countries, which are high-threat countries, without being inoculated against anthrax, just as we would inoculate people against smallpox."

In May 1998, Cohen ordered that everyone who wears a US military uniform—active, Guard, or Reserve—eventually receive anti-anthrax shots. Under Cohen's order, the Total Force will be covered by a three-phase program. Phase 1 involves inoculating all forces that are now assigned to or will be rotating through high-threat areas in Southwest Asia and Korea. Phase 2 will involve forces designated for early deployment into those areas. Phase 3 is everyone else.

DoD envisions finishing this huge inoculation project by 2006.

Inoculation involves more than rolling up a sleeve for a single shot. The present Anthrax Vaccination Immunization Program entails a series of six shots administered over a period of 18 months. The first three inoculations are delivered at zero, two, and four weeks. Boosters are then administered at six, 12, and 18 months.

The Pentagon insists that the vaccine is safe. Army Maj. Gen. Robert G. Claypool, deputy assistant secretary of defense, health operations policy, said that several studies have shown that the incidence of adverse reactions to anthrax vaccination is comparable to that for other commonly used vaccines.

Studies done at the time of FDA licensure of the vaccine showed that in 16,000 doses the anthrax vaccine causes a mild reaction in 3 to 20 percent of those who take it. Fewer than 1 percent exhibited a severe reaction, Claypool reported to Congress on July 21.

By way of comparison, the pneumonia vaccine has a 71 percent rate of localized soreness. The typhoid vaccine causes localized tenderness

Is It Mythology?

These examples were drawn from a statement published on the Defense Department's official anthrax vaccination Web site (www.anthrax.osd.mil).

Myth: There is no defense against anthrax.

Fact: Vaccination is the best defense against biological warfare involving anthrax. Nuclear, biological, and chemical gear and protective masks should also be used.

Myth: Antibiotics are just as effective against anthrax as the vaccine.

Fact: Antibiotics can be effective in cases of cutaneous anthrax [caused by contact with infected animals or contaminated animal products], ... [but] antibiotics have not been proven effective against the more deadly forms of anthrax: inhaled and ingested.

Myth: The anthrax vaccine can cause me to catch anthrax. It works by actually injecting live cells into my body to build immunity.

Fact: The anthrax vaccine does not use live bacteria. It is a sterile product made from a strain of anthrax that does not cause disease.

Myth: Service members will have ample warning of an anthrax attack due to effective detection devices.

Fact: Until reliable detectors are available in sufficient numbers, usually the first indication of a biological attack in unprotected soldiers will be ill soldiers.

Myth: Anthrax must be hand-delivered; it cannot survive any other means of deployment.

Fact: Anthrax bacteria can be deployed by missiles and artillery shells.

Myth: The anthrax vaccine is experimental and under investigation.

Fact: The anthrax vaccine is not experimental or investigational. It has been used safely to protect at-risk industrial and laboratory workers for almost 30 years.

Myth: The reliability of the anthrax vaccine is based on only one human efficacy group—wool mill workers.

Fact: Clinical studies with approximately 1,200 wool mill workers have demonstrated protection against cutaneous anthrax. Since conducting lethal challenge studies in humans is considered unethical, determining the actual efficacy of the vaccine is not possible. However, there have been numerous tests of the anthrax vaccine involving animal models (i.e., rhesus monkey model) upon which the FDA determined its safety and efficacy.

Myth: The anthrax vaccine may cause sterility.

Fact: The vaccination has been routinely used for the past 28 years and has not been associated with sterility.

Myth: Anthrax kills only farm animals.

Fact: Anthrax kills both animals and humans.

in 98 percent of recipients, pain by 56 percent, a feeling of malaise in 24 percent, and headaches in 11 percent.

As of midsummer, the Pentagon reported only 103 adverse reactions to the anthrax vaccine, out of more than 977,000 doses administered. Of these 103 events, only 14 reactions resulted in more than 24 hours of lost duty.

Pentagon health officials say they are aware of isolated, inexplicable systemic health problems that have developed in some military personnel around the time they received an anthrax shot. But they say they are not aware of any pattern of long-term side effects from the anthrax vaccine.

"Some Degree of Risk"

"Any vaccine carries with it some degree of risk with its use," said Claypool. "In the case of the anthrax vaccine, the scales of balance are clearly tipped in favor of its use to protect our military forces."

These explanations do not satisfy those who believe that their anthrax shot made them sick. The Pentagon's tracking system is underreporting adverse events for a number of reasons, these critics claim.

In some units, fear of possible side effects has proved as contagious as any flu virus. An ANG member testifying before Congress stated that the Connecticut Air National Guard lost eight pilots who refused the shots. At Travis AFB, Calif., the guardsman said that 17 KC-10 crew members resigned rather than face the anthrax needle.

Many of those who are worried about the vaccine's effects cite the military's long history of underplaying the threat posed to its members by certain substances and practices, from Agent Orange to radiation testing.

"The missing element of the mandatory anthrax vaccine program is trust," said Rep. Christopher Shays (R–Conn.) during a series of Congressional hearings on the issue.

Dover is one of the Air Force bases where suspicion about the vaccine has been strong and widespread, due to a large number of personnel with unexplained health problems that began to crop up around the time of vaccination.

At least 30 Dover personnel have filed reports with the Anthrax Vaccine Adverse Event Reporting System in recent months, according to Lt. Richard J. Rovet, a health care integrator for the flight medicine clinic at the base. These included six reports of dizziness, six reports of ringing in the ears, 10 reports of joint pain, two reports of chronic fatigue, and one report of a painfully swollen testicle.

Capt. Michelle Piel is a 13-year Air Force veteran and a C-5 Galaxy pilot stationed at Dover. She says that her arm went numb for about 20 minutes after she received her first anthrax shot on Oct. 21, 1998, from lot #030. Weeks later, while flying a return leg from humanitarian relief operations in Honduras, the right side of her head filled up with fluid.

"It was as if a faucet were turned on inside my head," she told Congress in written testimony.

A flight surgeon grounded her for a head cold and middle ear infection. Thus began a long struggle with fatigue, nausea, and other flu-like symptoms. Six months later, 12 doctors had yet to reach a firm diagnosis of her condition. Her wing commander sent her to the immunology

clinic at Walter Reed Army Medical Center, where researchers did tests that revealed some indications of an immune system disorder.

"The last few months I have felt some improvement in my condition," she said. "The dizziness has become less frequent. ... There is no way that I know of to prove that the anthrax vaccine caused any of this. All I can tell you is that I became uncharacteristically ill after I started taking the anthrax shots. It has taken 12 doctors and eight months for me to finally find any reason for my symptoms."

Dover Calls a Halt

In May, Col. Felix M. Grieder, commander of the 436th Airlift Wing at Dover, suspended anthrax vaccinations for a week for those under his command until he could obtain more information about the vaccine's safety. He is not the only field commander who ordered such a pause. In July, the commander of the Air National Guard's 122nd Fighter Wing, Fort Wayne IAP, Ind., suspended shots for his 950-member unit, in part to allow more time for vaccine education efforts. Vaccinations will resume this fall or winter, said Guard officials.

The rebellion has reached the point where some House Republicans want the vaccinations stopped altogether. A number of GOP members are backing legislation that would either make the vaccinations voluntary or suspend the program until the National Institutes of Health conducts a safety study.

The idea of going to a voluntary anthrax immunization program does not sit well with senior Pentagon leaders. In a joint statement this summer on this subject, Cohen and Shelton had this to say: "Our commanders must know that all, not simply some fraction, of their forces are protected from this biological threat. Soldiers, sailors, airmen, and Marines fight in teams, and they need to know that all team members are protected from anthrax. ... Allowing a voluntary vaccination program is inadequate in the face of this deadly threat."

Still, Rep. Dan Burton (R–Ind.) decried a situation "when five Marines are court-martialed because they are concerned they may not be fit for duty if they take a vaccine, and when 30 percent of the pilots in a Reserve unit resign rather than take this vaccine." These kinds of events, said Burton, constitute "clear signals that something is wrong."

For the critics, one major and specific concern is that the anthrax vaccine is in fact untested. Studies of its effects, they say, all carry the label "short-term."

Small Sample?

Though the Food and Drug Administration has approved use among veterinarians, laboratory workers, and livestock handlers for 30 years, very few such workers have actually taken it, charged Mark S. Zaid, a lawyer who has represented military personnel who refuse the vaccine. He said that only about 20,000 to 30,000 people received anthrax shots in the last half-century, prior to the Pentagon's first widespread use.

"The Defense Department's inoculation of 150,000 servicemen during the Gulf War ... was the first major use of the vaccine in any significant quantity," he said.

Others question whether the vaccine would be effective against inhaled anthrax germs—the most likely method of ingestion. They point out that the only US producer of the vaccine has had FDA–documented quality control problems in the past. And Zaid, among others, claims that the Pentagon's own studies show a systemic reaction rate to the vaccine that is two to seven times higher than the manufacturer's predictions.

Even a systemic reaction rate of 1 percent or so will incapacitate from 17,000 to 32,000 service members, said Zaid, considering the large numbers of service personnel receiving the vaccine.

The Pentagon strongly defends its decision to opt for servicewide anthrax protection. The effort is not primarily a medical program, officials say.

"It is a line commanders' program to keep our deployed military personnel safe and prevent combat casualties," said Dr. Sue Bailey, assistant secretary of defense for health affairs.

The anthrax vaccine was first licensed by the FDA in 1970. "There have been no long-term side effects reported," according to Bailey.

Furthermore, the vaccine is indeed effective against inhaled anthrax, DoD says. Or at least, the prevention of inhalation anthrax "is not inconsistent with the current product label," said Bailey, reading from an FDA memo.

According to the Pentagon's top doctor, it is not possible to directly determine the efficacy of the vaccine in humans against aerosol exposure to anthrax spores. Conducting such a study would be highly unethical.

Numerous studies using animals have indeed been carried out, the Pentagon said. Military researchers have relied in particular on rhesus monkeys for these studies.

"These animal studies showed that the FDA–approved anthrax vaccine provided greater than 95 percent protection against high-dose aerosol challenge with anthrax in the monkey model," said Bailey.

A February 1998 FDA investigation of state-run Michigan Biologics Product Institute found "significant deviations" from FDA regulations, according to FDA officials. As a result of this probe, BioPort Corp., which bought MBPI in September 1998 and is now the DoD contractor for anthrax vaccine, is holding 11 lots of the vaccine in quarantine storage.

Kathryn C. Zoon, director of the FDA Center for Biologics Evaluation and Research, told Congress, "These lots are still in quarantine and will remain in quarantine until the company submits required information to [the FDA]."

DoD officials say they will continue to be vigilant as they look for unexpected reactions to the vaccine. They insist that they are committed to fully investigating all questions about the shots' value.

Said the Pentagon's Claypool: "We know anthrax kills and immunization protects. ... Immunizing men and women we place in harm's way to prevent death or a serious injury is our moral and ethical duty. ... It would be unconscionable for us not to do so." ■

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The mission soon became too complicated for bombers and fighters to perform as an additional duty.

Reconnaissance on the Wing

By Walter J. Boyne

THE first-ever long-range aerial reconnaissance missions occurred in 1914 at the beginning of World War I. In late August three separate crews of Britain's Royal Flying Corps were tasked to establish the position and direction of the German armies then rampaging through France. Information that they gathered enabled the embattled British Expeditionary Force on the Continent to avoid being surrounded, trapped, and destroyed.

French forces benefited from their own airborne eyes. The great aircraft builder Louis Breguet went aloft to observe German forces and reported directly to Gen. Joseph S. Gallieni, the French commander. In response, Gallieni launched an attack that allowed the French to concentrate forces for the Battle of the Marne, where a desperate France, in one of history's decisive military actions, finally managed to halt the German advance.

With these two contributions, long-range reconnaissance forces did much to prevent the Kaiser from knocking France out of action quickly and winning the Great War by winter 1914.

Over the next 85 years, virtually everything about long-range aerial reconnaissance saw radical change. The definition of "long range" changed—from 15 miles, to a few hundred miles, to a few thousand miles. The definition of "reconnaissance" changed—from eyeball views, to photography with highly advanced cameras, to collection of signals in air and space with advanced gear.

After World War I, tight budgets kept most national armed forces to a minimum; in almost every air force, reconnaissance suffered the most. The great Air Service/Air Corps proponent of aerial reconnaissance was George W. Goddard, who risked his career and his life on many occasions in his dedication to the discipline. Goddard's career stretched from the Billy Mitchell era to the 1962 Cuban Missile Crisis. He was the father of night and color aerial photography, use of long-distance lenses, the stereo-strip camera, and many other advances. Despite arguments with his superiors, including Gen. Henry H. "Hap" Arnold, Commanding General of the Army Air Forces, Goddard's dogged efforts on behalf of all of the elements of reconnaissance paid great dividends. These included new cameras, developing equipment, distribution, interpretation, training, aircraft, and crews. The work of Goddard would form the bedrock of Army and Air Force intelligence gathering for decades.

Covert Operations

Another giant of the era was Australian Sidney Cotton, who moved to England and served as a Royal Naval Air Service Pilot in World War I. On the eve of World War II, he returned to England from Canada, where he had pioneered aerial surveying, and obtained two Lockheed Model 12 aircraft for use in many covert reconnaissance operations. The airplanes were painted a duck-egg green (to render them less visible at high altitudes) and modified to carry extra fuel tanks. A concealed, remotely controlled opening was built into the bottom of the fuselage. Three F-24 cameras were mounted, one pointing straight down and two set at an angle to take obliques, and all three were operated from the pilot's control wheel. Leica cameras were mounted in the wing, and Cotton used a handheld camera as well.

The RF-101 was the principal photoreconnaissance aircraft in the early days of the Vietnam War. Used primarily as a long-range interceptor in its earlier role, the Voodoo often flew deep into enemy territory over heavily defended targets—in this photo, dodging anti-aircraft weapons over North Vietnam.

By the end of World War II, the US had a reconnaissance force adequately equipped and manned and effectively used the intelligence gathered. Here, a camera technician at right checks a camera during preparation for a mission.

In 1939, Cotton flew the aircraft extensively through the Mediterranean and North Africa to gain information on disposition of Italian forces. He also flew into Germany, on some flights taking Luftwaffe officers on sight-seeing trips over their home fields, covertly snapping photos as they flew. His last flight was from Berlin, the week before the outbreak of war on Sept. 1, 1939. While these spy flights obtained a great deal of intelligence for Great Britain, their most important result was the establishment of a dedicated photoreconnaissance unit in the Royal Air Force, one which would serve as a prototype for later US efforts.

Not surprisingly, the Germans had done almost exactly the same kind of covert spying. They used a Heinkel He 111 with civil markings on what were called "route-proving" flights for Deutsche Luft Hansa, now Lufthansa. They were in fact photographic sorties over British, French, and Soviet territory. The reconnaissance unit, under the command of Lt. Col. Theodor Rowehl, was attached directly to Hitler's High Command, indicating the priority placed upon its work. In 1940, Rowehl's unit also employed the Junkers Ju 86P to operate at altitudes near 40,000 feet. Fitted with an extended wing (like the later RB-57s) and a pressurized cabin, the Junkers Ju 86P was immune to interception until a special, stripped down Spitfire Mark V was readied to counter it.

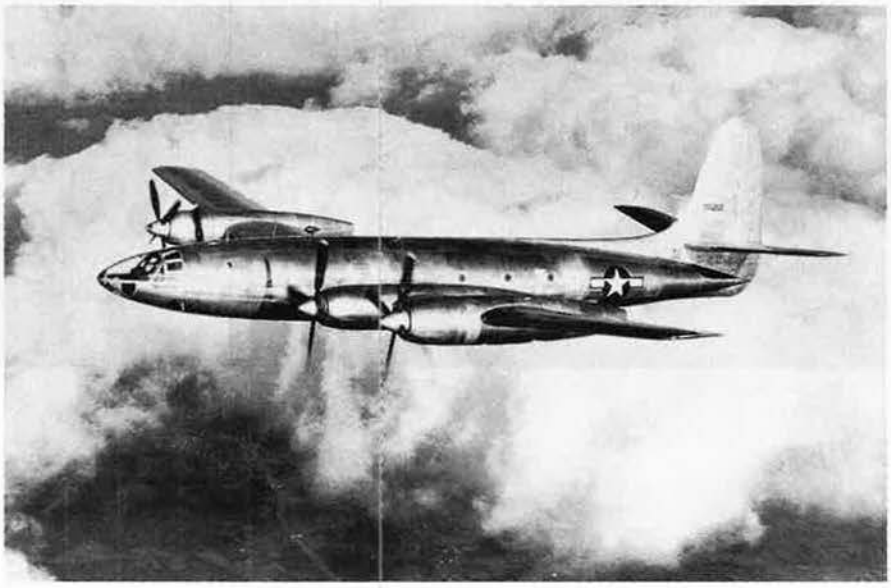
When it came to such airborne reconnaissance activities, Germany was much more systematic in operations over the Soviet Union. Rowehl's special reconnaissance unit had conducted almost 500 long-range flights using special Dornier Do 217A-O aircraft to pinpoint Soviet airfields, troop concentrations, and railheads, all targets for Hitler's planned invasion. Even though one aircraft crashed inside the Soviet Union, complete with its cameras and exposed film, Stalin was playing for time and did not protest. However, these clandestine German overflights and the subsequent invasion of the Nazi forces made the Soviets sensitive to the later US overflights during the Cold War.

Reconnaissance in the US Army during the interwar years remained locked in the embrace of the artillery, which demanded the sort of close-range artillery-correction support provided during World War I. The basic organizational setup remained the same until 1943, when requirements of both tactical and strategic reconnaissance had been writ large on every front.

No Specialized Aircraft

The requirements for reconnaissance of all types was immediately apparent after Pearl Harbor, but the US Army Air Forces had no specialized aircraft available for the task. From the start, most fighters and bombers conducted their armed reconnaissance missions as an "additional duty"; it was necessary to create variants dedicated to reconnaissance. Among these conversions, the P-38 became the F-4 and then the F-5; the P-51 the F-6; and the B-29 the F-13. (Later attempts at a specialized reconnaissance aircraft, such as the Hughes XF-11 and the Republic XF-12, were both more expensive and less successful than the modification of standard types.)

In the European and Mediterranean theaters, it made sense for USAAF to adopt well-proven British tactics and procedures and to a



At first, fighters and bombers conducted reconnaissance missions. Then came their variants, adapted for the role. Later, aircraft like this Republic XF-12 were specifically built for reconnaissance.

Piloted Long-Range Reconnaissance Aircraft

Recce Designation	Original	Popular Name	Number	Missions
F-3A	A-20J/K	Havoc	46	photo
F-9/FB/RB-17	B-17	Flying Fortress	71	photo
F-7	B-24	Liberator	224	photo
F-8	PR.Mk XVI, XX	Mosquito	140+	photo, weather, ECM
F-13/FB/RB-29	B-29	Superfortress	119	photo, Sigint, weather
FA/RB-26	A-26/B-26	Invader	?	photo, Elint
RB-50	RB-50	Superfortress	45	photo, weather
RB-36	RB-36	Peacemaker	143	photo
GRB-36J	RB-36	Peacemaker	12	fighter conveyor
RB-45C	RB-45	Tornado	33	photo, Elint
RB-47	B-47B	Stratojet	24	photo
RB-47E/K	RB-47	Stratojet	255	photo, weather
RB/EB/ERB-47H	RB-47	Stratojet	38	Elint
XR-16/RB-52	RB-52	Stratofortress	27	photo, Elint
RB/EB-57A/B/E	RB-57	Canberra/Intruder	67?	photo, Elint
RB-57D	RB-57	Canberra/Intruder	20	photo, Elint
RB-57F	RB-57	Canberra/Intruder	21	photo, Elint, sampling
RB-58	YB/B-58	Hustler	?	photo, Elint, SLAR, SAR
R/EB-66	B-66	Destroyer	186+	night recce, Elint, ECM
RB-69	P2V-7U	Neptune	7	Elint, SLAR
F-4 & F-5	P-38	Photo Lightning	1,400+	photo
F-6	P/F-51	Mustang	480+	photo
RP/F-80/XF-14	P-80	Shooting Star	280+	photo
RF-84F	F-84F	Thunderjet	742	photo
RF-86	F-86	Sabre	418	photo
RF-101	F-101	Voodoo	284	photo, ECM
RF-4	F-4	Phantom II	699	photo, SLAR, IR, Elint
EC-97G	C-97	Stratocruiser	1	Elint
E/RC-121	PO-1, PO-2	Warning Star	321	ECM, Elint, AEW, weather, Comint
RC-130	C-130	Hercules	52+	Comint, AEW, Sigint, photo, ABCCC
RC-135	KC-135	Stratotanker	48+	ECM, SLAR, Sigint, etc.
E-3	EC-137	Sentry	50	AWACS
E-8A		Joint STARS	15	battle management
F-15	P-61	Reporter	38	photo
U-2/TR-1	U-2	Dragon Lady	35	photo, ECM, Sigint, SLAR, Elint, Comint
A-12 (CIA)	A-12	Oxcart	15	photo, Elint, Sigint, etc.
SR-71	SR-71	Blackbird/Habu	30	photo, Sigint, Elint

Note: Numbers are approximate. Some aircraft took on missions not listed here.

certain extent even use British aircraft, most notably the Supermarine Spitfire and the Mosquito. By mid-1943, USAAF reconnaissance efforts had grown substantially. The number of photographs of enemy dispositions was never plentiful enough to satisfy everyone, but the American air- and ground crews were becoming increasingly sophisticated and productive. Long-range reconnaissance missions were used for bomb damage assessment and for plotting the future course of the bombing campaign.

The growth in capability can be illustrated by the assets applied to one of the most demanding assignments of the war. The 7th, 10th, 25th, and 67th photoreconnaissance groups photographed the entire coast of Europe from Cherbourg to Holland, often from 15 feet above the water. Called "dicing" missions, they required skill and courage of the highest nature.

As the Allied photoreconnaissance increased, the once formidable German capability atrophied. The German army, forced to fight without close air support, had to do without aerial reconnaissance as well. The defense system established over Britain virtually eliminated German aerial reconnaissance until the operational debut in September 1944 of the sensational Arado Ar 234 jet, which was able to operate over England with relative impunity.

The Pacific Imperative

Nowhere was aerial reconnaissance more important than in the Pacific theater. Had the US possessed sufficient reconnaissance aircraft, it might have detected the Japanese fleet on its way to Pearl Harbor in December 1941. In 1942, an American reconnaissance airplane detected the Japanese move toward Port Moresby, New Guinea, and sparked the important Battle of the Coral Sea. Perhaps most significant, it was the simultaneous Japanese failure and American success in reconnaissance that led to the stunning US victory at Midway. A Japanese reconnaissance airplane, an Aichi E13A "Jake" from the cruiser *Tone*, was delayed in its launch and, after locating the US fleet, initially failed to report the presence of a carrier. Even as the Japanese scout airplane was failing in its mission, an American Douglas SBD torpedo bomber, flown by Lt. Cmdr. Clarence W. "Wade" McClusky Jr., found the Japanese fleet and fixed it for attack.

In the southwest Pacific, Capt. Karl L. Polifka revitalized USAAF's reconnaissance with his Flight A of the 8th Photographic Squadron. USAAF Headquarters had allocated 100 P-38Es to be modified into F-4s (with cameras and two additional 75 gallon fuel tanks). Only five F-4s were ready for Polifka to take with

Early in the Cold War, World War II–era aircraft still flew reconnaissance, primarily along the perimeter of enemy territory. That did not lessen the danger. This RB-29, based at Yokota AB, Japan, was brought down by two MiG fighters in 1954.

him to Australia to begin his combat career. Of these, one was damaged en route and another crashed. The 31-year-old Polifka left two in Brisbane, Australia, and took one to Port Moresby to begin operations April 7, 1942. He almost single-handedly mapped large portions of New Guinea and New Britain. The weather and the long distance combined to make these extremely grueling missions, but results were invaluable for Gen. Douglas MacArthur's later campaigns in the area.

Polifka's charismatic leadership was critical, for he created a squadron of pilots with his own daring, initiative, and skill. He would do the same thing in North Africa and the Mediterranean, each time overcoming faulty equipment and a lack of supplies. One of his greatest satisfactions was the operations of his 8th Photo Squadron during the battle of Okinawa, where it was able to take low-level oblique photographs of Japanese positions at last light and have annotated prints delivered to US platoons by morning. "Pop" Polifka went to war again in Korea, commanding the 67th Tactical Reconnaissance Wing, flying RF-51s. He again took the tough missions and was killed July 1, 1951, over North Korea.

The Japanese greatly appreciated reconnaissance aircraft. Two of their designs, the Kawanishi H8K "Emily" and the Mitsubishi Ki-46 "Dinah," were equal to those of any nation. Unfortunately for the Japanese, there were too few of them and when air superiority was lost they were too vulnerable to American fighters.

The security conscious Japanese kept tight rein over any intelligence on the home islands, and there was virtually no information available on the location of the most lucrative targets. On Nov. 1, 1944, an F-13A Superfortress—commanded by Capt. Ralph D. Steakley and traveling at an altitude of 32,000 feet—flew over Tokyo. It was the first US aircraft to do so since Jimmy Doolittle's April 18, 1942, raid.

The photographs Steakley obtained on his 14-hour mission were invaluable. The flight became the model for the hundreds of subsequent recce missions which would ultimately map every significant target in Japan. The F-13s would fly over enemy territory out of reach of almost every fighter. The heavy Japanese flak was not generally effective, but the weather was often bad.

Lost in the Shuffle

By the end of World War II, the US reconnaissance force had matured. It was more than adequately equipped with airplanes and personnel, and intelligence derived from the missions was routed with efficiency and dispatch to the units needing it. All of this would be jettisoned in the swift demobilization that took place after V-J Day. When the US found itself facing new emergencies in the Cold War, it no longer had an effective system of reconnaissance.

The primary target—the USSR—could not have been tougher. In the Soviet Union, no information of any conceivable use to an enemy was ever knowingly disseminated; citizens could not even obtain valid street maps of its cities. The US had inherited a vast amount of intelligence from the Germans and, to a far lesser extent, from the Japanese. While this was helpful in preparing target folders, it provided no insight into current developments.

In addition to the Soviet Union, many other potential trouble spots held Washington's interest. These included China and North Korea. As time passed, these would be but the tip of the reconnaissance requirement iceberg, as dangers developed in Cuba, Latin America, Southeast Asia, and the Middle East.

The development of long-range reconnaissance would follow two general paths. The first involved the use of specialized versions of bombers, fighters, and transports intended for the most part to fly along the perimeter of enemy territory, making an actual overflight only on rare occasions. The second course reflected the development of specialized reconnaissance aircraft of sensational capability and performance.

The Korean War might have been prevented if an effective long-range reconnaissance force had been available to note the North Korean buildup. Further, had Chinese buildup been detected in the winter of 1950, steps might have been taken to prevent the intervention of Red China.

When war started, the principal reconnaissance task fell to the tactical units. The vital necessity of photoreconnaissance was recognized immediately, and, once again, individuals with courage and ingenuity stepped in to fill the gap. One of these was 1st Lt. (later Gen.) Bryce Poe II, who in 1950 had flown 19 clandestine missions near or over Soviet and Chinese territory. When North Korea invaded, he took off in his RF-80A on the morning of June 28 for the first jet reconnaissance sortie of some 67,000 reconnaissance sorties to be conducted during the war. He himself would fly a total of 71. Later, 1st Lt. (later Maj. Gen.) Mele Vojvodich Jr. would set a long distance tactical reconnaissance rec-

ord when he flew his RF-86 all the way to Mukden, China, some 300 miles beyond the South Korean border.

The SAC Effort

No one knew the value of long-range reconnaissance better than Gen. Curtis E. LeMay, but it took time for Strategic Air Command to reach the required level of proficiency. SAC's recce fleet grew from 12 F-9s and 24 F-13s in 1947 to 120 RB-36s and 180 RB-47s by 1954. Over the years, the numbers of aircraft declined as more sophisticated equipment such as the RB-47D, U-2, SR-71, and RC-135s entered the inventory. The effort of SAC was supplemented by that of the Royal Air Force, which used B-45s for daring, long distance overflights of Soviet territory.

Soon, modified B-47s began to overfly the Soviet Union. USAF Col. Donald E. Hillman, then deputy commander of the 306th Bomb Wing, made the first Presidentially approved overflight Oct. 15, 1952. Taking off from Eielson AFB, Alaska, Hillman, Maj. Ed Gunter (copilot), and Maj. Edward A. Timmins (navigator) made a 3,500-mile flight over the Chukotskiy Peninsula in eastern Siberia, checking for a buildup of Soviet air bases. Soviet MiG-15s tried to intercept the American aircraft, but they failed, and Hillman and his crew were able to take camera and radar photographs of five airfields. They were airborne for more than seven hours and had covered more than 800 miles of Soviet territory.

In mid-1954, an RB-47 flown by Capt. (later Col.) Hal Austin on a similar overflight mission was attacked by MiG fighters and almost shot down. By this time, the need for information on Soviet missiles, atomic capability, and conventional forces was great. President Dwight D. Eisenhower approved development of an advanced reconnaissance airplane which would ultimately result in the U-2.

Flights probing the perimeter of Soviet territory could be as dangerous as any overflight, if the Soviet interceptors were ordered to attack, either mistakenly or as a political statement. Such an event occurred July 1, 1960, when an RB-47H from the 55th Strategic Reconnaissance Wing was on a standard electronic reconnaissance mission over the Barents Sea, probing the Soviet radar system. On board was the standard three-man B-47 crew plus three electronic warfare officers.

The RB-47 was outside of Soviet airspace when cannon fire from a MiG-19 interceptor smashed into its wing and engines, sending it into a flat spin. The crew ejected, but the only survivors were the copilot, 1st Lt. Freeman Bruce Olmstead, and navigator, 1st Lt. John McKone. They were captured, incarcerated in the Lubyanka prison in Moscow, and released after being confined for several months.

Reconnaissance crews put their lives on the line during the Cold War. Variants of the B-47, like this RB-47K on its maiden flight, began to overfly the Soviet Union and were attacked even when outside of Soviet airspace.

Olmstead's RB-47 was but one of more than 40 US aircraft shot down by communist bloc defenses during the Cold War. Most of the more than 200 crew members killed in these shootdowns were on long-range reconnaissance missions, putting their lives at risk to obtain information on Soviet capabilities and intentions.

Revolutionary Change

In the 1950s, global tensions made it imperative to find better ways to obtain intelligence about Soviet dispositions, and work was under way. For one thing, as an interim measure, the Air Force was carrying out extensive modifications to the B-57, resulting in the RB-57D and later the RB-57F, with huge wings and high-altitude engines. Yet to come, however, was a revolutionary change in capability.

In March 1953, Maj. John Seaberg, working at Wright–Patterson AFB, Ohio, developed the requirements for a system that would have a 1,500-mile mission radius and be able to carry up to 700 pounds of reconnaissance equipment. In Seaberg's project, the quest for new reconnaissance equipment centered upon the new high-resolution panoramic camera invented by Edwin Land of Polaroid camera fame. The new camera was to use advanced Hycon Corp. lenses and the new Eastman Kodak mylar-based film.

Though not originally invited to participate, Clarence "Kelly" Johnson of Lockheed's famed Skunk Works muscled his way into the project with the promise of building—for about $22 million—20 airplanes which would meet or exceed specifications. He further promised to have the first article flying in a mere eight months. The Air Force already had contracted for the Bell X-16, and the service rejected Johnson's proposal. Johnson persisted, going directly to the CIA, which bought his plan. The Air Force then came on board, canceled the X-16, and got what has been called the best bargain in reconnaissance history.

The Skunk Works produced the magnificent U-2, in which the late, great Tony LeVier on Aug. 1, 1955, made the official first flight. The first U-2 overflight of Soviet territory occurred on July 4, 1956. The Soviet Union was outraged at the US ability to violate its airspace with

Photo by Ted Carlson

By the 1960s, the high-flying and high-speed SR-71 was already in the works as the ultimate reconnaissance aircraft. Today, computers have transformed both reconnaissance platforms and the types of missions they can undertake.

impunity but at the time was impotent to stop it. Its diplomatic protests were muted, as it was unwilling to admit it could not prevent the flights.

In 23 missions over the USSR, the U-2 gathered far more information about the Soviet Union than could be gleaned from all other sources combined. The US learned not only what Moscow might be doing but also what it could not do. The Soviet bomber fleet was revealed as being less impressive than estimated, and its buildup of ICBMs, while substantial, was not as great as had been feared. The U-2 also conducted operations over other Warsaw Pact countries as well as trouble spots in the Middle East and other Third World areas.

End of the Line

The last U-2 mission over Soviet territory came on May 1, 1960. Francis Gary Powers, a "sheep-dipped" Air Force officer flying in civilian guise and assigned to the CIA, was flying high over Sverdlovsk when his U-2 suddenly came under attack. Crushed by the blast effect of a salvo of some 14 surface-to-air missiles, the U-2 broke apart and Powers's parachute opened, and he floated to earth. He was captured and imprisoned. Powers was given the usual show-trial and sentenced to 10 years in a labor camp. In 1962 he was freed in an exchange for the notorious Soviet spy, Rudolf Abel.

The U-2 made no further spy flights over the Soviet Union, but it was used intensively over the People's Republic of China, where as many as 13 were lost. Most of these clandestine missions originated in Taiwan and were carried out by Nationalist Chinese pilots trained by the US Air Force.

The critical moment in the life of the U-2 came during the October 1962 Cuban Missile Crisis when President John F. Kennedy received irrefutable photographic evidence of Soviet IRBM sites on the Caribbean island nation. Two veteran reconnaissance experts, Goddard and Steakley, were called upon by the White House to help interpret the photos. As the U-2 overflights went on, however, the Cuban forces managed to down a U-2 with a surface-to-air missile. Maj. Rudolph Anderson Jr., its pilot, was killed.

The U-2's capability was continuously updated and expanded, and it is still in service. The latest version, the U-2S, was recently awarded the prestigious Collier Trophy.

By the time of the Cuban Missile Crisis, however, Lockheed had already launched studies for a U-2 replacement aircraft. The plan called for an aircraft that would fly extremely fast and extremely high and be difficult for Soviet radar to spot.

Working with CIA's Richard M. Bissell, the Skunk Works team went through a long series of studies, which ultimately resulted in the fantastic A-12, the predecessor of the more well-known SR-71 Blackbird. Johnson and fellow Lockheed designer Ben R. Rich bent technology to their will, creating a new airframe, new engines, and new systems. The program, called Project Oxcart, won an appropriation of $96.6 million for five aircraft within two years. USAF ultimately built 15 A-12s and 32 SR-71s.

The official first flight of the A-12 took place April 30, 1962. Since that time, no other manufacturer in any country has been able to create an aircraft with comparable performance. Capable of operating at speeds in excess of Mach 3 and at altitudes of 75,000 feet and greater, the Blackbird was employed all over the world. Its military contributions were of immense importance. In the 1973 Mideast War, photos taken by the SR-71 helped keep US policy-makers—notably Secretary of State Henry Kissinger—on top of dangerous military developments.

The advent of the lightweight computer has changed the nature of some long-distance reconnaissance. Reconnaissance aircraft are now primarily platforms for sophisticated equipment that is often linked to other aircraft, ground stations, and satellites. For the first time, long-range reconnaissance crews no longer have to land from their missions in order to process the "take." Real-time or near real-time electronic intelligence, advanced synthetic aperture radar signals, and electro-optical data can be transmitted from aircraft like the RC-135 and U-2.

As capabilities have increased, so have the types of missions. They now include airborne early warning and battle management, ground surveillance, electronic reconnaissance, weather reconnaissance, and more. The standard reconnaissance types have been joined by a new generation of unmanned aerial vehicles that clearly presage the direction of future warfare. ■

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

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1 Project Report for the Health Insurance Association of America, 1990.
2 Health Insurance Association of America, 1997.
3 Long Term Care Group, Inc., 1997.
*This program is subject to state availability.

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Books

Compiled by Chanel Sartor, Editorial Associate

Apple, Nick P., and Gene Gurney. *The Air Force Museum: Seventh Revised Edition.* Order from Air Force Museum Foundation, Inc., PO Box 33624, Wright-Patterson AFB, OH 45433-0624 (937-256-6245). 1999. 216 pages. $9.95.

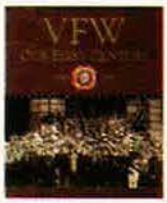
Bateman, Capt. Robert L. III, ed. *Digital War: A View From the Front Lines.* Presidio Press, 505 B San Marin Dr., Ste. 300, Novato, CA 94945-1340 (415-898-1081). 1999. 299 pages. $29.95.

Burgett, Donald R. *Currahee! A Screaming Eagle at Normandy.* Presidio Press, 505 B San Marin Dr., Ste. 300, Novato, CA 94945-1340 (415-898-1081). 1999. 195 pages. $24.95.

Giangreco, D.M., and Kathryn Moore. *Dear Harry ... Truman's Mailroom, 1945–1953: The Truman Administration Through Correspondence With "Everyday Americans."* Stackpole Books, 5067 Ritter Rd., Mechanicsburg, PA 17055-6921 (800-732-3369). 1999. 512 pages. $34.95.

Hawkins, Ian L. *The Munster Raid: Before and After.* FNP Military Division, 6527 Main St., PO 374, Trumbull, CT 06611 (203-261-8587). 1999. 447 pages. $32.00.

Manson, Herbert Molloy Jr. *VFW: Our First Century.* Addax Publishing Group, 8643 Hauser Dr., Ste. 235, Lenexa, KS 66215 (800-285-5786). 1999. 240 pages. $24.95.



Mason, Air Vice Marshal Tony. *The Aerospace Revolution: Role Revision & Technology—An Overview.* Brassey's, Inc., PO Box 960, Herndon, VA 20172 (800-775-2518). 1998. 219 pages. $34.95.

Mesko, Jim. *U.S. Self-propelled Guns in Action, Armor Number 38.* Squadron/Signal Publications, Inc., 1115 Crowley Dr., Carrollton, TX 75011-5010 (972-242-8663). 1999. 50 pages. $8.95.

Page, Geoffrey. *Shot Down in Flames: A World War II Fighter Pilot's Remarkable Tale of Survival.* Seven Hills Book Distributors, 1531 Tremont St., Cincinnati, OH 45214 (513-471-4300). 1999. 207 pages. $19.95.

Peebles, Curtis. *Dark Eagles: A History of Top Secret U.S. Aircraft, Revised Edition.* Presidio Press, 505 B San Marin Dr., Ste. 300, Novato, CA 94945-1340 (415-898-1081). 1999. 353 pages. $19.95.

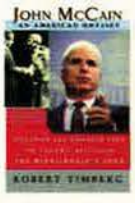
Quirk, Rory. *Wars and Peace: The Memoir of an American Family.* Presidio Press, 505 B San Marin Dr., Ste. 300, Novato, CA 94945-1340 (415-898-1081). 1999. 264 pages. $24.95.

Richelson, Jeffrey T. *America's Space Sentinels: DSP Satellites and National Security.* University Press of Kansas, 2501 W. 15th St., Lawrence, KS 66049 (785-864-4155). 1999. 329 pages. $35.00.

Shores, Christopher. *Aces High, Vol. 2: A Further Tribute to the Most Notable Fighter Pilots of the British and Commonwealth Air Forces in WWII.* Seven Hills Book Distributors, 1531 Tremont St., Cincinnati, OH 45214 (513-471-4300). 1999. 256 pages. $34.95.

Smith, George W. *The Siege at Hue.* Lynne Rienner Publishers, 1800 30th St., Ste. 314, Boulder, CO 80301-1026 (303-444-6684). 1999. 195 pages. $49.95.

Timberg, Robert. *John McCain: An American Odyssey.* Touchstone Books, 1230 Avenue of the Americas, New York, NY 10020 (212-698-7000). 1999. 236 pages. $13.00.



Walker, Paul D. *Jungle Dragoon: The Memoir of an Armored Cav Platoon Leader in Vietnam.* Presidio Press, 505 B San Marin Dr., Ste. 300, Novato, CA 94945-1340 (415-898-1081). 1999. 230 pages. $24.95.

Williams, Nicholas M. *Aircraft of the United States' Military Air Transport Service 1948 to 1966.* Specialty Press Publishers & Wholesalers Inc., 11605 Kost Dam Rd., North Branch, MN 55056 (800-895-4585). 1999. 192 pages. $44.95.

An Air Force Association & National Symposium Annual Air Force Ball

A Space Partnership for the 21st Century—Military, Civil, & Commercial

Beverly Hilton Hotel
Los Angeles, Calif.
(310) 274-7777

Nov. 19, 1999

The AFA Symposium

America's capabilities in space have been a unique source of national strength, enabling the nation to project power and influence around the world and to sustain our position of leadership in world affairs. Space is an area of vital national interest and requires a strong government and commercial partnership to defend and protect our interests. The partnership needs to adequately invest in the science and technology needed to maintain this national leadership.

Invited Speakers

Gen. Michael E. Ryan,
Air Force Chief of Staff

Carol A. DiBattiste,
Undersecretary of the Air Force

Gen. Richard B. Myers,
Commander in Chief, NORAD & US Space Command, and Commander, Air Force Space Command

Gen. George T. Babbitt,
Commander,
Air Force Materiel Command

Lt. Gen. Eugene L. Tattini,
Commander, Space and Missile Systems Center; Panel Moderator

Maj. Gen. Richard R. Paul,
Commander, Air Force Research Laboratory; Panel Member

Robert Pattishall,
Director of Advanced Systems and Technology, National Reconnaissance Office; Panel Member

Plus two leaders from industry; Panel Members

The Air Force Ball

The 28th annual Air Force Ball will also be held this year at the Beverly Hilton Hotel, Friday, Nov. 19. We will celebrate the space partnership and also recognize the support of the armed forces by the motion picture industry. 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 the AFA Fax Reply service at (800) 232-3563 and order document #0340. Visit our Web site at: www.afa.org/calendar/lasymp99.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 of $155 per night, single, or $175 double, plus tax. Reservations at this rate will be accepted through Oct. 15, 1999.

Sponsorship

The AFA 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.

AFA / AEF National Report

By Frances McKenney, Assistant Managing Editor

AFA Web Site Adds USAF Almanac

Readers have been asking for it ever since *Air Force* Magazine went online. In August, one of the magazine's most popular features, "USAF Almanac," joined the extensive lineup of resources posted on the Air Force Association's Web site at www.afa.org.

The Almanac is located in the Members Only section.

Other magazine materials are accessible to all AFA Web visitors, and as of mid-August, these items numbered nearly 640. (By the latest statistics, the magazine is the most frequently visited section on the association's Web site.)

The USAF Almanac first appeared in September 1951 as the "Anniversary Issue" and included what we now call the "Guide to Air Force Installations Worldwide" and a chart on the "Educational Level of Officers of the Three Services"—the forerunner to a table that still runs in the "Facts and Figures" section.

With the August 1958 issue of *Air Force* Magazine, the term "Almanac" appeared on the cover. The issue offered the "Gallery of USAF Weapons" and summaries of the major commands, such as Tactical Air Command, Alaskan Air Command, and Caribbean Air Command.

May 1970 marked the Almanac's 20th annual year of publication and another turning point: the beginning of its tenure as the "May Almanac."

It was in May 1973, however, that the Almanac took on the form in which it exists today. The "United States Air Force—Facts and Figures," 13 pages of charts, graphs, and data that first year, made its debut. From there it grew to the large compendium of look-it-up information now found in the annual Almanac.

Photo by Bryson Leidich

Jack Gross (third from left) was honored with a luncheon in August, to thank him for continued support and dedication to AFA. Attending the gathering for the former AFA board chairman (1963–64) were (l–r) Doyle Larson, current board chairman; Thomas McKee, national president; Charles Church Jr., national treasurer; John Shaud, executive director; and William Croom Jr., national secretary.

Full House for Joe Foss

Joe Foss, Medal of Honor recipient and a former AFA national president (1961–62), packed them in for one of the last major events held at MCAS El Toro, Calif., in June. The facility, which had been the West Coast headquarters for Marine Corps aviation, closed officially in early July, as the result of a 1993 Base Closure and Realignment Commission decision.

According to Richard C. Baynes, secretary of the **Orange County/Gen. Curtis E. LeMay (Calif.) Chapter,** about 200 people gathered at the Officers' Club where Foss spoke; it was a "sold out" event.

Foss earned the Medal of Honor as a Marine Corps fighter pilot, shooting down more than two dozen Japanese aircraft in defense of Guadalcanal between October 1942 and January 1943. In his remarks at El Toro, he covered his World War II experiences as well as his achievements in several other fields. He served as governor of South Dakota in the late 1950s. Many in the audience remembered him as star of the 1960s TV series 'American Sportsman" and "The Outdoorsman," airing from 1967 to 1974. More recently, he served as National Rifle Association president.

Foss' lecture was a joint function of the AFA chapter and local chapters of The Retired Officers Association, the Reserve Officers Association, and the Military Order of the World Wars.

The 11th in Michigan

The **Lloyd R. Leavitt Jr. (Mich.) Chapter's** 11th consecutive Community Partner Membership Gold Award was a prime topic of conversation when the chapter held a joint luncheon with the **Huron (Mich.) Chapter** in July.

Making the 100-mile round-trip for the meeting were Billie E. Thompson, chapter president, David McNeil, treasurer, Frederick C. Wismer, Paull H. Hines, A.B. Crow, Daniel Y. Gulden, Robert L. Scherwitz, and chapter supporter Lynn Barraco.

The Leavitt Chapter's Community Partner winning streak began in 1988 with the Gold Award. From 1989 until 1996 it received the top Community Partner honor, the Exceptional Service Award for Community Partners. Since 1997 it has been earning the Gold Award.

Thompson credited Wismer, the

chapter's Community Partner chairman, with keeping up the numbers. In rounding up four to five new Community Partners every year, he uses a recruiting package that includes a copy of *Air Force* Magazine, emphasizes AFA's mission statement, and points out how businesses in the city of Alpena are closely tied to the Alpena Combined Readiness Training Center.

"It's a sales job," commented Wismer. "And you have to have some gumption to be a salesman." He is a retired USAF pilot who served in World War II, Korea, and Vietnam before beginning a second career as a heavy-truck salesman.

Behind the Scenes

The **Gus Grissom (Ind.) Chapter** had a chance to observe the restoration of some historic aircraft when it took a day trip to the US Air Force Museum at Wright–Patterson AFB, Ohio, in July.

Most of the tour group took in the museum's IMAX theater presentations, and the YF-22 on display drew many who were interested in seeing the fighter aircraft that the House of Representatives recently has taken aim at by cutting production funds. But a dozen people from the group also opted to board a museum shuttle bus to travel an extra mile from the main buildings out to restoration hangars on the historic Wright Field flight line.

On Friday afternoons in the summer months, the museum opens these areas for behind-the-scenes tours, so visitors can see exhibits under construction and aircraft undergoing restoration.

The chapter members endured the summer heat in unair-conditioned buildings to look at work being done on a one-of-a-kind A-17 and XF-92, a rare Kawanishi "George" 21, and a Spad XIII being restored to look like Eddie Rickenbacker's airplane.

This is the second time the chapter has visited the museum, but it still ranked as the highlight of the year's activities, said Chapter President Robert L. Gray.

Del Rio Chapter President Col. (sel.) Jason Barlow (left) welcomes new Community Partners, Wal-Mart managers Richard Hernandez (middle) and Roger Gonzalez.

One-sies, Two-sies

Col. (sel.) Jason B. Barlow, **Del Rio (Texas) Chapter** president, made the rounds, recently, personally presenting Community Partner plaques to several business people.

The chapter, which grew by 26 members this past year, gained 18 Community Partners, up from two, in about eight months. They include the local US Border Patrol unit, country and Tejano music radio stations, and an apartment complex, where USAF members and employees make up about half the residents.

Chapter member Lonnie Ricks is responsible for the leap in Community Partner numbers. A furniture store owner whose father, Phil, was a chapter charter member, Ricks drew on his connections to civic organizations to compile a list of potential Community Partners. He joined Barlow and James S. Long, chapter vice president, in working the list.

Barlow has spoken to many civic groups and his wife is a doctor in the community. Their involvement in the town means businesses know them and so are willing to support AFA, Barlow said.

As for how he increased chapter membership, Barlow, who is the assistant deputy commander at the 47th Operations Group at Laughlin AFB, says he scheduled chapter meetings around the training base's full calendar and focused on rewards.

The chapter holds informal quarterly meetings and each time presents recognition awards to junior enlisted members selected from one of the base's four groups on a rotating basis. The chapter also presents safety awards.

A chapter representative attends every class graduation to give the Outstanding Second Lieutenant Award to a student pilot.

Presenting awards brings potential chapter members—family, coworkers, and friends of the awardee—into contact with AFA, Barlow explained. By "one-sies and two-sies," he said, this is how he increased chapter membership.

On Display

As part of a membership recruitment drive, William F. McDonald, vice president of the **Fairbanks Midnight Sun (Alaska) Chapter,** set up a dis-

William McDonald, Fairbanks Midnight Sun Chapter vice president, displayed World War II memorabilia at an AFA booth at a Ft. Wainright, Alaska, open house.

play of World War II memorabilia for an open house at Ft. Wainright, Alaska, in July.

McDonald's display featured—along with AFA brochures—American, Japanese, and German military uniforms, American World War II medals, photos, documents, artwork, statistics on casualties, a 48-star US flag, Japanese and German flags, and music from the war years playing in the background.

Retired from an Air Force career in aircraft maintenance, McDonald says he has always been a pack rat and history buff, and his late father, Brig. Gen. Everett A. McDonald, had given him items that are in his collection today. But it was his father-in-law, Albert Pachella, who inspired him to begin displaying the memorabilia.

Pachella, a tanker in World War II, gave McDonald an Eisenhower jacket, shirts, hats, a collection of lighters that included a German trench lighter, a German dagger, postcards, documents, and his Silver Star complete with the original, handwritten justification given to him in Sicily.

McDonald says the personal memorabilia helps him reach one of his goals: to encourage visitors to remember World War II.

Convention: Pennsylvania

Robert C. Rutledge of the **Lt. Col. B.D. "Buzz" Wagner Chapter** was named Man of the Year at the Pennsylvania State Convention held in Trevose, Pa., in July, and the **Total Force Chapter** of Pittsburgh was honored as Chapter of the Year.

Among other winners noted at the convention's awards luncheon were USAF recruiter SSgt. Mark Kossack, head of the 311th Recruiting Squadron's marketing branch; Reservist MSgt. Patricia S. Suszko, first sergeant of the 327th Airlift Squadron at Willow Grove ARS, Pa.; and from Pittsburgh IAP/ARS, Pa., ANG MSgt. Loretta B. Kendall, a paralegal with the 171st Air Refueling Wing (ANG).

Hosted by the **Liberty Bell Chapter,** the convention featured State Rep. Larry O. Sather as banquet keynote speaker. "I believe the only safe nation in the world will be the one that controls the air and space," he told the audience.

State officers elected for the coming year were Eugene B. Goldenberg of the Liberty Bell Chapter, president; Rutledge, vice president; Alma Cannon of the **Greater Pittsburgh Chapter,** secretary and Karen G. Hartman of the **Joe Walker–Mon Valley Chapter,** treasurer.

Convention: Oklahoma

A luncheon at the Tinker AFB Golf Club kicked off the Oklahoma State Convention in Oklahoma City in July. Fourteen teams then headed out to the links and competed in a golf tournament.

Afterward, the conventioneers held a social hour and an awards banquet attended by more than 100 guests. AFA Chairman of the Board Doyle E. Larson was the banquet speaker and in his remarks spoke about the association's role in representing its members.

Award winners announced at the banquet included recipients of 15 Medals of Merit and seven Exceptional Service awards and Lt. Col. Richard Knapp of the **Altus Chapter,** who was named Person of the Year; **Enid Chapter** President Jack E. Beam III, honored as Chapter Officer of the Year; and Oscar Curtis, also from the Enid Chapter, who accepted an award for recruiting more than 200 Community Partners.

The 57th Airlift Squadron from Altus AFB earned the Military Unit of the Year award. Also on the list of award recipients were Capt. Norman M. Worthen, from the **Central Oklahoma (Gerrity) Chapter,** Company Grade Officer of the Year; MSgt. Ward A. Hanning, Senior Noncommissioned Officer of the Year; SSgt. Brian A. Miller, NCO of the Year; and SrA. Jeffrey J. Klein, Airman of the Year.

The Central Oklahoma (Gerrity) Chapter produced all of the state's AFA officers for the coming year. Reelected during the business meeting the next day were William P. Bowden, president, Jo Smith, vice president, and Laverne Shaw, treasurer. MSgt. Robert Griffiths is the new state secretary.

Tri-state Convention

Minnesota, South Dakota, and North Dakota got together for a combined tri-state convention and regional meeting in Minneapolis in July. Looking forward to joining up with Wisconsin and Montana to become the newly formed North Central Region, they also invited representatives from those two states to the two days of activities.

Hosted by the **Gen. E.W. Rawlings (Minn.) Chapter,** the gathering took place at Ft. Snelling and opened with a dinner.

The next day was devoted to training sessions on chapter operation basics. George E. Masters, region vice president (North Central Region), Charles A. Nelson, then South Dakota state president, and Larry Barnett, vice president of the **Gen. David C. Jones (N.D.) Chapter** were among the presenters.

AFA Chairman of the Board Doyle Larson was the luncheon guest speaker. He covered AFA's accomplishments and future role and described the impact the association can have. He related how AFA secured a Purple Heart for a World War II Army sergeant, John A. Hagen of South Dakota, this year, after the award had been stalled in red tape for years.

Convention activities took place that afternoon, including elections of state officers. For Minnesota, AFA state officers are Coleman Rader Jr.,

president, and Charles L. St. Sauver, treasurer, both from the Rawlings Chapter. John C. Seely and James A. Armstrong, both from the **Richard I. Bong Chapter,** were elected vice president and secretary, respectively.

In North Dakota, Gary H. Olson and Troy Krabbenhoft of the **Happy Hooligan Chapter** were elected president and treasurer, respectively, and James Crawford from the **Gen. David C. Jones Chapter** is vice president. 2nd Lt. Jessica A. Presse from the **Red River Valley Chapter** was elected secretary.

In South Dakota, Ronald W. Mielke was elected state president. The vice president is Richard C. Gustaf, with Bruce C. Herrstrom and Francis L. McGuire as secretary and treasurer, respectively. They are all from the **Dacotah Chapter.**

Convention: Virginia

Despite the July heat, Virginia State convention-goers gathered on the west lawn of the US Capitol and listened to an open-air concert by the US Air Force Band. The AFA stalwarts then headed down the interstate to cool off at the convention hospitality suite in Vienna, Va.

At their business meeting the next morning, they re-elected Thomas G. Shepherd of the **Northern Shenandoah Valley Chapter** as state president. Also elected were Allan M. Van Wickler from the **William A. Jones III Chapter,** vice president north; Andrew H. Heath of the **Leigh Wade Chapter,** vice president east; and John F. Ree of the **Roanoke Chapter,** vice president west. S. Lynn Sanchez of the **Donald W. Steele Sr. Memorial Chapter** was elected secretary, and Clement P. Moore of the **Langley Chapter** will be treasurer.

Lawrence Shellhammer, Heath, and Moore received Outstanding Effort Awards, newly created by State President Shepherd. Margaret R. Moore of the Langley Chapter and Margaret L. Durazo and Rosalyn R. Knapp, both of the Steele Chapter, also received the award.

In addition, the awards luncheon saluted David S. Lutz with an Outstanding Support Award, recognizing his work as vice president of veterans affairs. R. Donald Anderson, John E. Craig II, Charles G. Durazo, and Mary Anne Thompson received awards for outstanding support.

State President Awards went to Glen E. Thompson, Robert Maiocco, Harry P. Turbiville Jr., Kurt O. Westerman, James M. Dellaripa Sr., George W. McKay, Robin M. Kozelka, Col. Kermit V. Boschert, Matthew E. Monczewski, and Dean P. Frohnapple.

The Steele Chapter hosted the convention, which featured at its evening banquet Air Force acquisition executive Lt. Gen. Gregory S. Martin, principal deputy, Office of the Assistant Secretary of the Air Force for Acquisition.

Awards From the Chief

Later that month, the Steele Chapter hosted an awards ceremony at the Pentagon, attended by Air Force Chief of Staff Gen. Michael E. Ryan and Lt. Gen. Donald L. Peterson, USAF deputy chief of staff, personnel.

They joined John E. Craig II, region vice president (Central East Region), Mason Botts, chapter president, and other AFA dignitaries in honoring recipients of several national-level AFA awards.

Chapter members Brig. Gen. John F. Regni, Maj. Charles P. Armentrout, and Wayne R. Gracie and Lynn Matsler–Brod of the **Gen. Charles A. Gabriel (Va.) Chapter** received Exceptional Service Awards. All four serve on AFA councils.

Chapter member Sean Ryan was also presented with an Exceptional Service Award. Reta Parsons of the Air Force Doctrine Center received the Outstanding Civilian Program

Specialist of the Year award. Lt. Col. Dennis Hilley received a Medal of Merit, recognizing his role as **Cape Canaveral (Fla.) Chapter's** project officer for USAF's 50th anniversary celebration. He is now a Steele Chapter member. Receiving Medals of Merit for their AFA chapter work in the past year were Robert Maiocco, Tom Veltri, and Robert Walsh.

A suggestion from AFA council members led the Steele Chapter to elevate the profile of this ceremony by inviting the awardees' bosses to the event, along with the region vice president and national directors in the area.

For a CAP Cadet

At a **Contrails (Kan.) Chapter** quarterly meeting in July, Samuel Gardner, national director, William S. Clifford, Kansas state president, and Jean M. Clifford, chapter president, presented the chapter's third annual Outstanding Cadet of the Year award to Civil Air Patrol cadet Phil Dipazza. A sophomore at Garden City High School in Garden City, Kan., Dipazza earned the honor through a CAP self-improvement program.

For example, he attended a CAP aerospace program at the US Air Force Academy in Colorado Springs, Colo., this summer. He also participated in a CAP–sponsored canoe trip down the Arkansas River, learning not only canoeing skills but also how to use the Global Positioning System for navigation.

More AFA/AEF News

■ According to Indiana State President James E. Fultz, more than a hundred AFA members turned out for B-2 dedication festivities at Grissom ARB and Kokomo, Ind., in May. Two days of events celebrated the naming of the 20th stealth bomber as *Spirit of Indiana.* About 250 guests—among them Fultz, from the **Southern Indiana Chapter,** and William R. Gommel, president of the **Central Indiana Chapter**—turned out for a dinner at a Kokomo country club the night before the dedication ceremony. Sen. Richard G. Lugar (R–Ind.) and Kent Kresa, the chief executive officer of Northrop Grumman, joined Gen. Richard E. Hawley, who was then Air Combat Command commander, for the next day's dedication at Grissom.

■ The **Maj. Gen. Oris B. Johnson (La.) Chapter** conducted a retirement ceremony for chapter member Col. Walter R. Dill in July. Dill has been a professor of aerospace studies at Louisiana State University. Chapter members Thomas H. Normile and retired Maj. Gen. Oris B. Johnson conducted the ceremony.

■ Roy A. Boudreaux, Alabama state president, attended an Air War College awards ceremony in June to present the Douhet–Mitchell International Airpower Award to Lt. Col. Michael J. Nowak. The trophy has been co-sponsored by AFA since 1987 with the Sons of Italy and is given to the author of AWC's top essay on international airpower. Col. Randy E. Honnet of the **Montgomery (Ala.) Chapter** was Nowak's advisor and attended the ceremony. The award is named for Italian Gen. Giulio Douhet, a strategic airpower theorist, and American airpower advocate Brig. Gen. William L. "Billy" Mitchell. ■

Unit Reunions

reunions@afa.org

6th BG Assn, B-29s on Tinian Island (1944–45). Oct. 28–31, 1999, at the Sheraton National Hotel in Arlington, VA. **Contact:** Harry H. George, 1599 85th Ave. N., St. Petersburg, FL 33702 (727-576-2577) (famdad@aol.com).

91st Air Refueling Sq. Nov. 4–6, 1999, at the Holiday Inn Historic Crockett Hotel in San Antonio. **Contact:** Dick Seivert, 173 Kandel Cir. SE, North Canton, OH 44720-3351 (330-499-4676) (rseivert@neo.rr.com).

303rd ARS, Tucson, AZ, and Bermuda. Sept. 12–15, 2000, in San Diego. **Contact:** Charlie Jensen, 2425 Locust St., San Diego, CA 92106-1527 (phone or fax: 619-224-8347) (thecapt @gateway.net).

307th BG/Wg (1946–54). April 5–9, 2000, at the Treasure Bay Casino Resort in Biloxi, MS. **Contact:** Harry Jenner, 5001 Kendall Ave., Gulfport, MS 39507 (228-863-4532).

358th FG and 462nd Service Sqs (WWII). Oct. 1–3, 1999, in Nashville, TN. **Contact:** L.H. Lok Jr., 1907 Maple Rd., Effort, PA 18330-2021 (570-629-3488).

416th and 531st TFSs, Misawa AB, Japan (1958–64). Nov. 10–12, 1999, at The Menger Hotel in San Antonio. **Contact:** Bob Graham (800-373-3383) (fujin001@aol.com).

862nd Engineers Aviation Battalion (1942–57). May 11–14, 2000, at the Holiday Inn Elyria in Elyria, OH. **Contact:** Sherl Hasler, RR 5, Box 25B, Bloomfield, IN 47424 (812-384-4666).

AFROTC Det. 640, Miami University of Ohio. Nov. 5–6, 1999. **Contact:** Dept. of Aerospace Studies, 50 Millett Hall, Miami University, Oxford, OH 45056 (937-529-2031) (www.muohio.edu/aerospace).

AFROTC Det. 830, instructors, staff, and Angel Flight (1951–91). Nov. 12–13, 1999, at Texas A&M University in Commerce, TX. **Contact:** Kayla Price (903-886-5765).

Pilot Class 43-D, USAAF. April 12–16, 2000, at Handlery Hotel & Resort in San Diego. **Contact:** Frank Dutko, Pilot Class 43-D Assn., Inc., 316 Florida Ave., Gulf Breeze, FL 32561-4242 (phone: 850-932-3467 or fax: 850-932-3901).

Pilot Class 49-A. Oct. 22–25, 1999, in St. Joseph, MO. **Contact:** P.E. Boyes, 7023 Pescado Cir., Rancho Murieta, CA 95683 (916-354-1031).

Pilot Class 56-D. Oct. 17–19, 2000, in Las Vegas. **Contact:** E.J. Zulauf, 2744 Childress Dr., Las Vegas, NV 89134 (702-228-7494) (ejzulauf1 @juno.com).

Pilot Training Class 49-B. Nov. 8–11, 1999, at the Red Roof Inn in Branson, MO. **Contact:** Andy Meyer (512-388-1778) (marge-andy-meyer @worldnet.att.net).

Pilot Training Class 52-A. April 27–30, 2000, at the Ramada Plaza Beach Resort in Fort Walton Beach, FL. **Contact:** Ken Lengfield, 12 Shady Ln., Mary Esther, FL 32569 (850-244-4836) (lengfield@gnt.net).

Society of Combat Search and Rescue. Nov. 11–14, 1999, at Nellis AFB, NV. **Contact:** Society of Combat Search and Rescue, PO Box 1962, Clovis, NM 88102-1962 (850-283-2071) (enmfa@etsc.net).

U-2 pilots and navigators. May 18–21, 2000, at John Ascuaga's Nugget Hotel Casino in Sparks, NV. **Contact:** Jim Cain, 11361 E. Hash Knife Cir., Tucson, AZ 85749 (phone: 520-749-9746 or fax: 520-749-2461) (killercain@prodigy.net).

Seeking members of the **601st TCW,** Germany, for a reunion. **Contact:** Harry Ambrose, 18720 Dallas Ln., Little Rock, AR 72223 (501-821-3509) (heambrose@aol.com).

Seeking USAF personnel who frequented the **USO–Soldiers' Memorial** in St. Louis, from 1958–71, for a possible reunion. **Contact:** Grace Skibinski, PO Box 2586, Florissant, MO 63032. ■

Mail unit reunion notices well in advance of the event to "Unit Reunions," *Air Force* Magazine, 1501 Lee Highway, Arlington, VA 22209-1198. Please designate the unit holding the reunion, time, location, and a contact for more information.

Bulletin Board

bulletin@afa.org

Seeking information on **Lt. David J. Mahoney,** B-24 bombardier, 446th BG, who was killed June 13, 1944, on a bombing mission over France. **Contact:** Jesse D. Mitchell, 619 Timothy Dr., Linthicum, MD 21090-2113 (410-859-1362).

Seeking members of **Field Training Detachment 911,** Yokota AB, Japan, 1970–71 and **FTD 901,** Kadena AB, Japan, 1971–73. **Contact:** Albert D. LaLonde, 2153 Pamela Dr., Holiday, FL 34690-4454 (727-942-1997).

Seeking **MSgt. James L. Dudeck** and his wife, **Blanca.** Their last known address was in Colorado Springs, CO. **Contact:** Harry Desantis, 63 Shadduck Rd., Middlebury, CT 06762 (hdesantis @snet.net).

Seeking members of **Pilot Class 44-B,** Hicks Field, Fort Worth, TX. **Contact:** Lee Lamar, 6000 W. 99th Ter., Overland Park, KS 66207 (913-381-7771) (lee.lamar@worldnet.att.net).

Seeking USAF veterans who flew or supported airlift, aerial refueling, or aeromedical evacuation aircraft in the **Korean War.** Specifically interested in **Fox Peter I and II** participants. **Contact:** Tom Cossaboom, HQ AMC/HO, 503 Ward Dr., Ste. 119, Scott AFB, IL 62225-5335.

Seeking **Elwell Everett McCray,** who attended Coe College in Cedar Rapids, IA, in 1943 and was then stationed in Santa Ana, CA. **Contact:** Leonard W. Lotts, 102 Frederick Ave., Apt. 312, Oelwein, IA 50662-2361.

Seeking **Phyllis Anderson,** who was stationed at USAF facility near Ickenham, UK, in 1966 and Denver, CO, in 1967, or any members of her family. **Contact:** Margaret Kiernan, 24 Beaufort Gardens, Ascot, Berkshire, UK SL5 8PG.

Seeking information on **Lt. William Moyle,** P-39 pilot, 110th Tac Recon Sq (F), who was killed in January 1945 off the coast of New Guinea. **Contact:** Mike Moyle, 6430 Gran Via Dr., Rockford, MI 49341 (616-874-6534) (mgmoyle@aol.com).

Seeking information about a B-29 and a B-17 that experienced extreme loss of engine oil in all engines, probably brought on by overfilling the oil, at Payne Field in Egypt or any other base. **Contact:** Henry L. Gauntt, 495 Nieuport Dr., Vero Beach, FL 32968.

Seeking anyone who served in **Queensland, Australia,** during WWII and either saw or stayed in a bunker. Also seeking photos or blueprints of these bunkers for a mapping project. **Contact:** Daniel Hultgren, PO Box 1252, Thuringowa, Central Queensland, Australia 4817 (61-7-54-789724) (nqrs@bigfoot.com).

Seeking **patches** for a collection. **Contact:** Johnny Signor, 714 Atlantis Rd. SE, Palm Bay, FL 32909.

Seeking copy of **SAC Manual 96-1,** "The Baltimore Project, Radar Prediction Improvement Program," two volumes, April 1958. **Contact:** H.P. Smith, 1454 Oakmont Pl., Niceville, FL 32578-4314 (850-897-1339).

Seeking anyone—instructors, students, members of foreign military services—with information about flying any military versions of the **Cessna 172. Contact:** Michael R. Little, 1740 S. 153rd Avenue Cir., Omaha, NE 68144-1926 (michaelriffe @prodigy.net).

Seeking information on **African-American aviators** who flew as pilots or crew members in the Korean War. **Contact:** Kenneth P. Werrell, Airpower Research Institute, 401 Chennault Cir., Maxwell AFB, AL 36112-6428 (334-953-8858 or DSN: 493-8858) (ken.werrell@cadre.maxwell. af.mil).

Seeking **TSgt. John L. Henry,** flight engineer, 1st Sq, 9th BG, 313th BW, 20th AF, at Tinian Island, Northern Marianas, July–December 1945, assigned to the B-29 *The Uninvited.* **Contact:** Elliott F. Victoria, 38 Mary Jones Rd., Newton, NJ 07860-6464 (973-383-6051).

Seeking **John Roberts (John Seccafico),** WWII pilot with the 788th Sq, 801st BG, 8th AF, and a Carpetbaggers (801st/492nd BG Assn) member until 1993. **Contact:** Rene J. Defourneaux (fax: 317-849-8652) (eldoctor@compuserve.com).

Seeking contact with enlisted personnel who filled commissioned **EWO** slots on **SAC** B-52 combat ready crews, 1956–64, or who trained and certified officers for the slots. **Contact:** James E. Maxson, 106 Brian Dr., Crestview, FL 32536-9282 (850-689-4580) (aa0ck@aol.com).

Seeking information on or contact with **William P. Mitchell** of Chicago, a special services officer at Tokyo, Japan, 1954–55, whose last known assignment was at Stewart AFB, NY, in 1955. **Contact:** James A. Hall, 18642 E. Poco Rio Dr., Rio Verde, AZ 85263-7019 (480-471-9803).

Seeking photos or slides of the **Martin B-57,** all variants and units, especially in Southeast Asia. **Contact:** Terry Panopalis, 30 D'Auvergne, Candiac, Quebec, Canada J5R 5R2 (tpanopalis@sprint.ca).

Seeking information on **SSgt. Oliver Joel Bowen,** 855th BS, 491st BG (H), a B-24 turret gunner from Woodland, AL, whose crew crashed into the North Sea March 30, 1945. **Contact:** Chris Batte, 110 Pheasant Cove, Warner Robins, GA 31088 (912-922-7247).

Seeking information on contributions of **USAF flight surgeons** to combat operations in all conflicts. **Contact:** Dr. David R. Jones, 3558 Southview Ave., Montgomery, AL 36111-1424 (phone: 334-286-1833 or fax: 334-284-0917) (drjones@zebra.net.) ■

Pieces of History

Photography by Paul Kennedy

CCT

Memorabilia courtesy Combat Control School, Pope AFB, N.C.

Combat Control Teams have been described as performing an air mission in the tactical ground environment. Assigned to special tactics squadrons within Air Force Special Operations Command, CCTs establish and control the air–ground interface: They can parachute under fire into an assault or landing zone, establish communications with incoming aircraft, clear the airfield of debris, and then coordinate the arrival and takeoff of hundreds of transports and helicopters. Those Air Force members who wear the red beret and combat control flash of this field have learned their basic skills during more than a year of rigorous training at seven specialized schools such as the Combat Diver School at NAS Key West, Fla., the Airborne School at Ft. Benning, Ga., and the Air Traffic Control School at Keesler AFB, Miss.

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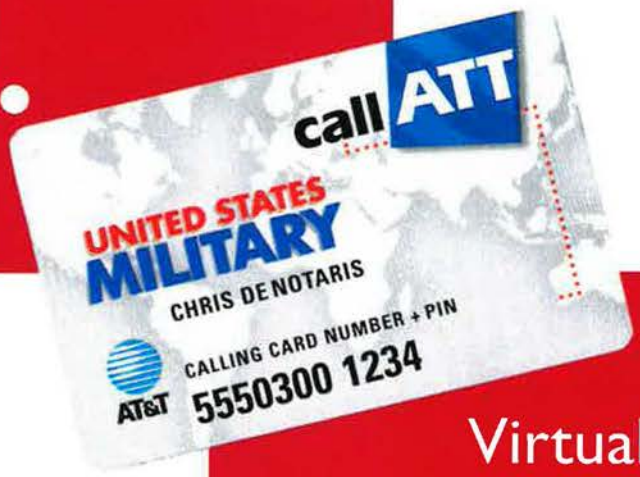

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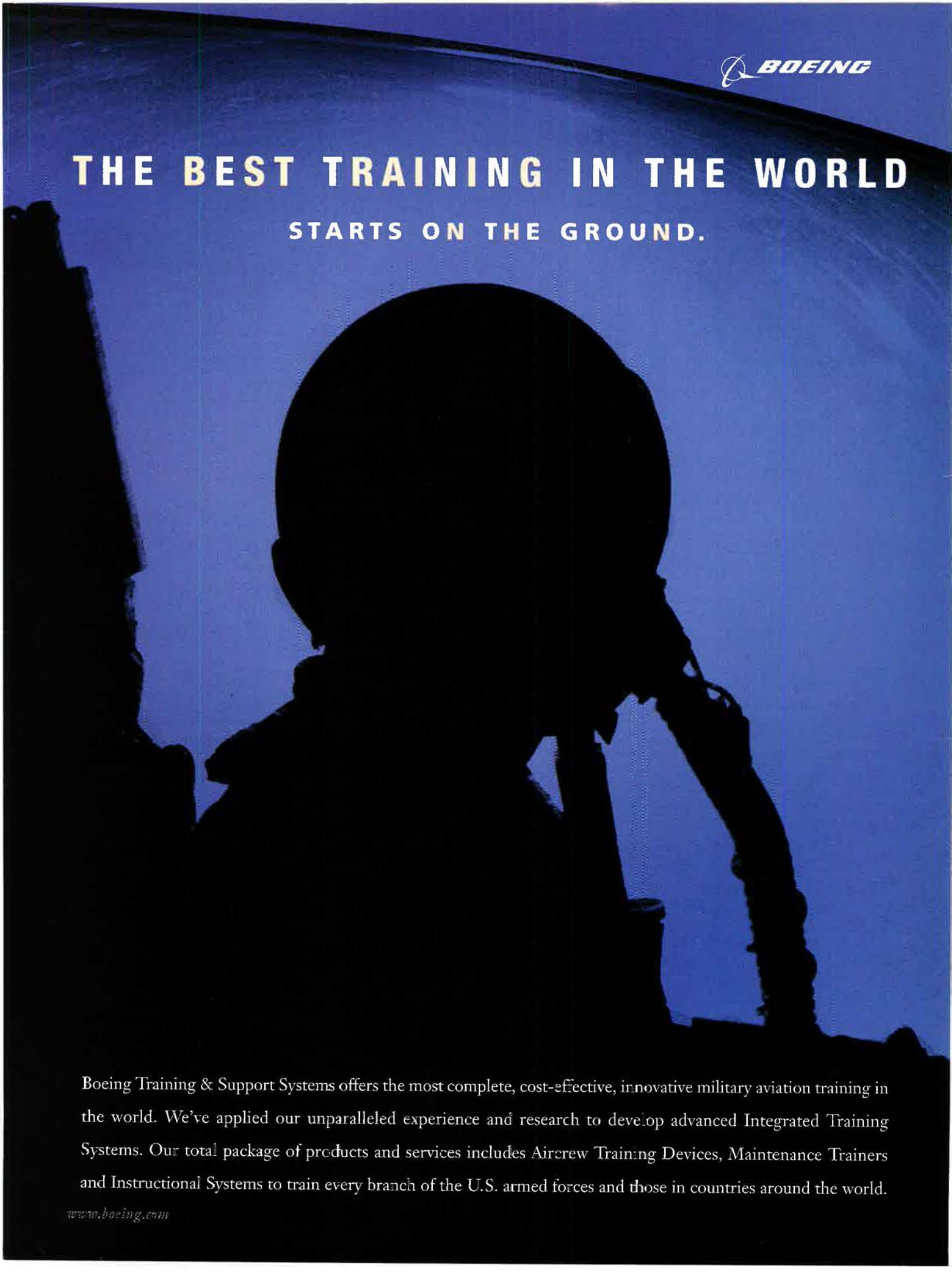
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