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AIR FORCE MAGAZINE

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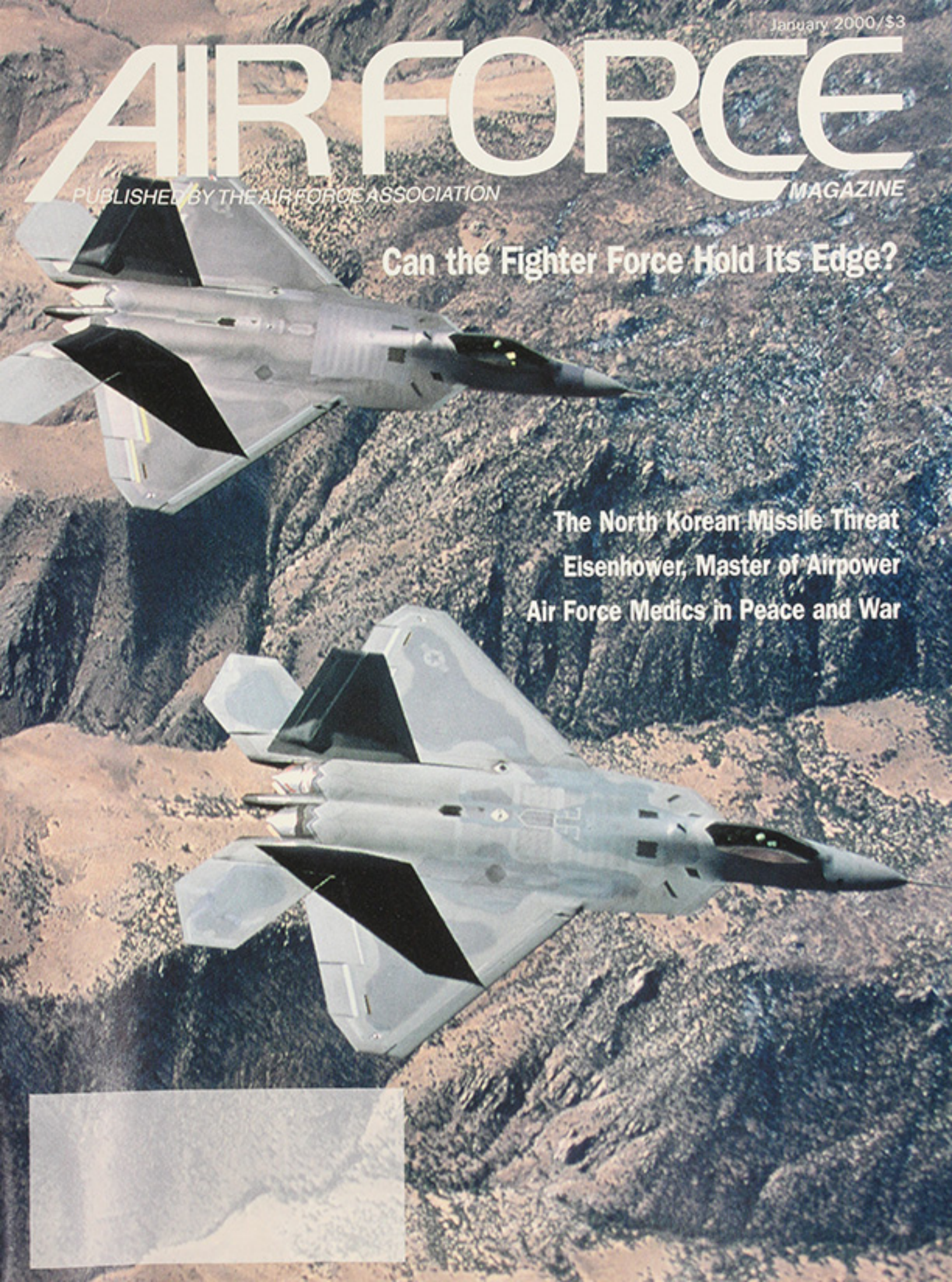

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January 2000, Vol. 83, No. 1

AIR FORCE MAGAZINE

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About the cover: Two F-22s from Edwards AFB, Calif., fly over the desert during a test flight. See "Can the Fighter Force Hold Its Edge?" p. 24. Photo courtesy F-22 Team.

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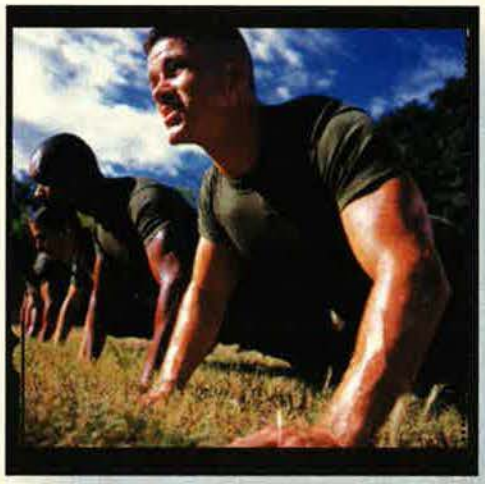

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EQUAL HOUSING LENDER

Editorial

By John T. Correll, Editor in Chief

The Military–Civilian Gap

In this 27th year of the all-volunteer force, the vast majority of US citizens have no personal experience of military service. Less than a third of the members of Congress are veterans. The President is not a veteran, nor are the secretaries of Defense and State or the national security advisor.

Taking note of this trend in a speech at Yale in 1997, Secretary of Defense William S. Cohen said that "one of the challenges for me is to somehow prevent a chasm from developing between the military and civilian worlds, where the civilian world doesn't fully grasp the mission of the military, and the military doesn't understand why the memories of our citizens and civilian policymakers are so short, or why the criticism is so quick and so unrelenting."

Last October, the Triangle Institute for Strategic Studies announced the results of extensive research for its Project on the Gap Between the Military and Civilian Society. It measured the differences in opinion and attitude between "elite military officers"—those selected to attend staff and war colleges and new flag officers—and the "elite public" and the general civilian public. (The project excluded enlisted members and "rank and file" officers.)

The civilian and military elites disagreed on when and how the nation should use military force and on what role, if any, the military should have in that decision. The military officers were twice to four times as "casualty averse," or hesitant to take combat losses, as the civilians were. A declining percentage of veterans in policy-making positions makes the nation "more likely to initiate the use of force overseas," the report said.

Compared to "civilian elites," the officers in the survey were more conservative; 64 percent were "partisan Republicans." They thought civilian society could benefit from adopting some of the military's values and behaviors. Seventy-six percent of them opposed gays and lesbians openly serving in the military, whereas a majority of the civilians were said to approve of it.

The directors of the project are Professors Peter D. Feaver of Duke University and Richard H. Kohn of the University of North Carolina. Feaver was on the National Security Council staff in the early days of the Clinton Administration. Kohn is a former chief of Air Force history. Both of them have been writing on this subject for years.

The armed forces are not out of control, nor are they growing dangerously apart from society.

In "Out of Control" (*The National Interest*, 1994), Kohn called for "a concerted campaign to restore civilian control" over the armed forces. He said the concern was not a military takeover of the government, the chance of that being "virtually nil," but rather a diminished civilian control of policies and procedures that govern matters great and small.

"The very worst breach of civilian control occurred just after Bill Clinton's election on the question of homosexuals serving openly in the armed forces," Kohn said. The President's authority was undercut and "defiance at the top led to resistance all down the line."

Feaver and Kohn decry the tendency—which arose after Vietnam but intensified in the Clinton Administration—for the armed forces to resist military forays abroad. In 1996, Feaver cited Bosnia, Somalia, and Haiti as "troubling" instances of such reluctance.

Contrary to the title of Kohn's 1994 essay, the military was not and is not "out of control." It is well-understood that the armed forces do not define the national interest, nor do they pick the wars they will fight. That does not mean military leaders should acquiesce quietly in matters of strategy, as they did in 1965 when Secretary of Defense Robert S. McNamara had his own way, with disastrous consequences, about Vietnam.

The armed forces owe their best military advice not only to the Administration but also to Congress and the nation. The less the civilian leaders know about military operations themselves, the more important the advice becomes. It is perhaps at its most useful when it is not what the civilian leaders want to hear. If anything, it would be beneficial for military leaders to speak up more often than they do now.

In his speech at Yale, Cohen said that 'people coming into the military are leaving the military far better citizens than when they arrived." Military people are held to higher standards of discipline and conduct.

This has always been so, but it has been underscored in recent years by constant headlines reminding us that different standards apply elsewhere and at other levels of government.

It is preposterous to say, in the name of civilian control, that basic issues of force composition—such as the ill-considered gambit on behalf of gays and lesbians in 1993—are none of the force's business. There is no more basic military leadership function than maintaining the cohesion of the force. And furthermore, the Administration is quick enough to call on military people to bear witness on organizational and personnel issues when their views support the Administration position.

The military–civil relationship is important and it requires careful nurturing. However, there is no reason to fear that the armed forces are growing dangerously apart from the society that they defend.

One of the findings in the Triangle Institute research report was that the military "elites" were "considerably more conservative than elite civilians but not quite as conservative as the general public." That raises the question of just who might be out of step. ■

Letters

letters@afa.org

On Policy

The policy statement (on people) coming out of the [Air Force Association] National Convention was not nearly strong enough as far as I was concerned. *[See "An Aerospace Force for the Nation," November, p. 2.]* Two things come to mind: The issuance of a "Cold War certificate" for veterans who served during that time period is small recognition, while at the same time Congressional actions gutted the retirement benefits (delayed COLAs, Redux, broken promises for lifetime health care, and a base exchange system that has been in retrograde for years). Never in my wildest dreams did I think I would ever see a sign in the [base exchange] that I saw the other day: "We will match any price for like products found elsewhere."

Lt. Col. Homer J. Merfeld,
USAF (Ret.)
Rapid City, S.D.

As a longtime AFA member, I feel the 2000 Statement of Policy is one of the best I have ever seen. I hope I am not alone in having contacted my senators and congressman to voice my concerns about the weakness in our current defense.

Maj. W. Ed Norwood,
USAF (Ret.)
Macon, Ga.

Taking on Air Defenses

Your article on dealing with air defenses in a future conflict was interesting in that it almost pointed out just how far we have let our capabilities in the area of lethal [Suppression of Enemy Air Defenses] deteriorate. *[See "Dealing With Air Defenses," November, p. 24.]* Once again we are learning how very important SEAD assets and their unique capabilities are in the successful conduct of any modern conflict.

In the "No Guy in Back" section of the article, the lieutenant colonel quoted is at best uninformed [or] has absolutely no idea of the capabilities, flexibility, and lethality of the F-4G weapons system or how it was used by a combat-ready Wild Weasel crew. He particularly seems to have no concept of the mission tasking of the backseater, or "Bear," or how the F-4G/APR-38 operated, or of its capabilities. Either that or he is deliberately attempting to downplay the capabilities of the F-4G to make it seem that the F-16CJ may have some ability [as a] substitute. Believe me, whatever the CJ can do in the SEAD arena, the G could do better.

Contrary to what he says, the F-4G system was all automatic, faster, much more accurate, and much more tactically relevant than anything in the CJ. And with the Bear handling or sharing many of the tasks, the pilot was free to concentrate on the difficult task of flying the airplane and missing the rocks. And a second pair of eyes is invaluable when trying to look in two directions at once. You tend to do this a lot in the fighter business, especially [in] the Weasel mission.

Additionally, the G could integrate other weapons, such as AGM-65s, or most other hard ordnance with the [Electronic Warfare] systems and deliver a true hard kill on the target. And you could carry a variety of weapons on each aircraft or in the flight.

As far as an updated or improved capability for the F-16 or a replacement for the F-16, it is possible that some studies have already been done. When I was stationed at George AFB [Calif.], there was a lot of talk about incorporating the APR-38 into the two-seat F-15 as a follow-on Wild Weasel. I believe that a good deal of work and study went into the concept. There were a number of technical problems, but it may be a possible direction in the future.

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

In the "Enhanced Jamming Powers" section, Maj. Gen. Bruce A. Carlson, in referring to dedicated Weasel and jamming platforms, states that the only areas in which the Air Force can realistically expect to maintain such specialty combat airplanes, is in the air superiority and strike/interdiction roles. It seems to me that in Southeast Asia the North Vietnamese were on the verge of gaining air superiority with their [Surface-to-Air Missiles] and [Anti-Aircraft Artillery]. Enter the Wild Weasels and there ended the possible loss of US air superiority. In the Gulf War the first order of business, once the war started, was defeating the Iraqi air defenses so that air superiority could be gained. Even then, the continuing threat of Iraqi SAMs and AAA kept some of the [coalition] air assets from performing their missions as effectively as possible. In the Balkans the potential threat of some modern SAMs and our inability to counter them effectively made it difficult or impossible for some air assets to be employed in their most effective mode and [kept] others from being employed at all.

Sounds to me like a dedicated SEAD (let that read Wild Weasel) airframe is definitely an air superiority asset. The skills and equipment needed to be successful in the arena of air-to-air combat are very important and will always have a place in establishing air superiority. However, as we have seen, it is difficult at best to gain and maintain air superiority in the modern air combat environment when faced with a tactically smart, well-equipped, and highly mobile integrated air defense system. To relegate the assets needed to defeat this threat and gain true air superiority to a second level, a level which will always be unfunded, unneeded, or unwanted until it's too late, is doing the brave men and women who "fly into the valley" a grave injustice.

Maj. F. Lee "T.R." Marino,
USAF (Ret.)
Apple Valley, Calif.

The importance of SEAD was demonstrated and realized by all who

flew and the leadership in the chain. Unfortunately, as the dust settles and we return to the reality of the budget, SEAD will once again take a backseat to our primary roles and missions.

Perhaps it's time that we in USAF recognize that SEAD and air superiority are inseparable and merge these roles/requirements into a single mission. The stealthy F-22 may be able to roam an enemy's airspace and dominate [his] fighter aircraft, but until our adversary's radar-directed SAMs are suppressed or destroyed, we will not have established air superiority.

Dominance of a [Radio Frequency] spectrum is really the key, as most shooters (air or ground based) work in the same RF band. The F-22 platform is the perfect sensor to engage these threats, supporting all our SEAD requirements and truly specializing in air superiority.

Col. Kurt Dittmer
Luke AFB, Ariz.

In light of the Air Force's position during recent budget battles over F-22 funding and [this] article, I realize that the Air Force's leadership has not taken to heart the lessons learned from recent conflicts. As stated in the article, there is an increasing availability of highly capable SAMs on the open market for countries to purchase to defend their airspace. Both the Balkans and Desert Storm have shown that we are facing enemy leaders that are more concerned about protecting their own interests than the general populace of the country they control. SAM systems are extremely effective in providing these rogue leaders with a means of protecting their centers of gravity. For a fraction of the cost of equipping and training an air force, a country can buy highly automated, highly capable SAM systems that will provide them local air superiority and deny us the freedom to attack these centers of gravity.

In defining air and space superiority as a core competency, Air Force Doctrine Document 1 states: "Control of the air and space ... provides freedom to attack as well as freedom from attack." In the Balkan conflict, as well as Desert Storm, enemy air threats were neutralized to the point of providing freedom from attack, whereas enemy air defense threats were not. The number of surface-to-air engagements overwhelmingly outnumbered air-to-air engagements in both conflicts. Also, the threat of engagement by enemy air defenses forced coalition aircraft to attack from medium altitude, denying them the freedom to attack in their most effective manner. Given that countering both enemy surface and air threats is part of air superiority, the emphasis placed on these missions (borne out in program funding) does not reflect an attitude that they are equal in importance. To counter surface threats, USAF leadership is willing to accept a mix of onboard self-protection systems and SEAD assets that requires aircrews to enter the surface threat's missile engagement zone. However, for the air threat, the leadership demands a robust air-to-air fighter, the F-22, capable of shooting the threat down before the threat even detects the F-22. There is no logical explanation for why the two threats are handled so differently.

This is not the first time USAF leadership has been at this crossroads of dealing with air defenses. Following Desert Storm an Electronic Warfare study was conducted to look at mission deficiencies, and contrary to the findings of the study, upgrades to both the F-4G and EF-111 were canceled, and ultimately the aircraft were retired. The solutions offered in [this] article indicate a continuation of the Band-Aid approach—providing upgrades to current systems—that has gotten us to where we are today. If USAF is to solve its SEAD mission deficiencies, it must invest in the capability to execute the mission.

Fielding this capability will require USAF leadership to advocate funding development efforts and diligently defend these programs during budget drills. The F-22's example has shown that USAF leadership is willing to go to great lengths, even to the extent of sacrificing numerous other programs, to protect a program it deems important. And despite all the rhetoric justifying the F-22, it will not attain air superiority for us; it will only defeat the air threat while leaving the enemy with air superiority over areas protected by his surface air defense systems. Scrapping the F-22 and buying a new dedicated SEAD platform is not the solution either. A balanced approach that provides capabilities to counter both the air and surface threats is more reasonable than the lopsided approach today.

Jim Avrit
Manassas, Va.

F-22 Safe?

Common sense seems to have prevailed on Capitol Hill regarding the F-22, at least for the time being. *[See Aerospace World: "F-22 Survives a Stealth Attack," November, p. 11.]*

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Congress's recent compromise on the funding of the Raptor, successor to the Vietnam–era F-15, will protect the much-needed fighter for the duration. The $2.5 billion appropriation is still $500 million short of the Senate–approved request, but it will at least sustain production through 2001.

While the cost of building and buying the F-22 may be in dispute, the cost of not buying it is not. Without an advanced, next-generation fighter, the Air Force cannot expect to maintain the near-total supremacy of the air it has enjoyed since the Korean War. Critics of the program are quick to point out that with the Soviet Union gone, there's no need to build new, expensive airplanes. But while the Soviet Union may not exist anymore, its fighter aircraft do. And as the need for hard cash grows in Russia, it isn't inconceivable that its government will continue to design and produce aircraft. The same is true for other potential adversaries around the globe.

Another threat comes from the development of new air-to-air missiles. The United States has been slow to develop a next-generation missile, which has allowed Russia to develop and sell the AA-11, one of the world's best short-range, infrared-guided missiles. Russia has also sold its most sophisticated medium-range missile, the fire-and-forget AA-12, along with MiG-29 and Su-27 fighters to Cuba, Iran, Iraq, and North Korea. The sophistication of these missiles significantly closes the gap on the F-15.

The F-22, however, will be far more survivable than the F-15, partly because air-to-air missiles will have great difficulty attacking it. Because of the Raptor's stealth characteristics, it will be nearly impossible to hit with radar-guided missiles. And the carefully managed heat exhaust will minimize the risk of attack from infrared-guided missiles.

The key to maintaining air supremacy is to constantly stay ahead of your adversaries. In this case, that means finding the best replacement for a 30-year-old, unstealthy airplane. That's a far more palatable alternative than seeing a last-generation fighter shot out of the sky when the rest of the world catches up to it.

Phillip Thompson
Senior Fellow, Lexington Institute
Arlington, Va.

The Memorial Issue

Just a note to commend you on your reply to citizen and former Marine J.C. Allen. *[See Letters: "The 'Civilian Branch'?" November, p. 6.]* This whole issue is very perplexing and very sad. The Air Force Memorial will serve as a monument to service and sacrifice. The lengths and means that the Marine Corps (officially or unofficially) [has] gone to keep it from Arlington Ridge only serves to tarnish the honor and dignity that they so treasure.

CMSgt. Charles E. Knaub Jr.,
USAF (Ret.)
Fairborn, Ohio

Kudos to your well-thought-out riposte to J.C. Allen. Harry Truman always said the Marines had great public relations staffs. Maybe now they will quiet down.

Maj. Martin V. Smith,
USAF (Ret.)
Sea Bright, N.J.

Allen's intemperate and childish remarks do more to dishonor fallen Marines and the Corps as a whole than anything related to the siting of the Air Force Memorial.

Col. Bobby G. Yow,
USAF (Ret.),
Fort Worth, Texas

I have been following the debate on the Air Force Memorial location and design and must admit I am dismayed by the entire affair. I do not understand how the Air Force Memorial Foundation managed to turn this into a competition with the Marine Corps. Why does the Air Force Memorial have to be on the Arlington site? And the explanation that it will be down the hill and out of sight does not make me feel better. Our memorial has to be hidden? Winning a battle in the court does not mean winning the "hearts and minds." Only hard feelings and inflamed emotions will result. The site should be reconsidered. Second, the design is bad—there is no other way to say it. I do not feel inspired or uplifted by the chosen design. It looks like a concrete pavilion. I cannot support the planned effort; it is not a fitting memorial to the people of the Air Force.

Lt. Col. Mike Cleveland,
Vandenberg AFB, Calif.

J.C. Allen, former Marine, you know nothing about honor. Your attempt to debase those who have served honorably and many [who] gave the ultimate sacrifice speaks volumes of your own integrity. Not surprisingly, your letter accusing the Air Force of arrogance was in itself an arrogant display of character.

Although you probably wouldn't know it, Air Force history is replete with warriors who fought viciously against a numerically superior enemy or performed acts of bravery worthy of the Medal of Honor. Many died in combat. And you, with the stroke of a pen, imply that their contribution wasn't good enough, that they fell short of honor merely because they were members of the "civilian branch of the armed forces," that their deaths were less than significant. How pathetic.

I, however, will continue to serve my country with honor and salute those who have fallen in the service of this great nation, including the 6,000 Marines who took Iwo Jima.

TSgt. John Galbraith,
F.E. Warren AFB, Wyo.

The Expendable Pilot

I was absolutely shocked as I read "Robert McNamara and the Expendable Pilot" *["Aerospace World," October, p. 16]*. Is it that easy for senior leaders to sacrifice military lives without following legal procedures? In addition, only one senior military officer questioned the order. I sincerely hope that we now have sufficient controls to prevent this kind of laissez-faire management of military lives.

MSgt. Nelson Johnson,
USAF (Ret.)
Dale City, Va.

I was Adm. Harry D. Felt's [Commander in Chief, Pacific, July 31, 1958–June 30, 1964] reconnaissance officer from 1960 through most of 1963. [Retired Cmdr. Glenn] Tierney came aboard the J-3 [operations] staff about 1963. [Marine Brig.] Gen. George Bowman was my J-3 boss until early 1963, when he was replaced by Brig. Gen. Keith B. McCutcheon, USMC. Thus, Bowman [was not] there in 1964.

Tierney states that the recce aircraft was to operate without armed escort, then later stated that the "escort pilot had seen him moving about." In conferring with other people who were on the J-3 staff during my tenure, they were incredulous that Tierney called the Joint Chiefs of Staff on the secure line and "demanded to know who had issued such an order." Staff officers did not contact JCS unless cleared by a flag officer. How Tierney knew there were two choppers 20 miles away while he was way off in Hawaii will remain a mystery to me.

Col. Harold E. Comstock,
USAF (Ret.)
Auberry, Calif.

As Hal writes, I probably should have been referring to McCutcheon as J-3 at the time, rather than Bowman. Whichever one it was on June 5, 1964, it seems immaterial, since I did not talk to either one but went directly to Felt.

As to the photo airplane escort,

[Navy Lt. Charles] Klusmann did not have an armed escort—he had another RF-8 photo pilot, who was also taking photos, but obviously was [not] an armed F-8 fighter [escort]. I can understand Comstock's consternation in this case. I believe this important distinction was not made clear in the edited *Proceedings* article.

As to my demand to know who issued such an order, what I said was that I literally demanded to know who had issued such an order. I did not use the word "demand," certainly not to a flag officer. I did tell him I wanted to know because I knew that the admiral was going to ask me first and work his way up the line. Then, as I said in my story, "I respectfully suggested that he find out as soon as possible and we would be calling him back." It appears Comstock took the first line out of context.

As to the secure line, I was not specifically aware that I needed flag clearance to use the secure line. If I had known, I doubt that it would have stopped me. We had a pilot down and someone was stopping his rescue; all this was happening in real time as Klusmann had been on the ground only a short time. I also know that the CINCPAC duty officer was not cleared for any of the Air America search and rescue operations. I personally find it incredulous that someone else should find my actions under the circumstances "incredulous."

As to the statement "how Tierney knew there were two choppers 20 miles away while he was way off in Hawaii will remain a mystery to me," no problem. I knew because it was my business to know. Part of my field of action in J-3 was search and rescue (all services), and I was involved in many things of which Comstock was not aware. End of mystery.

Cmdr. Glenn Tierney,
US Navy (Ret.)
Carson City, Nev.

She Earned It

As one of Col. Eileen Collins's Test Pilot School instructor pilots over 10 years ago and a space shuttle commander myself on STS-90, I believe I'm better able to comment on her qualifications than [retired] Lt. Col. Karl Hutchinson. *[See Letters: "Since When?" November, p. 8.]* First of all, NASA had in fact previously picked at least one male pilot astronaut while [he was] still in Test Pilot School, so [Collins's] selection was not "politics as usual." And having flown with Eileen in F-4s, T-38s, and sailplanes, I can personally witness to her prodigious flying skills. With a C-141 operational background, she flew the F-4 better than most of the fighter pilots I evaluated. During STS-93 she and her crew very quickly, calmly, and correctly handled a major malfunction during launch. And by the way, *Columbia's* touchdown under her control was as nearly perfect as any space shuttle landing ever—I witnessed it, saw the [head-up-display] film, and reviewed the numbers.

Flying prowess and technical skills, although crucial, aren't the most important traits for a space shuttle commander. In the civilian NASA environment, Collins's tact, patience, goodwill, true concern for others, and great team-building skills make her an outstanding leader and example. For a successful human space mission, those leadership skills are absolutely essential. STS-93 was a great mission, led by a great commander. Period.

Shame on us that still, more than 20 years after the first women to complete Air Force pilot training earned their wings, some folks continue to second-guess any female pilot's significant accomplishment. I guarantee Eileen earned that left seat in *Columbia* every step of the way. Hutchinson not only owes Collins an apology but should congratulate her as a fellow Air Force aviator for her magnificent achievements.

Col. Richard A. Searfoss,
USAF (Ret.)
Astronaut, STS-58, -76, -90
Orlando, Fla.

On Valor

I wanted to commend you on a particularly great section of your magazine, "Valor." This is the first section I turn to when I receive the magazine in the mail. I have noticed, though, that there have been little or no stories about any actions the Air Force performed during the 1980s or the 1990s. I'm sure that the [coalition] action in the Gulf War is good for a few stories at least. I'm very proud of what my grandfathers, fathers, and uncles have done in World War I and II, the Korean War, and Vietnam. But along with that I would like to be proud of the things my friends have done in Desert Storm and Somalia. It would be great if the heroes of today can stand side by side with the heroes of yesterday in your column.

Joesph T. Page II
Las Cruces, N.M.

■ *The Valor series, which has been running continuously since 1983, came to an end with the December 1999 issue. The main reason is that John Frisbee, who was the author of the series for most of the run, is no longer able to continue because of age and health. Before that, though, it was becoming increasingly difficult for him to find instances of valor that were on a par with those covered earlier. We opted to close out the series. Actually, we have been running reprints for quite awhile now, and all the articles are on the magazine section of the AFA Web site (www.afa.org). We will continue to run hero stories, but not in the Valor format. We would like nothing better than to publish more stories of contemporary valor. Given a chance (see the June 1994 cover story, "Heroes at Mogadishu"), we will do so.*—THE EDITORS

The Flying Undertaker name on Medal of Honor [recipient] Bill Shomo's P-51 was more than the usual warbird penchant for cute nose art. *[See Valor: "Instant Ace," November, p. 54.]* Bill actually was an undertaker before signing up as an aviation cadet, and after his spectacular feat of downing seven Japanese airplanes in a P-51, returned to his trade.

Ben Nicks
Shawnee, Kan.

I always enjoy Valor. It is most important to always have a reminder of who got us here. I am aware the article "Crisis in the Cockpit" [*October, p. 59.*] is a reprint, but I would call attention to the fact that on March 4, 1944, Berlin was attacked by the 95th Bomb Group and a squadron from the 100th BG. The 95th BG commander ignored a recall order, thinking it was false, and proceeded to carry out the mission. My father's fighter group, the 357th, also ignored the recall and stayed with the formation.

Mike Howell
Vancouver, Wash.

As a World War II Air Corps vet, I take war stories with a grain of salt, as time seems to obscure memories and enhance events. The story about Lt. John Morgan *["Crisis in the Cockpit"],* as reported, fits that scenario to a T.

A bomb run at 26,000 feet? Not in my 25 missions—18,000 to 20,000 was SOP [Standing Operating Procedure]. The pilot would have died without oxygen, true, yet the waist and ball turret gunners reportedly survived without oxygen for over two hours. With the console between pilots containing throttle, flap, landing

gear, and numerous other controls, the copilot could not reach far enough to hold the pilot in place for up to two hours. My 200 hours on the flight deck of a B-24 taught me that flying a heavy bomber was extremely physical, and a damaged one would have required two hands—keeping it in formation with one hand [was] impossible. No pilot would have jeopardized other airplanes in his squadron by flying erratically as reported by the navigator, bombardier, and engineer.

Morgan may well have earned his Medal of Honor but not in the manner as related in the article.

Leo Harding
Fairmount, W.Va.

■ *The MOH write-up (prepared at the time, not years later) states that Morgan "flew in formation with one hand at the controls and the other holding off the struggling pilot." The write-up further confirms that the B-17 was above 20,000 feet, where oxygen would be needed, because "the waist, tail, and radio gunners had lost consciousness from lack of oxygen." How long they were at a higher altitude is unclear. However, the MOH write-up passed the scrutiny of USAAF officials, including Lt. Gen. Ira C. Eaker.—THE EDITORS*

The First Radar-Equipped Fighter

Your obituary for Maj. Gen. Oris B. Johnson in the November issue (p. 23) is in error when you state that the P-61 Black Widow was the first radar-equipped fighter ever fielded by the US. P-61s entered combat in May 1944, replacing relatively useless Douglas P-70 Nighthawks (modified A-20 Havocs) which were in service in the Pacific from late 1942. During 1943, several USAAF units were equipped with British Bristol Beaufighters in the Mediterranean. The P-61 was the first night fighter equipped with an internal dish antenna, while these previous radar-equipped night fighters had various external Yagi–type antennae, but the US fielded many radar-equipped fighters before Northrop's fine machine was ready for combat.

Col. Scott A. Willey,
USAF (Ret.)
Fairfax, Va.

Route Pack 6, Several Views

Walter Boyne's recent article on F-105s in Vietnam preaches to the choir that the Washington politicians were the reason for our failure to be successful in that war. *[See "Route Pack 6," November, p. 56.]*

The truth is the military leadership was writing checks their flight crews couldn't cash, leading the politicians to believe we could successfully interdict the Ho Chi Minh Trail. The average [Circular Error Probable] of F-105–delivered iron bombs was around 425 feet, and some units got as high as 475 feet.

Because of that and because of heavy losses from small-arms fire below 2,000 feet, we were using 45-degree dive angles and releasing bombs at 7,000 to 8,000 feet [above ground level]. The fire-control radar system on the F-105 was quite sophisticated but designed for tactical nukes delivery in the air-to-ground mode and required too much of the pilot's attention to operate and fly the airplane.

I asked an F-105 pilot friend who was flying missions out of Takhli [RTAB, Thailand] in 1967 how he aimed his bombs, and he pointed to the grease pencil in the shoulder pocket of his flight suit. He used it to put an X on the canopy and aimed off it when he rolled in. Visibility was also usually poor, with smoke and dust obscuring the ground. Obviously, your chances of killing trucks and bicycle carts with F-105s and F-4s along the sometimes visible red dirt tracks that were the Ho Chi Minh Trail were not good under those conditions.

The B-52 target-box strategies were also woefully deficient and the vast majority of those bombs wasted, tonnage giving a false impression of our results. It was our failure to successfully interdict which was the major reason the war was lost, not the decisions of Washington politicians. Our military leadership back then failed to admit to these limitations, fearing for their careers were they to bring the bad news to the appropriate levels.

Instead, they pressed the political leadership for more forces and mostly got them. In my experience, problems are not solved until they are brought into the light, discussed, and examined. We don't benefit from debate over which arm of the service won the last war. Those engaging in that debate do a great disservice to the team effort needed to carry out the mission.

It is not the point of this letter to criticize those aircrews. They did all they could with what they had. The point is to demand our military leadership honestly and fully confront our weaknesses and deal with them, not to continue to shift that responsibility anywhere else.

Escalation theory was the prevailing doctrine then and was supported by the military, as was taught to me at Squadron Officer School in 1964. Hindsight establishes we didn't know what we were talking about. Blaming

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AFA's Mission

To promote aerospace power and a strong national defense.

To support the needs of the Air Force and Air Force people.

To explain these needs to the American people.

politicians for it is to hide from our own shortcomings.

Let's not do that again. We still need, as we did then, high-quality real-time intelligence on where targets are located, the ability to very quickly frag weapons against those targets, and accurate, survivable weapons delivery systems at prices that don't bankrupt the country. What all of the debate over Kosovo and how many of what was destroyed by whom tells me is that although we are better now, there is still considerable room for improvement.

Let's get to work on it. Your magazine and the articles you print should lean more in the direction of honest critiques of those weaknesses and address the ranges of solutions for them, to include cost information. It would also help the civilian industrial component of national defense to become aware of problems and to be involved with the solutions. For example, why don't [US] Army armored vehicles carry secure [identification, friend or foe] systems and ground-attack systems (including armed helicopters) have the ability to interrogate them, thereby reducing friendly fire losses, something seemingly within easy technological reach at relatively low cost?

Lt. Col. Charles M. Meyer,
USAF (Ret.)
Stanton, Neb.

A war so fraught with senior leadership blunders is quite succinctly [portrayed] by Walter J. Boyne. So-called "gradual escalation" is a no–no in any warrior's language, a principle rule of engagement that goes back to 1776. From the beginning, North Vietnam realized that the United States was superior, but [its leadership] must have also gambled that [the US] military hierarchy was in disarray.

From the Oval Office, the Secretary of Defense, the Joint Chiefs, to the commander in Vietnam, all must share equal responsibility for the carnage and deep humiliation heaped upon the American military. Neither can one totally rule out the body politic—only one US Senator stood in opposition.

But was it a complete failure? Capitalizing on their predecessors' mistakes, the planners who occupied those same offices during Desert Storm had learned their lesson well: Start with full thrust and never, ever allow the enemy the luxury of organizing a defense.

CMSgt. Lloyd M. Greenwell,
USAF (Ret.)
North Little Rock, Ark.

After many years I finally read something in *Air Force* Magazine about the aircraft I served as a crew chief on—the EB-66. The mission description given in this article seems accurate.

The one EB-66 shot down by a MiG is different from my memory. I was at Takhli in 1969–70, and the EB-66 was lost after I returned to the States. I read an article that told how the EB-66 had been hit by ground fire after it had tried to dive under multiple missiles that had just been a lucky shot in the dark. Also, I understand that the movie "Bat-21" was the story of that EB-66 that was shot down and of the pilot who used coded messages about the Shaw AFB [S.C.] golf course to help the rescue aircraft know his movements on the ground as he evaded capture.

SMSgt. Frank Waddell,
Air Reserve Technician
Charleston AFB, S.C.

■ *Check out "The Other Jammer," March 1992, p. 74.—THE EDITORS*

There I was, in March 1966, in my trusty Voodoo (RF-101) hastening to leave Route Pack 6 after a five-minute poststrike photo op, when on strike frequency I heard, "All single -105s, rock your wings. I think I have a MiG in sight." Trying to get more than 540 knots out of my old bird while vigorously rocking the wings, and in a voice which to me sounded calm (no doubt three octaves higher than normal), I replied, "Be careful, there's at least one recce up here, too." We weren't many, but we were also there.

Maj. Gen. Larry Garrison,
USAF (Ret.)
San Antonio

I would like to correct a misperception. The author indicated that "sufficient airborne warning and control aircraft became available at last" in 1972. In fact the old EC-121 Warning Star (or Super Connie) was flying for years prior to 1972; my first College Eye Task Force [Temporary Duty] was in 1968 to Korat RTAB [Thailand], and I was a bit of a Johnny-come-lately, as the original Joint Chiefs of Staff tasking occurred in April 1965. I would, however, like to thank the author for the positive recognition of our efforts.

Maj. Donald R. Hilburn,
USAF (Ret.)
Albuquerque, N.M.

I thoroughly enjoyed the article, but I wish [Boyne] had mentioned weather satellite imagery used in the Route Pack 6 missions. In late 1966 and early 1967, I was weather detachment commander at Korat and later special projects officer at [Military Assistance Command, Vietnam] IV at Cholon, South Vietnam, and Tan Son Nhut AB [South Vietnam], where I had two USAF officers and 10 USAF noncommissioned officer technicians working with me and over a million dollars' worth of meteorological spacecraft-receiving equipment for tracking, processing, gridding, analyzing, and disseminating imagery from polar-orbiting weather satellites.

In a CBS television interview in the late 1960s, Gen. William W. Momyer, the commander of 7th Air Force in Vietnam, declared that meteorological satellite usage in Southeast Asia operations was among the most significant innovations of the war.

Lt. Col. Hank Brandli,
USAF (Ret.)
Melbourne, Fla.

I was the "Chief Crow" in the 2nd Air Division in summer 1965. The B-66Bs were still in Saigon, and the other half of our Electronic Warfare force was in Da Nang [South Vietnam]. VMCJ-1 of the 1st Marine Air Wing flew the EF-10B, "Willie the Whale," out of Da Nang under USAF direction. You see, VMCJ-1 was assigned to the 2nd AD. The Marines were a valuable asset in the establishment of an effective Electronic Warfare program in Vietnam.

The B-66s and the EF-10Bs were flying recon missions to establish an electronic order of battle. It took a mission by the EF-10Bs to get everyone's attention and interest in using the B-66 and EF-10Bs. The VNAF [South Vietnamese Air Force] was planning an attack on Dong Hoi AB [North Vietnam] and heard that we had something that could help and asked for our assistance. We assigned one EF-10B, with a "Cottontail" call sign, to arrive 10 minutes ahead of the VNAF so that it could jam the lone fire-control radar on the base. They arrived on site, began jamming and even dove on the radar. The radar [was] shut down because [the ememy wasn't] sure what was happening. The VNAF arrived shortly and successfully attacked the base. The following day, 2nd AD received notice from the State Department that the VNAF would have Cottontail support aircraft any time they went North—and what is a Cottontail aircraft? When the Air Force pilots heard of this they, too, wanted electronic countermeasures support. From then on,

we began to see EW aircraft providing real combat support.

The B-66Bs, RB-66Cs, and EF-10Bs were instrumental in locating the numerous SAM sites and flying numerous special missions. Their work led to the Iron Hand concept and eventually the Wild Weasel. I suggest that your readers might find it interesting to read about the USMC role under the Air Force in Vietnam.

Maj. Roger Boan,
USAF (Ret.)
Beavercreek, Ohio

With regard to [this] very worth-reading article, I would like to make a correction and two additions. Boyne states that aerial combat started inauspiciously for the US when MiG-17s attacked and shot down one F-105 and damaged another on April 3, 1965. It was even worse: Two F-105Ds in the same flight were downed by MiG-17s of [North Vietnam's] 921st Sao Dao Fighter Regiment. Both [USAF] pilots, from the 354th Tactical Fighter Squadron, were listed as killed in action. By the way, the date was April 4.

Boyne also mentioned the differences in tactics and styles of fighting between Korat's 388th and Takhli's 355th TFWs. I'd like to add two striking differences in this respect: (1) the wings had different (QRC-160/ALQ-71) ECM-pod formations, and (2) all 388th TFW's F-105F Wild Weasel aircraft were concentrated in just one squadron, while all three squadrons of the 355th had Wild Weasel Fs assigned.

Theo van Geffen
Utrecht, Netherlands

More on Reconnaissance

Walter J. Boyne's informative narrative, "Reconnaissance on the Wing" [*October, p.72.*], noted that the weather to Japanese targets "was often bad." That's an understatement.

The operational demands of that theater came to focus on weather as a specific mission of air reconnaissance, essential to providing integrated synoptic data to all services and mission route weather to individual air units. The 55th Weather Reconnaissance Squadron, Long Range (later, Very Long Range), was organized as the first to fill this mission in any theater. Flying B24-L/M, modified with special equipment and fuel tanks, missions were flown by single aircraft, often exceeding 14 hours' duration, over those vast ocean distances and over Japanese territory and homeland.

Helmut E. Nimke
Tuxedo, NY

This article was well-written and well-done. I would call attention to one sentence that I believe needs to be corrected. On p. 75, [the author calls] an American Douglas SBD a torpedo bomber. [When I was] a rear-seat gunner on the SBD and SB2C dive-bombers in the South Pacific during World War II, they were referred to as dive-bombers and scout bombers, but this is the first time I have heard torpedo bomber.

Col. H. Lively Brown,
USAFR (Ret.)
Granbury, Texas

In 1956 I was an instructor pilot for the new German Luftwaffe, stationed at Fürstenfeldbruck AB [Germany] and was one of the 11 American pilots in the cadre of their first operational F-84F squadron. The name of the game in those pre–SAM days was to be as high as possible. Those late-model (-71s and -77s) Superhogs the Germans had would climb smartly to 46,000 feet—and that was it! That was the ceiling.

One day I was leading three Luftwaffe pilots at our peak altitude when I spotted four somethings that appeared to be four aircraft in finger-four tactical formation heading east, so far above us they were unrecognizable as to what they were. The air at that altitude is pretty clear, and I had 20/15 vision in those days. Those objects had to have been at least 10,000 feet above us. They were just little white blobs. And, yes, the other pilots in my flight also saw them. I followed under those objects until [I] had to turn my flight back west. Those four objects continued going east, over Czechoslovakia, and disappeared still heading east.

To this day I do not know what sort of aircraft they were—or whose they were! We were pretty used to the new F-100s bouncing us from 50,000 feet, but these objects were much, much higher than that. I don't buy UFOs; because of the formation, I think they were somebody's aircraft. The fact that there were four of them rules out U-2s. We at Fürsty certainly knew about the B-45s at RAF Sculthorpe [UK]. They had a habit of collapsing their nose gear while taxiing at Fürsty—a prime R&R spot, compared to Sculthorpe!

Col. Thomas E. Colvin,
USAF (Ret.)
Sperryville, Va.

In late summer of 1950 we were deployed to Yokota AB, Japan, with three RB-45s at 85th Bomb Squadron, Det. A, Tactical Air Command. We started to fly recon missions over Korea immediately upon arrival. Captain McDonald was our detachment commander. The Air Force never admitted it, but McDonald and crew and a colonel from the Pentagon were shot down over North Korea in December 1950. [McDonald's] wife and daughter found this out through the Freedom of Information Act in the late 1980s or early 1990s. The 85th BS, Det. A, was deactivated in May 1951, and the other two RB-45Cs and the flight and ground crews were assigned to Strategic Air Command at Barksdale AFB, La. SAC, at that time, had all of the RB-45Cs and continued to fly missions over Korea.

SMSgt. John I. Mangum,
USAF (Ret.)
Roseburg, Ore.

RB-36s are rarely ever mentioned, and their missions are never described. In March of 1953, I, as a two striper, was sent with the 717th Strategic Reconnaissance Squadron to RAF Fairford, UK, and later to RAF Lakenheath, to fly what I'm sure were not "routine training missions."

After our arrival, we were briefed that our mission was classified but was to be photo mapping. Where? We were not told, but the [photos] were quite necessary for the security of our country. These missions went on for well over a year, with each squadron being at Lakenheath for 90 days.

As young kids, we were all ears when we would hear stories about turrets being rolled out and other encounters. Whether they were true or not, I never knew. I think it is time one of our great authors of Air Force history writes an article on these and other B-36 missions, which SAC was flying around the world. I know there are a lot of exciting stories that should be told before the men involved are no longer around to tell them.

CMSgt. Dick Ott,
USAF (Ret.)
Great Falls, Mont.

Why does the Air Force refuse to recognize the existence of the 91st Strategic Reconnaissance Squadron and [its] contribution to the Korean War? I know that much of our work was classified, but it has surely been downgraded by now.

As NCOIC–Aerial Photography, I was in charge of "Project Charley," 1952–53. At the request of SAC, we designed, built the equipment needed, then flew the mission that produced the first acceptable high-altitude night photos ever acquired by the Air Force.

SMSgt. Robert R. Ott,
USAF (Ret.)
Paonia, Colo.

Aerospace World

By Peter Grier

Ralston Says USAF Committed to JSF

The Air Force is committed to building a Joint Strike Fighter that stays within existing cost caps, according to Gen. Joseph W. Ralston, vice chairman of the Joint Chiefs of Staff.

The terms of the service's participation in the JSF effort have become an issue in the wake of Congressional efforts to derail the F-22 program. If the air superiority Raptor were to be canceled or drastically scaled back, the Air Force might have to re-evaluate the JSF, USAF officials said this fall.

"I have not changed my position that the key to success for our Tacair modernization program is to build an affordable JSF," Ralston told a Senate hearing Oct. 27.

Operational requirements for the aircraft are not etched in stone, however, Ralston pointed out.

"There is still a great deal of work to be done to determine the proper statement of requirements," he told the hearing, which was held for the purpose of weighing his nomination to become commander in chief of US European Command.

Loss of the F-22 could affect the JSF because it is not currently configured to shine in the air superiority role for which the Raptor is intended.

Adding air-to-air capability to the JSF could be expensive, particularly as the Air Force intends to buy more than 1,700 of the aircraft. "We need both aircraft," Air Force Chief of Staff Gen. Michael E. Ryan told an Oct. 26 Congressional hearing.

Class A Accidents Decline in 1999

Fiscal 1999 was one of the safest years on record for US military aviation, according to just-released statistics. The Class A accident rate for the year was 1.58 mishaps per 100,000 flight hours. That represents a 4 percent reduction from 1998's figure of 1.64, according to the Department of Defense.

In addition, the five-year Class A crash rate is 25 percent lower than the previous five-year rate.

USAF photo by SSgt. Kevin J. Gruenwald

Russian–made MiG-29s from the 73rd Steinhoff Fighter Wing of the German air force fly with F-16s from Nellis AFB, Nev., during Red Flag exercises. German pilots flew five Fulcrums from Laage, Germany, to Iceland, Greenland, and Canada, arriving at Nellis in late October. The squadron has 23 Mig-29s it acquired from East Germany following German reunification in 1990.

The military lost 43 people and 55 airplanes to crashes during Fiscal 1999. The Air Force's 12-month cumulative Class A rate was 1.40.

"Even one accident is one too many, and I continue to advocate continuous improvement until we reach a goal of zero accidents, occupational illnesses, and fires," said Secretary of Defense William S. Cohen.

The most dangerous item of equipment for military personnel remains their own automobiles. Vehicle crashes accounted for 280 deaths in 1999, up from 249 in Fiscal 1998.

Airborne Laser Backers Fight Cuts

A DoD–proposed cut of $258 million in the Airborne Laser Program budget could end up costing the Air Force upward of $700 million in increased costs for the anti-missile weapon, say ABL proponents.

A letter to Secretary of Defense Cohen, signed by 20 senators, said it was likely that the move would both raise final costs and slip the program's schedule by up to two years.

"While we understand the financial constraints under which you are operating, we oppose changing the ABL's schedule for any reason other than unforeseen technological problems," said the letter.

The Air Force Association urged Cohen to back away from the proposed cut. AFA said the ABL was "among the most promising" of the Defense Department's ballistic missile defense efforts.

"ABL is the only boost-phase missile defense program," AFA National President Thomas J. McKee said in a Nov. 9 letter to Cohen. "In comparison with other programs, the cost of ABL is extremely modest. But the effect of the proposed cut is not. It will disrupt a program that was just restructured last year and possibly delay deployment for up to two more years. Missile defense is an urgent national priority."

Two Army Divisions Rated Unfit for Major War

A classified evaluation that became public in early November showed that

two of the Army's 10 combat divisions have been rated as unready for major theater war.

It marked the first time in at least seven years that an Army division had received such a C-4 readiness rating. The units in question are the 10th Mountain Division, Ft. Drum, N.Y., and the 1st Infantry Division, headquartered in Germany.

The main reason for the low rating is that both units have at least one brigade serving peacekeeping duty in the Balkans. Rating them unready may be something of a political statement by Army leaders looking for relief from the expense and strain on personnel of continual deployments.

"The commanders have lowered readiness assessments out of concern that they may be unable to disengage from the Balkans, retrain, and redeploy forces in time to meet their major theater war requirement deployment dates, as specified in current war plans," said a senior Defense official at a Pentagon briefing Nov. 10.

None of the other divisions received the highest rating, C-1. All were rated C-2 in the monthly report, said an Army official.

The problem goes to the heart of a balancing act that all the services now undertake, said a Defense official. How do commanders weigh the need to maintain an edge for heavy combat vs. the demands of peacekeeping and humanitarian duty?

"Clearly, we've got more complex issues of how we train to be ready for the high end as well as the low end, of which we've deployed about 45 times in the last nine years on the low end," said the official.

Peters Details Philosophy of EAF

Now that the first two Aerospace Expeditionary Forces have been assembled and deployed in part to Southwest Asia, Secretary of the Air Force F. Whitten Peters thinks it is a good time to promote the Expeditionary Aerospace Force gospel throughout the US military.

It is important to emphasize that "EAF is a journey, not an end state," he said in a commentary released in early November.

By that, Peters means that the new way of organizing is not just one event. "It is a completely different way of looking at how we do our business," his commentary said.

The establishment of new training courses for both young enlisted members and young officers shows the type of change in thinking Peters wants in the service in regards to EAFs. Warrior Week during basic military training at Lackland AFB, Texas, and the Aerospace Basic Course at Maxwell AFB, Ala., will both get new personnel thinking about the Air Force as an expeditionary force able to respond to crises around the globe.

By spreading around the responsibility for deployments, AEFs should make life better in the Air Force—Peters' self-proclaimed No. 1 priority for 2000.

"The EAF will also lessen the high work levels at home stations by putting enough manning on our bases to do the work, even when units are deployed," wrote Peters.

Implementation of the concept won't be pretty at first, the Secretary admitted. But the experience of Operation Allied Force, in which the US Air Force deployed to 20 bases with seeming effortlessness, shows that it can succeed. In the Kosovo crisis USAF personnel transformed facilities with no US infrastructure into fully operational bases within hours or days.

"The initial AEFs include many men and women who have been involved in Kosovo and other operations this year," wrote Peters. "It is not ideal to ask these men and women to leave again so quickly, but it is essential if we are to find a long-lasting solution for optempo and perstempo."

The mind-set of the Air Force can't be changed without the hard work and support and feedback of everyone in the organization, he noted.

"I need the help of all Air Force members to get the word out about EAF. I need them to take time to understand the vision and our goals," wrote Peters.

USAF photo by TSgt. Michael Farris

USAF personnel from Pacific Air Forces provided humanitarian support to Vietnam after recent flooding. Above, SSgt. John Brooks, 17th Special Operations Squadron, Kadena AB, Japan, wraps up a loading strap after delivering flood relief supplies. C-130s from Kadena's 353rd Special Ops Group delivered 21,760 pounds of plastic sheeting, 3,600 blankets, and 4,800 water containers.

Group Warns About Missile Defense Effort

The Pentagon's effort to develop an anti-missile system remains at "high risk" of failure, according to a new report by a group of civilian experts and retired military personnel headed by former Air Force Chief of Staff Gen. Larry D. Welch.

Delays in testing and development have pushed the program hard up against politically imposed time deadlines, said the Welch report, which echoed earlier criticisms of the program made by the same group in early 1998.

While a prototype interceptor successfully hit an incoming re-entry vehicle over the Pacific in October, as yet no tests have attempted to integrate the entire anti-missile system, noted the report. Only two exercises that tie together the interceptors, radars, and controlling computer systems are scheduled before next summer, when President Clinton is supposed to decide whether to go ahead with deployment of something that will cost upward of $10 billion.

Furthermore, the program remains fragmented, with different parts of the military pursuing their own parts of the pie, noted the report. This has occurred despite some progress made since Boeing was hired to oversee development work.

"Instead of unusual clarity, there is unusual fragmentation and confusion

Shinseki and the F-22 Letter

On July 28, with the F-22 under assault in the House, all six members of the Joint Chiefs of Staff sent a letter to senior lawmakers expressing support for USAF's new fighter.

Rumors have circulated—sometimes in print—that the Army Chief of Staff, Gen. Eric K. Shinseki, signed only under duress, after prolonged "arm-twisting" by, among others, Gen. Michael E. Ryan, the Air Force Chief of Staff, Army Gen. Henry H. Shelton, the JCS Chairman, and William S. Cohen, the Secretary of Defense.

At a Nov. 10 session of the Defense Writers Group in Washington, Shinseki told this story:

Q: Were you politicized by having to sign the F-22 letter? ... Were you forced into doing something that wouldn't be natural because you are not in charge of threat assessments or the F-22 or other aircraft?

Shinseki: First of all, the call was not initiated by Mike Ryan and certainly not by the Chairman or by the SecDef. There was some description of yelling or screaming or some indication that there was great disagreement. There wasn't. The letter came down, asking for my support on F-22, and I called General Ryan and I said I don't know enough about the F-22 to sign this letter; I am not going to sign it. No one has made the effort to come down and educate me, but I'd be happy to be educated.

I said I would call the Chairman and inform him that I had taken this position, and I did, and the Chairman encouraged me to take the briefing offered by the Air Force. I did, and it really was about technology and the technologies associated with the F-22 that the Air Force desired and felt was important for a joint contributor to the warfight, and then I agreed to sign the letter. I didn't sign up necessarily to whatever numbers are involved here, but it was my agreement that the technology was important.

Q: Who did initiate asking you to sign the letter?

Shinseki: I think it did come down, as I recall, from Mike Ryan's office.

Q: But not Mike Ryan himself?

Shinseki: No. The letter showed up. It was carried in, and I was asked to sign it, and I called him and, after reading the letter, said, "Look, I am not going to sign it, I am not prepared to sign it at this point," and that started the follow-up to that.

Q: It wasn't from Secretary Cohen or the White House?

Shinseki: In fact, I had never talked to Secretary Cohen or anybody at the White House. That was one chief to another, and I responded, and, in deference to him, because I was disagreeing with another member of the Joint Chiefs, I told him I would call the Chairman and inform him that I had taken that position, as a courtesy to the Chairman.

Q: To follow up, for the historian, was there arm-twisting?

Shinseki: In terms of, "Sign it," no. No arm-twisting involved.

about authority and responsibility," said the study.

Defenders of the program admitted that some technological criticism was in order, but the context of a dangerous world means that the US needs to forge ahead.

"We don't have the luxury of time," said Sen. Thad Cochran (R–Miss.), an anti-missile system proponent. "Because of the threat, we have no choice but to accept a high-risk program."

Congress Gets DoD Report on Reserve Health Benefits

On Nov. 8, Secretary of Defense Cohen sent Congress a study of National Guard and Reserve health benefits and entitlements that recommends sweeping changes to ensure that America's part-time military members get the care they need.

Reservists are an increasingly important part of the Total Force, and they are increasingly called upon to put themselves in harm's way. Yet medical policies for the Guard and Reserve were established long before today's era of regional scenarios and humanitarian aid airlifts.

"The findings of this report are compelling and important because the changed nature of today's Total Force requires a new approach to providing medical care to our reservists," said Cohen. "At the core of this new approach is the notion that performance of duty, not length of duty, establishes risk and exposure to harm."

That means the military should change to make sure it will treat injury or illness sustained in the line of duty, regardless of the duty status in which the individual was serving at the time.

Among the report's 14 recommendations:

Congress should vote into law or DoD should write into regulations specifically what constitutes "incurring" or "aggravating" an injury, illness, or disease in the "line of duty."

DoD should be able to place a Guardsman or Reservist who is injured or becomes ill during inactive duty training on active duty for the period of treatment or recovery.

DoD should be able to waive or reduce Tricare annual deductibles for the dependents of reservists ordered to active duty for less than one year in support of a contingency operation.

The dental care options available to Guardsmen and Reservists should be expanded.

The report is part of a three-year effort to reassess reserve component health care issues. It was produced by the Offices of the Assistant Secretaries of Defense for Reserve Affairs and for Health Affairs.

Airman's Death Brings Training Changes

The Air Force on Nov. 24 released a report of the investigation into the death of Amn. Micah J. Schindler, citing the cause of death as heatstroke complicated by overhydration.

At the same time, Air Force officials recommended changes of procedures in basic training.

Schindler died Sept. 12, two days after he became seriously ill near the end of a 5.8-mile field march during basic military training at Lackland AFB, Texas.

Air Force medical experts sought out recent studies on the subject of water intoxication and excessive water consumption. Water intoxication and the resulting low blood sodium levels lead to an increased tendency for internal organs, such as the brain and lungs, to rapidly absorb the excess water and swell. This phenomenon played a critical role in the death of Schindler, according to the investigation.

The investigating officer's recommendation for procedural changes include:

- Increased instruction on heat-related illness symptoms and the risks of overhydration.
- Better procedures to help training instructors and medical personnel monitor the medical status of trainees.
- Increased efforts to encourage trainees to identify personal or fellow trainees' problems and automatic removal from field exercises for trainees with certain medical symptoms.

In addition, the Air Force will move the 5.8-mile march to a time earlier in

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Will the Real F-22s Please Stand Up?

USAF will acquire six F-22 fighters with funds provided by Congress in the Fiscal 2000 budget. But what kind of fighters will they be: Test aircraft? Production aircraft?

The answer isn't clear, given the way Congress recast the program, delaying a production decision but continuing with the construction of air vehicles.

Note, for example, a Nov. 17 Air Force News story containing this statement by Maj. Gen. Claude M. Bolton Jr., program executive officer for fighter and bomber programs:

"These six airplanes will be operational test and evaluation airplanes, because they come from research and development funds, but they will be production airplanes. ... You won't be able to tell the difference between what that aircraft will look like in a year or two, vice what it was going to look like before we had to change the 'color' of money."

the day, part of scheduling changes for Warrior Week training.

AMC Chief Expresses Concern for Future

The Department of Defense is currently revising its airlift requirements with an eye on the importance of mobility assets to future regional conflicts and humanitarian aid scenarios.

However, the commander of Air Mobility Command, Gen. Charles T. Robertson Jr., worries that new transport airplanes will not come fast enough and may not make up a big enough fleet to meet all the nation's needs.

"I wonder when we get to the end of that road whether it will be enough?" Robertson said at a House Armed Services readiness subcommittee appearance on Oct. 26. Robertson also is commander in chief of US Transportation Command.

The planned purchase of 134 C-17s to replace 270 C-141s is all well and good, but tonnage capacity is not the same as airlift capability, he warned. While the new C-17s will be able to carry about the same weight of cargo as the C-141s they replace, the obvious fact that there are fewer of them will limit airlift flexibility.

"In other words, 134 C-17s can only be in half as many places as 270 C-141s," he said.

The planned C-5 Reliability Enhancement and Re-engining Program could help. It will be a long time coming, however—if it comes at all.

"Even if we succeed, ... we will not see [C-5 mission capable] rates rise significantly until 2005," said the TRANSCOM chief.

The C-5's current mission capable rate is about 58 percent, Robertson told lawmakers.

Cohen Says Housing, Health Care Need Work

Now that Congress has raised the military's pay, housing and health care loom as the two biggest issues for service members, according to the Secretary of Defense.

Improving these areas is important, because even with the raises provided by the FY 2000 defense authorization act "we can't possibly pay what the private sector can pay and will pay," said Secretary of Defense Cohen at a Nov. 2 conference in Washington.

Things are getting better, Cohen hastened to add. The new pay scales, plus changes in the retirement system, have already made a difference in attitudes.

"We've seen in the most recent weeks some change in the attitude and willingness to re-enlist," he said. "Whether this will be enough to sustain that remains another question."

In his travels to installations around the country, the biggest complaints Cohen now hears are about the Tricare health care system, he said. Many people are not satisfied with the system and its perceived inefficiencies and long lines.

"This is something we have to come to grips with," he admitted.

Housing is second on the new complaint list. DoD is trying to leverage its housing money via a new program that attracts six or seven private dollars per DoD dollar for housing projects, said Cohen.

He praised the new Air Force Aerospace Expeditionary Force concept as a way to provide more stability in military life. But more than stability will be needed to attract recruits in today's economy, he said.

DoD must change its recruiting message, said the Secretary.

"The mere fact that we say we'll pay for your college education frankly is not a big seller today. ... We need to have advertising appeal to young peoples' patriotism, to show them what military life can and should be," he said.

Kosovo Air Boss Finds Fault With France

The NATO air campaign against Serbia began too slowly, and political considerations increased the risks run by US and allied pilots, a top USAF general told a Senate panel Oct. 21.

Lt. Gen. Michael C. Short, commander of Allied Air Forces Southern Europe and head of USAFE's 16th Air Force, was particularly critical of France. Certain targets that French leaders did not want the alliance to strike were deemed off limits at the outset of the campaign, he said. To guard against collateral damage as much as possible, sensitive sites such as bridges could be bombed only at times of day when civilians were least likely to be near.

Yet France contributed only 8 percent of Operation Allied Force's sorties, said Short, who acknowledged that he was being perhaps impolitic with his remarks to the Senate Armed Services Committee.

Allied Force should have more closely resembled Desert Storm, said Short, with a heavy punch aimed at the heart of the Serb regime in the first moments of conflict.

F-22 Testing Progresses

During a November sortie by Raptor 4002, the F-22 test program passed its 433rd flight hour. That accumulated time represents 10 percent of the program's planned flight testing—an important milestone of development.

Historically, most major design or performance flaws in jet aircraft have surfaced by this point in the test regime. So far, the F-22 has suffered no such problems, say program officials.

Earlier in the fall, the F-22 contractor team successfully completed engine runs on Raptor 4003. The runs, which included generator checks and environmental control system flow checks, checked off one more of the nine major steps the F-22 had to take last year before the Pentagon will consider putting the airplane in low-rate production.

"Only one more [Defense Acquisition Board] criterion to go—delivery of the F-22's Block 2 software to the program's flying test bed—and we will have completed all DAB criteria for 1999," F-22 program director Maj. Gen. Michael C. Mushala said Oct. 22.

DAB goals surpassed last year included flight at Mach 1.5 without use of afterburners, flight at greater than 60 degrees angle of attack, and initial radar cross section full-scale pole model testing.

USAF Photo by SSgt Rachel Butler

At Andersen AFB, Guam, Maj. Gen. Daniel Dick, 13th Air Force commander, places a wreath on a coffin during a ceremony conducted for 11 US service members who were missing in action from Laos, Vietnam, and North Korea. Their remains were brought back in November from Hanoi and Thailand by the 446th Airlift Wing (AFRC), McChord AFB, Wash.

Cohen Addresses Anthrax Questions

The current effort to vaccinate all US military personnel against anthrax should not be equated with the Pentagon's use of Pyridostigmine Bromide as an anti-nerve gas shot during the Gulf War, said Secretary of Defense Cohen on Oct. 20.

The Pentagon has released a RAND report that says there could be a connection between PB and unexplained Gulf War illnesses. Hot, stressful conditions might cause the brain to absorb damaging amounts of the substance, RAND researchers speculated. More study is needed, because current information is inconclusive, said the study.

Yet growing worry over the first vaccination effort should not be allowed to sow doubts about the current one, insisted the Defense Department chief at a press conference in the United Arab Emirates.

"What we have to do is make the best possible policy judgements," said Cohen. "Given the potential for our forces to be exposed to an anthrax threat, which is one of the most deadly they could encounter, it would be irresponsible not to insist they be properly protected."

At the time it was dispensed to some 250,000 US troops, PB was not fully licensed by the Food and Drug Administration. But it was the only available protection against soman, a deadly nerve gas that US intelligence suspected had been passed to Iraq by Soviet officials in previous years.

The anthrax vaccine, by contrast, has been in use by civilians since the 1970s, when the FDA approved its use. Its flu-like side effects are mostly mild and dissipate.

"In order to show that I believe absolutely in the safety, in the veracity, of the vaccine, I've had six of the vaccine injections to date," said Cohen.

The jury remains out on PB as well, officials said.

"Given the deadliness of soman and the lack of other treatments available, we certainly cannot rule out

A Marine Takes the Helm at Air and Space

Gen. John R. Dailey, USMC (Ret.), former assistant commandant of the Marine Corps and recently an associate deputy administrator of NASA, was named Nov. 24 as director of the Smithsonian's National Air and Space Museum.

His appointment, announced by Smithsonian Secretary I. Michael Heyman, will take effect in January.

Dailey succeeds retired Vice Adm. Donald D. Engen, who was killed in a glider accident last July. Engen served as director of the museum for three years, coming in after the departure of Martin O. Harwit, who had embroiled NASM in a major controversy over its *Enola Gay* exhibition.

The new director came to NASA in 1992, following retirement after 36 years of service in the US Marine Corps.

Heyman said, "We selected Jack Dailey from a very strong field of candidates. He is a most impressive individual, and even more impressive is the confidence and admiration he has earned throughout the air and space community. The responses we received to our inquiries were simply astounding. He will continue the strong, dedicated leadership that we have come to expect at Air and Space. We look forward to an exciting future as the museum continues to grow and reach out to new audiences on The Mall and at the planned Dulles Center."

Dailey is a pilot with more than 6,000 hours in aircraft and helicopter flight. During two tours in Vietnam, he flew 450 combat missions.

USAF Photo by MSgt Kevin L. Heath

Maj. Kevin Jenkins (left) and Lt. Col. Gary Holland, both from the 19th Special Operations Squadron, Hurlburt Field, Fla., test equipment at a high-tech Mission Rehearsal Observation Center that gave a real-time, bird's-eye view of the action in a recent joint exercise using distributed simulation technology.

using PB to protect our forces in the future," Sue Bailey, assistant secretary of defense for health affairs, said Oct 19 at the Pentagon.

Tricare To Get Patient Advocates

Over the next eight months Tricare patients will get someone new to watch over their quality of care—beneficiary counseling and assistance coordinators.

These patient advocates will be added to the staffs of Tricare lead agent offices and military treatment facilities due to a push from the FY 2000 defense authorization act. The regional positions will likely be filled with full-time employees, while the clinic and hospital level slots will be filled with part-time workers, Dave Bartley of the Tricare Management Activity told a Tricare Communications and Customer Service conference Nov. 3.

The new offices will be a "buck stops here" locale, said Bartley. Once patients go there with a question or concern, they should not have to look any further for someone who can provide them with answers.

Patients with questions should continue to first contact their local health benefits advisors at clinics and hospitals.

US To Beef Up Kuwait Infrastructure

The US will upgrade its air and army bases in Kuwait and establish a permanent land force headquarters in that strategic Gulf ally, a senior defense official said Oct. 23.

The official was accompanying Secretary of Defense Cohen on his fall swing through the Middle East region.

The official said Kuwait is supportive of the move, which is slated to get done over the next several years.

Ali al-Salim AB, just south of the border with Iraq, will be upgraded to support more aircraft and store more pre-positioned aviation equipment. Currently the facility there is dedicated mainly to 12 British Tornado strike aircraft and some US helicopters.

Al Jaber AB, south of Kuwait City, will become a logistics hub. Currently it is the main US Air Force installation for airplanes that patrol the no-fly zone in southern Iraq.

Meanwhile, Camp Doha, site of pre-positioned US ground force equipment, will be modernized to provide command-and-control capability for an Army headquarters.

Cost of the projects is an estimated $193 million.

X-33 May Not Fly as Planned in 2000

The NASA/Lockheed Martin X-33 reusable launch vehicle prototype will likely not take to the skies in a test flight during 2000. Damage to a liquid hydrogen tank incurred during a recent exercise will likely push first flight into 2001, officials said in early November.

The composite tank structure apparently failed as it warmed, following a liquid hydrogen fill test Nov. 3. The test included both filling the tank and subjecting it to some of the stresses it would undergo prior to an actual test flight.

The starboard and port liquid hydrogen tanks will form an integral part of the X-33 structure. Their fill tests are one of the most demanding hurdles that the program will have to surmount before first test flight. Hot fire tests of the craft's unique linear aerospike engine are also likely to be challenging, officials said.

CALCMs To Be Fitted With Hard-Target Warheads

USAF awarded Boeing a three-year, $40 million contract to add a penetrating warhead capability to 50 of Conventional Air Launched Cruise Missiles, the company said in a Nov. 29 statement.

Boeing is on contract to convert 322 nuclear Air Launched Cruise Missiles to non-nuclear CALCM AGM-86C Block 1 and Block 1A configurations. Under the latest deal, the last 50 conversions will be to the new

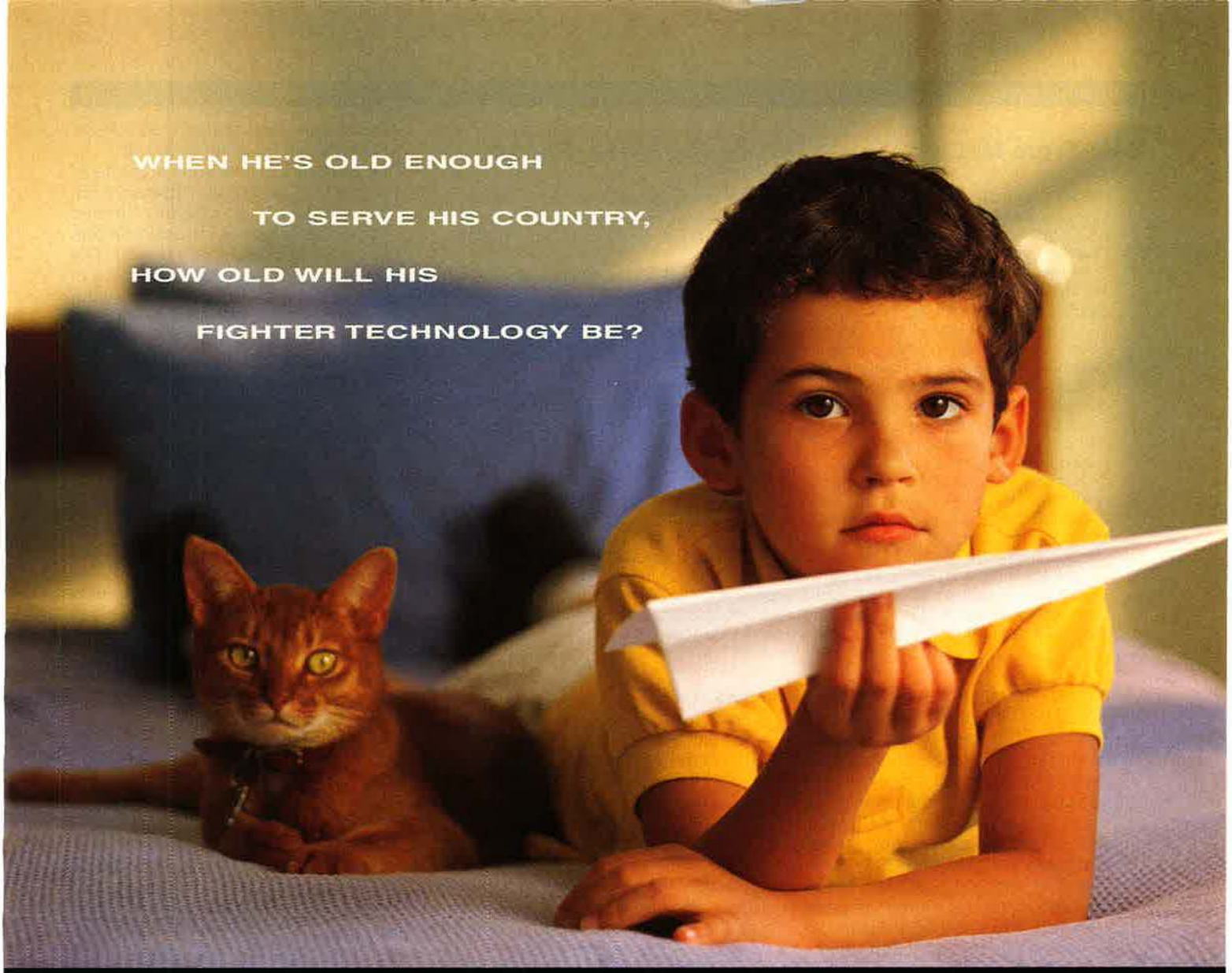
Return of the Capitalist Insect

Maj. Gen. Vladimir Dvorkin, head of Russia's strategic missile research institute, thinks he knows why the US has moved toward approving a limited National Missile Defense system. The impetus comes not from legitimate concern about a rogue or inadvertent missile strike, said the general, but from pressure put on by greedy Star Wars military contractors.

Dvorkin developed the Soviet–style interpretation of events in the Dec. 1 issue of the military newspaper *Krasnaya Zvezda*.

His words: "One can only assume the main reason [for the American effort] is not threats but satisfying the interests of military–industrial sectors connected to ABM [Anti-Ballistic Missile systems] and of financial groups. ... Since there has been a considerable blockage in implementing the Star Wars program, it is necessary to clear the blockage and secure profits."

Plans call for President Clinton next summer to decide whether to order the Pentagon to push ahead with deployment of a thin NMD system capable of coping with a relative handful of incoming warheads.



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

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From McCain, Tough Words for Allies, Rivals

Sen. John McCain (R–Ariz.), the Presidential candidate, had some unvarnished words for America's premier military allies as well as the world's two other major powers—Russia and China. In a Dec. 1 speech to the National Jewish Coalition in Washington, McCain made these points:

Europe: "Our allies are currently spending too little on their own defense. They are increasingly indifferent to serious problems inherent in developing a defense identity separate from NATO, and they persist in avoiding coming to terms with the necessity of forging a mutual defense against threats to our interests outside Europe. These failings require immediate improvement, and we must use the forms of persuasion necessary to do so."

Russia: "The Russian people are now being told by many of their leaders that democracy and free markets have caused Russia's descent into chaos. Nothing could be further from the truth. At fault in Russia is not the failure of free market and democratic principles but rather their corruption by weak leaders, militant nationals, and greedy profiteers. For too long, we have indulged systemic dishonesty in Russian politics and in our relationship in the false hope that time is all that's needed for Russian leaders to change their country's destiny."

China: "They [China's communist leaders] are determined, indeed ruthless, defenders of their regime, who will do whatever is necessary, no matter how inhumane or offensive to us, to pursue their own interest. ... I would not accept a forced reunification with a democratic Taiwan. I do not think it useful to publicly identify the means by which we would oppose such aggression, but China must be made to understand that the use of force would be a very serious mistake in judgment, a serious mistake with grave consequences."

AGM-86D hard-target penetrating warhead configuration.

Boeing's statement said the Seattle–based firm will select either Lockheed Martin's advanced unitary penetrator or the British–designed multiple warhead system. Both warhead variants have undergone a series of tests at Eglin AFB, Fla.

The first Block 1 CALCMs were delivered to the Air Force in early November. The final AGM-86D missiles will be delivered by mid-2001.

Navy Squadron Gets First Super Hornets

The US Navy's first F/A-18E/F Super Hornet squadron—VFA-122, based at NAS Lemoore, Calif.—received its first seven aircraft Nov. 18.

VFA-122 is a fleet readiness squadron, meaning it is responsible for aircrew and maintenance training. The carrier-based aircraft is scheduled to become the workhorse of the fleet, replacing earlier model F/A-18 Hornets and F-14 Tomcats. Later, it is to be complemented by the Joint Strike Fighter.

Until June, the Navy squadron will focus on verifying the Super Hornet syllabus and qualifying the first group of Super Hornet instructor pilots, instructor weapon system operators, and maintenance personnel.

The first graduates are destined for the first fleet squadron of operational Super Hornets. The first fleet deployment is scheduled for spring of 2002.

News Notes

■ The Navy honored USAF's first Vietnam–era Medal of Honor recipient by naming a newly chartered prepositioning ship the MV *Maj. Bernard F. Fisher.* It did so at an Oct. 15 ceremony at the Military Ocean Terminal, Sunny Point, N.C. The nation bestowed its highest military honor on Fisher for his bravery in saving a fellow downed airman in 1966 at a remote special forces camp near the Vietnam–Laos border.

■ The first operational EGBU-15—an upgraded version of the TV– and IR–guided glide bomb—has been delivered to the Air Force, according to system contractor Raytheon. The weapon features Global Positioning System guidance for all-weather capabilities. It was developed, tested, and delivered in 44 days following the stellar performance of the GBU-15 in Operation Allied Force.

■ The fifth production E-8C Joint STARS radar aircraft was delivered to the 93rd Air Control Wing, Robins AFB, Ga., on Oct. 21. The wing is scheduled to receive three more of the airplanes by the end of Fiscal 2000—doubling the size of the fleet of this important national asset.

■ On Oct. 29, Air Force Lt. Col. John J. Gomez made history by taking command of the newly established Training Squadron 35 at NAS Corpus Christi, Texas. The ceremony marked the first time a Navy unit has stood up under the leadership of an Air Force officer, according to a USAF release. VT-35 will prepare Navy and Air Force aviators to fly C-130s, P-3s, and other multi-engine aircraft.

■ Pursuant to the terms of the 1977 Panama Canal Treaty, Howard AFB, Panama, has been officially handed over to the Panamanian government, the Air Force announced Nov. 2. The transfer occurred with the passing of a ceremonial key from US Ambassador Simon Ferro to Panama President Mireya Moscoso. It ends a legacy of 82 years of US airpower in Panama.

■ The 126th Air Refueling Wing raised the US flag over its new home, Scott AFB, Ill., in a special ceremony Oct. 23. The unit moved from Chicago's O'Hare IAP/ARS to Scott, as recommended by the Base Realignment and Closure Commission. The cross-state transfer resulted in $80 million in new construction at Scott.

■ The Defense Department has created a new Web site that explains the military pay changes taking place Jan. 1. The "Military Pay and Benefits 2000" site details the 4.8 percent pay raise scheduled to take effect in 2000 and covers new retirement options and housing allowance rules, among other things. Later this year the site should become interactive, allowing service personnel to calculate and compare retirement choices. The Web address is http://pay2000.dtic.mil.

■ The US Air Force returned to Vietnam on Nov. 11 when the 353rd Special Operations Group, Kadena AB, Japan, flew 19 tons of disaster relief aid across the Pacific to help ease the suffering caused by the worst Vietnamese flooding in a century. Nearly 22,000 pounds of plastic sheeting, 3,600 blankets, and 5,000 water containers were among the items that made up the cargo of two Kadena–based C-130s. Crew members relied heavily on facial expressions and hand motions to communicate with the Vietnamese. "It was a challenge, but once they understood how to untie cargo straps or stack the pallets, it went pretty smoothly," said SSgt. Bobby Casey, a 353rd loadmaster.

■ An Aug. 11 F-16 accident at Kunsan AB, South Korea, was caused by pilot error, according to an accident report released in November. Pilot 1st Lt. Marco Parzych became so focused on flying his aircraft that he did not hear radio calls of other airplanes and did not notice that he was about to strike another aircraft.

■ The Air Force selected 502 of 2,855 eligible master sergeants for promotion to chief master sergeant, officials announced Nov. 8. That would come out to a 17.58 percent

selection rate for the 99E9 cycle, well above the TOPCAP (Total Objective Plan for Career Airmen Personnel) minimum of 13 percent set for chief master sergeant during the force drawdown.

■ On Nov. 2, Air Force Maj. Gen. Robert J. Courter Jr. was selected to be the next director of the Defense Commissary Agency. He is currently director of plans and programs for Air Force Materiel Command.

■ The Supply and Transportation Re-engineering Concept Team from the 20th Fighter Wing, Shaw AFB, S.C., recently was selected as a winner of the 1999 Chief of Staff Team Excellence Award. The prize recognizes outstanding performance of teams that use a systematic approach to improve performance.

■ Names of the four winners of the Lance P. Sijan Air Force Leadership Award were announced Nov. 1. They are Col. Paul G. Schafer, formerly assigned to the 332nd Air Expeditionary Group, Al Jaber AB, Kuwait; Capt. Mark T. Daley, 21st Special Operations Squadron, RAF Mildenhall, UK; SMSgt. Gordon H. Scott, formerly of the 7th SOS, RAF Mildenhall; and SSgt. Thomas B. Mazzone, 3rd Aerial Port Squadron, Pope AFB, N.C. The Sijan prize was created in 1981 to recognize personnel who demonstrated outstanding leadership while assigned to wing level and below organizations.

■ The 55th Wing at Offutt AFB, Neb., received its 15th RC-135 Rivet Joint aircraft on Oct. 14. The addition should ease some of the workload on the eavesdropping Rivet Joint fleet—one of the highest-demand assets in the service.

■ Almost 66,000 troops from the US and 10 other nations gathered in Egypt in late October for the biennial Bright Star live-fire training exercise. They peppered a desert area outside Cairo with mortar and rocket fire in a mock war designed to promote interoperability between the militaries of NATO members and friendly Mideast states.

■ Steve Pecinovsky, an Air Force judge advocate general who works in the US attorney's office in Dayton, Ohio, and in the Fraud Directorate of the Air Force Materiel Command Law Office, may be the first colonel in US history to compete in the US Olympic Trials in track and field. Pecinovsky, one of the top racewalkers in the country, will vie for an Olympic slot in the 50-kilometer racewalk event in February.

■ Mark W. Gaddis, an electrical engineer at the Air Force Research Laboratory's Semiconductor Laser

A Fresh Look at Race and the Military

US armed forces have made good progress in fighting discrimination in their ranks in recent decades, but both white and minority service personnel continue to differ widely in their views about the current state of race relations in the ranks.

That is the bottom line of two large equal-opportunity studies released by the Pentagon on Nov. 23.

Defense officials and others have long portrayed the US military as a model of integration for US society at large. Thus, they were disappointed by the mixed picture presented by the surveys, but they vowed that they would try to act on the less positive aspects of the survey results.

"There is no place for racism in our society," said Secretary of Defense William S. Cohen at a Pentagon news conference. "There is certainly no place for it within the military."

The two studies—one a survey of active duty members of the services, the other an examination of the career progression of minority and female active duty officers—did find that large majorities of service members believe racial and ethnic relations in the military are better today than they were even five years ago.

All of the surveyed groups of service members agreed that the military handled race relations better than civilian society and that opportunities were more numerous in the armed services.

Eighty-two percent of white members of the military who responded to the survey said they had a close friend who is of a different race/ethnicity. A comparable figure for white civilians is around 60 percent, according to a 1997 Gallup survey.

However, the surveys pointed up sharp disagreement about the importance of remaining race problems. Some 17 percent of white respondents felt that the military has not paid enough attention to racial discrimination and harassment in the past several years. The corresponding figure for black personnel was 62 percent. For Hispanics, it was 38 percent.

Minority respondents were more likely to perceive that they had been punished unfairly due to their race than whites. They also felt that racial hostility continues to snake throughout the services. Some 71 percent of black officers reported an offensive encounter with another service member, as opposed to 46 percent of white officers.

In the overall force, 75 percent of blacks and 78 percent of Hispanics said they had had a racially offensive encounter within DoD in the year prior to the survey. Surprisingly, 62 percent of whites said they had had a similar experience.

Senior Staff Changes

NOMINATIONS: To be **Brigadier General:** John J. **Catton Jr.,** David E. **Clary,** Michael A. **Collings,** Scott S. **Custer,** Daniel J. **Darnell,** Duane W. **Deal,** Vern M. **Findley II,** Douglas M. **Fraser,** Dan R. **Goodrich,** Gilbert R. **Hawk,** Raymond E. **Johns Jr.,** Timothy C. **Jones,** Perry L. **Lamy,** Edward L. **Mahan Jr.,** Roosevelt **Mercer Jr.,** Gary L. **North,** John G. **Pavlovich,** Allen G. **Peck,** Michael W. **Peterson,** Teresa M. **Peterson,** Gregory H. **Power,** Anthony F. **Przybyslawski,** Ronald T. **Rand,** Steven J. **Redmann,** Loren M. **Reno,** Jeffrey R. **Riemer,** Jack L. **Rives,** Marc E. **Rogers,** Arthur J. **Rooney Jr.,** Stephen T. **Sargeant,** Darryl A. **Scott,** James M. **Shamess,** William L. **Shelton,** John T. **Sheridan,** Toreaser A. **Steele,** James W. **Swanson,** George P. **Taylor Jr.,** Gregory L. **Trebon,** Loyd S. **Utterback,** Frederick D. **Van Valkenburg Jr.,** Dale C. **Waters,** Simon P. **Worden.**

CHANGES: Brig. Gen. David M. **Cannan,** from Civil Engineer, AETC, Randolph AFB, Texas, to Command Civil Engineer, AFMC, Wright–Patterson AFB, Ohio ... Maj. Gen. Robert J. **Courter Jr.,** from Dir., P&P, AFMC, Wright–Patterson AFB, Ohio, to Dir., Defense Commissary Agency, Ft. Lee, Va. ... Maj. Gen. Timothy A. **Kinnan,** from Cmdr., AF Doctrine Ctr., Maxwell AFB, Ala., to Vice Dir., Strategic P&P, Joint Staff, Pentagon ... Brig. Gen. (sel.) Gary H. **Murray,** from Dir., Medical Force Mgmt., Bolling AFB, D.C., to Cmdr., AF Medical Ops. Agency, Bolling AFB, D.C. ... Maj. Gen. Leonard M. **Randolph Jr.,** from Special Asst. to Surgeon General, USAF, Bolling AFB, D.C., to Dep. Surgeon General, USAF, Bolling AFB, D.C. ... Brig. Gen. (sel.) Robert L. **Smolen,** from Dep. Dir., Nuclear & Counterproliferation, DCS, Air & Space Ops., USAF, Pentagon, to Dir., Manpower and Personnel, Joint Staff, Pentagon ... Maj. Gen. Todd I. **Stewart,** from Command Civil Engineer, AFMC, Wright–Patterson AFB, Ohio, to Dir., P&P, AFMC, Wright–Patterson AFB, Ohio.

SENIOR EXECUTIVE SERVICE CHANGE: Thomas S. **Wells,** to Dir., Contracting, ESC, AFMC, Hanscom AFB, Mass.

Photo by Judson Brohmer

An F-22 connects with a KC-10 from Travis AFB, Calif., during a series of tests that determined the Raptor's compatibility with the tanker. The five days of testing in November helped identify the F-22's minimum and maximum allowable airspeeds, altitude, and tolerance for boom movement during refueling. In the testing period, KC-10s transferred 35,000 pounds of fuel.

Branch at Kirtland AFB, N.M, has been named the Air Force recipient of the DoD Outstanding Federal Employees With Disabilities Award for 1999. Gaddis, born with osteogenesis imperfecta, is one of the most respected engineers in his field.

Obituaries

Retired Air Force Col. **John Paul Stapp**—once known as the fastest man on Earth—died at his home in Alamogordo, N.M., Nov. 13 at 89. Stapp, who entered the service during World War II, became one of USAF's premier aeromedical researchers, pioneering work in deceleration effects on the human body. In all he made 29 runs himself on a rocket-driven sled, reaching a top speed of 632 miles per hour in 1954 at Hollomon AFB, N.M., where he headed an aeromedical field lab. His work led to improved helmets, stronger safety harnesses, and advances in aircraft and ejection seats, as well as additional efforts in space travel and automobile safety. Among many accolades, he received the Air Force Association's Theodore von Karman Award in 1954.

Military analyst **Harry G. Summers Jr.**, 57, a retired Army colonel, died Nov. 14 in Washington after a stroke. Summers, a noted writer and lecturer, was a recognized expert on the Vietnam War. His first book, *On Strategy: A Critical Analysis of the Vietnam War,* is used as a text at the US Army War College and several civilian universities. He was also a former editor of *Vietnam* magazine. ■

Credit Where Due

Our November 1999 "Aerospace World" carried an item (p. 16) on USAF optempo, quoting Lt. Gen. Frederick McCorkle, Marine Corps deputy chief of staff for aviation. He said: "I don't think the Marine Corps right now can take care of the Air Force. ... We've got our own problems." We thought that statement (which we found in DoD's "Current News" clipping service) came at a public think tank session on Capitol Hill. In fact, McCorkle made his comments to a reporter for *Inside the Air Force*, a defense newsletter, which printed them. Credit *ITAF* for bringing the general's words to public attention.—THE EDITORS.

Index to Advertisers

MARTIN-BAKER QUALIFIED FOR JSF

This is one of a series of dynamic tests that have successfully qualified the Martin-Baker US16B ejection seat for the Boeing Joint Strike Fighter Concept Demonstration Aircraft, flight seats have been delivered as scheduled and installed ready for the start of the demonstration program.

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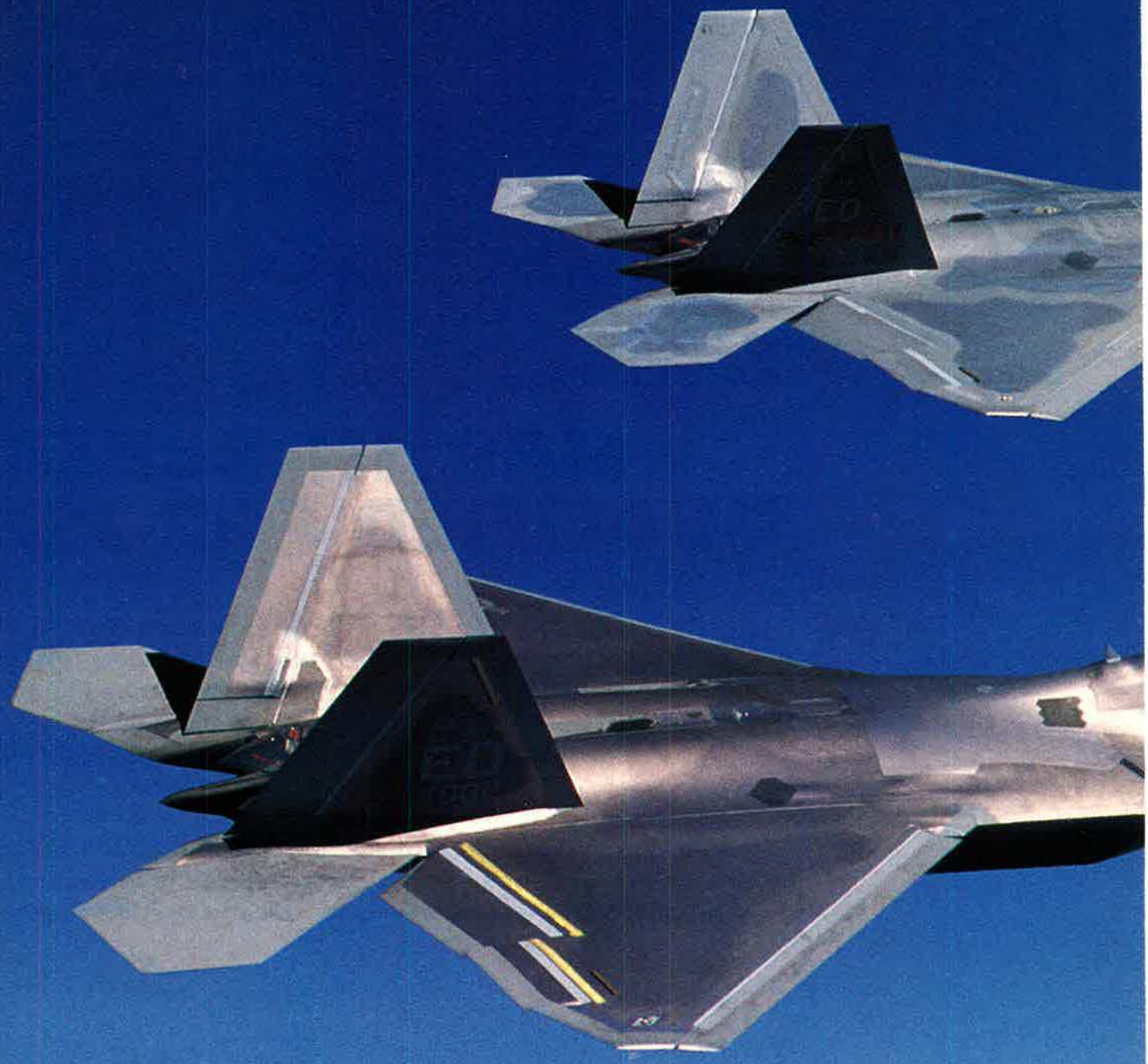
Foreign aircraft and SAMs are already closing in on the USAF fleet.

Can the Fighter



F-22 Team photo

Force Hold Its Edge?

By John A. Tirpak, Senior Editor

Streaking over the California desert, the Air Force's two F-22s head out on another day of flight tests. The Raptor is meeting all expectations in terms of performance, but it will still take another six years for the first squadron to be available for duty. It won't be a moment too soon—the F-15 is already matched or outclassed by a handful of foreign fighters already in production, and USAF's 40-year edge in air superiority is eroding by the day.

THE Air Force's ability to guarantee control of the skies over any present or future battlefield is becoming precarious. The long defense procurement "holiday" of the 1990s has produced an Air Force of aging fighters that are coming up against a new and advanced foreign fighter and missile threat. Further delay in modernizing the fleet could have painful consequences and directly affect the ability of the US to act militarily when and where it chooses.

USAF is having to conduct a kind of programmatic triage, patching up the most fatigued elements of its aging fighter force as well as it can until replacements start reaching squadron service. Technological Band-Aids are being applied to the frequently deployed fighters, which have been called on so often this decade that the Air Force has had to restructure itself into expeditionary groups to manage the strain. Recent Congressional action challenging the

F-22 Team photo

The F-22 can handle six AMRAAM missiles in its weapons bay. For ground attack, it can carry two 1,000-pound, satellite-guided JDAMs. Though chiefly a guarantor of air superiority, every F-22 will also have a formidable attack capability.

expense of—and need for—replacement fighters has only complicated the problem.

Under Joint Vision 2010, the Joint Chiefs of Staff's current operational template, the Air Force's first job is to clear the skies of enemy aircraft, making it possible to use theater ports, assemble air, ground, and naval forces, and halt an enemy advance. The concept depends on sensor platforms like the E-8 Joint Surveillance Target Attack Radar System and E-3 Airborne Warning and Control System aircraft to provide a comprehensive view of the battlespace and relies on the Air Force to protect those key assets with its fighters. If the Air Force failed in those crucial first steps of any future war, US forces would be hard-pressed to make much headway against a determined foe, let alone achieve the lopsided victories seen in the Gulf or the Balkans.

Wearing Out

The Air Force's fighters, however—all of which were designed in the 1970s or earlier—are of a vintage now being eclipsed in performance by first-class warplanes being built by a European consortium and in Russia, France, and elsewhere. Perhaps even more critical, sophisticated new air-to-air and Surface-to-Air Missiles are proliferating and available to any country with the cash to pay. US fighters are either losing their technical edge or simply wearing out.

Though the fighter fleet is expected to be able—with new weapons and upgrades—to handle any adversary for the next decade, literal as well as metaphorical cracks are beginning to show in the air dominance the nation has come to expect.

Gen. (sel.) Gregory S. Martin, principal deputy to the Air Force's acquisition executive, said in a Pentagon press conference last summer that USAF could still probably prevail in an air war a decade hence. However, the risks faced by US troops would have expanded considerably.

With only today's fighters in the force, Martin said, "I don't think we're going to lose the air war in 2010. I just think we're going to see more people come home in body bags."

Maj. Gen. Claude M. Bolton Jr., USAF program executive officer for fighters and bombers, said that, if the Air Force is not allowed to expeditiously replace its airplanes with the next generation of fighters, combat losses can be expected.

Noting that the F-15—the premier US fighter since the mid-1970s—is already at parity with the performance of the Russian MiG-29 and Su-27/35, Eurofighter Typhoon, and French Rafale, Bolton said that "right now, the way I see the threat, if we don't make some changes in the equipment that we provide to the warfighter, we will have F-15s shot out of the sky."

Gen. John P. Jumper, commander of US Air Forces in Europe, said it was only a matter of "incredibly good fortune" that NATO did not lose any aircrews in the recent Balkans conflict. Still, two aircraft—an F-16 and a stealthy F-117—were brought down by Serb SAMs. Operation Allied Force would have been a "very different war" if Serb forces had possessed late-model Russian fighters or SAMs, Jumper said.

Lt. Gen. (sel.) Bruce A. Carlson, then director of operational requirements for the Air Force, said bluntly that "if we run the F-15 against the Rafale, or Typhoon, or Su-35, we

Photo by Katsuhiko Tokunaga

A close match to F-15s in maneuverability, the Su-27 Flanker family is being aggressively marketed. China has purchased several squadrons' worth and may build the type under license. This Su-35 is a block improvement.

would probably lose those fights." Moreover, since the Air Force fights not on its own turf but at the enemy's doorstep, "we don't fight with our entire force against theirs at one time. So the first squadron [sent against an enemy] may have to fight three wings—200 to 300 airplanes." The F-15 would not be up to such a task unless the adversary was a "third-rate nation" without much of an air force to speak of, he said.

The US can't expect that a future enemy will follow the example of Saddam Hussein in the 1991 Gulf War and "give us six months to get ready" for war, Carlson observed.

In terms of F-15s, "we consider ourselves limited in certain respects now," said Col. Doug Lincoln, Air Combat Command mission area requirements chief. He noted, "We never flew F-15s over downtown Baghdad [in Iraq during Operation Desert Storm], and I think we avoided some places even in Kosovo because of the threat" of air defenses.

Residual Edge

"We hold a little bit of an edge [against potential threat aircraft] still because we can sustain our fleet a little bit better, and we have better training than the people we're facing," Lincoln said. However, he added, "We consider those to be perishable items [if an adversary were to] get serious" about building up a credible air force.

The USAF fighter fleet has been streamlined from eight types in the early 1990s to just five now: the A-10, F-15, F-15E, F-16, and F-117. According to Carlson, the fighter force breaks down to "about 25 percent [dedicated to] air dominance—that's the F-15s—50 percent multirole F-16s, and 25 percent interdictors, which is the F-15Es and F-117." The A-10 is a close air support attack aircraft.

The Air Force hopes to consolidate the types it operates even further, to only two: the F-22—which will replace the F-15 as the dedicated air dominance fighter—and the Joint Strike Fighter, which will replace the multirole F-16 and the A-10. A decision on what will replace the deep-strike F-15E and F-117 has not been made, but it will likely be a variant of either the F-22 or JSF.

The F-22 incorporates a number of capabilities never before achieved in a true maneuvering fighter airplane. It will be as much as 80 times less visible on radar than the F-15, allowing it to spot and shoot at an enemy airplane before the opponent could see it and shoot. Its stealth will allow it to get close enough to a ground target to release a Joint Direct Attack Munition and start to leave the target area before the bombs even hit.

With an operating altitude of more than 50,000 feet, the F-22 can fly above the envelopes of even many of the newest SAMs, and its ability to supercruise—fly at Mach 1.5 without using afterburner—means it can vault over enemy air defenses and be out of range before it could be spotted and fired on. Should the F-22 have to engage in a dogfight, its agility is comparable to the F-16, and it can safely recover from an attitude of 60 degrees angle of attack.

The F-22 is supposed to require far less maintenance and deployment gear than the F-15 and can accommodate new capabilities through software upgrades or even new kinds of microprocessors. Its onboard computing power will be able to take information from a host of offboard sensors—satellites, AWACS, Joint STARS, other fighters—and present the pilot with a clear, unambiguous display explaining who is in the battlespace, what side they're on, and who poses the most immediate threat.

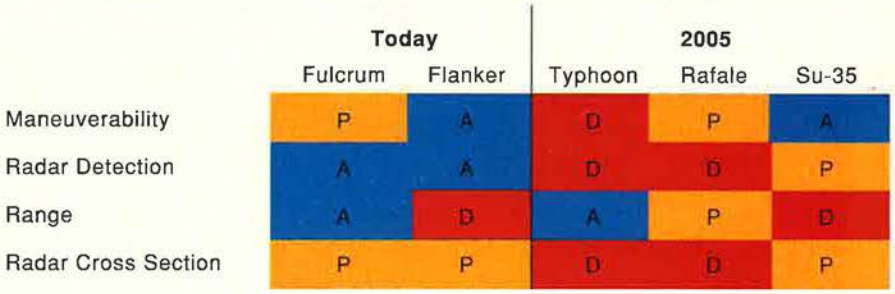
Fighters High and Low

The F-22 and JSF would be the new version of the Air Force's high–low mix—reflecting a philosophy of using a smaller number of expensive, highly capable airplanes backed up by a larger number of less costly, multimission aircraft. The concept follows the template set by the F-15 and the F-16, which has proved highly successful, Carlson asserted.

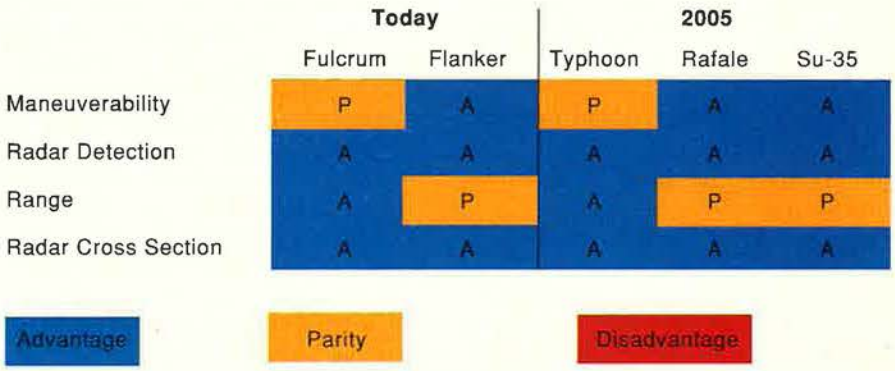
The F-22 is due to achieve Initial Operational Capability with one squadron in December 2005. The Air Force plans to acquire 36 F-22s a year at peak, concluding a planned buy of 339 airplanes by 2011. The JSF is to be bought beginning in

The Air-to-Air Threat

How the F-15C Compares to the Emerging Threat



How the F-22 Compares to the Emerging Threat



Source: USAF assessment using Defense Intelligence Agency data.

2008 and achieve IOC with the Air Force in 2010, and the service plans to acquire 1,763 of them. The US Navy, Marine Corps, and UK Royal Navy are also partners on the JSF.

The buy of 339 F-22s is the latest benchmark in a long line of reductions taken since the program got its initial go-ahead in the early 1980s, when 750 of the aircraft were anticipated. Through three subsequent strategy reviews, the F-22 fleet was whittled down to the 339 figure—roughly three wings' worth—a number that does not match with the four wings of F-15s considered essential to fulfilling the national military strategy of being able to win two overlapping Major Theater Wars.

The latest figure is a product of several factors, Carlson said.

One is "pressure from a declining force structure." From a high of nearly 39 wings in the mid-1980s, the Air Force has been reduced to about 20 fighter wings, which obliged USAF to "get rid of some of our specialized airplanes, such as the F-4G, EF-111, and F-111," Carlson reported.

Another reason, though, he said, is the "significantly greater capability" in the F-22. As currently envisioned, two F-22 wings would deploy to the MTW where their advanced technologies would be most needed, while the other wing, supplemented by newer F-15s and even late-model F-16s, would take on the lesser threat in the second MTW. After the tougher adversary was beaten, some F-22s would swing to the second war.

Bolton said that the decision to build only 339 F-22s was a Department of Defense–wide choice.

"That was ... the department getting together and [deciding] ... what the military should look like. ... When it came to fighter planes, our compromise was 339. But a compromise is what it implies. ... You win a bit, you lose a bit."

However, Carlson noted that the Quadrennial Defense Review left the door open for purchase of up to two more wings of F-22s.

In the 1997 document, which laid the groundwork for service budget choices, Carlson said, "The Secretary of Defense allowed a statement ... that said the Air Force could evaluate the requirement for two air-to-ground wings of missionized F-22s,"

The Eurofighter Typhoon, once derided as a "warmed-over F-16," has performance beyond that of the F-15. Typhoons will likely beat F-22s to operational status; non–European customers may get preference for early production lots.

meaning F-22s configured to do the job now performed by the F-15E and F-117. Both aircraft types will need replacement starting at about the time the F-22 line is winding down, circa 2011–15. The idea is to extend the F-22 production—by that point, running at peak efficiency and lowest cost—to generate the required interdictor replacements.

Significant Advance

The F-22's radar cross section is considered to be at least on a par with the F-117, and certainly far less than the F-15E. Given its supercruise and stealth capability, it would be a significant advance over the F-15E and F-117 in the strike role. The F-22 as now configured will be able to carry two 1,000-pound JDAMs, but weapons of 10 to 20 years hence are expected to be more precise and carry greater explosive yield in a smaller round.

The F-15 fleet was bought mainly in the early 1980s. The average age of the F-15s is nearly 20 years; by the time the F-22 reaches IOC, the average age of the F-15 fleet will be 26 years. The type has a design life of 8,000 hours and most of the fleet has already passed the 5,000-hour mark, meaning it has roughly seven to 10 years of normal operations left.

If the F-22 was further delayed, "there would be a requirement to SLEP [Service Life Extension Program] the F-15 force ... to bridge the gap [between] when they were supposed to phase out and when the F-22 was supposed to take their place," Martin said.

Such an effort would require whatever reductions in radar cross section that could be obtained through coatings and other techniques, as well as improved electronic countermeasures and structural strengthening of the airplane, Martin said. When all that was done, there would only be a modest improvement in the F-15's survivability and life expectancy—but at a cost "of almost what you would be spending on a brand-new F-22," Air Force Global Power Programs chief Maj. Gen. Raymond P. Huot said at an Air Force Association press conference in September.

Carlson noted that even a "reduced-signature" F-15X "is at a severe disadvantage in the near term."

He expects that the youngest F-15s could be safely used as air superiority fighters in some parts of the world against a very small number of low-capability airplanes for 10 or 12 years, especially performing duties like cruise missile interception, "on our side of the fence, where the threat environment is fairly benign."

The F-15's radar—the heart of the weapon system—suffers from a chronic maintenance problem: Many of the parts needed to keep it running are simply no longer available and must be rebuilt rather than replaced when they break; an update to the radar is expected to alleviate the problem. A large number of F-15s lack digital engine controls and di-

Behind the Worries About SAMs

New Surface-to-Air Missiles are faster, fly higher and farther, and are less susceptible to jamming and countermeasures than their predecessors, and they are available to anyone able to pay. For US fighters, they pose a challenge as tough as—if not tougher than—the best competitor aircraft.

Lt. Gen. (sel.) Bruce A. Carlson, then USAF's director of operational requirements, warned that large-area coverage with state-of-the-art SAMs can be acquired by "anyone out there with any kind of [military] budget." Carlson noted, "For $65 million to $75 million, ... someone can buy a dozen launchers" of modern design and cover an area as large as Yugoslavia.

These new missiles can engage an airborne target at altitudes as low as 75 feet or as high as 45,000 feet. They have twice the maneuverability of previous generation SAMs and the ability to simultaneously engage six times as many targets.

Such a capability, if used skillfully, could give an enemy the ability to knock down 40 to 50 aircraft of the same vintage as most US fighters.

The Air Force reports that more than 14 countries already have weapons equivalent to the Russian-made double-digit SAMs—the SA-10 and SA-12. It estimates that, by 2005, 24 countries will have such weapons.

Early Soviet-designed SAMs required large and permanent, or at least heavily prepared, launch sites. The new ones, however, are highly mobile, enabling them to pop up in unexpected locations and severely complicate mission routing. The two NATO aircraft lost in Operation Allied Force likely were brought down by such pop-up surprises.

NATO lost no aircrews to enemy fire in Yugoslavia, but alliance aircraft did take damage from some of the 600 to 700 SAMs launched by the Serbs.

The US has yet to face the new generation of SAMs in battle. The presence of double-digit SAMs was suspected but never detected in the Yugoslavian air campaign, and Iraq is not known to have acquired any. However, in both theaters, the new missiles present a nightmarish prospect.

Gen. John P. Jumper, commander, US Air Forces in Europe, said that he worries about the new SAMs "every day."

In an Eaker Institute Symposium on Allied Force conducted last August, Jumper said he was constantly concerned during the Balkan air campaign that "somehow, Mr. Milosevic would find a way to float an SA-10 or SA-12 up the Danube River, put it together, and bring it to bear as a part of this conflict. If that had happened, it would have profoundly changed the balance of the threat and our ability to maintain air superiority."

Allied pilots, instead of being able to thread their way between—or fly over—the range and altitude limits of SAMs, would have had to fly directly through their overlapping arcs of engagement, inviting missile shots from many directions at once.

The shortage of escort jamming aircraft and suppression of enemy air defenses jets to beat down this threat would have drawn out the pace and sharply increased the risks of the air war, potentially leading to an entirely different outcome.

The new SAMs, unless countered, undoubtedly will constrain future air access to the battlespace. However, one major partial solution will be provided by the stealthy, supercruising F-22 fighter. Take, for example, the air defense situation in Iraq. According to the Air Force, an F-22 flying at subsonic speeds and at medium altitude can safely traverse five times as much Iraqi territory as would be true with a nonstealthy F-15. If the F-22 were to fly at high altitude and in supercruise, the advantage grows to a factor of eight.

agnostic systems, requiring manpower-intensive maintenance; but to fix it, the service would have to get a waiver from a law that mandates that no major modifications can be made to an airplane that is within five years of being retired. By the time the upgrade is designed and approved, the F-15 would be within the prohibited window.

Disintegration

"In about 2006 the airplane begins to disintegrate because it runs out of its 8,000-hour service life," Carlson asserted. "What will happen [after that] is hard to predict, but if it's anything like the F-16, we will have some significant structural problems." Other F-15s, more benignly used, "will fly fine."

Early F-16s were designed to a 4,000-hour service life and later models to 8,000 hours, but the F-16 fleet has been flown more often than anticipated and often beyond the design limits of the airplane, causing cracking in bulkheads and wings. Much of the F-16 fleet has passed the 5,000-hour mark, and if no modifications are performed, most will run out of service life before the JSF arrives.

"The F-16 fleet needs a major mod well prior to the arrival of the JSF," an Air Staff official observed. A modification called Falcon Star is being readied for the next five-year budget plan and is intended to shore up the structural elements of the F-16.

As Congress debated the Fiscal 2000 defense spending plan this fall,

The Effect of Stealth

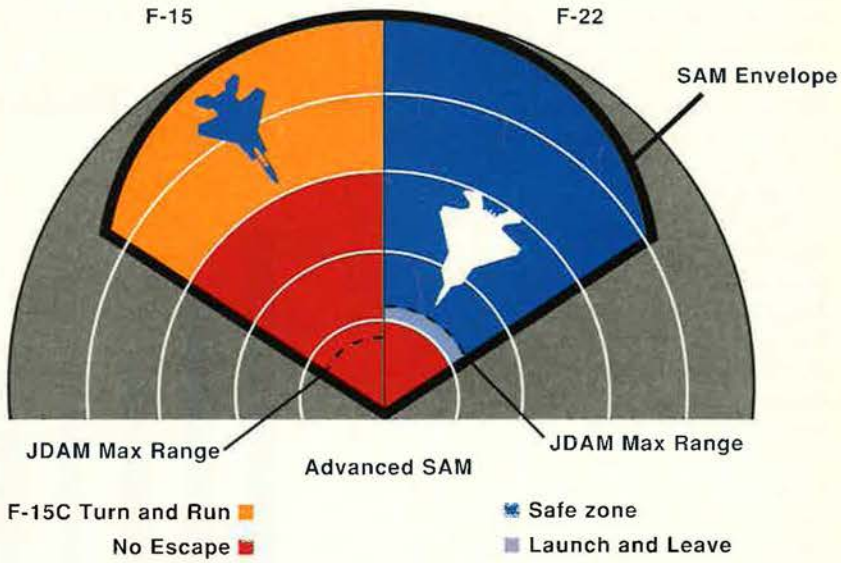


Photo by Katsuhiko Tokunaga

Technically younger than the F-15, the F-16 has been worked harder and is more urgently in need of upgrade and replacement. Though considered the low end of the high–low mix, the F-16 is often tapped to carry the air superiority role.

it threatened to pause the F-22 program, preferring to spend the money on readiness accounts instead. The Air Force was able to make the case that a pause in the F-22 program would kill it.

Martin said that a pause would release crucial subcontractors from the program and that to get them back would cost as much as $6.5 billion.

In discussing the F-22, Congressman Jerry Lewis (R–Calif.) and others have suggested that perhaps the JSF could be reworked to take on the F-22's role, since in Lewis's view, the tactical aviation modernization plan as a whole is unaffordable.

Such an adaptation of the JSF would not work, Carlson said.

The JSF assumes the F-22, he said. The JSF was not designed to be a pure air superiority machine but one designed to take advantage of the freedom of maneuver the F-22 would provide, just as the F-16 was intended as a complement to the F-15, rather than a substitute.

The JSF would not be as fast as the F-22 and would be unable to reach the same altitudes as the F-22. For adequate acceleration, it would need a second engine, something that would force a major redesign. It could not carry as many air-to-air missiles as the F-22 and would lack much of the onboard avionics that will make the F-22 so powerful a gatherer of information.

"We don't think you can tweak the JSF to do the F-22 mission," Carlson said. "We would want to just start over." Given that the F-22 has taken nearly 17 years to get to flight test, the delay in getting a new fighter to the field before the existing fleet wears out or loses its capability against the threat would be too long, Carlson said.

The True Cost

When introducing his plan to divert F-22 production money to other military accounts last summer, Lewis suggested that the F-22 would cost as much as $200 million apiece. Bolton, however, said that in current dollars, the cost "out the door" of an F-22 will be $84.7 million.

Because of improvements in the manufacturing learning curve, streamlined procedures, and other cost savings, "the last one only costs me $64 million," Bolton added.

The Air Force denied reports circulated last fall that the service would be willing to give up the JSF to keep the F-22.

"When we looked at ... airplanes that have a lot less stealth" than the JSF, Carlson said, "they don't fare nearly as well as an all-aspect stealth design like the JSF." The survivability of an F-16 is far less than that of a JSF, he explained, and while the JSF is expected to cost about $33 million apiece for the Air Force, a top-drawer version of the F-16 would cost nearly as much but have far less capability.

Asked whether the F-16 force could simply go on without being replaced by the JSF, Lincoln replied, "Absolutely not. ... We could probably continue to Band-Aid fix the thing, but it's the law of diminishing returns: You're spending more to keep the F-16 up and running than it would cost to buy the JSF."

Because replacing the F-16s is a priority—they are wearing out faster than the A-10s and provide addi-

During production run of 341 aircraft, marginal cost of each new fighter is expected to decline dramatically as a result of scale economies, experience, and the like. "PRTV" stands for Production Representative Test Vehicle, one of the first eight F-22s used to explore flight characteristics, avionics, and other features. (Source: USAF)

tional air-to-air backup for the F-15—the A-10s are at the back of the line for replacement in the Air Force fighter inventory.

However, the A-10s "provide a visible signal to the Army that we are taking the close air support mission seriously," said one ACC official. "There is nothing else like it for its punch and ability to get low and take damage," he added.

The Air Force will perform a SLEP of the A-10 that will strengthen and thicken its wings and double its structural life from 8,000 to 16,000 hours, meaning the aircraft will be able to stay in business well into the 2020s. Also to be added will be the Link 16 digital data-sharing system and new munitions like JDAM.

The Air Force wants to add LANTIRN night-targeting pods to the A-10 but lacks funding for this. A more ambitious upgrade would involve a new engine, but ACC officials do not expect such a project to win funding in the coming five-year budget plan.

The Air Force will have to have stealth to be credible in future air combat, according to Col. Greg Shaka, ACC's JSF monitor.

"Stealth is the enabler," he said. "JSF is improving on known deficiencies in our current fighter fleet in terms of lethality, survivability, and supportability." Stealth, he said, offers surprise, which is one area where the F-16 falls short.

F-22 Team photo

Computer simulation and exhaustive wind tunnel work mean engineers find few surprises in F-22 tests. Comprehensive preparation means fewer actual flying hours are needed for tests and more can be accomplished on each flight.

In calculating the number of fighters the Air Force needs to carry out its two-MTW responsibilities, it has not taken into account the future potential role of Uninhabited Combat Air Vehicles, according to Lincoln.

"I don't think it's been determined exactly how we play UCAVs and by what amount you can leverage their unique advantages," Lincoln said. Since it isn't known yet what capabilities UCAVs will have—an Advanced Technology Demonstration is only now getting under way—it's too soon to tell if they could offset some of the need for JSFs, he said.

Bolton said Congress is right to hold the Air Force accountable on the F-22's cost and rightfully controls the power of the purse. However, each time the F-22 program was restructured—four times in the last decade—all Congress succeeded in doing by demanding delays was to add cost to the program.

The Wages of Delay

"Time is money," he said. "A lot of money has been taken away, nothing's been returned, and now we're living under a cost cap [of $20.8 billion]. Yet the product is supposed to be the same."

While some in Congress have argued that the stretches of the F-22 have allowed technology to mature and reduce risk, Bolton disagrees.

"We bought nothing with the delays," he asserted.

While much has been made over how the F-22 will consume an inordinate amount of the Air Force's—even DoD's—budget, Bolton said this is neither unusual nor undesirable.

The F-22 program, he noted, is "less than 1 percent of the DoD budget. Now, for that ... I will continue to provide the air dominance that we've enjoyed for decades." During that time, "we have not lost any soldier, sailor, or Marine to enemy air in 40 years." The F-22, he said, "allows my colleagues in the other services to do their jobs." ■

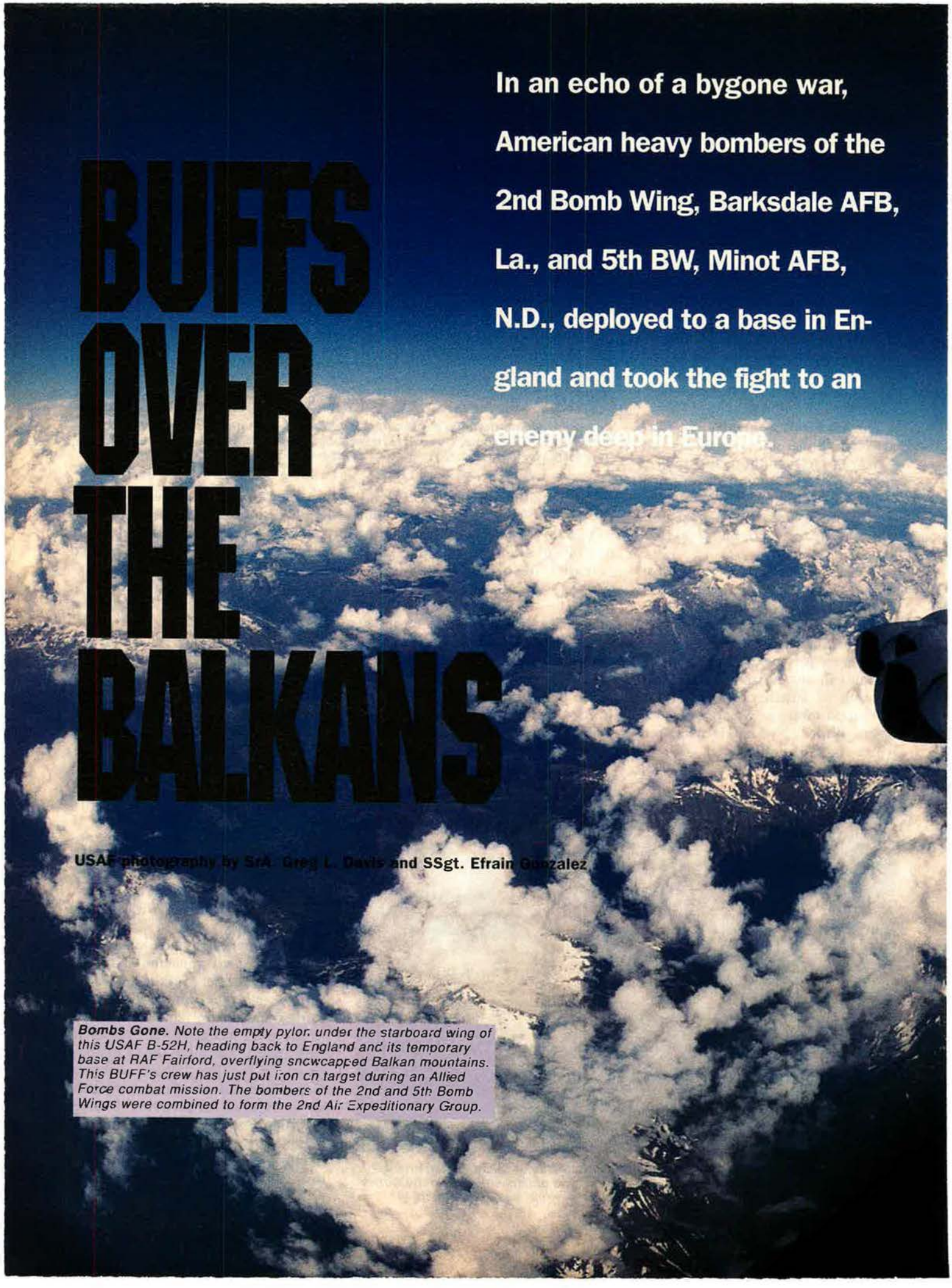
Staff photo by Guy Aceto

The A-10 (top) has survived several planned retirements to the boneyard and will serve as a tank killer well into the 2020s. A structural enhancement is in the works and several other improvements—not yet funded—would add to its punch.

BUFFS OVER THE BALKANS

In an echo of a bygone war, American heavy bombers of the 2nd Bomb Wing, Barksdale AFB, La., and 5th BW, Minot AFB, N.D., deployed to a base in England and took the fight to an enemy deep in Europe.

USAF photography by SrA. Greg L. Davis and SSgt. Efrain Gonzalez



Bombs Gone. *Note the empty pylon under the starboard wing of this USAF B-52H, heading back to England and its temporary base at RAF Fairford, overflying snowcapped Balkan mountains. This BUFF's crew has just put iron on target during an Allied Force combat mission. The bombers of the 2nd and 5th Bomb Wings were combined to form the 2nd Air Expeditionary Group.*

USAF photo by SrA. Greg L. Davis

To the Target. *A B-52H speeds toward a target inside Yugoslavia during an Allied Force mission, for which it carried approximately 45 500-pound iron bombs. The photo was snapped at high altitude over the Adriatic Sea just minutes before the bomber began its run-in to the target. Note the icing on the tips of the massive wings, caused by flying at high altitude for an extended period.*

Today's BUFFs are all B-52H models, delivered to the Air Force in 1961 and 1962. Even now, the aircraft still looks sleek and deadly on its way to the target. While most attention focused on the B-52's newer stablemates—the B-1s and B-2s—the older warhorse saw lots of action in the Balkan operation.

"The target for today." *Crews from the bomb wings hold a pre-flight maintenance brief prior to engine start at RAF Fairford, UK. Their mission was to conduct cruise missile launches at targets in Yugoslavia. Any mission generates intense planning, but the Allied Force crews did not take any chances, going over and over even well-practiced procedures.*

Early in the conflict, the Air Force required crews to decline to release their names to the press and to remove names that had been proudly painted on each aircraft, the better to avoid reprisals.

USAF photos by SSgt. Efrain Gonzalez

Before the Strike. *Allied Force B-52 crew members step to their aircraft, ready to begin preparations for an April cruise missile strike on Yugoslav targets. A B-52 crew includes two pilots, an electronic warfare officer, a radar navigator, and a navigator.*

USAF photos by SrA. Greg L. Davis

Rack 'Em. *A BUFF's normal load includes bombs carried in its cavernous bomb bay as well as on external racks on pylons wedged between the fuselage and inboard engine nacelle. Above, Mk 82 500-pound bombs hang from the racks of the interior bomb bay of a B-52H. (Some of the bombs bear chalk artwork and messages.) At right, nine Mk 82 500-pounders hang from the port-side under-wing pylon of a B-52H that is about to launch. The yellow band at the nose of the bombs signifies that each is a live weapon. B-52s dropped hundreds of these weapons during the operation.*

Some aircraft participating in the campaign were capable of dropping only conventional, general-purpose iron bombs. Others had already received planned modifications, allowing them to drop Conventional Air Launched Cruise Missiles and AGM-142 Have Nap missiles.

One at a Time. *At left, munitions specialists work to attach a 500-pound bomb to a B-52H under-wing pylon. Above, other munitions personnel move a 500-pounder to a B-52H.*

USAF photos by SrA. Greg L. Davis

Intensity. *In a unique shot (left), the pilots—masks on, visors down—prepare to make the run to the target. (Seated between the pilots is USAF photographer SrA. Greg L. Davis, who flew on two combat missions for this story.)*

Below, one gets a view from the cockpit of a B-52H as it heads toward a target inside Yugoslavia. Visible outside the window is another B-52H leaving contrails while flying at high altitude.

Where military targets were isolated, B-52s were free to use gravity bombs, especially against targets like barracks. Even so, the BUFFs were not used to lay waste to vast areas, as was done in Vietnam. USAF officials said multiple explosions from today's better-equipped bombers could be confined in a footprint only 1,000 feet long.

On Course. *At right, a B-52H navigator works at his station during a combat mission. The navigator doesn't get an office window, but he's able to "see" much more, as he monitors a wide array of signals to make sure the aircraft is on course.*

Symbols. *Above, 15 CALCM silhouettes adorn the fuselage of this B-52H from Barksdale. The aircraft also carries the POW/MIA shield and the nickname "Free Bird" beneath the cockpit windows. Note the names of the crew chiefs have been removed from within the outline of the map of Louisiana, conforming with an ACC directive to eliminate from combat aircraft all possible personal identifying factors.*

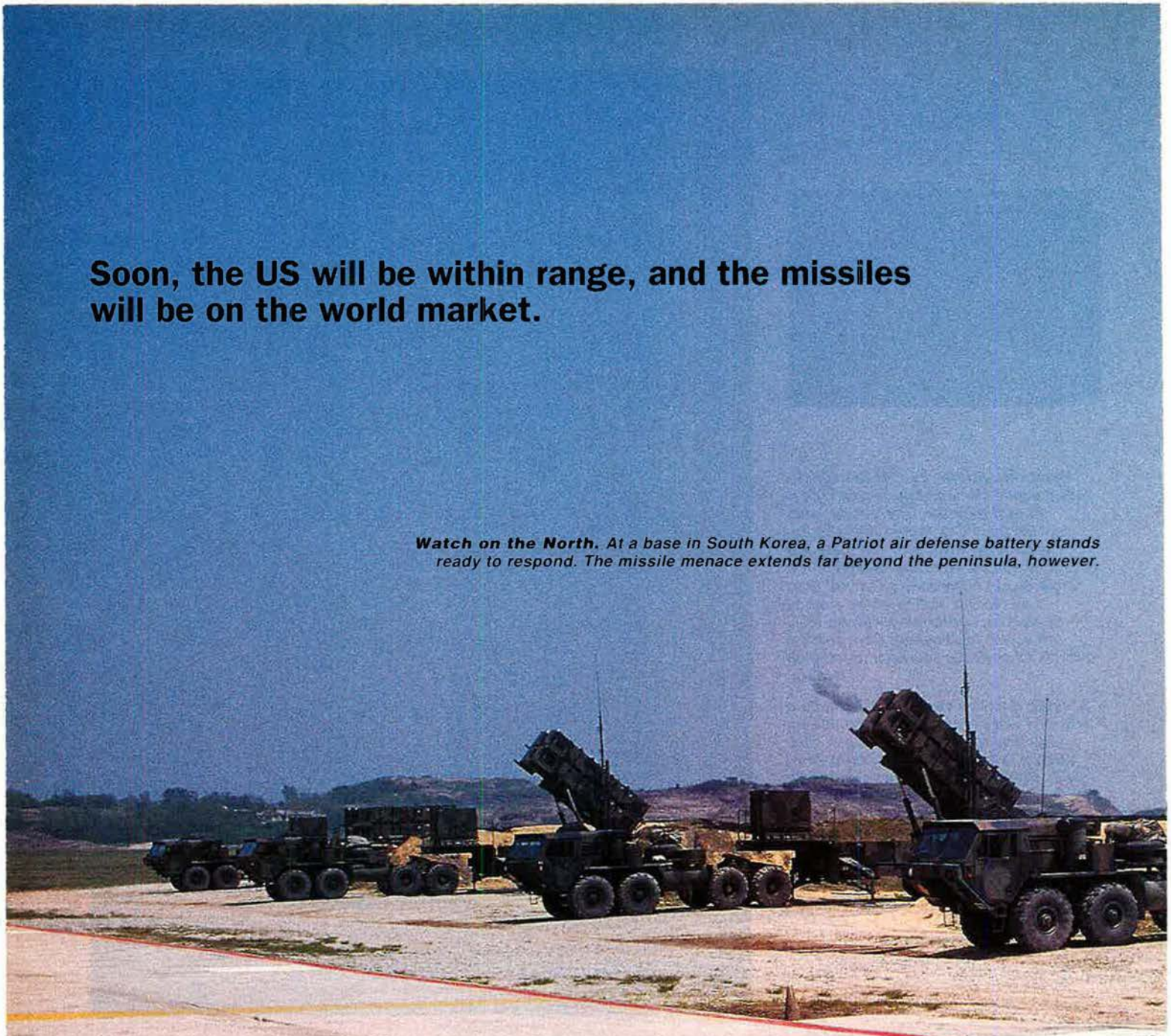
At right, massive contrails are left by a B-52H while flying at high altitude on the way to a Yugoslav target. This aircraft is home-based at Minot AFB, N.D. When the mission was complete and as the crew turned back to England, they began the process of evaluating the mission, lessons learned, the location and intensity of the threat, and so forth. Mission debrief can last longer than the pre-brief.

USAF photos by SrA. Greg L. Davis

USAF photo by SSgt. Efrain Gonzalez

The Next One. *At left, crews from the 2nd and 5th BWs engage in a mass briefing for the next mission. These crews and aircraft have since returned home to the United States, but they stand ready for a return to action, if the need arises.*■

Soon, the US will be within range, and the missiles will be on the world market.



Watch on the North. *At a base in South Korea, a Patriot air defense battery stands ready to respond. The missile menace extends far beyond the peninsula, however.*

The North Korean Missile Threat

By Bill Gertz

NORTH Korea has embarked on a broad buildup of its ballistic missile force and is on the verge of fielding an Intercontinental Ballistic Missile capable of reaching the United States.

This development of long-range missiles capable of delivering chemical, biological, and eventually nuclear warheads is taking place at the same time the secretive Stalinist government in Pyongyang is facing severe economic problems. North Korean poverty is staggering—one recent US intelligence report said famine in the northeast Asia state has led to cannibalism.

"It is now believed that two types of North Korean Intercontinental Ballistic Missiles can strike the continental United States with weapons of mass destruction," said Rep. Benjamin A. Gilman (R–N.Y.), chairman of the House International Relations Committee and head of a special advisory panel on North Korea. "For the first time in our history, we are within missile range of an arguably irrational rogue regime. Regrettably, we cannot defend against that threat."

The problem of North Korean missiles is made worse by the fact that Pyongyang has become a wholesaler of missiles and related technology and materials. In the words of one US defense official: "They are becoming The Home Depot for missile sales around the world."

Defense Secretary William S. Cohen identi-

Photo by Paul Kennedy

fied North Korea's long-range missiles as a key factor in Pentagon plans to develop a nationwide defense against ballistic missiles. "The threat threshold has been crossed," Cohen said in an interview at the end of a recent trip through Asia. "The threat is growing. I think that, with the spread of technology, with the transfer of this technology between rogue states, it poses an increasing threat. I don't think there is any question about that."

"Strategic" Arms?

Today's three principal rogues—North Korea, Iran, and Iraq—seek to acquire these long-range missiles because they are strategic weapons. Long-range missiles represent a threat by their presence alone. According to a recent government study, "We judge that North Korea, Iran, and Iraq would view their ICBMs more as strategic weapons of deterrence and coercive diplomacy than as weapons of war."

In another recent report, the Air Force's National Air Intelligence Center at Wright–Patterson AFB, Ohio, described North Korea's missile program as extensive. "North Korea has ambitious ballistic missile development programs and has exported missile technology to other countries, including Iran and Pakistan," the unclassified report said. "The North Koreans have already flight-tested their No Dong MRBs [Medium-Range Ballistic Missiles], and the Taepo Dong 1 MRBM booster was used in an attempt to orbit a satellite in August 1998." The test showed the two-stage booster "apparently performed successfully," the report said.

Cohen argued that defenses against long-range missiles will prevent "intimidation, blackmail, or extortion" by countries like North Korea. "We don't want to be in a position of having someone blackmail us with this kind of capability," he said.

North Korea has moved quickly to a high position on the intelligence community's strategic missile threat list, ranking a notch below Russia and China. A National Intelligence Estimate—a consensus view of more than 10 US intelligence organizations—was made public in September. It warned of new dangers from North Korea's missile program.

"We project that during the next 15 years the United States most likely will face ICBM threats from Russia, China, and North Korea, probably from Iran, and possibly from Iraq," the report said.

The report notes that North Korea is the driver in the spread of missiles. "The proliferation of Medium-Range Ballistic Missiles—driven primarily by North Korean No Dong sales—has created an immediate, serious, and growing threat to US forces, interests, and allies and has significantly altered the strategic balances in the Middle East and Asia," it stated.

The report went on, "We judge that countries developing missiles view their regional concerns as one of the primary factors in tailoring their programs. They see their short- and medium-range missiles not only as deterrents but also as force-multiplying weapons of war, primarily with conventional weapons, but with options for delivering biological, chemical, and eventually nuclear weapons."

The Clinton Administration has sought to highlight the positive elements of its policy toward North Korea, which was the focus of a major review by former Defense Secretary William J. Perry. Perry reported his findings to the President in September and called for continued engagement with the communist government in Pyongyang with the goal of normalizing relations that have been hostile since the end of the Korean War.

Perry's "Urgent Focus"

The Perry report stated that "the urgent focus of US policy toward the [Democratic People's Republic of Korea, or North Korea] must be to end its nuclear weapons and long-range missile–related activities."

As part of the new policy, President Clinton lifted some economic sanctions against North Korea, and in response Pyongyang announced it would "not launch a missile"—the Taepo Dong 2—during talks with the United States. "Pledges are important," said State Department spokesman James B. Foley of the North Korean testing moratorium. "Actions are equally or even more important, but I am not aware that we have reason to disbelieve the pledge."

Within days of making the announcement, however, North Korea's official Korean Central News Agency made clear that the testing moratorium would not stop the weapons buildup. "The DPRK has built up its defense power very expensively," the agency said. "The Korean people have strengthened the defense capabilities to the maximum [by] fastening their belts."

Indeed, widespread famine has killed thousands in North Korea. In 1996, North Korean leader Kim Jong Il called for a crackdown on cannibalism after three cases were reported, one US intelligence report said.

"There is reason to be concerned about North Korea today," Gilman said. "The threat to US interests continues and is in fact spreading into less conventional areas. The DPRK has deployed three new types of missiles since 1993—the newest capable of striking our nation. This is a clear and present danger to our national security and allows North Korea to create a balance of terror in northeast Asia."

Gilman views North Korea as the greatest of the world's proliferators of missiles and enabling technologies. "Its transfers to South Asia and to the Middle East are particularly distressing and potentially destabilizing," he said.

Worse, Gilman believes the North Koreans secretly are continuing to develop nuclear weapons—despite agreement with the US not to do so. "North Korea may still be pursuing a nuclear program," he said. "The DPRK may be seeking a parallel program based on Highly Enriched Uranium which strongly suggests that North Korea never intended to curb its nuclear ambitions.

"My greatest fear is that this unpredictable regime in Pyongyang will combine its covert nuclear weapons program with an Intercontinental Ballistic Missile capable of striking the United States—and our policy will have failed to prevent it."

Clinton "Very Hopeful"

President Clinton brushed aside North Korea's unpredictable behavior and said he is hopeful the pledge not to test the Taepo Dong will hold. "[The agreement] offers the most promising opportunity to lift the cloud of uncertainty and insecurity and danger that otherwise would hang over that whole region, including the American ser-

North Korean Missiles

Designation	Stages	Propellant	Range (miles)	Status
Scud B	1	liquid	185	Operational
Scud C	1	liquid	310	Operational
No Dong	1	liquid	800	Operational
Taepo Dong 1	2	liquid	925–1,240	Development
Taepo Dong 2	2	liquid	2,500–3,700	Development
TD 1 plus	3	liquid/solid	2,400–3,500	Development (test fired 8/31/98)
TD 2 plus	3	liquid/solid	anywhere in US	Development

Source: NAIC and North Korea Advisory Group report.

North Korean Sites

Launch Sites

Mt. Kanggamchan (Chugsan County, South Pyongan Province)
Mayangdo (Sinpo, South Hamgyong Province)
Paekun-ri (Kusong County, North Pyongan Province)
Nodong-Taepodong (Hwadae County, North Hamgyong Province)
Chonggang-up (Huchang County, Chagang Province)
Nodongja-ku in Okpyong (Munchon County, Kangwon Province)
Chiha-ri (Ichon County, Kangwon Province)
Sangwon County, Oryu-ri, and Chunghwa County (in Pyongyang)
Toksong County (South Hamgyong Province) (under construction)
Yongo-tong (South Hamgyong Province) (under construction)

Four missile production sites:

Plant No. 26 in Kanggye, Chagang Province (missile components)
Plant No. 118 in Kagam-ri, Kaechon County (engines)
Plant No. 125 in Chunggye-tong, Hyongjesan District, Pyongyang (component assembly)
Yakchon Machinery Plant in Mangyongdae-ri, Pyongyang (explosive compounds).

Source: South Korea's *Hangyore* (Internet version).

vicemen and -women who are there," the President said Sept. 22. "I am very, very hopeful about it. If it works, it does. If it does not, there will be other options open to us."

The United States maintains about 100,000 airmen, soldiers, sailors, and Marines in the Pacific. All are vulnerable in one way or another to North Korean missiles. US military planners believe any North Korean military operation will be a blitzkrieg—an all-out attack on South Korea, bolstered by deadly conventional, chemical, biological, and possibly nuclear missile attacks on US forces in the region. The goal would be to inflict as many casualties as possible on the United States in the shortest period of time because of North Korea's inability to resupply its forces.

Robert D. Walpole, the CIA's national intelligence officer for strategic and nuclear programs, stated in Congressional testimony that North Korea has joined Russia and China as one of the very few nations capable of striking the United States with a strategic missile.

"After Russia and China, North Korea is the most likely to develop ICBMs capable of threatening the United States during the next 15 years," Walpole said.

North Korea shocked Asia and the world in August 1998 when it test fired its first three-stage Taepo Dong 1 over the Sea of Japan and into the Pacific Ocean.

The missile test has become the prototype for states that are building long-range missiles. It was disguised as a space launch vehicle and nearly succeeded in orbiting a small satellite. Walpole told the Senate Foreign Relations Committee Sept. 16 that the military version of the Taepo Dong 1 most likely will carry biological or chemical warfare agents far enough to hit the United States.

The real danger, he said, is in a longer range Taepo Dong 2 that US intelligence agencies have been closely watching. The TD 2 was set for launch last summer according to CIA officials. It was delayed under frantic US diplomatic pressure and appeals to China to intervene with North Korea to put off the test.

"A two-stage Taepo Dong 2 could deliver a several hundred–kilogram payload to Alaska and Hawaii and a lighter payload to the western half of the United States," Walpole warned. "A three-stage Taepo Dong 2 could deliver a several hundred–kilogram payload anywhere in the United States. North Korea is much more likely to weaponize the more capable Taepo Dong 2 than the Taepo Dong 1 as an ICBM."

A senior US intelligence official who briefed reporters on the CIA missile threat report said that North Korea's long-range missile program will only be slowed, not stopped, by diplomatic efforts.

"If they don't fly it, then they don't know if the first stage will work the way they want it to," the official said. "They would be relatively confident the second stage would work because it's already flown once as a first stage."

The lack of a flight test for the Taepo Dong 2 "would certainly slow the program down, stall the program," he said. "Then what we'd be faced with is a threat from an untested system, a completely untested system. That gets pretty hard to try to define, so I think it would really stall the program. Does it eliminate it? No."

Work Continues

In fact, the US Intelligence Community has concluded that the development of the Taepo Dong 2 is continuing, despite the pledge by North Korea not to conduct a flight test. USAF's National Air Intelligence Center, the community's premier missile monitoring center, reported that Pyongyang is "continuing development of the Taepo Dong," said one official who has seen the report.

"They are still improving the TD 2 and proceeding with development," said the official. "In fact, their level of confidence in the TD 2 may be high enough to have it available [for use] without any flight test."

The official stopped short of saying the missile is "deployed," but he noted that, because of the unusual methods used by the North Koreans for developing their missiles with a few flight tests, the missile has to be considered a threat.

The CIA believes the Taepo Dong 2 could be tested at any time the North Koreans choose to do so, although there are no signs a test launch is imminent.

The major fear of Clinton Administration policy-makers is that a second long-range missile flight test will cause support from Japan and South Korea for the nuclear agreement with North Korea to evaporate.

Photo by Paul Kennedy

DoD photo by PH1 (NAC) Stephen Batiz

***Tension.** A South Korean soldier peers across the border at one of the most heavily militarized countries in the world. The communist north has not only Scuds (such as this one acquired by the US and used in an exercise) but is developing longer-range systems that soon will pose a direct threat to the US.*

Sen. Jesse Helms (R–N.C.), chairman of the Senate Foreign Relations Committee, said during a recent hearing that North Korea has been working overtime on its missiles.

"One of our worst fears has materialized," Helms said. "North Korea, right now, could convert its Taepo Dong 1 missile to drop anthrax on the United States."

Worries do not end with the Taepo Dong. North Korea also has developed a new 620-mile-range No Dong missile. The No Dong was flight-tested only once but is believed by military officials to be deployed and to pose a direct threat to troops not only in South Korea but at bases in Japan as well.

Deployed or Not?

Officially, the Pentagon won't say if they consider the No Dong deployed and threatening. However, one senior intelligence official said that one flight test was enough to show the North Koreans that the missile works. "Given everything that's gone on, you would be real smart to consider it deployed," the official said.

Cohen has refused to say publicly that the No Dong is deployed. Last year he was asked about the system and would say only that it has "completed development." The careful answer was an apparent attempt to mask the fact that the missile currently threatens US troops in Asia and there are no defenses against it yet.

The Congressional panel headed by former Defense Secretary Donald H. Rumsfeld, however, appeared more candid. The panel's report issued in July 1998 states: "The commission judges that the No Dong was operationally deployed long before the US government recognized that fact. There is ample evidence that North Korea has created a sizable missile production infrastructure, and therefore it is highly likely that considerable numbers of No Dongs have been produced."

Because of the Intelligence Community's failure to assess both the scope and pace of the No Dong development, the Rumsfeld commission warned that "the United States may have very little warning prior to deployment of the Taepo Dong 2"—the missile that can target the United States.

The North Koreans also have exported the No Dong to Pakistan and Iran. The No Dongs have been, as one official put it, "repainted" and named the Ghauri and Shahab 3 missiles.

"Obviously, North Korea has them, and Pakistan has the No Dong derivatives as a Ghauri," the official said. "The Shahab 3 is based on it as well with some other foreign assistance. I don't expect it to stop there. ... I expect over time we're going to

see more countries emerge with them."

The US Intelligence Community also is very concerned about North Korea's continuing nuclear weapons program, which was supposed to be halted by the 1994 Agreed Framework that was to have frozen Pyongyang's drive for what could only be nuclear missile warheads.

"We've been concerned about that nuclear program for some time," the intelligence official said. "The North Koreans had enough nuclear material for one or two nuclear devices several years ago."

The Energy Department intelligence office, which monitors nuclear weapons programs around the world, reported last year that a North Korean government trading company was shopping for uranium enrichment technology in Japan. The report said that the North Koreans, with help from Pakistan, could develop a uranium-fueled nuclear weapon in six years.

"On the basis of Pakistan's progress with a similar technology, we estimate that the DPRK is at least six years from the production of HEU"—Highly Enriched Uranium used in nuclear weapons, the report said. "On the other hand, with significant technical support from other countries, such as Pakistan, the time frame would be decreased by several years."

The North Korean missile program began with the purchase of Soviet–designed Scud short-range surface-to-surface missiles from Egypt. The North Koreans then built their own longer range Scuds and began exporting Scud know-how around the world.

North Korean Scuds and Scud production equipment have been transferred to Egypt, Iran, Syria, Libya, and Pakistan.

Instant Missile

On June 25, Indian authorities seized a North Korean ship bound for Pakistan carrying 170 tons of missile components, as well as blueprints, drawings, and instruction manuals for missiles. US intelligence agencies later determined that some of the equipment may have been Chinese in origin.

According to Indian press accounts, the North Korean ship was carrying all the components needed for building missiles. It included heavy-duty presses, lathe machines used for flattening and milling high-grade steel sheets, a plate bending machine with three rollers capable of rolling 16 mm–thick sheets into 700 mm diameters (for use in the manufacture of engine casings), "Torroidal" air bottles (used to guide missile warheads), two sets of theodolites (used to survey missile launch sites), three electronic weighing machines, a digital micron soldering machine, 1.5 mm forged steel bars (used for making missile components), and water refining and filtration machinery (used to purify water for washing missile casings). The equipment was destined for a missile factory in Pakistan.

Joseph S. Bermudez Jr., a private analyst who specializes in North Korean missile programs, said North Korea has been building missiles for 30 years. "It's only in the past 10, however, that we've really taken notice in that it's threatening not only our allies but is beginning to threaten us directly," Bermudez told a House committee hearing in October.

"During the past 15 to 20 years, it has taken that program and exported the products of the program, which has extended its threat, indirect threat, to other allies in other areas of strategic interest to the United States," he said.

Bermudez has categorized North Korea's missiles in three groups: Scuds, No Dong, and Taepo Dong. The short-range Scuds threaten all of South Korea, while the No Dong is the first North Korean missile designed specifically to deliver nuclear warheads. The Taepo Dongs have built upon the Scud and No Dong, literally. According to US intelligence officials, the North Koreans built the Taepo Dong 1 by taking the medium-range No Dong and placing a Scud on top of it.

According to Bermudez, the Taepo Dong 1 test in August 1998 combined a third stage to launch a satellite. It failed to reach orbit but still successfully demonstrated the most important elements of long-range missile technology, such as stabilizing a payload during launch and successfully separating three stages.

"If that system had been used instead ... [as] a ballistic missile, [it] would have a range in excess of 4,000 kilometers," Bermudez said. "If they had done a few other things, it could have a range of approximately 10,000 kilometers with like a 200-kilogram warhead—not very significant in size, but in range it actually puts the United States at risk."

The North Koreans have produced a total of between 750 and 1,150 ballistic missiles, and as many as 400 of them have been sold overseas. "Those states include Egypt, Iran; there's been possibly some cooperation with Iraq, Libya, Pakistan, Syria, United Arab Emirates, and Vietnam," Bermudez said.

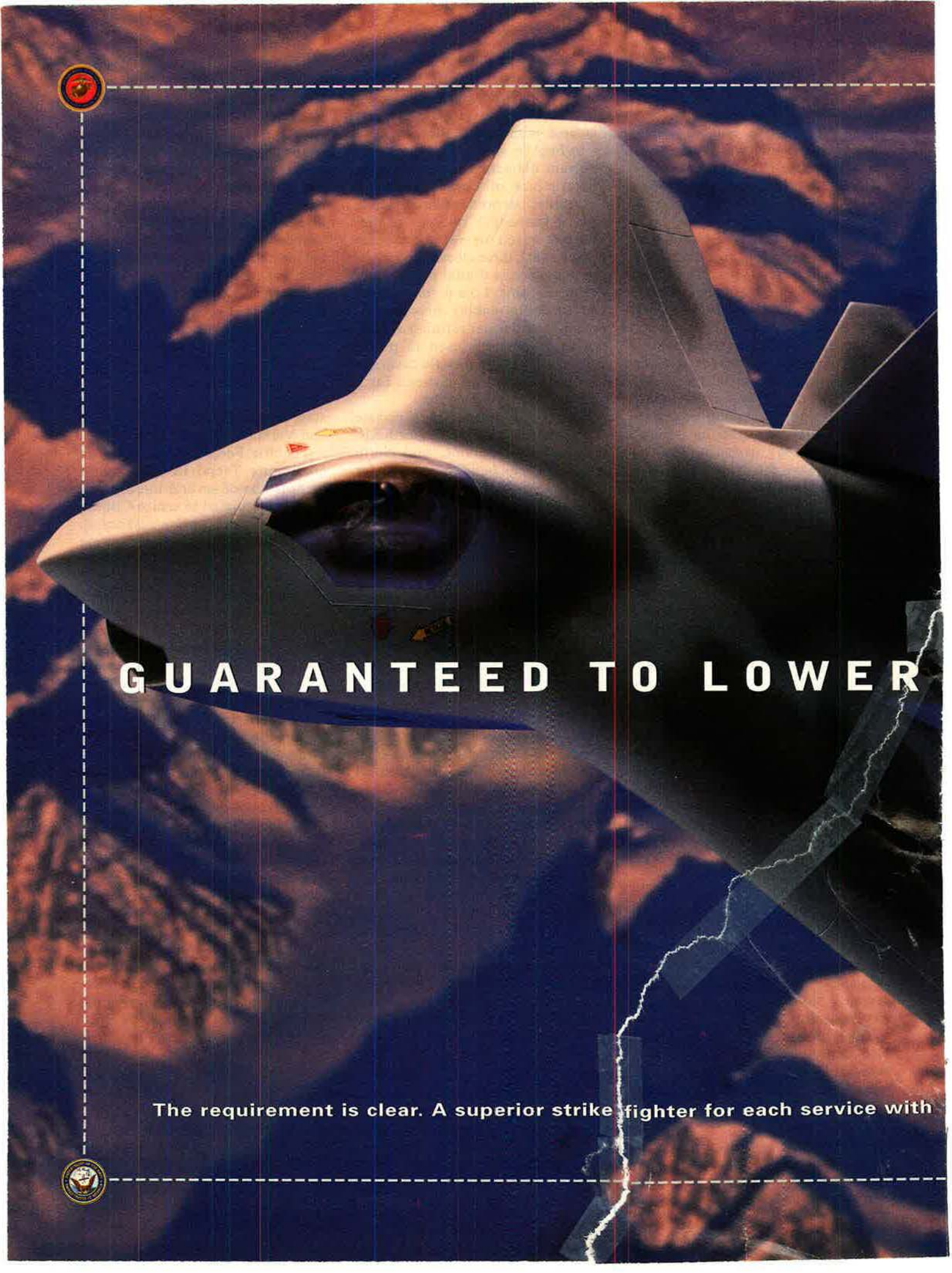
The Air Force NAIC report on continuing Taepo Dong development is one of several intelligence reports circulated to senior Clinton Administration policy-makers in September and October indicating that the new conciliatory approach to the reclusive communist state is not working.

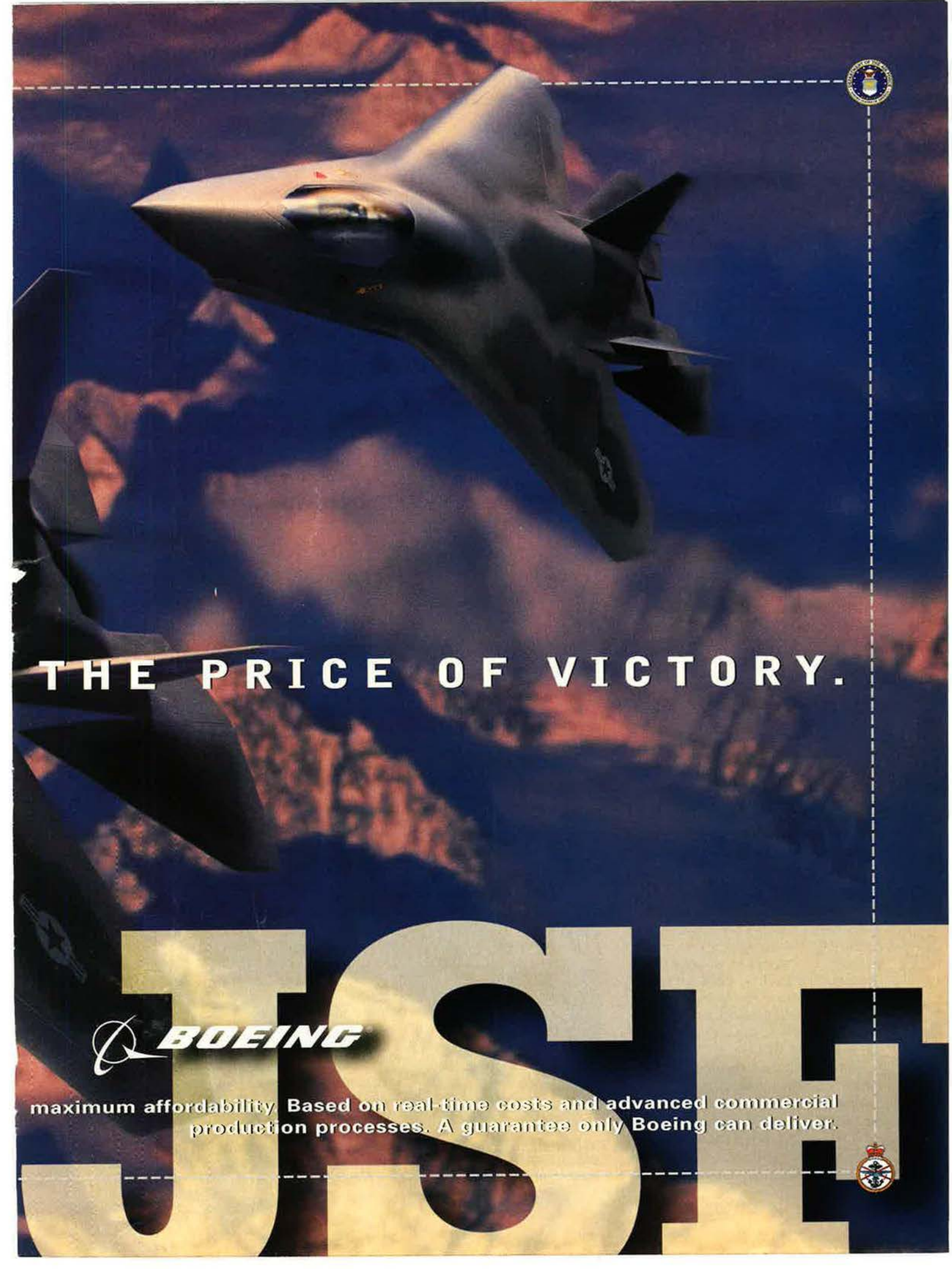
In addition to continued long-range missile development, US intelligence agencies uncovered information about North Korea's sales of missiles and related goods to rogue states.

Pentagon intelligence agencies reported in the fall that North Korea offered to Sudan an entire factory for assembling Scud missiles, like those produced in North Korea. Also, North Korea recently supplied 10 tons of aluminum powder obtained from China to Syria, another intelligence report stated. The aluminum powder is being used by the agency of the Syrian government involved in building weapons of mass destruction and missiles, said an official who has seen the report sent to senior US policy-makers.

One official said the recent intelligence reports are a clear sign the new policy is not working. "So much for the Perry approach," this official said. ■

Bill Gertz is the defense and national security affairs reporter for The Washington Times *and author of* Betrayal: How the Clinton Administration Undermined American Security, *published by Regnery Publishing. His most recent article for* Air Force *Magazine, "Missile Threats and Defenses," appeared in the October 1998 issue.*


GUARANTEED TO LOWER
The requirement is clear. A superior strike fighter for each service with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JSF

The basic idea was for the warfighters to go forward, even as battle area intelligence was beamed back to the rear—and then on to the warfighters.

Joint Experiment in Expeditionary Force

Two F-15C fighters roared over Langley AFB, Va., slicing through the heat of a Virginia day as they practiced basic flight maneuvers. Down below, inside a nondescript auditorium-sized building not far from the base's La Salle Gate, hundreds of airmen and civilians peered at computer screens, chattered among themselves, and tapped out messages to distant bases.

The work of those on the ground may not have been as exciting as the action high overhead, but it was far from mundane. It was all part of an ambitious experiment that employed electronic pipelines and satellite links to streamline the way that USAF warfighters get intelligence, weather, and targeting information when they deploy to the world's hot spots.

The activity inside the Operations Support Center and at outposts in Florida, Idaho, and Nevada formed the backbone of Joint Expeditionary Force Experiment 99, held last year. It was the second in a series of experiments expected to continue through 2010. This was a joint service experiment. The goal is further improvement in the way the Air Force and other services react and deploy when trouble strikes.

The basic idea is to send fighters, bombers, and tankers forward, even as drone aircraft and satellites over the trouble spot beam up-to-the-minute intelligence back to the rear. That intelligence is analyzed, turned into target lists, and then transmitted

By William H. McMichael

USAF photo

SSgt. Joseph Checho (foreground) and MSgt. Paul Moreau, 9th Information Warfare Flight, review a checklist during JEFX 99 at the Langley AFB, Va., Operations Support Center.

USAF photo

Among the aircraft participating in the live-fly portion of JEFX 99 were F-15C and KC-135 aircraft, like these from Mountain Home AFB, Idaho. Aircraft operated out of Nellis AFB, Nev., as part of an Aerospace Expeditionary Force.

forward to the warfighters, who get their orders on the move. At the same time, their support web manages the battle from the rear, keeping the forward presence light, nimble, and flexible.

The Battle Starts

JEFX 99 put this strategy to the test in a mock operation that spanned the United States. Reacting to an emerging military threat in a notional "foreign" trouble spot (the actual location was on the Nevada–California border), an Aerospace Expeditionary Force—some of it flying live out of Nellis AFB, Nev., and some of it virtual, created on a simulator in New Mexico—was deployed to the "theater." As during EFX 98, the AEF was directed from a Combined Aerospace Operations Center at Hurlburt Field, Fla., and backed by air battle managers working out of Langley. All told, some 4,000 airmen and civilians scattered around 10 locations took part in JEFX.

The scenario also included Army and Marine Corps ground assets, Navy jets, and a command-and-control ship. Allied officers also took part in the two-week effort. The deputy Joint Force Air Component Commander was a three-star German air force general who was linked to JEFX activities from his post at Ramstein AB, Germany. All of the activity was observed and scrutinized by personnel from US Joint Forces Command, DoD's new lead operational player in the joint world. (See box, p. 50.)

Planners made two large assumptions in JEFX: that they had the ability to see the battlespace clearly and could decide, in real time, what effect a given weapon or event would have on the battlespace. The Air Force doesn't have those capabilities today, but work goes on.

Already, the experiments have produced some exciting results. For example, the Air Force during Operation Allied Force received fresh intelligence that detailed changed enemy positions. This information was analyzed and forwarded to a B-1 bomber crew already airborne, allowing the crew to hit a new target. The Multi-Source Tactical System that made it happen was developed during EFX 98.

"We were able to give real-time information to the aircrew en route, information about the threat changes which had occurred since their takeoff," said Maj. Gen. Gerald F. Perryman Jr., commander of the Aerospace Command and Control and Intelligence, Surveillance, and Reconnaissance Center at Langley and the officer charged with implementing Air Force experimentation programs. "We could give them imagery, we could give them a picture of the target we wanted, we could change their target, we could give them two-way e-mail with command centers. That's an exciting development."

That advance was refined during JEFX 99. In one JEFX scenario, operators were able to retask and retarget an in-flight B-52 only 35 minutes after new intelligence was received. The data was programmed directly into the bomber's cruise missiles via satellite link, Perryman said.

"This is something that airmen have sought for decades," Perryman said, "and we're working on it full bore."

Less dramatic advances have emerged. The Air Force tested 59 separate initiatives during JEFX 99. One of these, the Theater Battle Management Core System, is expected to appear in the tool kits of warfighting commanders early this year. TBMCS, a complex combination of hardware and software products, promises to streamline the flow of data to a Joint Force Air Component Commander and quicken the decision-making cycle.

Perryman called JEFX 99 "a resounding success." The Air Force hopes the lessons learned will help its deployed forces get where they're going more quickly and with less support than ever. It's become a common aim of all the service branches, a move driven to some extent by slack budgets. The Air Force wants its AEFs to be "light, lean, and lethal" and says JEFX will take it there.

Revolution, Evolution

JEFX has been advertised as a series of "revolutionary experiments," in the words of one brochure. And everyone involved in the experiments likes to toss around the names of aviation pioneers such as Billy Mitchell and Jimmy Doolittle. However, the Air Force cautions against taking this claim too literally. The program remains largely incremental, an extension of current systems and procedures.

Air Force Maj. Gen. Timothy A. Peppe heads the joint experimentation directorate of US Joint Forces Command. Peppe thus leads the development of joint operational concepts. He said anything revolutionary goes against the culture of the military.

"Most of us are very comfortable working the here and the now, and I daresay that most of us are probably not really good at looking 10 or 15 years into the future," Peppe ob-

served. "I'd say we're really good at making some evolutionary steps and improvements in our capabilities, but I'm not sure how revolutionary we are."

He gets no argument from USAF Lt. Gen. Lansford E. Trapp Jr., who now is vice commander of Pacific Air Forces but served as the Joint Force Air Component Commander in the first EFX iteration.

"We all come into these darn things hidebound by the procedures and everything you've learned," Trapp said, "and when you sit down with a group of people and say, 'Hey, look, throw all that away and figure out a better way' to do, in this case, dynamic battle control, there's some resistance to that, initially, because everybody comes in with these preconceived notions."

And, of course, no one wants to fail.

"We're measured by success," Peppe said. "I think what we all have to come to grips with is, if you're really going to experiment with some stuff, you're going to fail every now and then. And maybe you fail more often than you succeed. But if you go back and look at some of the previous stuff that was done in the interwar years, we're going to have to learn to accept some failures and not as much progress.

"We have some folks that, ... if they give you a buck, they want a 'deliverable,' " Peppe said. "If you're going to look to the future and try some things that are really outside-the-box thinking, you're not always going to get that deliverable. And that's hard for some people to realize."

Laser Targeting

At JEFX 99, revolution was reserved for a category of initiatives that don't have current applications but looked too interesting not to explore. One of these was a Space Based Laser targeting system simulator set up at Langley.

Staff photo by Guy Aceto

Sophisticated simulators provide realistic capability to use unfielded weapon systems, such as the F-22, Joint Strike Fighter, and Airborne Laser. JEFX 99 even featured a Space Based Laser targeting system simulator.

On a computer screen showing a map of the Korean peninsula, simulated North Korean missile launches appeared as colored blips. An operator could identify the location, current altitude, projected target site, and the time remaining to shoot it down in its boost phase.

"This is more of a 'what-if,' " said Bob Grueneberg of the Air Force SBL Office. "The problem with simulators," he joked, "is that they're doomed to succeed." The system, an element of 1980s Strategic Defense Initiative research, is scheduled to be operative in 2020, according to SBL's Capt. Eric Kolb.

True risk-it-all experimentation also faces serious budget constraints. Congress seems committed to the concept, having in 1998 formally handed responsibility for joint experimentation to what is now Joint Forces Command. On the other hand, nearly all of the money for Pentagon experimentation rests in the hands

Live-Fly USAF Players in JEFX 99

Aircraft	Quantity	Base
B-1B	4	Mountain Home AFB, Idaho
B-2	1	Whiteman AFB, Mo.
B-52	1	Barksdale AFB, La.
F-15C	6	Eglin AFB, Fla.
F-15C	12	Mountain Home AFB, Idaho
F-15E	4	Eglin AFB, Fla.
F-15E	12	Mountain Home AFB, Idaho
F-16	12	Nellis AFB, Nev.
F-16C	3	Tucson IAP (ANG), Ariz.
F-16CJ	7	Eglin AFB, Fla.
F-16CJ	8	Mountain Home AFB, Idaho
F-117	3	Holloman AFB, N.M.
E-3	2	Tinker AFB, Okla.
E-8	1	Robins AFB, Ga.
EC-130C	1	Harrisburg IAP (ANG), Pa.
RC-135	1	Offutt AFB, Neb.
U-2	1	Beale AFB, Calif.
Predator	1	Nellis AFB, Nev.
C-130	2	Mountain Home AFB, Idaho
KC-135	4	Mountain Home AFB, Idaho
KC-135	4	Tucson IAP (ANG), Ariz.

of the services. "We're publishing that we've got about nine concepts," Joint Forces Command's Peppe said, "but we're really only working about four or five, because of resources."

The services are wrestling with how to best allocate their scarce resources. "Do you fund these things and do an experiment and you find out great things, but then you have to wait another two years or so before you get it into the normal budget process?" asked Gen. Lester L. Lyles, vice chief of staff of the Air Force. "It almost means that we have to look at and find ways that we can more quickly evolve, find revolutionary steps or experiments on how we can do our normal budgeting and programming process to match with the lessons learned from these experiments.

"Right now, we haven't completely broken the code on how to do that."

Still, senior USAF leaders have said they are deeply committed to experimentation and are pleased with what EFX has produced to help speed deployment and operations of its expeditionary forces.

Asked to tout the successes of JEFX 99, senior officials invariably lump it together with the 1998 experiment, indicating that they want the Air Force effort to map its future to be considered as a continuum rather than each year as an end in itself. That said, they invariably point with pride to the advances made on TBMCS.

TBMCS is slated to replace CTAPS, the Contingency Theater Automated Planning System, according to Perryman. To better deploy contingency forces—to give an airborne JFACC the smoothest possible link to all forces to execute the upcoming battle—TBMCS is a must.

TBMCS is a key to what the Air Force calls dynamic battle control—the ability to acquire a near-instantaneous picture of the battlespace, quickly react with a force tailored for the specific mission, and rapidly gain a tactical advantage.

Getting Dynamic

Today, dynamic battle control comes in dribs and drabs—the B-1 retargeting, for example. Currently, said Trapp, "We take a look at what the battlespace is 48 hours from now. And we allocate resources against designated sets of targets. And then we prosecute those in a time-phased manner through this thing called the Air Tasking Order. And then we assess what impact that had, and we start the cycle over again. And they overlap with one another, as you know. That's not very dynamic."

Compare that to the Kosovo retargeting, accomplished, officials said, in 20 to 40 minutes.

"We didn't do that on a routine basis," Trapp said. "Don't get me wrong, here. But we did that a number of times. And that's getting pretty near real time. Beats the hell out of 48 hours. And, in a couple of instances, we were able to find significant military targets and strike 'em in that time frame, and it made a difference."

The Air Force wants dynamic battle control over the entire spectrum of operations—and to provide it to an airborne JFACC as well as a land-based commander.

A JFACC looking to gain a modicum of such control must now rely on CTAPS. And as Perryman pointed out, "It just doesn't interoperate as well with the other services. It's more cumbersome. You can't keep up with things in a dynamic way."

JEFX 99 taught the Air Force that TBMCS, despite its promise, needs to be scaled back. The Air Force tried to make TBMCS a one-size-fits-all operation, "the system of systems," Trapp termed it. "What we found is that some of the systems are easier done and more easily understood if we just make them Web–based."

Imagery and messaging systems are two such areas, he said.

"There are pieces of TBMCS that work wonderfully," said Trapp. "The module that generates much of the ATO work is just slicker than can be. [It's] Y2K compliant. There's an open architecture. But it's not Web–based, it's Unix–based. So as a result, it takes a lot of training."

Those tweaks aside, JEFX has convinced the Air Force that TBMCS is the way to go—at the joint as well as Air Force level.

During JEFX 99, the Army battle control element at the Combined Aerospace Operations Center at Hurlburt Field was able to flow the targets it wanted the Air Force to strike directly into TBMCS, according to Perryman. In other words, TBMCS and the Army's Battle Command System were able to talk with each other, allowing for a broader shared picture of the battlespace.

What Perryman called a successful development test and evaluation on TBMCS is being followed by a full multiservice operational test and evaluation in January. That test will include an electronic liaison with a Navy command-and-control ship, he said.

Several other JEFX products showed similar promise. Perryman touted "the ability to use distributive and collaborative operations so that the JFACC can get the right information

Staff photo by Guy Aceto

A Predator Unmanned Aerial Vehicle sits on the flight line in Nevada. UAVs, which have been used successfully in recent real-world operations, and future uninhabited combat aerial vehicles are key to future battle management.

A Few Suggestions from US Joint Forces Command

In late 1998, Congress ordered US Joint Forces Command (known at the time as US Atlantic Command) to assume the role of DoD's executive agent for joint military experimentation.

USJFCOM, headquartered in Norfolk, Va., has begun to work closely with the four military services to study ways to integrate their various systems, forces, and doctrines, with a goal of helping the services achieve objectives set in Joint Vision 2010, the Joint Chiefs' operational template.

However, USJFCOM can't tell the services what to do. The command did not tell the Air Force how to run this year's JEFX. It deployed observers (three at Hurlburt Field, Fla., and five at Nellis AFB, Nev.) and was read in on what worked and what did not work. It made recommendations for future experiments.

USJFCOM did not manage JEFX but was "leveraging" the USAF experiment and that of other services in an effort to make gains in the joint sphere. The command's leaders have convinced all four services to conduct a joint experiment in 2000 as part of their own experiments. It hosts monthly conferences with the services' experimentation chiefs; weekly and daily contact takes place at the O-5 and O-6 levels.

JFCOM is a coordinator, an observer, and, for the time being, the voice that matters most on joint experimentation. Adm. Harold W. Gehman Jr., the commander in chief of USJFCOM, must submit an annual report to Congress, specifying how the services can work together better and making recommendations on cutting redundancies in the four services. Gehman must make similar recommendations to the Joint Chiefs of Staff.

about space-based activity and get a better link to the tanker airlift coordination center at Scott [AFB, Ill.]. Those are huge."

Langley's Operations Support Center successfully delivered an electronic ATO to a command center in Korea and did so on another occasion to USS *Coronado*. "It was a smaller version of a full-up ATO," Perryman said, "but we were able to push an ATO to them, which those forces in those locations could have used."

Everyday Use

Until such processes and systems are employed on an everyday basis—until they allow commanders to develop enough confidence in them to feel comfortable relying on a smaller footprint in the forward area, and on the concept of reaching back for the support and information they need—near-term expeditionary forces will probably carry Desert Storm–sized support elements forward, should war break out.

"There's a debate on that," Trapp said. "If we had to go to a major theater war today, I think we would take all of our large footprint forward to do the command and control. We just demonstrated that in Kosovo. We ended up with, I think, 1,500 to 1,800 people at Vicenza [Italy]."

Why? "Because we are not confident enough yet that we can do what we think we need to do through reachback," Trapp said. "We've only experimented with it twice. I mean, when lives are at risk, you tend to be a hell of a lot more conservative."

Lyles said he agreed with that "to some extent" but said that in Kosovo, the Air Force "learned lessons again about the benefit of having ... light and lean, plus lethal, capabilities. Perhaps there's some specific products that are not mature enough for us to take. But some of the general concepts and the whole reachback aspect we demonstrated and used very well in Allied Force, and, I think, depending on the specific scenario, you will see a lot of us leaning towards trying to encompass some of those in another Desert Storm, if we had to."

Air Force officials agree that in the not-too-distant future, they'll have to break out of the Desert Storm–Kosovo mold. "You know, at some point in time, you'll always have to go out and play with the real thing," Peppe said. "Because models can't do everything for you."

In 1995–96, the Air Force sent three specially created AEFs to Bahrain, Jordan, and Qatar, part of a Pentagon strategy of using AEFs to fill the gap between Navy carrier deployments to the Middle East. The composite units were to help patrol the no-fly zones over Iraq, train with coalition partners, and practice rapid deployment.

The deployments took the AEFs to unimproved airfields, making them a fit test for the concept. Similar deployments, officials say, may be the next logical step to take in deploying expeditionary forces that truly are, as Lyles terms it, "lean, light, and lethal."

Confidence Building

Trapp agreed. "I think that that's what it's going to take," he said. "We've got to get it off the experiment mode into the exercise mode. We've got to actually go do it for real a couple of times before people get ... confidence and say, 'This is how we're going to go forth.' "

"We will be seeing more things like that," Lyles said. "We may have to find ways that we can do some of these things in a sort of real-world contingency, if you will."

Unless those exercises are conducted in tandem with a no-fly zone mission, they may have to come out of some other program's hide. The Air Force spent more than $40 million on EFX 98 and more than $60 million on JEFX 99. Live AEF tests would certainly require even more.

"The US Army has set aside a large pool of money, a relatively large pool of money, so that they can take advantage very quickly of lessons learned from experiments," Lyles said. "We and the Navy and others are looking at whether or not we want to try to adapt the same technique or whether there is some other way that we can do it."

The Air Force also will cut back on the number of large-scale experiments following JEFX 2000. "What we'd like to see is smaller-scale experiments throughout the year, as well as a larger-scale, integrated experiment conducted in concert with the Joint Forces Command that will be done every other year, on even-numbered years," Perryman said. ■

William H. McMichael is the military reporter for the New News, Va., Daily Press. *His most recent article for* Air Force *Magazine, "Watch on the Desert," appeared in the March 1999 issue.*

A *Deafness* on National Defense

Most Americans believe they lack sufficient information to make good judgments about military and national security matters. They aren't too interested in learning more, either.

That, in a nutshell, was the conclusion of a recent Gallup survey of 1,000 American adults, 178 one- and two-star officers, and 56 military and national security correspondents. The sponsor of the survey was the Robert R. McCormick Tribune Foundation of Chicago and the Media and Security Project in New York.

Gallup said 46 percent of the public either thinks it gets inadequate information or doesn't know if it does.

Even more surprising was the survey's finding that the public's desire for military coverage is weak—far weaker than assumed by either the military or the media respondents. In fact, less than one-half of the public wanted to know about *any* of various types of military stories.

As the graphic shows, the officers vastly overestimated public interest in military issues. This finding is consistent with current conventional wisdom citing waning public engagement in international or military issues. The media's miscalculation of public interest was even greater.

	What the Public Wants to Know ...	*What the Military and Media Estimate is the Degree of Public Interest ...*	
	Public	**Military**	**Media**
Terrorist Threats	49%	99%	100%
Counterterrorist Activities	49%	89%	95%
Military Readiness	48%	91%	85%
Effect on Reaching Policy Goals	47%	98%	98%
Physical Damage	46%	93%	100%
Year 2000 Problems	45%	96%	96%
Human Casualties	45%	95%	100%
Quality-of-Life Issues	43%	80%	73%
Sexual Misconduct	28%	65%	89%

new rules on Dual Compensation

By Bruce D. Callander

Critics called it "double dipping." For many members of the armed services, it has long carried heavy financial penalties or has been forbidden outright. Now, it is legal.

The term refers to a situation in which an individual receives two government paychecks at the same time—one for retired military pay and another for employment in a federal civilian agency or department.

The Fiscal 2000 defense authorization act, signed by President Clinton Oct. 5, repealed two laws that through the years have forced thousands of military retirees to give up large portions of the first check—for retired pay—as a precondition for taking federal civilian jobs.

The toughest restrictions had applied to retired regular commissioned officers and warrant officers. The Dual Compensation Act of 1964 limited them to keeping roughly the first $10,000 (at the current level) of the retired pay to which they were entitled, plus half of the remainder.

Under this offset penalty, it was possible for a retired regular officer in a low-paying civilian job to wind up with less total income than he would have enjoyed by turning down the federal job and living on retired pay alone.

The 1964 law, however, did not apply to retired regular officers in temporary civilian jobs and did not reduce disability retired pay. Nor did it affect retired reserve officers or retired enlisted members of any component.

The second dual-compensation law, included in the Civil Service Reform Act of 1978, was more sweeping. First, its provisions included disability pay, granting no exemptions. Second, the law covered not only retired regular officers but all retired service members, whether officer, enlisted, or reserve.

This law put a limit on the total amount that any retiree could receive in combined civil service salary and retired pay. The cap was based on the pay of civilians at the bottom (Level V) of the Executive Schedule. In 1999, that amount was $110,700.

The double-dipping term itself pointed up the nature of the controversy. Should federal employment

The critics called it "double dipping." Their choice of words was revealing.

be regarded primarily as a benefit—thus "dipping"—or as a means of hiring the best talent available?

Disadvantage for 6,000

At last count, about 6,000 retired regular officers came under some type of dual-compensation restriction. Most were subject to the 1964 offset requirement. About 160 had their pay reduced by the 1978 executive-level pay cap and some 650 were affected by both limitations.

Opposing these limitations were the Air Force Association and other members of The Military Coalition, a group of about 30 military, veteran, and uniformed services organizations. They argued that they not only were unfair to affected retirees but also were bad for the country. AFA said the offset and salary caps discouraged experienced members from bringing their expertise to another sector of government.

The Military Coalition supported repeal, and the services themselves favored it. Because the limitations affected only relatively small numbers, it did not receive as much attention as some of the broader issues such as the military pay raise and retention incentives.

The Pentagon's interest in the dual-compensation restrictions increased in recent years, however, as active duty strengths dropped and the services searched for ways to meet shortages in critical skills. The Air Force, for example, said it would like to hire more retired rated officers to fill headquarters staff positions that have gone begging because of pilot shortages.

In 1990, Congress did ease the restrictions slightly with the Federal Employees Pay Comparability Act. FEPCA allowed government agencies to waive dual-compensation limitations and hire civilian and military retirees to meet critical personnel shortages. The criteria were stringent, however, and the provisions were applied selectively. Some waivers were permitted in 1998, for example, to bring retirees with selected computer expertise back to work on the government's Y2K problems.

Congress also has allowed exceptions to the law in a number of specific cases to help government agencies meet physician shortages. In 1984, it allowed the Department of Veterans Affairs to grant dual-compensation waivers to retired military doctors, and in 1986, it gave similar power to the US Soldiers' and Airmen's Home and the Uniformed Services University of the Health Sciences.

The Congressionally mandated Commission on Servicemembers and Veterans Transition Assistance concluded in its 1999 final report that retirement pay reduction requirements imposed by the Dual Compensation Act destroyed any incentive for military retirees to go into federal employment and deprived the government of valuable skills. The commission also said that the setup created inequity between regular and reserve retired officers.

The Federal Managers Association, a lobbying organization supporting federal executives, managers, and supervisors, supported total repeal of dual-compensation restrictions as a means of drawing experienced professionals back into federal service.

Civilian Grumbling

The Office of Personnel Management has been unenthusiastic about removing the limitations. Historically, the government generally has been wary of hiring military retirees in civilian jobs lest they saturate the high-level positions. From the 1880s until 1964, in fact, no retired regular officer could take a federal civilian job without first obtaining a waiver.

In effect, the dual-compensation law of 1964 opened the door to retirees but exacted a price for taking a federal job.

Even when it did not actually restrict their employment or their income, the government kept a close eye on members who retired and moved into government jobs. In the beginning, only retired officers had to report that they did so. Since 1993, a DoD ethics regulation has required all retirees, officer and enlisted, to report.

Federal civilian employees themselves have been even more outspoken about their opposition to dropping the pay limitations on military retirees. Many civilian workers see the military retirees as a threat to their own advancement. Others resent the fact that double-dippers often can make more than their peers in the same jobs.

To the charge that dual-compensation rules discriminate against the military, civilian workers have countered that they are under even harsher restrictions. A retired civilian employee who returns to government service usually receives his full annuity but finds his civilian salary reduced by the amount of that annuity. It is only fair, some say, that retired service members give up at least some of their retired pay.

With the limitations now repealed, government service doubtless will become more attractive to retiring service members. ■

Bruce D. Callander, a regular contributor to Air Force *Magazine, served tours of active duty during World War II and the Korean War. In 1952, he joined* Air Force Times, *serving as editor from 1972 to 1986. His most recent story for* Air Force *Magazine, "Warrior Week," appeared in the December 1999 issue.*

The Chart Page

By Tamar A. Mehuron, Associate Editor

The Future of Military Satellites

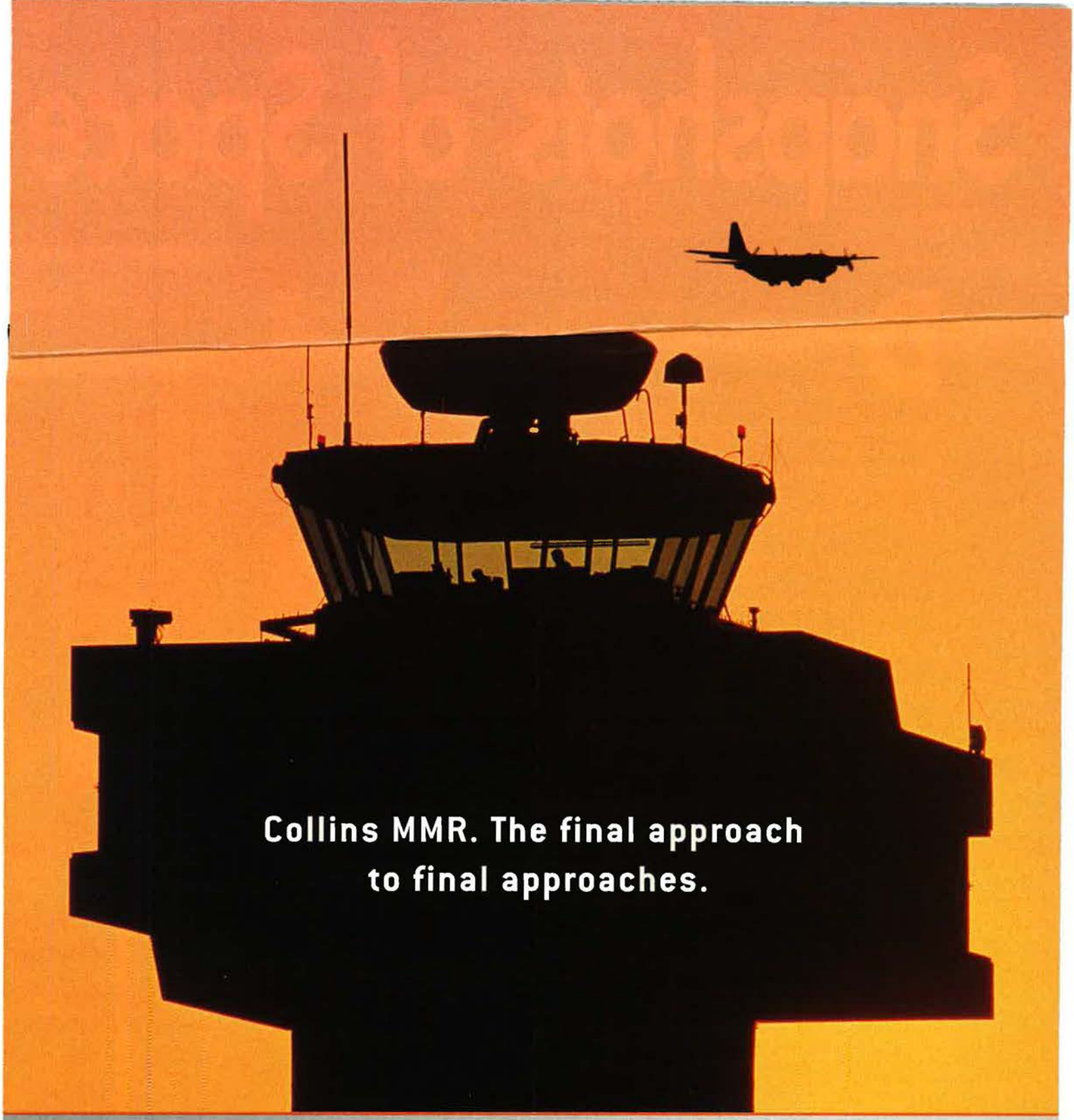
Current plans call for the United States and other nations to launch 308 military satellites over the next decade, about one-fifth of all new satellites to be put in orbit during that period. The largest single group of new military satellites comprises those used for reconnaissance and surveillance. It will command the largest market value—$16.3 billion, out of a total of nearly $35 billion. (See table.)

The US will dominate the field, launching roughly half of all military satellites. DoD now launches 10 to 11 satellites each year. That rate is projected to increase. Today, Russia launches about 15 satellites annually, but that number is expected to decline. The rest of the market includes Europe, China, Israel, and Japan, plus a few smaller nations.

The Outlook for Military Satellites: 1999–2008

New Military Satellites	Number Worldwide	Market Value (in Billions)
Reconnaissance/Surveillance	85	$16.3
Technology Development	73	$1.4
Navigation	51	$1.9
Communications	50	$4.9
Early Warning	43	$9.6
Meteorological/Earth Resources	6	$0.5
Total	**308**	**$34.6**

Source: Marco Caceres, Teal Group, "The Military Satellite Market," *Aerospace America*, June 1999.



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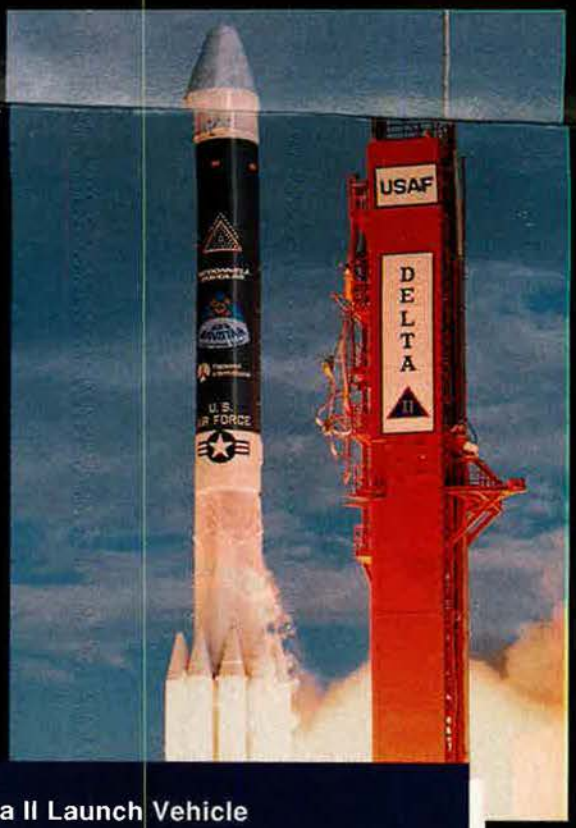
Snapshots of Space

DATA sheets that follow are snapshots of 17 key Air Force space programs—experiments, development, production, sustainment, and upgrades. The list is not all-inclusive. It is based on the official *Air Force Handbook for the 106th Congress* and other Air Force and company documents, current as of Nov. 1, 1999.



Delta II Launch Vehicle

Medium-weight spacelift provides access to space to deliver essential Global Positioning System capabilities.

Acquisition
Status: operational, production, last five procured Fiscal 1999.
Contractors: Boeing, Rocketdyne, Aerojet, Alliant.
Inventory: 28 purchased.
Upgrades: none planned.

Capabilities/Profile
Range: 4,120 pounds to Geosynchronous Transfer Orbit.
Length: up to 125 feet.
Diameter: 8 feet.
Fairing Diameter: 9.5 feet.
Weight: 511,190 pounds.

Performance/Comment
Placement accuracy—apogee: 12,636 miles (±24 miles).
Placement accuracy—perigee: 116 miles (±0.9 miles).
Placement accuracy—inclination: 39.0 degrees (±0.0 degrees).

Atlas II Launch Vehicle

Medium-weight spacelift provides access to space to deliver essential Defense Satellite Communications System and other capabilities.

Acquisition
Status: operational, production.
Contractors: Lockheed Martin, Rocketdyne, Pratt & Whitney, Honeywell, Marconi.
Inventory: N/A.
Upgrades: IIA and IIAS.

Capabilities/Profile
Range: 6,100 pounds to Geosynchronous Earth Orbit.
Length: up to 156 feet
Diameter: 10 feet.
Weight: 414,000 pounds.

Performance/Comment
Will be supplanted by Evolved Expendable Launch Vehicle.

Modernization

Evolved Expendable Launch Vehicle

Medium- to heavyweight spacelift to meet lift requirements for DoD, nationa , and civil users. Vehicles will replace current Delta, Atlas, and Titan space launch vehicles during Fiscal 2002–20.

Acquisition
Status: engineering and manufacturing development.
Contractors: Boe ng (Delta IV), Lockheed Martin (At as V).
Invento y: 28 purchased. First government medium launch Fiscal 2002; governmert heavy launch Fiscal 2003; commercial launch Fiscal 2001.
Upgrades: N/A.

Capabilities/Profile
Variants: Delta IV Medium/Heavy; Atlas V Medium/Heavy.
Delta IV Range: (Medium) 9,100 pounds to GTO; (Heavy) 29,100 pounds to GTO.
Atlas V Range: (Medium) 18,900 pounds to Low Earth Orbit; (Heavy) 42,000 to LEO.
Delta IV Length: 235 feet.
Atlas V Length: 89.3 feet.

Performance/Comment
Launch savings of $5 billion–$10 billion through 2020.
Competition for life of program.
Payload interface standard by class for all.
Reliability rate of 98 percent.

Space Maneuver Vehicle

Conceptual space vehicle for aircraft-like space operations with high responsiveness, on-orbit flexibility, and maneuverability. Could be launched from expendable booster, reusable booster, or space shuttle. Work undertaken in conjunction with NASA.

Acquisition
Status: technology demonstration.
Contractor: Boeing
Inventory: TBD.
Upgrades: N/A.

Capabilities/Profile
Altitude: LEO to GTO.
Length: 25 feet.
Weight: 12,000 pounds gross liftoff weight.
Payload Capacity: 1,200 pounds.
Mission Duration: up to 6 months.

Performance/Comment
Perform significant orbital maneuvers from LEO, including transfer to GTO and aero-assisted orbital plane changes of more than 10 degrees.
Loiter on orbit for up to six months, then return to US for refit and redeployment.
Deployment, repositioning, and on orbit service and recovery of satellites
Support of Intelligence, Surveillance, Reconnaissance missions by maneuvering ISR payloads and reconfiguring constellations for optimal coverage.
Rendezvous with and inspection of satellites.

Titan IV Launch Vehicle

Heavyweight spacelift capability to deliver nation's highest priority satellites—Defense Support Program, Milstar, and National Reconnaissance Office satellites—into orbit.

Acquisition
Status: operational, production.
Contractors: Lockheed Martin, Boeing, Alliant, Aerojet, Honeywell.
Inventory: 40 purchased, 25 launched.
Upgrades: none planned.

Capabilities/Profile
Range: 12,700 pounds to GEO.
Length: up to 204 feet.
Diameter: 10 feet.
Fairing Diameter: 16.7 feet.
Weight: 2.2 million pounds.

Performance/Comment
USAF's largest, most powerful expendable launch vehicle.
Operational success rate 95 percent plus.

Advanced EHF Satellite Communications System

Extremely High Frequency communications spacecraft that will replace Milstar system and provide additional capabilities.

Acquisition
Status: demonstration–validation (development).
Contractors: Hughes, TRW.
Inventory: five in development, none on orbit.
Upgrades: N/A.

Capabilities/Profile
Coverage 24 hours a day between 65 degrees north and south.
Anti-jam protection for users exposed to fixed and mobile jammers.
Nuclear protection for networks supporting critical functions.
Provides ability to plan, control, and reconfigure resources.
Supports joint warfighter communications among EHF terminals.

Performance/Comment
Low probability of interception/detection.
High data rate.

Defense Meteorological Satellite Program

Acquisition
Status: operational, sustainment.
Contractors: Lockheed Martin, Aerojet, Northrop Grumman, Hughes.
Inventory: five on orbit, one more planned.
Upgrades: solid-state data recorders.

Capabilities/Profile
Satellite mean mission duration: 39 months.
Primary sensor global resolution: 2.78 kilometers.
Theater Resolution: 0.56 kilometers.

Performance/Comment
Senses surface and atmospheric radiation in visible, infrared, and microwave bands.
Flies instruments that measure space environmental parameters.
Broadcasts critical regional data directly to user terminals in theater to support tactical missions.
Global data is downloaded to processing centers.

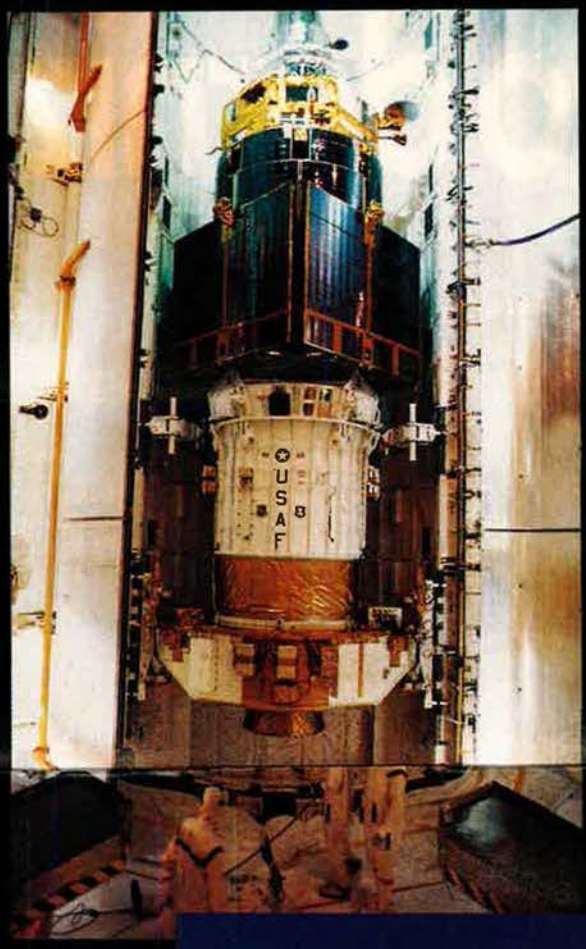
Defense Satellite Communications System

Nuclear-hardened, jam-proof satellite backbone of MILSATCOM system, provicing secure and high data rate superhigh frequency communications.

Acquisition
Status: operational.
Contractor: Lockheed Martin.
Inventory: 10 on orbit, four in development.
Upgrades: service life enhancement plan.

Capabilities/Profile
28 channels on five satellites.

Performance/Comment
Worldwide, responsive wideband, and anti-jam satellite communications supporting strategic and tactical C³I requirements.



Defense Support Program

Infrared satellite system that provides global coverage and warning of ballistic missile launches, nuclear detonations, and other events.

Acquisition
Status: operational.
Contractors: TRW, Aerojet.
Inventory: classified number on orbit, four in storage.
Upgrades: transition to Space Based Infrared System begins in Fiscal 2002.

Capabilities/Profile
Classified number of GEO satellites.

Performance/Comment
Near real-time detection and reporting of missile launches against US or allied forces, interests, and assets worldwide.
Near real-time detection and reporting of endoatmospheric (0–50 kilometers), exoatmospheric (50–300 kilometers), and deep space (more than 300 kilometers) detonations worldwide.
Other classified parameters.

Discoverer II Program

Planned on-orbit demonstration of technologies that will permit acquisition of radar surveillance satellites for tactical surveillance and targeting.

Acquisition
Status: technical demonstration, concept definition.
Contractors: TBD.
Inventory: Fiscal 2003–04 demo, two satellites and tactical ground station planned. Eventual constellation of 24.
Upgrades: N/A.

Capabilities/Profile
Orbit: two satellites, LEO, 770 kilometers altitude.
Payload: phased-array radar for ground moving target indicator, imagery, and precision digital terrain elevation data.
Tasking: direct downlink.
Operations: day/night, all-weather capable.

Performance/Comment
Two Discoverer II satellites are not operational prototypes but will have technology legacy in operational system.

MILSATCOM Polar System

Satellite that provides secure, survivable communications, supporting peacetime, contingency, and wartime operations in North Pole region.

Acquisition
Status: engineering and manufacturing development.
Contractors: classified.
Inventory: one on orbit, two in development.
Schedule: polar 2 Fiscal 2003 launch, Polar 3 Fiscal 2004.
Upgrades: N/A.

Capabilities/Profile
Coverage of North Pole region 24 hours/day.
Milstar–compatible low data rate service.
EHF packages on three classified host satellites.
Supports independent submarine operations, maritime task force operations, special operations forces, strategic force reconnaissance, single integrated operations plan, tactical warning/attack assessment, and intelligence collection/dissemination activities.

Performance/Comment
Milstar–type data rates.
Low probability of interception/detection.
Anti-jam protection.
Anti-scintillation protection.

MILSATCOM Wideband System

Global Broadcast System satellite provides efficient, high data rate broadcast between many distributed information sources and warfighters using small, inexpensive terminals. Wideband Gap-filler is an interim replacement of current DoD wideband communication satellites. Advance Wideband is a DSCS follow-on, continuation of Gap-filler Ka service, and new GBS Phase 3.

Acquisition
Status: GBS Phase 2 Milestone 2, Wideband Gap-filler first launch Fiscal 2004, Advanced Wideband first launch Fiscal 2008.
Contractor: Raytheon (GBS Phase 2).
Inventory: two GBS-2 on orbit, one GBS-2 in development.
Upgrades: Wideband Gap-filler and Advanced Wideband systems.

Capabilities/Profile
Coverage: 65 degrees south to 65 degrees north.

Performance/Comment
TBD.

Milstar Satellite Communications System

Satellite system that provides commanders assured, worldwide C^2 for tactical and strategic forces.

Acquisition
Status: operational, engineering and manufacturing development.
Contractors: Lockheed Martin, Hughes, TRW.
Inventory: two Block I on orbit, four Block II in development.
Upgrades: new mission control facilities to support medium data rate operations.

Capabilities/Profile
Anti-jam capability.
Anti-scintillation.
Low probability of interception/detection.

Performance/Comment
Protected communications at low and medium data rates.

National Polar Orbiting Operational Environmental Satellite System

Remote sensing satellite that acquires environmental imagery and specialized meteorological, oceanographic, climatic, land surface, space environmental, and other data supporting DoD and civil missions.

Acquisition
Status: program definition and risk reduction.
Contractors: TRW, Hughes, Lockheed Martin, Ball Aerospace, Orbital Sciences, ITT, Saab Ericsson.
Inventory: none on orbit, five in development.
Upgrades: TBD.

Capabilities/Profile
Uses instruments to sense surface and atmospheric radiation in visible, infrared, and microwave bands.
Flies an instrument suite that measures space environmental parameters.

Performance/Comment
Measures 61 distinct environmental parameters such as soil moisture, cloud levels, sea ice, ionospheric scintillation, and more.

Navstar Global Positioning System

Constellation that provides highly accurate time and three-dimensional position and velocity information to unlimited number of users anywhere on or above Earth, in any weather.

Acquisition
Status: operational, sustainment.
Contractors: Boeing, Lockheed Martin, North American.
Inventory: 27 operational satellites.
Upgrades: modernization, second civil signal, user equipment upgrades, Navwar.

Capabilities/Profile
Constellation: 24+ satellites.
Altitude: 10,898 miles.

Performance/Comment
Standard positioning service accuracy: 100 meters.
Precise positioning service: 16 meters.
Timing: 100 nanoseconds. User accuracy dependent on receiver type and number of satellites acquired.

Space Based Infrared System

Proposed High and Low infrared system that fulfills needs for missile warning, missile defense, technical intelligence, and battlespace characterization.

Acquisition
Status: engineering and manufacturing development (High); program definition (Low).
Contractors: Lockheed Martin, TRW, Raytheon, Boeing.
Inventory (planned): five GEO satellites (High), 27 LEO satellites (Low).

Capabilities/Profile
Missile warning—North America and theater.
Theater missile defense.
National missile defense.
Battlespace characterization.
Technical intelligence.

Performance/Comment
Provides enhanced capabilities necessary to combat evolving theater and ballistic missile threats.

Space Based Laser

Conceptual space-based weapon that would provide effective, continuous, boost-phase interception for theater and national missile defense, as well as global surveillance, target designation, and space and air defense.

Acquisition
Status: technology experiment.
Contractors: Lockheed Martin, TRW, Boeing.
Inventory: TBD.
Upgrades: N/A.

Capabilities/Profile
Satellites: 30 (proposed).
Altitude: 1,000 kilometers.
Range: more than 3,000 kilometers.
Length: TBD.
Weight: less than 48,400 pounds.
Magazine: 100 shots.

Performance/Comment
Highly automated battle management capability with assured human control.
Negation of enemy missiles within minutes.
Provide impact point predictions.
Provide data to support accurate kill assessment reports.
Perform launch point detection of missiles by using onboard sensors within a defined focus area or by using cued data.

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Compiled by Chanel Sartor, Editorial Associate

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Keegan, John. *The Book of War: 25 Centuries of Great War Writing.* Viking Press, 375 Hudson St., New York, NY 10014 (212-366-2000). 1999. 492 pages. $34.95.

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Long before D-Day, he had seen his faith in airpower borne out in combat.

Eisenhower,

Return from the fight. *A B-26 Marauder, decked out in invasion stripes, passes over the secured Normandy beachhead on its return to England. Scores of these medium bombers and their escorts roared out to attack German positions on June 6, 1944, and afterward.*

By Rebecca Grant

Master of Airpower

DWIGHT D. Eisenhower, the American general who led Allied forces in Europe to victory in World War II, was from the start a believer in airpower. In fact, Eisenhower's understanding of and appreciation for airpower led him in 1942 to make it the linchpin of the plan for what became the Normandy invasion of June 1944.

Over the years, the supreme commander learned hard lessons about the complexities of air allocation, air apportionment, and operational control, but in victory, he paid airpower an eloquent tribute. In his memoir, *Crusade in Europe*, Eisenhower wrote: "Foremost among the military lessons was the extraordinary and growing influence of the airplane in the waging of war."

Allied air forces became overpowering and, in Ike's words, "an ever-present asset of incalculable power." In the early years of the war, however, he took it mostly on faith that airpower could be decisive in the battles ahead. Where did he acquire this confidence in airpower? He was a pilot, having earned his license when stationed in the Philippines in the 1930s, but the education of this master of airpower really began years earlier.

Direct quotations throughout this article come from various sources. Among the most important, in addition to Eisenhower's *Crusade*, are Stephen E. Ambrose, *Eisenhower*, Vol. I; Matthew Cooper, *The German Army, 1933–1945;* David Eisenhower, *Eisenhower at War, 1943–1945;* Eduard M. Mark, *Aerial Interdiction: Air Power and the Land Battle in Three American Wars;* David R. Mets, *Master of Airpower: General Carl A. Spaatz;* and Samuel W. Mitcham Jr., *The Desert Fox in Normandy: Rommel's Defense of Fortress Europe.*

Eisenhower graduated from West Point in 1915 but never got to France for World War I. He took a course on tank warfare at Ft. Leavenworth, Kan., and then was assigned to a unit training to employ tanks. Eventually, he wound up in charge of a large tank training camp near Gettysburg, Pa. In November 1918, Eisenhower finally got orders to embark for France as commander of a tank unit building up to be part of a big Allied offensive in 1919. That thoroughly planned campaign was to revolve around large-scale use of tanks and aircraft in mobile warfare, and the young Eisenhower expected to be a key part of it. Then came the armistice.

"Open Warfare"

Nearly a decade later, in January 1927, Eisenhower went to Washington to work for Gen. John J. "Black Jack" Pershing, the retired general who had commanded the American Expeditionary Force in France and was in 1927 head of the American Battle Monuments Commission. Eisenhower's job was to take World War I US unit histories and battlefield maps and write a guide to American actions in the Great War. His guidebook contained incredibly detailed accounts of highly mobile campaigns of 1918, where tanks and airplanes were used to good effect.

The act of writing the guidebook steeped Eisenhower in the intricacies of what Pershing liked to call "open warfare." These American battles did not feature the stalemates, trenches, and meat-grinder artillery duels that virtually defined combat on the Western Front for most of World War I. By the time American forces fought their major engagements, the conflict had changed, and doctrine stressed the advantages of speed and mobility.

The American and Allied air forces were thoroughly integrated into all of the major campaigns of 1918. The air arms of a thousand or more airplanes would seize air superiority each morning and then fly sorties to keep back German fighters and to bomb and strafe second echelon forces. Aircraft controlled back areas and protected tanks as they pressed ahead. Observers provided a constant stream of photos and intelligence both at the division level and to higher headquarters. The Allied commander, Marshal of France Ferdi-

Comrades in Overlord. *Before and during the invasion, Lt. Gen. Jimmy Doolittle (left) commanded Eighth Air Force, whose bombers did much to soften up Nazi forces in northern France for Eisenhower (right). The officer in the background is Maj. Gen. Frederick L. Anderson.*

nand Foch, had an air intelligence picture of the battlefield refreshed with hourly updates. One grainy picture in Eisenhower's guidebook was captioned, "German gun destroyed by American aviator."

Pershing was pleased with Eisenhower's work. He kept the younger officer on his staff for some months more to help redraft several chapters of his memoirs. In this position, Eisenhower wrote extensively on the mobile Argonne and St. Mihiel offensives where airpower had played a key role. Moreover, in the next year, Eisenhower took his family to Paris for 15 months so that he could work on a second edition of the guidebook.

All told, Eisenhower spent more than two years immersed in the details of early mobile ground and air warfare as it emerged in the last battles of World War I.

Eisenhower knew he had a future in the Army and, like many officers of the time, he believed there might be another European war. In the 1930s, Eisenhower served as chief military aide to Gen. Douglas MacArthur, the Army chief of staff. MacArthur wrote a fitness report that said simply, "This is the best officer in the Army. When the next war comes, he should go right to the top." Eisenhower also demonstrated prowess in the field. In the Army's Louisiana Maneuvers of 1941 Ike helped lead the Third Army to victory. That wargame featured extensive use of airpower, with fully 60 percent of the air-to-ground sorties devoted to interdiction, 22 percent to strikes on armor, and 18 percent given over to close air support missions. The Louisiana Maneuvers demonstrated that Eisenhower and other Army leaders were well aware of the potential impact of airpower at the operational level of war.

One week after the Dec. 7, 1941, Japanese attack at Pearl Harbor, Eisenhower arrived at the War Department to work on the staff of the Army chief of staff, Gen. George C. Marshall. Marshall assigned him first to the desperate task of finding ways to reinforce the US position in the Pacific war, but Japan's air superiority had put a stranglehold on theater operations. The Navy could not resupply the Philippines while the sea was controlled by Japanese land-based airpower. In February 1942, Eisenhower wrote in his diary that the US Navy should "quit building battleships and start on carriers and more carriers," which indeed, the Navy was just beginning to do.

Origins of Overlord

It was not long before Marshall gave Eisenhower the task of drawing up plans for what became known as Overlord, the invasion of Nazi–controlled Europe. In early 1942, the Americans were about the only ones who believed an invasion of northern Europe would work, but the belief was strong and constant. According to Eisenhower, the use of airpower was "the keynote of the invasion plan." American war plans from the outset incorporated "independent" airpower as a means to shape and control the deep battlespace. In this, Eisenhower was backed by Marshall, another prominent believer in airpower.

At the core of the plan lay determination to win control of the air and use air attacks to strike deep at German forces. As Eisenhower recalled, the plan was based on "the conviction that, through an overpowering air force, numbering its combat strength in thousands rather than in hundreds, the German's defenses could be beaten down or neutralized, his communications so badly impaired as to make counter-concentration difficult, his air force swept from the skies."

In June 1942, Marshall made a fateful move. Eisenhower had pointed out that the Army Air Corps would be the first American organization to go to war against the Axis forces in Europe. For that reason, he recommended that Marshall send an Army Air Corps officer to London to oversee the buildup there and commence planning. Eisenhower recommended Maj. Gen. Joseph T. McNarney because, in Eisenhower's words, "McNarney firmly believed in the Air Force's ability to make ground invasion of France possible."

Marshall sent Eisenhower instead.

Well before Normandy, then, Eisenhower had chances to test his faith in airpower as a deep striking force, and he and his commanders learned difficult but profitable lessons. North Africa came first. Disasters at Kasserine Pass and elsewhere thoroughly discredited the idea of parceling out control of aircraft to local ground commanders and demonstrated the need for central control of air forces.

Close Call at Salerno

Lesson No. 2 came with the invasion of Salerno, Italy, on Sept. 9, 1943. Three reinforced Allied divisions totaling 60,000 troops came ashore against just one German division, the 16th Panzer, which was stretched across a 20-mile sector. Allied aircraft suffered from range limitations. Only heavy bombers could

reach railroad targets from bases in North Africa. They struck Italian marshaling yards, rolling stock, and roads in an effort to cut off the Germans. But it did not work. Two other Panzer divisions drove 130 miles north to Salerno and were in the line by Sept. 11. Two days later, the Germans brought up elements of two Panzer corps from 100 miles away, and two other Panzer units raced 200 miles to join the line near Salerno.

On Sept. 13, the Germans counterattacked, pushing to within two or three miles of the beachhead and inflicting heavy casualties on the American 36th Division. Eisenhower ordered his air commander, British Air Chief Marshal Sir Arthur W. Tedder, to send "every plane that could fly" to hit "sensitive spots in the German formations."

On Sept. 14, the fighters surged from less than 100 to almost 600 sorties over the battlefield. Bombers from North Africa flew 2,000 deep-interdiction sorties covering some areas of the battlefield with tons of bombs. Eisenhower acknowledged that his deputies had warned him about not having enough air cover. He wired the combined chiefs of staff that he would "give up my next year's pay for two or three extra heavy groups right this minute."

The surge in airpower helped hold Salerno. A German commander later commented that "from 13 September on, any forward movement of reserves or any other movement on the field of battle resulted immediately in attacks by Allied air forces," according to an Air Force report. Eisenhower said of the air offensive: "So badly did it disrupt the enemy's communications, supplies, and mobility that, with the aid of naval gunfire, the ground troops regained the initiative and thereafter German counterattacks were never in sufficient strength to threaten our general position."

However, it was a close call. Eisenhower later admitted that, "in some respects, the operation looked foolhardy, but it was undertaken because of our faith in the ability of the air forces, by concentrating their striking power, to give air cover and emergency assistance to the beachhead" and because of naval gunfire.

Need To Do Better

Still, the struggle at Salerno pointed out that the Allies would have to do a much better job of isolating the landing areas and hitting German forces while they moved into position for the counterattack.

Four months later, at Anzio, Italy, airpower again failed to isolate the battlefield or break up the German redeployment to counterattack. Eisenhower had returned to London, but he and the Allies watched from afar this second attempt to slow German reinforcements with airpower.

The Allies landed almost unopposed at Anzio on Jan. 22, 1944. However, the German commander, Field Marshal Albert von Kesselring, soon had elements of 14 divisions converging on Anzio. Some came by rail from as far away as Avignon, France, and Yugoslavia. The Allied breakout attack on Jan. 30 was repulsed, and the Allies took up defensive positions, eventually holding off the German counterattack on Feb. 16.

The German general who had to explain the failure to Hitler said they needed more allocations of ammunition, "but that it was impossible to bring them to the front, owing to the daily severance of rail communications in Italy by bombing attacks."

Air interdiction had some impact, but the failure to restrict German maneuver doomed the Allies to spend four months on the defensive while the British and American navies brought them supplies.

Salerno and Anzio showed that air superiority was a prerequisite for ground operations. The Germans were vulnerable to air attack while on the move, but these deep attacks would have to come faster. For Normandy to succeed, the air plan would have to work much better than it had in Italy.

By February of 1944, Eisenhower knew what he had to do to apply airpower to make the invasion succeed. His priorities were clear. He wanted airpower to isolate the Normandy battlefield and was willing to try any combination of tactics to make it happen. Eisenhower also wanted command of all air units—from fighters to heavy bombers, American and British—while preparing for and executing Overlord.

The Key Three

Eisenhower's plans had three key elements. First, as all agreed, the Allies must have air superiority. Next, they had to thwart the arrival of enemy reinforcements by decimating the French rail system. The Germans had 58 divisions in the west, and their strategy was to counterattack against any invasion with a mobile reserve commanded by Field Marshal Erwin Rommel, in tactical charge of defending forces. Finally, Eisenhower planned for airpower to disrupt the Panzers in Army Group West and parry a counterattack that could defeat the landing force.

To make this happen, Eisenhower first had to win agreement from his

***Pulverized from above.** A US soldier surveys bomber damage to a German gun emplacement in France. Much of the Nazis's vaunted "Atlantic Wall" looked like this after heavy and medium bombers did their work preparatory to D-Day.*

Battle scarred. *Ground crew members rush to use foamite to extinguish a fire that started when the wounded pilot of this heavily damaged P-47 crash-landed at a newly created base in France.*

British and American allies that he would control all aircraft and allocate their striking power in accordance with his plan to isolate Normandy and interdict the Panzers. He had to overcome British concerns about French civilian casualties and resistance from some airmen eager to bomb oil facilities to debilitate the Luftwaffe.

On the last Saturday in March 1944, Eisenhower convened a meeting to settle the issues. On the Wednesday prior, he grimly thought through the idea that if he did not get the decision he wanted, "I am going to take drastic action and inform the combined chiefs of staff that unless the matter is settled at once I will request relief from this command." Many issues plagued Eisenhower that spring, but this was the only one that made him consider calling it quits. It was an indication of the importance that he attached to the full use of airpower.

When the Saturday meeting began, everyone agreed that the German air force targets were still top priority. Big Luftwaffe losses were beginning to bite, and worse was soon to come. Yet the military leaders disagreed over other targets. Lt. Gen. Carl A. "Tooey" Spaatz, commander of the US Strategic Air Forces in Europe, presented the case for concentrating on oil targets because he thought attacks on the transport system would not bring up the German fighters, whereas "we believe they will defend oil to their last fighter plane."

What Eisenhower really wanted was to defeat the German air force and hinder transportation so that the Germans could not maneuver rapidly to oppose the landing in strength. Germany had large stocks of oil in Normandy, probably enough for the critical early phases of the battle. Perhaps more important, German forces already had 12 Panzer divisions in the west. Eisenhower reminded the group that the whole plan was "conditioned on no more than 12," with three near the landing areas. To Eisenhower, "delaying the arrival of one division would be worthwhile." This was the key Eisenhower had identified two years earlier: making Allied air supreme over Normandy at the right moment to prevent effective German maneuver.

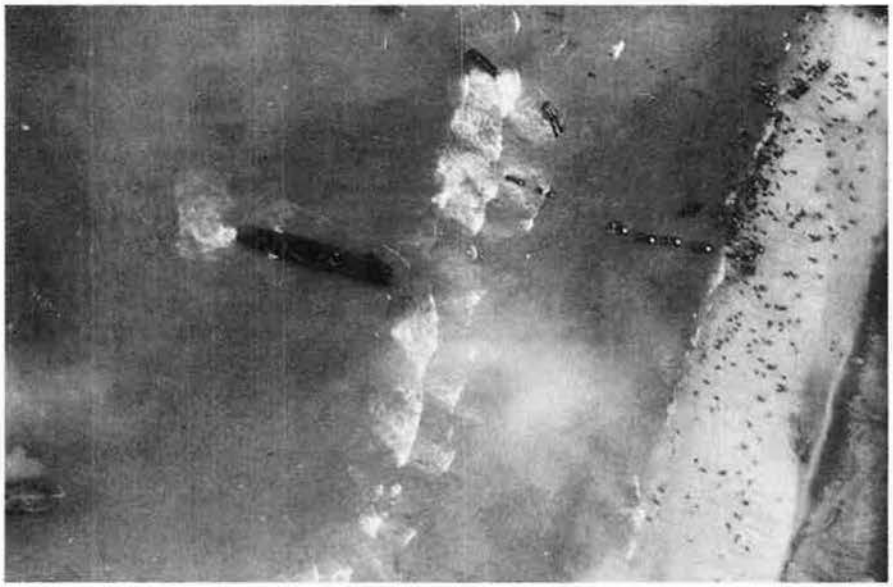
Eisenhower won his point. All aircraft were to come under his control by mid-April 1944.

Rommel's Intuition

Rommel nearly figured out what Eisenhower was trying to do. The "Desert Fox" noticed that "Allied airplanes were bombing all the bridges into Normandy, as if they were trying to isolate it." He began to suspect that Normandy would be the landing site. "My only real anxiety," Rommel wrote in April, was that "any large-scale movement of motorized forces to the coast will be exposed to air attacks of tremendous weight and long duration." To compensate, he moved troops closer to the coast and put them to work building more obstacles on the beaches.

It was too late. By the end of April, the Germans had to move 18,000 workers out of Normandy, where they were building defenses, and set them to work repairing railways. Another 10,000 workers were moved in May. The air attacks slowed down coal shipments to the plants that were churning out concrete to build defensive positions in Normandy. The plant that was Rommel's main source closed down.

When the Allied invasion came, Rommel's real dilemma would be how to move infantry to the landing zone



Maximum vulnerability. *Allied troops swarm ashore during one of the most courageous military operations in history. As this photo demonstrates, command of the air over the beaches was of critical importance.*

to hold the line at a time when he was forming up the key Panzer divisions being held in reserve. The infantry traveled by rail, but the Panzers moved with their own tanks and trucks. Speed was vital. "If we cannot get at the enemy immediately after he lands, we will never be able to make another move, because of his vastly superior air forces," Rommel told his boss that spring. "If we are not able to repulse the enemy at sea or throw him off the mainland in the first 48 hours, then the invasion will have succeeded and the war will be lost."

The air attacks on French railways would make it nearly impossible to move infantry and supplies. The Germans had been moving 100 trains a day into Normandy, but in April, the average fell to 48 per day, and by the end of May, to fewer than 20. By D-Day, June 6, the Allies had cut every railway bridge over the Seine south of Paris. "Normandy was, for all practical purposes, a strategic island," concluded one scholar.

Rommel was in Germany on June 6. As he raced back to Normandy, 12th SS Panzer, and Panzer Lehr [illegible]. But his units were already in trouble. The 21st Panzer Division had a hesitant commander who committed it first against Allied paratroopers, then sent it toward Caen, France, after noon on June 6.

Hitler released the 12th SS Panzer Division and Panzer Lehr in the afternoon on June 6. When the 12th SS Panzer Division began to move toward Caen at 4 p.m. on D-Day, clearing weather exposed it to Allied air attack. Air attack halted the division's movement until night came, and it did not reach its designated area near Caen until June 8. It averaged only four miles an hour on its 44-mile journey and ran out of fuel as it reached the battle zone.

Panzer Lehr, the best of the three divisions, had 90 miles to go to reach Caen. Allied aircraft detected Panzer Lehr's movement late on the afternoon of June 6. "Air attacks had been severe in daylight and everyone knew everything that could fly

Beginning of the end. *Roadways suddenly materialize as long lines of Allied troops and materiel stream into Hitler's "Fortress Europa." A flow of troops onto the Continent marked the first step in the German collapse in the West.*

would support the invasion," said Panzer Lehr's commander, Gen. Fritz Bayerlein. "My request for a delay until twilight was refused. We moved as ordered and immediately came [illegible]."

At daylight Bayerlein received a direct order to proceed. According to an Air Force report, he recalled: "The first air attack came about half-past five that morning, near Falaise. By noon it was terrible; my men were calling the main road from Vire to Beny–Bocage a fighter–bomber racecourse. Road junctions were bombed and a bridge knocked out at Conde. This did not stop my tanks, but it hampered other vehicles. By the end of the day [June 7] I had lost 40 tank trucks carrying fuel and 90 others. Five of my tanks were knocked out and 84 half-tracks, prime-movers, and self-propelled guns." Bayerlein concluded: "These were serious losses for a division not yet in action."

Rommel's first counterattack, planned for June 7, simply never happened. Panzer Lehr straggled to Caen on June 8. Air attacks debilitated command post communications. Panzer Group West headquarters delayed the counteroffensive to June 9. The attack of June 9 met an almost simultaneous offensive by British forces. In the midst of the fighting, Allied aircraft found Panzer Group West headquarters and decimated it. Rommel himself had left the headquarters [illegible] that Allied air superiority had been the No. 1 reason for his enemy's success and his own failure. Rommel reported: "The enemy has complete command of the air over the battle up to about 100 kilometers behind the front and cuts off by day ... almost all traffic on roads, or byroads, or in open country." Air superiority almost entirely prevented movement of German forces by day. His one chance to push the Allies back into the sea was gone.

Eisenhower's masterful planning succeeded, and his faith in airpower was vindicated. It did not decide every one of the countless individual engagements of infantry and tanks that made the Normandy campaign an Allied victory, but it was air attack that isolated the Germans in Normandy and blocked Rommel's plan for a rapid counterattack. As late as June 18, just five German armored divisions had arrived in Normandy.

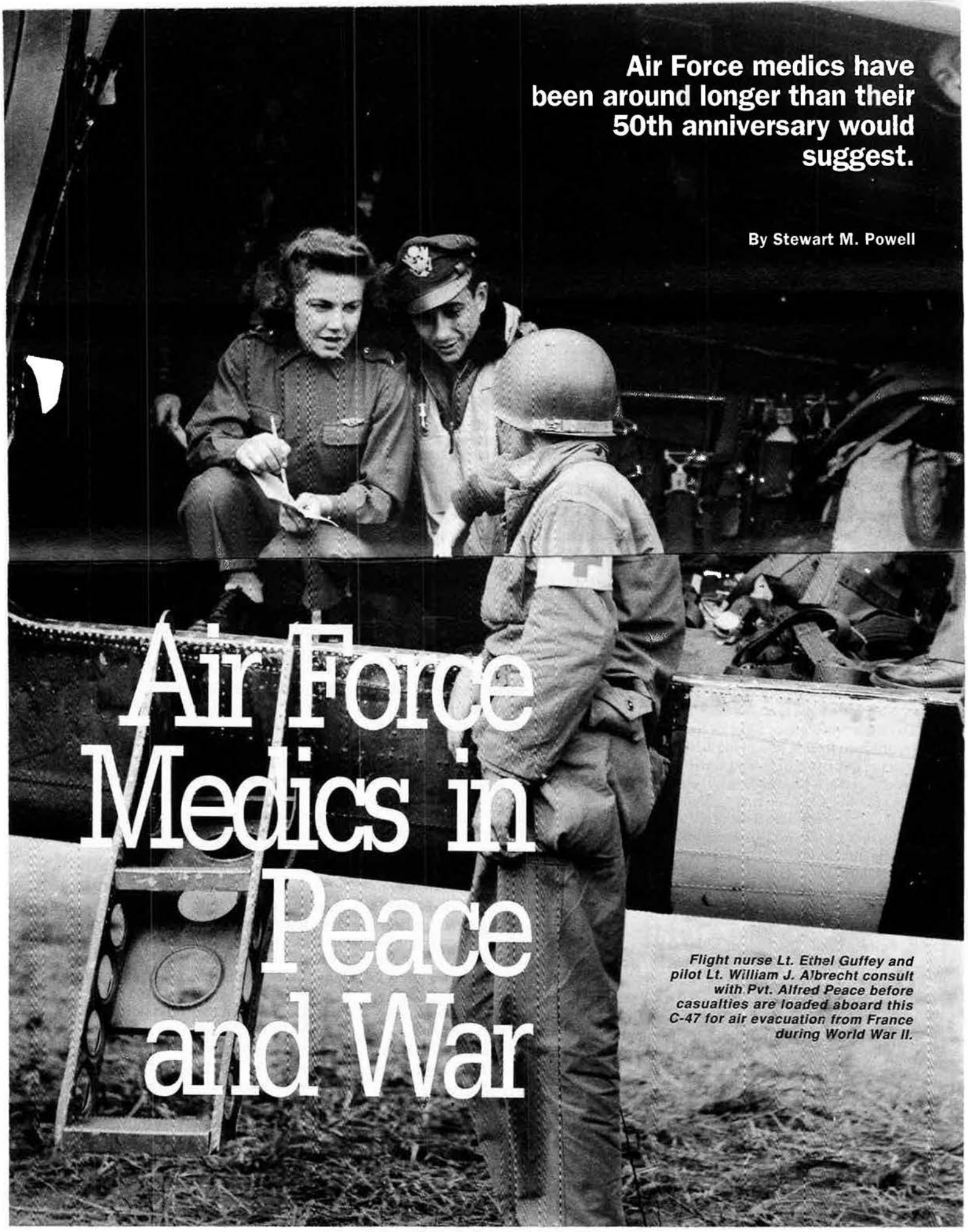
By taking the initiative away from Rommel, Allied airpower spoiled Germany's best chance for defeating the invasion and protecting Festung Europa—just as Eisenhower had planned. ■

Rebecca Grant is president of IRIS, a research organization in Arlington, Va. She has worked for RAND, in the Office of Secretary of the Air Force, and for the Chief of Staff of the Air Force. Her most recent article for Air Force *Magazine was "Airpower Made It Work," appeared in the November 1999 issue.*

Air Force medics have been around longer than their 50th anniversary would suggest.

By Stewart M. Powell

Air Force Medics in Peace and War



Flight nurse Lt. Ethel Guffey and pilot Lt. William J. Albrecht consult with Pvt. Alfred Peace before casualties are loaded aboard this C-47 for air evacuation from France during World War II.

THE US Air Force Medical Service celebrated its official 50th anniversary in 1999. It was a historic milestone for a low-profile team of specialists—one achieved by dint of resilience and determination displayed time and again over many decades. Long before the official creation of the medical service in 1949, medical personnel had been heavily engaged in the nation's airpower operations.

It was in World War I that the first flight surgeons provided specialized care for US Army airmen of the open-cockpit biplane era. From that humble beginning more than 80 years ago, the service has grown into an organization now capable of routinely executing demanding transoceanic aeromedical evacuations.

The worldwide team of 48,000 physicians, medics, technicians, and nurses established itself as a highly respected branch of the Air Force. Medical personnel handle routine cases one day, only to deploy a day later to an unexpected assignment thousands of miles away. Service members who helped evacuate victims of terrorist bombings at US embassies in Tanzania and Kenya back to Ramstein AB, Germany, in 1998, later prepared for anticipated casualties in Operation Allied Force, the air attack against Yugoslavia. A few months after that, medical teams were deploying from Europe to Turkey to assist with treatment of victims in an earthquake that claimed thousands of lives.

As the operations underscore, the medical corps continues to respond on short notice and adapt quickly to circumstances to bolster US forces and operations, whether with on-site health care for US humanitarian operations or with preparations for US casualties in distant, little-understood conflicts.

Air transportable hospitals are being reconfigured for quicker, easier deployment. Active duty and reserve personnel are being more fully integrated. Aeromedical evacuations are being overhauled with critical-care-in-the-air teams to enable the Air Force to shift emergency medical care from front lines to in-flight treatment back to rear echelons or even to the United States itself.

All in all, says James S. Nanney, chief historian in the Office of the Air Force Surgeon General, the medical corps continues to respond to changed circumstances by being steadily "more flexible and responsive."

The Early Years

The service's origins can be traced back to World War I. A team of specially trained aviation medics, comprising 34 physicians and enlisted personnel, arrived in France in August 1918. On Sept. 17, Maj. Robert R. Hampton took up duties as the first flight surgeon in the American Expeditionary Forces.

During the same war, but on the eastern rampart of the conflict, the experiences of a daring young American physician would help to shape a medical corps that came into its own more than three decades later. Dr. Malcolm C. Grow traded a secure medical practice in Philadelphia for combat surgery on the Russian front. An internist with a degree from Jefferson Medical College in Philadelphia, Grow treated Russian troops over a two-year period, first as a civilian and later as a commissioned captain in the army of the Russian czar.

It was in that capacity that Grow and a Russian officer conducted a reconnaissance flight over German lines in a captured German aircraft. The experience left an indelible impression on the young physician. According to a study by George M. Watson Jr. of Grow's role as a pioneer in aviation medicine, Grow would never again doubt the importance of aircraft in combat.

Grow and his Russian pilot spied a pair of new German artillery batteries and reinforcements moving into position. The young American saw that the Russian forces were truly "a blind army," without adequate observation aircraft, "unable to tell what the enemy was doing," recalled Frederick A. Stokes, author of a 1918 biography of the American. Grow and the Russian returned to Russian lines with the news.

Grow left Russia before the Bolshevik Revolution of late 1917. He joined American forces on the Western Front, but he did not ever forget the horrific Eastern Front experience and the manifest need for the troops to have adequate medical care. In time, Grow would rise to major general in the Air Force and become the first head of the medical service.

The interwar years—the 1920s and 1930s—saw the emergence of preparations for combat aviation and the blossoming of the role of aviation medicine. The Medical Research Laboratory at Mitchel Field, N.Y., became the School of Aviation Medicine, with Maj. Louis H. Bauer serving as first commander. The facility was moved to Brooks Field, Texas, in 1926, later to Randolph AFB, Texas, and still later back to Brooks.

Farewell to Silk Scarves

Aviation engineers and pilots began to recognize during the 1920s and 1930s that the flight suits and silk scarves of World War I were no match for the rigors pilots faced flying for hours in open-air cockpits in all weather. Test pilots at Wright Field, Ohio, struggled with the ill-effects of carbon monoxide fumes from propeller engines and penetrating wind-driven cold.

For assistance, they turned to the flight surgeon serving at nearby Patterson Field—Maj. Malcolm Grow.

Grow flew with test pilots to assess flight clothing and equipment. He worked to assess maximum allowed carbon monoxide exposure in cockpits, producing a landmark study in 1934. The deepening collaboration between test pilots, physicians, and engineers yielded the Aero Medical Laboratory at Wright Field in 1935. Lt. Harry G. Armstrong guided the facility to become the premier aeromedical research and develop-

ment center in the United States, according to *A History of the Origin of the US Air Force Medical Service 1907–1949* by Mae Mills Link and Hubert A. Coleman.

Groundbreaking demonstration flights highlighted the partnership between medicine and aviation. Grow accompanied 12 Martin B-10 bombers on the "Alaskan Flight" in 1934 to underscore bombers' potential role as coastal defense weapons. Grow took the assignment at the urging of then–Lt. Col. Henry H. "Hap" Arnold, later chief of the Army Air Corps. The follow-on demonstration mission of 11 B-6 bombers and 12 P-12 pursuit airplanes to Panama in 1936 included Grow as copilot in one of the bombers.

It would take the outbreak of World War II and the peculiar medical demands of hard-pressed aircrews to force the entire US Army Air Corps to take into account the special medical demands of flight crews.

"When the United States entered World War II, our nation's small aviation force belonged to the US Army and relied on the Army medical system for support," recalls retired Air Force Lt. Gen. Edgar R. Anderson Jr., who served as surgeon general of the Air Force in the mid-1990s. "By the end of the war, the Army Air Forces successfully acquired its own medical system, oriented to the special needs of air warfare."

World War II

When World War II broke out in Europe in 1939, Grow and Armstrong worked with Britain's armed forces medical staff, including Air Marshal Sir Harold Whittingham, chief medical officer of the Royal Air Force. The US officers gleaned what they could, not only about British adaptations to the physiological challenges of high tempo fighter operations, but also German advances in aviation medicine, according to Watson, in his study, "The First Central Medical Establishment."

The collaboration of Grow and Armstrong yielded *Fit to Fly: A Medical Handbook for Flyers*. The manual helped commanders begin to train large numbers of aviators for the rapidly expanding Army Air Corps. The authors identified and named the specific emotional stress that irritated aircrews' gastrointestinal tracts as well as the inflammation of the middle ear stemming from frequent altitude pressure changes. They also anticipated the impact of flight fatigue, the aerial version of the shell shock of World War I that eroded combat effectiveness but could be staved off with periodic breaks.

During the Burma campaign in World War II, USAAF amphibious L-1 liaison airplanes air evacuated wounded soldiers from deep in the jungle to forward hospital units for treatment.

The Air Corps specialists, with help from US Navy and Allied researchers, developed anti-G suits. They worked to refine cockpit oxygen equipment and cold-weather gear for high-altitude aircrews that faced frostbite when fuselages were blown open by flak, exposing the aircrews to extreme cold. The collaborative team turned to the Wilkinson Sword Co. to produce light armored suits of thin manganese plates and to craft helmets that dramatically cut the rates of injury and death from Nazi flak and cannon fire.

More than one million wounded GIs were moved successfully by air during World War II, according to Nanney's 1995 study, "Army Air Forces Medical Support in World War II." The practice grew out of necessity in China, Burma, and the southwest Pacific in the bleak early days of World War II. Allied forces sought a foothold against the Imperial Japanese forces. Venerable four-engine C-47 Skytrains that delivered cargo and troops into battle were called upon to carry out wounded troops, bringing Americans back to hospitals in New Caledonia, New Hebrides, and Australia.

Air evacuations came into their own in early 1943 when the fast-moving Allied offensive across North Africa left medical facilities more than 12 hours behind the lines by truck or more than 20 hours away by train. A C-47 equipped with 18 individual litters could carry out an air evacuation in barely an hour. By May 1943, AAF aircraft had evacuated 15,027 patients from Tunisia, with only one death in flight.

"In the final attack on Tripoli, almost all patients were evacuated by air," Nanney noted. "Although still new and imperfect in some respects, the use of aeromedical evacuation quickly proved its worth."

Longer-range C-54 Skymasters could be used for longer flights. In January 1943, five patients from Karachi, Pakistan, were airlifted to Bolling Field in Washington, D.C. It was an operation that showed the feasibility of global aeromedical evacuation, which would greatly reduce reliance on evacuation by sea.

Still, such long-distance air evacuations accounted for a small share of the operations, with only 15 percent of the patients from Europe ferried back to the United States by air. Intratheater air evacuations were far more common. In the first six weeks following the D-Day landings in Normandy, aeromedical evacuations ferried 18,415, or 33 percent, of American casualties to Great Britain.

When Army hospitals in Europe

became filled to capacity during the Battle of the Bulge in winter 1944–45, air teams ferried some GIs from Europe back to Mitchel Field. By September 1945, 5 percent of the war's aeromedical evacuations had been back to the United States.

Gen. Dwight D. Eisenhower, the supreme allied commander in Europe, credited air evacuation with saving many lives. "We evacuated almost everyone from our forward hospitals by air, and it has unquestionably saved hundreds of lives, thousands of lives," Eisenhower said.

Aviation medicine evolved greatly during World War II. Nearly 6,000 doctors completed aviation medical training, with more than 3,000 of the physicians going on to qualify as flight surgeons. By January 1945, AAF had 75,000 hospital beds at 200 station hospitals, 30 regional hospitals, and seven convalescent centers. The AAF medical system had become virtually separate in practice, if not in the military chain of command.

The development stemmed in part from the vision of Maj. Gen. David N.W. Grant, a 1937 graduate of the Army Air Corps Tactical School, who served as the chief air surgeon during World War II. Grant believed that a separate medical corps was essential to the use of airpower as a separate arm in combat, with a separate command and support structure.

AFMS was created on July 1, 1949, with 3,706 Army officers selected for transfer to the newly created US Air Force. This group included 1,182 for the medical corps, 424 for the dental corps, 78 for the veterinary corps, and 1,197 for the nurse corps.

Korean War

The medical service had not even marked its first anniversary when communist North Korean troops stormed across the 38th parallel with a surprise attack on South Korea on June 25, 1950. Barely 30 doctors, 30 nurses, and 25 medical service corps officers were in the Far East to care for Air Force personnel and dependents stretching from Korea and Japan to Guam, Okinawa, and the Philippines.

The onslaught came well before the Army and the Air Force had worked out an agreement on the division of responsibilities for the aeromedical evacuations from the battlefield that became so crucial in the fast-moving conflict. As Grow had warned in a report in November 1949: "A great deal of integrated planning with the sister services is necessary for not only peacetime operations but more particularly for planning in the event of an emergency at which time this function may become enormous."

The surprise war "provided a stiff challenge for the small, inexperienced Air Force Medical Service," wrote Nanney, the chief historian, in "The Air Force Medical Service in the Korean War." He added, "For several months the heavy fighting and heavy UN casualties almost overwhelmed the meager resources of the medical service."

The armed forces' medical corps grew rapidly, thanks to a nationwide doctor's draft that funneled physicians and medical personnel into the military. AFMS mushroomed, with 236 physicians, 210 nurses, and 161 dentists in the Far East. The service itself increased from 3,400 to 8,300 medical officers and from 8,000 to 17,500 enlisted medics.

Still, shortages of aircraft, poor communication, and faulty scheduling of cargo aircraft called upon to evacuate the wounded from Korea to Japan imperiled the ability of the US to carry out the 1949 Defense Department directive that aeromedical evacuation was the route of choice.

Air Force H-5 rescue helicopters and C-47 Skytrains with aeromedical crews rushed into forward areas to retrieve casualties. The Air Force's 801st Medical Air Evacuation Squadron evacuated more than 4,700 Marine casualties from the 1st Marine Division's bloody withdrawal from Chosin Reservoir, winning the unit one of the first Distinguished Unit Citations of the war.

It was not until 18 months into the conflict—in December 1951—that the Air Force, Army, and Marine Corps worked out arrangements for battlefield medical evacuation, with the Army and Marine Corps acquiring specially equipped helicopters to handle their own casualties.

Korea underscored the need for compact mobile hospitals that could be transported by air. Ad hoc medical complexes were thrown together with whatever was available, but there was no common design. By 1953, AFMS had conducted a successful experiment, transporting a mobile hospital by air. By 1955, the components of a 36-bed facility were acquired. By 1959, the air transportable hospital came on line as a standardized package for quick deployment.

The American Medical Association formally recognized aviation medicine as a separate specialty in 1953 (changed in 1959 to aerospace medicine). The burgeoning US space program took advantage of specialists in AFMS who learned the lessons of Korea. The first two flight surgeons assigned to the Mercury, Gemini, and Apollo programs were

In Korea, a Far East Air Forces H-5 helicopter delivers a critically wounded patient from the battlefield to a rear area medical facility. The war speeded development of a compact air transportable hospital.

As aeromedical evacuation progressed, it took less than an hour during the Vietnam War to go from battle to a hospital. Here, USAF medical personnel move a Marine casualty from Khe Sanh to a waiting C-130.

USAF officers—Lt. Col. William K. Douglas and Lt. Col. Charles A. Berry.

Vietnam War

In the Vietnam War, the front-line evacuation role that AAF personnel played in World War II and the similar emergency duties carried out by AFMS personnel in the Korean War continued to shift to more rear guard responsibilities for long-range aeromedical evacuation operations.

Increasing air operations prompted the Air Force to expand the number of Air Force flight surgeons from 550 in 1963 to more than 700 by 1971—almost 20 percent of Air Force physicians on duty. By 1968, there were roughly 1,900 Air Force medics working in Southeast Asia—about 5 percent of the 41,000 military personnel assigned to the medical service worldwide, according to Nanney's study. About 110 Air Force physicians were serving with 7th Air Force medical service at the peak of fighting in 1968.

They lacked adequate facilities, so 10-foot-by-40-foot modular containers were shipped to Vietnam by sea to create hospitals at airfields, including the air base at Cam Ranh Bay. The 12th Air Force Hospital at Cam Ranh Bay became the largest in-country Air Force medical facility, with 475 operating beds and a 100-bed casualty staging facility.

Long-range air-evacuation operations were carried out by the Air Force from Cam Ranh Bay airfield, ferrying casualties to Clark AB, Philippines, as well as Yokota and Tachikawa ABs, Japan. Military Airlift Command carried out patient movements to the United States using ordinary transport airplanes equipped with litters and staffed by medical personnel.

Air evacuation over long distances contributed to USAF's acquisition of specially equipped C-9A Nightingales, beginning in August 1968. Twelve aircraft joined the Air Force domestic aeromedical evacuation system. The aircraft began routine missions in Southeast Asia in March 1972.

Continued preparations by AFMS to quickly deploy mobile hospitals into potential combat areas finally came to fruition in the first weeks of August 1990, after Iraq's surprise invasion of Kuwait.

The seamless deployment stemmed not only from a generation of work with air transportable hospitals. The success could be traced, as well, to a little noticed decision in 1983 to begin a five-year campaign to make air transportable hospitals more flexible. Standard 24-bed air transportable hospitals were transformed into modular components that could create hospitals with 14 beds, 25 beds, or 50 beds.

By the summer of 1990 more than two dozen 50-bed air transportable hospitals were available, many of them attached to US–based tactical fighter units that were on call for rapid deployment into a variety of contingencies. The hospitals were configured for transport aboard six C-141 Starlifters for assembly and operation by a medical staff of 128 personnel within 48 hours. Each facility, equipped for up to 30 days of independent operation without resupply, offered up to three surgery bays.

In addition, AFMS had developed 250-bed staging facilities to complement the air transportable hospitals and provide first-class temporary care for patients awaiting aeromedical evacuation. The facilities relied on

Staff photo by Guy Aceto

Long-distance air evacuation from Vietnam to the Philippines, Japan, and the US spurred USAF to acquire specially built C-9 Nightingale hospital aircraft. The C-9 can carry 40 litter patients with five medical personnel.

tents and could be set up in five days.

Into Desert Storm

The first medical teams—assigned to fighter squadrons—with air transportable clinics, which had only one physician and three technicians and emergency medical supplies, left the US on Aug. 8, 1990. Air transportable hospitals followed from Shaw AFB, S.C., MacDill AFB, Fla., and Langley AFB, Va., on Aug. 11. Given the suspected chemical warfare threat posed by Iraqi President Saddam Hussein, each air transportable hospital was accompanied by a 19-member decontamination team to handle casualties from chemical warfare.

The air mobile AFMS provided arriving Air Force, Army, and Marine forces their principal medical support for the first month of rapid US force deployments to Saudi Arabia to deter a deeper Iraqi penetration into the Arabian oil fields.

The six-month buildup before allies launched their 43-day campaign enabled AFMS to deploy 925 hospital beds in-theater, in addition to staffing contingency hospitals in Germany and Britain, providing 500 to 1,500 beds each.

By November, air transportable hospitals from 10 US bases had reached the area of operations. Each was designed to provide care for about 4,000 personnel, the number required to support a deployed tactical fighter wing. By January 1991, 15 air transportable hospitals were up and running, backed by a 250-bed contingency hospital.

Injured or wounded Air Force personnel could obtain emergency treatment at 31 deployed air transportable clinics. The service deployed nearly 4,900 medics to the Persian Gulf theater—about 9 percent of the total Air Force deployment. Almost 6,900 additional medics provided care at 3,740 beds in the Air Force fixed and contingency hospitals in Europe.

By the end of the Gulf War, the active-duty AFMS was at its peak size—14,500 officers, 30,000 enlisted medics, and 9,500 civilians, the Nanney study reported. More than one-half of the Air Force medics who deployed to Europe and Southwest Asia at that time belonged to the Air National Guard and the Air Force Reserve, with almost 97 percent of the aeromedical evacuation personnel drawn from the reserves.

The Air Force Medical Service expects to be able to deploy multiskilled teams to any part of the world within 72 hours as it restructures to fit USAF's new expeditionary force.

Getting Expeditionary

The operation gave AFMS another chance to evaluate itself with an eye toward improvements.

"Although the deployment was extremely rapid and successful by historical standards, the medical service was fortunate that hostilities began 163 days after the initial mobilization," Nanney wrote. "Since there was no guarantee that this lead time would be available in a future war, the Air Force Medical Service immediately began to ensure that its next response would be even more timely and efficient."

The leadership began to reconfigure the size of air transportable hospitals and revise air evacuation operations to accommodate the rapid deployment scenarios into remote regions that have become standard fare at the turn of the century.

Air Force leaders focused on improving the integration of Guard and Reserve personnel called to active duty with AFMS. They instituted a program that was dubbed "Mirror Force" by then–Deputy Surgeon General Maj. Gen. Charles Roadman II.

Roadman, who became Air Force surgeon general (1996–99), saw reservists "coming onto active duty, not understanding the milieu in which things were occurring," forcing AFMS to operate with "a dual class of warriors, vs. a single class." So Roadman made sure that medical personnel called onto active duty were "involved in the mainstream so that when we call them to active duty, they mesh quickly."

The reassessment paid off with greater emphasis on working reservists into their prospective active duty units.

The medical service continues to underscore its traditional flexibility by fielding a range of mobile deployable medical facilities, from the four-person air transportable clinic to 90-bed air transportable hospitals. With the Air Force shifting to expeditionary Air Force units, AFMS is revamping operations to enable it to dispatch multiskilled teams to any part of the world within 72 hours. Forward resuscitative surgical capabilities are being achieved with five-person teams relying on only 300 pounds of man-portable equipment.

AFMS was prepared to adapt as needed to changing Air Force requirements. It's now an 80-year tradition. ■

Stewart M. Powell, White House correspondent for Hearst Newspapers, has covered national and international affairs since 1970 while based in the United States and overseas. His most recent article for Air Force *Magazine, "Honor Bound," appeared in the August 1999 issue.*

The Secretary of Defense says the right decision on the F-22 is critical to the future.

Cohen *on* Airpower

William S. Cohen, the Secretary of Defense, responded to questions at a Nov. 9, 1999, press conference in Dallas, prior to addressing the Dallas Council on World Affairs. He dealt with the subject of the need for the F-22 fighter and for the Pentagon's broader fighter modernization program. Here are excerpts.

We Do Heavy Lifting

"We have just concluded the most successful air campaign in the history of the world. We did so based on technology that was developed back in the 1970s and even prior to that time. The reason that we need the F-22 as well as the Joint Strike Fighter is to give us the same kind of capability that we had to have in this war [in] Kosovo.

"In this situation you might take note that the United States had to carry out most of the heavy lifting during the first phase of the campaign because none of our allies had the capability that we had to go in with stealth aircraft, with precision guided munitions, to go after the air defense systems [and] the command-and-control systems in Kosovo.

"So we are depending upon technology that was developed over three decades ago to carry our forces today."

Through a Glass Darkly

"When we talk about the need for the F-22, I don't think anyone can tell you exactly how the world is going to unfold in 10 or 15 or 20 years from now. But the fact is if we don't have the F-22, you will be calling upon our pilots to fly aircraft, during that time frame, roughly 30 or 35 years old.

"We don't ever want to put our pilots in a situation where they have to fly against more and more sophisticated air defenses and against aircraft that are being developed by other countries—Russia, China, and others—that will pose a challenge to them. So we think it's imperative that we go forward with the F-22."

Pulling Out a Thread

"If you don't have the F-22, you have to go back and recalculate exactly what you want the Joint Strike Fighter to do. The Joint Strike Fighter's requirements were designed and based upon the fact that we would have an F-22 and a Joint Strike Fighter—the high end being the F-22, which would take the place of the F-15 and F-117, and the so-called low end would be the Joint Strike Fighter.

"So we need both, and if you were to ever cancel out the F-22, you would have to go back and redesign the Joint Strike Fighter—which pushes it well into the future, which means we'd be relying upon the F-16, F-14, other aircraft, and the F-15, well into the period of 2015, 2020. That's not something we ever want to put our pilots in a position of doing. ...

"We just completed the most successful air campaign in history—depending upon the kind of high–low mix that we've had developed back in the '70s, '80s, and '90s. We need to have that kind of a mix for the future."

Cost of Three-Fighter Plan

"I went through this [cost analysis of DoD's three-fighter modernization plan, comprising the F-22, JSF, and Navy F-18E/F] during the so-called Quadrennial Defense Review and made a determination at that time [1997] that we had the F-18E/F models coming off the lines as I was taking office, so it became important to keep that line going.

"I also needed to have the F-18E/F models as some leverage against the Joint Strike Fighter, which at that point was still basically on paper. I needed to have some leverage, so I cut the F-18E/F model purchase by half, and then said we will acquire roughly half as many as the current production schedule calls for, and then in the event the Joint Strike Fighter doesn't come on line as called for, or there are delays or there's some reason why I need more leverage, then I have the E/F model as some leverage to balance that out.

"In the mean time, the F-22 gives the Joint Strike Fighter the kind of [improved] capability also as far as the stealth is concerned.

"So we looked at this very closely and decided that we needed to have the high–low mix, and it was important for our pilots for the future to be able to take on either sophisticated air defense systems or air-to-air type of combat scenarios. We want to do so with the best that this country has to offer and not with something that is 30 or 35 years old.

"So as far as Tacair is concerned, in the wake of what took place in Kosovo, I would think we would have more support rather than less."

F-15, F-117 Must Be Replaced

"The F-15—that is an aircraft, again, that needs to be replaced by the F-22. So that line is still open, but that's the purpose of the F-22, to replace the F-15 and the F-117 stealth bomber. That gives you the kind of air superiority that you need as we move into the future.

"So all of that technology—I know it's easy to say at this point, 'Why do we need it?' Well, we just saw why we needed it in Kosovo where many of our allies didn't have the capability that we did. We had to carry the heavy load in the first part of the campaign. It evened out somewhat, quite a bit actually, towards the end of the campaign, where we carried about 53 percent of the airstrikes compared to 47 for the allies. But in the beginning phase of that campaign, we had to go in with our capability."

For the Successor Generation

"There may be other cases in the future, and I certainly don't want to be in a position to shortchange those pilots 10 and 12 years from now who will rely upon the decisions we make today, and I will address this this evening as well. Decisions—when Dick Cheney [Secretary of Defense, 1989–93] finished up his term in office, he pointed out that he would hope that decisions he would make would be as important to his successor as those that were made two or three decades prior to his service. And those decisions made back in the '70s served him well during the Persian Gulf War and certainly in Panama as well.

"The decisions I make today in making recommendations to the Congress to fund will, I hope, serve my successors, because they will not come on line until 2008, 2015, during that period where we get all of the modernization in the Tacair. So I hope that the decisions I'm making will benefit my successors as well." ■

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- Urban Warfare
- Special Forces Operations

Verbatim

By Robert S. Dudney, Executive Editor

Running for Daylight

"He [Deputy Defense Secretary John J. Hamre] gave them [Army National Guard and Army Reserve supporters] a couple of head fakes, so they think they're still in the fight [to prevent more force reductions]. ... We say, 'Thank you for your interest in national defense' and send them away. ... We tell them no decision will be made without taking their sage advice into account."—***"An OSD [Office of the Secretary of Defense] official," as quoted by reporter Elaine M. Grossman in the Nov. 11 issue of the defense newsletter*** **Inside the Pentagon.**

Thank You for Your Interest in National Defense ...

"The Clinton–NATO bombing was carried on for 78 days with total disregard for human life. ... What was advertised as an air war against Yugoslavia's military capabilities was really a war directed against the Serbian people. ... Before the bombing began, there was no humanitarian crisis in Kosovo. It was only after the US and NATO airstrikes began that the Serbs started to expel Albanians from Kosovo."—***Phyllis Schlafly, writing in the Nov. 19*** **Washington Times.**

Clinched Jaws

"There is an oversight job here, you know. If they [Air Force leaders] presume [it's] still business as usual, it could be a difficulty, because we've got to look with great care. ... Listen, there's not a more favored force around here, among the members—including this member—than the Air Force. I don't start out as being anti–Air Force, I'll tell ya, ... but oversight still is our job."—***Rep. Jerry Lewis (R–Calif.), chairman of the House defense appropriations subcommittee, in an interview published in the Nov. 15 issue of*** **Defense Week.**

And Existential, Too

"We do find it puzzling and passing strange that France would spend so much energy and focus so much attention on the danger to them of a strong United States rather than the dangers that we and France together face from countries like Iraq."—***State Department spokesman James P. Rubin, as quoted in the Nov. 23*** **Wall Street Journal.**

The 15-Year Gap

"The C-5's readiness remains a significant concern, as its MC [Mission Capable] rate continues to decline from the 61 percent I reported to you earlier this year to about 58 percent today. This aircraft, important to every peacetime deployment we undertake today, is even more critical in an MTW [Major Theater War] scenario, where we would be required to move significantly more unit equipment from CONUS. ... To meet the ... two–MTW requirement, we need a 75 percent MC rate for the C-5.

"We are putting a C-5 modernization program in place in an effort to raise the C-5's reliability to the required level, but even if we succeed, ... we will not see MC rates rise significantly until 2005 nor—assuming full funding for the current program and assuming the modifications are successful in reversing the C-5's declining reliability rates—will we begin to approach the required 75 percent MC rate until 2014."—***Air Force Gen. Charles T. Robertson Jr., commander in chief, US Transportation Command, in an Oct. 26 statement to the House Armed Services Committee.***

Second Thoughts ...

"Since the last Quadrennial Defense Review [in 1997], I've said—and believed—that a force of 305 ships—fully manned, properly trained, and adequately resourced—would be sufficient for today's requirements, within acceptable levels of risk. But ... mounting evidence leads me to believe that 305 ships are not likely to be enough in the future. ... Numbers do matter, especially when it comes to contested littoral warfare."—***Adm. Jay L. Johnson, Chief of Naval Operations, writing in the November 1999 issue of*** **Proceedings,** ***journal of the US Naval Institute.***

... In Lehman's Terms

"In 1979 the Chief of Naval Operations testified before Congress that the Navy was 'trying to meet a three ocean requirement with a one-and-a-half ocean Navy.' The Navy of 1979 was being stretched beyond the breaking point. ... Now, the situation is much the same, but our military leaders are not being as blunt as Adm. Tom Hayward was in 1979. Neither the Secretary of the Navy nor the Chief of Naval Operations has testified to Congress that the Navy cannot meet its mission with the forces and resources that have been provided. Our current Navy leaders only hint that there are problems and that 'mounting evidence leads me to believe that 305 ships are not likely to be enough,' in the words of the present Chief of Naval Operations. These are not the bold and unvarnished words that are needed to head off another Pearl Harbor and hollow military."—***Christopher Lehman, a Reagan Administration national security affairs staffer, writing in the Dec. 7*** **Washington Times.** ***His brother, John F. Lehman Jr., was Secretary of the Navy in the period 1981 to 1987.***

Walkie Talkie

"While Pentagon civilian officials and service chiefs all see their future forces as being fundamentally different than today's, they urge that change be cautious and deliberate, so we continue to place the highest priority on current readiness—keeping our organizations and weapons prepared to deal with the threats they were designed to deal with while trusting that incremental and evolutionary improvements will allow them to adapt to deal with different threats as they emerge. Consequently, our resource allocation is still too much like it was during the Cold War. ... What we are doing now is talking the revolutionary talk but not walking the revolutionary walk."—***Sen. Joseph Lieberman (D–Conn.), Senate Armed Services Committee member, in a Nov. 2 statement at a conference in Washington.***

AFA / AEF National Report

By Frances McKenney, Assistant Managing Editor

AFA Hosts The Adjutants General

In November, AFA hosted a reception for state adjutants general who were in Washington for a four-day Air National Guard Senior Leadership Seminar. The seminar marked the first time TAGs had gathered together at the invitation of the ANG, and it was the first time AFA honored the group with a reception.

Appointed by their governors, there are currently 54 TAGs in each state, the District of Columbia, US Virgin Islands, Guam, and Puerto Rico. Thirty-five are from the Army and 19 from the Air Force. Although the incumbent might be an Army Guardsman, a TAG has responsibility for an air component, and as AFA National President Thomas J. McKee observed, all TAGs are "believers in airpower."

Distinguished guests at the AFA reception came from not only the ANG sector but also included USAF active duty leaders, senior civilians from the Air Staff, and defense industry representatives. Among the more than 100 guests were Gen. Lester L. Lyles, USAF vice chief of staff; Maj. Gen. Paul A. Weaver Jr., director, Air National Guard, and an **Iron Gate (N.Y.) Chapter** member; Lt. Gen. Russell C. Davis, chief, National Guard Bureau, and a member of the **Nation's Capital (D.C.) Chapter;** and Brig. Gen. Craig R. McKinley, commander, Air National Guard Readiness Center, and a **Donald W. Steele Sr. Memorial (Va.) Chapter** member.

TAGs and spouses attending the reception included the Texas adjutant general, ANG Maj. Gen. Daniel James III, an **Austin (Texas) Chapter** member and son of Gen. Daniel "Chappie" James Jr., for whom an AFA chapter in New York is named.

The gathering also honored the 109th Airlift Wing, Schenectady County Airport, N.Y., the unit that sent a C-130 to retrieve an American doctor from Antarctica in mid-October. McKee presented a Special AFA Presidential Citation to ANG Brig. Gen. Archie J. Berberian II, New York ANG chief of staff, in recognition of the Guard's skill in carrying out a dangerous mission to the South Pole to bring back Jerri Nielson, who was evacuated to receive treatment for cancer.

Photo by Paul Kennedy

At AFA's first reception for state adjutants general, AFA National President Thomas McKee (second from right) presented an AFA Presidential Citation to ANG Brig. Gen. Archie J. Berberian II (center) of the New York ANG. The award recognized the 109th Airlift Wing's part in a recent South Pole medical evacuation. Joining in the award presentation are (l–r) Maj. Gen. Paul Weaver Jr., ANG director; Lt. Gen. Russell Davis, chief, National Guard Bureau; and Gen. Lester Lyles, USAF vice chief of staff.

AFA Opposes Cuts to Airborne Laser

Reacting quickly to reports that Department of Defense senior officials were considering cutting $258 million from the Airborne Laser program, Air Force Association National President Thomas J. McKee wrote to Defense Secretary William S. Cohen on Nov. 9, strongly opposing such a move.

"ABL is the only boost-phase missile defense program," McKee pointed out. "Its laser technology is revolutionary, and other potential applications for ABL could quickly multiply its value." He added that the ABL is the most promising option for theater missile defense, has stayed within budget, and that a cut in funding could delay deployment for up to two more years.

"Missile defense is an urgent national priority," McKee wrote to Cohen. "We urge you to do everything in your power to keep ABL fully funded."

State Presidents Meet

AFA leaders from 34 states attended the annual State Presidents Orientation in late October at AFA headquarters in Arlington, Va.

During two days of leadership development activities and information sessions, the state presidents learned about AFA operations, resources, requirements, and the functions of various departments. They received extensive briefings on the Aerospace Education Foundation and on AFA's Web site. They learned that the site receives 1,000 visitors a day and were urged to get their states and chapters online. They also viewed recently produced TV public service announcements that promote AFA and AEF.

John J. Politi, national director and an Executive Committee member, conducted a leadership and chapter

development segment for the new state leaders, while James E. Callahan, a former national director, held a planning and operations practicum.

This year, AFA has 21 new state presidents.

Recruiting Force Multiplier

Four AFA chapters have been invited to participate in a test program, developed by the Air Force Recruiting Service and AFA, that places chapter volunteers in a local recruiting office to help cover it when the USAF recruiter is out.

Presidents of the **Dallas (Texas) Chapter, Colorado Springs/Lance Sijan (Colo.) Chapter, Total Force (Pa.) Chapter,** and **Central Indiana Chapter** received letters last summer, informing them about this opportunity to help the Air Force reach its recruiting goal.

"It may be possible, with help from some patriotic retirees, to 'force multiply' our recruiters," wrote Brig. Gen. Peter U. Sutton, AFRS commander, when he first explained the concept to AFA early last year.

Air Force recruiters brought in 32,068 new airmen in Fiscal 1999. Although it was the highest number for any year since 1992, it was 1,732 short of the goal.

AFA volunteers are to help staff an armed forces recruiting station—where usually only one Air Force recruiter is assigned—so a potential applicant will not be lost to another service if the USAF recruiter happens to be out.

The AFRS project officer for this initiative is Robert J. Cantu, an AFA national director.

The Out-of-Towner

In Washington to attend a seminar, Colorado Springs, Colo., resident Gerald Romero spotted a flyer advertising the Air Force in Motion 10K, took a taxi to the site at Bolling AFB, D.C., and surprised the race's two-time champion by winning the competition in 33 minutes, 37 seconds.

USAF Maj. Andrew T. Klemas of the **Donald W. Steele Sr. Memorial (Va.) Chapter** won the race in 1997 and 1998—both times in 33:40—but came in four seconds behind Romero, this year. Klemas has run on several military teams and in the Washington area is ranked sixth in his age group (35–39). Romero, 28, said he is in the top five 10K runners back in Colorado Springs, where he is a county health department air quality specialist.

Both the 5K and 10K races, hosted for the past three years by the **Nation's Capital (D.C.) Chapter,** follow a flat, circular course through Bolling and into Naval Station Anacostia, D.C., finishing on a path along the Potomac River.

Jodi Mlynarski, at 43:04, was the first woman crossing the finish line for the 10K. Navy doctor Antonio Eppolito, from Bolling, won the 5K race in 16:53, while Beth McCann was the first female finisher in the 5K, with a time of 20:15.

This year 186 runners participated, including Air Force General Counsel Jeh Charles Johnson. Also present was Lt. Gen. Russell C. Davis, chief, National Guard Bureau, and a Nation's Capital Chapter member. Five ranked D.C.–area runners were among the top 16 finishers.

Photo by Susan Kennedy

Robert Largent, Georgia state president (at left), and Raymond Otto, Maryland state president, were among the new AFA state presidents attending the annual orientation for state leaders.

Remembered in Maine

It has been 57 years since Royal New Zealand Air Force pilot George N. Harrison died while attempting to land a Royal Canadian Air Force Hudson transport at Houlton AAF, Maine. But his wartime sacrifice was recalled in September with a memorial service arranged by the local American Legion post, with the support of the **Maj. Charles J. Loring Jr. (Maine) Chapter.**

The service came as a complete surprise to Harrison's niece, Colleen Rae–Gerrard, who had traveled from Canberra, Australia, to visit the grave of her uncle. "We thought we were coming for a private little look," she told the local newspaper.

But Maine's AFA state president, Peter M. Hurd, had been alerted by a friend that Rae–Gerrard was planning a visit, and—in his other role as the American Legion post's chaplain—arranged a memorial service with help from AFA chapter member Allan K. Bean, Houlton town manager, and representatives of three countries.

Members of the American and Royal Canadian Legions presented the colors at the ceremony. The staff

Photo by Susan Kennedy

Minnesota State President Coleman Rader Jr. has a question during an information session at the annual State President's Orientation held at AFA headquarters. Seated in his row (l–r) are State Presidents Austin Landry (Alabama), James Rau (Michigan), J. Ray Lesniok (Ohio), and William Howard Jr. (Indiana).

of New Zealand Defense Force Air Commodore James S. Barclay—who is dean of the foreign air attaché corps in Washington—provided their country's flag and pilot's wings for presentation to Rae–Gerrard and her husband, Michael. Hurd also presented them with an American flag that had flown over the cemetery.

Hurd said his research indicates that Harrison's cargo aircraft was being ferried to the UK as part of the war effort and because of weather and possible engine or fuel trouble was diverted to Houlton. Three RCAF flight sergeants also died in the crash.

C² Symposium Success

The **Paul Revere (Mass.) Chapter** hosted a two-day symposium on Command and Control at Hanscom AFB, Mass., in October. Nearly 270 attendees took in presentations, panel discussions, and breakout sessions centered on the theme "C² As a Weapon System—Technology Supporting Aerospace Expeditionary Force."

The Revere Chapter has hosted a C² symposium 11 times in the past nine years, Chapter President Robert Kennedy said, but this was one of the best, with a lineup of speakers from the government and defense industry sectors who covered not only the technical aspects but also presented the viewpoint of "the guys who fly at 40,000 feet."

Lt. Gen. Leslie F. Kenne, commander of Electronic Systems Center at Hanscom, opened the symposium. Keynote speaker was Maj. Gen. Gerald F. Perryman Jr., commander of the Aerospace Command and Control and Intelligence, Surveillance, and Reconnaissance Center at Langley AFB, Va. Brig. Gen. (sel.) Henry A. "Trey" Obering III, director of USAF's Information Dominance Mission Area Directorate, gave the third presentation, on integrating C² for the warfighter.

After lunch at the base NCO Club, five breakout sessions gave attendees a chance to learn about topics such as network centric warfare and integrating ISR throughout the theater of operations.

Brig. Gen. Craig P. Weston, program executive officer for Command and Control programs, led the next day's debriefing session.

Kennedy said about 30 volunteers, including "seasoned symposium veterans," organized the event. This year, the symposium's military co-chairman was Col. Bruce Heavey, a system program office director. Chapter member Bruce R. Denner served as chapter co-chairman. Other chapter volunteers handled the infrastructure details such as facilities, food, and equipment.

Air Shows in Maryland

Maryland's **Central Maryland** and

AFA's National Committees and Advisors for 1999—2000

Executive Committee. Doyle E. Larson *(Chairman)*, Roy A. Boudreaux, Charles H. Church Jr., William D. Croom Jr., Daniel C. Hendrickson, Thomas J. McKee, John J. Politi, William L. Sparks, Jack H. Steed, Michael J. Dugan, *ex officio*, Jack C. Price, *ex officio*, John A. Shaud, *ex officio*.

Finance Committee. Charles H. Church Jr. *(Chairman)*, Bonnie Callahan, R.L. Devoucoux, Ted Eaton, Jack G. Powell, Arthur F. Trost, Mark J. Worrick, Doyle E. Larson, *ex officio*.

Membership Committee. John J. Politi *(Chairman)*, W. Graham Burnley, Michael F. Cammarosano, Stephan R. Kovacs Jr., James R. Lauducci, George E. Masters, William T. Rondeau Jr., I. Fred Rosenfelder, Lisa A. Smith, Jack L. Ventling, Thomas J. McKee, *ex officio*.

Constitution Committee. Monroe W. Hatch Jr. *(Chairman)*, Joan Blankenship, Stephen P. Condon, W. Ron Goerges, Tommy G. Harrison, Howard R. Vasina, Cheryl L. Waller, Doyle E. Larson, *ex officio*.

Resolutions Committee. William D. Croom Jr. *(Chairman)*, Roy A. Boudreaux, Charles H. Church Jr., Michael J. Dugan, Daniel C. Hendrickson, Doyle E. Larson, Thomas J. McKee, John J. Politi, Jack C. Price, William L. Sparks, Jack H. Steed, John A. Shaud, *ex officio*.

Long-Range Planning. Roy A. Boudreaux *(Chairman)*, Gerald S. Chapman, Rodney E. Ellison, Raymond C. Otto, Robert E. Patterson, Michael J. Peters, Jenifer J. Petrina, William G. Stratemeier Jr., Deborah S. Canjar–White, Thomas J. McKee, *ex officio*.

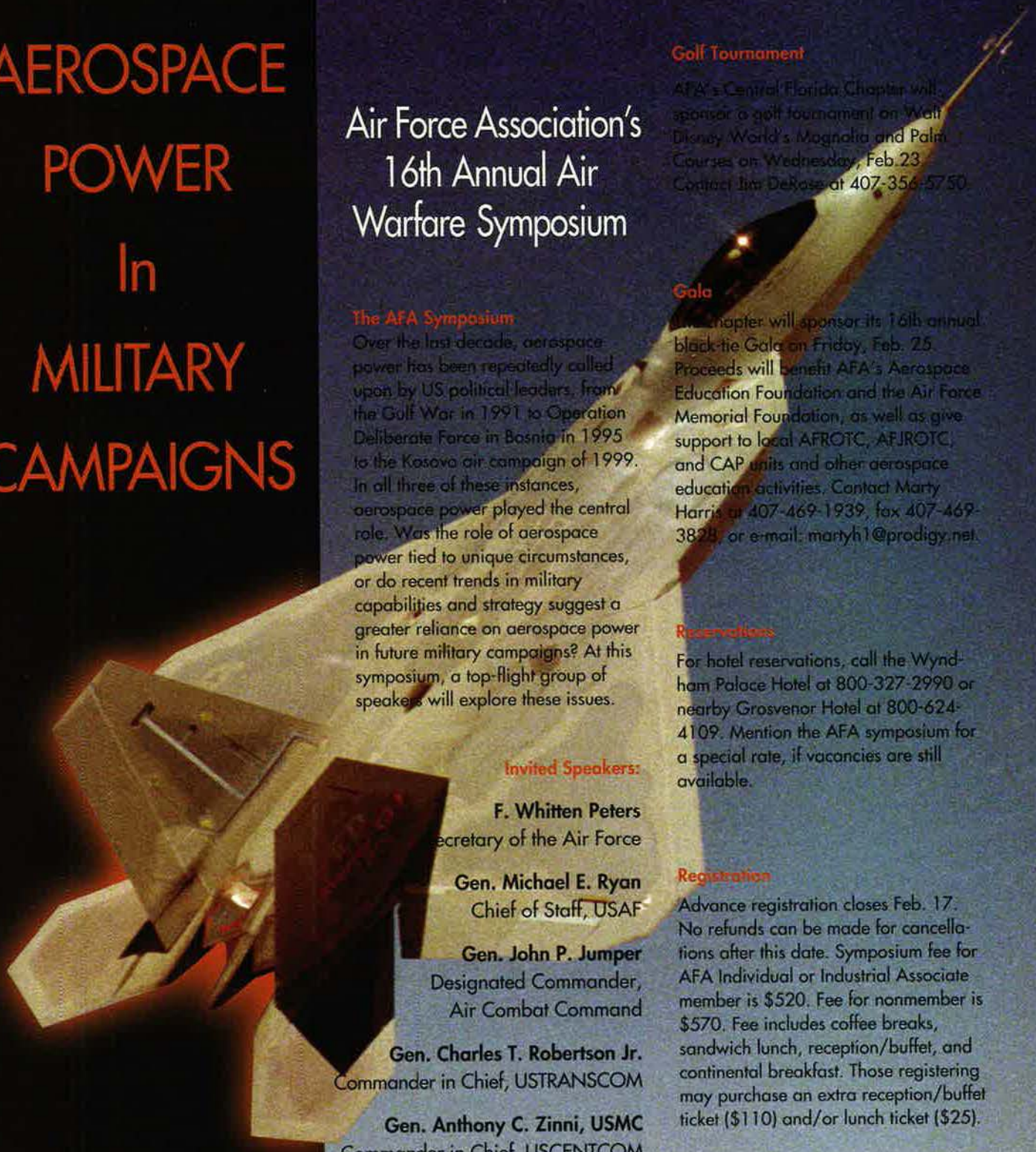
Science and Technology Committee. Lawrence A. Skantze *(Chairman)*, Edward C. "Pete" Aldridge, Krzysztof "Kris" Burhardt, James W. Evatt, Martin C. Faga, J. Michael Loh, Robert T. Marsh, Thomas S. Moorman Jr., George Muellner, George A. Paulikas, James M. Sinnett, Jasper Welch, John J. Welch Jr., Thomas J. McKee, *ex officio*.

Audit Committee. Charles A. Nelson *(Chairman)* (term expires September 2001), Billy M. Boyd (term expires September 2000), Thomas J. Kemp (term expires September 2002), Charles G. Thomas (term expires September 2002), L.B. "Buck" Webber (term expires September 2000), Robert M. Williams (term expires September 2001), Doyle E. Larson, *ex officio*.

Presidential Advisors. William R. Bean, Civil Air Patrol Advisor; Col. Robert J. Kraynik, Senior AFROTC Advisor; Donna L. Tinsley, Medical Advisor; Lt. Col. Jimmie N. Varnado, Junior AFROTC Advisor.

AEROSPACE POWER In MILITARY CAMPAIGNS

Air Force Association's 16th Annual Air Warfare Symposium



The AFA Symposium

Over the last decade, aerospace power has been repeatedly called upon by US political leaders, from the Gulf War in 1991 to Operation Deliberate Force in Bosnia in 1995 to the Kosovo air campaign of 1999. In all three of these instances, aerospace power played the central role. Was the role of aerospace power tied to unique circumstances, or do recent trends in military capabilities and strategy suggest a greater reliance on aerospace power in future military campaigns? At this symposium, a top-flight group of speakers will explore these issues.

Invited Speakers:

F. Whitten Peters
Secretary of the Air Force

Gen. Michael E. Ryan
Chief of Staff, USAF

Gen. John P. Jumper
Designated Commander,
Air Combat Command

Gen. Charles T. Robertson Jr.
Commander in Chief, USTRANSCOM

Gen. Anthony C. Zinni, USMC
Commander in Chief, USCENTCOM

Lt. Gen. (sel.) Charles F. Wald
Designated Commander,
9th Air Force

Lt. Gen. Michael C. Short
Commander, Allied Air Forces
Southern Europe

Dr. Rebecca Grant
IRIS Independent Research

Golf Tournament

AFA's Central Florida Chapter will sponsor a golf tournament on Walt Disney World's Magnolia and Palm Courses on Wednesday, Feb. 23. Contact Jim DeRose at 407-356-5750.

Gala

The chapter will sponsor its 16th annual black-tie Gala on Friday, Feb. 25. Proceeds will benefit AFA's Aerospace Education Foundation and the Air Force Memorial Foundation, as well as give support to local AFROTC, AFJROTC, and CAP units and other aerospace education activities. Contact Marty Harris at 407-469-1939, fax 407-469-3828, or e-mail: martyh1@prodigy.net.

Reservations

For hotel reservations, call the Wyndham Palace Hotel at 800-327-2990 or nearby Grosvenor Hotel at 800-624-4109. Mention the AFA symposium for a special rate, if vacancies are still available.

Registration

Advance registration closes Feb. 17. No refunds can be made for cancellations after this date. Symposium fee for AFA Individual or Industrial Associate member is $520. Fee for nonmember is $570. Fee includes coffee breaks, sandwich lunch, reception/buffet, and continental breakfast. Those registering may purchase an extra reception/buffet ticket ($110) and/or lunch ticket ($25).

Call Nikki Whitlock at the Air Force Association at 703-247-5838, or e-mail: nwhitlock@afa.org, if you have any questions or to register. To receive registration information by fax, call our fax-on-demand service 24 hours a day at 800-232-3563 and order document #0350, or visit our Web site at:

www.afa.org/calendar/aws2k.html

Feb. 24–25, 2000

The Wyndham Palace Hotel
Orlando, Florida

Retired Col. Carol Holland, Cheyenne Cowboy Chapter's vice president for aerospace education, presents an Eagle Grant to SrA. Leslie Reed at a Community College of the Air Force graduation ceremony at F.E. Warren AFB, Wyo.

College Park Airport Chapters set up displays at two air shows, first at Frederick, Md., for the Wings of Freedom Air Show in August and then at AeroFair '99, held at College Park in September.

From various Maryland chapters, more than 20 AFA members, including Erwin B. Nase and David Hondowicz, volunteered their time and resources for the events. College Park members John J. Peele and Michelle D. Peele even purchased a tent to set up at the air show, and George Apostle of the **Thomas W. Anthony Chapter** donated balsa wood gliders and die-cast metal models. The volunteers distributed about 100 copies of *Air Force* Magazine at both air shows.

Raymond C. Otto, Maryland state president, said visitors to the AFA booths asked questions covering all aspects of the Air Force. They wanted to know how to start a JROTC unit at their high school, how to gain admission to the Air Force Academy, the difference between serving on active duty and in the reserves, and the role of women in USAF. The AFA air show volunteers in some cases had to research the answers later and get back to the questioner.

Hometown Ties

Gen. Richard B. Myers was in the area to a visit his alma mater, Kansas State University, and at the invitation of Charles H. Church Jr., AFA National Treasurer, added a visit to the **Harry S. Truman (Mo.) Chapter** to his itinerary.

The night before he took to the chapter's podium, the commander in chief of North American Aerospace Defense Command and US Space Command was confirmed as the vice chairman of the Joint Chiefs of Staff.

Church first met Myers, who also heads Air Force Space Command, at the AFA Air Warfare Symposium in Orlando, Fla., and learned that he hails from Merriam, a suburb south of Kansas City, Kan. The two renewed the ties at the AFA National Convention last September, and about a month later Myers worked in the chapter visit.

To help make the dinner meeting special, the Truman Chapter arranged for Merriam's mayor, Irene French, to present the general with a key to the city. For entertainment, student musicians performed as "The Strolling Strings," patterned after the USAF group. They were from Shawnee Mission North High School, another Myers alma mater, and Church said, "He was very pleased by this."

Among the guests on hand for Myers's speech were John Miller, Missouri state vice president; Rodney G. Horton, chapter president; and local Air Force JROTC cadets, including a color guard unit that performed at the meeting.

Two Eagles

The **Cheyenne Cowboy (Wyo.) Chapter** recently presented Eagle Grants to SSgt. Steven D. Carter and SrA. Leslie D. Reed at a Community College of the Air Force graduation ceremony at F.E. Warren AFB, Wyo.

Both assigned to the 90th Missile Maintenance Squadron, Carter and Reed earned CCAF degrees in the same field, mechanical and electrical technology. Both are missile facility maintenance technicians and also received AFA memberships from the chapter.

Carol A. Holland, the chapter's vice president for aerospace education, made the presentations.

Eagle Grants are one-time educational grants of $400 given to top

AFA National Treasurer Charles Church Jr. (center, who was recovering from recent surgery) invited Gen. Richard Myers (second from left) to be guest speaker for the Harry S. Truman Chapter. With them are (l–r) John Miller, Missouri state vice president; Rodney Horton, chapter president; and Irene French, mayor of Myers's hometown.

enlisted CCAF graduates to help them earn bachelor's degrees. The grants are endowed by the Aerospace Education Foundation through corporate contributions and donations from AFA members and chapters.

Convention: Delaware

A presentation on aerospace power, including its central role in defining, shaping, and implementing defense policy, highlighted the Delaware State Convention, held at the Air Mobility Command Museum at Dover AFB, Del., in September.

Lt. Col. Peter Faber, from the National Security Briefing Team, conducted the briefing—one of 10 that the Air Force Strategic Planning Directorate now makes available for presentation to groups interested in promoting the aerospace power perspective.

In elections, Ronald H. Love was elected state president; Stephanie M. Wright is vice president; Margaret A. Whitman is secretary; and the treasurer is Teresa A. Connor. They are all from the **Delaware Galaxy Chapter.**

Anniversary Ball

The **Wright Memorial (Ohio) Chapter** held its 17th annual Wright Brothers Heritage Benefit and Anniversary Ball at the US Air Force Museum, Wright–Patterson AFB, Ohio, in September. Serving this time as a celebration of the 52nd anniversary of the US Air Force, the event has raised more than $260,000 over the years, through this formal ball and golf outing.

The US Air Force Band of Flight, based at Wright–Patterson, provided entertainment for the 250 guests at the ball. Lt. Gen. Robert F. Raggio, commander of Aeronautical Systems Center at Wright–Patterson, helped the chapter present a dozen awards to active duty and reserve personnel, Civil Service employees, and volunteers.

In a highlight of the evening, Gen. George T. Babbitt, commander of Air Force Materiel Command, presented the Heritage Award to Richard M. Scofield of the **C. Farinha Gold Rush (Calif.) Chapter.** A retired lieutenant general and former ASC commander (1994–96), Scofield returned to Dayton from his home in California to receive the award. It recognizes significant contributions to USAF over several years and a legacy of systems or improvements.

Chapter member Donald L. Huber received the Ambassador Award, recognizing his support for USAF, AFMC, and the local Dayton and Miami Valley communities.

More than 100 players turned out for a golf tournament, the next day,

Photo by Brian Wheeler–Melvin

In the front row, second from left, Maj. Andrew Klemas of the Donald W. Steele Sr. Memorial Chapter takes off for a second-place finish in the Air Force in Motion 10K road race, sponsored by the Nation's Capital Chapter.

for what was called "fierce but friendly" competition.

The two events were held to benefit the chapter's scholarship fund, the Air Force Museum, the Wright B flyer replica, and other area endeavors.

Air Show in Florida

In the air, on the ground, and with a cash donation, the **Central Florida Chapter** helped carry out an air show organized by a local chapter of the Experimental Aircraft Association and a flying service from Orlando, Fla.

The annual two-day Orlando AirFair took place in late October at the local executive airport and featured military and civilian aircraft

Brig. Gen. F. Randall Starbuck (second from left), vice commander, 21st Air Force, McGuire AFB, N.J., was keynote speaker at the annual Fall Ball, hosted by the New Jersey AFA and AEF. He spoke about the combat readiness of air mobility forces. Other special guests at the formal affair, held at Cream Ridge, N.J., in October, were (l–r) Rebecca Starbuck; William Stratemeier Jr., national director; Vincent Fairlie, New Jersey state treasurer; Ethel Mattson, New Jersey state president; Eugene Goldenberg, Pennsylvania state president; Raymond "Bud" Hamman, region president (Northeast Region); Almalinda Fairlie, New Jersey vice president south, and Monte Lower from the High Point Chapter.

on static display, flight simulators, games with an aviation theme, and entertainment.

Chapter member Joe W. Kittinger Jr. took to the skies to demonstrate skywriting and banner towing, and Robert P. Phillips, also from the chapter, performed an aerobatic routine.

Barbara Walters–Phillips, 1995 winner of the Christa McAuliffe Memorial Award for Teachers; James Burns; and Richard A. Ortega, state vice president for aerospace education, organized an AFA table, displaying AFA and AEF brochures and educational material. Several US Air Force Academy liaison officers helped the AFA volunteers answer questions from visitors.

With help from Civil Air Patrol cadets and chapter members Burns, Dennis M. Moran, Charles A. Pfeiffer, and Kelton D. Sweet Jr., Ortega coordinated volunteers who parked aircraft for Young Eagle Flights. These were free airplane rides for approximately 500 youngsters during the air show.

Return From Kosovo

With a Sunday champagne brunch, the **Tucson (Ariz.) Chapter** welcomed back to Davis–Monthan AFB, Ariz., three EC-130 squadrons that had been deployed to Kosovo.

James I. Wheeler, chapter president, said it was the first time in more than six years that all three of the heavily tasked units—the 41st Electronic Combat Squadron and 42nd and 43rd Airborne Command and Control Squadrons—were back at Davis–Monthan at the same time.

Chapter members and Community Partners donated enough to sponsor breakfast for 72 squadron personnel, mostly enlisted air- and ground crews. In all, 132 guests enjoyed the celebration, including three refugees from Kosovo, sponsored by TSgt. Robert "Gus" Molnar of the 42nd ACCS.

After the brunch, Lt. Col. Ernest Jones, 42nd ACCS commander, and Maj. David Contreras presented a briefing on a typical mission, supporting air combat operations in Kosovo.

More AFA News

■ Jack H. Steed, national director and AFA Member of the Year, was successful in getting the Georgia State Transportation Board to name an interstate interchange in Macon, Ga., after Air Force flight surgeon Maj. Bobby M. Jones, who became missing in action during the Vietnam War. Jones was assigned to Udorn RTAB, Thailand, and was en route to Da Nang, South Vietnam, when his aircraft went down.

■ Ransom Meriam, president of the **Gold Coast (Fla.) Chapter,** presented an AFA Outstanding Cadet of the Year medal in September to Civil Air Patrol cadet Emily Doctor at a meeting of the CAP Fort Lauderdale Composite Squadron.

Have AFA/AEF News?

Contributions to "AFA/AEF National Report" should be sent to *Air Force* Magazine, 1501 Lee Highway, Arlington, VA 22209-1198. Phone: (703) 247-5828. Fax: (703) 247-5855. E-mail: afa-aef@afa.org. ■

Correction

In the November issue, p. 74, the school that AFROTC Cadet of the Year Nicholas H. Martin attends should have been listed as Colorado State University.

Unit Reunions

reunions@afa.org

2nd Infantry Div, Korea (1950–53). Sept. 5–10, 2000, in Seattle. **Contact:** M. Tom Eastman, PO Box 1372, Poplar Bluff, MO 63902-1372 (phone or fax: 573-785-2967) (kwva2id@ims-1.com).

13th BS Assn, all 13th Aero Sq, Attack Sq, and Bomb Sq members from 1918 on. June 2000 at Dyess AFB, TX. **Contact:** Bill Cowan, PO Box 79568, Saginaw, TX 76179 (817-232-0313) (rottenbill13@juno.com).

19th ARS, 8th AF, SAC personnel, Homestead AFB, FL, and Otis AFB, MA (1957–65). Oct. 6–9, 2000, in San Diego. **Contact:** Frank Szemere, 711 E. Sunset Blvd., Fort Walton Beach, FL 32547 (850-862-4279) (fszemere@gnt.net).

38th BW Assn, France (1954–59). June 1–4, 2000, at the Clarion Riverview Hotel in the greater Cincinnati area. **Contact:** Jerry Black, 8350 Savannah Trace Cir., #1608, Tampa, FL 33615 (813-885-3342) (jblack38@gate.net).

57th BW Assn of WWII, all B-25 units in the Mediterranean Theater. Aug. 31–Sept. 5, 2000, at the Marriott Omaha in Omaha, NE. **Contact:** Bob Evans, 1950 Cunningham Rd., Indianapolis, IN 46224-5341 (317-247-7507).

446th BG, 8th Air Force, Bungay, UK (WWII). May 18–21, 2000, at the Hilton Arlington & Towers in Arlington, VA. **Contact:** Bill Davenport, 13382 Wheeler Pl., Santa Ana, CA 92705 (714-832-2829).

Reunions

449th BG Assn (WWII). April 30–May 4, 2000, in Branson, MO, at the Settle Inn. **Contact:** Lee F. Kenney, 800 Inverness Ave., Melbourne, FL 32940 (321-242-8654).

556th Recon Sq, Yokota AB, Japan. March 31–April 1, 2000, in Las Vegas. **Contacts:** Donald J. Chase (402-493-5612) or Don Hein (949-454-8986).

820th BS, 41st BG, Seventh AF (WWII). May 18–21, 2000, at the Sheraton Framingham Hotel in Framingham, MA. **Contact:** William W. Childs, 3637 Patsy Ann Dr., Richmond, VA 23234-2951 (804-275-6012).

Aviation Cadet Class 54-H. April 25–28, 2000, at the Excalibur Hotel Casino in Las Vegas. **Contact:** Gary Denzer, 280 St. Ives Dr., Talent, OR 97540 (phone: 541-535-9000 or 877-659-4040 or fax: 541-488-1582) (denzer@medford. net).

Class 55-P. June 13–15, 2000, in San Antonio. **Contact:** Carlos Higgins, 10712 Fountainbleu Cir., Austin, TX 78750 (phone: 512-258-3564 or fax: 512-258-0255) (carlostx@worldnet.att.net).

Iwo Jima combat veterans, families, and friends. Feb. 18–20, 2000, in Washington, DC. **Contact:** Jan Emde, Iwo Jima 2000, 4424 Montgomery Ave., Ste. 201, Bethesda, MD 20814 (phone: 301-986-0325 or 888-233-2863 or fax: 301-654-3739) (imi@imimtg.com).

Pilot Class 50-G. June 9–12, 2000, at the Radisson Hotel in Hampton, VA. **Contact:** Samuel E. Massenberg, PO Box 65905, Langley AFB, VA 23665-5905 (757-864-5800).

RAF Chicksands, all military and civilians, from WWII until deactivation as US operation. July 9–16, 2000, at RAF Chicksands, UK. **Contact:** William Grayson, PO Box 4053, ATTN: Chicksands Y2K Reunion, Crofton, MD 21114 (www.chicksands.com).

USAF Flying School Class 50-A. March 27–29, 2000, at The Menger Hotel in San Antonio. **Contact:** Joe Williams (850-863-8008).

Seeking members of the **433rd TCG,** including the 65th, 66th, 67th, 68th, 69th, and 70th TCS, South Pacific (WWII), for a reunion in 2000 in San Diego. **Contact:** Ted Casper, 4164 Inverrary Dr., 12-414, Lauderhill, FL 33319 (954-484-7230) (tedellie@aol.com).

For a reunion, seeking anyone who served or had a family member serve during the **Korean War** in the armed forces, including the Coast Guard and merchant marine, for at least one day from June 25, 1950, to July 27, 1953. **Contact:** Harry J. Mohr Jr., US–Korea 2000 Foundation, Inc., 4600 Duke St., Ste. 416, Alexandria, VA 22304-2517 (phone: 703-212-8128 or fax: 703-684-0193) (info@uskorea2000.org) (www.uskorea2000.org).

Seeking members of **OCS Class 54-D** for a reunion. **Contact:** J. Hampton, 706 Martin Dr., West Bellevue, NE 68005 (402-292-7902) (jbhampton@aol.com). ■

Mail unit reunion notices well in advance of the event to "Unit Reunions," *Air Force* Magazine, 1501 Lee Highway, Arlington, VA 22209-1198. Please designate the unit holding the reunion, time, location, and a contact for more information.

Bulletin Board

bulletin@afa.org

Seeking contact with **Harry Ryan** of Boston, son of Paul Ryan, who served with USAF in Germany in the 1950s and spent his vacations in Dublin, Ireland. **Contact:** Derek Carruthers, 49 Beechwood Lawns, Rathcoole, Co. Dublin, Ireland (011-353-1-458-9848).

Seeking information on an organization for airmen who ditched. Especially interested in the **Goldfish and Squatters clubs. Contact:** W. Mack Palmer, 2928 Barton Skyway, #365, Austin, TX 78746.

Seeking information on or contact with anyone stationed at **Neubiberg AFB,** Germany, 1955–58. **Contact:** David Strick, PO Box 98641, Lakewood, WA 98498.

Seeking contact with or information on USAF serviceman **Purdy,** who was stationed at Charleston AFB, SC, in 1963 and knew **Linda Brown and Glenn Klette. Contact:** Michael Wesseler, 335150 L.O. C.I., PO Box 69, London, OH 43140.

Seeking a **patch** for the 345th BW, Langley, VA, during the late 1950s. The patch has a profile of an Indian with "Air Apaches" below. **Contact:** Robert E. Johnson, 16169 North 158th Ave., Surprise, AZ 85374 (robersabel@aol.com).

Seeking contact with **Technical Sergeant Thorsen,** who was a tower operator and whose wife, **Jean,** was secretary to the 414th FG director of operations in 1962. **Contact:** Hank Meierdierck, 2900 Valley View SP287, Las Vegas, NV 89102 (702-876-5720).

Seeking information on the nine crew members that survived the crash of the B-17 ***Rosemary III,*** piloted by **2nd Lt. Clarence Aaberg,** 711th Sq, 8th BG, 4th Wg, Eighth AF, who died Feb. 25, 1944. **Contact:** Warren Aaberg (701-965-6333).

For a book, seeking information, photos, and contact with former flight and crew members of **Military Air Transport Service operations,** 1948–66. **Contact:** Nick Williams, 1002 Ridgewood Blvd., Waverly, IA 50677-1114.

Seeking **William Manson Hollifield Jr.,** who was in AFROTC, University of North Carolina, Chapel Hill, 1962. He was stationed at James Connally AFB, TX, in 1963 and was a member of a SAC B-52 unit in Bangor, ME, in 1964. **Contact:** John F. Mosher, 9467 Woodbreeze Blvd., Windermere, FL 34786 (407-876-6921) (bluechipone@earthlink.net).

Seeking contact with **Robert James Welliver,** USAAC, from Williamsport, PA, who was stationed in Bath and Chilbolton, UK, in 1943. Also seeking **Jack Blankenship,** USAAC, from Thomaston, GA, who was stationed in Baverstock, UK, in 1943. **Contact:** Christine Beal, 60 Mon Crescent, Bitterne, South Hampton, Hampshire, UK S018 5QU (01703-465019).

Seeking contact with **Tom or Thomas Mayfield (Manfield, Maesfield, or Mayfair),** a navigator stationed at Rolleston Hall, UK, April–May 1945. **Contact:** Sally Vincent, 44 Third Avenue, Frinton on Sea, Essex, UK CO13 9EE (01255-678588).

Seeking information on a cargo airplane that crashed in **Cuba** in October 1962. Also seeking contact with anyone stationed at **Guantanamo,** Cuba, or who flew in with the **363rd Recon Wg,** TAC, Shaw AFB, SC, or MacDill AFB, FL. **Contact:** Martin P. Dugan, 207 Pearl St., W. Seneca, NY 14224 (716-668-5764).

Seeking contact with members of **Class 1944,** H. Moore Field, TX. **Contact:** Tom Aiken, 389 Jubilee Dr., Bridgeville, PA 15017.

For a book, seeking contact with anyone associated with **RB/EB/WB-66** aircraft in Europe, the Pacific, and Southeast Asia. Also interested in operational photos. **Contact:** Capt. Gilles Van Nederveen, CADRE/ARJ, 401 Chennault Cir., Maxwell AFB, AL 36112 (334-953-6456) (gilles_van_nederveen@hotmail.com) (gilles.vannederveen@cadre.maxwell.af.mil).

Seeking graduation list for **Basic Training Class 2961st Sq, Bn7,** Lackland AFB, TX, in July 1948. **Contact:** Stanley Lutz, 666 W. Germantown Pike, Apt. #518, South Plymouth Meeting, PA 19462-1030.

Seeking contact with **Roy Johnson,** who was stationed at Ubon and Udorn ABs, Thailand, 1973–76. His last known address was at Homestead AFB, FL, in 1986, where he was NCOIC of Social Actions. **Contact:** Kerry Maxwell (krymax@yahoo.com).

Seeking photos of the cartoon-like lobster with the name "Seacoast Crunchers," carried on **FB-111s #68-0247 and #68-0265** from Pease AFB, NH, that participated in the 1981 SAC bombing and navigation competition. **Contact:** Curtis J. Lenz (curt.lenz@f-111.net).

Seeking contact with **Maj. Larry B. Moore,** whose last known assignment was Yokota AB, Japan, 1996–97. **Contact:** Troy D. Cash, 1320 Bloomingdale Dr., Cary, NC 27511 (tdcash@gte.net).

Seeking **Jack Merritt** of Tenafly (NJ) High School, class of 1948, who served in USAF. **Contact:** Doris Myer Donges (dorisd@bright.net) (419-281-1774).

Seeking contact with **WWII veterans** who were in Nazi concentration/extermination camps and anyone who was at the Berga camp during Christmas 1944. **Contact:** Orville L. Coil, 2580 N. Emerald Dr., Fairborn, OH 45324 (937-426-1579).

Seeking **identification (recognition/spotter) models** of aircraft (all scales, issues, and countries), postwar ship ID models, Teacher Scale 1/500 and 1/250, Kix Cereal 1/432-scale aircraft models from the 1940s, AHM Cox Showcase miniature aircraft models, and Wings or Players cigarette cards of aircraft. **Contact:** James A. Dorst, 113 Beach Rd., Hampton, VA 23664-2054.

Seeking contact with or information on **Lewis C. Olive Jr.,** USMA Class of 1955, who was in Pilot Training Class 56-T, attended navigation training for pilots at James Connally AB, TX, and then served with SAC. **Contact:** Robert O. Wray (843-768-1542) (bobwray@charleston.net). ■

If you need information on an individual, unit, or aircraft, or want to collect, donate, or trade USAF–related items, write to "Bulletin Board," *Air Force* Magazine, 1501 Lee Highway, Arlington, VA 22209-1198. Items submitted by AFA members have first priority; others will run on a space-available basis. If an item has not run within six months, the sender should resubmit an updated version. Letters must be signed. Items or services for sale, or otherwise intended to bring in money, and photographs will not be used or returned.

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Following each state name are the names of the communities in which AFA chapters are located. Information regarding these chapters or any of AFA's activities within the state may be obtained from the appropriate contact.

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Pieces of History

Photography by Paul Kennedy

The Little Things

Memorabilia courtesy US Air Force Museum, Wright-Patterson AFB, Ohio

Memorabilia like these help the US Air Force Museum at Wright-Patterson AFB, Ohio, tell the thousands of stories—big and small—that are part of military aviation history. "Col. Elmer E. Elmer," for example, was the teddy bear mascot for the crew that flew the World War II B-29 Deacon's Disciples. *Historic documents shown here include a photo of ace Maj. Richard I. Bong, who downed 40 enemy aircraft in World War II; the honorable service certificate of pararescue jumper A1C William H. Pitsenbarger, who died while rescuing American casualties in a Vietnam War firefight; a prisoner of war record for Royal D. Frey, who was a P-38 pilot in World War II and later served 31 years with the USAF Museum; and the aeronautical engineering degree of Carmen A. Lucci, one of USAF's first female graduates of test pilot school. At top left is a World War I German aircraft control stick.*

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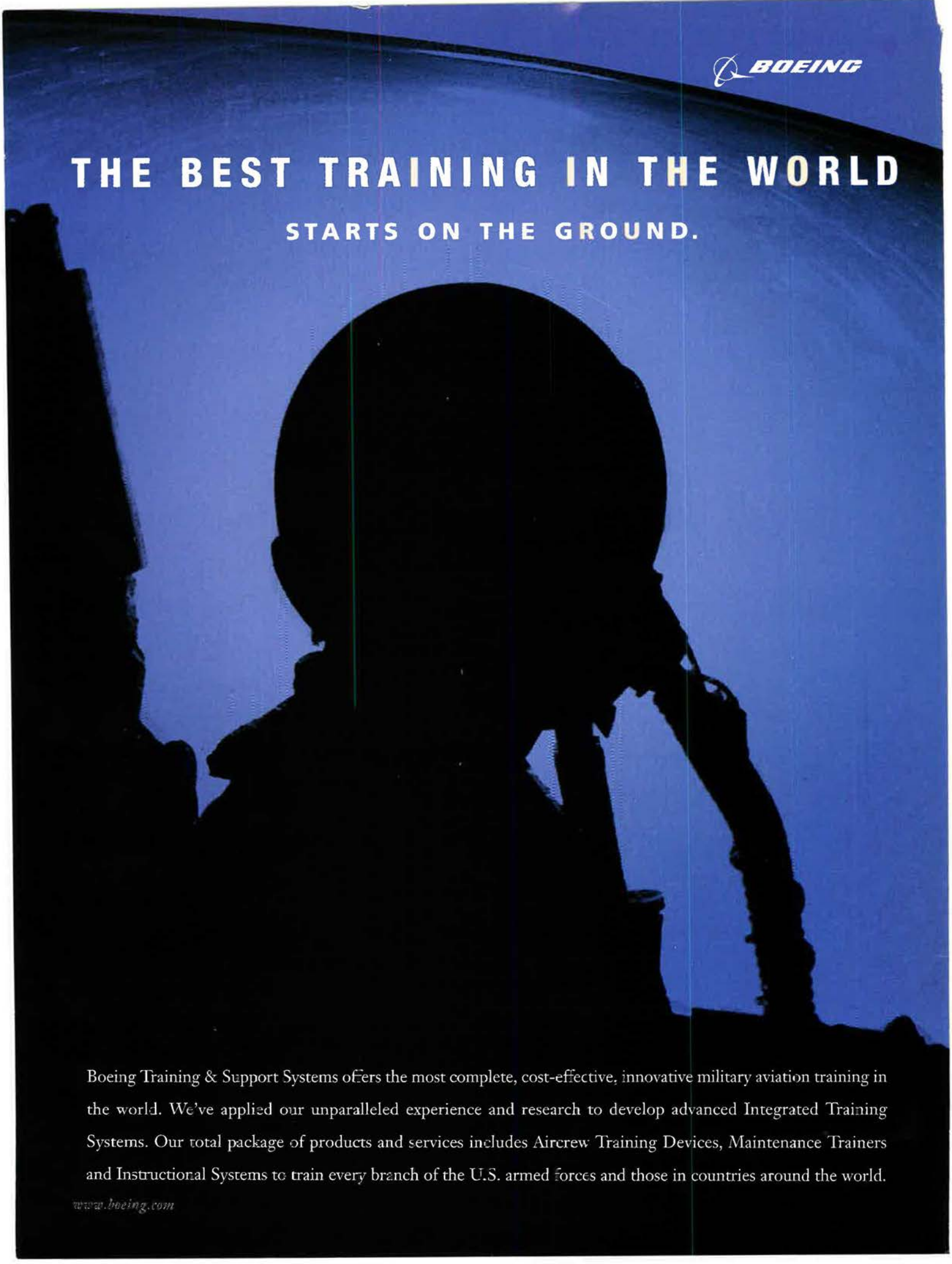
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