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AIR FORCE

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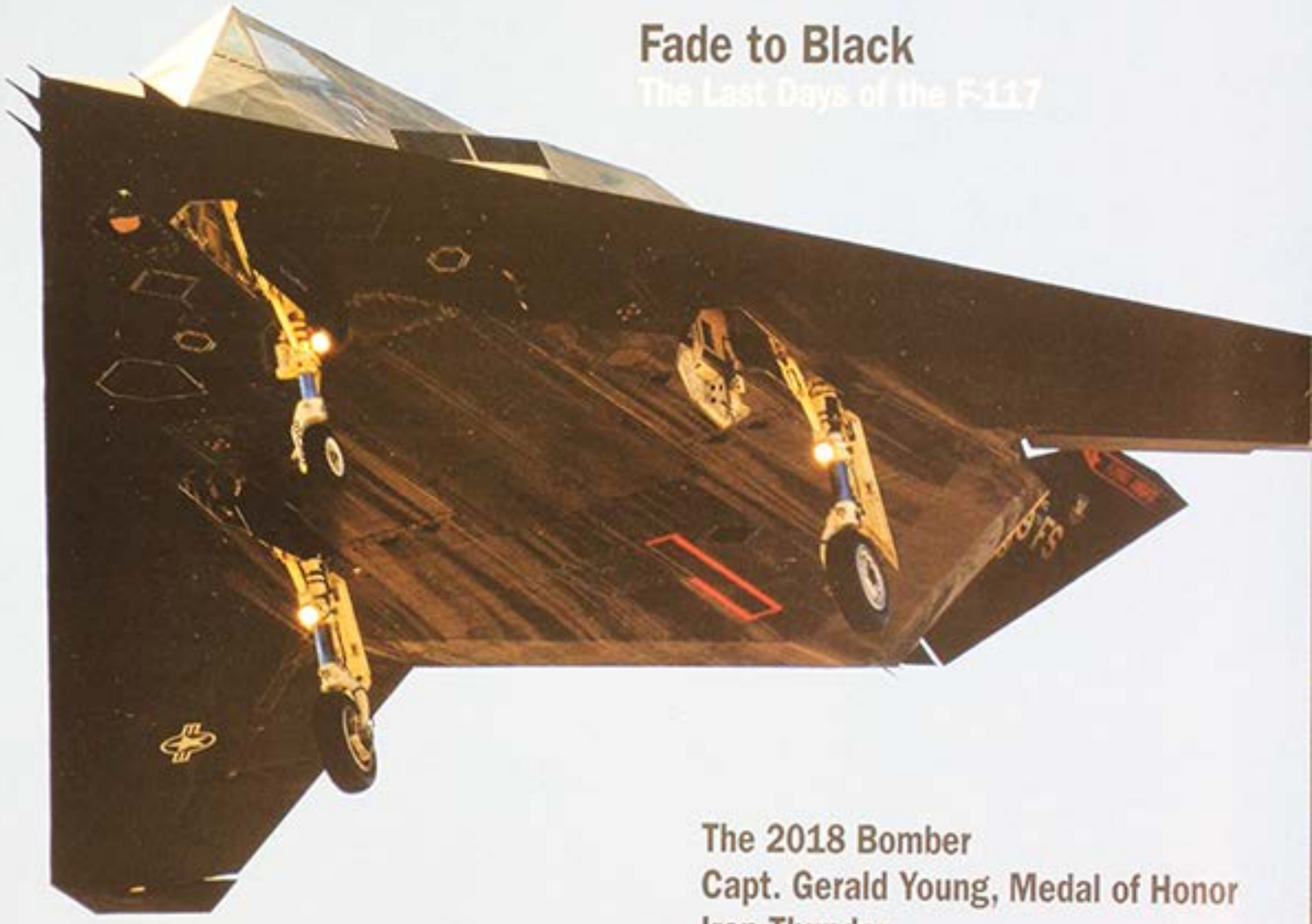

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The 2018 Bomber

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About the cover: F-117 photograph by Richard VanderMeulen. See "Fade to Black," p. 66.

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Editorial

By Robert S. Dudney, Editor in Chief

The Ten Truths

In the 1943 version of Field Manual 100-20, "Command and Employment of Airpower," the War Department declared, "Landpower and airpower are co-equal and interdependent forces; neither is an auxiliary of the other." That, unfortunately, was not the Army's last word on this matter.

Army officials and supporters have often advanced the claim that "boots on the ground," not aircraft, count most in today's battlespace. They hold that landpower generally dominates combat, and airpower plays a "supporting" role. In the green world, it seems, airpower has a kind of "auxiliary" status, after all—one focused on support for the land force in battle.

However, that is true only in the green world. The Air Force has never accepted claims of ground force dominance. More and more since 1990, USAF has challenged such notions where it matters a great deal—in service and joint doctrine.

The latest example is the recently released Air Force Doctrine Document 2, "Operations and Organization," which is the last word on employment of airpower at the operational, or "theater," level of warfare. Signed out by Gen. T. Michael Moseley, Chief of Staff, it is the first update of its kind in six years.

The Air Force has added a considerable amount of starch to the document. At its core is a list of 24 "foundational statements," deemed to be "the basic principles and beliefs" that undergird all USAF doctrine. And of those two dozen statements, 10 stand out as being fundamental truths about air and space power.

Taken together, these factors reaffirm that air and space power is not now, and never could be, "auxiliary" in any way. Call them "The Ten Truths":

- Air and space power "operates in ways that are fundamentally different from other forms of military power." It provides speed, range, and a three-dimensional perspective. Airmen range across a whole theater, unlike geographically limited surface forces with their "fronts, flanks, and rears."
- By using "the vertical dimension" and time, "air and space forces can wrest the initiative, set the terms of battle, establish a dominant tempo of operations, anticipate the enemy, take advantage of tactical and operational opportunities, and thus can strike directly at the adversary's strategy."
- "When employed aggressively, air and space forces can conduct operations aimed directly at accomplishing the joint force commander's objectives." These operations are not dependent upon friendly surface force disposition. Some can be conducted at long range, reducing the need for forward deployed US forces.

These factors reaffirm that air and space power is not now, and never could be, "auxiliary" in any way.

- "Air and space forces can strike directly at an adversary's centers of gravity, vital centers, and critical vulnerabilities," with an impact that goes beyond tactical effects of individual actions. The attacks disrupt an enemy's decision cycle and force tempos that cannot be matched by enemy forces.
- "Air and space superiority allows simultaneous and rapid attack on key nodes and forces, producing effects that overwhelm the enemy's capacity to adapt or recover." The surprise nature of such attacks, and fear of the next blow, demoralizes targeted forces and opens up opportunities for exploitation.
- Recent experience, said the document, "has shown that parallel, asymmetric operations are more effective, achieve results faster, and are less costly than symmetric or serial operations." These types of attacks cause maximum dislocation. It is true that some symmetric, force-on-force warfare may be needed, but it should be avoided if at all possible.
- Air and space power is needed for emergencies. "In some situations, air and space power, whether land- or sea-based, may be the only force immediately available and capable of providing an initial response." Whether this 911 force is based on land or at sea, it should be employed directly against enemy systems so as to block their immediate war aims.
- For all airmen, "air superiority is the desired state before all other combat operations." That is because "attaining air superiority provides both the freedom to attack and freedom from attack, as well as ensuring freedom to maneuver." Seeking battle without air superiority "radically increases risk to surface and air operations."
- Likewise, "space superiority is important in maintaining our unique advantages in precision, situational awareness, and operational reach." Offensive operations can hit an enemy's spacelift and information infrastructure. Defensive steps such as hardening and dispersal can protect US space assets.
- There is no one-size-fits-all model appropriate for commanding air and space operations, but, "at the focus of operations within any region, it is possible to place the collective capabilities of air and space power in the hands of a single airman."

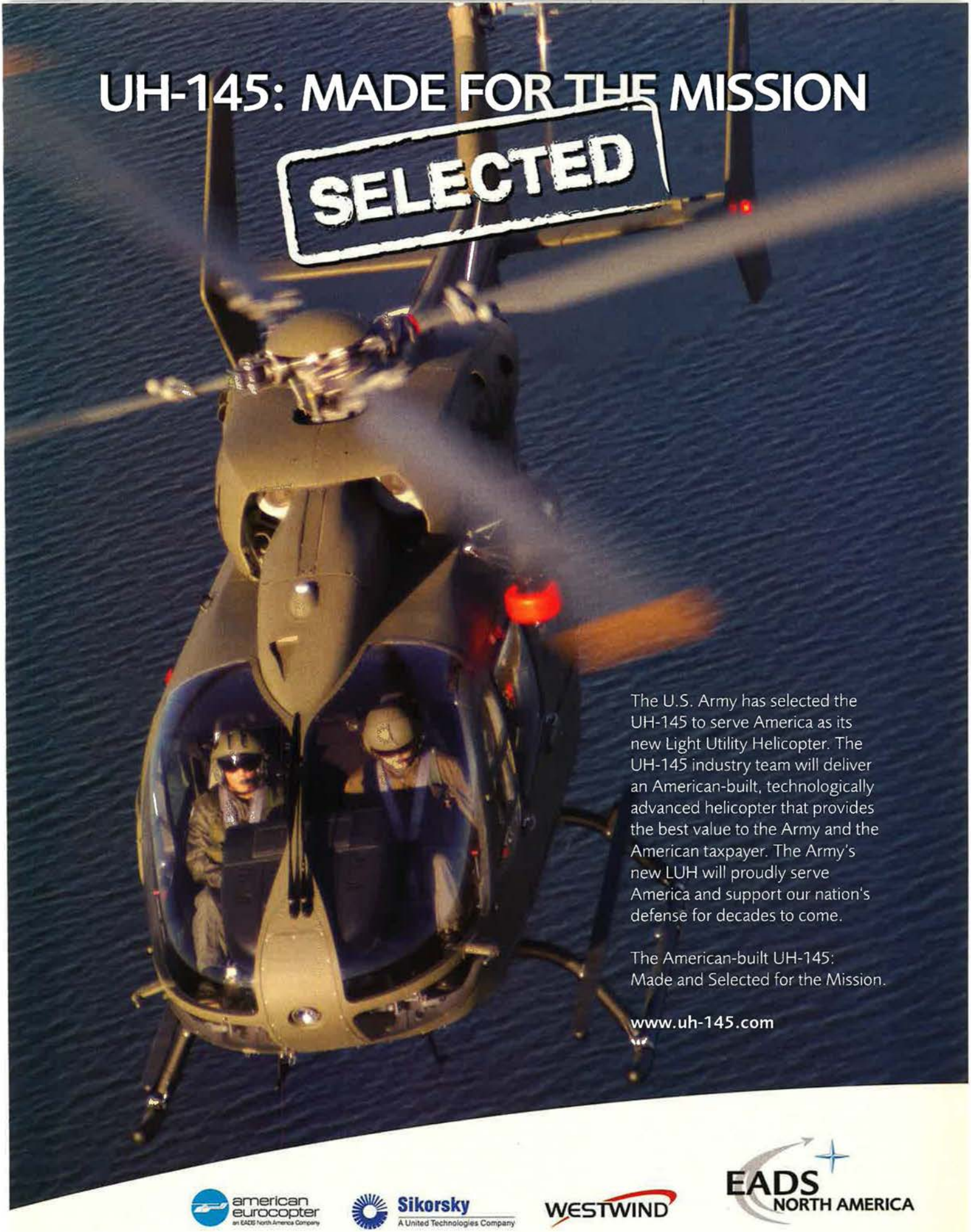
The point of such doctrine statements is not, as critics sometimes claim, the creation of an "Air Force Über Alles" view of the world. Senior airmen know as well as any—and better than most—that wars are won by the joint force, not service forces in isolation.

The point, rather, is to distill the experiences of recent years, adjust Air Force practices accordingly, and make sure that today's air and space operators understand the intellectual foundation of their craft and can articulate it well to defense leaders, other services, and the public.

In his 2000 version of this doctrine statement, Gen. Michael E. Ryan, USAF Chief of Staff at the time, declared, "Aerospace power is a critical—and decisive—element. ... We, each of us, must be articulate, knowledgeable, and unapologetic advocates of aerospace power."

Six years later, in his version, Moseley also called on airmen to be "unapologetic advocates" for the Air Force's capabilities.

Note the recurrence of the word "unapologetic." Some things shouldn't change. That is one of them. ■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Letters

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The Bomber Generals

It is difficult to know where to begin in response to "A Changing of the Guard," July, p. 60, except perhaps with the old cliche, "Every man has a right to his opinion; no man has a right to be wrong in his facts." Major General Worden seemed almost breathless as he raced to make his points about the inadequacies of the inflexible, single-minded, strategic nuclear-driven SAC generals during the Cold War era. Many of Worden's assessments are indeed factual, although his inflection in most instances is intentionally oblique. As he stated, "Proliferation of nuclear weaponry, deliverable by strategic bombers, gave air advocates what they saw as an arsenal of decisiveness." What more could we ask? The declaratory policy of the Soviet Union was destruction of the United States and democratic governments worldwide. Gen. Curtis LeMay was awarded the responsibility to create a long-range nuclear deterrent force to hold the Soviets in check—and it worked for 45 years—until they capitulated. Indeed, "the bomber generals insisted upon clear-cut military supremacy of the kind seen in World War II." And it worked!

LeMay and his "bomber generals" insisted on discipline, centralized management, yes, even "command posts," and strict measurements and evaluations. How else would the nation want the Air Force to conduct the care, feeding, and employment of nuclear weapons? During the Cuban Crisis, "Kennedy settled for a negotiated withdrawal of Soviet missiles." The fact that 60 or more SAC B-52 bombers fully loaded with nuclear weapons encircled the Soviet Union 24-hours-a-day until Khrushchev fully understood his situation assisted President Kennedy considerably in "settling the negotiations." I was there, and the several hundred of us disciplined SAC Cold Warriors who flew those airborne alert sorties at the time can vividly recall sitting in orbit just off the Soviet coast waiting for the "go code" should it come. We patiently circled, listening to the communications traffic as we had to wait our turn to make our position reports "in the clear"—so that Ivan was aware of our presence, location, and intent. That worked, too!

With regard to the assertion that "SAC generally kept its people within the command for an entire career," I did not find that to be true nor did thousands of other SAC professionals. I did spend 20 of my 31 years, gratefully so, in the command, but also an additional six years with the Defense Nuclear Agency, three years with the JCS (incidentally in the "SAC-dominated" JSTPS), a year in TAC, receiving a below-the-zone promotion as a result of the generosity of my "fighter pilot" commanders and even served a little time flying C-141s in MAC. ... Perhaps many of us didn't take time out to get a master's, a doctorate, or [attend] senior service school, but there was ample time standing Cold War bomber, tanker, or missile alert to knock those out by correspondence—and we did. With regard to General Worden's assessment of SAC in Vietnam: I don't believe he was there, but perhaps an interview with a few former POWs would better inform him of who and what SAC B-52 raids led unequivocally to their release.

Lastly, the reference to the dismal and conciliatory Carter Administration and the strategic decisions thereof would have been better left out of his article. The American people soon learned and elected President Reagan who clearly understood the options to bring the Cold War to an end, restored the Carter-cancelled B-1 bomber, and moved on with the production of the B-2, and, interestingly, the venerable B-52, which I first began flying back in 1959 and which is still in the force today.

In closing, I had the distinct honor of meeting and participating in two

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To educate the public about the critical role of aerospace power in the defense of our nation.

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To support the United States Air Force and the Air Force family.

meetings in the latter years with the long-since retired and still sage General LeMay, and I also served proudly under the tutelage of Generals Power, Ryan, Dougherty, and many other distinguished SAC generals beneath those stalwarts. What a great privilege and lifelong learning experience!

Time moves on and defense strategies evolve, but for anyone to demean and dismiss the valiant service of hundreds of thousands of dedicated, committed, and, yes, disciplined Strategic Air Command Cold Warriors and their distinguished leaders does a great disservice to the history and legacy of our Air Force.

Maj. Gen. Chris Adams,
USAF (Ret.)
Former Chief of Staff,
Strategic Air Command
Granbury, Tex.

Having read "A Changing of the Guard" several times, I feel compelled to respond to this article that does not portray the professional men and women who served in Strategic Air Command in a positive light. These dedicated professionals helped win the Cold War by their commitment and belief that deterrence was the only way to get the Soviet Union to back down.

I was not a "bomber general," but I served over 16 years of my 31 years in the Air Force under some very fine SAC general officers who had one thing in mind—"take care of your people and they will take care of the mission." As the first SAC senior enlisted advisor (1975-79), I served under Gen. Russell E. Dougherty and Gen. Richard Ellis and had many an opportunity during these years to sit in on the senior SAC staff meetings and listen to the concerns that these truly professional and dedicated general officers and their staff had for the command, its mission, and, more importantly, its people. I find it difficult to accept some of the things the author stated about the legendary figures that led SAC during some of the most difficult times in our nation's history.

Although I never had the privilege to serve under General LeMay when he was CINCSAC, he was the first commander of any of the major Air Commands to establish a Noncommissioned Officers Academy so that the NCOs of SAC could have the opportunity to learn and develop their professional careers to the standards that he believed in. General LeMay also put the term "quality of life" into [use] by standing up and fighting for adequate housing both for single airmen and [airmen's] families, child care facilities, recreational programs, visitation centers for the SAC alert facilities—just to name a few issues that were so necessary at the many remote SAC bases throughout the command. Yes, he was tough and demanded discipline from his commanders and others, because of the nature of the business—to prevent a nuclear holocaust. He was so respected by the enlisted men and women of SAC for his continuing efforts to improve their quality of life and for what he did during some of the most difficult years in the history of our country that, after his retirement, he was inducted into the Strategic Air Command Order of the Sword in 1980. This is the highest recognition that the enlisted men and women of SAC could bestow, not only upon General LeMay, but several other SAC general officers as well. In the eyes of many of us who had the honor to serve in SAC, they truly were "leaders among leaders and airmen among airmen."

Again, in my opinion, the author did not give the thousands of individuals that served in this command the respect and dignity they so richly deserve. I was among the many SAC veterans, officer and enlisted, who witnessed the disestablishment of Strategic Air Command on June 1, 1992. Gen. Colin Powell, former Chairman of the Joint Chiefs of Staff, said it best: "You never let us down. You were always prepared, and the horror of World War III never came. You kept the peace, and the nation and free world will be forever grateful. Thank you, SAC." It is sad that the author didn't dwell on this subject versus the route he elected to take to put down this great command and its people.

CMSAF James M. McCoy,
USAF (Ret.)
Bellevue, Neb.

■ *Short articles can provide only limited context. Readers can find much more context and perspective in my full book,* Rise of the Fighter Generals: The Problem of Air Force Leadership 1945-1982, *Air University Press. For decades, SAC and its airmen admirably performed the primary mission of strategic nuclear deterrence, which was invaluable in the winning of the Cold War. The article's thesis does not challenge that. However, some of SAC's dominant characteristics influenced the broader Air Force in a way that did not serve the Air Force well as it faced new challenges in the era of Vietnam and Flexible Response. The Air Force, and any other large and diverse institution, still incurs great risk if one of its "groups" overdominates to the extent that it neglects other voices and perspectives within that institution.—*MAJ. GEN. R. MIKE WORDEN

A-10C. ALL-WEATHER. ALL-POWERFUL. IN PRODUCTION.

In August, the U.S. Air Force rolled out its first production A-10C aircraft — the eagerly awaited upgrade to the service's revered close air support fighter. With integrated smart and laser-guided weapons, state-of-the-art cockpit displays, and integrated targeting systems, the A-10C's new capabilities make it a force to be reckoned with through 2028. The A-10 Prime Team congratulates the Air Combat Command, the Air National Guard, the Air Force Reserves, and Air Force Materiel Command on your success in procuring and building this tremendous new warfighting aircraft!

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Washington Watch

By John A. Tirpak, Executive Editor

A Large Airpower Lesson; Refocusing the Army; C-17 Down For the Count? ....

RAND's Advice: Let Airpower Lead

United States military doctrine should assign to the Air Force the lead role for major combat operations and for "shaping the battlespace," maintains a new RAND study. Meanwhile, it declared, the Army should focus its efforts on delivering on-the-ground victory and postwar stabilization.

RAND's study, "Learning Large Lessons," was released in August. In it, analyst David E. Johnson says that the experience of the last five wars shows the Pentagon's joint doctrine "must be overhauled" relative to the roles of air- and land power.

Johnson referred to operations in the Gulf (1991), Bosnia (1995), Serbia (1999), Afghanistan (2001), and Iraq (2003). Some of these also featured follow-up air and land actions.

The services pay lip service to "interdependence," argued Johnson. In reality, he added, the American approach tends to be an "amalgamation" of service doctrines that "frequently reflects a consensus view rather than truly integrated joint perspective."

This won't work if the US military is to be effective in the 21st century, he said.

"A radical shift has occurred in the relative roles of ground power and airpower in warfighting," he asserted. Over the last five conflicts, he went on, "airpower showed growing levels of effectiveness and robustness and played commensurately growing roles. ... The cases illustrate a gradual acceptance by Army officers of this reality."

Johnson quoted senior Army commanders in Operation Iraqi Freedom—Gen. Tommy R. Franks, head of US Central Command, and Gen. William S. Wallace, head of V Corps—as saying that airpower proved "decisive," not only in achieving victory, but in preventing defeat in certain situations.

The Army's doctrinal desire to control the entire battlespace actually gets in the way of effective use of fixed-wing airpower, limiting its ability to strike where needed in a timely manner, Johnson said. He suggested that the US make the Air Force the "supported" service in the initial phase of a war—defeating or neutralizing an enemy's major combat forces—and then allow the Army to deliver the coup de grace.

The Army should get out of the business of deep attack, declared the RAND study, because it does a bad job of it. Rather, it should shift resources spent on deep attack missiles and helicopters to the task of improving its capabilities in so-called military operations other than war, or MOOTW.

Johnson asserted that airpower has made the biggest contribution in major combat operations from the 1991 Gulf War onward. There's no question, Johnson said, that "the strategic and operational levels of warfighting against large conventional enemy forces were dominated by flexible, all-weather, precision-strike airpower, enabled by intelligence, surveillance, and reconnaissance."

Johnson quoted official Army histories of Operation Iraqi Freedom and other conflicts, in which senior Army commanders praised the decisiveness of airpower.

"It is difficult to overstate the importance of air operations in the context of OIF," the Army's history states. "By dominating the air over Iraq, coalition air forces shaped the fight to allow for rapid dominance on the ground." Integration of air-delivered precision weapons with ground operations, backed up by "a largely space-based command and control network, enabled combat operations to occur in ways only imagined a decade ago."

US Army photo by 1st Lt. Patricia A. Sinnett

The Apache did not impress.

Johnson said the Army's attack helicopters, although doctrinally charged with "shaping" the battle space, proved to be highly vulnerable to an ad-hoc Iraqi air defense "system" based on cellular phones and small arms. The Army's official war history said Army aviation found it "virtually impossible to detect and suppress such defenses."

In one early Apache engagement, all 30 choppers were hit, one was shot down, and a crew was captured, yet the attack caused only minor damage to the enemy. The Apaches fared somewhat better when engaging in close air support operations. Still, they were increasingly used for scouting rather than deep attack or for efforts to shape the battlespace.

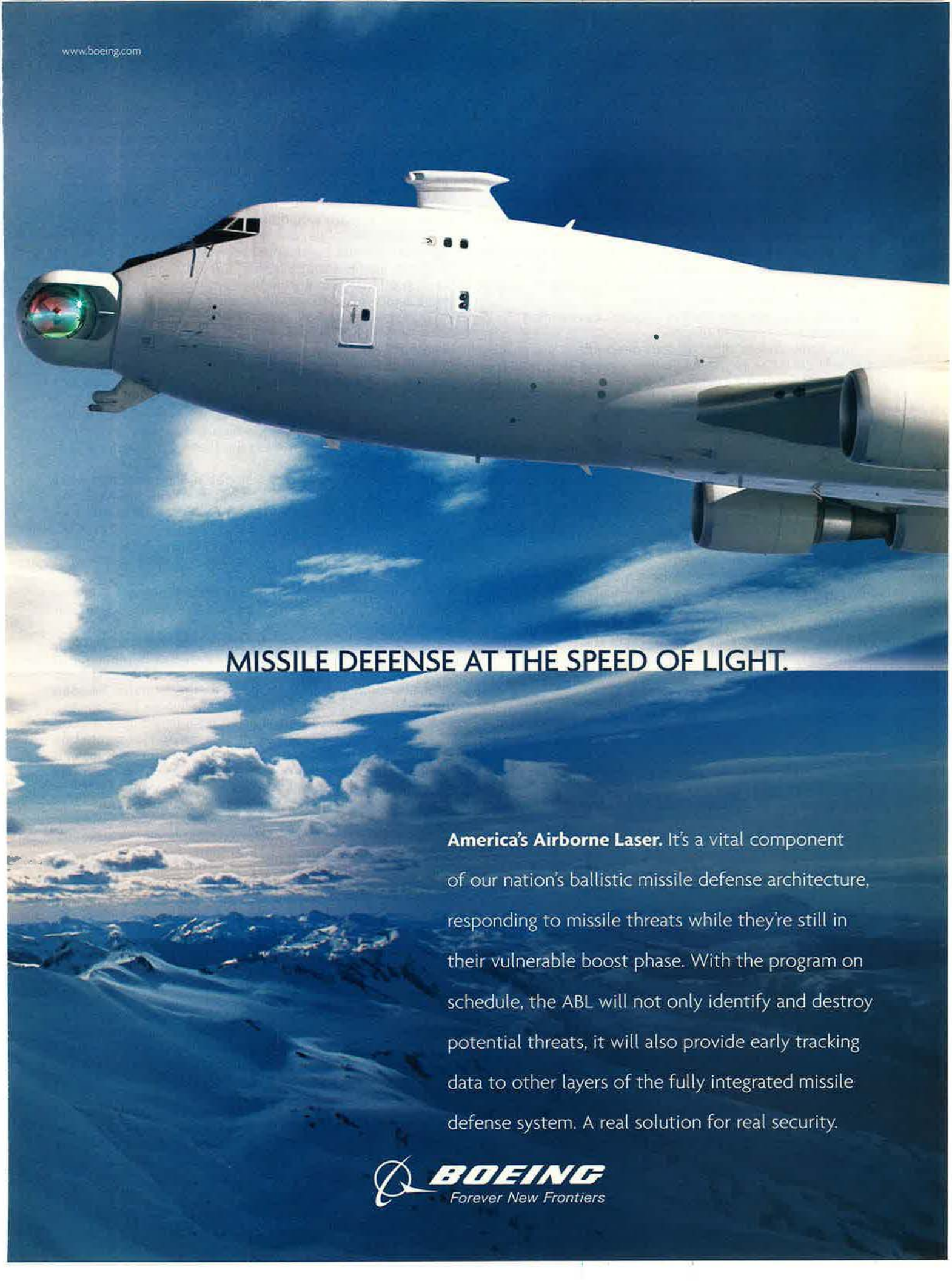
The Army canceled its Apache successor, the stealthy RAH-66 Comanche, after the end of major combat operations in Iraq. That was the decision of Gen. Peter J. Schoomaker, the Army Chief of Staff. He based it on the Army's realization that stealth was not all that important for helicopters, that helicopters tend to be vulnerable to small-arms fire, and that the Army needed to focus its resources on its ground capabilities.

Sharpening the Army's Approach

Speedy American success in large conventional conflicts—made possible mainly by airpower—typically doesn't bring about a "strategic political end state or conflict resolution," the RAND study concluded. That, said Johnson, requires a land force well-practiced in nation-building and certain other functions.

At present, the US Army does not emphasize these aspects in its training and equipment programs, but it should, he added.

The Army believes that well-trained soldiers able to fight the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big wars can handle the perceived lesser mission of military operations other than war. (The acronym MOOTW is generally pronounced "moot-wah.") However, Johnson argued that more specific preparation and equippage is needed.

In his study, Johnson noted that, in Bosnia, Serbia, Afghanistan, and Iraq, the end state was not a classic victory but persistent, low-grade MOOTW.

The Army and Marine Corps, Johnson argued, should focus their "overwhelming tactical dominance" on several key missions. They are to:

- Compel the enemy to move or concentrate his forces such that they become vulnerable to attack from the air.
- Close with and destroy enemy tactical remnants, exploit success, and seize and hold ground.
- Deal with the post-conflict security environment "until the desired end state is reached."

The Army should ditch its own deep attack capabilities and rely on those of the Air Force, a move that would allow it to focus more intently on the close battle. Johnson acknowledged such a change will be "particularly difficult" for the American land force, given its focus on "operational-level warfighting."

In the aftermath of the 1991 Gulf War, Johnson pointed out, senior Army leaders stubbornly insisted that the brief, 100-hour land campaign (launched after a devastating 38-day air war) had been decisive and that airpower had merely softened up Iraqi forces. Airpower advocates argued that airpower had all but won the war by setting the conditions for victory.

In Bosnia four years later, the Army once again asserted that victory was achieved not by airpower—the only force used by NATO—but rather by a Croatian-led ground offensive that led to Bosnian Serb concessions.

In Kosovo in 1999, the story was much the same. The NATO alliance used only airpower. Still, the Army asserted that it was the "threat" of a ground invasion that caused Yugoslav strongman Slobodan Milosevic to yield and that his "center of gravity" was his forces in Kosovo.

Army views began to change somewhat after the Afghanistan campaign in 2001. Army leaders concluded that anti-Taliban Afghan militias, aided by airpower, defeated the Taliban and al Qaeda.

In Iraq in 2003, the Army went further. It found that, though ground troops were needed to finish off Saddam's regime and occupy the capital, airpower was a key enabler in achieving these objectives. The Air Force view was that, again, airpower set the conditions for quick victory on the ground.

Johnson concluded that, in Operation Iraqi Freedom, the employment of airpower prevented Iraqi forces from positioning themselves properly. Even in bad weather or darkness, he went on, airpower often shattered Iraqi units before they could close with coalition ground forces. The air element "not only reduced the costs, risks and duration of the coalition campaign ... but largely left coalition ground units to mop up the remnants of shattered enemy formations in close battle."

C-17: The End of the Line?

Congress, Boeing, and airlift advocates mounted a late summer effort to stop the planned shutdown of the C-17 production line, but it appears that the effort came too late to bring about an extension of Globemaster III production.

Boeing announced on Aug. 18 that it was sending out word to suppliers to stop work on C-17 parts and subassemblies and was planning to close the Long Beach, Calif., production line in 2009, after all outstanding orders are filled.

The company said it would desist, though, if it received a "statement of intent" from the Air Force that it would seek more aircraft beyond the 180 the service has on order.

Company officials indicated that they didn't need a written contract but merely a verbal pledge that USAF intended to seek more in years to come. By early September, the Air Force had made no such commitment, and the Defense Department indicated no such reversal would be forthcoming.

On Aug. 15, a Pentagon spokesman told *Aerospace Daily and Defense Report,* a defense trade publication, "We have the C-17s we need." He strongly discouraged anyone from thinking that there would be a last-minute reprieve.

Ronald C. Marcotte, Boeing vice president of global mobility systems, said there would be relatively small impact on the program for about a month, but after that, "things start to drop off fast" and it would become steadily harder—and more expensive—to restart production.

To restart production, any vendor that had stopped making a certain kind of part would have to be recertified. Laid-off workers would have to be recalled, retrained, and recertified. Some vendors would no longer be available, leading to delays and greater expense. "It's not like a tap you can turn off and then turn on again," an industry official said.

By late August, Boeing had delivered 154 C-17s to the Air Force and another four, which are leased, to Britain. Britain has said it will convert the lease to a purchase and wants to buy one more.

Boeing said it had not developed any numbers on what it would cost to restart the C-17 line, should the Air Force wish to do so. However, retired Air Force Gen. John W. Handy, the former head of Air Mobility Command and US Transportation Command, wrote in the *Los Angeles Times* that restarting production after the line goes cold would cost upward of $4 billion.

A Boeing spokesperson said, "We believe our customers would rather spend their acquisition dollars on aircraft purchases, not line restarts."

The shutdown had been long telegraphed, and, indeed, Boeing warnings earlier this year that it was planning to stop work encouraged Britain, Canada, and Australia each to make some last-chance orders for the airplane. Sweden has also expressed interest in buying two aircraft.

However, those orders were not sufficient to stave off closure, Boeing officials said. In fact, an announcement on Aug. 17 by Marine Corps Gen. James L. Jones, Supreme Allied Commander Europe, that NATO would seek to buy up to eight C-17s to help the Alliance with deployments to Afghanistan and elsewhere wasn't enough for Boeing to pull back.

Dan Page, Boeing's director of airlift business development, said in August that the company had committed $100 million of its own money since the summer of 2005 to keep production going, even though the Air Force still had not placed any orders beyond the 180 on contract under a multiyear deal.

At that time, Page said, the Air Force was indicating that a number closer to 222 C-17s was about right.

"We had good reason to believe" the Air Force would keep ordering C-17s and that other countries would, as well, Page said.

However, the Quadrennial Defense Review, released earlier this year, said 180 C-17s would be sufficient, as long as other elements of the airlift inventory held up. Notably, the 180 figure is dependent on Lockheed Martin's success in upgrading the C-5 Galaxy, but flight testing of those updates won't be done for several years.

The C-17 line would have shut down in 2008 if it had not received the additional orders, but those will only carry the production line into early 2009. In August, the company deemed it too risky to shareholders to keep spending money in hopes of sales that might not materialize, he said.

Boeing said it will, of course, consider any further orders from USAF that are short of that needed to meet the economical 15-per-year pace at which the company has been building Globemaster IIIs. "It will depend on how many the Air Force wants to buy and at what rate," a company spokesperson said.

The C-17 Impact on Congress

The shutdown, if it happens, would adversely affect states with large pieces of C-17 production—mainly Missouri, California, and Connecticut—and their representatives in Congress said they would appeal directly to the White House.

They touted the fact that the C-17 is being delivered ahead of schedule, at the agreed cost, and is proving indisputably useful in ongoing, far-flung military operations worldwide.

The C-17 issue thus has been a contentious one for Congress, and it seemed in late summer that it would be a ripe issue for debate in the House-Senate budget conference on Capitol Hill.

Three aircraft were added to USAF authorization bills, versus the seven the Air Force carried as an "unfunded priority" for Fiscal 2007. If signed into law, this action would raise the total USAF C-17 purchase to 183 aircraft. The service has been using the C-17 heavily in the Southwest Asia theater and in disaster relief and needs more aircraft to replace service life that has already been consumed in the C-17 fleet.

Stopping production "would be a loss for the nation," Handy wrote in the *Times* editorial.

"Dismantling the C-17 line now means that the US will be limited in its ability to adequately support the war against terrorists, as well as the loss of the most capable aircraft ever used in support of humanitarian crises at home and abroad," Handy wrote, adding rhetorically, "How will we respond to hurricanes, earthquakes, and tsunamis?"

He noted that the figure of 180 C-17s was the conclusion of mobility studies largely concluded before the 9/11 attacks and developed without the expeditionary war against terror in mind. Last year's QDR conducted a mobility study, but it was a "capabilities" review and not a requirements analysis.

Handy also held out the B-2 as an analogy that shows how premature termination can be penny-wise and pound-foolish.

"The B-2 bomber is a cautionary tale," Handy wrote. "Considered the most expensive plane in history, the original B-2 procurement was cut from 132 aircraft to 20, exponentially increasing the cost per plane and leaving our military with an aging bomber fleet that we are now seeking to replace."

He concluded that "it would be unwise to do the same with the C-17."

Boeing said it is studying future airlift requirements for tactical transports and thinks a modified version of the C-17 could fill the bill. However, those aircraft will not be needed for some years, yet, and by the time they are, the company's Long Beach facility could be shut down for good. ■

Aerospace World

By Marc V. Schanz, Associate Editor

Airman Dies in Afghan War

SrA. Adam P. Servais, 23, of Onalaska, Wis., died Aug. 19 when his vehicle came under fire in Uruzgan Province, Afghanistan, during a long firefight with insurgent forces.

A combat controller, Servais was assigned to Air Force Special Operations Command's 23rd Special Tactics Squadron at Hurlburt Field, Fla. He was part of a US team that is training the Afghan National Army.

Servais' team was supporting an Afghan patrol when it encountered a force of as many as 150 insurgents. The patrol was attacked with small arms and returned fire, calling in artillery and close air support. The firefight continued for nearly four hours. In addition to Servais, an Afghan soldier was killed and three other US service members were wounded in the engagement.

USAF photo by TSgt. Justin D. Pyle

This B-2 participated in Air Force Week, held Aug. 6-13 in St. Louis. The week featured an open house and an air show at nearby Scott AFB, Ill.

IED Claims Ohio Airman

The Defense Department confirmed on Aug. 21 the death of MSgt. Brad A. Clemmons, 37, of Chillicothe, Ohio. While on transportation convoy duty en route to Taji, Iraq, Clemmons' vehicle was struck by an improvised explosive device. He was assigned to the 354th Civil Engineer Squadron at Eielson AFB, Alaska.

ANG Deflects Cuts, Leaders Say

The planned cut of 40,000 USAF personnel planned over the next six years will largely spare the Air National Guard, according to two Guard leaders.

Lt. Gen. Craig R. McKinley, ANG commander, and Army Lt. Gen. H. Steven Blum, chief of the National Guard Bureau, stated in August that no dramatic reductions in ANG personnel are expected. (See "An Air Guard for the Future," September, p. 67.) Blum told reporters that the Air Force had offered the Guard Bureau the option to cut personnel as a way to reduce costs, but he and Air Guard officials rejected the idea, citing the Guard's recent workload in Southwest Asia and domestically.

Blum added that the ANG will absorb its share of cost-cutting but that the savings will come through reductions in flying hours and other economies. The Air Guard wants to wait until it has a better idea of what missions USAF wants it to bear in the wake of the Base Realignment and Closure process before making any drastic cuts to its ranks, he added.

CMOC Goes on Standby

Cheyenne Mountain Operations Center, the iconic Cold War-era nerve center of North American air defenses, has been put in standby status by the order of Adm. Timothy J. Keating, commander of North American Aerospace Defense Command. Over the next 16 months, missions previously performed by US Northern Command and NORAD "under the mountain" will shift to nearby Peterson AFB, Colo.

The facility will be kept in standby status, ready to be reactivated on short notice if needed.

Keating said he wants to better integrate the activities of NORTHCOM and NORAD. He took the action after a study of the two organizations' functions; the review was not connected with either the Quadrennial Defense Review or the Base Realignment and Closure process. No jobs are being eliminated by the action.

NORTHCOM and NORAD account for about a quarter of the US military functions conducted at Cheyenne Mountain. The others aren't affected by the move.

F-35 Training Goes to Eglin

The 33rd Fighter Wing at Eglin AFB, Fla., is getting a new mission: It will conduct pilot training in the F-35 Lightning II fighter, scheduled to arrive at the base in 2010.

The much-decorated wing, which has flown F-15Cs since the 1980s and claimed the most air-to-air victories in the 1991 Gulf War, will train pilots from the Air Force, Navy, and Marine Corps, as well as pilots from allied air forces, in the F-35. The Air Force announced the change Aug. 10.

The 33rd's F-15Cs will be distributed to other units throughout the Air Force and Air National Guard; the last one will leave in the summer of 2010. At that point, the wing will transfer from Air Combat Command to Air Education and Training Command. Final certification of the plan depends on the results of an environmental impact analysis.

Plans call for AETC, over the next few years, to stand up a new wing structure for the Lightning II mission. Details on the number of peop e who would transfer from the old mission to the new were not disclosed.

The announcement seemed timed to answer the concerns of Florida officials—including Republican Gov. Jeb Bush—who have complained about Air Force Materiel Command's plan to move flight-test operations elements of

the 46th Test Wing, now based at Eglin, to Edwards AFB, Calif.

Gen. Bruce Carlson, AFMC commander, paid a visit to local officials in the Eglin area in July to reassure them that the wing would not be leaving Eglin imminently and that the Department of Defense would need to sign off on the move and forward it to President Bush for inclusion in the Fiscal 2008 budget.

CSAR-X Acquisition Delayed

The Air Force will wait until next month at least to award a contract for its next generation combat search and rescue helicopter, the service said in August.

The delay was directed in order to conduct more analysis with bidders, a service spokesman said. As a result of the need for more analysis, the Defense Acquisition Board, which must approve contract milestones, rescheduled its contract-review meeting from Sept. 6 to Oct. 31. The DAB review will look at a range of issues—such as cost, funding, requirements, and performance—before moving the program into system development and demonstration. The contract award is now targeted for Nov. 6.

The Air Force has already delayed the award twice, once to change program requirements that pushed the contract announcement back from this spring into summer—then delaying to September.

The CSAR-X program seeks to replace the HH-60G Pave Hawk fleet, now managed by Air Combat Command. The mission was moved from Air Force Special Operations Command in February. (See "Aerospace World: CSAR Mission Is On the Move—Again," April, p. 17.)

The Air Force has 101 Pave Hawks, first fielded in 1982, and wants to replace them with 141 CSAR-X airframes. USAF wants more aircraft to fully flesh out the needs of the air and space expeditionary forces and seeks to fix a long-standing low-density, high demand situation.

The CSAR-X replacement effort is one of the top five priorities of Air Force Chief of Staff Gen. T. Michael Moseley, who has said that it is "an ethical and a moral imperative to be able to pick our people up."

Lt. Col. Tim Healy, the Air Staff's special aircraft requirements deputy division chief, told reporters last December that the Air Force doesn't have enough assets to meet rotational requirements and that the harsh operational environments of the past several years have taken a toll on mission capable rates. Operating costs per flying hour for the Sikorsky Pave Hawk have also risen 16 percent over the last few years, and the type has been turning in only a 62 percent mission capable rate.

Competing for the program are Boeing, with the CH-47; Lockheed Martin with the US101; and Sikorsky, with the HH-92 Superhawk.

Valor Decorations

MSgt. David Halvorson of the 16th Helicopter Maintenance Squadron, Hurlburt Field, Fla., was awarded the Bronze Star in July for combat actions in Iraq from Aug. 13, 2003 to Dec. 3, 2003. According to the citation, Halvorson led 56 maintenance and supply personnel from his squadron in keeping four MH-53 Pave Low helicopters on 10-minute alert in Iraq, despite being under constant threat of mortar and rocket attack. All the while, the team worked out of the back of a truck, in extreme temperatures with limited resources and no maintenance facilities.

Also from the 16th HMXS, TSgt. Mark Skerrett and SSgt. Sean Allen received the Air Force Commendation Medal with valor. They received the decorations for actions while responding to a disabled helicopter in Southwest Asia while under enemy fire, resulting in the successful extraction of the helicopter. It was the third AFCM with valor for Skerrett.

TSgt. Ruben M. Vasquez, of the 36th Medical Operations Squadron at Andersen AFB, Guam, was awarded the Bronze Star in August for his meritorious service as a medical technician and military advisor in Iraq from November 2005 through May 2006. Vasquez was assigned to a military transition team, a small unit embedded with Iraqis to teach specialty skills and help set up medical capabilities.

First Lt. Kelly McGann from Charleston AFB, S.C., was awarded the Bronze Star in August for actions as the officer-in-charge of a multinational combat camera unit in Iraq from Nov. 24, 2005 to May 15, 2006. McGann was honored for his actions during an April 13, 2006 patrol near Mumandyia, Iraq, when a bomb exploded and engulfed the lead vehicle in a fire. McGann ran to the vehicle burning in a ravine and helped pull the injured driver and gunner from the wreckage and administered first aid—later helping provide covering fire for injured troops.

RAF Stealth Flying Expands

British pilots have flown both the B-2 Spirit stealth bomber and the F-22A Raptor fighter.

Royal Air Force Squadron Leader David Arthurton is the first foreign exchange pilot to fly the B-2. Arthurton, a veteran Tornado GR4 pilot flies with the 13th Expeditionary Bomb Squadron as part of the RAF Personnel Exchange Program.

Arthurton joined the 13th Bomb Squadron at Whiteman AFB, Mo., last year and deployed with other members of the unit as the 13th EBS at Andersen AFB, Guam, this summer.

Besides flying, Arthurton has performed other squadron chores at Whiteman, such as overseeing long-range scheduling, including several exercises such as Red Flag, and the 13th's deployment to Australia this summer.

In July, RAF Flight Lt. Dan Robinson completed flight training in the F-22A Raptor at Tyndall AFB, Fla., with the 43rd Fighter Squadron. As the first allied pilot to train on the fifth generation fighter, Robinson is now serving a three-year tour at Langley AFB, Va., with the 27th Fighter Squadron.

British pilots have been assigned to F-117 Nighthawk squadrons almost since that aircraft became operational in the early 1980s.

Saudis, Britain Close Fighter Deal

Saudi Arabia recently announced it will buy 72 Eurofighter Typhoons from

Three Missing World War II Airmen Identified

The Defense POW/Missing Personnel Office announced in August the identification of three airmen missing in action from World War II, and the return of their remains to their families for burial with full military honors.

The missing airmen were 2nd Lt. David J. Nelson of Chicago; TSgt. Henry F. Kortebein of Maspeth, N.Y.; and TSgt. Blake A. Treece Jr. of Marshall, Ark. All three were members of the Army Air Forces on Aug. 8, 1944 when their B-17G Flying Fortress departed an Allied air base in England to bomb targets near Caen, France. Witnesses saw the B-17 explode and crash after being struck by flak near the village of Lonlay L'Abbaye, south of Caen.

While German forces and French civilians living near the crash site recovered some of the crew's remains and buried them nearby, only six of the nine crew members were identified after US forces advanced. In 2002, a team from the Joint POW/MIA Accounting Command was informed that a French aircraft wreckage hunting organization had found a crash site near Lonlay L'Abbaye. The JPAC team excavated the site in July 2004, recovering human remains, effects, and crew materials.

Nelson, Kortebein, and Treece were buried along with group remains of their aircrew at Arlington National Cemetery in August.

Hill Air Force Base Workers Clamor for Early Outs

More than 760 people filed applications for voluntary early retirement from civilian posts at Hill AFB, Utah, on the first day the program was offered in July. The large number seeking to take advantage of the program—which offers a cash incentive for accepting an early out—indicates that Air Force Materiel Command may not have some of the severe financial problems next year it was worrying about.

In June, AFMC chief Gen. Bruce Carlson told reporters he expected his command would have to lose about 700 people as its share of Air Force-wide personnel reductions in Fiscal 2007. The incentives for early outs were to be the first way to address the situation.

But, Carlson said, "what if nobody volunteers?" That would be followed by an involuntary reduction in force, or RIF, which would take time to do properly and fairly, he said.

By that point, "now you're already probably at least halfway, maybe two-thirds of the way, into '07, and I don't have funding for any of those people in '07. So now I've got to pay the bill by taking money out of something else," Carlson said.

The strong response at Hill indicates that AFMC needn't worry so much about finding enough people to volunteer.

Hill's Personnel Director Andy Flowers told the *Hilltop Times* that the high number wasn't a surprise there, adding that officials had expected "hundreds of employees" would want to get in the line to time their decision to end their federal employment with the chance of some extra cash. The program provides up to $25,000 pretax incentive pay when employee service ends this month, if the eligibility criteria is met and the positions are not considered critical.

"Some very experienced employees will be permitted to leave our employments rolls, where others can't be let go because of mission requirements," Flowers said.

The response of the civil service employees doesn't mean AFMC is out of the woods, yet, Carlson noted.

"You don't just want to open the floodgates and say the first 700 people who make it through the door get a bonus and get to retire early. You may get the wrong 700 people that, if you let go, you absolutely couldn't make the command work." AFMC will continue to "target" certain groups, he said.

Britain in a deal worth nearly $19 billion. Half the money covers the aircraft; the other half covers weapons and parts.

The Typhoon is considered the second-best fighter in the world after the US F-22 Raptor. The F-35 Lightning II is also expected to be superior to the Typhoon, but it won't be available for export for another decade or so. The F-22 is restricted from export under current US law; that and the more near-term availability of the Typhoon were considered a big part of the reason for the Saudi selection of the Typhoon.

The F-35 and the French Rafale fighter were also in the competition.

The Saudi order marks the biggest export deal for the Eurofighter, which until now has only been purchased among the original program partners—Britain, Germany, Italy, and Spain—and Austria, which has bought 18 of the fighters. Cost growth and delays have plagued the development and production cycle.

Details of the deal were not immediately made public, but British government officials said Saudi Arabia might perform final assembly of some of the aircraft, among other "technology transfer" aspects of the deal.

Second F-35 Engine Has a Cost

If Congress insists that the Pentagon continue development of an alternative engine to power the F-35 Joint Strike Fighter, it will mean fewer F-35s are bought, Air Force Brig. Gen. Charles R. Davis, the new JSF program manager, said.

The Pentagon, in its last budget, killed the General Electric-Rolls Royce F136 engine, which was to compete with the Pratt & Whitney F135 to power JSFs. The money for F136 development came out of the JSF budget. Putting the F136 back in the program without adding funds—as Congress seemed inclined to do in the run-up to the House-Senate budget conference—would mean the program will have to pay for it some other way, Davis said in August.

"If the money comes out of JSF, we'll trade airplanes to pay for it," Davis told *Bloomberg News*. He said that somewhere between 50 and 100 aircraft out of the 2,500 planned for US use would have to be eliminated to cover the costs of developing the F136.

The JSF program office told *Air Force* Magazine that the cost of developing the F136 would be "approximately $2 billion" between Fiscal Years 2007 and 2013.

In a written response to a query, the program office said, "If the overall F-35 program budget is not increased by this amount, aircraft will need to be cut from the early production lots to fund the F136 effort."

Lockheed Suggests Pilotless F-35

Lockheed Martin has been working for more than two years on an unmanned version of the F-35, the company said in August. The aircraft could fly autonomously or be remotely piloted.

The news came from Frank Mauro, Lockheed Martin's director of unmanned aeronautical systems, who said in a National Press Club briefing that the concept is in its early stages, but will advance if the government shows interest. He said that a pilotless F-35 would leverage worldwide logistics and help to lower overall acquisition costs.

Rear Adm. Steven L. Enewold, who until July was the F-35 program manager, said that the F-35 has a "superb flight-control system" and "there's no reason you couldn't" make it into an unmanned system. However, he said that so much investment has been made in the cockpit of the aircraft—human interface, escape systems, displays—that it might be impractical to convert it to such a role.

The idea of using the F-35 as a UAV is not new. Retired Gen. Ronald R. Fogleman, former Air Force Chief of Staff, suggested in 1996 that later versions of the Joint Strike Fighter would probably be unmanned. (See "First Force," September 1996, p. 34.)

Mauro also provided background on the Lockheed Martin-funded Polecat UAV concept, which the company held out as a potential intelligence-surveillance-reconnaissance platform as well as a contender for the next long-range strike vehicle. The company unveiled

P-47 Ace "Herky" Green Dies in California

Retired Col. Herschel H. "Herky" Green, one of the top Army Air Forces fighter aces in World War II, died Aug. 16 in Torrance, Calif. He was 86. Green destroyed 18 aircraft in air-to-air combat. He was the top ace for Fifteenth Air Force as a fighter pilot in Europe and Africa from 1943 to 1944, flying the P-40, P-47, and P-51. He shot down his first aircraft in May 1943 near Italy, sustaining heavy damage in combat with enemy fighters.

Green went on to earn several decorations during his service, including the Distinguished Service Cross, the Silver Star, and two Distinguished Flying Crosses before being grounded after flying 100 combat missions. His exploits are detailed in his 1996 memoir, *Herky! The Memoirs of a Checkertail Ace*. He retired from the Air Force in 1964, after which he worked for Hughes Aircraft.

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the aircraft during the summer to show that it is fully engaged in the large UAV field, presently dominated by Northrop Grumman's Global Hawk, General Atomics' Predator, and the Boeing Navy Unmanned Combat Air System, or N-UCAS.

Travis Gets First C-17

Travis AFB, Calif., celebrated the arrival of its first C-17 Globemaster III on Aug. 8 with a ceremonial flyover. *Spirit of Solano,* named in honor of the base's surrounding community of Solano County, makes Travis the first and only mobility base to operate three of AMC's largest weapon systems: the C-5 Galaxy, KC-10 Extender, and C-17.

Twelve more C-17s will be delivered to the base and will be flown by the 301st and 21st Airlift Squadrons in airlift and aeromedical evacuation operations.

Mirrors, and then Smoke

The Air Force demonstrated the ability to bounce a laser off a mirror at long range and hit a target, in an experiment done recently.

The Aerospace Relay Mirror System demonstration, performed at Kirtland AFB, N.M., in conjunction with contractor Boeing, was done with a half-scale device and proved that such a system could be used to bounce ground-, air-, or sea-based lasers off high-altitude or orbiting mirrors toward a target, such as an ICBM. Extending the reach of lasers beyond line of sight opens up some new possibilities for future laser weapons.

During the Kirtland test, the ARMS hardware was suspended 100 feet off the ground by a crane, while testers fired a low-power ground laser from several miles away at one of the system's two 30-inch mirrors. The other mirror relayed the laser to a ground target two miles away from the relay.

Boeing has been working on the ARMS project for four years, under a $20 million Air Force contract. USAF plans to use the system to build a permanent test bed for relay technology development.

AFSOC Activates Intel Squadron

Air Force Special Operations Command stood up its first dedicated intelligence squadron Aug. 1 with the reactivation of the 11th Intelligence Squadron at Hurlburt Field, Fla.

The squadron's mission will be to process, analyze, and distribute information to commanders gathered by AFSOC's MQ-1 Predator unmanned aerial vehicles and other airborne intelligence-surveillance-reconnaissance sources.

AFSOC's first Predator squadron, the 3rd Special Operations Squadron at Creech AFB, Nev., stood up in October 2005. The two units will coordinate their activities to provide a unique method of gathering and distributing intelligence, unit officials said.

The squadron traces its heritage to World War II-era photo and reconnaissance units that became the 11th Reconnaissance Technical Squadron. The unit was inactive until its redesignation and activation as the 11th IS in August. It has 38 members; at full strength in 2008, it will have 135.

Despite Cuts, USAF Still Hiring

The Air Force may be in the process of cutting about 40,000 people from its ranks, but it's still hiring.

Next year's recruiting goal is 27,760 people, down nine percent from Fiscal 2006 goals. About a third of those slots—10,200—will be filled by people going to the security forces, maintenance, administration, and electronics fields, which are now undermanned (see "News Notes"). Another 5,540 slots are available in linguistics, aerospace maintenance, computer systems operations, fire protection, integrated

Index to Advertisers

The War on Terrorism

Operation Iraqi Freedom—Iraq

Casualties

By Sept. 15, a total of 2,676 Americans had died in Operation Iraqi Freedom. The total includes 2,669 troops and seven Department of Defense civilians. Of these deaths, 2,131 were killed in action with the enemy while 545 died in noncombat incidents.

There have been 20,113 troops wounded in action during OIF. This number includes 10,955 who returned to duty within 72 hours and 9,158 who were unable to return to duty quickly.

C-130 "Jackpot" Assists Convoys

A C-130 unit assigned to Balad AB, Iraq, is flying one of its Hercules aircraft over Iraq in a new mission—carrying a command and control suite to aid ground convoy commanders running supplies along the country's explosive-laden roads.

The new capability, provided by the 777th Expeditionary Airlift Squadron, is called the Joint Airborne Command and Control Command Post, or "Jackpot." Aircrews from Balad began flying the missions this summer, for several weeks without a break.

The operators of the Jackpot are from all branches of the military and are helping convoy operators manage information and pick out problems in advance.

Operation Enduring Freedom—Afghanistan

Casualties

By Sept. 15, a total of 333 Americans had died in Operation Enduring Freedom, in and around Afghanistan. This number includes 178 troops and one Department of Defense civilian employee killed in action and 155 who died in nonhostile incidents such as accidents.

A total of 931 personnel have been wounded in OEF. That number includes 355 who were wounded and were able to return to duty within three days and 576 who were not.

Warthogs Surge in Afghanistan

The A-10 Warthogs of the 455th Air Expeditionary Wing at Bagram AB, Afghanistan, have been surging this summer. In two major ground offensives, A-10s have pushed enemy forces out into the open and made short work of them.

"There have been numerous occasions where our troops have been taking heavy fire and we show up, and either our presence ends the engagement or we employ against enemy positions and end the engagement," said Col. Tony Johnson, the 455th Expeditionary Operations Group commander.

Operations Mountain Lion and Mountain Thrust helped flush Taliban extremists out of their hiding places, exposing them to coalition forces on the ground who have called in A-10s on numerous occasions to provide close air support.

On Aug. 22, Air Force A-10s and Royal Air Force GR7s helped provide close air support to coalition troops in contact with enemy forces near Kandahar. Warthogs and GR7s responded with CAS, expending a Paveway II bomb that NATO officials said killed 11 insurgents.

Summer of 66 for the 347th RQW

The 347th Rescue Wing from Moody AFB, Ga., racked up an impressive record in their summer Afghanistan deployment, saving 66 people from potentially fatal injuries between June 1 and Aug. 4, wing officials said. Another 56 were saved from serious injuries in the same time frame. The group has a wide variety of missions in its Operation Enduring Freedom portfolio, performing aeromedical evacuations, flying emergency medical supplies to forward locations, and rescuing downed helicopter pilots.

The unit is deactivating this month. (See "Pope's A-10s Off to Moody," p. 17.)

avionics systems, vehicle operations, munitions systems, tactical aircraft maintenance, air traffic control operations, fuels, explosive ordnance disposal, aerospace propulsion, aircraft loading, and operations intelligence.

Career fields that the Air Force Personnel Center classifies as "hot" include air and ground linguists and special tactics areas such as pararescuemen, survival instructors, and combat controllers. The Air Force is also looking for 482 college graduates to fill out its officer corps, most for the pilot, combat systems officer, air battle management, and electrical engineering fields.

ANG Dedicates New Intel Center

A ribbon-cutting was held Aug. 16 to open the Air National Guard's newest and largest intelligence center at McConnell AFB, Kan.

The $7.4 million center is home to the ANG's 161st Intelligence Operations Group. The unit is already providing intelligence support for deployed forces, but with the new 22,000 square-foot facility up and running, the unit's imagery processing and battlefield support capabilities are multiplied.

Sen. Pat Roberts (R-Kan.), chairman of the Select Committee on Intelligence, Sen. Sam Brownback (R-Kan.), Rep. Todd Tiahrt (R-Kan.), ANG director Lt. Gen. Craig R. McKinley, and Lt. Gen. Stephen G. Wood, deputy chief of staff for strategic plans and programs, attended the ceremony.

Hobbins Eyes Russian Airpower

Gen. William T. Hobbins, chief of US Air Forces in Europe, in August toured military facilities in Russia, taking up an invitation from Russian officials to fly in two-seat models of the frontline Su-27 Flanker and MiG-29 Fulcrum fighters.

Hobbins flew in the aircraft from Lipetsk Air Base. After the flights, he told reporters, "It's obvious the aircraft are meticulously maintained. ... These are very good airplanes, and I'm flying with skilled masters."

Those "masters" were Gen. Col. Aleksandr Zelin, the deputy commander in chief of the Russian Federation Air Force, and Gen. Maj. Aleksandr Kharchevskiy, chief of the 4th Center for Combat Use and Flight Training. The two generals visited USAFE in 2003, where they each got F-15E rides, prompting the reciprocal invitation from Russia.

Brig. Gen. Daniel R. Eagle, the US defense attache to Russia, said the aim of the visit was to improve cooperation in the Global War on Terror by building better mutual understanding of tactics, techniques, and procedures. He said he hoped the visit would lead to further dialogue and training opportunities. Hobbins visited other facilities and towns, as well.

Pope's A-10s Off to Moody

The A-10s stationed at Pope AFB, N.C., have begun relocating to Moody AFB, Ga., in implementation of Base Realignment and Closure decisions. The transition is expected to be complete by the middle of 2007.

The move is intended to streamline combat search and rescue operations by locating A-10s with Moody's rescue aircraft. Warthogs are woven into the fabric of rescue operations, since their primary mission is close air support; they are often used to escort HH-60 Pave Hawk helicopters and HC-130s during rescue operations.

In addition to the 23rd Fighter Group from Pope, Moody will get six A-10s from Alaska's 355th Fighter Squadron at Eielson Air Force Base, and from the Connecticut Air National Guard's 118th Fighter Squadron.

To preserve the heritage of the 23rd Fighter Group—which stretches back to Lt. Gen. Claire Lee Chennault's Flying Tigers of World War II—the 347th Rescue Wing combat search and rescue unit will deactivate this month and be replaced with the 23rd Wing, headquartered at Moody and adopting

the banner of the Flying Tigers. The wing will retain the rescue mission.

The 347th RQW is currently the only active duty combat search and rescue wing in the Air Force, but more units and missions are scheduled to fall under the 23rd Wing in the future.

Talon I Ends Active Service

The first MC-130E Combat Talon serving with the 8th Special Operations Squadron completed one of its last active duty missions July 14, on its return from a deployment to Southwest Asia.

The aircraft's return to Duke Field, Fla., was greeted by distinguished visitors, crew family members, and 8th SOS commander Lt. Col. Ted Corallo. "It's served the nation well after 41 years of active duty service," Corallo said of the 1960s-vintage aircraft. The modified C-130 is not retiring; it will continue to serve with the Air Force Reserve.

The 8th SOS and the Talon I have a long history in Air Force special operations—going back to the assault on the North Vietnamese Son Tay prisoner of war camp in 1970. The Talon I also took part in the 1980 Desert One rescue attempt in Iran, flew Gen. Manuel Noriega back to the US after Operation Just Cause in 1989-90, and flew missions in Operations Desert Storm, Assured Response, and Southern Watch.

Along with support operations in Afghanistan, Iraq, and South America in 2005, Talon I was the first aircraft to land at the New Orleans Airport after Hurricane Katrina had devastated the city.

The unit began its transition to the CV-22 Osprey in August, when the 8th SOS began moving from Duke Field to nearby Hurlburt.

Canadian Soldier Killed in Friendly Fire Incident

One Canadian soldier was killed and about 30 wounded on Sept. 4 in a "friendly fire" incident in Afghanistan.

According to NATO officials, USAF A-10 Warthogs strafed a group of Canadian troops camped in an open area in Kandahar Province. Close air support had been requested by another Canadian unit in the area. The incident followed several days of fighting in which Canadians were engaging Taliban forces as part of Operation Medusa.

The Canadian contingent belonged to the International Security Assistance Force, other elements of which provided immediate medical assistance. The 30 wounded troops did not have critical injuries, NATO reported. The military operation against the Taliban forces continued.

An investigation into the incident was launched by the US, NATO, and Canadian forces.

Turkey Seeks Advanced F-16s

Turkey wants to buy 30 F-16 Block 52s to replace some of its aging F-4E Phantoms, Turkish government officials said in August.

The buy would be a stopgap measure to keep the Turkish fighter fleet fresh until the Ankara government decides on a more advanced aircraft. It is considering the F-35 and the Eurofighter Typhoon. Turkey is partnered with the US on development of the F-35, but is under no obligation to buy the fighter.

The announcement seemed to indicate that a plan to have Israel update 48 of Turkey's F-4Es has been dropped or reduced. Turkey already fields 217 F-16s, some purchased and some license-built by Tusas Aerospace Industries in Turkey.

Turkish officials said they hope to reach a deal by the end of the year. The 30 F-16s would be worth about $1.5 billion.

Greece, Turkey's longtime sparring partner and NATO ally, signed a deal in 2005 to purchase 30 Block 52 F-16s, which will arrive in 2009. (See "Aerospace World: Greek Deal Extends F-16 Line," February, p. 21.) ■

Senior Staff Changes

RETIREMENTS: Brig. Gen. Rosanne **Bailey,** Lt. Gen. George P. **Taylor Jr.**

CHANGES: Brig. Gen. Brooks L. **Bash,** from Cmdr., 15th EMTF, AMC, Travis AFB, Calif., to Dir., Combat & Info. Ops., STRATCOM, Offutt AFB, Neb. ... Maj. Gen. Irving L. **Halter Jr.,** from Vice Supt., USAFA, Colo., to Cmdr., 19th AF, AETC, Randolph AFB, Tex. ... Maj. Gen. Marc E. **Rogers,** from Cmdr., 19th AF, AETC, Randolph AFB, Tex., to Vice Cmdr., USAFE, Ramstein AB, Germany ... Brig. Gen. (sel.) Marvin T. **Smoot Jr.,** from Spec. Asst. for Gen. Officer & Flag Officer Matters, Jt. Staff, Pentagon, to Dir., Manpower, Orgn., & Resources, DCS, Manpower & Personnel, USAF, Pentagon ... Brig. Gen. Mark E. **Stearns,** from Dir., Strategy, Policy, & Plans, SOUTHCOM, Miami, to Cmdr., 15th EMTF, AMC, Travis AFB, Calif.

SENIOR EXECUTIVE STAFF RETIREMENTS: Dennis J. **Cassette,** Joseph G. **Diamond,** Thomas J. **Robillard.**

SES CHANGES: James B. **Engle,** to Dir., Defense Armaments, Communications-Electronics & Investments Div., US Mission to NATO, Brussels, Belgium ... Neil A. **Rohan,** to Dir., Plans, Programs, Rqmts., & Assessments, AFRC, Robins AFB, Ga. ■

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News Notes

■ The Air Force expected to meet or exceed its recruiting goals for Fiscal 2006—the seventh straight year it has done so. The Air Force Personnel Center announced Aug. 17 that 25,654 people had enlisted in the Air Force and entered active duty in FY06. The force was on pace to send 30,750 airmen to basic training and technical schools to fill slots in more than 150 career fields.

■ Unmanned aerial vehicles in USAF service hit two major milestones this summer. The Global Hawk surveillance system passed 10,000 flight hours in June and had added another 500 hours by late July. More than 63 percent of the flying time was spent on combat support missions. The figures were announced by the Air Force Aeronautical Systems Center at Wright-Patterson AFB, Ohio. The Predator MQ-1 system achieved the 200,000 hour mark in August, 75 percent of that time in nearly 11,000 combat missions.

■ The 100th F-22 Raptor fuselage went into production in Seattle in August, Boeing announced. The aft fuselage component, housing the fighter's two F119 engines, is scheduled for delivery this month to prime contractor Lockheed Martin, which had delivered 76 Raptors to USAF as of Aug. 8.

■ Raytheon delivered the first next generation active electronically scanned array (AESA) radar for the F-15C to Boeing ahead of schedule, the company announced in August. The delivery in late June followed a successful flight test on the APG-63(V)3 AESA radar, where it exceeded all performance expectations in air-to-air modes in flight. The new radars provide increased situational awareness for Air Force and Air National Guard F-15s. More test flights are scheduled for Eglin AFB, Fla., this fall.

■ Air Force leaders signed a portion of the Air Force Memorial during a visit to the construction site in Arlington, Va., on Aug. 3. Gen. T. Michael Moseley, Chief of Staff, and CMSAF Rodney J. McKinley both signed a stainless steel segment that is now on top of the tallest of the three spires that comprise the memorial. Moseley and McKinley were given a tour of the area by retired Maj. Gen. Edward F. Grillo Jr., president of the Air Force Memorial Foundation. The memorial will be dedicated and opened to the public this month.

■ Boeing received a $780 million contract in August as the first payment toward providing four C-17 Globemaster III transports to the Royal Australian Air Force. The deal is part of a foreign military sales agreement announced July 31. The first airplane is scheduled for delivery in November and the last is scheduled for February 2008.

■ To attract more dentists to a USAF career, the service is expanding programs such as special pays and bonuses, as well as scholarship incentives. The Health Professions Scholarship Program is being offered to anyone who has a bachelor's degree and is selected for dental school. The Air Force has been struggling to recruit sufficient numbers of dentists for nearly a decade. The goal is to recruit about 150 new dental officers a year, but only about 120 make it in. Only 35 percent of dentists remain in USAF after their initial service commitment is up. (See "Action in Congress: Medical Recruiting Incentives," September, p. 34.)

■ Air Force Reserve Command's aerial spray unit flew out to the California coast in August to participate in an oil spill response exercise. The 910th Airlift Wing from Youngstown-Warren Arpt./ARS, Ohio, participated in Exercise Safe Seas 2006 in the Gulf of the Farallones and Monterey Bay. There the unit worked with participants from the National Oceanic and Atmospheric Administration, the Coast Guard, California's Office of Spill Prevention and Response, and the Department of the Interior. The unit deployed a C-130 that conducted several passes to simulate dropping an oil dispersal material.

■ A six-person team from Ramstein Air Base's 24th Intelligence Squadron in Germany and an eight-person team from the 1st Combat Communications Squadron deployed to Niger in July for an Eagle Vision mission. The airmen collected satellite imagery for map-making purposes and to spread some goodwill. Squadron members distributed donated soccer balls to children in villages and bought 1,000 pounds of rice for residents of Karadje.

■ A bearing assembly failure caused the crash of an F-16 in March, Air Combat Command announced in August. The crash, in an area close to Carrington Island in Utah's Great Salt Lake, ocurred when the No. 4 bearing assembly in the engine failed, causing a compressor stall. There was then inadequate thrust to sustain flight. The pilot ejected successfully, but the aircraft, assigned to the 388th Fighter Wing, Hill AFB, Utah, was destroyed on impact.

■ As part of an effort to provide services more effectively, Air Force officials plan to move 170 civilian personnel from various locations to the Air Force Personnel Center at Randolph AFB, Tex., the service announced in August. Of the positions to move, 135 will come from Air Force Materiel Command's four interim personnel centers—at Hill AFB, Utah, Robins AFB, Ga., Tinker AFB, Okla., and Wright-Patterson AFB, Ohio. Bolling AFB, D.C., will also realign some positions. The shift will centralize a number of functions; it will be accomplished by Fiscal 2011.

■ The north runway at Ramstein AB, Germany, is undergoing a $20 million, three-phase construction plan that will extend the airstrip 1,000 feet to allow heavier air transports to take off at maximum payload. The construction began in April and should be complete by Jan. 1, 2007, a Ramstein project official said. When complete, the runway will stretch nearly 10,000 feet and will be used by the 86th Airlift Wing and the 723rd Air Mobility Squadron. ■

USAF photo by TSgt. Jeffrey Allen

An F-16 of the 80th Fighter Squadron, Kunsan AB, South Korea, fires an AIM-9 Sidewinder as part of a weapons system evaluation program for fighters assigned to the Northwest Asian base.

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Action in Congress

By Tom Philpott, Contributing Editor

Who's the Guard Boss?; Predators Get Pushed Out; More on Survivor Benefit Plan ....

"Hands Off Guard," Warn Govs

Congress got an earful from state governors of both parties who blasted a House provision in the 2007 defense authorization bill giving the President emergency powers to federalize the National Guard without a governor's consent.

The National Governors Association, in a letter to the House and Senate Armed Services Committees, urged conferees working on a final compromise defense bill to reject a House provision allowing the President to take control of National Guard in the event of "a serious natural or manmade disaster, accident, or catastrophe that occurs in the United States, its territories and possessions, or Puerto Rico."

The Aug. 1 letter to committee chairmen and ranking members notes that the House doesn't define what constitutes a "serious" disaster. The letter also argues that when the issue is one of national security, and state government becomes incapacitated, the President already has authority to take control of a state's National Guard under the "insurrection act."

The governors, however, clearly oppose any action by the federal government to pre-empt their authority when natural disasters occur.

"We are responsible for the safety and welfare of our citizens and are in the best position to coordinate all resources to prepare for, respond to, and recover from disasters. When federal aid is needed, it should be coordinated by the governors," the state leaders advised lawmakers.

The letter said the governors "feel very strongly about protecting [their] constitutional responsibility." Therefore conferees should "drop this provision" from the bill, the letter urged. No such provision appeared in the Senate version of the bill.

The letter was signed by Arkansas Gov. Mike Huckabee (R), who was then NGA's chairman; Arizona Gov. Janet Napolitano (D), NGA's current chairman; and every other US governor. Huckabee told reporters that the House plan "violates 200 years of American history" and continues a pattern by the federal government of trying to turn states into mere satellites controlled by Washington, D.C.

Lending Practices Probed ...

In a matter of increasing interest to Capitol Hill, a Pentagon study confirms the growing prevalence of predatory loan practices aimed at service members. The study also endorsed a Senate-passed initiative that would help protect service members from commercial debt traps.

While 11 states have toughened laws against abusive loans, the study found most have done little to discourage payday lenders from exploiting cash-strapped troops with costly loans. The steady incomes of service personnel make them prime targets.

Short-term lenders typically offer loans in return for access to paychecks, car titles, or income tax refunds. The risk of default is low with guaranteed military incomes—but predatory lenders count on service members being unable to easily repay the loans.

In passing its version of the Fiscal 2007 defense authorization bill, the Senate agreed to an amendment from Sen. Jim Talent (R-Mo.) and Sen. Bill Nelson (D-Fla.) to strengthen safeguards against abusive loans for military personnel. The legislation would cap annual interest rates at no more than 36 percent and would require lenders to present service members with a clear explanation of loan rates and terms. (See "Action in Congress: Payday Lenders Under Fire," September, p. 35.)

A House-Senate conference committee was to decide whether to include the Senate initiative in a final version of the defense bill.

... and Case Study Presented

The DOD study cited the experience of an Air Force E-4 who got a $500 payday loan that she agreed to pay back in two weeks—plus an interest payment of $100. Unfortunately, the senior airman took out another payday loan to cover the first and then took out multiple rollovers on each.

Finally, to pay off the loans, she sought help from an installment loan company. That company loaned her $10,000, at a 50 percent annual interest rate. Her total cost finally to pay off the pair of payday loans was $12,750, and the total obligation on the installment loan was $15,000—all from borrowing an initial $500.

The Pentagon report endorses the 36 percent interest rate cap voted by the Senate as well as a requirement that loan terms be unambiguous.

It also recommends that lenders be prohibited from requiring as part of loan contracts that service members waive their right to take legal action against lenders or to waive any special legal protections otherwise given them by law, and that states be prohibited from allowing lenders to charge nonresident military members higher loan rates than state residents pay.

The report found that the average payday loan to service members was $350. Interest rates ranged from 390 to 780 percent per year.

Service Education Efforts

The services strive to educate their younger members on managing their money and brief them on alternatives to payday loans, including loans available from military relief agencies such as the Air Force Aid Society, Army Emergency Relief, and Navy-Marine Corps Relief Society.

But short-term loan companies are ubiquitous in communities surrounding military bases. The number of payday lenders outside the gate has almost tripled since 1999, from 8,000 to 23,000. They also are increasingly effective at pushing their loan products to service people via the Internet.

Citing the DOD report's finding that lenders target "service members to make a quick buck at the expense of their livelihood and future," Talent

urged conferees to support the Senate provisions.

"Our military families deserve better," added Nelson. "This report once again shows us the need to protect our service men and women from unscrupulous lenders."

The Military Coalition, an umbrella organization for three dozen service organizations including the Air Force Association, joined with consumer groups to draw the attention of conferees to support the initiative.

Working the other side is the Consumer Credit Research Foundation, a lobbying group for the financial services industry including payday lenders. The CCRF released a report in June claiming payday lending problems are exaggerated and that "fewer than 13 percent" of military enlisted members had taken out a payday loan in the last year.

The DOD study cited CCRF's own findings. CCRF found that 75 percent of non-payday borrowers and 74 percent of payday borrowers felt the government should limit interest rates—even if it means fewer service people will be able to get credit.

Survivor Benefit Plan Pressure

House-Senate conferees shaping a final defense authorization bill are feeling heat from a lot of directions this year, including widows of disabled military retirees and their advocates.

Sen. Chuck Hagel (R-Neb.) and Sen. Bill Nelson (D-Fla.) urged conferees not to compromise away two Senate-passed changes to the military's Survivor Benefit Plan.

One would end a reduction in benefit plan payments that occurs when survivors of disabled military retirees begin drawing tax-free VA Dependency and Indemnity Compensation.

Another would accelerate the effective date of the SBP paid-up rule by two years (to Oct. 1, 2006) for retirees who are 70 years old and who have been paying premiums for at least 30 years. (See "Action in Congress: Top Conference Items," August, p. 24.)

The House did not act on these proposals.

Military Coalition Concerns

The Military Coalition, in its own letter to conferees, highlighted several key provisions it wants the lawmakers to embrace. The supported compensation improvements include:

- A House-backed military pay raise of 2.7 percent, rather than the 2.2 percent raise that is sought by the Administration and endorsed by the Senate.
- The call by the House to expand the premium-based Tricare Reserve Select program to any drilling reservist.
- Full concurrent receipt, retroactive to Jan. 1, 2005, for retirees with 20 or more years of service who are rated "unemployable" by Veterans Affairs. This provision was endorsed only in the Senate version of the bill.

Recruiting Violations Increase

A new Government Accountability Office report finds that allegations and service-identified incidents of military recruiter wrongdoing increased from 4,400 cases to 6,600 cases from 2004 to 2005.

Substantiated cases of misconduct rose from just over 400 to almost 630 cases, and criminal violations more than doubled from just over 30 to almost 70 cases.

More worrisome for the Defense Department, the report found, is that the services don't have procedures in place to monitor recruiting violations effectively.

DOD doesn't require the services to keep and report data on recruiter irregularities, nor has it set criteria for characterizing irregularities. This makes it difficult to compare and analyze data across services and limits DOD's ability to judge when corrective action is needed. ■

The and

Artist's conception by Erik Simonsen

Finally, after years of study, controversy, changes of course, and shifts of timetables, plans for a new Air Force long-range strike aircraft—a bomber—have come into focus. The goal: Have a powerful new system on the ramp and operational no later than the year 2018.

The plan was endorsed earlier this year as part of the Pentagon's latest Quadrennial Defense Review. The new schedule is ambitious, and the Air Force already has launched a full-speed development effort to meet it. Officials say the deadline leaves the service with no time for delay.

The precise system that will emerge from the development effort is not known or knowable. Air Force leaders say it could be manned, unmanned, or "optionally manned."

The "2018 bomber" is but one part—the middle part—of a much broader long-range strike modernization program.

First comes the strengthening of existing aircraft. The Air Force will continue to fly many of its B-1, B-2, and B-52 bombers for decades to come, as each platform offers a unique set of strike capabilities. Planned improvements should keep these aircraft combat-ready into the 2030s.

Last will be the fielding, around 2035, of a true "next generation" long-range strike weapon. This may be a traditional bomber or an exotic "system of systems," with features such as hypersonic speed.

The QDR codified Air Force plans that had shifted several times in recent years. In 1999, USAF released a controversial "bomber roadmap" that put off fielding a new LRS system until 2037. (See "The Bomber Roadmap," June 1999, p. 30.)

In 2004, the Air Force abandoned this plan and advocated a multiphase approach. The goal was to field an advanced new bomber sometime between

2018 Bomber Its Friends

USAF is pushing a three-phase bomber plan, but the next new bomber is the centerpiece.

By Adam J. Hebert, Senior Editor

2025 and 2030. This futuristic system was to be supplemented by an "interim" system with a fielding date between 2015 and 2018. (See "Long-Range Strike in a Hurry," November 2004, p. 26.)

The Air Force in 2004 sent out a request for information to industry, seeking to learn what would be possible.

"Interim" No More

Two years later, what is needed from the medium- and long-term LRS programs is better defined, as are the target dates. And what was once considered an "interim" system is now expected to fill a major mission gap.

Unlike any of today's bombers, the 2018 aircraft should be able to operate for extended periods in hostile airspace, day or night. This aircraft will help the Air Force meet QDR goals that call for "increasing [USAF] long-range strike capabilities by 50 percent and the penetrating component ... by a factor of five by 2025."

Why the new urgency? There was a "congruence of a few different elements" that led to the 2018 date, reports Maj. Gen. David M. Edgington, director of global power programs in the Air Force acquisition office. He said that the QDR validated 2018 as the target date partly based on "the intelligence estimates coming on board" concerning likely future threats.

"We have requirements from the combatant commanders, which we fully embrace and intend to meet, and a changing threat environment," Edgington said.

"The one key thing" needed in the new bomber is "to be able to strike targets in near-real time," said Edgington. This requires "persistent presence over the battlefield."

The current bomber fleet lacks survivability, especially during daylight hours, he noted. USAF has only 16

Bomber Upgrades Are Meeting Urgent Needs

Although much of the Air Force's future long-range strike efforts are focused on developing capabilities that will be fielded 12 or more years in the future, some new capabilities have been quickly put into service aboard today's bombers.

In response to "urgent need requests" from US Central Command, 500-pound Joint Direct Attack Munitions were recently rushed into service for the bomber fleet, said Col. Roy Cleland of the Air Force's global power acquisition office.

Similarly, based on lessons learned in Operation Enduring Freedom, there was a request to integrate advanced line-of-sight targeting pods on the B-52.

The B-52 required "buddy lasing" to attack with laser guided bombs, but targeting pods enable the bomber to lase its own targets, also improving battle damage assessment. The Litening II pod was found most suitable for the task.

Existing AGM-142 Have Nap interfaces were used with the Litening pods, and qualification took about a month. The first B-52s had their Litening pods installed in early 2004.

"Rapid acquisition and integration efforts" such as these help maximize the utility of the bombers by meeting those "quick needs," Cleland said.

combat-coded B-2 stealth bombers, and they are designed to attack at night. These systems may be "invisible" to radars and other sensors, but they are readily visible to the human eye.

"Any of the three [existing bombers] ... has the range to be persistent today, but you can't persist, day and night, in an anti-access type environment," noted Col. Roy Cleland, chief of the power projection division in AQ's global power directorate.

Future threats are driving the program, but there is also a recapitalization angle. The youngest Air Force B-52s already are 44 years old and are planned to remain in service for decades more. The B-1s were built during the Reagan Administration.

As these aircraft continue to age, they may unexpectedly break. USAF is already dealing with a wide range of obsolescence issues—many parts are no longer being made.

Further, the Congressional Budget Office estimated that aircraft operation and maintenance costs increase by an average of two percent for every year their average age increases. "For the Air Force, those figures could translate into an increase of $80 million to $230 million" in annual O&M costs, CBO wrote in 2001.

Enough Study, Already

More than 20 long-range strike studies have been conducted in recent years. In 2004, Maj. Gen. Stephen M. Goldfein, who was then USAF's requirements director on the Air Staff, said "it became clear that enough studying had probably been done," and it was time to move forward on a new LRS system.

The profusion of studies identified several "desired capabilities" for the 2018 platform, spanning from the obvious (long range) to the surprising (self-defending).

Some of the features considered desirable are: flexible payload, to include precision and nuclear weapons; high survivability through defensive systems and stealth; global situational awareness; and the ability to operate autonomously.

"Self-defending" is a desire for the bomber to "have as much of an autonomous survivability capability as [is] practical, against a wide range of advanced threats," an Air Force spokeswoman explained. For example, an LRS aircraft carrying air-to-air missiles has "enhanced survivability" against enemy fighters.

The bomber will rely on technology considered mature enough to be fielded in 2018. The Air Force is looking for capabilities that will be at Technology Readiness Level 6 by January 2009. TRL 6 means a system model or prototype has been demonstrated in a relevant environment, while January 2009 is when the program is expected to have its Milestone B approval—the official Pentagon go-ahead for system development.

Variable geometry (swing wings) and supersonic dash capability are possibilities for the new system. Stealthy low observable characteristics are a must.

Unmanned operation is an intriguing possibility. There are benefits to removing the aircrew, but "I think it would be a showstopper for the Air Force if we cannot prove refueling capability" of an unmanned bomber, Edgington said, because gaining the required range and loiter time requires refueling. Nonetheless, even though this capability is still unproved, "we might be able to clear that [hurdle], so the manned-unmanned piece, or, quite frankly, optionally manned, is something we are excited about."

The schedule seems viable if the Air Force pursues a full "mil-power" acquisition effort, Edgington said in an interview. There is nothing "magic" about the date, but the QDR and Gen. T. Michael Moseley, Chief of Staff, have "endorsed 2018 as the mark."

USAF needs to "commit to a path ahead," Edgington said, and Air Combat Command is in the midst of an analysis of alternatives that will determine what is possible by 2018.

Photo by Richard VanderMeulen

A B-1B releases flares and ordnance. The Air Force has a wide range of modernization programs on the books for its three existing bombers, many of which could still be in service long after a new long-range system is fielded in 2018.

Photo by Clive Bennett

This B-52 is one of 94 still in USAF's inventory. The Air Force wants to trim its B-52 fleet to 56, making it more economical. Congress has resisted such moves in the past.

The study will, in March 2007, recommend the best alternative for providing the long-range strike capability, said Lt. Col. Kevin Shorb, AOA director at Langley AFB, Va. What is needed is a "responsive, high volume, long-range aircraft," Shorb said, and the AOA will make specific recommendations.

Lt. Col. Tony Siler, chief of ACC's ground dominance team, added that although the current bombers are very capable, future battlefields will be "more hostile." The AOA is also evaluating various weapons improvements and upgrades that could trickle down to the legacy bombers.

The Coming Lockdown

The acquisition community is waiting for the results of the AOA, Edgington said, and "we're going to have to have very rapid progress" once the study is complete. "That means locking down some requirements and being able to go out to industry with ... the request for proposal" later in 2007.

There is certainly no shortage of options. Another CBO report, released this March, evaluated several LRS alternatives and found tremendous variance in cost and capability.

- Converting C-17s into missile-carrying "arsenal aircraft" is a cost-effective way to increase LRS capabilities, but the mother ships themselves would be slow and vulnerable.
- A long-range supersonic bomber is appealing, but CBO estimates a notional program of 150 aircraft would cost $912 million per aircraft—more than double any of the other alternatives.
- A 150-aircraft fleet of subsonic bombers is estimated to cost $409 million each, but would offer capability similar to the arsenal aircraft and the existing B-2. A benefit of this approach, however, is that it would promise better access in high-threat areas and during daylight hours.

CBO also evaluated possible medium-range bombers, such as the FB-22, and found them much less expensive than the LRS alternatives. Their shorter range, however, means that "medium-range bombers alone could not replace all of the capabilities of heavy bombers."

A decision needs to be made, and the clock is ticking. John J. Young Jr., director of defense research and engineering, recently told reporters that waiting to formulate requirements for the bomber could push developmental funding out of the 2008 budget request and essentially delay the program by a year. Coming forward with some basic requirements now could smooth funding—and development—he said.

The Air Force is fully aware of the schedule crunch. The program is going to have to stay on "an extremely aggressive schedule" through the AOA, the system design and development phase, and the test program, said Edgington. It will require that "all key decision points are met on time. ... We are rapidly approaching the point where we've got to have information to make budgeting decisions and some commitments."

The Air Force has been in constant contact with Boeing, Lockheed Martin, and Northrop Grumman. "The three major aircraft manufacturers that we deal with all the time are all exploring the new concepts," Edgington said. Information from the contractors in response to the 2004 RFI continues to come in.

The Air Force plans on spending at least $1.6 billion through 2011 to begin developing the next generation bomber.

Fewer, but Better

In 2001, the Air Force proposed retiring a portion of the B-1B fleet and necking down Lancer operations from five bases to two, all to help pay for improvements to the remaining B-1s. After much back and forth with Congress, the fleet was reduced from 93 B-1s to today's inventory of 67.

The Air Force would like to use a similar approach with the B-52. The QDR weighed in on this issue as well, saying DOD plans to "reduce the B-52 force to 56 aircraft and use savings to fully modernize B-52s, B-1s, and B-2s to support global strike operations."

The Air Force's assessment is that the 56 B-52s are "adequate to meet the combatant commanders' needs," Edgington said. The issue had not been resolved in August, but if approved by Congress, the drawdown would take place over two years. The first 18 B-52s would be retired in 2007, the other 20 in 2008.

Smaller but similar reductions have been proposed many times in the past. Since 1997, the Air Force has annually tried to retire 17 B-52s. Congress blocks the move every year, adding funding to keep a larger fleet of attrition reserve aircraft. Of the 94 BUFFs, only 44 are combat coded and one is on permanent loan to NASA.

There are "alternate interpretations or understandings of the combat capability that the B-52 brings. It's a viable weapons system," Edgington said, describing the debate. "Well, the more the better is one interpretation, ... but we've got combatant commander requirements that say 'this is the number of targets we need to strike ... and this is the survivability you need.'"

The Air Force can meet the military requirements with 56 B-52s, Edgington said, but Congress is highly reluctant

to draw down the fleet with no other bombers in or near production. Retiring the 38 aircraft would save taxpayers $680 million through 2011.

The current long-range strike inventory has a full slate of modifications and improvements in the budget, and each of the three existing bombers offers something unique.

The venerable B-52 carries the largest variety of weapons, including various cruise missiles, and offers the highest reliability of the three bomber types. The B-1 can perform high-speed, low-level attacks and, with three weapons bays, can attack with the heaviest and most flexible weapons payload. The stealthy B-2 is capable of taking out the most heavily defended targets with precision weapons, 5,000-pound bunker busters, or nuclear bombs.

These aircraft remain busy, regularly deploying to provide global combat power over Afghanistan, Iraq, and in deployments to Guam in the western Pacific Ocean.

Photo by Clive Bennett

The Air Force has 67 B-1Bs such as this one from the 28th Bomb Squadron, Dyess AFB, Tex. B-1B reliability and combat performance has improved since a decision to reduce fleet size and fully fund B-1 modernization programs.

Still Spry

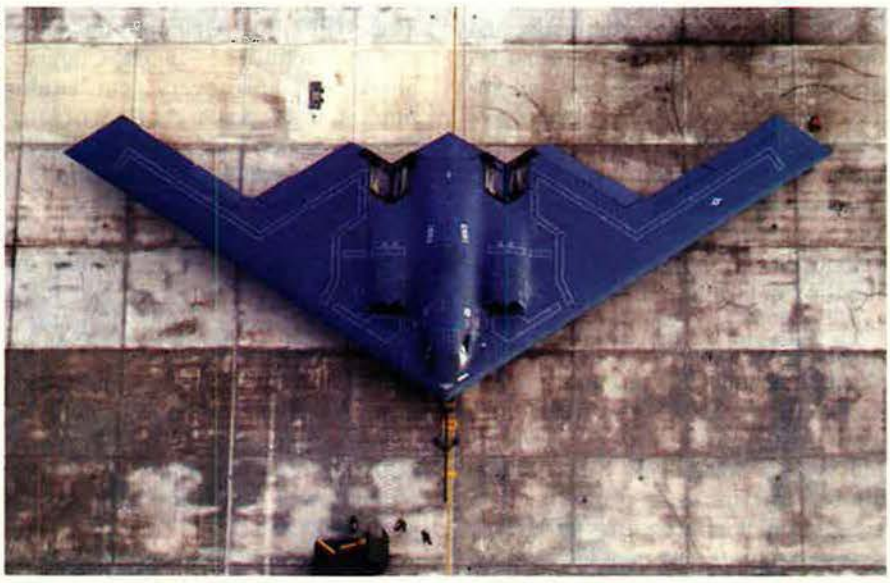
Despite their advancing age and some parts obsolescence issues, the bomber fleet remains healthy. "I think we've invested in the right areas, and all those areas are funded to avoid grounding-type scenarios," said Edgington.

The B-52H, more than 40 years old, is barely halfway through its estimated lifespan. The average B-52 has approximately 16,000 flying hours, and "the aircraft is good to over 28,000 hours, so we're only over half of what we could potentially milk out of that airplane," the two-star said.

The B-1, meanwhile, is "only a third of the way through what we consider to be its lifetime, and the B-2 is still a toddler, in terms of overall life."

The Air Force "can't make a B-52 stealthy, but you can keep it viable," Edgington observed.

For the B-52, ongoing modifications focus on resolving some "electronic countermeasures [ECM] issues" in the ALQ-172 ECM system, Edgington said. "We're seeing parts obsolescence issues in the spares, so we're replacing those." The modifications will come through 2007, and the improvement program is expected to decrease ECM failures sixfold.



USAF photo by SSgt. Bonnie J. Davis III

The stealthy B-2 would perform "Day 1" wartime missions. Each B-2 (such as this one deployed to Andersen AFB, Guam) is a precious asset.

B-52 avionics also need work. Some navigation system spare parts will run out next year, so the Avionics Midlife Improvement program is replacing the inertial navigation system, aircraft computers, and data transfer unit. Work continues through 2008.

The Air Force is also improving the BUFF's firepower with new weapons and connectivity. An updated weapons interface unit will solve yet another parts obsolescence issue.

Longer term, the Combat Network Communications Technology (CONECT) program will enable rapid retasking of advanced weapons and cruise missiles, add extremely high frequency satellite communications, and modify the Link 16 data link. CONECT will not be complete until 2018.

The B-1 suffered from numerous developmental and reliability problems in 2001, when the decision was made to shrink and reinvest in the fleet. Although the bomber has redeemed itself in recent operations, there are still several potential grounding items that the Air Force is working to fix.

"There's one issue on the radar that's been our primary focus—changing out some of the obsolescent parts and finding the right spares," Edgington said. The radar component upgrade will be complete in 2013 and will replace obsolete parts and enable additional upgrades.

The B-1's onboard diagnostics computer, which maintenance personnel rely on to know what needs to be fixed, is being updated.

The inertial navigation system is another potential grounding item, and

a replacement ring laser gyroscope system with embedded GPS will improve navigation accuracy and reliability. The navigation system modification will be complete by 2011.

Not all the work being done on the B-1 is to mitigate problems. A fully integrated data link will be in place by 2016, adding Link 16 and beyond line-of-sight communication to the bomber. This will automate weapons retargeting by passing target data directly to onboard weapons.

This targeting capability will speed up the B-1's targeting flexibility. "J-series" weapons can be retargeted in flight today, Cleland noted, but this is done by the time-consuming "fat finger" method—an operator manually punches in new coordinates for each individual weapon.

The B-1 is also the threshold weapons system for the extended range Joint Air-to-Surface Standoff Missile, a 500-mile range variant of the stealthy JASSM cruise missile. The Air Force is "very excited to get JASSM-ER on the platforms that don't have stealth," said Edgington.

How Stealthy Is Stealth?

As the only LO bomber, the B-2 has a unique difficulty—simply staying mission capable. "With any stealth platform, you're going to have some challenges," said Edgington. The B-2's inability to meet mission capability goals has been driven by "high requirements for LO maintenance." Simply taking off and "having an airworthy platform that can go drop bombs is not mission capable for an LO platform," he said.

A B-2 is not considered mission capable unless it can meet "Day 1 of the war" requirements, where the B-2 is "absolutely critical to take down strategic systems or the eyes and ears of the enemy. You're going to have to have a pristine, perfect LO platform."

USAF may not need that same degree of stealthiness later in a campaign, after enemy defenses have been ground down, but the Air Force measures "solely to a mission capable rate," Edgington said. The fleet posted a 30.5 percent MC rate in 2005.

The Alternate High Frequency Material program is attacking the root cause of the low MC rates—the extensive maintenance and "cure times" for the B-2's stealth coatings. Any time a B-2 access panel is opened, it must be resealed. For most B-2s, this requires tape and caulk that can take 20 hours to cure. AHFM is replacing 3,000 feet of tape and caulk with a "spray on" stealth coating that dries in less than an hour.

Artist's conception by Erik Simonsen

USAF plans to field a true next generation long-range strike weapon (seen here in an artist's conception) in 2035. The "exotic" bomber may be a traditional bomber or a system of systems with capabilities such as hypersonic speed.

Although only five AHFM bombers had been delivered to Whiteman AFB, Mo., by August, the Air Force reports that those aircraft require 64 percent fewer LO maintenance man-hours per flying hour.

This represents "a whole generational leap in LO technologies," Edgington said. AHFM "probably increases [by] eight to 12 percent" the B-2 mission capable rates, as those jet aircraft spend much less time sitting and curing in non-MC status.

"The most capable aircraft" are available to the combatant commander at all times, Edgington added.

The B-2s are being converted to AHFM coatings as they go through depot maintenance at Northrop Grumman's Palmdale, Calif., facility, at a rate of three per year. The entire fleet will be converted by 2012.

Also in progress is a radar modernization that "is required for the B-2 because of some frequency conflicts that we've had," Edgington explained. By 2012, the B-2's radars will move off a frequency where they are secondary users and upgrade to an active electronically scanned array (AESA) system. The first test flight of the B-2's AESA radar took place this summer.

The stealth bombers have also recently completed installation of a smart bomb rack assembly that allows the aircraft to deliver 80 independently targetable 500-pound Joint Direct Attack Munitions.

Here to Eternity?

The B-1, B-2, and B-52 will be around for a long time. Previous service life estimates postulated that the B-1 airframes could remain in service until 2038; the B-2s until approximately 2040; and the B-52s until 2044. Even with a new bomber fielded in 2018, USAF's inventory of long-range strike assets could still suddenly drop off in about 30 years, making the third phase of LRS modernization important even today.

Although officials will not rule anything out, some capabilities are unlikely to reach TRL 6 in time to be used on the 2018 bomber. These developing technologies include hypersonic speed, wing morphing, exoatmospheric flight, and tactical directed energy weapons—lasers.

If a given technology is desirable but deemed too immature for fielding in 2018, "it kicks forward to the 2035 platform, which is still out there," said Cleland.

(Some desirable LRS improvements identified in the AOA could also be pushed into the "Phase I" modifications that are planned for the current fleet.)

The Air Force is therefore continuing the science and research efforts to develop revolutionary LRS capabilities. The service has budgeted $275 million between Fiscal 2008 and 2011 to help develop advanced LRS technologies because a hypersonic bomber or exoatmospheric missile could have a major payoff in 30-some years. ■

Where Next With Elect

USAF photo by SrA. Brian Ferguson

Air Force Capt. Matthew Polus pre-flights a Navy EA-6B Prowler. USAF crews have been flying Prowlers since 1999, but will lose their ride in the next few years.

USAF's roadmap, years in the making, has collapsed. The service is struggling to find a new course.

On the Pentagon's so-called "stoplight" briefing slides—where red is bad, yellow is fair, and green is good—many aspects of the airborne electronic attack mission are a deep, deep red.

The AEA mission—after a decade of turmoil in which plans have been started, stopped, restarted, and halted again—is still being sorted out. In the meantime, the threat has gotten worse. The world has seen a proliferation of new integrated air defense systems, such as Russia's S-400, with its unprecedented detection and missile ranges and better processing.

In many cases, such systems have wound up in the hands of America's biggest adversaries.

The purpose of AEA systems is to disrupt or blind enemy air defenses, mainly by pounding them with intense bursts of radar energy. An adversary's radar screen is bathed in electronic noise and blips that prevent him from knowing for sure which ones are US aircraft and which ones are electronic artifacts or decoys.

Stealth aircraft have been able to slip past adversary radars unseen. However, nonstealthy "legacy" aircraft have to be protected by jamming. Moreover, against the newer threat systems, even stealth aircraft will need protection, Air Force and Navy experts agree.

In August, the Air Force was struggling to reconstruct its AEA plans, which were undone late last year by budget and policy decisions. The Air Force canceled its central AEA program, the B-52 Standoff Jammer, because costs had grown and the program was no longer affordable.

In addition, the Air Force's share of the Joint Unmanned Combat Air System was terminated by top Pentagon leadership, and what was left was given over to the Navy. The Air Force had planned to use J-UCAS for a variety of roles, one of them as a radar jammer loitering directly over enemy air defenses. (See "Washington Watch," March, p. 12.)

All Fall Down

It is no exaggeration to say that the Air Force AEA roadmap, which was years in the making, virtually collapsed.

After the cuts, Air Force planners went to work almost immediately, trying to rebuild the AEA program and

ronic Attack?

By John A. Tirpak, Executive Editor

find alternate solutions. However, by mid-August, they had not yet settled on a final workable scheme.

Moreover, they didn't have their new plan ready in time for inclusion in USAF's Fiscal 2008 program objective memorandum, the requirements and resources plan that serves as the basis for the next budget request, which was due to the Office of the Secretary of Defense Aug. 15.

Missing that deadline threatens to delay any new start efforts until Fiscal 2009 or later.

Pressure was mounting on the Air Force to define its plan because a top-level Pentagon study that was due in September was supposed to identify options for the joint AEA "system of systems." The Air Force wanted to have its own plan in place, rationalized against its other requirements, rather than possibly be handed one from higher up. That might require drastic changes elsewhere in the overall USAF budget.

The Air Force faces a hard deadline for bringing on new operational AEA capability. Since 1999, it has been sharing the Navy's four-seat EA-6B Prowler escort jammer aircraft, but the Prowler fleet begins retiring in 2009, to be replaced by the Navy's new escort jammer, the EA-18G Growler, a variant of the F/A-18F Super Hornet. The Growler has only two seats and is slated to completely replace the EA-6B in 2012.

For some time, plans have called for USAF by then to be out of the Navy's program and fielding its own system.

Boeing photo by Peter George

The airborne electronic attack business comprises five primary disciplines, each taking the action progressively closer to the target.

The first is standoff jamming. Aircraft loiter outside the range of enemy missiles while sending out powerful waves of long-bandwidth energy at an entire region of enemy territory.

Second comes the use of escort jammers. They go in closer, flying alongside or near strike aircraft during their journey in hostile airspace. These fighter-type aircraft are equipped with pods that generate intense energy to saturate enemy radar receivers and blind them to the exact whereabouts of the US strikers.

Third, the attack aircraft themselves would use either external pods or internal electronic countermeasures systems to generate self-protection jamming as they near the target. New active electronically scanned array radars, or AESAs, have great power and huge potential to do some jamming and precisely identify and locate threat radars. Towed decoys also play in the self-protection ring.

Fourth, "stand-in" AEA comprises any systems designed to defeat enemy radars at practically point-blank range. Flying decoys and drones fit in this mission, which is considered too risky for manned aircraft.

Based on the 2001 analysis of alternatives, the last is relatively new: cyber-attack. The Air Force believes that it can use network attacks to trick enemy radars into turning off or presenting false information to their operators. Gen. John P. Jumper, the recently retired Air Force Chief of Staff, described the basic idea as

US Navy photo by Randy Hepp

Top, the EA-18G takes off on its first flight on Aug. 15. Above, how the Growler looks with its ALQ-99 jamming pods and weapons. The EA-18G is the only new airborne electronic attack system that is funded and in production.

Photo by Clive Bennett

The Air Force is going back to the drawing board with the B-52 Standoff Jammer. The service will have to exercise iron discipline in keeping the new SOJ focused on essential functions, lest mission creep and cost doom it like the first version.

causing an enemy radar to think it's a washing machine and go into the rinse cycle.

Basket of Options

By mid-July Air Force planners had delivered to Gen. T. Michael Moseley, the USAF Chief of Staff, a number of AEA options.

The options were "kind of what you'd expect," said Col. Rick Rankin, head of the electronic and cyber-warfare office of the Air Force's requirements directorate. "We're looking at the B-52, we're looking at the EC-130, and we're also looking at the F-15E," Rankin reported.

Moseley killed the B-52 Standoff Jammer last winter because it had become a victim of "mission creep." In April, Moseley said the SOJ had started out as performing "a very narrow slice" of the SOJ requirement—at a cost of about $1 billion—and ended up weighed down with a myriad of extra missions, driving the cost of the program over $7 billion.

"We couldn't afford it," Moseley told a symposium on Capitol Hill in April. He added that the Air Force, hewing to its policy of seeking the "desired effect" rather than concentrating on the platform that creates them, would not prejudge what the replacement system should be.

In August, though, the B-52 SOJ was back in the lineup of AEA solutions but slimmed down considerably. The original plan called for up to 76 B-52s to be equipped with the internal gear necessary for the SOJ mission and 36 sets of 30-foot-long jamming pods—two per airplane—that would be fitted on the outer wings.

Rankin said the B-52 SOJ project could be restored but with fewer aircraft, fewer pods, and reduced capability than the system as it stood when it was canceled.

"The Chief has already told us that it has to be affordable and it has to be smart," Rankin said. However, the requirement to have at least initial operational capability by 2012 still stands, despite the delays.

The in-service date is not an impossible goal, though, because of technical advancements.

"A year has passed, so some of the technology development that we were concerned about, to put on this platform—the cost of that development has actually gone down," Rankin noted. The Air Force Research Lab has "come up with some solutions that, a year ago, we didn't have. So that helps." He said that Air Combat Command and Air Force Materiel Command were looking at ways to come up with a variant that the service could fill by 2012 that would be affordable during the future years defense program.

Prowler, Growler, and ...

Another option being considered is to use the F-15E in the role of escort jammer, not unlike the role performed by the Navy's EA-6B Prowler and, soon, the EA-18G Growler.

The Air Force contacted the Navy during the summer about sharing the ALQ-99 jamming pods that are now carried by the EA-6B and will also be used by the EA-18G, according to Navy Capt. Steven Kochman, co-lead of the EA-18 program.

Kochman said "there are enough" of the pods that "it might be possible" to let the Air Force use some of them. However, the idea had not been fleshed out with thorough study. The pods cannot simply be hung on a bomb rack and start functioning; the hosting aircraft must be equipped with the processors, displays, and software necessary to operate them.

An industry official familiar with the concept said the cost to outfit F-15Es for the escort jamming mission "would not be trivial." Boeing did some research on such an idea a few years ago, but it didn't gain much traction with the Air Force.

The F-15E concept would not be an alternative to the B-52 SOJ, but complementary. Rankin emphasized that "there's no golden BB" that will solve the AEA mission with a single platform. It is very much a "system of systems" with room for all services to contribute.

Kochman said in a press conference in August that the EA-18G is optimized for the escort jammer role, is not suited for the stand-in mission, and would be ill-used as a standoff system.

"If you can do ... escort, you want to do ... escort," Kochman said. A standoff system requires "something with longer persistence; you need an aircraft that's larger." The Growler, he said, "doesn't really have the persistence ... [or] as much size and power" as is needed for the standoff role.

At one time, the Air Force considered converting some F-15Cs, many of which will be retired in the coming years, into electronic warfare platforms. However, the only fighter option being seriously looked at by USAF is the F-15E.

Not only is the F-15E newer, with a more modern avionics system, but the presence of a second crew member is considered necessary, Rankin reported.

"You're talking about a Prowler with four seats going to a Growler with two seats, to [an F-15C] model with one seat: That's an awful lot to ask of a young captain, to be doing air-to-air intercept and worry about protecting other forces and then also be responsible for electronic attack."

F-15E crews, by contrast, are accus-

tomed to the penetration mission, the electronic aspect, and the teamwork involved.

Out of Vogue

The Air Force will not consider either a specialized B-52 or F-15E to do the jamming mission. In fact, the term "EB-52," once the vogue for referring to the SOJ bomber, has been banned because it suggests a capability that is separate from the rest of the force. The reason is that small, specialized capabilities swiftly become low-density, high-demand assets, with all the problems that status entails.

"When you have [a] small fleet ... dedicated to a particular type of mission, they have training issues, ... logistics issues, ... operational concerns, ... and they're [deployed] 200, 300-plus days a year," Rankin pointed out.

Requirements officials believe the Air Force should "use these things multimission and multiplatform. It just makes more ... sense."

The B-52H equipped with SOJ would still be called a B-52H, Rankin said. "It's just a matter of how the crews are trained" that would distinguish the jammer versions from the regular models.

The EC-130 Compass Call is a Hercules fitted with special antennas and pods to jam enemy communications. Rankin said the Air Force may study a counter-radar mission for the aircraft, as well. Changes would be made to the massive Spear (special emitter array) pods under the wings, which would be modified with new equipment.

For the standoff mission, the Air Force will continue working with the Navy until 2012 on the EA-6B, doing escort jamming. Air Force crews have been stationed at the Navy's Whidbey Island, Wash., Prowler base and have been flying with Navy crews since 1999. These airmen—many of whom came from F-15E, B-52, and Compass Call—would likely form the core of a new generation of Air Force airborne electronic attack specialists.

The Navy plans to build 90 EF-18G Growlers to replace the 120 EA-6Bs now in the inventory. The smaller number reflects the fact that the Navy has shrunk the size of its carrier fleet and air wings. The first Growler rolled out at the Boeing plant in St. Louis in August, and Navy managers reported the program as being on schedule and under budget. In fact, the software for the aircraft is so well along that the program manager, Navy Capt. Donald Gaddis, said the schedule for software test was being moved "to the left"—in other words, accelerated.

Gaddis said the EA-18G improves on the EA-6B by being more precise in locating and jamming threat radars and offering the new capability of allowing aircraft near the Growler to communicate with each other. When the EA-6B is jamming, it also jams friendly communications. The Growler has an Interference Cancellation System that will allow friendly aircraft to communicate in its vicinity.

The Growler program was started just three years ago, and its overall cost is expected to be $9 billion, for a unit cost of $100 million per aircraft.

GAO Meddling

Reacting to a Government Accountability Office report claiming that the Navy could go slower on the EA-18G program by making some upgrades to EA-6B, the Senate cut the Growler program to just four aircraft in Fiscal 2008; the matter was headed for the House-Senate conference. Gaddis, however, said he didn't need more time, and the Navy might have some serious trouble if it was obliged to extend the Prowler and slow the EA-18G.

The Navy plans to get all its Growlers by 2014. It will fund work on a next generation jamming pod for the aircraft in the 2010 POM.

A planned upgrade of the Growler will be to integrate its AEA systems with its APG-79 active electronically scanned array radar, which is also being fitted on newer F/A-18Es and Fs. The AESA radar, by virtue of its high-resolution synthetic aperture mapping, can be used to precisely locate enemy radar emitters, the better to target them for jamming or attack with anti-radiation missiles.

The advent of the AESA has also provided a welcome complication to the overall airborne electronic attack scheme, because similar radars are on the F-22 and will be on the F-35, as well. Officials from both services are mum about what those radars are really capable of, but radar industry officials have suggested they can generate enough power to fry the circuits of some radars, or possibly cancel them out by broadcasting an inverse radar waveform. Moreover, both aircraft have been designed to be highly network-centric, able to receive and transmit vast amounts of data, even when in their most stealthy mode.

The role of the F-22 and F-35 is "pretty much the heart of the debate that we're in right now," Rankin reported.

"There's some debate as to how survivable they are in a certain threat scenario, so we're looking at that right now." He said that modeling and simulation efforts have been under way since January to determine the proper trade-off between "how many F-22s, ... F-35s, how much B-52 SOJ support or EC-130 support." Rankin said the capabilities of the F-22's inherent electronic countermeasures are "very good for what they're programmed for—and again, all part of the system of systems; we intend on using them as well."

Although USAF looked at buying some F-22s as dedicated jammers, it discarded that idea to, again, avoid creating an oversubscribed asset that could never be bought in sufficient numbers to meet demand.

Marine Corps Commandant Gen.

USAF photo by MSgt. Joe Cupido

This F-16 carries an ALQ-131 self-protection jamming pod mounted on the centerline. Such pods will get hardware and software updates, but there's no indication they will ever be an option for legacy attack aircraft.

USAF photo

The EC-130 Compass Call specializes in jamming enemy communications, but USAF may add an anti-radar function. The Air Force insists that meeting the AEA mission does not create new low-density, high demand assets.

Michael W. Hagee said in February that the F-35 has "tremendous EA capability and would be a much more powerful jammer aircraft than the EA-18G Growler." However, he also said there needs to be "a discussion" about how the services should divvy up the AEA mission. The Marine Corps opted out of the EA-18 program and put its money into the F-35.

Now, an "EA-35"?

Lockheed Martin, which builds the F-22 and F-35, has done some preliminary study of the concept of an escort jammer based on the Joint Strike Fighter.

"There was a concept that was looked at when the Marine Corps was faced with looking at a stand-alone jammer," said Tom Burbage, Lockheed Martin vice president for the F-35 program, in July.

The company considered a two-seat version. "Would you even need to?" said Burbage. "You probably don't. But does it make any sense to put these big pods underneath an airplane that's supposed to be stealthy? And how much inherent capability is there in the airplane already, to do the ... mission?"

He said that "nobody has come back and asked us to do any follow-on work, so there's no program going on right now ... targeted at an EA-35." In the future, after the F-35 starts to build up in inventory, it may be possible for tactics to change and the stealth aircraft to do AEA "cooperatively," thanks to their network centricity, without the need for large standoff jammers at all. However, he said the F-35 will not have sufficient energy to do "high-power, broadband" jamming such as that envisioned for the B-52 SOJ.

The Air Force got rid of its own escort jamming and dedicated suppression of enemy air defenses aircraft—the EF-111 and the F-4G—in the 1990s partly because it expected the fielding of stealth aircraft as a large proportion of the overall fleet would sharply reduce the need for such jamming aircraft by the mid-2000s.

However, the B-2 bomber was coupled with EA-6Bs during Operation Allied Force in Kosovo in 1999 and took advantage of the Prowler's jamming capabilities. The F-22 and F-35 may need some jamming support, as well.

"It depends on who you're talking about that we're going against," an Air Force official said. In "certain scenarios, they're fine. Other scenarios, we think they may not be. And I'm not going to say which ones are which. The stealthy platforms are very good against certain types of radars and they're not very good against others."

Gaddis said that the Navy opted to take a "balanced approach" to stealth, electronic warfare, network-centric operations, weapons signature, and "vulnerability reductions" when it began mapping out its Super Hornet and EA-18G programs. The result was "a very effective carrier air wing against a very robust IADS," or integrated air defense system.

"That was our story," he said, adding, "That is still a good story."

Seeking Balance

Obviously there's a need for stealthy platforms like F-22 and JSF, Gaddis said. But he said the Navy is still seeking the right way to "optimize" the balance between the stealth aircraft and the nonstealthy F/A-18E/F. "That's ... being studied right now, at least on the Navy side: Between how many Super Hornets and how many JSFs do we need?"

However, he asserted that the JSF will still need some jamming in certain circumstances.

"I don't foresee folks going in alone and unafraid," he said. "I would venture to say that there will be plans put in place where you'll need Growlers. Whether it's the [F/A-18] E/F, first day of the war, or F-35. I am positive of it. ... From what I've seen, the Growler is going to be jamming for everybody that's out there."

Self-protection systems such as the ALQ-131 pod and the ALE-50 towed decoy work very well against certain kinds of threats, Rankin said, but they, too, will need constant improvements because "in the future, the threat is going to become ... farther out, stronger, more integrated."

He added that other programs have priority because "you have to get there" before an aircraft can use self-protection measures.

For the stand-in aspect of the mission, the Air Force has only one system at the moment: the Miniature Air-Launched Decoy. The MALD is a smallish missile that emulates the radar signatures of other aircraft and, it is hoped, will draw the fire of enemy air defenses. It is not recoverable or reusable, so the Air Force is laboring to keep the cost of the system down. The service is also looking at a variant, called the MALD-J for jammer, that would fly over threat radars directly and jam them at the source. A warhead could also possibly be added to give the decoy a direct-attack capability.

The Air Force might still want to use a recoverable unmanned aerial vehicle for the stand-in role, Rankin said.

"We know that we can use them, ... and we're pretty comfortable with using them" he noted.

The Air Force is hoping that it will be able to work the system of systems concept of AEA with the Navy. Rankin explained the many starts and stops of the plan as being the result of "so many different components and pieces and parts. ... It gets very complex. ... It's just a matter of what we can afford and what kind of risk will we assume if we don't have all the pieces together." ■

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A Better Way to Run a War

By James A. Kitfield

Above, Air Force Gen. David Jones, Chairman of the Joint Chiefs of Staff, who set out to change US military organization after the failure of the Desert One mission in Iran. At right, Jones with Sen. Barry Goldwater, who helped push through legislation that would revolutionize joint operations.

Two decades ago this year, Goldwater-Nichols unleashed fundamental change.

When US military forces attacked the insurgent stronghold of Fallujah in Iraq in November 2004, the action featured some of the heaviest urban fighting Americans had seen since Vietnam. The operation was led by Marine Corps light infantry, backed up by Army armored brigades and Iraqi infantry. Air Force, Navy, and Marine Corps warplanes mounted devastating air attacks. After a fierce battle, the insurgents and affiliated terrorists were routed, and the city was retaken.

Such joint operations have become standard these days. Yet there was a time when truly cooperative ventures seemed beyond the capacity of US armed forces.

In April 1980, US commanders brought together in a patch of Iranian desert the ill-fated Desert One task force, troops that had never trained together. Marine Corps helicopter pilots, Air Force C-130 crews, and Army Special Forces were cobbled together for a mission to rescue 52 US hostages held in Tehran.

The result was a historic debacle that ended with eight dead American servicemen and fiery wreckage in the desert.

Three years later came Operation Urgent Fury, a mission to rescue US students on the island of Grenada. The operation, though successful, was characterized by a muddled chain of command and squabbling among the branches. The dark humor among the participants was that the island simply wasn't big enough for all the US services.

The pivot for the Defense Department's transformation from service competition in the field to relatively well-synchronized operations was the 1986 Goldwater-Nichols Act, considered by some to be the most successful military reform measure of the past half-century.

Two Decades On

With the Goldwater-Nichols Act turning 20 this year, and with US joint task forces engaged in Afghanistan, Iraq, and other hot spots, it is worth recalling how a Congressionally imposed reform that the Pentagon vigorously resisted

fundamentally reshaped the US military into the force it is today.

"The two most transformational events of my career were the advent of the all-volunteer military [in 1973] and the Goldwater-Nichols reforms," Adm. Edmund P. Giambastiani Jr., vice chairman of the Joint Chiefs of Staff, said in an interview.

What is interesting about both of those fundamental changes "is that neither had anything to do with weapons or technology, and neither was supported by most senior military leaders at the time," Giambastiani said. The Pentagon leadership "had to be brought along kicking and screaming. Yet virtually no one in the uniformed leadership today would like to go back" to the draft era or the days before Goldwater-Nichols.

That is certainly true of the draft, but less so of the jointness changes. Although the Goldwater-Nichols legislation has become somewhat of an untouchable sacred cow in Washington, it still is possible to find thoughtful officers who are critical. They do not necessarily pine for the old days, but they worry that the urge to be joint has unnecessarily weakened the armed services, which, after all, are the chief creators of military power and the keepers of much of the operational art.

Some also worry that the legislation has aggrandized the Secretary of Defense and a small group of civilians, while more or less shunting aside the advice of the armed services.

For all that, one hears mostly positive assessments, such as this one from one of that era's key players—John J. Hamre.

"I think Goldwater-Nichols has been far more successful than any of us anticipated, because we didn't really appreciate just how revolutionary the changes were going to be," said Hamre, a staff member of the Senate Armed Services Committee in the 1980s and deputy Secretary of Defense in the 1990s.

As the Pentagon's No. 2 official, Hamre (now president of the Center for Strategic and International Studies) saw firsthand how the legislation fundamentally rewired the Pentagon, shifted the balance of power within the defense establishment, and reoriented service cultures.

Three seemingly small, relatively simple changes, he said, turned out to be extraordinarily powerful change agents for the US armed services and Department of Defense.

"The centerpiece was elevating the Chairman of the Joint Chiefs by making him alone the principal military advisor to the Secretary of Defense and the President and also giving him a vice chairman and sole control of the Joint Staff," said Hamre.

The second change was making joint-duty assignments mandatory for promotion to general officer rank.

The third major factor was elevating the joint theater commanders to positions of authority over the service component commanders for operations.

"Those three changes were the meat and potatoes of Goldwater-Nichols, and most everything else was parsley on the plate," Hamre said.

Botched Operations

Asked what inspired a Republican-controlled Senate Armed Services Committee to take on Ronald Reagan's Administration, the service Chiefs, and a powerful Pentagon bureaucracy, Hamre had a ready answer—the two botched rescue operations.

"What infused the debate and instigated the reforms were Desert One in Iran and the Grenada invasion," he said. "There was a growing perception among military reformers and Congress that the armed services couldn't work together in the field. A number of the most defense-oriented members of Congress kept standing up and pointing out these military failures."

Tension between services goes back at least to the Spanish-American War, when the Army and Navy had to deploy and fight as a team in an expeditionary force. The internecine fighting that ensued was so contentious that the Army commander refused to even allow the

Associated Press photos

Top, an American C-130 was destroyed in the ill-fated 1980 Desert One mission to rescue US hostages held in Iran. Above, rescue operations take place after the October 1983 terrorist bombing of a Marine Corps barracks in Beirut.

Associated Press photo

US Marines deploy during Operation Urgent Fury in October 1983. The invasion of Grenada featured a muddled chain of command and squabbling among the services.

Navy to be represented at Spain's formal surrender.

The World War II Joint Chiefs of Staff began meeting regularly in 1942, but, even then, the military effort was split into separate theaters that were fought largely along service lines.

After the war, service desires impeded attempts to unify air, sea, and land forces under a centralized national military establishment. The Navy, historically independent and autonomous around the world, steadfastly resisted any attempt to allow others command of its fleets. The Marine Corps fought unification with equal vigor. The Army Air Forces, though not opposed to unification, pressed to become an independent service. Only the land Army gave its unreserved support.

The National Security Act of 1947 was a compromise. It created a separate Air Force, formalized the Office of the Joint Chiefs of Staff, and provided a civilian Secretary to exercise overall supervision of the armed forces.

Rather than producing a truly unified military establishment, however, the 1947 act essentially created a loose confederation with a weak Secretary at the top. Predictably, the massive service bureaucracies came to dominate everything of import: the JCS system, the unified commands, and (with frequent support from Congress), the civilian Pentagon leader.

The way the American military organized itself for war evolved slowly after 1947. The biggest and most important change came about in 1958, when President Dwight D. Eisenhower, the revered Allied leader of World War II, pushed bold legislation that removed the military departments from the operational chain of command. Thereafter, the services would be limited to so-called "organize, train, and equip" functions. (See "American Chieftains," September 2002, p. 102.)

This step was a pivotal moment. After the Eisenhower reforms, operational military direction would bypass the service leaders and run from the President through the Secretary of Defense and the corporate Joint Chiefs of Staff and down to the unified commands themselves. The role of the service Chiefs became that of advisors, as a body, to the President.

Lighting the Fuse

The organization structure saw little change for two decades. Then came the failed Iranian mission. Desert One became the watershed event. An extremely high risk operation that might have failed even under the best conditions, the mission collapsed after a series of mishaps and equipment failures, capped off with a deadly accident during a refueling stop. An RH-53D helicopter, maneuvering in blacked-out, dust-storm conditions, crashed into an Air Force C-130. (See "Desert One," January 1999, p. 60.)

Many observers saw written in the blackened sands of the desert a microcosm of what ailed the US military. Problems included an inability for the services to operate in harmony as a team, interservice communications snafus, nonexistent joint training, and a lack of clear command authority.

Air Force Gen. David C. Jones, then Chairman of the Joint Chiefs of Staff, had overseen the mission and then watched it collapse from his vantage point in the "tank" at the Pentagon. Jones was roundly criticized for presiding over a fiasco, and he soon set out on a mission to change US military organization.

As Jones perceived things, virtually any reform that threatened the prerogatives of the individual services would get watered down for the sake of unanimity. It was, he opined, next to impossible to make progress toward a more "joint" structure. Jones had argued to no avail, for instance, for establishment of a joint-service transportation command to coordinate mobilization and deployment of forces, especially in times of crisis.

Reform was favored by one other Chief, Gen. Edward C. Meyer of the Army. The Desert One debacle convinced Meyer that the Pentagon needed a multiservice command for the nation's special operations forces and systems. He thought they should train and operate together and report directly to the JCS. Such a unified special operations command threatened to shift power away from the services, which opposed the idea.

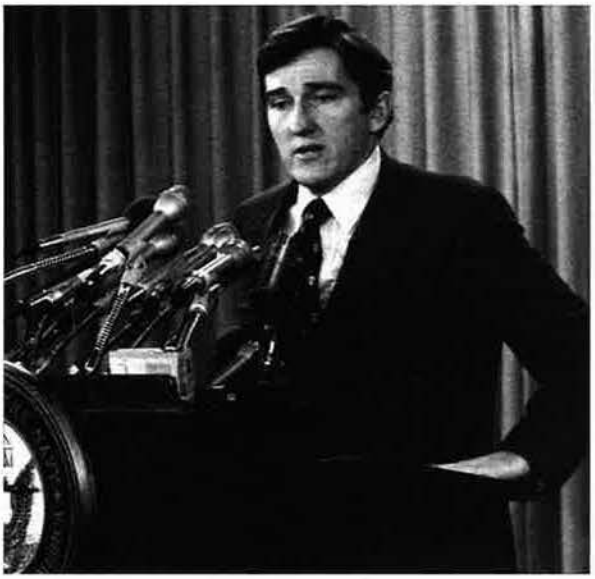
After Desert One, Jones and Meyer began speaking out for reform. By publicly criticizing in the strongest terms the very organization and system they headed, Jones and Meyer became the pebbles that started the avalanche that resulted in Goldwater-Nichols.

Shortly after Desert One, Jones commissioned a special study group to look into the issue of joint reform. It found that joint culture was anathema to the services. Less than two percent of the officers who served on the Joint Staff, for instance, had any "joint" experience at all. At the time, the Joint Staff's J-3—the principal joint operations officer—was a three-star general who had spent most of his career in the Army's air defense branch and thus knew little about even the other Army branches, let alone the other services.

Joint Staff duty was regarded as a career killer, so the average tenure on the staff for flag officers was only about one year. That, Jones told lawmakers, was analogous to having a Congress made up entirely of freshmen legislators.

Heavy Hitters

Despite a series of supportive Congressional hearings and think-tank studies, Jones' proposed reforms were easily diverted by opponents in the Pentagon



Secretary of the Navy John Lehman Jr. was one of many prominent defense officials who opposed the legislation.

and the armed services as well as their allies on Capitol Hill.

And the opposition was formidable indeed. Most prominent were Secretary of Defense Caspar W. Weinberger and Secretary of the Navy John F. Lehman Jr. They were joined by all five members of the Joint Chiefs of Staff, including the highly respected Army Gen. John W. Vessey Jr., who replaced Jones as the JCS Chairman. Their backers included some of the most senior defense legislators in Congress.

In October 1983, however, reformers were handed another cudgel with which to attack the traditionalists.

On Oct. 23, Hezbollah, the Lebanese Shiite militia, carried out a devastating terrorist bombing of a Beirut barracks used by US and French military peacekeepers, an act resulting in deaths of 241 US servicemen, mostly marines.

Investigations revealed a familiar litany of military shortcomings. And once again, the most glaring deficiencies were a muddled chain of command and the continued inability of the services to work together as a coherent team.

Those same shortcomings cropped up again two days later in Operation Urgent Fury, the Grenada invasion that began on Oct. 25. Army officers aboard the US Navy flagship *Guam* nearly came to blows over the initial refusal of Marine Corps pilots to fly them ashore at a critical point in the operation. Meanwhile, Army Rangers on the island were pinned down under enemy fire because they were unable to call in naval fire support.

As it turned out, no Army representatives had attended naval planning sessions prior to the operation—the Army Rangers did not know the procedures or communications channels needed to call in naval fire support. Even if they did, their radios couldn't talk to the Navy's radios, anyway.

Urgent Fury gave new impetus to calls for fundamental defense reform and helped win over some key figures on Capitol Hill. At the top of the list were Sen. Barry M. Goldwater (R-Ariz.) and Rep. William F. Nichols (D-Ala.). Eventually, they and their allies in Congress were able to wear down the resistance mounted by the Chiefs, Weinberger, Lehman, and others.

The movement for change expanded throughout 1984 and 1985. As the legislative battering ram gained momentum, officials at the Pentagon crafted a series of amendments that were designed to neuter the reforms. These amendments, crafted in a special "war room" in the Pentagon, were offered in Congress by Sen. John W. Warner (R-Va.), a former Secretary of the Navy whose state was home to a massive US Navy presence.

A Close-Run Thing

The amendments came near to passing but were in the end defeated in a series of extremely close votes.

The anti-reform effort was dead. Soon after the defeat of the Warner amendments, the Senate, in an effort to convey harmony and consensus on such a critical matter, finally voted 95 to zero on May 7, 1986 to pass the Goldwater-Nichols Act.

"It was the best goddamned thing I did in 35 years in the Senate," the crusty Goldwater later declared privately.

The unmistakable thrust of the Goldwater-Nichols Act was to improve interservice coordination and foster a more joint culture. The Chairman of the Joint Chiefs, the only member of the JCS without command of a military service, became the principal uniformed advisor to the President.

A Joint Staff of well over 1,000 officers was placed under the exclusive direction of the Chairman, ending the reign of the "iron majors" who defended service interests. This represented a fundamental shift in power within the Pentagon from the service staffs to the Joint Staff.

A four-star vice chairman of the Joint Chiefs was added as a sixth member of the JCS. He was charged with representing the Chairman in his absence and to speak for the regional commanders.

These four-star regional command-

US Army photo by Spec. Jeff Rhodes

Secretary of Defense Caspar Weinberger also resisted joint reform. The Pentagon chief was backed by all five members of the Joint Chiefs of Staff.

Institutionalizing the Effects of Goldwater-Nichols

As the commander of US Joint Forces Command (which was US Atlantic Command during the Cold War), Air Force Gen. Lance L. Smith is the military's top proponent for advancing the cause of "jointness." JFCOM is pushing service integration begun by the Goldwater-Nichols Act ever further, as a key pillar of Secretary of Defense Donald H. Rumsfeld's transformation initiatives.

Whereas in the past commanders talked about "joint interoperability" between the services, the new paradigm is joint interdependence. Similarly, deconfliction is no longer good enough; the goal is for integrated operations to be planned jointly from the outset.

"I look back at Vietnam when the US military did almost everything as separate services, and I see today how we are so comfortable working through joint task forces for missions that go from humanitarian relief all the way to major combat operations," Smith told *Air Force* Magazine. It is "almost hard to believe how far we've come." Goldwater-Nichols was "extraordinarily important in that evolution," he said.

With US forces engaged in joint task forces and ongoing joint operations all over the globe, a major emphasis at Joint Forces Command has been to capture those experiences, learn from them through additional experimentation and exercises, and then feed those concepts and doctrines rapidly back into the operational force.

"At our Joint Warfighting Center we do mission rehearsal exercises for staffs and commanders who are preparing to deploy and fight, for instance, and those exercises are driven by the lessons learned from Iraq, Afghanistan, the Horn of Africa, East Timor, and other operations," said Smith.

Joint Forces Command also conducts exercises twice each year with each combatant commander. In those exercises, JFCOM encourages experimentation with doctrine and concepts to take better advantage of the joint force.

The Defense Department has "set up these really joint organizations in places like Iraq and Afghanistan, where our captains and sergeants have witnessed firsthand the benefits of jointness," Smith said, "and when those wars are over I don't want to have them go back to an Air Force or Army or Navy base [with] a service-centric environment. We have to find ways to capture how we fight in our everyday training and operations."

ers—the true warlords of America's military, whom Eisenhower had tried to empower in 1958—were given broader authority over the service component commanders and joint task forces.

Under Goldwater-Nichols, service in a joint assignment became necessary for promotion to flag or general officer rank and thus became a required stepping stone for each service's best officers. A joint curriculum was established at the command, staff, and war colleges, and officers were required to complete a joint-duty assignment following graduation.

Goldwater-Nichols also forced the establishment of two new unified functional commands. In 1987, US Transportation Command was established, putting air, land, and sea assets under a single mobility commander. That same year, US Special Operations Command was created.

Experts say that the forces set in motion by Goldwater-Nichols continue to shift power and influence away from the four armed services and toward the "purple" combatant commanders, the Joint Staff, and Pentagon civilians.

Hamre explained that the goal of Goldwater-Nichols was to elevate the warfighters over the services and give them a strong voice in advocating jointness. "Prior to the reforms," he said, "the people on the supply side of the supply-and-demand equation called the shots, meaning the service Chiefs and the service Secretaries." Goldwater-Nichols, Hamre went on, raised the power of the people on the "demand side"—that is, the Chairman of the Joint Chiefs and the regional combatant commanders.

"You still have to keep the supply-and-demand equation in balance," Hamre summed up, "but there's no denying that Goldwater-Nichols somewhat diminished the power of the service Chiefs and dramatically reduced the role and influence of the service Secretaries."

The Downside

It is precisely the question of the services that is the key to any assessment of Goldwater-Nichols.

For all of their importance, regional combatant commanders are necessarily focused on their short-term operational needs and not on long-term strategy and long-term requirements. The armed services are uniquely able to take the long-term view and develop the capabilities the Defense Department will need in the future. In fact, they are the only institutions capable of fulfilling this vital function.

A second issue concerns operational leadership. While Goldwater-Nichols trimmed and shortened the chain of command from the Secretary of Defense to the combatant commanders in the field, it did so by marginalizing the strategic input of the service Chiefs on any given operation.

One who has spoken out about this is retired Air Force Maj. Gen. Charles D. Link, now an airpower strategist at the National Defense University in Washington, D.C.

"As a result of Goldwater-Nichols," said Link, "the service Chiefs no longer have any motivation or real opportunity to focus on grand strategy or strategic issues, because they've been relegated to the program business. As we saw in the case of Iraq, the result is that major decisions get made essentially by two people and their staffs, one of whom is subordinate to the other—the combatant commander in the field and the Secretary of Defense.

As for the Chairman of the Joint Chiefs, Link said, "His ability to formulate an independent point of view has been circumscribed because he spends most of his time with Pentagon civilians and essentially acts as the President's spokesman on military matters."

As a result of that streamlined dynamic, Link argues, there was never a meeting in the tank where the Chiefs actually signed off on the decision to invade Iraq, on the force levels required, on the prudent risks to be assumed, or on the level of resources needed to support the long-term strategy for the country.

"At one time the Joint Chiefs would have carefully considered each of those issues after careful consultation and vetting by their service staffs," said Link, "and then reconciled their differences internally before conveying their corporate military advice to the Secretary of Defense.

"Without that input, I believe there was a power vacuum, and a handful of political appointees in the Office of the Secretary of Defense stepped into it and formulated a plan for Iraq based on academic theories and their own agendas. The broader point is that we need a strong Secretary of Defense, but we also need strong military advisors. You can't have one at the expense of the other." ■

James A. Kitfield is the defense correspondent for National Journal *in Washington, D.C. His most recent article for* Air Force *Magazine, "The Tehran Triad," appeared in the April issue.*

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Verbatim

By John T. Correll, Contributing Editor

Idiots on the Home Front

"More than a third of the American public suspects that federal officials assisted in the 9/11 terrorist attacks or took no action to stop them so the United States could go to war in the Middle East."***—National poll conducted July 6-24 by the Scripps Survey Research Center at the University of Ohio, www.scrippsnews.com.***

The Duckbuilders

"Pasting feathers together, hoping for a duck."***—Unnamed colonel in end-of-tour report about efforts of the Coalition Provisional Authority under leadership of Ambassador L. Paul Bremer, presidential envoy to Iraq, 2003-04, Thomas E. Ricks,*** **Fiasco: The American Military Adventure in Iraq,** ***Penguin Press, July.***

Start at the Top

"We are cutting the force from top to bottom, in fact, leading with 30 general officers. The officer field and the enlisted field are imbalanced, so it is a working process to make sure that we have force balance across the spectrum."***—Air Force Secretary Michael W. Wynne,*** **European Stars and Stripes,** ***July 20.***

Call Them Airmen

"We tell them during that coin ceremony that from this day on, we are going to call them airman. But sometimes, we get them to their first duty station and we call them kids. We call them troops. We call them the cats and dogs of the dorms. And they're not. They're airmen."***—CMSAF Rodney J. McKinley after presentation of Airman's coin to basic trainees in their final week of training,*** **Air Force Print News,** ***Aug. 8.***

Future Is on the Ground

"As in all past world wars, clashes of all arms will occur. But future combat will be tactical, isolated, precise, and most likely geographically remote, unexpected and often terribly brutal and intimate. Strategic success will come not from grand sweeping maneuvers but rather from a stacking of local successes, the sum of which will be a shift in the perceptual advantage—the tactical *schwerpunkt,* the point of decision, will be very difficult to see and especially to predict. As seems to be happening in Iraq, for a time the enemy may well own the psycho-cultural high ground and hold it effectively against American technological dominance. Perceptions and trust are built among people, and people live on the ground. Thus, future wars will be decided principally by ground forces, specifically the Army, Marine Corps, Special Forces, and various reserve formations that support them."***—Retired Army Maj. Gen. Robert H. Scales, former commander of the Army War College,*** **Armed Forces Journal,** ***July 2006.***

Not Me

"I have never painted a rosy picture. I've been very measured in my words, and you'd have a dickens of a time trying to find instances where I've been excessively optimistic. I understand this is tough stuff."***—Secretary of Defense Donald H. Rumsfeld, denying that he has given excessive assurances about the war in Iraq, Senate Armed Services Committee, Aug. 3.***

The Pendulum Swings

"South Koreans seem to have a double standard in terms of threat perceptions. Having been fed propaganda for years by military regimes that painted North Korea as an evil monster poised to devour them, they now seem to dismiss even factual claims as Cold War scare stories. Many of them see North Korea as a slightly delinquent brother who needs to be cajoled into better manners."***—Adrian Foster-Carter, Leeds University research fellow on Korea,*** **New York Times,** ***Aug. 11.***

About Time

"Department of Veterans Affairs Secretary R. James Nicholson Monday announced that all VA computers throughout the agency will be upgraded with enhanced data security encryption systems beginning immediately."***—VA news release, Aug. 14.***

Don't Count on Long War

"The war on terror may require a long, long time, as the Bush Administration insists, but time is not on our side. ... If the war does last decades, our chances of losing it rise dramatically. Why? Because the illusion that we can take forever to win fosters a do-it-tomorrow mind-set in dealing with a wily, adaptive foe. It gives terrorists the time they need to acquire true weapons of mass destruction."***—John Arquilla, professor of defense analysis at the US Naval Postgraduate School, Monterey, Calif.,*** **San Francisco Chronicle,** ***July 16.***

Remember Reciprocity

"The United States should be an example to the world, sir. Reciprocity is something that weighs heavily in all of the discussions that we are undertaking as we develop the process and rules for the commissions, and that's the exact reason, sir. The treatment of soldiers who will be captured on future battlefields is of paramount concern."***—Maj. Gen. Scott C. Black, judge advocate general of the Army, on US plans for special courts and rules to deal with terrorists, Senate Judiciary Committee hearing,*** **Washington Post,** ***Aug. 3.***

Complementary Domains

"Air and space power has the ability to conduct operations and impose effects across the entire theater, wherever targets or target sets might be found, unlike surface forces that typically divide up the battlefield into individual operating areas. ... While initial [airpower] theories claimed to render surface combat obsolete, today's airmen realize that all domains of combat are complementary."***—Air Force Doctrine Document 2, "Operations and Organization," June 27.***

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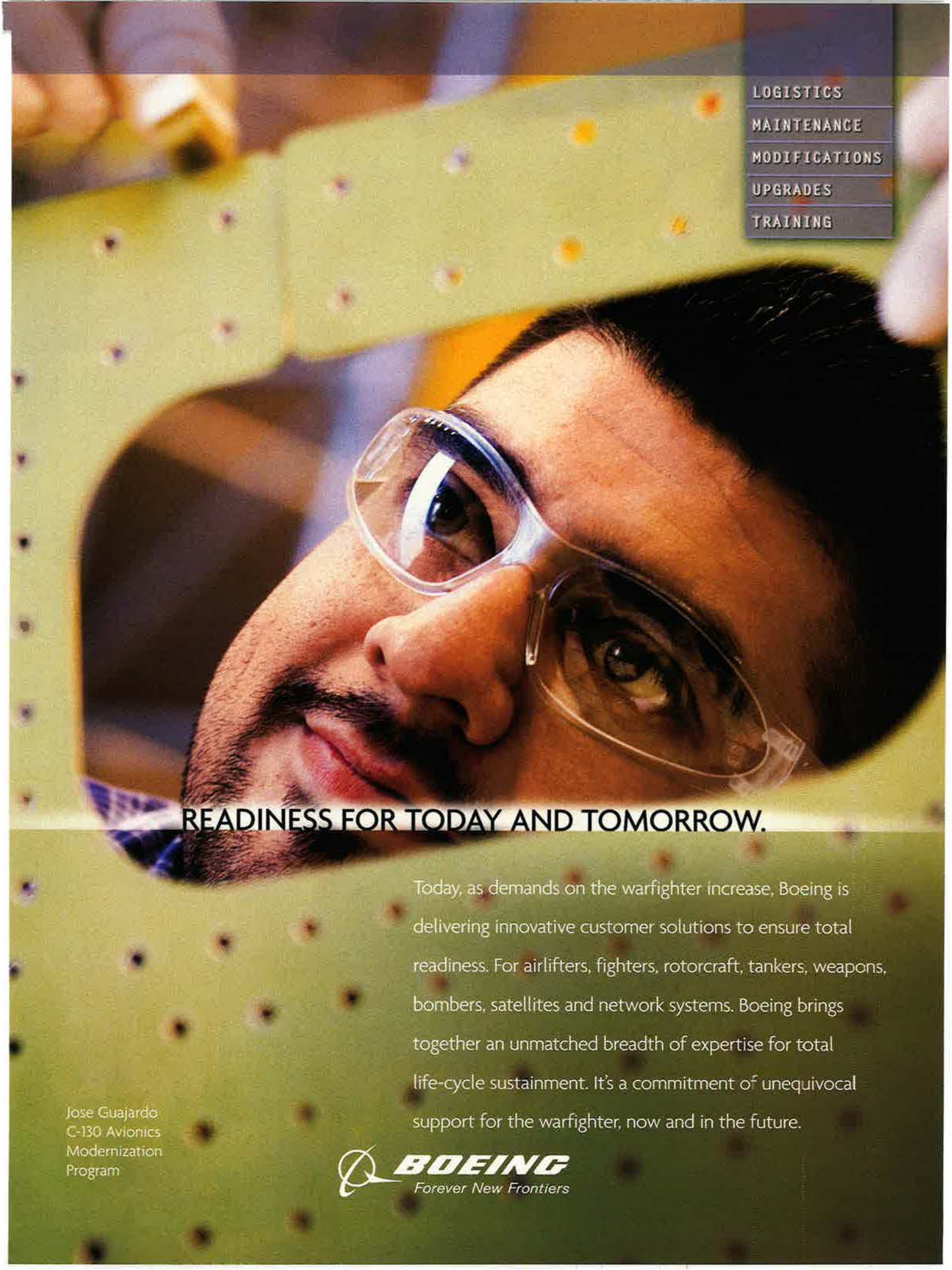

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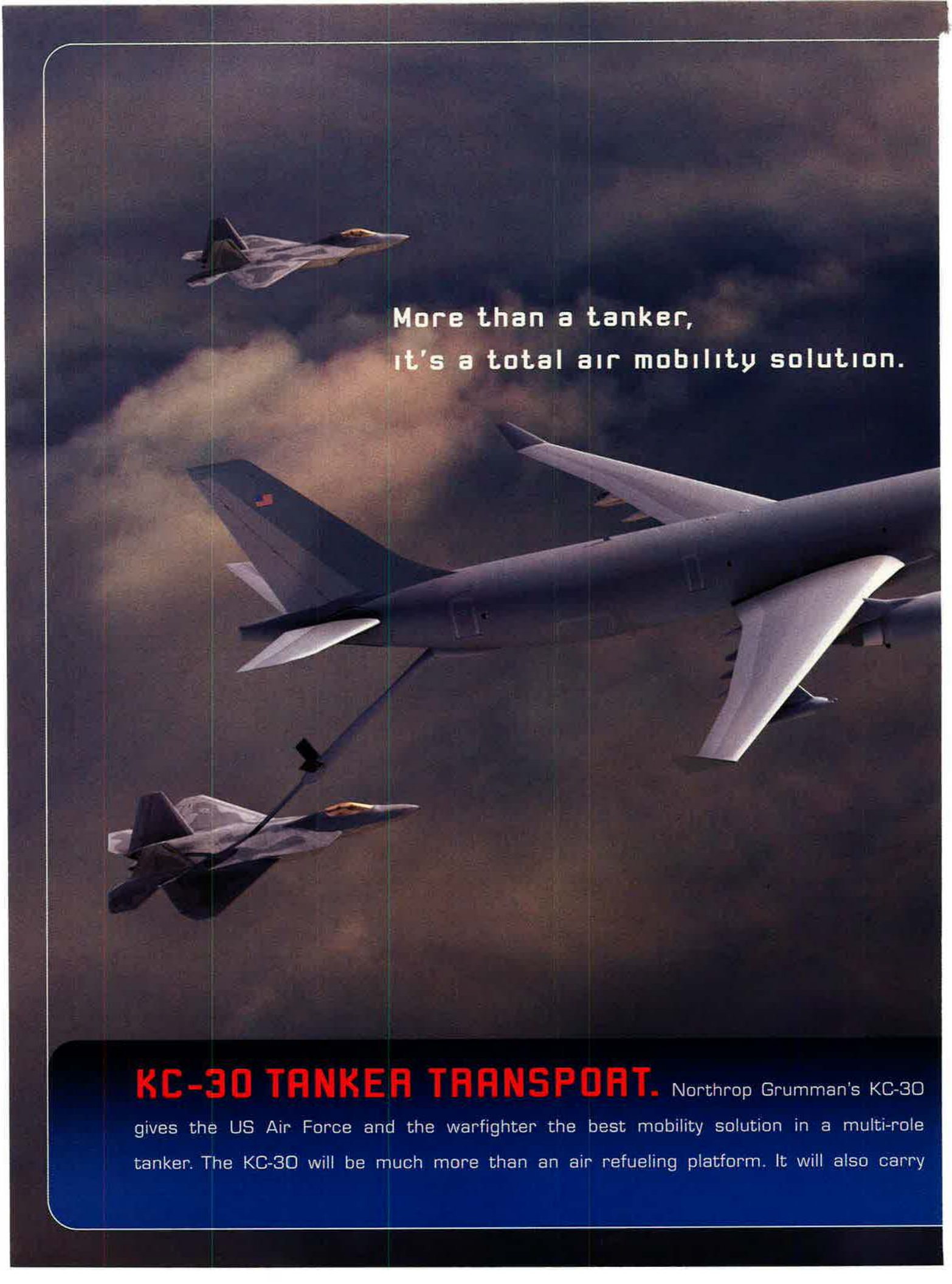

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For 17 hours, Capt. Gerald Young led the North Vietnamese through the jungle and away from the crash site.

Flak Trap

By John T. Correll

Capt. Gerald Young was assigned to a rescue squadron at Da Nang AB, South Vietnam, in August 1967. Three months later, his helicopter was caught in a flak trap.

On the afternoon of Nov. 8, 1967, a 12-man team of American and South Vietnamese soldiers returning from a secret road-watch and reconnaissance mission on the Ho Chi Minh Trail was ambushed and mauled by a North Vietnamese Army battalion.

The team was assigned to Military Assistance Command Vietnam's "Studies and Observation Group." The name was intentionally vague. MACV/SOG was an unconventional warfare task force that had been conducting cross-border operations in the Laotian Panhandle—where the United States did not admit it had any military forces—since October 1965.

Some contemporary reports give the location of the ambush as Vietnam's Quang Tri Province, but the actual site was a mountainside, surrounded by dense jungle, a few miles inside Laos. It was not far from the US Marine Corps base at Khe Sanh, which lay to the northeast on the other side of the border.

At first, the soldiers thought they had run into a reinforced company, but it turned out to be the main body of an enemy battalion.

The team leader, a US Army Special Forces sergeant, called for help—just as the North Vietnamese expected him to do. They were setting up what was known as a "flak trap."

In the Vietnam War, the United States made an unprecedented effort to rescue those shot down or in trouble in hostile territory. The North Vietnamese knew it, too, and took advantage of it. They often held back from finishing off the survivors of a crash or an attack, preferring to use the Americans as bait. Helicopters and other aircraft would be coming soon and the aircraft would make fat targets as they moved in for the rescue.

The first effort to pick up the SOG team was by a South Vietnamese Air Force H-34, escorted by a US Army UH-1B "Huey" gunship. The North Vietnamese held their fire as the two helicopters approached.

The Huey went in first and hosed down the surrounding area with rockets and guns. The enemy guns were silent until the H-34 pulled into position above the hillside and a sudden fusillade blew him out of the sky. The Huey attacked again, and again the ground fire stopped. The

Huey pilot decided to try the rescue himself, and his helicopter was promptly shot down as well.

The NVA battalion could have made short work of the beleaguered patrol, but chose instead to wait for more aircraft to be drawn into the flak trap, which was still baited.

The second rescue force got there around midnight. There were two Air Force HH-3E "Jolly Green Giant" helicopters from Da Nang, an Air Force C-130 flare ship, and three Army helicopter gunships.

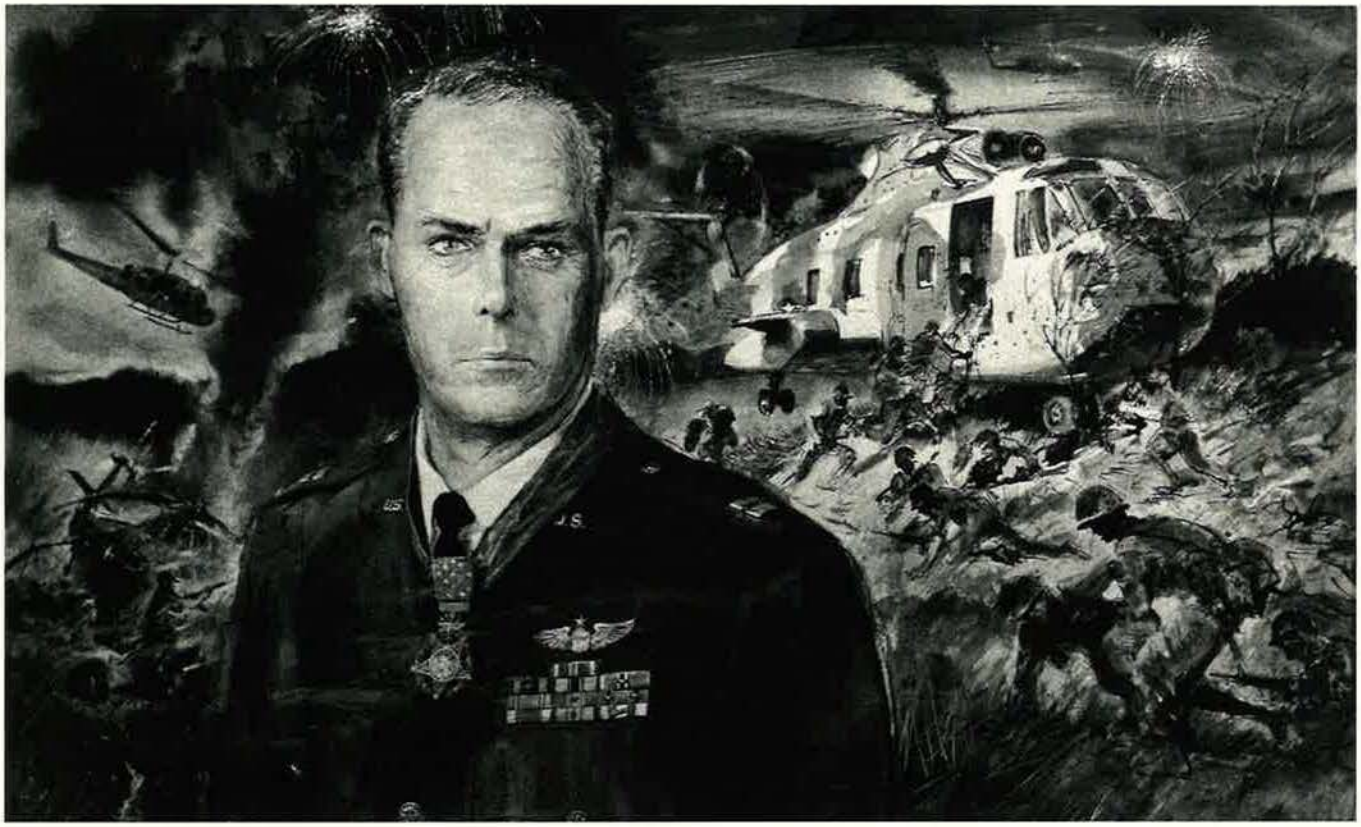
Flares from the C-130 lit up the whole area and the Hueys pounded the enemy positions with their rockets and guns. The first HH-3E, call sign Jolly Green 29, maneuvered into position on the slope and picked up two American soldiers and three South Vietnamese. However, enemy fire from a nearby ridge took its toll and Jolly Green 29 pulled away leaking fuel and hydraulic fluid and headed for an emergency landing at Khe Sanh, the closest airstrip.

The pilot of Jolly Green 29 advised the second helicopter, Jolly Green 26, to pull out. The ground fire on the mountainside was intense, and the enemy guns were too numerous for the Hueys to suppress. The Rescue Center agreed and told Jolly Green 26 to return to Da Nang although there were more survivors left on the ground.

Photo courtesy of Yadira Young

The HH-3E Jolly Green Giant was the most famous of rescue helicopters during the Vietnam War. Its nickname came in part from its green and brown paint scheme.

The pilot of Jolly Green 26, Capt. Gerald O. Young, didn't like that order. He talked it over with his crew and they all wanted to stay. Expressing the sentiments of them all, the copilot, Capt. Ralph W. Brower, said



An Air Force art collection painting by Harvey Kidder portrays Young and the helicopter rescue that he led in Vietnam.

Photo courtesy of taskforceomegainc.org

Capt. Ralph Brower (shown here as a lieutenant) was the copilot on Young's helicopter. When Young asked the crew if they should continue the rescue attempt, Brower spoke for them all: "We're airborne and hot to trot."

that "we're airborne and hot to trot." Young appealed the order to return and the Rescue Center authorized them to see what they could do.

Young, 37, had a lot of flying experience behind him. He had dropped out of high school and joined the Navy in 1947. In the Navy, he obtained a General Educational Development diploma and got a private pilot's license. After a break in service, he again joined the Navy. In 1956, he moved over to the Air Force, where he earned his commission through the Aviation Cadets, went to flight training, and became a helicopter pilot. In August 1967, he was assigned to the 37th Aerospace Rescue and Recovery Squadron at Da Nang Air Base in South Vietnam. On Nov. 9, Young was on his 60th combat mission.

Jolly Green 26 went in fast, with the gunships strafing the jungle on both sides. It was a tricky hover. Young rested the right main wheel on the slope while holding the other two wheels in the air and avoiding rotor contact with the ground. Brower directed the gunship fire. The pararescue jumper, Sgt. Larry W. Maysey, hopped to the ground and lifted two American sergeants, both of them wounded, up to the flight engineer, SSgt. Eugene L. Clay, who pulled them aboard.

As Young applied power to lift off, enemy troops appeared at point-blank range and raked Jolly Green 26 with automatic weapons fire. A rifle-launched grenade struck the right engine, which caught fire and exploded. The big helicopter flipped over on its back, burst into flames, and crashed down the hillside into a ravine.

17 Hours

Young was suspended by his seat belt, hanging upside down, and his clothing was afire. He managed to kick out the right window, get out of his straps, and reach the ground. He rolled farther down the embankment and beat out the fire in his clothes. The burns already covered a fourth of his body.

He found another survivor, one of the Army sergeants, who had also been thrown clear. He was unconscious. Young put out the fire in the sergeant's clothing with his bare hands. He tried to reach others in the wreckage, but was driven back by the heat.

About 3:30 a.m., two A-1Es, Sandy 07 and 08, arrived from a base in Thailand to direct the continuing rescue effort. At this point, at least seven Americans and South Vietnamese were still alive on the hillside.

According to Maj. Jimmy Kilbourne, the pilot of Sandy 07, the rescue team could not talk with Young on the radio

Air Rescue in Vietnam

One of the great success stories of the Vietnam War was combat search and rescue. Chances were good that a pilot shot down or troops in trouble behind enemy lines would be picked up and brought out.

Air Rescue Service—later Aerospace Rescue and Recovery Service—was credited with saving 2,511 aircrew members and 1,372 others during the war. Of the aircrew rescues, 739 were in Laos, 176 were in North Vietnam, and 1,596 were in South Vietnam. That record was all the more impressive because the Air Force entered the Vietnam War with extremely limited rescue capability.

Initially, rescue detachments used the HH-43F Huskie, a utility helicopter, universally known as "Pedro," designed for fire and crash work around air bases. It was slow, unarmed, and had a short operating range. Nevertheless, Pedro accounted for more saves than any other rescue helicopter in the war.

The HH-3E, most famous of the rescue helicopters and called the "Jolly Green Giant" because of its green and brown camouflage, arrived in 1965. The Jolly Green was built for missions deep in North Vietnam. It had a range of 736 miles, could be refueled in flight, and could carry up to 15 wounded in litters. It had two 7.62 mm machine guns to aid in its own defense.

The ultimate rescue helicopter in Vietnam was the HH-53C Super Jolly, almost twice the size of the HH-3, faster, better armed, and with longer range and able to carry more people. It entered service in 1967. The other services also flew some rescue missions, as did the CIA's proprietary airline, Air America.

The conspicuous heroes of ARRS were the pararescue jumpers, or PJs, airmen trained not only in rescue but also in survival skills, hand-to-hand combat, and as medics. They went down on jungle penetrators attached to long cables to bring out the wounded. PJs won more decorations for bravery than any other airmen in the war.

Photos courtesy of Yadira Young

Young stands in front of his barracks next to an advertising icon that helped give a nickname to the HH-3 helicopter. On the back of this photo, he wrote, "Two Jolly Greens."

finished his B.A. degree at the University of Maryland with a major in Latin Studies and a minor in Spanish. That prepared him for his last assignment, as air attaché to Colombia. He retired as a lieutenant colonel in 1980.

Young and his family went to the Pacific Northwest and a 30-acre farm on Guemes Island in Puget Sound, a five-minute ferry ride from Anacortes, Wash.

"I think that 'rescuing' was in his blood," said his wife, Yadira Young. "Here on our farm ... he always wanted to employ people who needed second chances. As he worked alongside of his helpers fixing fences or feeding the cattle, he told them that it was never too late to change."

He was a frequent speaker for schools, ROTC units, and public events and took an active role in the community. The city of Anacortes named Young's Park, a popular recreation area on the north end of the island, for him.

gunship. The eight helicopters working the extraction had to avoid the flak trap, but they took no more losses.

Accounts vary of how many people got off the hillside. According to an article written in 1969 for *Airman,* the official magazine of the Air Force, by Sandy 07 pilot Kilbourne, "seven survivors and the remains of six men were recovered." The bodies of Brower, Maysey, and Clay were not recovered.

Young was treated for his wounds at Da Nang and flown back to the United States for further treatment and skin grafts. He spent six months in hospitals recovering from burns before he returned to active duty.

The Medal of Honor was presented to Young by President Lyndon B. Johnson at the Pentagon, May 14, 1968, in ceremonies dedicating the Pentagon's new Hall of Heroes. The other members of the Jolly Green 26 crew, Capt. Ralph W. Brower, SSgt. Eugene L. Clay, and Sgt. Larry W. Maysey, were awarded the Air Force Cross posthumously. The four Sandy pilots received the Silver Star.

USAF photo

After receiving the Medal of Honor from President Johnson, Young and his first wife, Nancy Lee, show the award to Gen. John McConnell, Air Force Chief of Staff.

Propensity for "Rescuing"

Gerald Young served another 13 years in the Air Force after returning from Vietnam. He had several assignments in flight training programs at the Air Force Academy and in Air Training Command. He helped set up a forerunner to the Military Assistance to Safety and Traffic (MAST) program in which military helicopters support the civilian highway patrol in emergencies. He also assisted the Panamanian Air Force in establishing a rescue program.

During a tour with the VIP transport squadron at Andrews AFB, Md., he finished his B.A. degree at the University of Maryland with a major in Latin Studies and a minor in Spanish. That prepared him for his last assignment, as air attaché to Colombia. He retired as a lieutenant colonel in 1980.

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Young was diagnosed in 1989 with a brain tumor and died in 1990, just after his 60th birthday. A memorial service on Guemes Island featured a flyover by HH-3 helicopters. He was subsequently buried with full military honors at Arlington National Cemetery. ■

John T. Correll was editor in chief of Air Force *Magazine for 18 years and is now a contributing editor. His most recent article, "In the Wake of the QDR," appeared in the September issue.*

Sgt. Larry Maysey, a pararescue jumper, lifted two wounded US soldiers onto Young's helicopter. He died when enemy fire hit the Jolly Green, causing it to flip over and burst into flames.

because there were "three 'beepers' broadcasting on the emergency radio frequency, making voice contact with the survivors impossible. ... The beepers blocked the voice transmissions." The scene below was illuminated, Kilbourne said, by the three helicopters, which formed a "fiery triangle" within 100 yards of each other.

Sandy 07, who was directing the rescue team, decided to wait until first light and bring in more Sandys, fighters, and gunships before the next attempt. "The plan," Kilbourne said, "was to go in early, locate the survivors, and draw enemy fire by flying low and slow over the area." Sandy 07 would then put fire from gunships and fighters on the enemy positions and "escort the Jolly Green Giants in for the pickup while all four A-1Es formed a firing 'daisy chain' around them."

At daybreak, Young came out of hiding long enough to fire a pen gun flare. He wanted to warn the Sandys that they were circling a flak trap. Sandy 07, making a low, slow pass, saw Young. The Sandys made about 40 passes, "trolling" for ground fire, but drew none.

At 7 a.m., Sandys 05 and 06 relieved Sandys 07 and 08, who were low on fuel. Sandy 05 spotted five survivors near the wreckage of one of the helicopters. Two hours had passed with no sign of the enemy, so the Sandys led Army and VNAF helicopters in for the pickup. They were not fired upon. Apparently, the enemy had pulled back for the night and had not yet returned. Sandy 05 was on the verge of sending in a Jolly Green to pick up Young and the sergeant when the North Vietnamese troops reappeared.

Young saw the enemy force approaching from the south. He hid the wounded man and decided he would lead the North Vietnamese away from the crash site if he could. Injured and suffering from second and third degree burns, he drifted into shock from time to time. He used his survival maps to cover the worst of his burns.

"When enemy troops approached the crash scene, he led them away from the wounded sergeant hidden in the underbrush," an Air Force historical summary said. "He took off through the brush, enemy troops following him. Young knew that the only way rescue helicopters would be able to reach the scene and recover any remaining survivors was if they could see and have time to operate without encountering enemy fire. Young was determined to give them that time by luring his pursuers farther and farther from the wreckage. In his condition, that meant almost certain capture or death. After stumbling for six miles, he eluded the North Vietnamese troops in pursuit."

Young came to an open field, dragged himself out, signaled the helicopters circling overhead, and was picked up. He had been on the ground for 17 hours.

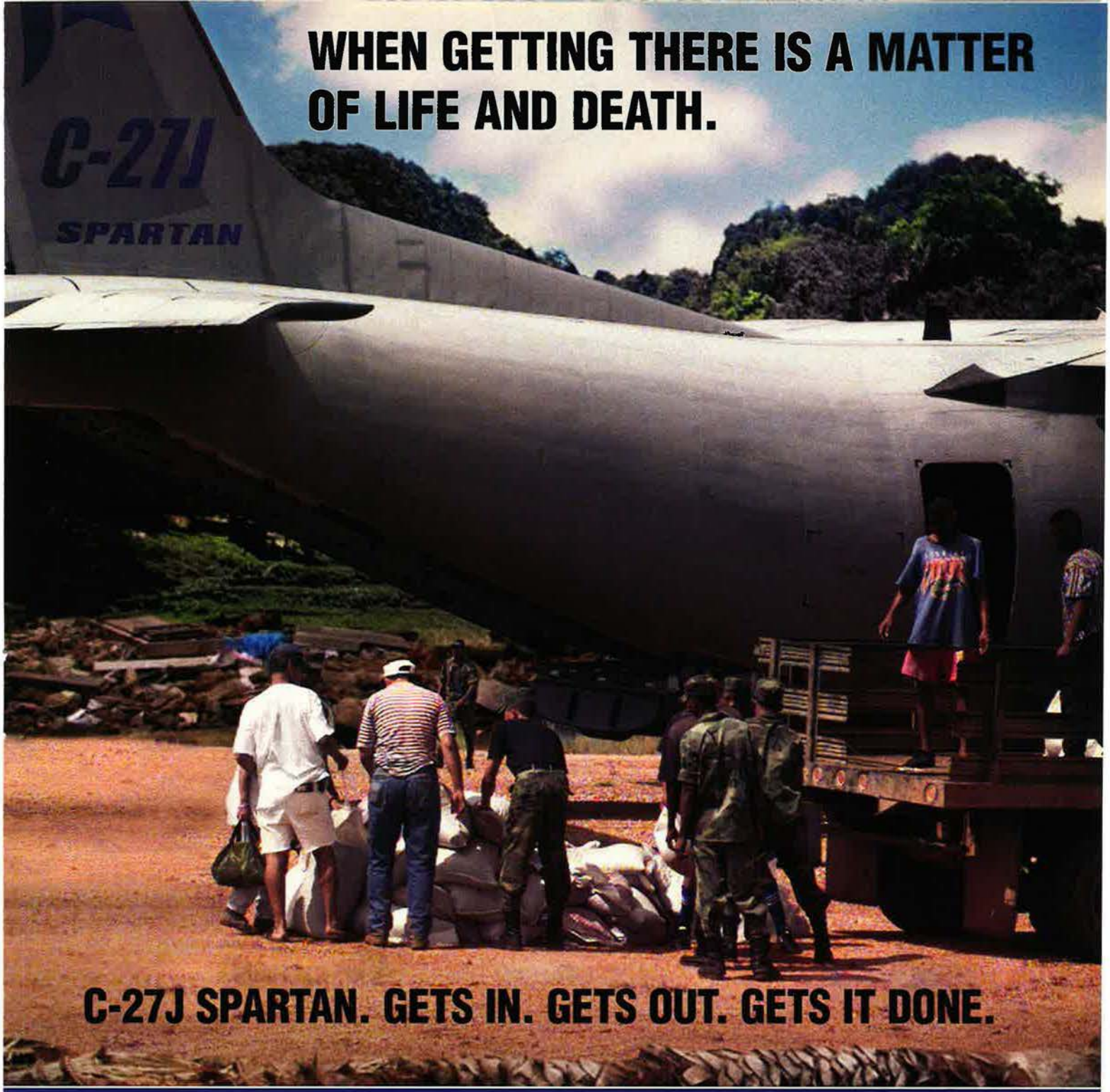
Medal of Honor

Back at the crash site, US and VNAF aircraft pounded the enemy with rockets, cannon, and machine gun fire. The NVA gunners got a piece of Sandy 07—who had since returned and resumed control—and kept on shooting.

Eventually, a 100-man ground party landed, remained overnight, rescued another survivor, picked up bodies, and destroyed ordnance on the Army

Photo courtesy of Yadira Young

Young suffered second and third degree burns in the helicopter fire. He covered them with survival maps and led the enemy away from the crash site, so others could be safely rescued. Here, he recovers on USS* Sanctuary *after his own rescue.



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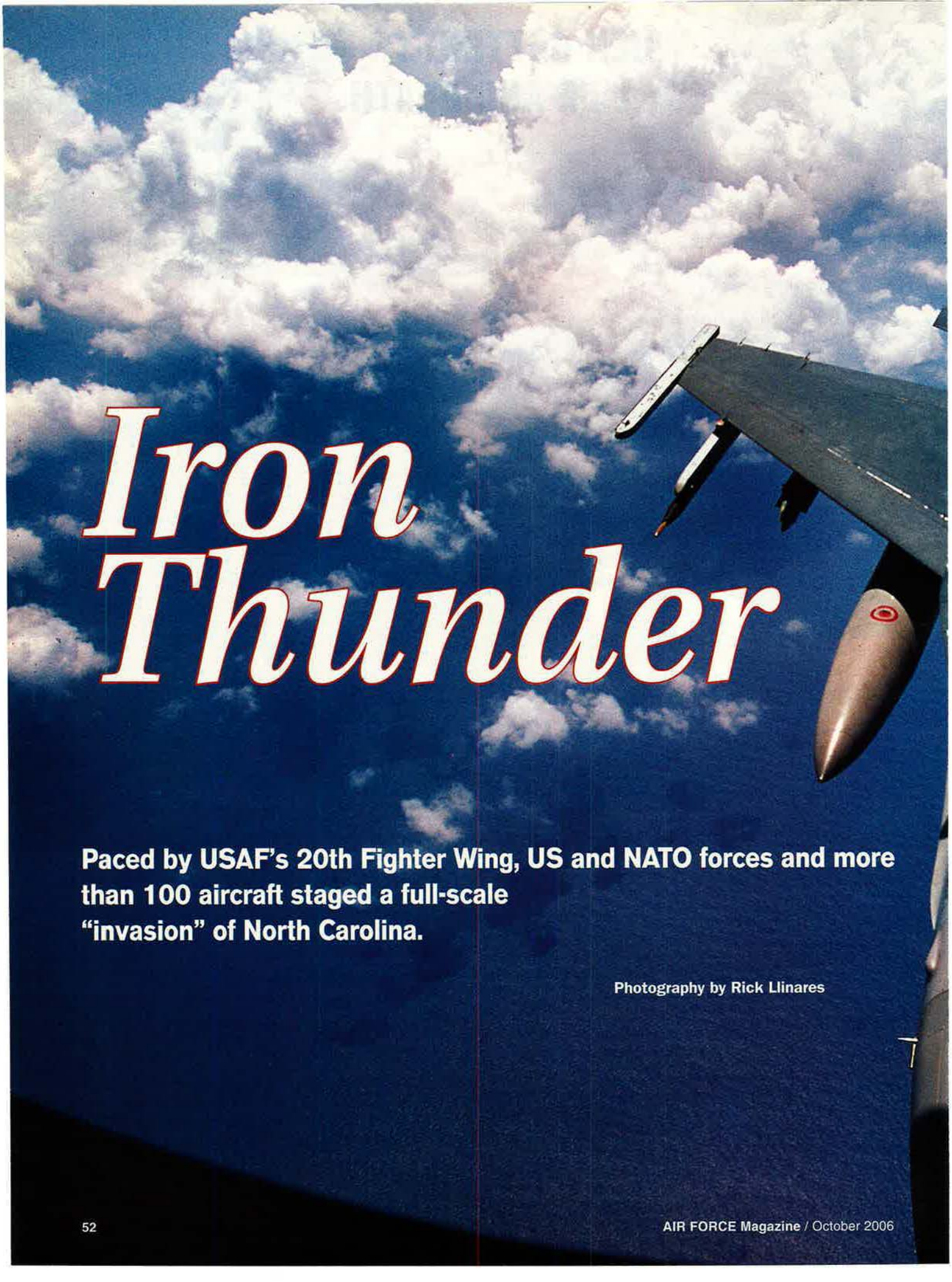
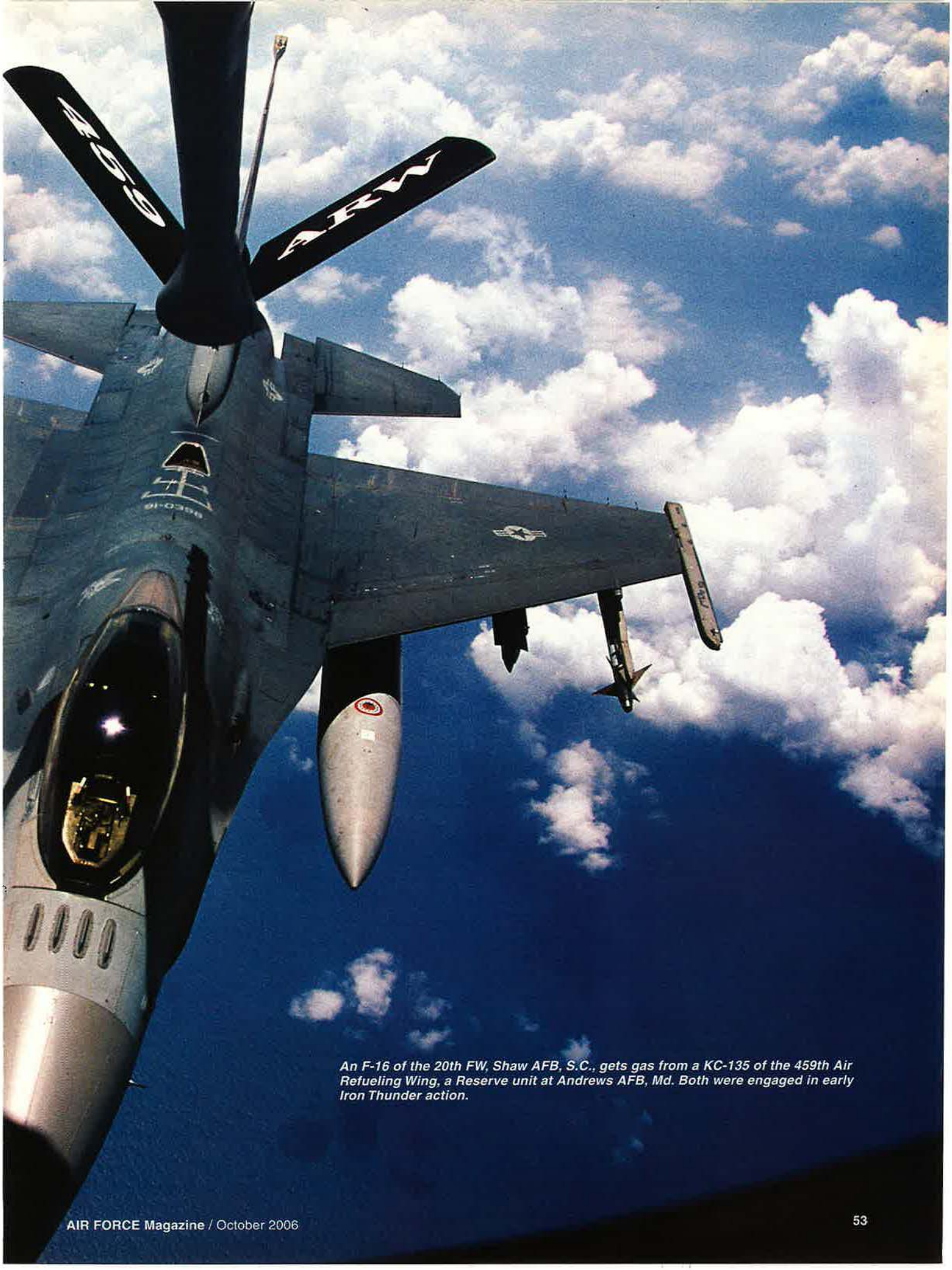


Iron Thunder

Paced by USAF's 20th Fighter Wing, US and NATO forces and more than 100 aircraft staged a full-scale "invasion" of North Carolina.

Photography by Rick Llinares



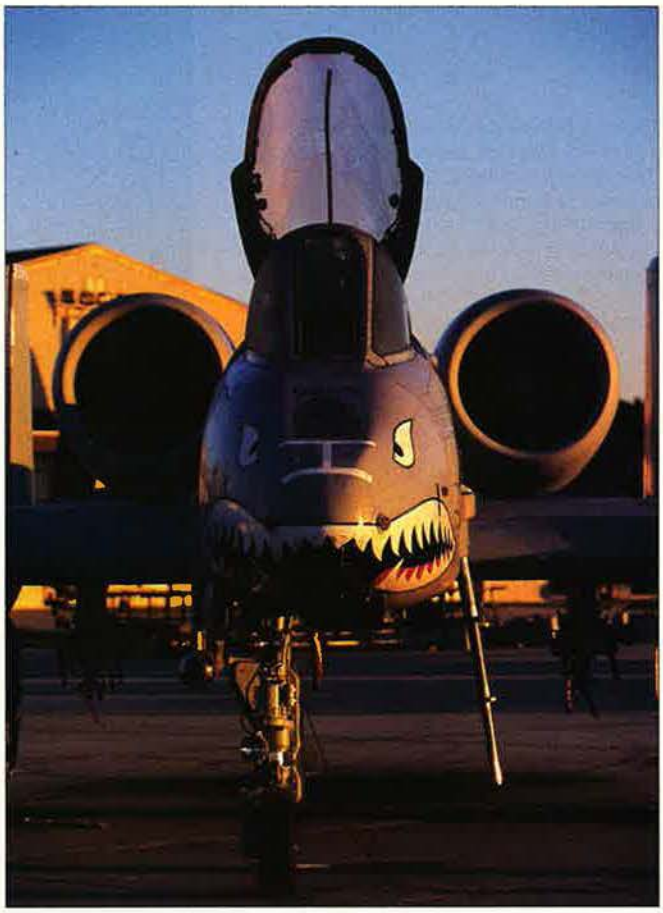
An F-16 of the 20th FW, Shaw AFB, S.C., gets gas from a KC-135 of the 459th Air Refueling Wing, a Reserve unit at Andrews AFB, Md. Both were engaged in early Iron Thunder action.

Operation Iron Thunder, a large-force exercise of air, sea, and land forces, played out over four days last July around the coast of North Carolina. Aircraft came from as far away as Washington state to the west and Europe to the east. Hosted by the 77th Fighter Squadron of Shaw AFB, S.C., it unfolded much like a Red Flag exercise, with flying operations extending hundreds of miles from Jacksonville, Fla., in the south to Norfolk, Va., in the north. Because the exercise simulated modern air and surface threats, participants were exposed to combat-like conditions for an extended period.

Right, three new F-22 Raptors from the 1st FW, Langley AFB, Va., form up in an echelon formation. The three (top to bottom) were piloted by USAF Capt. William Creeden, Capt. Jonathan Gration, and Capt. Brandon Zuercher. F-22s and F-15Cs from Langley flew together.

The US and NATO forces simulated a full-scale invasion along North Carolina's coastline. Left, Maj. Kevin Pugh, F-16CJ pilot of the 77th FS, leads a Viper pair at the outset of the exercise. The "Gamblers" of the 77th FS came up with the concept of the exercise and acted as the host unit throughout the training period. A total of 42 F-16CJs participated in the exercise with other F-16s from the 55th FS, 77th FS, and 79th FS.

Right, Col. Thomas Lohr (l) and Maj. Dana Nelson of the 459th ARW guide their KC-135R refueler on final approach to Andrews. The 459th ARW was one of five KC-135 wings to participate in the exercise. Others included the 100th ARW from RAF Mildenhall, Britain; the 107th ARW with the New York Air National Guard; the 117th ARW of the Alabama ANG; and the Reserve 916th ARW from Seymour Johnson AFB, N.C.



Top left, a US Navy F-14 Tomcat—Felix 21—sweeps its wings for speed. It is flown by Lt. Cmdr. Dave Faehnle, with Lt. Michael Petronis in back. Tomcats of Navy Fighter Squadron (VF) 31 served as Iron Thunder's Red Air element. It was the final large-force exercise for the legendary Tomcat, which officially retired last month.

Top right, an A-10 attack aircraft of the 74th FS, Pope AFB, N.C., is readied for action in Iron Thunder. The 74th FS is one of two A-10 squadrons assigned to the 23rd Fighter Group.

Below, Lt. Justin Allen flies the lead Navy F/A-18, followed by a second Super Hornet flown by Lt. Cmdr. Jeff Blake. The F/A-18 "Gunslingers" of Navy Strike Fighter Squadron (VFA) 105 assisted with Red Air duties during the exercise.

Above, Navy Lt. William Grant (in top Tomcat) and Lt. Nick Smith (below), both of VF-31, fly two F-14s in trail formation off Felix 21. The squadron hails from NAS Oceana, Va., near the Navy's giant base at Norfolk.

Right, a Gunslinger of the Navy's VFA-105, NAS Oceana, supports Iron Thunder. This aircraft is painted in a brighter scheme to honor the carrier air wing commander, Capt. James Cook. Each squadron in a Navy air wing dedicates a single aircraft in this manner. VFA-105 had previously operated F/A-18C Hornets and upgraded to the Super Hornet.

Left, Air Force MSgt. Kevin Beccard (far right in photo), a 459th ARW boom operator, confers with Lohr (at far left) after an Iron Thunder mission. Tanker aircraft provided critical support to the exercise's tactical aircraft, as did E-3 Airborne Warning and Control System (AWACS) and E-8 Joint Surveillance Target Attack Radar System (Joint STARS) aircraft.

Below, an AV-8B Harrier of Marine Corps Attack Squadron (VMA) 231 out of MCAS Cherry Point, N.C., takes off to provide direct support for Marine Corps landing operations.

Above, a KC-10 of the 514th ARW, McGuire AFB, N.J., deploys its boom. KC-10s refueled Air Force, Navy, and Marine Corps aircraft.

USMC photo

USMC photo

Top left, an Air Force C-17 transport delivers marines to a drop zone near the coast of North Carolina. Top right, a marine prepares to hit the road. Under escort from other Blue Air forces, the C-17s flew just above the surface of the Atlantic Ocean before gaining altitude for the drop. Meanwhile, in the air, three AWACS aircraft participated in the operation. The one shown at right is of the 965th Airborne Air Control Squadron, Tinker AFB, Okla. Another Royal Air Force E-3 flew in from Waddington, Britain.

Left, an F-15C fighter of the 71st FS's "Ironmen" provides air superiority for Blue Air during the exercise. The 71st is based at Langley as part of the 1st FW.

Right, an F-22 of the 27th FS at Langley, maneuvers into refueling position behind one of the KC-135 tankers. The Raptors were critical components of air superiority missions during Iron Thunder.

At left, MSgt. Zerrik King, a Reservist with the 459th ARW, works to reinstall a newly serviced boom onto one of the unit's KC-135s at Andrews AFB, Md. The high-speed boom can transfer fuel at a rate of up to 6,500 pounds per minute.

Below, an E-8 Joint STARS from Robins AFB, Ga., helps provide airborne battlefield management during the exercise.

Above, this EA-6B Prowler jammer of the Marine Tactical Electronic Warfare Squadron (VAQ) 4 from MCAS Cherry Point provides electronic warfare support for Iron Thunder aircraft.

Top left, TSgt. Richard Carlton assists the crew of a KC-135 from the 459th ARW as they complete final preflight checks at the Andrews flight line in preparation for a morning mission.

Top right, an F-16CJ pilot keeps an eye on what's above him. F-16CJ pilots sharpened their skills to prepare for future air defense suppression missions.

Right, a pair of A-10s flies over the Atlantic. Built for survivability, the A-10 can carry up to 16,000 pounds of ordnance on its 11 stations.

At left, Beccard, one of the senior boom operators with the 459th ARW, delivers fuel to an F-22 of the 1st FW. He has more than 19 years as a boom operator, instructor, and evaluator, with more than 5,900 flight hours.

Iron Thunder gave US and NATO military forces a chance to display their capabilities. The operation was an invaluable opportunity for pilots to participate in a realistic invasion scenario and work with a host of other units and sister services. ■

USAF photo by SrA. Brian Ferguson

Because of advances in aeromedical evacuation, most American troops now survive their combat wounds.

The 90 Percent Solution

By **Bruce D. Callander** and **Adam J. Hebert,** Senior Editor

Aeromedical evacuation, led by the Air Force, in recent years has become dramatically more effective. The improvement has a tangible benefit—injured troops are much more likely to survive wartime injuries than they were even in the 1991 Gulf War.

The survival rate for troops injured in Operations Enduring Freedom and Iraqi Freedom is 90 percent. In Operation Desert Storm, only about 75 percent of injured US troops survived their wounds. The survival rate for every other war in the 20th century was between 70 and 80 percent.

Although improvements in body armor, medical treatments, and vehicle protection have undoubtedly contributed to the improved survival rate, aeromedical evacuation plays a key role. In Desert Storm, it took 10 days to return an injured troop to a Stateside medical care facility. Today, even if an injured troop cannot be treated at the massive Landstuhl Regional Medical

USAF photo by SSgt. Scott Campbell

Center near Ramstein AB, Germany, it only takes three days to return them to the US.

"Aeromedical evacuation is the best example ... of something that has totally transformed over time," said Gen. Duncan J. McNabb, commander of Air Mobility Command at Scott AFB, Ill.

The train of events that leads to an aeromedical evacuation (AE) typically begins with a battlefield injury. The wounded service member will be delivered to a primary resuscitation site and then transported to a larger hospital, perhaps the jointly staffed hospital at Balad AB, Iraq.

As soon as 30 minutes after surgery, the injured American could be on an airplane headed to Landstuhl. From there, the injured person may be back in the United States at the military's National Naval Medical Center (Bethesda, Md.) or Walter Reed Army Medical Center (Washington, D.C.) three days after the injury.

"We used to have a structure where we had dedicated airplanes," McNabb said—C-9 Nightingales and C-141s reserved for the AE mission.

The dedicated transports flew on fixed schedules, and the AE mission operated separately from the rest of the air mobility world. The segregated effort reduced flight availability, lengthening the amount of time it took to evacuate injured personnel.

In the past, medical personnel "made sure the [patients were] absolutely stable" before flight, McNabb told *Air Force* Magazine, because "we were worried we would lose them in the air."

In many cases, injured troops never made it into the airlift system because they died first, McNabb noted. Now, the

Opposite, an Air Force HH-60 Pave Hawk of the 33rd Expeditionary Rescue Squadron and an Army UH-60 take off from the Afghan desert during a medevac mission. Above, Lt. Col. Joe Kennedy, commander of the 386th Contingency Aeromedical Staging Facility, checks patients aboard a C-17 Globemaster III. The wounded are being medevaced from the Southwest Asia theater to Germany for further treatment.

Lessons From Hurricane Katrina

One change in the Air Force's aeromedical evacuation system sprang not from wartime lessons but from the experience of the Hurricane Katrina relief mission.

After 9/11, the Air Force medical community "reorganized into a rapid response force that had a 25-bed hospital and aeromedical evacuation assets put together and on call," said Lt. Gen. George P. Taylor, then Air Force surgeon general. This is the group that went to New Orleans to triage the victims and send the most critical individuals to other locations.

The deployable team was "just the medics," however, Taylor said. "We have been working really hard on an integrated force package. I call it a 'humanitarian relief package.' It is going to be a force module that will be available to combat commanders" for relief missions.

The deployable package will still "be centered around a 25-bed hospital," but it will also include base operational support capabilities, he said, "the feeding, the housing, command and control, the communications, security, in one package."

This holistic approach is "the evolution for us in terms of having rapid response capability," Taylor said, "so in a matter of hours—not days—we can have this kind of capability on the ground."

Air Force performs "critical care in the air ... as soon as we can get that person stabilized."

All of this has happened even though—or perhaps because—the C-9s and C-141s have been retired. The C-9, USAF's primary aeromedical evacuation bird, was devoted exclusively to the mission of airlifting patients out of war zones.

Designated, not Dedicated

Dedicated medical airlift has been replaced with designated airlift. This mission is performed by highly trained AE and critical care air transport teams (CCATTs). These teams, with portable patient pallets and equipment, can use any mobility aircraft to perform an aeromedical evacuation.

USAF photo by SSgt. Lanie McNeel

USAF photo by MSgt. John E. Lasky

At top, airmen of the 55th Rescue Squadron depart from Davis-Monthan AFB, Ariz., to the US Gulf Coast to assist in Hurricane Katrina rescue operations. Here, Maj. Kathleen Browning comforts a patient at an Air Force medical facility at Balad AB, Iraq. Browning, of the 374th Medical Squadron, Yokota AB, Japan, accompanied the patient on a medevac to Germany.

When an injured service member needs to be moved, the first available aircraft can be readily identified with up-to-the-minute knowledge of where airlifters are. The pallets, medical teams, and other personnel will already be ready to go.

"There's a good bit of traffic" in and out of Iraq, noted Maj. Gen. Quentin L. Peterson, AMC operations director, so it is fairly easy to find an available aircraft for an evacuation mission.

The airlifters used for evacuations are known as "back-haul" aircraft. The AE teams often board aircraft that have just delivered supplies to the forward area, and reconfigure them to carry patients out.

If a C-17 is on final approach when an aeromedical evacuation is needed, airmen would be given prompt instructions, Peterson said. "Clear these three pallets—we're putting these [injured] folks on, and by the way, you're not going to X, you're going to Ramstein."

The AE teams can quickly convert an airframe for medical use. Typically, the aircrew must load some 800 pounds of equipment and supplies. The loads are standardized, so the AE crew is always familiar with what will be aboard: such basic gear as cardiac monitors and oxygen and suction equipment.

"You don't have to wait for that dedicated airplane," McNabb noted, and the results have been spectacular. Fully equipped, the AE aircraft has the basic elements of a hospital emergency room, complete with standard medications.

By June, AMC had already flown more than 13,000 AE missions since

9/11, out of Iraq, Afghanistan, and elsewhere—transporting nearly 72,000 patients. Lt. Gen. George P. Taylor Jr., then Air Force surgeon general, said about 6,500 battle casualties have been evacuated from Iraq alone.

The "vast majority" of patients are brought back for diseases or sickness, "which is always true in warfare," Taylor said.

The dedicated AE fleet was a limited asset. In the past, if an aeromedical evacuation bird was not available, the result was "too bad, so sad," said Peterson. "Well, that's not the answer we want to give to that injured soldier, sailor, airman, or marine."

Officials said the idea for the new approach came from Lt. Gen. Paul K. Carlton Jr., the Air Force surgeon general until 2002.

USAF photo by MSgt. Ruby Zarzyczny

SSgt. K.C. Martin (l) and SrA. Courtney Johnson, medical technicians of the 349th Aeromedical Evacuation Squadron, Travis AFB, Calif., participate in a training exercise aboard a KC-135. Crews are now trained to work in multiple aircraft.

Moving Right After Surgery

Prior to the new AE procedures taking effect, medical personnel would "stabilize the patient for days beforehand until the patient was able to travel," noted Brig. Gen. Frederick F. Roggero, AMC deputy operations director.

Now, airlift is sometimes being coordinated as a patient is still in surgery on the ground in Iraq, Roggero said.

The only reasons that an AE mission will not take off immediately is if the weather is too bad or the patient is just not stable enough to be flown, said Lt. Col. James E. Reineke, chief of AMC's Aeromedical Evacuation Operations Branch. However, "from a contingency perspective, what the medical providers will have to do" is determine if better care can be provided at the ground location. "It may be more advantageous to move the patient, even in a less-stable state," he said.

"I remember one of the admissions where the aircraft had to be held for a couple of hours because we were waiting for the patient to come out of the [operating room] and recover," said Capt. Chris Thrasher, who has flown on operational AE missions. "It's a rare instance that we can't move a patient. More often, we are taking them right out of surgery and taking them off."

The AE aircraft essentially serves as an en route intensive care unit as the patient is transported to Landstuhl or a Stateside medical care facility.

In addition to the emergency flights, there are also six scheduled medical flights between Iraq and Germany each week, for less-urgent moves.

AE is a Total Force mission. Roggero noted that 88 percent of the "backend" care personnel are Guardsmen and Reservists.

Of the 31 AE squadrons, only four are active duty units. Ten are manned by Air National Guardsmen and 17 by Air Force Reservists. Reserve component and active duty nurses and technicians all train together and periodically take part in joint exercises.

Although the overall injury survival rates did not improve significantly until recent years, the efficiency of the aeromedical evacuations has been increasing for some time. During the Vietnam War, it took an average of 45 days to get a sick or wounded service member back to the States.

In the Persian Gulf War and before, "we only moved patients who were a week or more post operative [and] who didn't have any substantial injuries that hadn't been fairly well stabilized," said Taylor. "We also ran a policy in the

Aeromedical Evacuation's Long History

Air Force aerial evacuations began early in World War II. The approach was first used informally in the Pacific Theater, where land and sea routes often were lacking.

C-47s lifted the wounded to general hospitals in New Caledonia, New Hebrides, and Australia.

A more formal program began in November 1942 at Bowman Field, Ky. There, Army Air Forces opened training for aeromedical squadrons. Flight crews included a surgeon, nurses, and technicians.

The C-47 also became the aerial ambulance in the Mediterranean region. Wounded troops were airlifted out of Tunisia, Salerno, and Anzio. Surgeons accompanied only the most seriously wounded—most flights were handled by nurses and technicians.

By the end of the war, the longer range C-54 was airlifting many patients all the way to the US. In all, more than a million sick and wounded troops were airlifted during World War II.

Early in the Korean War, most sick and wounded were moved by land or sea. Then Lt. Gen. William H. Tunner took control of Combat Cargo Command. He initiated a study of the possibilities of aeromedical evacuation as a standard procedure for transporting wounded and sick troops.

By October 1950, Combat Cargo was airlifting patients to South Korea or Japan. The Military Air Transport Service (MATS) was then carrying patients all the way to the US. By the end of that year, air transport was the usual method for moving casualties.

Vietnam saw further improvements in medical airlift, but the rule still was to move only patients who were fully stabilized. As a result, troops often spent weeks in in-country hospitals, waiting to be sent to the US.

USAF photo by SrA. Brian Ferguson

TSgt. Mark De Corte, a member of the 33rd Expeditionary Rescue Squadron based in Kandahar, deploys in an HH-60 Pave Hawk. The tan footprints painted on the helicopter represent saves.

past where, if you could return to duty within two weeks, we didn't move you from theater."

Today, things move quickly. "Your airway is protected, you're treated for shock, your extremities are stabilized, and then we put you with your ICU team and fly you back," Taylor said. "What we have done is build a system to allow patients to move as soon as half an hour after surgery."

As a result, he said, if you walk through a hospital in Iraq you will see few Americans because most of them have already been airlifted out.

Ready Teams

A typical aeromedical evacuation aircrew today consists of two nurses and three technicians, said Maj. Mary O'Loughlin, chief of the Aeromedical Evacuations Operations Branch Training Division at Scott. Multiple teams are "involved with getting the patient from the hospital to the airframe, and the airframe to their final destination," she added.

The critical care air transport teams are separate from the standard AE teams and travel with the "very critical patients," added Maj. Dale G. Gray, a nurse examiner. The CCATTs consist of a physician, a nurse, and a respiratory therapist. They are allowed to handle up to three patients, but do not fly unless a standard AE team is also on board, because the CCATTs "are not crew members. They are medical support," Gray said.

The difference between the two teams is that the aeromedical evacuation team is "there to interface between the air evac mission and the aircraft mission," said Reineke.

The AE teams "help with the configuration of the aircraft and egress of the aircraft [in] an emergency," he said. "The critical care air transport teams are specifically there to care for the patients, and they don't have the expertise—and it is not their mission—to do that interface" with the aircraft mission.

Training for the aeromedical teams is exhaustive. SMSgt. John T. Truillo, an aeromedical evacuation manager, said that in addition to the regular medical course at Sheppard AFB, Tex., graduates must volunteer for the mission, go to flight school, and undergo survival training that "teaches them the basics on how to escape, ... evade, and resist [capture] as a medical crew member." The training regimen takes "anywhere from half a year to a year" or longer, Truillo said.

"The crews used to be trained on only one type of airframe. Now, our crews are trained on multiple airframes, and this really adds to flexibility," said Col. Naomi M. Boss, deputy chief of aeromedical evacuation current operations. "We're saving more lives because of that."

The AE crews practice cardiac skills, life support, cardiopulmonary resuscitation, and other basic procedures.

Growing Importance

Aeromedical evacuation is more important than ever, said Taylor. For starters, the US has troops operating "much farther away from home than we have had in the past and farther away from robust health care facilities than in the past."

At the same time, if you can "take care of your very sick patients ... and feed them into the medical evacuation system within hours or days, you don't have to have a large hospital forward," Taylor said. "You can actually put a number of small hospitals out in the theater and flow a large number of patients through, if you have a solid aeromedical evacuation system."

The injured service member "may travel through six or eight health care teams" along the way without the care degrading, Taylor said. "Even when traveling long distances in the back of a C-17, the [sickest] travel with their own portable ICU, so it is a remarkable bit of teamwork that appears to be going very well."

The initial care on the ground is vitally important to the survival of the wounded, Taylor said. To improve this first treatment, the services have developed devices such as one-handed tourniquets and hemostatic bandages.

The Air Force also has revised its recuperating "buddy care" program, with new resuscitation kits and more medical training.

The other military services are responsible for moving their patients to the airfields where they can enter the air evacuation system, which was "originally designed to move very large numbers of casualties," Taylor said. Today, the Air Force is moving smaller numbers of patients, but they are frequently in worse shape.

"Fixed wing air evacuation has always been an Air Force mission," he said. It was an Army Air Corps mission during World War II, and the Air Force inherited it as part of the mobility portfolio.

The job is an old one, but the new tactics, techniques, and procedures of the aeromedical evacuation mission mean the Air Force is now performing it better than ever. ■

Bruce D. Callander is a contributing editor of Air Force *Magazine. He served tours of active duty during World War II and the Korean War and was editor of* Air Force Times *from 1972 to 1986. His most recent article for* Air Force *Magazine, "Whatever Happened to the Plain Blue Suit?" appeared in the July issue.*

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USAF photo by MSgt. Lance Cheung

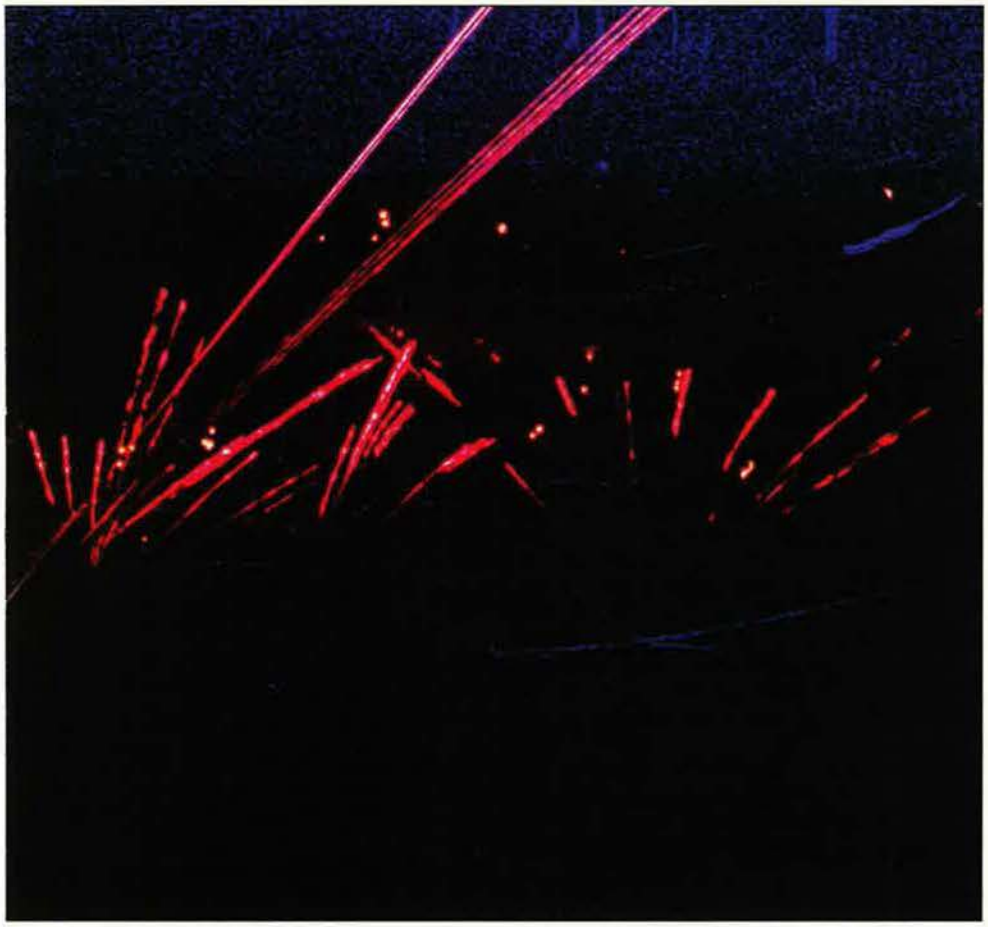
Fade

The F-117 Nighthawk combined low observable characteristics with the pinpoint accuracy of laser guided munitions. These features allowed it to operate with impunity in the dense air defenses around Baghdad, seen above, during Desert Storm.

The world's first operational stealth aircraft, the F-117, is nearing the end of an amazing career.

to Black

By Rebecca Grant



AP photo by Dominique Mollard

It's official. America's first operational stealth aircraft, the F-117 Nighthawk, is set for retirement.

"It is still a good airplane right now," Gen. T. Michael Moseley, Air Force Chief of Staff, said of this strange-looking but highly effective weapon. However, he added, "it's time to start looking at a transition" from the F-117 to something else.

Moseley noted that, after another 10 to 15 years, the service will have F-22s and F-35 Joint Strike Fighters possessing the same low observable characteristics and able to carry more than just two weapons—the F-117's limit.

The Air Force's 2007 budget request called for the retirement by 2008 of the entire fleet, but Moseley later allowed that the day could be postponed to a point at which a larger number of F-22s have entered into service.

The F-117 first saw action in Panama in 1989 during Operation Just Cause. Ever since, the "Black Jet" has been a star player in a new era of air warfare. That new era started with a bang in 1991, when the F-117 matched up stealth and precision during the first Gulf War.

The F-117 is also likely to retire with an amazing distinction: It suffered no combat fatalities. Although one F-117 was shot down in Yugoslavia in 1999, during NATO's Operation Allied Force, that pilot was rescued.

At first glance, it was hard to believe that the oddly shaped aircraft sometimes called the "cockroach" or "stinkbug" could achieve so much.

The Zowie Factor

"When I first looked at [the F-117A]," said Col. Al Whitley, an early Nighthawk pilot, "it reminded me of some Star Wars type of aircraft. I thought, 'Boy, is this the 21st century!'" Whitley later flew F-117s in Panama and Desert Storm as commander of the 37th Tactical Fighter Wing, Nellis AFB, Nev. (See "The Secret Doings at Tonopah," January 1993, p. 72.)

The F-117 began as an idea. Starting in the 1940s, aircraft designers had sought ways to spoof radar. Aircraft such as the SR-71 incorporated some signature reduction techniques. By 1974, the Defense Advanced Research Projects Agency's "Project Harvey" was casting about for ways to reduce radar cross section.

The breakthrough came in 1975, when a Lockheed computer scientist named Denys Overholser saw inspiration in a translated Soviet paper. Lockheed ginned up a computer program to measure and predict how different shapes could diminish the amount of energy reflected back to a tracking radar.

The trick was to combine radar absorbing materials with an aircraft built of angles and facets to reduce its radar cross section. If designed properly, according to these revolutionary principles, a full-scale fighter jet might send back no more energy than a tiny object.

Of course, it would look like no airplane ever seen before. The engineers nicknamed their concept the "Hopeless Diamond."

Ben Rich, the head of Lockheed's Skunk Works, sold the Air Force on the

Lockheed Martin photo

Lockheed Martin built the "Have Blue" F-117 prototype seen here for the Defense Advanced Research Projects Agency in the 1970s. The F-117 first flew in 1981, but the program remained under wraps for seven years.

idea, and the stealth era was born. (See "How the Skunk Works Fielded Stealth," November 1992, p. 22.)

Another big supporter was William J. Perry, who arrived at the Pentagon as defense undersecretary for research and engineering in 1977.

Two Have Blue prototypes were built for DARPA. The first began flying in December 1977. By that summer, and in a precursor to the aircraft's teething problems, both had crashed. Fortunately, the birds had flown long enough to demonstrate stealth's potential.

Radar range tests on the prototypes had quickly proved the theories of stealth. The F-117 was not exactly invisible. It was just extremely hard to detect and distinguish.

Aviation historian Don Holloway later described the F-117 on radar as "at most, a low-intensity, nebulous radar sparkle that was nearly indistinguishable on a radar scope from background noise until the aircraft was well within a ground missile's minimum launch range." The phenomenon gave the pilot of the stealth aircraft a tremendous advantage over the radar operators of the surface-to-air missile crew.

A total of 59 operational F-117s were secretly and quickly built, often using off-the-shelf parts. For years, Lockheed Martin maintained the aircraft under contract.

"We guaranteed to deliver an aircraft which would have stealth characteristics, be virtually undetectable by today's known radar technologies, and be able to deliver a weapons system with unprecedented accuracy," said Rich.

The Air Force also took the important step of making the F-117 a precision bomber. Armed with two laser guided GBU-27s, weighing 2,000 pounds apiece, the F-117 could attack hard targets with pinpoint accuracy.

The Nighthawk's fighter designation is a misnomer. Everything about it was optimized to excel at precision attack. It carries no air-to-air weapons, and its unorthodox shape had less-than-ideal aerodynamics. The aircraft would never "fight" another aircraft.

At First, Doubts

There were early doubts about what this secret aircraft could really do in air warfare.

One of the few who learned about the program in the early 1980s was Buster C. Glosson, then a colonel on the Air Staff. He remembered his boss telling him about a classified prototype based on radar cross section reduction.

"I didn't have any idea how good it was," Glosson wrote later. "We had to work it secretly with committees on Capitol Hill and enter that money in the budget in ways that were not obvious."

These were serious dollars. "It was awfully expensive," said Glosson, "but you had to be oblivious to warfighting not to see the benefits."

The F-117 remained one of the Air Force's biggest secrets. From the time of its first flight in June 1981, no one acknowledged the existence of the program. Production aircraft began flying steadily in 1982. Even fatal crashes in 1986 and 1987 did not unmask the program. The Air Force took extraordinary precautions, going so far as to plant parts from an F-101 after one of the crash sites had been cleansed.

The secrecy ended on Nov. 10, 1988 when the Air Force published a grainy picture of the F-117 and officially acknowledged its existence.

Still, few had seen the Black Jet up close. "Prior to April 21, 1990, nobody could get close to those airplanes," recalled Bobby Shelton, a former public affairs officer for the Air Force, in a February interview with the *Las Vegas Review-Journal.*

The rollout was a media sensation. "We had it cordoned off with a 50-foot cord and had a mini-open house at Nellis. We had about 350 media types from around the world in addition to tens

USAF photo by TSgt. Kevin J. Gruenwald

SSgt. Robin Walker (l) and SSgt. Greg Slavik prepare an F-117 for a Red Flag mission at Nellis AFB, Nev. F-117s are based at Holloman AFB, N.M.—where these two crew chiefs are assigned—and at Eglin AFB, Fla.

AP photo by Vladimir Dimitrijevic

The Black Jet's aura of invincibility ended in 1999 when one was shot down northwest of Belgrade during Operation Allied Force. The pilot was rescued. Above, a group of Yugoslavians inspects the wreckage.

of thousands of people from the Las Vegas area," Shelton said. "For some, it was probably the ugliest airplane that anybody had ever seen."

By then, the F-117s flying in the Nevada desert had already built a combat track record.

The original concept of operations saw the F-117s as a clandestine, silver bullet force. Special operations or intelligence agencies could direct the F-117 to attack key enemy facilities. Planners contemplated using the F-117 in the Operation El Dorado Canyon raid on Libya in 1986, for example, but scrapped the idea at the last minute. The risk of revealing the aircraft's existence at the height of the Cold War was deemed too great.

Room for Improvement

The F-117's combat debut came three years later in Operation Just Cause in December 1989. Six aircraft departed Tonopah for the flight to a target in Panama. This was not heavily defended airspace, so there was no true test of the F-117's effectiveness against an integrated air defense system.

Instead, planners called on the Nighthawk because they wanted the heavy-duty laser guided bombs carried in the F-117's bomb bay. Two F-117s attacked targets near the Panamanian Defense Force barracks on Dec. 19. It was an inauspicious combat debut—one of the bombs missed its target by more than 300 yards.

The real triumph of the F-117 came in Operation Desert Storm in 1991. The F-117's combination of stealth and precision attack capability proved its worth against a far more daunting target set: Iraq.

F-117s deployed to remote Khamis Mushayt, on the Red Sea coast of Saudi Arabia. Thirty-six of the aircraft were in place when the war began.

Still, no one was completely sure stealth would work. Commanders worried about sending the F-117s in alone to attack critical targets. A controlled test at Nellis using the best Air Force personnel in the adversary role suggested that, on a bad night, the Iraqi air defense system might shoot down one in 10 of the F-117s.

Glosson was now in theater helping Lt. Gen. Charles A. Horner, the combined forces air component commander, mastermind air campaign planning. The F-117's potential for strategic attack was so great that Glosson ignored the naysayers.

"Nobody ever guaranteed we wouldn't lose an F-117," Glosson told the Tactical Air Command chief, Gen. Robert D. Russ, but "unless we have a mechanical malfunction, the Iraqis won't put one hole in an F-117."

F-117 pilots had qualms, too. One pilot, Maj. Joe Salata, later told *Airman* magazine that squadron scuttlebutt estimated only half the pilots in the first wave of 10 would survive the Baghdad raid. "My biggest fear," said then-Maj. Mike Mahar, was that "if I live through tonight, I'll be the only F-117 pilot who survived."

As it turned out, the F-117 and its pilots did far better.

On the night of Jan. 17, 1991, the F-117s launched in three waves. Four, on different flight paths, became the first coalition aircraft to cross into Iraqi airspace that night.

Two Air Force special operations Pave Low helicopters led in four Apache helicopters from the Army's 101st Airborne Division to destroy early warning radars on the border at a site code-named Objective Omaha. By then, the first-wave F-117s were already 50 miles inside Iraq and heading to separate targets. They hit an Iraqi integrated air defense command center, communications centers, Iraqi Air Force headquarters, one of Saddam Hussein's many presidential palaces, and most famously the Iraqi communications tower known as the "AT&T building."

That's when CNN went off the air.

An hour later, wave two F-117 pilots had the awe-inspiring experience of seeing glowing anti-aircraft artillery fire on the horizon.

"When I saw the triple-A, I also didn't think we'd all make it through," Salata said.

Still, they struck their targets, and a third wave hit suspected biological weapons bunkers just before dawn.

Everybody Made It

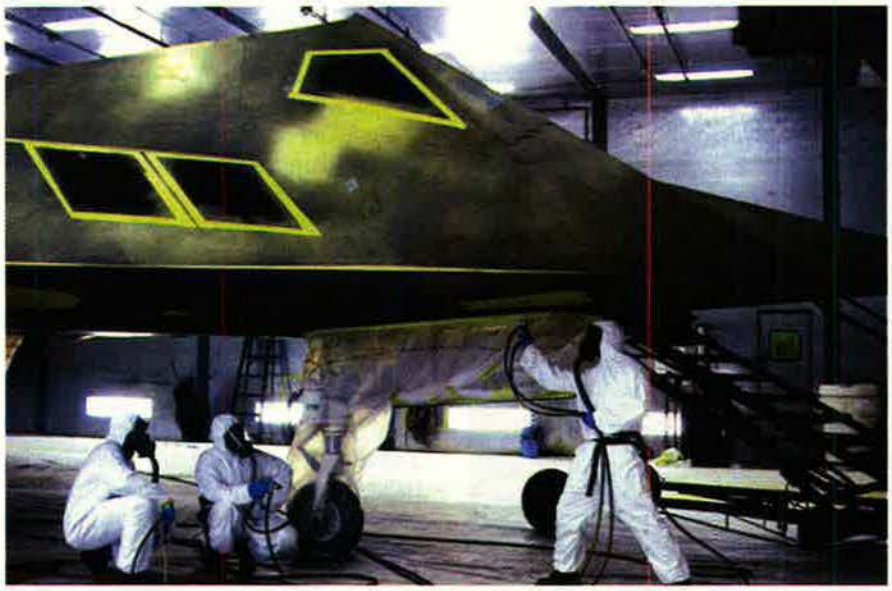
Heading home, Salata listened for his fellow F-117 pilots to check in. "Initially, I heard only five of the 10 guys check in," he said. "So when I landed back at Khamis Mushayt, I thought we'd lost five guys. It was a real relief when I went around the squadron and saw everybody there."

The critical role of the F-117s in Desert Storm did not cease after night one. Under wartime conditions, the pilots and their Black Jets proved adept and flexible.

On one occasion, two F-117s flew in under a cloud deck at 5,000 feet and attacked two separate targets over downtown Baghdad. To mitigate risk, they approached from the north, which added to the flying time.

On Jan. 24, F-117s went north to attack bioweapons bunkers in the vicinity of Mosul. The target area was so far north aerial tankers had to cross well into Iraqi airspace to give the F-117s prestrike and poststrike refueling. "There was no other aircraft that could have successfully completed that mission," Glosson attested.

Many times F-117s changed their targets on short notice. Risk reduction demanded the F-117s fly a carefully planned route to keep their signature



USAF photo by A1C Vanessa LaBoy

low while entering a threat zone. Most pilots rehearsed the mission routes in simulators. Still, the pilots changed targets 40 minutes before takeoff on one particular occasion.

Not that the missions were easy. One pilot likened the feel of anti-aircraft fire around an airfield target to being "inside a popcorn popper."

The F-117's success came from the synergy of stealth and precision. It was the only aircraft able to provide that overmatch during most of the 1980s and 1990s.

Salata's description of a mission where he attacked a bridge in Baghdad showed just what an incredible edge the F-117 delivered. Salata started to aim for the attack, then noticed a car starting to drive across the bridge. "I actually aimed behind him, so he could pass over the bridge," he said.

Thanks to laser designation, "you can pick and choose a little bit in the F-117," Salata explained. "In any other type of aircraft, I would've never had the opportunity to move my spot. I would've missed everything, and then I wouldn't have been able to see what happened anyway. Stealth allows us to look longer at the targets before release, as well as after release."

The F-117s flew 1,271 sorties in Desert Storm. The Pentagon's official report put the achievement in perspective. "Over the course of the war, the deployed F-117s flew approximately two percent of the total attack sorties, yet struck about 40 percent of the strategic targets attacked," the report stated. "It was the only aircraft to attack targets in downtown Baghdad and to hit targets in all 12 categories."

USAF officials stuck to a policy of revealing no details about the crash or the rescue. Sources cited evidence suggesting "the plane was hit by a Yugoslav SA-3 missile" active in the area at the time. Other reports hinted that the Serbs tracked the fighter optically using an intricate network of ground observers. Fortunately, an audacious rescue retrieved the pilot from enemy territory.

The Air Force decided not to bomb the wreckage. Gen. John P. Jumper, commander of US Air Forces in Europe at the time, later said it would have been "very, very hard to duplicate" a stealth aircraft by reverse engineering it from the wreckage. In any event, the F-117 used "second generation" stealth—technology that was already 20 years old.

USAF photo by SSgt. Vince Parker

The F-117 at top receives a coat of primer from technicians of the 49th Aircraft Maintenance Squadron at Holloman. Above, a group of Nighthawks wait on the flight line during a stopover at Langley AFB, Va.

Even more incredible, no F-117s were lost or even damaged due to air defenses.

During Operation Allied Force, the NATO air war over Yugoslavia in 1999, a total of 24 F-117s deployed to Aviano AB, Italy, where they flew more than 300 sorties.

The Black Mark

Serbian integrated air defenses were dense and deadly. Three nights into the war, the seeming invincibility of the F-117 came to an end.

On March 27, 1999, an F-117 with the call sign Vega 21 went down. Public interest spiked with dramatic television pictures of the wreckage clearly showing the aircraft's Holloman Air Force Base markings.

Jumper still praised the F-117's performance. He said in August 1999 that "we put our stealth assets into the most dangerous places night after night and after the hundreds of sorties that have been flown in most dangerous situations, the loss of one is certainly better than any of us expected."

The passage of time was beginning to raise questions about the F-117's long-term future. Air Combat Command set a tentative retirement date of 2018 for the F-117. That would take the aircraft just beyond 30 years of service life. However, officials told *Air Force* Magazine in 2001 that the F-117 had not been maneuvered very aggressively, and ACC believed its airframe could conceivably last until 2030 or later. (See "Two Decades of Stealth," June 2001, p. 32.)

Lockheed Martin photo

USAF continued to improve the F-117's capabilities, even as plans were made for the F-22 Raptor to take over most of its missions. The exact retirement date for the Black Jet has not been set, and there is Congressional opposition to the move.

Last Hurrah?

Two years later, the F-117s played their critical and unique role again at the start of Operation Iraqi Freedom on March 19, 2003. Intelligence sources thought they had pinpointed Saddam Hussein, which called for an immediate strike just hours before the war was set to begin.

The deployed squadron was on a wartime footing and had two F-117s in pristine condition—with low observable maintenance complete to combat standards—and ready to go. To solve the problem of low clouds over Baghdad, the F-117s were armed with the EGBU-27s whose seekers could track targets using GPS coordinates.

Mission pilots Lt. Col. David F. Toomey III and Maj. Mark J. Hoehn had a two-hour flight to Baghdad. It was a dangerous mission for the F-117s, because dawn would be breaking about the time the pilots dropped their bombs.

At 5:34 a.m. Baghdad time, four 2,000-pound bombs exploded on their targets. Army Gen. Tommy R. Franks, head of US Central Command, praised the F-117 mission as "about as close a [feat of] coordination as I have ever seen work a time-sensitive or an emerging target." Unfortunately, Saddam was not at the location.

All told, 12 F-117s flew more than 100 sorties during Iraqi Freedom's major combat operations phase. As was the case in 1991, none were damaged or lost. Maintainers kept the F-117 mission capable rate at a laudable 89.3 per cent, better than the rates for the deployed F-15Cs and F-15Es.

The Air Force continued to improve the F-117's capabilities, especially avionics, maintainability, and weapons.

Given that track record, even the tentative retirement date of 2018 did not seem real. But the F-22 Raptor was on the way.

Initial design plans for the F-22 were laid out while the F-117 was still in the black world and flying at Tonopah. With the passage of time, the Air Force had developed the technology to make a jet aircraft stealthy as well as fast and maneuverable. Vastly improved radar absorbing materials enhanced performance and made maintenance easier.

By late 2003, the Air Force was moving to operational tests on its newest stealth platform: the F-22. The first serious move to retire F-117s came in early 2004 with a proposal to cut up to 12 jets. That initiative evaporated in the face of Congressional resistance.

Still, the grand plan was clear. When the F-22 was ready, it would take over the roster of missions previously flown by the F-117.

In December 2005, the Air Force declared the F-22s of the 27th Fighter Squadron at Langley AFB, Va., ready for operations. Today's F-22 is not a perfect replacement for the F-117, however. Raptors do not currently offer the pinpoint accuracy of the Nighthawk's laser guided weaponry.

As the F-22 became operational, final work on the 2006 Quadrennial Defense Review and the Fiscal 2007 budget was under way at the Pentagon.

Given the Air Force's goal of recapitalization, the F-117 fleet was a natural target for retirement. One estimate projected savings up to $1.1 billion from the procurement accounts and $5.1 billion from associated manpower accounts stemming from the F-117 retirement.

Still a Shock

Even so, the decision to begin F-117 retirement came as a shock to many. "The Pentagon has not made a credible case for wanting to retire these stealth fighters," protested New Mexico Sen. Jeff Bingaman (D). "In my view, the F-117s remain an important part of the Air Force's fleet, and there is no good reason to retire them."

"I am strongly opposed to the retirement of F-117s. They are vital to the overall Air Force mission," echoed Sen. Pete V. Domenici (R-N.M.).

Balm on the wounds came in the form of strong indications that USAF would base F-22s at Holloman. "The announcement of Holloman as a preferred location for beddown of an operational F-22A unit makes sense," said Gen. Ronald E. Keys, Air Combat Command chief, in March 2005. "This is a clear acknowledgement of the outstanding flying weather, ranges, facilities, and community support the base enjoys."

The F-117 will stay combat ready even as F-22s are slated to begin arriving at Holloman as soon as 2008.

"We remain focused on providing combat-ready F-117s and aircrews for any worldwide location, should we receive the call to send them into combat," said Maj. Gen. Kurt A. Cichowski, who was 49th Fighter Wing commander at Holloman until May.

The exact retirement plans have yet to be worked out between the Administration and lawmakers, so the F-117 fleet enters its last days much as it began. The F-117 stands ready in the desert, prepared to bring stealth and precision wherever it is sent. ■

Rebecca Grant is a contributing editor of Air Force *Magazine. She is president of IRIS Independent Research in Washington, D.C., and has worked for* Rand, *the Secretary of the Air Force, and the Chief of Staff of the Air Force. Grant is a fellow of the Eaker Institute for Aerospace Concepts, the public policy and research arm of the Air Force Association. Her most recent article, "Airpower in a Fragmented Battlespace," appeared in the July issue.*

From the earliest days of the space program, USAF has supplied top space operators.

Air Force Astronauts

Project Mercury astronauts (l-r): Lt. Scott Carpenter, Capt. Gordon Cooper Jr., Lt. Col. John Glenn Jr., Capt. Virgil Grissom, Lt. Cmdr. Walter Schirra Jr., Lt. Cmdr. Alan Shepard Jr., and Capt. Deke Slayton. Cooper, Grissom, and Slayton were all active duty USAF airmen.

In the early 1960s, seven Americans gained immortality as the first US astronauts in the Mercury program. Three were from the active duty Air Force: Capt. Virgil I. "Gus" Grissom, Capt. Donald K. "Deke" Slayton, and Maj. L. Gordon Cooper Jr.

These were the first of more than 80 Air Force astronauts to participate in the Mercury and succeeding Gemini, Apollo, Skylab, Apollo-Soyuz, space shuttle, and International Space Station missions. Their collective achievements did not come without sacrifice. Of the 27 NASA astronauts who have died during their time in the space program, eight came from the Air Force.

By Walter J. Boyne

The National Aeronautics and Space Administration was created on Oct. 1, 1958. NASA was formed from the former National Advisory Committee for Aeronautics, which transferred its facilities, personnel, equipment, and advisory committees.

Yet NASA had a clearer and much more broadly defined charter than NACA, for it was the US response to the incredible space accomplishments of the Soviet Union.

Only six days after NASA's formation, it announced Project Mercury, with the objective of placing a manned spacecraft into orbit around the Earth. The initial criteria for selection as a Mercury astronaut were as follows:

- Less than 40 years of age
- Height not greater than 5 feet 11 inches
- Excellent physical condition
- Bachelor's degree or equivalent
- 1,500 hours total flying time
- Graduate of a test pilot school
- Qualified jet aircraft pilot

Over the years, these criteria would be modified as circumstance required and as scientific demands increased.

The Mercury missions were to investigate human reactions and capabilities in the strange new environment of space, with the fundamental premise that the spacecraft and pilot were to be recovered safely.

The Gemini missions were to learn how to maneuver a spacecraft in orbit so as to be able to rendezvous and dock with other vehicles. The Gemini missions also featured the first American extravehicular activities (EVAs), which would be required for lunar surface exploration.

The Apollo missions were to fulfill President Kennedy's challenge, to place a man on the moon by the end of the 1960s, by using the lunar orbital rendezvous (LOR) technique. This called for a spacecraft to be launched from the Earth to the moon, then enter an orbit around the moon and separate into a command module and a lunar module. The latter would touch down on the moon's surface with two astronauts. A third astronaut would continue to orbit the moon in the command module. After exploring the surface, astronauts would re-enter the lunar module, then rejoin their colleague in the command module for the trip home.

All three of the programs were fraught with technical risk, but provided the only apparent means to beat the Soviets to a moon landing. And all three were tremendously successful, thanks in great part to the contributions of the Air Force astronauts.

While it is perilous to single out individual astronauts for acclaim, in each program there were those who distinguished themselves by daring feats of skill and courage—or by some chance element of fate.

First among the notable astronauts is Capt. Virgil I. "Gus" Grissom. Flying the Liberty Bell 7 spacecraft, Grissom entered the history books on the second and final Mercury suborbital flight on July 21, 1961. He entered legend when the hatch popped open on the spacecraft on splashdown. Grissom was rescued from the water, but the capsule sank 15,000 feet into the Atlantic, not to be recovered until 38 years later.

A tough fighter pilot who had flown 100 missions in F-86s in Korea, Grissom became dominant in the design of the Gemini spacecraft at the contractor's plant and was the first person to complete two flights into space.

Flying with NASA civilian John W. Young in 1965, Grissom exercised complete control of the spacecraft in a convincing demonstration that the problem of altering orbit in flight was solved.

After serving as a backup pilot on Gemini 6, Grissom was selected as the command pilot for the first Apollo flight. Intensely involved in the Apollo program, Grissom was one of three men killed in the tragic Jan. 27, 1967 flash fire in Apollo 1, during a launchpad test.

Air Force Lt. Col. Edward H. White II and Lt. Cmdr. Roger B. Chaffee also died in the disaster. White had previously made the first American space walk, on Gemini 4 in June 1965.

The Gemini program produced an astounding array of feats from Air Force astronauts, from White's dramatic EVA to Cooper's masterful handling of a long series of emergencies on Gemini 5.

Buzz Aldrin is notable for his intensive planning and execution. Aldrin, now a USAF retired colonel, had helped solve the problem of how to train for walking and working in the free fall of Earth orbit by suggesting training in a swimming pool. The practice sessions

Apollo 1 astronauts (l-r): Capt. Virgil Grissom, Lt. Col. Edward White, and Lt. Cmdr. Roger Chaffee. All three men were killed in a Jan. 27, 1967 fire that broke out in their capsule during a launchpad test.

served him well when Gemini 12, the last mission of the series, was launched on Nov. 11, 1966 with command pilot Navy Capt. James A. Lovell Jr.

Aldrin's mathematical skills came into play when charts of his own making were used to guide his spacecraft to a rendezvous with the Agena target vehicle. The previous American record for an EVA had been held by Navy Capt. Eugene A. Cernan, who on the Gemini 9 flight set a record two-hour, 10-minute space walk.

Aldrin executed a record EVA of five hours, 30 minutes and, thanks to his pool training, did it with little sign of physical stress. NASA subsequently built a huge weightless environment training facility to train its shuttle EVA crews.

Thirty astronauts would participate in Apollo flights, and about half were from the Air Force.

Similarly, of the 12 men who walked on the moon, four wore USAF wings—Aldrin, retired Col. David R. Scott, retired Col. James B. Irwin, and retired Brig. Gen. Charles M. Duke Jr.

Each of the Apollo flights was significant, but the most famous was the July 1969 Apollo 11 mission, in which two Air Force astronauts, Aldrin and Michael Collins, participated.

Neil A. Armstrong, a NASA civilian astronaut and Navy veteran, was the Apollo 11 mission commander and the first man to set foot on the moon. He was followed on the lunar surface by Aldrin, while Collins orbited the moon above them.

NASA saw a requirement for more astronauts and in 1965 selected a new breed, called "scientist-astronauts," to join the ranks of astronaut aspirants. The disciplines most needed were geology, geophysics, medicine, and physiology.

The selection criteria no longer included being a test pilot. Scientists who were not qualified pilots were to be taught to fly after they joined the program. More than 1,000 applications were received, and in June 1965, NASA announced that six were selected. Of these, two had Air Force ties: Duane E. Graveline, who was still on active duty with the Air Force, and F. Curtis Michel, a former USAF member. They were the first of many more scientist-astronauts to come from Air Force ranks.

As the astronaut program expanded and qualities other than those possessed only by test pilots were needed, the astronaut corps included a dazzling variety of skills and talents. Thus, while military jet aircraft pilots are still best suited to actually fly the space shuttle through its complete mission, equally challenging scientific tasks can be handled by mission specialists who do experiments, manage the shuttle's robot arm, conduct extravehicular activities, and more.

The first non-test pilot astronaut was NASA civilian Russell L. "Rusty" Schweickart, who flew on Apollo 9, and the first non-test pilot scientist-astronaut to venture into space was NASA civilian Harrison H. Schmitt, the lunar module pilot on Apollo 17, the last flight of the series.

Astronaut-scientists were members of each of the crews of the three manned Skylab missions. This early space station, coming on the heels of Apollo, was never fully appreciated and never captured the public's imagination as the moon flights did.

William R. Pogue, an Air Force veteran of F-84 combat in Korea, added to his career on the third manned Skylab mission. As pilot, Pogue, with Gerald P. Carr (USMC) and civilian astronaut-scientist Edward G. Gibson, guided the Skylab crew through 1,214 Earth orbits and four EVAs.

In July 1975, the possibility of political detente was signaled when an Apollo

Air Force Col. Eileen Collins sits in the cockpit of the Shuttle Training Aircraft at NASA's Kennedy Space Center. Collins, who retired in 2005, was the first female pilot and commander of a space shuttle.

spacecraft docked with a Soviet Soyuz spacecraft.

The Apollo was commanded by an Air Force space veteran, Thomas P. Stafford. Selected among the second group of astronauts in September 1962, he made his first spaceflight aboard Gemini 6 in December 1965. The following June, he commanded Gemini 9, demonstrating an early rendezvous technique that would be used in the Apollo program. Stafford commanded Apollo 10 in May 1969 and flew a test flight within 10 miles of the moon's surface. The Apollo-Soyuz mission was his last spaceflight—and the first meeting in space of American astronauts and Soviet cosmonauts.

Deke Slayton, who had to drop out from the Mercury program because of a heart condition, made his first spaceflight as the Apollo docking pilot on this mission.

Despite—or perhaps because of—this rapid succession of achievements, the American public was becoming sated with space triumphs. The knowledge that the Soviet Union already possessed a powerful intercontinental ballistic missile force simultaneously made its space effort seem less threatening.

There was also a change of pace within the astronaut program. Where the Mercury astronauts went from selection to flight in less than three years, astronauts for the later missions had to look forward to long and unspecified delays before being assigned to a flight crew.

The delays often lasted many years, and astronaut aspirants stayed busy with training and with work as a backup or support crew member. It took even more motivation to be dedicated to the cause of being an astronaut, because it was uncertain that the final goal, a flight in space, would ever be reached.

Guion Bluford Jr., pictured here onboard the STS-8* Challenger, *exercises on a treadmill while restrained by harness. As an Air Force lieutenant colonel, Bluford was the first African-American astronaut to fly in space.

In their memoirs, the early astronauts attribute their desire to fly in space to many causes, but the common denominator seems to be a driving urge to explore, to raise the limits of human capability, and to be on the forefront of both American science and defense.

Astronauts who came into the program later, while often feeling the same sentiments, were also inspired by those who had gone before.

The early enthusiasm for the space program masked the fact that becoming an astronaut was not necessarily a career enhancing move. The very nature of the astronaut program took its members outside the normal Air Force career progression path, particularly in wartime.

There were other dissatisfactions. The demand on the astronaut's time was great, and the families sometimes suffered when the astronaut was away on lengthy temporary tours of duty. Offsetting this was the comfort derived from the stability of a NASA job in Houston, in contrast to the constant moves of the typical Air Force family.

Compensation was another consideration. Active duty officers received their normal pay while on detached duty to NASA. Everyone entering the astronaut program knew in advance that the pay was far from that which might be earned in comparable work in academia or in industry. Nonetheless, when family emergencies arose, or when their

A Sample of the Airmen in NASA

Sputnik's first surprise beep from orbit on Oct. 4, 1957 began a dismal period of playing catch-up for the United States. The USSR's lead in the space race reached its zenith on April 12, 1961 when cosmonaut Yuri Gagarin flew his Vostok 1 spacecraft on the first manned orbital flight in history.

The Kennedy Administration and Congress sensed the American public's demand to win the space race and opened the nation's coffers to a vigorous, expanded NASA. Air Force personnel would—and continue to—play starring roles.

Twenty-nine astronauts now working for NASA have former ties with or are currently members of the Air Force, and like their predecessors, they are highly qualified. Following is a cross section of a few of the many airmen made available to NASA:

* Col. Lee J. Archambault is a veteran of 22 combat missions in the F-117A during Operation Desert Storm. Archambault entered astronaut training in August 1998 and has since supported launch operations and served as capsule communicator.

* Col. Michael J. Bloomfield was an honor graduate of USAF Test Pilot School before selection by NASA in 1994. He is a veteran of three spaceflights and has logged more than 753 hours in space.

* Col. Yvonne Darlene Cagle has service as a flight surgeon, which helped qualify her for a NASA flight assignment as a mission specialist.

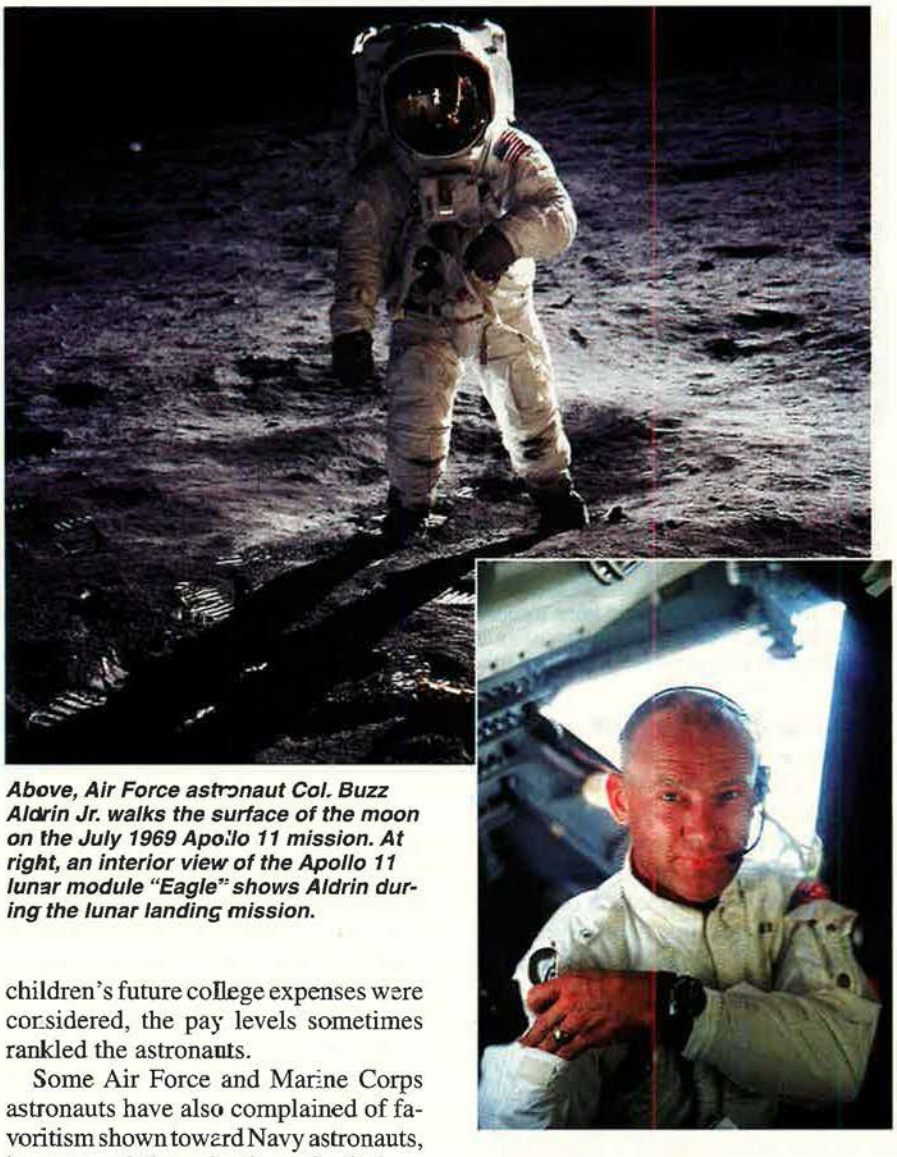
* Retired Col. John H. Casper, a former Wild Weasel pilot, has logged more than 10,000 hours of flying time—and another 825 hours in space.

* Lt. Col. Edward M. "Mike" Fincke is a scientist and graduate of the Air Force Test Pilot School Flight Test Engineer Program. Fincke spent six months aboard the International Space Station, where he made four spacewalks.

* C. Gordon Fullerton, a retired colonel, flew more than 13,000 hours in aircraft and the shuttle prototype *Enterprise*. He has also logged more than 380 hours in space on two space shuttle missions.

* Col. James D. Halsel Jr. has been on five spaceflights. He flew the SR-71 before becoming an astronaut in 1990. Since then he has logged more than 1,250 hours in space.

* Col. Pamela Ann Melroy flew the KC-10 tanker for six years and has combat experience, having flown 200 combat hours during Operation Just Cause and the 1991 Gulf War. She has logged more than 600 hours in space on two space shuttle missions.



Above, Air Force astronaut Col. Buzz Aldrin Jr. walks the surface of the moon on the July 1969 Apollo 11 mission. At right, an interior view of the Apollo 11 lunar module "Eagle" shows Aldrin during the lunar landing mission.

children's future college expenses were considered, the pay levels sometimes rankled the astronauts.

Some Air Force and Marine Corps astronauts have also complained of favoritism shown toward Navy astronauts, in terms of the selection of missions and positions. This favoritism—if in fact it ever took place—seems a thing of the past.

Perhaps most telling, as NASA and the astronaut corps aged, bureaucratic procedures grew, creating another source of discontent.

But, significantly, few astronaut aspirants ever left the program. There were many inconveniences and the challenges were great—but the rewards of actually traveling in space and contributing to America's great space adventure made the delays, uncertainties, and inconveniences worthwhile for most.

Despite the career challenge that space service creates, eight Air Force astronauts have become general officers. Most notable is Gen. Kevin P. Chilton, the head of Air Force Space Command, who reached four-star rank after flying on three space shuttle missions.

The seven others are Lt. Gen. Thomas P. Stafford, Maj. Gen. William A. Anders, Maj. Gen. Roy D. Bridges Jr., Maj. Gen. Michael Collins, Brig. Gen. Charles M. Duke Jr., Brig. Gen. Susan J. Helms, and Brig. Gen. James A. McDivitt.

From its memorable first manned flight on April 12, 1981 to its current workman-like support of the International Space Station, the space shuttle has been both a triumphant scientific achievement and the center of a growing controversy over its cost, schedule, and implicit hazard.

Space shuttle and International Space Station veterans include many airmen. Among the most notable is retired Air Force Col. Jerry L. Ross, who is now chief of the Vehicle Integration Test Office and chief astronaut, NASA Engineering and Safety Center.

Ross received his commission after ROTC at Purdue in 1970. He has flown more than 3,900 hours in 21 different aircraft. But more importantly, as the first human being to be launched into space seven times, he holds the current US records for space walks (nine) and space-walking time (58 hours, 18 minutes). His seven shuttle flights between 1985 and 2002 included one to the Russian Mir and two to the International Space Station.

Col. Guion S. Bluford Jr. was the first African-American astronaut to fly in space. His experience with 144 combat missions in Vietnam was bolstered by serving as a mission specialist on four space shuttle flights.

Col. Eileen M. Collins flew four missions from 1995 to 2005 and was the first female pilot and commander of the space shuttle.

Former USAF Capt. Thomas D. Jones logged four spaceflights and performed three space walks lasting more than 19 hours.

Col. Richard M. "Mike" Mullane flew three space shuttle missions, logging 356 hours in space.

Two tragic accidents have clouded the aura of the space shuttle. The first of these, the *Challenger* disaster of Jan. 28, 1986, claimed the lives of seven people. Among them were shuttle commander Francis R. "Dick" Scobee, who had retired from a distinguished career with the Air Force before joining NASA, and USAF Lt. Col. Ellison S. Onizuka, a mission specialist.

In the second disaster, the space shuttle *Columbia* broke up and was destroyed on re-entry into the atmosphere on Feb. 1, 2003. Seven crew members were again killed, and once again two had Air Force ties. Col. Rick D. Husband, the space shuttle commander, and payload commander Lt. Col. Michael P. Anderson died in that tragedy.

While President Bush has set ambitious goals for NASA and the space program, budget realities threaten the timing and the scope of future manned space exploration in the near term. Whatever happens, however, Air Force astronauts will continue to be in the forefront of American space exploration. ■

Walter J. Boyne is a contributing editor of Air Force *Magazine. He is a former director of the National Air and Space Museum in Washington, a retired Air Force colonel, and an author. He has written more than 600 articles about aviation topics and 40 books, the most recent of which is* Roaring Thunder. *His most recent article for* Air Force *Magazine, "The Famous Flying Lockheed Brothers," appeared in the August issue.*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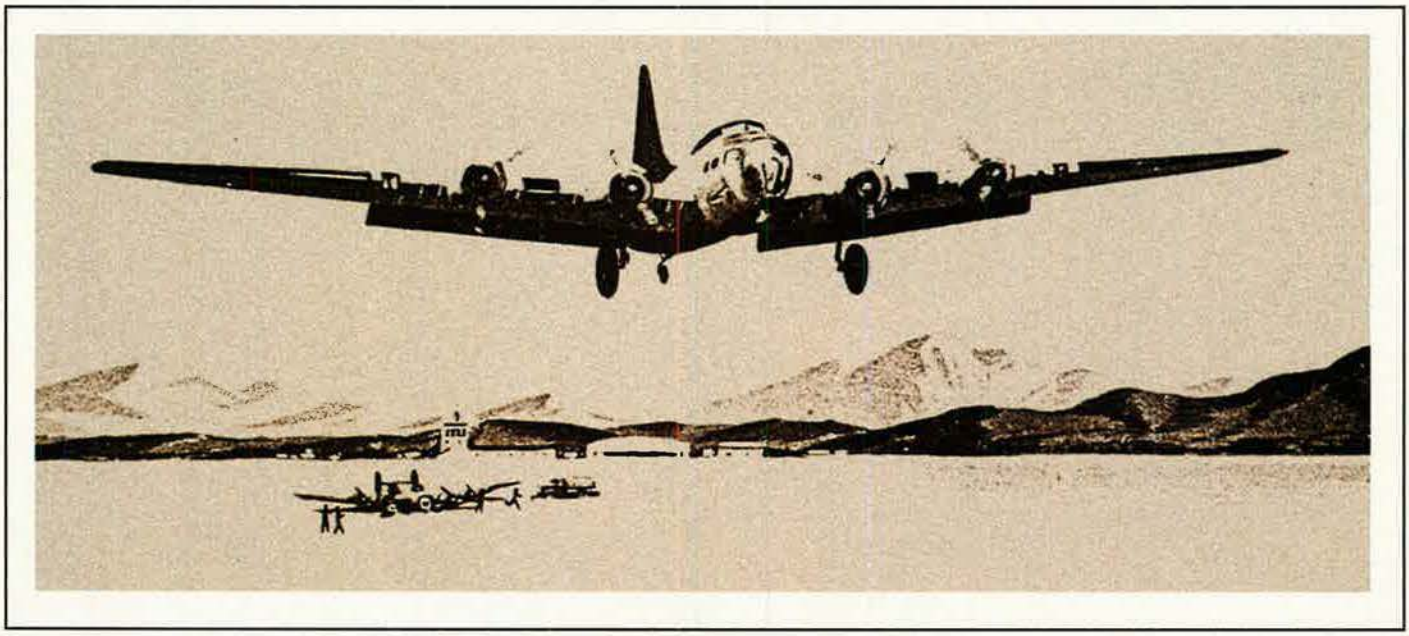
How did the B-17 become the public's beloved favorite and the B-24 a respected runner-up?

The Making of an

Illustrations courtesy of Peter M. Bowers collection



There is no real point in challenging the revered status that the B-17 Flying Fortress enjoys among heavy bombers. At this late date, nothing is going to change that. Perhaps, though, the strangely secondary position handed down to the B-24 Liberator should be re-examined.

The icon-creation process over the years has cast some of the era's aircraft—notably the B-17—into permanent positions of great prominence. In the pantheon of World War II bombers, the B-17 unquestionably occupies the top position in the public mind.

The Army Air Forces, and some of its leaders, occasionally contributed overtly to the canonization of the Flying Fort. At other times, in an act of perhaps inadvertent fairness, the service mocked the B-17s before audiences of B-24 crews.

The two heavyweight contenders for the title of best World War II bomber were born nearly a half-decade apart. The sleek, streamlined B-17 had four engines jutting from its fat airfoil as evidence of Boeing's bold (by 1935 standards) engineering. The B-17 reposed on a conservative tailwheel and relied on split flaps to help slow its landing speeds. A strong circular fuselage cross section and low-mounted bridge-truss wing construction made it stout and strong, just right in the event of a ditching or belly landing.

Consolidated Aircraft's B-24 was a major rival. By 1939, Consolidated's design team had embraced the obvious advantages of four engines but shunned just about everything else in the B-17 design. The B-17's Wright Cyclone engine nacelles were split by the wing; the B-24, in a conscious effort to keep the Davis wing's upper surface undisturbed, slung its Pratt and Whitney engines nearly flush with the top of the airfoil.

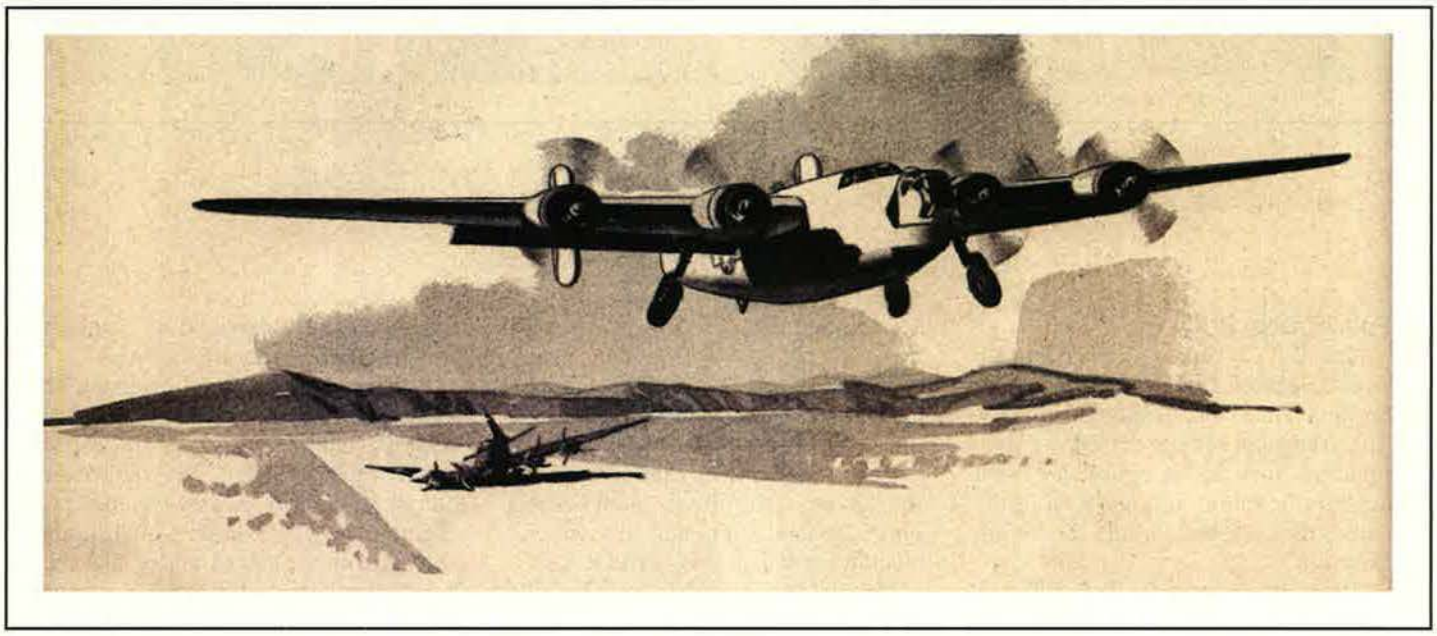
That high-speed wing carried with it the penalty of fast landing speeds. However, the Liberator's newer area-increasing flaps offered benefits superior to those of the Fortress' *passe* split flaps.

Most noticeably, the XB-24 presaged the 1940s with its use of tricycle landing gear.

In the four-plus years when the B-17 was the only heavy bomber considered for production for the Army Air Corps, it faced attacks from members of Congress who were still infatuated with the false economy of twin-engine bombers. The Fortress also came under suspicion from admirals and generals not ready to embrace the upstart Air

Iconic Bomber

By Frederick A. Johnsen



A drawing from a B-17 training manual (left) presents an imagined "go-around" scenario—the runway crash of a twin-tailed B-24. In a parallel image from a B-24 manual (above), a Liberator maneuvers to avoid the hulk of a Flying Fortress.

Corps' emerging doctrine of strategic bombardment.

Hollywood Bombers

In the 1930s, airmen often protected the strategic bombardment concept by sidestepping the criticism. The Air Corps touted the Fortress as a coastal protection weapon even as it launched small groups of B-17s on promotional flights emphasizing its great range and navigational precision.

Yet Air Corps thinkers had a new and different conception about the next war. They envisioned long-range bombers bringing the battle to the enemy's rear areas, targeting its war-making capabilities.

The 1935 arrival of the B-17 galvanized the already coalescing concepts of strategic bombardment. The Flying Fortress became the Air Corps' symbol of its future, in an era when no other heavy bomber was on the horizon. This early importance would have far-reaching implications.

When the Air Corps managed to preserve an order for a dozen Fortresses in perilous fiscal times, those few aircraft carried the future of US strategic bombardment doctrine. Crews were carefully screened in an effort to avoid crashes.

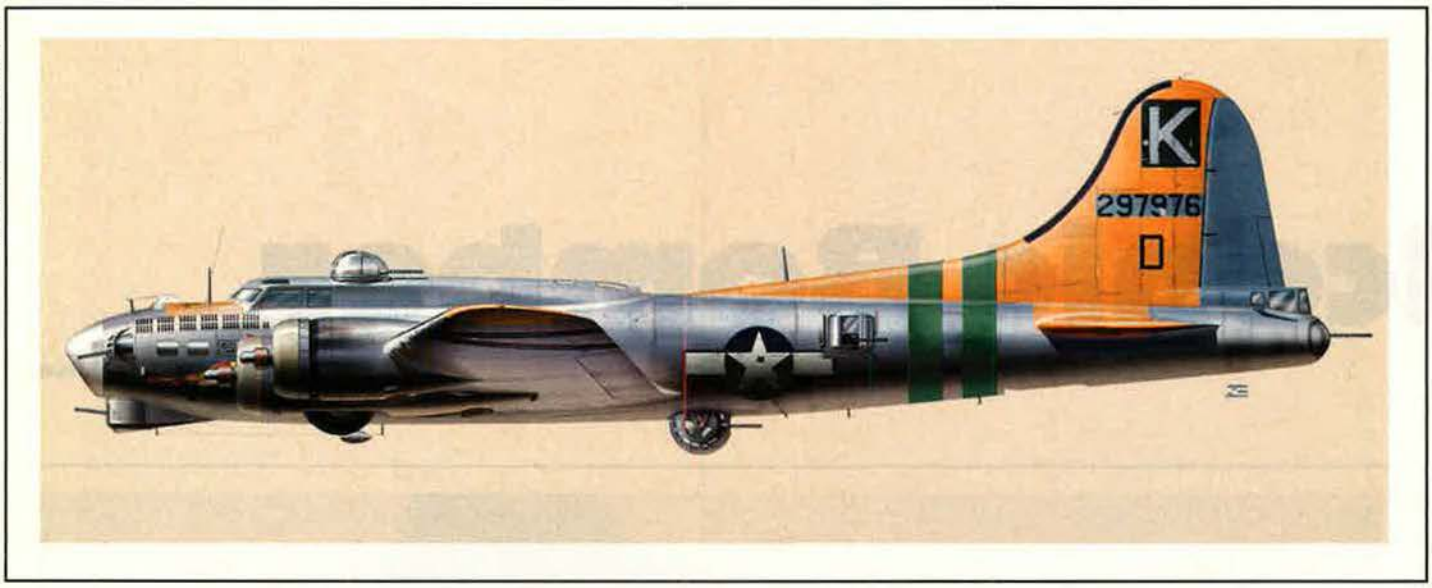
The B-17s were rapidly becoming icons as early as the late 1930s. They co-starred (with Clark Gable and Spencer Tracy) in the 1938 movie "Test Pilot" (thus beginning the derisive nickname "Hollywood Bomber" that some B-24 crews would apply to the Fortress in later years). By 1939, undeniable threats in Europe and Asia provided ample support for further procurement. That eliminated the need to publicize the heavy bombers.

Enter the B-24 Liberator, which made its first flight on Dec. 29, 1939. The B-24 owes its existence to a late 1938 query that the Air Corps sent to Consolidated. The corps wanted to know: Would Consolidated consider building the B-17 under license?

Consolidated's response was not long in coming. It sent back a design for a new bomber, featuring new technologies.

The popularity of the B-17 benefited Consolidated and helped the B-24 gain approval for production. Riding on the coattails of the Fort meant the B-24 also did not require the same level of promotion that was needed by the earlier program. The downside was that the Flying Fortress was already fixed in the public mind as the ideal of what a heavy bomber was supposed to be. That being the case, the B-24 would have little opportunity to upstage it.

Staff illustrations by Zaur Eylanbekov



Pain of Obscurity

The B-17's recognition advantage with the American public was painfully brought home to Consolidated in 1943. The company commissioned a public relations firm to ascertain "to what degree the public is familiar with the names of the Liberator and the Flying Fortress."

The poll surveyed nearly 2,500 men in six cities where Consolidated had previously run newspaper advertisements touting the Liberator. The survey reported: "The Flying Fortress is better known than the Liberator." Only 73 percent of interviewees had heard of the Liberator. The figure for the Flying Fortress was 90 percent.

The B-17's worst showing—"only" 86 percent recognition in Boston—was better than the B-24's best—82 percent recognition in Pittsburgh.

The identity battle went beyond the man in the street. In World War II, the mighty Eighth Air Force—the standard bearer of Army Air Forces strategic bombardment doctrine—was run by top officers who openly preferred the B-17.

One well-known joke stemmed from AAF pilot training manuals that used B-17 and B-24 artwork and text explaining how to carry out a "go-around." The B-17 manual presented the image of a crashed B-24 on the runway, its twin tails unmistakable, as the reason for a B-17 go-around. Meanwhile, the B-24 manual showed a crumpled B-17 blocking the runway.

Not all official AAF actions treated the two bombers equally, however. The B-17 came out the winner in a series of studies, conducted by Eighth Air Force statisticians, purportedly showing that Fortresses had utility and survivability much greater than that of the B-24.

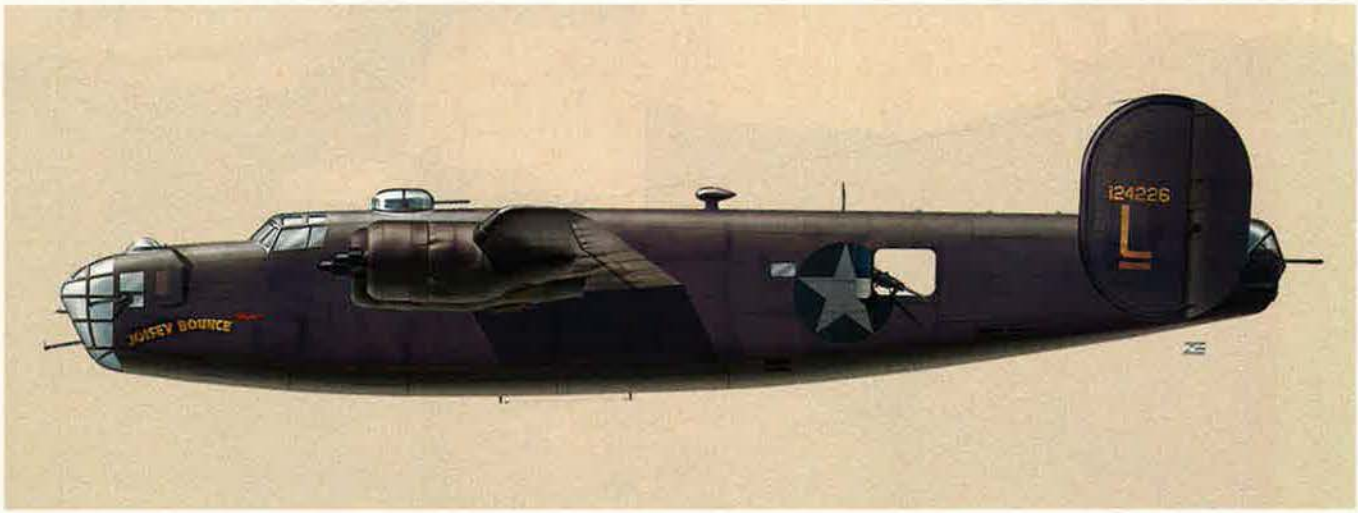
Meanwhile, Lt. Gen. Jimmy Doolittle wrote about his preference for equipping the Eighth with B-17s. There is a logistical advantage in keeping fielded forces down to a minimum number of aircraft types with their unique servicing and spares. Doolittle wanted B-17 bombers and P-51 fighters for the Eighth.

While acknowledging the Liberator's early performance advantages over the Fortress, Doolittle said modifications required to keep B-24s survivable over Europe resulted in extra weight and thus degradation of its handling qualities.

It has often escaped notice that the AAF's first heavy bomber mission over Europe was flown by B-24 Liberators, not B-17 Flying Fortresses. The June 11, 1942 mission featured a dozen B-24Ds flying from North Africa in a precursor raid on Romania's Ploesti oil fields. The

Photo courtesy of NARA

Star turn. *The crew of B-17F* **Memphis Belle** *being reviewed by Lt. Gen. Ira Eaker, Eighth Air Force commander, before the start of their US publicity tour. Note (bottom left corner) the presence of a motion picture camera.*



Heavyweight contenders. *Left, B-17G named* **A Bit O' Lace,** *as it looked in 1945, and, above, the B-24D* **Joisey Bounce** *as it looked in 1943. The two great bomber types are forever linked.*

attack came a full two months before the first US B-17E foray over Europe.

When US Fortresses arrived in Britain in the summer of 1942, press portrayals of gallant B-17 crews in England continued the positive drumbeat of coverage that had began for the Forts so many years earlier. It would be October 1942 before Eighth Air Force sent B-24s into combat from England.

Belle of the Ball

One of the first B-17s to complete 25 missions over Europe was highly honored and publicized. This celebrated 25-mission bomber, *Memphis Belle,* was a B-17F that was featured in a color 1944 documentary film and which toured the United States with its crew for purposes of national morale. *Memphis Belle* and its crew received a hero's welcome in 32 cities.

As American production grew, the B-24 was assembled at five aircraft plants and the B-17 at three. By war's end, the United States arsenal of democracy had churned out more than 18,000 B-24 variants, compared with 12,731 B-17s.

When Fifteenth Air Force swung into battle in November 1943, B-17 production was feeding the operational needs of two numbered Air Forces, Eighth and Fifteenth. B-24s, by that time, were spread out and flying operational sorties with nine different numbered Air Forces. A substantial number of Liberators served the US Navy and the Royal Air Force as well.

The AAF realized its highest in-service B-17 strength in August 1944, with 4,574 B-17s on the books. The following month, the AAF's peak B-24 strength topped out at 6,043 Liberators. Although there were nearly 1,500 more B-24s than B-17s in service at their peaks, the greater number did not move the B-24 to the front of the icon line or even to equal status.

Both of these bombers had their share of famous fliers—recipients of the Medal of Honor, movie stars, famous musicians, and so forth. (See "Airpower Classics: B-17 Flying Fortress," February, p. 96, and "Airpower Classics: B-24 Liberator," June, p. 96.)

There's another kink in the B-17-vs.-B-24 popularity contest that suggests a lack of subtlety in the way Americans create and treat icons. The durability of the B-17, especially in belly landings and ditchings, soon took on mythical proportions. The hydraulically dependent B-24, perhaps initially built with a structure more suited to capacity than combat, seemed less robust. Popular opinion endowed the B-17 with an aura of invincibility beyond even its great prowess.

In the postwar era, it became formulaic to see published photos depicting B-17s surviving battle damage and B-24 Liberators down on their luck. Passionate latter-day defenders of the B-24 Liberator face what appears to be an impossible task. Americans love the simplicity of icons.

It hasn't helped that the Air Force quickly got rid of its B-24s at war's end. The Air Force opted instead to keep a smattering of stripped-down B-17s on hand as VIP transports and drone directors. Similarly, the Navy and Coast Guard flew some B-17s on over-water patrols well into the postwar years.

Many of these Fortresses survived subsequent civilian careers to enter museums and "Warbird" inventories. Therefore, the iconization of the B-17 that began before World War II, and was burnished in combat publicity, only became greater with time. Postwar recognition was improved by easier access to a larger number of Flying Fortresses still in existence. Only one flying B-24 exists today, however.

Perceptions of the relative importance of the two bombers have become self-perpetuating. The eyes of popular history may one day only be able to discern the boldest of shapes in what has passed, and on a pinnacle in the distance, the shape of the World War II era's bomber icon will most likely rest on a tailwheel. ■

Frederick A. Johnsen is the public affairs director for NASA's Dryden Flight Research Center. He spent almost two decades as an Air Force civilian historian and has written more than 20 books on aviation history. This is his first article for Air Force *Magazine.*

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AFA National Report

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By Frances McKenney, Assistant Managing Editor

Alaska From the Air

While in Alaska in July, Stephen P. "Pat" Condon, the then-Air Force Association Chairman of the Board, viewed the vast Pacific Alaska Range Complex twice—from the back seat of an F-15 and on board a helicopter.

Condon was in the 49th State to touch base with Air Force personnel, civilian business leaders, and AFA's **Edward J. Monaghan Chapter** and the **Fairbanks Midnight Sun Chapter.**

In Anchorage, his military hosts were Lt. Gen. Douglas M. Fraser, commander of NORAD's Alaskan Command and 11th Air Force; Maj. Gen. Craig E. Campbell, the adjutant general; Brig. Gen. Herbert J. Carlisle, commander of 3rd Wing at Elmendorf Air Force Base; and CMSgt. David K. Andrews, 11th Air Force command chief master sergeant. Gary A. Hoff, Northwest Region president, was Condon's AFA host.

Flying from Elmendorf, Capt. Jared Santos, 12th Fighter Squadron F-15D pilot, took Condon over the PARC, a 67,000 square-mile area where the training exercise Red Flag Alaska—formerly called Cope Thunder—takes place. Viewing snow-covered mountains, rolling hills, and long stretches of flat terrain, Condon got a feel for the variety of training scenarios the range offers.

On the ground in Anchorage, Condon listened to briefings on Air Force operations in Alaska and joined Fraser in a wreath-laying ceremony at Merrill Field's Eleventh Air Force Memorial. The black-granite memorial, built and maintained largely with funds raised by the Monaghan Chapter, pays tribute to a unit famous for having driven the Japanese out of the Aleutians in World War II. Condon later spoke at a Monaghan Chapter luncheon for ceremony participants and attended the Alaska State Convention.

Condon's military hosts at Eielson Air Force Base in Fairbanks were Brig. Gen. David J. Scott, 354th Fighter Wing commander, and CMSgt. Bruce A. Kenney, the wing's top enlisted airman. Condon spoke at an airmen's luncheon and visited with security forces personnel, the 168th Air Refueling Wing (ANG), and the 210th Rescue Squadron (ANG), which arranged for a 90-minute helicopter tour of the PARC.

Bob Largent (front row, third from left), AFA's National President, was a guest speaker at the Georgia State Convention, hosted by the Carl Vinson Chapter in Warner Robins, Ga. See "More AFA News."

AFA National Treasurer Steven R. Lundgren and Midnight Sun Chapter President Butch Stein coordinated several Fairbanks AFA activities for Condon, as well as an address to business leaders at the Greater Fairbanks Chamber of Commerce.

Awards in Texas

The Texas State Convention in Houston in July featured the presentation of more than 40 Air Force and AFA awards to Total Force personnel: active duty, Guard, Reserve, civilians, Civil Air Patrol, AFROTC and AFJROTC cadets, and AFA members.

The awards luncheon speaker was Robert E. "Bob" Largent, then AFA's National President. He spoke about his recent fact-finding trip to Southwest Asia and about challenges facing both the Air Force and AFA.

Retired Gen. Gregory S. Martin, former commander of Air Force Materiel Command and a **Lance P. Sijan Chapter (Colo.)** member, was keynote speaker for the evening banquet.

State-level AFA honors included Chapter of the Year, awarded to the **San Jacinto Chapter;** Texas Member of the Year, presented to David Dietsch, of the **Fort Worth Chapter;** and Teacher of the Year, Kyle Mantel of the **Concho Chapter.** (Texas AFAers who received national-level awards will be listed in convention coverage in the November issue.)

New state officers are Robert L. Slaughter of the **Denton Chapter,** president; Dietsch, executive VP; Joan B. Lopez from the **Alamo Chapter,** secretary; and Robert Cantu, also from the Alamo Chapter, treasurer.

AFA on CNN

The **Frank Luke (Ariz.) Chapter's** effort to help a soldier recover from war injuries came to the attention of CNN this summer.

On July 28, the news and commentary cable TV show "Lou Dobbs Tonight" aired a short piece, for its "Heroes" segment, on medically retired Army Specialist Erik Castillo. Reporter Bill Tucker explained how a mortar attack in Baghdad in 2004 shattered almost half of Castillo's skull and how the 23-year-old from Tucson continues to work on overcoming the resulting paralysis.

The CNN reporter said, "Helping him stay positive and focused on the future? An unlikely new friend—an Air Force veteran." The video segment then cut to a short comment from Chapter

USAF photo by SSgt. Rhiannon E. Willard

Pat Condon, AFA's Chairman of the Board, flew on an F-15 from Elmendorf AFB, Alaska, while in Anchorage for the AFA state convention in July. Capt. Jared Santos was the pilot for this orientation flight. See "Alaska From the Air."

President Harry Bailey and noted that the chapter arranged to send Castillo on a vacation.

An earlier *Arizona Republic* newspaper article on the chapter's help for Castillo generated interest, as well, inspiring readers to offer donations, including timeshare vacations for other wounded veterans. Castillo has been featured in many newspaper articles, web sites, and radio and TV programs, to the point where one traveler, passing through Phoenix, happened to catch news coverage of the former 1st Cavalry Division soldier's rehabilitation and contacted Bailey with an offer to help.

The story has made at least one Community Partner proud to be part of AFA. With the headline "AFA Supports Injured Soldier," the newsletter for Credit Union West reported on the chapter's vacation gift to Castillo and noted proudly that it is a Luke Chapter Community Partner.

News at 5, 6, and 10

When the **Meridian Chapter (Miss.)** presented $400 worth of phone cards to the local Air National Guard unit in August, it brought media attention to AFA, also.

The *Meridian Star* newspaper ran a photo of Chapter President Roy P. Gibbens and Vice President Sam Forbert presenting the donation to 186th Air Refueling Wing officials.

The local ABC television affiliate, WTOK, aired the story three times that evening—on the 5 o'clock, 6 o'clock, and 10 o'clock news—and posted the story on its online edition.

Funds for the 48 phone cards came from the chapter's Community Partners, as well as individuals, most of them solicited personally by Gibbens and Forbert.

Gibbens, who founded the chapter in 2005 and last month handed over leadership to Langford Knight, pointed out that the 186th ARW personnel are deployed to eight countries from their home base at Key Field. He said the unit's members do not usually deploy together but instead go as individuals or small groups.

Knight said that in the past, military personnel on temporary duty could sometimes use the Defense Switched Network phone system, but there were restrictions on the length and number of phone calls. It's why these phone cards are such a morale booster.

As for this donation? "That's just a start," said Knight. The chapter plans to make fund-raising for phone cards an ongoing project. It has also signed up the 186th as a chapter Community Partner.

Happy 90th Birthday!

In June, the **Bill Harris Chapter** in Klamath Falls, Ore., celebrated the 90th birthday of retired Lt. Col. Bill Harris—chapter namesake, World War II triple ace, and mentor to new pilots.

The chapter joined forces with the Air National Guard's 173rd Fighter Wing at Klamath Falls Airport-Kingsley Field to carry out the festivities. It was a fitting partnership since Harris regularly gives what are called heritage speeches to the unit's new student fighter pilots.

Wing commander Col. Thomas R. Schiess, a chapter member, led a ceremony dedicating the wing's new Heritage Hall to Harris. The hall displays memorabilia about the P-38 ace, who is credited with 16 aerial victories—on two occasions knocking out three in a day—most of them while assigned to the 339th Fighter Squadron, based in New Caledonia.

Following the Heritage Hall ceremony, the guests went to the flight line. With local TV and newspaper reporters on hand, Maj. Curtis McLain, a 114th Fighter Squadron instructor pilot, unveiled an F-15 training aircraft decorated with the same nose art that Harris' fighter airplane bore during the war: the symbol branded on cattle at his father's ranch.

At a luncheon after the flight line unveiling, Chapter President Curtis A. Waite presented AFA polo shirts to Harris and his wife, Roslyn. Northwest Region President Gary A. Hoff, who had flown in from Anchorage, Alaska, gave Harris an AFA commemorative coin and read a letter of congratulations from AFA National President Bob Largent.

Other AFA out-of-town VIPs who drove down from Portland to take part in the celebration were Tom Stevenson, state president; Jerry Moore, **Columbia Gorge Chapter** president; Barbara M. Brooks-Lacy, a former Northwest Region president; and John Lee, former state president.

Florida State Convention

At the Florida State Convention, hosted by the **Hurlburt Chapter** and **Eglin Chapter** at Fort Walton Beach, a teacher who seeks out new ways to cover aerospace topics in her classroom received the state Teacher of the Year award.

Kathleen A. Foy is a seventh-grade teacher for pre-engineering magnet

science classes at Crystal Lake Middle School in Pompano Beach. "Every year, Kathy has either taken a course in aerospace, attended a week-long course, or presented at conferences," said E. Max Friedauer, state president, when he introduced Foy to the convention audience. "She is motivated by the need to make new curriculum available to her students."

During the convention, 47 delegates, representing 10 chapters, participated in a golf tournament and barbeque, hosted by Hurlburt Chapter President James B. Connors, and toured an airpark with Chapter Secretary Leslie Matheson as guide. Convention-goers visited an assisted living facility at the Air Force Enlisted Village in Shalimar and received a briefing from CMSAF James C. Binnicker. Other briefings covered Air Force Special Operations Command, Eglin Air Force Base, and the Air Armament Center.

Convention luncheon speaker was Maj. Gen. Donald C. Wurster, vice commander of AFSOC. He delivered a slide presentation on anti-terrorism missions in the Philippines in the months following 9/11. Wurster received AFA Florida's Jerry Waterman Award at the convention. Other awardees were Judy Stokley of the Eglin Chapter, who received the Gen. Lewis H. Brereton Award, and Bryan B. Paul, **Central Florida Chapter** treasurer, named Florida State Member of the Year.

More AFA News

■ Hosted by the **Carl Vinson Memorial Chapter,** the Georgia State Convention and State Awards Luncheon brought three guest speakers to the podium: AFA National President Bob Largent; Maj. Gen. Thomas J. Owen, commander of Warner Robins Air Logistics Center; and Col. Bradley Heithold, WRALC vice commander. Gregory A. Bricker of the **Dobbins Chapter** received the Denise Camejo Spirit of AFA Award, while Medals of Merit went to John F. McCreary and John G. Walther Jr., both from the Dobbins Chapter, and Donald R. Michels of the Carl Vinson Chapter.

■ The **Ark-La-Tex Chapter** honored its chapter and state Teacher of the Year at a June social, held at Barksdale AFB, La. Nearly 50 guests gathered to recognize Martin D. Bourgeois Jr., who received both the chapter- and state-level awards, based on 19 years as an educator. Chapter member Ivan L. McKinney calculated that Bourgeois has taught more than 39,000 Bossier Parish middle school students. A retired senior master sergeant, Bourgeois teaches aviation to all eighth graders in the parish. His courses culminate with each student completing a "check ride" in a Cessna simulator.

■ **Columbus-Bakalar Chapter** members in Columbus, Ind., got a firsthand account of the Korean War, including one of its fiercest battles—Heartbreak Ridge—from a former US Army corporal who survived it. Frank J. Biehle was drafted into the Army in December 1950 and arrived in Korea in August 1951. In September, a month-long back-and-forth battle began over a seven-mile-long hill mass that was nicknamed Heartbreak Ridge. The Army division that finally captured the area suffered 3,700 casualties. Biehle was hit by mortar shrapnel and began his recovery in Japan, where he received a bedside visit from Army Gen. Matthew B. Ridgway, the Supreme Allied Commander in the Far East.

■ **Langley Chapter (Va.)** President Fred C. Richardson reported that the group recently established a Heritage Honorary Fellowship to thank its exceptional contributors. The six recipients for this year are Clement Moore, Margaret Moore, Bud West, William H. Russell, Ivan R. Frey, and Lester J. Rose. As part of the fellowship, the chapter donated $500 in their names to AFA's educational programs. ■

Have AFA News?

Contributions to "AFA 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: natrep@afa.org. Digital images submitted for consideration should have a minimum pixel count of 900 by 1,500 pixels.

Florida State Teacher of the Year Kathleen Foy turned the tables on State President E. Max Friedauer (left) and AFA Vice Chairman Boyd Anderson (right). After receiving her award, she gave them framed photos of the Apollo 14 moon walk. See "Florida State Convention." The Gold Coast Chapter nominated Foy for her award.

Reunions

reunions@afa.org

4th ACCS. June 15-17, 2007 in Rapid City, SD. **Contacts:** Mary Hillman (mdhillman@fedteldirect.net) or Jeff Bixler (jbixler@blackhills.com).

80th FG. May 17-19, 2007 in Milwaukee. **Contact:** Hal Doughty, 3620 McElroy St., Eau Claire, WI 57201.

509th BW. Oct. 2-5 at the Flamingo Hilton in Las Vegas. **Contact:** Don Scheid, 10440 Georgetown Pl., Las Vegas, NV 89134 (702-360-4611) (djs@express56.com).

525th FIS. April 20-22, 2007 in Fredericksburg, TX. Contact: Albert & Carol Mikuski, 89 Pond Rd., Vernon, VT 05352 (802-254-6297).

667th, 932nd, 933rd, and 934th AC&Ws, Iceland. April 26-30, 2007 at the Radisson Hotel in Branson, MO. **Contact:** William Chick (803-932-9596) (littlechick@msn.com) (www.usradarsitesiceland.org).

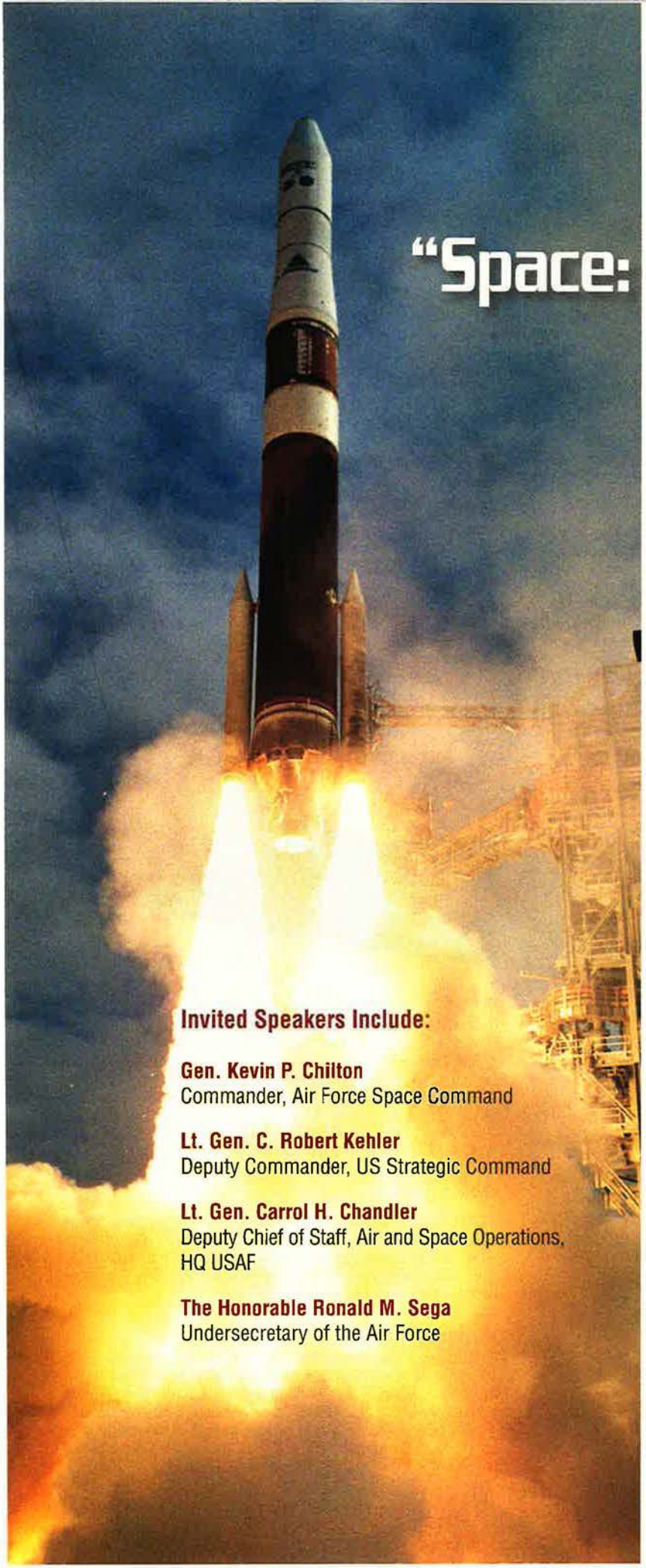
5700th Albrook Air Police, Panama Canal Zone (1951-54). April 24-26, 2007 in Nashville, TN. **Contact:** Bob Carlson, 29 Rainbow Pond Dr., #A1, Walpole, MA 02081 (508-668-1655) (bobjoancarlson@earthlink.net).

Pilot Class 50-B, all bases. April 24-28, 2007 at the Comfort Suites Arrowhead Town Center in Peoria, AZ. **Contact:** Verb Biaett (623-972-7328) (vbiaett@cox.net).

Pilot Class 55-C. April 1-4, 2007 at the Holiday Inn in San Diego. **Contacts:** Richard Schimberg, 701 Kettner Blvd., Unit 205, San Diego, CA 92101 (619-232-5436) (jodicks@cox.net) or Herb Larson, 25425 N. Bronco Trail, Scottsdale, AZ 85255 (480-585-7361) (herbliz@aol.com).

Seeking members of **Pilot Training Class 57-K** for a reunion in April 2007 in Las Vegas. **Contacts:** Carl Young, 8160 O'Bannion Dr., Las Vegas, NV 89117 (702-363-0796) (young@intermind.net) or Pat Hafner, 3402 El Dorado Trail, Austin, TX 78739 (512-280-3178) (p.hafner@sbcglobal.net). ■

E-mail unit reunion notices four months ahead of the event to reunions@afa.org, or mail notices 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. We reserve the right to condense notices.



Air Force Association
Los Angeles National Space Symposium
and Annual Air Force Ball

"Space: The Way Ahead"

Beverly Hilton Hotel
Los Angeles, California
Friday, November 17, 2006

Invited Speakers Include:

Gen. Kevin P. Chilton
Commander, Air Force Space Command

Lt. Gen. C. Robert Kehler
Deputy Commander, US Strategic Command

Lt. Gen. Carrol H. Chandler
Deputy Chief of Staff, Air and Space Operations, HQ USAF

The Honorable Ronald M. Sega
Undersecretary of the Air Force

Panel Discussion:

There will also be a panel discussion with aerospace industry leaders moderated by Lt. Gen. Michael A. Hamel, Commander, Space and Missiles Systems Center, AFSPC

The AFA National Symposium on Space:

In the 21st century, space capabilities serve all warfighters. Space provides for precise navigation and timing, missile warning, surveillance, space control, weather tracking, and communications. In fact, space assets are essential to all military operations and to the nation. Airmen, soldiers, sailors, and marines in the field require critical information to do their jobs and to stay ahead of the enemy.

At the 2006 AFA Los Angeles National Space Symposium and Ball, top military and commercial leaders will address the contributions of space to the combat environment and current challenges affecting the military, civilian, and commercial space partnership.

The AFA Annual Air Force Ball

The 35th Annual AFA Air Force Ball will also be held at the Beverly Hilton Hotel on Friday evening, November 17. For additional information regarding the Ball, and to reserve tickets and/or a table, please call Henry Sanders at (310) 645-3982.

Beverly Hilton Hotel

If you plan to stay at the Beverly Hilton Hotel, please call the hotel directly to make reservations as soon as possible at (310) 274-7777 or 1-800-HILTONS. Mention the AFA Symposium to receive the special Symposium rate of $215 for a single or double room, plus taxes, which are currently 14.05%, plus 1.37% surcharge. The deadline to receive these rates is October 17, 2006.

Symposium Registration

The fee for the Symposium is $465. This includes continental breakfast, coffee breaks, and lunch. For nonmembers, the fee is $550. To register, call 1-800-727-3337, extension 5805, or visit www.afa.org.

Artwork by Zaur Eylanbekov

SPAD XIII

Nine decades on, France's SPAD XIII stands out as the definitive World War I fighter of two aviation forces—France's *Aéronautique Militaire* and America's US Army Air Service. The French firm SPAD developed the potent biplane in response to the appearance of advanced German aircraft on the Western Front in 1916. The US military, for its part, had gone to war without a fighter of its own, and so it simply adopted the XIII as its primary air weapon—the first great fighter in its long and storied history.

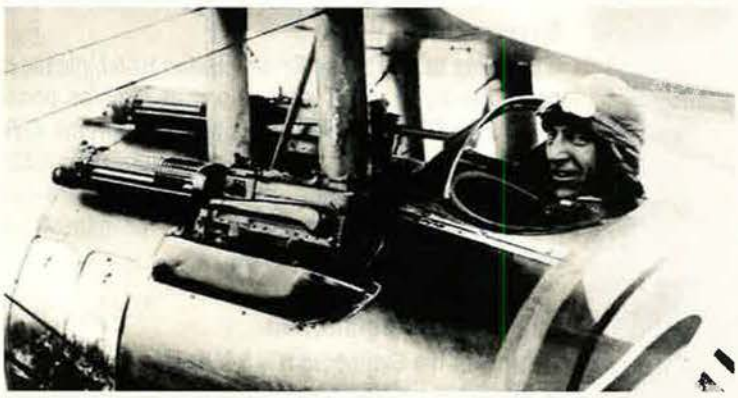
The XIII was a bigger, stronger, more powerful, and more heavily armed successor to the SPAD VII. A pure fighting machine, its pugnacious look well-suited the aggressive young Air Service pilots trying to make their mark in France. SPAD chief designer Louis Bechereau built his airplane around an advanced Hispano-Suiza eight-cylinder engine, which had a good power-to-weight ratio, but it was temperamental. What's more, the aircraft was not overly maneuverable.

For all that, though, the XIII was a stable firing platform and could take great punishment and keep flying. It was faster than the Sopwith Camel and Fokker D.VII, with a good climb rate, and so rugged that it could dive at 200 mph and go immediately into a steep ascent without failure of its cloth-covered wings or wooden fuselage.

The top US ace of World War I, Capt. Eddie Rickenbacker, greatly preferred the XIII to any other fighter. It was perfect for his dive-and-kill tactics. Many viewed it as the best dogfighter of the war. That capability, perhaps, is the reason that the XIII wound up equipping not only French pursuit units but 15 of the 16 American Expeditionary Force fighter squadrons. The SPAD also was flown in significant numbers by Britain, Italy, Russia, and Belgium.

—By Walter J. Boyne

This aircraft: US Army Air Service SPAD XIII #S4523—*No. 1*—as it looked in fall 1918 when flown by Capt. Eddie Rickenbacker, 94th Pursuit ("Hat in the Ring") Scuadron at Rembercourt near St. Mihiel, France. *No. 1* was intended for the squadron commander, but Rickenbacker claimed it for himself.



Eddie Rickenbacker was the "Ace of Aces."

In Brief

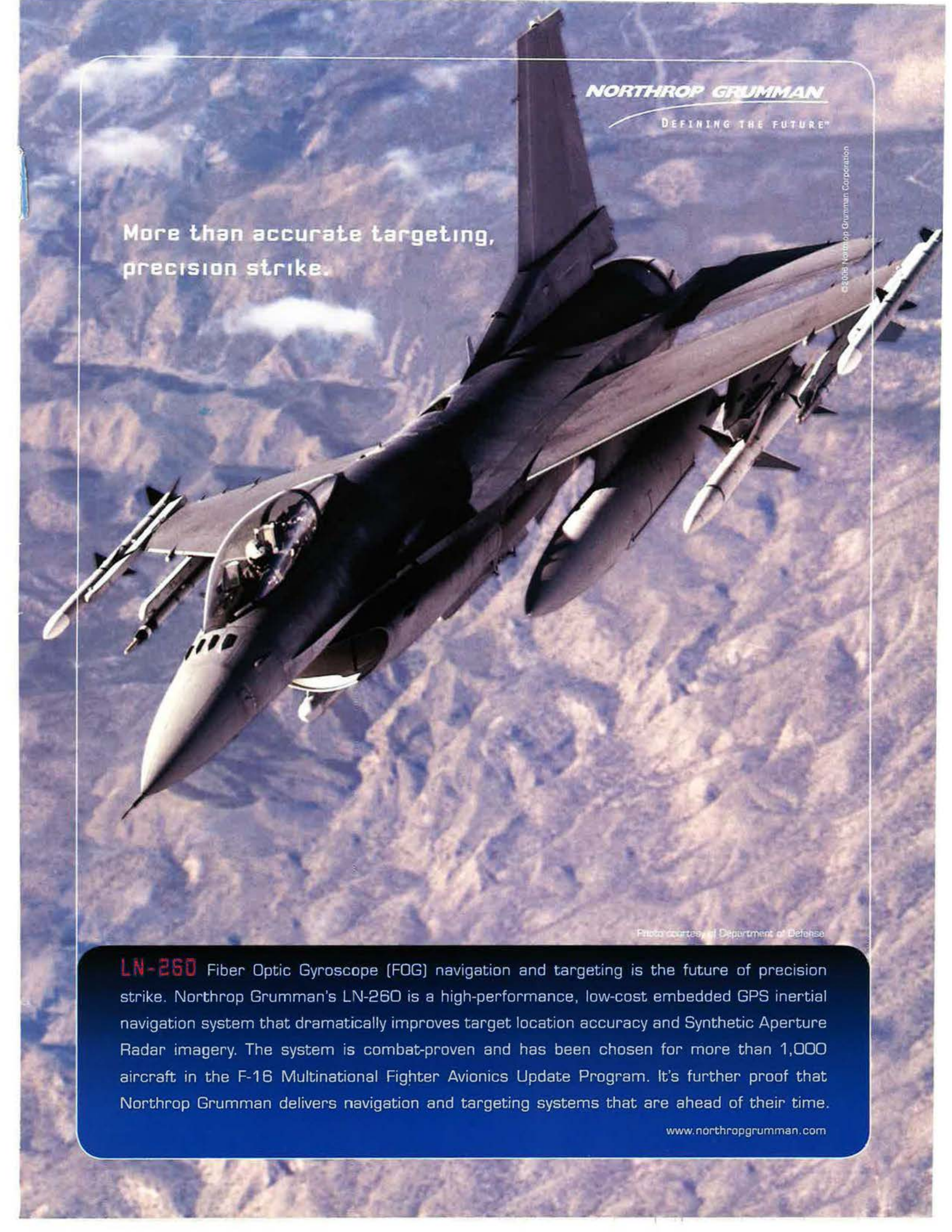
Designed by *Société Pour l'Aviation et ses Dérives* (SPAD) of France ★ manufactured by SPAD, eight other firms ★ first flight April 4, 1917 ★ crew of one ★ number built 8,472 (893 for US Army Air Service) ★ one 8-cylinder engine ★ armament two synchronized .303-cal machine guns, each with 400 rounds ★ **Specific to latter XIIIs:** 235 hp V-8 engine ★ max speed 138 mph ★ cruise speed 105 mph ★ max range/endurance 2 hrs ★ weight (loaded) 1,811 lb ★ span 26 ft 6 in ★ length 20 ft 6 in ★ height 8 ft 6.5 in.

Famous Fliers

UNITED STATES: Capt. Eddie Rickenbacker, top US ace of WWI, Medal of Honor ★ 1st Lt. Frank Luke, No. 2 US ace of WWI, Medal of Honor ★ 1st Lt. Carl Spaatz (became first USAF Chief of Staff) ★ FRANCE: Capt. René Fonck, top French ace of WWI ★ ITALY: Maj. Francesco Baracca, top Italian ace of WWI.

Interesting Facts

Pilots covered bullet holes with Iron Cross patches ★ flown by top aces of three countries (US, France, Italy) ★ built at rate of 11 per day in 1918 ★ *Smith IV,* a SPAD XIII used by Lt. A. Raymond Brooks, is on display at National Air and Space Museum in Washington, D.C. ★ used by air forces of 16 nations ★ first flight was executed by an ace (Lt. René Dorme of France) ★ US tail colors were red, white, and blue (front to back); France's were blue, white, red.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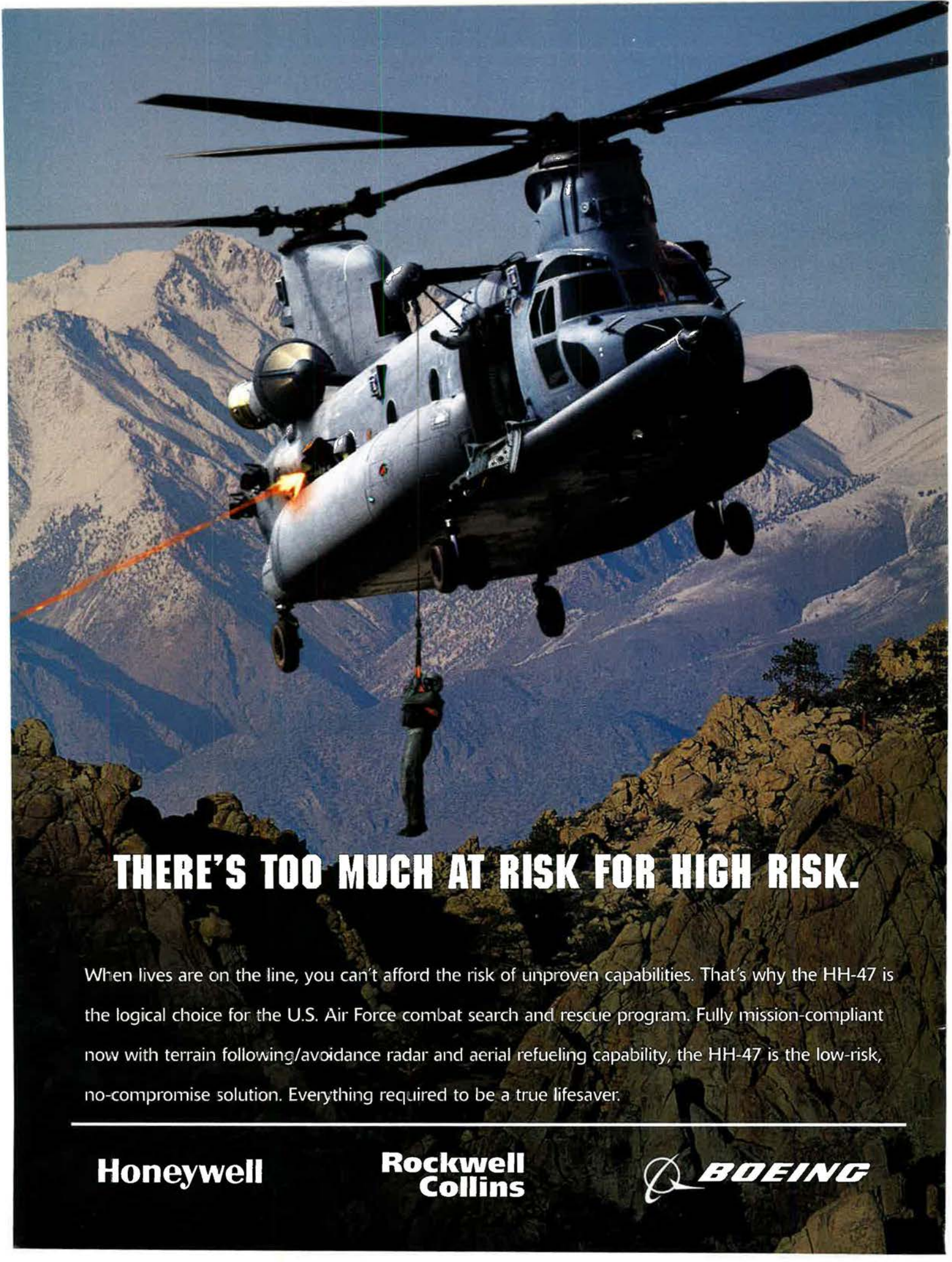
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