February 2008/$4

AIR FORCE MAGAZINE

JOURNAL OF THE AIR FORCE ASSOCIATION

Wonder Warthogs

The Air Legion
Rise of the Reaper
On African Ground

40.

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February 2008, Vol. 91, No. 2

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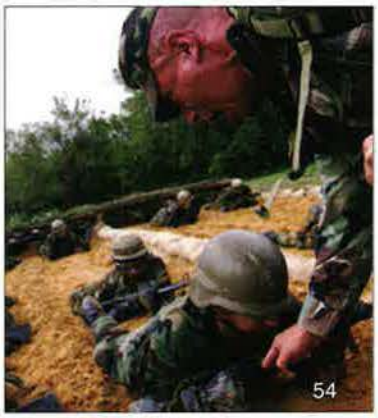

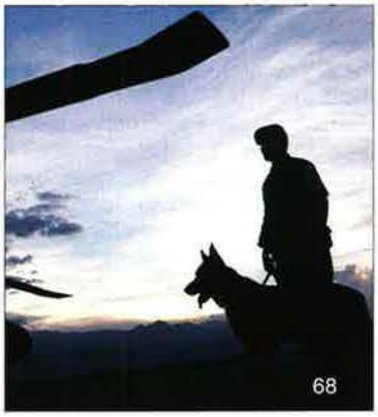

About the cover: A-10s from the Maryland Air National Guard. See "Wonder Warthogs," p. 46. Photo by Rick Llinares.

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Editorial

By Robert S. Dudney, Editor in Chief

Vindication + Vengeance

THE Khobar Towers bombing happened so long ago that many might need a refresher course on both the disaster itself and the man who once was, but no longer is, its scapegoat—Terryl J. Schwalier.

On the night of June 25, 1996, USAF sentries on the roof of the Khobar Towers compound, a high-rise apartment complex in Dhahran, Saudi Arabia, saw two men wheel a tanker truck into an adjacent lot, next to Building 131. Quartered in that building were airmen of the 4404th Wing (Provisional). Their commander was Brigadier General Schwalier.

The terrorists parked their truck 80 feet from Building 131, got out, and fled. In four minutes, the truck exploded with the force of 20,000 pounds of TNT, shearing off the face of the building. Nineteen airmen died. Another 240 were injured, some horribly.

Investigations ensued. A year later, Defense Secretary William S. Cohen, propelled by a Capitol Hill lynch mob, charged Schwalier had not done enough to protect his troops—despite the fact that he had taken 130 specific actions to improve security and carried out 36 of the 39 recommendations from a recent vulnerability assessment. Though two USAF probes found Schwalier blameless, Cohen blocked his previously approved promotion, sending him into retirement.

This was a notorious injustice. It stood for a long time—10 years, five months, and 21 days, to be precise—but not forever. Schwalier, who never abandoned his pursuit of vindication, has finally put an end to it. He has won his case.

The Air Force Board for Correction of Military Records, after carrying out a major review, concluded Schwalier had been victim of "an injustice" and never should have been denied his second star. The board ruled he should regain it, retroactive to Jan. 1, 1997, and be placed on the retired list at the grade of major general. The Air Force affirmed the decision Dec. 21 with an official order, made public in January.

We at AFA have followed the case in detail from the beginning, and it has been a matter of discussion among many with experience in the responsibilities of command. Our view has been strong and consistent in support of Schwalier.

Retired Gen. John A. Shaud, who headed AFA during the original controversy, declared in a July 28, 1997 letter to Cohen, "In our opinion, there is no way that Brig. Gen. Terryl Schwalier can be held at fault. What happened was that his command took casualties in an attack by an adversary. Without the security initiatives he put in place, the casualty toll would surely have been higher." Shaud said Cohen's message "seems to be that reasonable attention to security (or any other area of responsibility) is not enough; a commander becomes punishable if he leaves anything—anything at all—undone, even when discovered with 20/20 hindsight. That is a very tough standard for mortals to meet."

The Schwalier injustice has been eliminated, but the Khobar Towers case goes on.

Shaud continued that second-guessing would "tend to put your field commanders in a self-defensive mode, and that is not what you would want."

Retired Maj. Gen. Stephen P. Condon, AFA's Chairman of the Board at the time, said in a June 1, 2006 letter to Secretary of Defense Donald H. Rumsfeld: "To us, it is obvious that General Schwalier never should have been blamed. His men died in an act of war, one that was no different from the August 1998 attack on US embassies in Africa, October 2000 attack on the USS *Cole,* or September 2001 attack on the Pentagon." None of these events produced similar punishment of individuals.

"A decade ago," Condon went on, "one Administration bowed to political forces demanding a sacrifice for the deaths at Khobar Towers, and the result served neither justice nor US security interests. ... The injustice ... continues to weigh on a conscientious military officer who did his best in a difficult and dangerous situation."

Retired Lt. Gen. Michael M. Dunn, AFA President and Chief Executive Officer, said in a Jan. 11 statement that AFA was "pleased to learn that the United States Air Force has rectified a decade-long injustice against an outstanding former general officer. ...

"For more than 10 years, Schwalier persevered in seeking redress. He has finally succeeded. The Air Force's action was entirely logical and proper. We applaud it, as will any fair-minded person. ... Those responsible for the deaths of the Khobar Towers airmen were *the terrorists*—not the commander who did everything reasonably within his power to protect them."

The Schwalier case was a disaster for everyone. It elicited some truly reptilian performances from members of Congress, the media, and persons within the Office of the Secretary of Defense. It played a big role in the decision of Gen. Ronald R. Fogleman to step down prematurely from the post of Chief of Staff. It divided the services between self-appointed "real warriors" and everybody else. We are glad it's over.

The Schwalier injustice has been eliminated, but the Khobar Towers case goes on. The outrage occurred a long time ago; many, perhaps most, of today's airmen were not yet even in uniform. However, the US should continue to pursue the Khobar Towers killers. Here are 19 excellent reasons:

- Capt. Christopher J. Adams
- SSgt. Daniel B. Cafourek
- Sgt. Millard D. Campbell
- SrA. Earl F. Cartrette Jr.
- TSgt. Patrick P. Fennig
- Capt. Leland T. Haun
- MSgt. Michael G. Heiser
- SSgt. Kevin J. Johnson
- SSgt. Ronald L. King
- MSgt. Kendall K. Kitson Jr.
- A1C Christopher B. Lester
- A1C Brent W. Marthaler
- A1C Brian W. McVeigh
- A1C Peter J. Morgera
- TSgt. Thanh V. Nguyen
- A1C Joseph E. Rimkus
- SrA. Jeremy A. Taylor
- A1C Justin R. Wood
- A1C Joshua E. Woody

These are the dead at Khobar Towers. The killers who planned, aided, or carried out the attack are numerous and mostly still at large. It's not too late for vengeance, but we should get going. Success can take a long time. Just ask Schwalier. ■

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Letters

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For Short-Reach Airlift

Your editorial on "The Last Tactical Mile" *[December, p. 2]* is right on target. Which military service is the most competent in air transport, the aerodynamics of STOL, and maintenance-mission readiness of aircraft, the Army or Air Force? Of course, it is the Air Force. Which military service should utilize air transport to get supplies to Army troops for that "last tactical mile"? The Air Force.

Why then is there any discussion about this subject at all? I believe it is because the Air Force has concentrated on the "long reach" air transport mission and neglected the "short reach" air transport mission. The "long reach" air transport issue is solved by the C-17s and C-130s. Yes, I know they can land and takeoff on shorter, unprepared airfields, but the reality is that they fly into regular paved air bases.

What the Air Force should have been doing, and should do now, is focus on the "short reach" intratheater air transport problem (short distances, short airfields, small defended perimeters). The C-27 is one step in that direction, but the Air Force should be taking other even smaller steps. Sure, the C-27 can land on a shorter air strip than a C-17, but can it go the "last tactical mile"? I don't think so. The Air Force needs a stable of "short reach" air transports, such as the C-7 and Pilatus Porter.

This is more than a turf war between the Army and the Air Force. This is a vital issue on irregular warfare, one type of warfare that we will undoubtedly see more of.

William Thayer
San Diego, Calif.

Act Like We're at War

If we need lots of new tankers, a split buy may sound tempting to some, but it would be more economical and logistically feasible to do what they did in World War II. Select the best design and pay more than one company to build the aircraft. The more production lines, the faster the aircraft get flying *["Crunch Time for Air Mobility," December 2007, p. 28]*.

We are at war, so we should act like it.

Capt. Glenn C. Tuley,
USAF (Ret.)
West Melbourne, Fla.

Pearl Harbor

I just read the opening paragraph of John T. Correll's article, "Caught on the Ground" in the December issue, p. 62. I am dismayed to see the Japanese attack described yet again as a "surprise" attack. Come on! For most of our lives, it has been appropriately called the "sneak" attack and for good reason. I bear absolutely no animosity towards the Japanese, but to go the "PC" route lest we offend the country that bombed Pearl Harbor is pathetic.

Lt. Col. Robert G. Dwyer,
USAF (Ret.)
Tucson, Ariz.

"Caught on the Ground" by John T. Correll recently came to my attention. I am a former naval officer, the eldest grandson of Admiral Husband Kimmel, and Naval Academy student of Admiral Kimmel's successor, Adm. Chester Nimitz.

Mr. Correll wrote, "The Martin-Bellinger report and other analyses said the greatest vulnerability for air attack was from the north and northwest." Please

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of judgment, and opined that he had done everything possible under the circumstances. In fact, Admiral Nimitz, who succeeded Kimmel, reissued the same readiness directive that Kimmel had in place on Dec. 7.

Thomas K. Kimmel Jr.
Cocoa Beach, Fla.

■ *John T. Correll replies—Mr. Kimmel says that the Martin-Bellinger report does not identify north and northwest as the most dangerous sectors. The text of the report bears him out. My source for this statement was* Pearl Harbor: The Verdict of History, *by Gordon W. Prange et al, published by McGraw Hill in 1986. It states on p. 441: "A 360-degree search was not needed. Carefully reasoned estimates, such as the Martin-Bellinger and Farthing reports, ... postulat[ed] that the most dangerous sectors were the north and northwest." It appears that Prange, though a recognized authority on Pearl Harbor, was wrong on this.*

Kimmel's point is offset, substantially if not wholly, by evidence of something else: That there was a widespread contemporaneous view that the primary threat was from the north and northwest. If Kimmel did not know it, he should have.

The "Farthing report" citation (Verdict) *refers to an extensive report by Col. William E. Farthing, commander of the 5th Bomb Group. It said the enemy "will not have unlimited avenues of approach for his attack" and "it seems that [the] most probable avenue of approach is the hemisphere from 0° counterclockwise to 180° around Oahu."* (At Dawn We Slept, *Gordon Prange, p. 186)*

*Martin, in an Aug. 20, 1941 request for 180 B-17s, said the most probable direction for air attack would be from western quadrants, either northwest or southwest. (*Defenseless: Command Failure at Pearl Harbor, *John Lambert and Norman Polmar, p. 108)*

*Capt. Ellis M. Zacharias, longtime naval intelligence officer, testified to Congress that the most probable threat had been from the north. (*Verdict, *p. 441) Indeed, Zacharias testified that in March 1941 he briefed Kimmel "that the most probable method of attack would be by aircraft carriers" and "that such an attack would come in undoubtedly from the northern" sector. (*Dawn, *p. 712)*

*Navy Capt. Logan C. Ramsey, who had been Bellinger's operations officer, testified that "we decided the northwest sector was the most likely line of approach." (*Verdict, *p. 441) Bellinger testified that he was "in agreement with*

read the Martin-Bellinger report so that this outrageous misrepresentation can be corrected. Adm. Carlisle Trost, Chief of Naval Operations, wrote in October 1994: "The Martin-Bellinger estimate of March 1941 ... nowhere states that the most dangerous sectors were the north and northwest. The words 'north' and 'northwest' do not appear in the text, nor does any equivalent nautical or numerical terms."

Correll's article states, "Air attack was not equally probable from every direction. Japan was not likely to strike from the east, the California side of the island." However, Admiral Nimitz wrote to Admiral King on Jan. 7, 1942: "It cannot be assumed that any direction of approach may safely be left unguarded."

The article states, "The United States had broken the Japanese diplomatic code and had been intercepting and reading the message traffic since the summer of 1940." These decoded messages gave indications of the time, place, reason, and deceit plan to cover the attack. The article does not mention that Kimmel and Short received none of this information.

A Naval Court of Inquiry approved of all of Admiral Kimmel's force dispositions, found he committed no errors

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AFA's Mission

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

To advocate aerospace power and a strong national defense.

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

Admiral Davis [Arthur C. Davis, who in December 1941 was a commander and Pacific Fleet aviation officer] that the greatest possibility of a successful air attack lay in an attack coming in from the sector of the north." (Verdict, *p. 438)*

Adm. Ernest J. King, the then-CNO, responding to findings of the 1944 Naval Court of Inquiry, said that Kimmel "was not on entirely sound ground in making no attempt at long-range reconnaissance" and that certain sectors were "more dangerous than others." (Verdict, *p. 440)*

James V. Forrestal, undersecretary of the Navy at the time of Pearl Harbor and later Secretary of the Navy, faulted Kimmel for "his failure to conduct long-range air reconnaissance in the more dangerous sectors." (Verdict, *p. 440)*

One needs to correct the myth that [Gen. Douglas] MacArthur refused a request by Maj. Gen. Lewis H. Brereton, the new commander of the Far East Air Force, to hit the enemy on Formosa before she could bomb the Philippines.

Instructions from Washington were very specific to wait until the Japanese made the first "overt" move. On Nov. 28, 1941, MacArthur received an "alert" warning from the War Department: "Negotiations with Japan appear to be terminated. ... Japanese future action unpredictable but hostile action possible at any moment. *If hostilities cannot be avoided, the United States desires that Japan commit the first overt act."* (Emphasis added.)

Nonetheless, even without the directive, it would have been suicidal and pointless for MacArthur's meager and inadequate air force (Washington delayed sending spare parts for most of the 72 P-40s, none for the 35 bombers, and not a single extra airplane engine) to attack the enemy's fields on Formosa. Postwar examination of Japanese records and interrogation proved that any such daylight attack on Formosa at the time would have been met by overwhelming enemy interception. None of the US planes could have reached their targets, much less returned to their Philippine bases.

After the war, Rear Admiral Tomioka stated: "If MacArthur had an air force of 500 planes (vs. 150 combat-ready, not 300 cited by Correll), we would not have ventured to strike the Philippines. Long experience had taught us that a three-to-one ratio was necessary to attain air supremacy." The Japanese provided for this figure: 307 first-line Army planes and 444 Navy planes—a total of 751 first-class aircraft of the same quality that had hit Pearl Harbor.

Further, MacArthur had ordered all 35 B-17s sent south to the island of Mindanao, out of range of the Japanese planes. Some were sent south, but the air commander did not carry out immediately MacArthur's clear directive. Curiously, on that fateful day, Brereton ordered his B-17 bombers to return to base around lunch hour when they had enough fuel to stay in the safety of the air for another 10 hours. Japanese planes suddenly struck around this time, catching all 17 bombers on the ground.

Finally, contrary to another myth, the general had always defended his air force commander when criticisms of Brereton were called to his attention. An example was in Australia in 1943 when he said: "General Brereton had in the Philippines only a token force of bombers and fighters. He was greatly handicapped by the lack of airdromes. At this time, and during succeeding days, a number of our planes were destroyed on the ground while landing for gas, or while down for essential maintenance ... *but never as a result of negligence."* (Emphasis added.)

As Far East Air Force commander, Brereton had overall responsibility for tactical air security.

Mo Ludan
Camano Island, Wash.

Not Clouds, Sand

As one who has flown over White Sands Missile Range many times, allow me to inform you that the four birds in the photo on p. 17 of your December 2007 issue are flying over the White Sands, not a cloud bank.

Lt. Col. Harv Segrest,
USAF (Ret.)
Albuquerque, N.M.

Jolly Green Heroes

I enjoyed Walt Boyne's homage to one of the truly great aircraft in USAF history ("Airpower Classics: HH-3 Jolly Green Giant," December 2007, p. 88). The article mentioned one Medal of Honor recipient and six who earned the Air Force Cross in the "Jolly Green." However, 18 additional H-3 crewmen also received the nation's second highest combat decoration and deserve similar recognition. They are: Majors Philip J. Conron, Joe B. Green, Jerry M. Griggs, Herb Kalen, Don P. Olsen, Travis Wofford, Patrick H. Wood, and Glen P. York; Captains Gregory A.M. Etzel, John A. Firse, John B. McTasney, Oliver E. O'Mara, and Travis H. Scott; TSgt. Leroy M. Wright; Sergeants Thomas A. Newman and Dennis M. Richardson; and Airmen Charles D. King and Joel E. Talley—heroes all.

In addition, Jolly Green crewmen earned the following aviation awards in the course of their rescue work: the 1979 and 1981 Mackay Trophies for the most meritorious USAF mission of the year; the '79, '80, '85, '86, '87, and '94 Kight Awards; the '67, '68, and '70 Cheney Awards; the '75 and '78 Aviator's Valor Awards and the '71 Pitsenbarger, '80 Schilling, '81 Jabara, '85 Kolligian, '86 President's, '86 Tunner, and '90 Ricks, to name the major ones.

In the "Jolly Green Giant," with its armor plating, defensive firepower, and air refueling capability, the Air Force finally had a vehicle that could go anywhere, fight its way in, and make a pickup in any terrain. The brave crews of these magnificent machines accomplished that task no less than 567 times during the Vietnam War, providing perhaps the greatest human interest stories in the annals of Air Force history. To paraphrase the Rescue Creed: "Those things they did, that others might live."

Col. Ron Thurlow,
USAF (Ret.)
Beavercreek, Ohio

Reader to Reader

As an old Provider driver, I read with interest retired Lt. Col. Rolland Freeman's letter on "COIN Airlift Redux" *["Letters,"*

December 2007, p. 4]. While I agree with his observations about the C-123, I believe that he is in error in talking about A and G models. My research and experience indicate that other than very limited experimental and prototype models, the bulk of the aircraft were designated as B models prior to the addition of the jets, and K models after.

The National Museum of the United States Air Force here in Dayton is currently in the process of restoring and polishing aircraft #64362, affectionately known as "Patches" due to the 500-plus holes acquired during its Ranch Hand spraying operations. This type of aircraft has also been featured in at least three Hollywood movies: "Air America," "Operation Dumbo Drop," and "Con Air"—living testimony to the longevity of the design!

Lt. Col. Paul J. Reinman,
USAF (Ret.)
Dayton, Ohio

In response to Dan Rinaldo's letter in the December 2007 edition of *Air Force* Magazine, the answer is yes, the US could've been first in space if in fact that was the nation's (Eisenhower's) true priority at the time *["Letters: Sputnik," December, 2007, p. 6].*

The US Navy's Vanguard program and the US Army's Redstone program were both competing for the right of placing the world's first satellite into orbit. If the US had consolidated its efforts, instead of dedicating its resources to multiple programs, it is likely that the US would have beaten the Soviets into space by approximately a year, had Wernher von Braun been permitted to work towards that goal. In fact on Sept. 20, 1956, his team successfully launched a Redstone rocket with Sergeant upper stages catapulting an 84-pound payload over 3,300 miles. Had the rocket been fired at the appropriate trajectory, the US would have beat the Soviets that day. The launching of Sputnik, although a tremendous blow to the US political system, was exactly what the doctor ordered. That event compelled the US to focus its efforts towards a common goal. It appeared that this moment finally flipped the right switch.

The primary reason the US was beaten into space by the Soviets was due to a lack of unity of effort. Multiple programs were simultaneously in motion to meet different objectives—the first to establish freedom of space, the other to develop a dependable ICBM. Despite the fact that the US was forced to congratulate the Soviets on their spectacular feat, its goals were actually met: Freedom of space had been established, and the US Atlas ICBM program was on track, although slightly behind the Soviets' R-7 success. The political blow was far more damaging than expected.

[As Roger Launius explained in his book *NASA: A History of the US Civil Space Program*:] "The event created an illusion of a technological gap and provided the impetus for increased spending for aerospace endeavors, technical and scientific educational programs, and the chartering of new federal agencies to manage air and space research and development."

Sen. Lyndon B. Johnson, only two weeks after the successful launch of Sputnik, addressed Congress, calling for all Americans to work together on this new technology. This eventually led to the formation of the Special Committee on Space and Aeronautics by the Senate on Feb. 6, 1958, chartered to work on the establishment of a permanent space management agency. If the US were to be successful in the race against the Soviets, it needed to consolidate its efforts. After all, the result of too many separate efforts led to the second place finish.

Capt. Joseph J. Hammes,
Camp S.D. Butler, Japan

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Washington Watch

By John A. Tirpak, Executive Editor

Let those geezers go; Up front on C-17s; F-15 options ....

Untying the Mobility Knot

In response to the Air Force's pleas that it be allowed to retire some dangerously old mobility airplanes, Congress voted last fall to let some aircraft go ... but with strings attached, as usual.

Lawmakers also ordered the Pentagon to get busy and sort out its overall mobility plan—long a tangle of technical issues, each linked to all others. It gave DOD just one year to answer basic questions about strategic and tactical airlift.

The 2008 defense authorization bill, approved in December by lawmakers, would allow USAF to retire up to 48 of the 85 oldest, Eisenhower-vintage KC-135E Stratotankers. Of these, 45 aren't considered safe to fly, but Congress has always insisted they be retained to justify base manning and spending coveted by constituents.

USAF has long argued the aircraft aren't useful and keeping them around, even in standby status, consumes maintenance funds that could be better used to buy replacement aircraft.

Congress said USAF can get ready to retire the rest of the KC-135Es, but the old iron can go only if the service meets three conditions:

- It must have selected a winner for the new KC-X tanker.
- If that selection draws a protest—as is widely expected—it must be resolved.
- If the Government Accountability Office orders USAF to carry out certain steps, it must implement them.

Congress also gave USAF permission to retire some C-130Es with cracked wing boxes, but only if the Air Force offers defense committees a "fleet mix" rationale and then gives Congress time to comment.

An amendment allows USAF to retire 24 C-130E/Hs as long as it keeps them in a condition for emergency recall.

Contrarily, however, Congress specifically barred USAF from retiring any of its old C-5 Galaxy transports, for which a costly upgrade is being developed.

The C-5 Reliability Enhancement and Re-engining Program, or RERP, has been the catch-22 of mobility for several years. If the upgrade works, USAF won't need more new C-17s. If it waits and then the RERP doesn't work, the C-17 line will be closed, leaving no strategic lift option.

In recognition of the situation, Congress told USAF to speed up the RERP so it can make realistic and logical choices. The RERP is at least 54 percent over budget, according to estimates last fall.

Congress ordered an "objectivity/sufficiency" review of the RERP by the Institute for Defense Analyses, due March 1. A RAND review is also being done at the Air Force's request.

House-Senate conferees directed DOD to pull together various mobility studies now under way in USAF, US Transportation Command, and other entities for a report in January 2009. The study is to analyze "lifecycle costs of the various alternatives" for buying C-17s, upgrading C-5s, buying KC-Xs, upgrading KC-10s, replacing C-130s, and fielding C-27J Joint Cargo Aircraft.

USAF photo by MSgt. Vincent De Groot

Some old KC-135Es will probably be retired.

The study is to finally answer questions left unresolved by the last two major mobility studies done by DOD: what to do to accommodate a larger and heavier Army and Marine Corps, how to manage intratheater lift, and what overall level of lift is needed for the US military strategy.

No More Backdoor C-17s

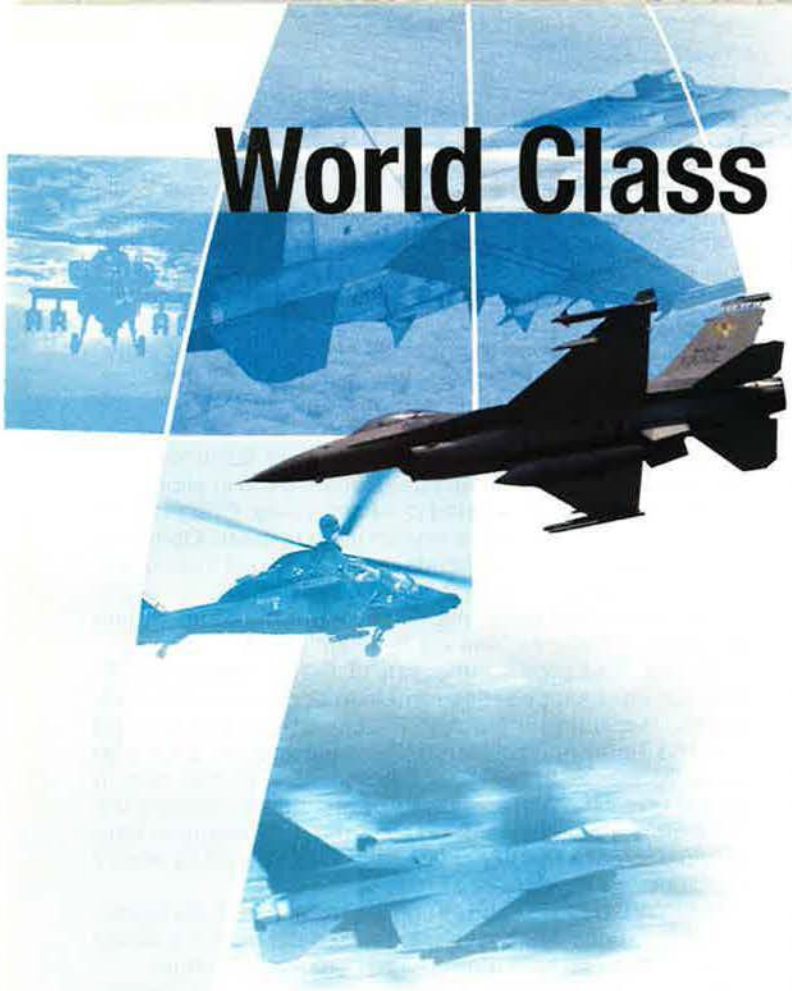
Just as Congress was approving the purchase of eight unasked-for (but still needed) new C-17s, a group of 19 Senators warned that they won't bail out the Air Force that way again.

The Senators issued the warning in a Dec. 13 letter to Robert M. Gates, the Secretary of Defense, and Jim Nussle, the director of the Office of Management and Budget.

The bipartisan group noted that DOD hasn't asked for C-17s in two years, but that the Air Force, in both years, subsequently asked Congress to help out by adding C-17s on its own.

The group said it is "unrealistic to presume that [Congress] will be able to continuously support needed production through Congressional adds," insisting that "the C-17 must be rightly funded in the President's Fiscal Year 2009 budget."

The Senators said that closing the C-17 line would leave no alternative on the drawing boards, and that restarting production later would be "prohibitively expensive." They



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said USAF clearly doesn't have enough heavy-lift capacity, pointing out that the service has had to hire Russian-built freighters to cover needs.

Moreover, the number of C-17s built to date supports only a "minimum requirement," the Senators wrote, urging Gates to abandon the "minimalist approach" which could leave the US short of strategic airlift at a critical time.

"There is no justification to believe that airlift requirements will decrease and many reasons to believe that currently available capacity is insufficient," the group said.

The move came one week after Gen. Norton A. Schwartz, head of US Transportation Command, said he "cannot support" terminating C-17 production at this time, given the problems facing the C-5 upgrade program. He declared his belief that the minimum fleet now is 205 C-17s. Schwartz made these comments at a briefing on Capitol Hill.

Counting previous Congressional adds and the eight in the new defense bill, the eventual C-17 fleet is now up to 198 aircraft.

The opposite position was taken by Sen. John S. McCain (R-Ariz.), who last fall demanded the Pentagon's inspector general look into the relationship between the Air Force and Boeing. McCain—along with other lawmakers—had previously written to Air Force Secretary Michael W. Wynne, wanting to know why Boeing had, on its own nickel, decided to cover the costs of keeping the C-17 line going in the absence of any clear USAF requirement or foreign sales of more of the aircraft.

McCain speculated USAF had somehow "induced" Boeing to extend the line with some secret handshake deal. Wynne responded simply that Boeing had, as the company said, merely gauged the attitude toward C-17s in Congress and made its own bet.

The Fighter Dilemma

The unexpected two-month grounding of F-15 A-D models provoked feverish, if unofficial, brainstorming about what USAF could do if the nightmare scenario became reality.

The nightmare scenario was this: Scores of elderly F-15s, beset with fatal structural flaws, are condemned and swiftly retired, with no replacements anywhere in sight.

The obvious answer would be to more rapidly replace the F-15s with new F-22s, but that's more easily said than done.

On Dec. 12, 28 Senators and 68 members of the House of Representatives wrote to Pentagon chief Robert M. Gates, urging him to keep buying F-22s, at least through the end of the 2009 Quadrennial Defense Review.

They said that, in light of the F-15 groundings and reports indicating that "significantly more than 220" Raptors are needed to fulfill national strategy, ending F-22 production now would be, at best, "ill advised."

Gates was willing to listen. In late December, Pentagon Comptroller Tina W. Jonas directed USAF to shift $497 million marked for F-22 shutdown costs to fix up the old F-15s instead. The move effectively set the stage for continued F-22 production.

The Air Force had made little secret of the fact that it wanted to ask for an additional 20 F-22s beyond the three-year multiyear buy that finishes delivery in 2011.

To go faster, though, would take some doing, not to mention an immediate infusion of cash. Some items in F-22 construction—such as labor-intensive large forgings and castings—require more than two years to produce.

Lockheed Martin has in recent times built F-22s at a rate of 24 a year. The company officials said it would be relatively easy to ramp back up to that figure, and that its facilities could be revamped to reach 32 a year.

However, if USAF needed the fighters faster, costs could go up, because either additional shifts would be required with heavy overtime, or facilities would have to be expanded with new tooling and factory floor space. A potentially more time-consuming task would be finding, training, and certifying workers.

"We have not done those kinds of excursions recently," a company official said, meaning that it had not computed the costs of larger-buy options available to the Air Force.

Asked to identify the longest-lead item in F-22 production, Lockheed said simply, "titanium." Because it is in short supply, its cost has skyrocketed in recent years. One problem is that Russia is one of the world's chief sources. Obtaining titanium has also caused headaches because of "buy American" laws sharply affecting military programs. The Pentagon maintains a list of programs that take priority when certain materials get scarce, and the F-22 isn't on it.

Of the Air Force's hundreds of F-15s, about 180 F-15A-Ds were supposed to remain in service into the mid-2020s. Replacing them with F-22s—above and beyond the 183 Raptors now planned—would require buying at least 20 a year to be minimally efficient. At that rate, it would take nine extra years of production to replace the F-15 fleet fully. Raise the rate, and replacement time would decrease. At 30 per year, the F-15s could be wholly replaced in six years.

However, USAF is also struggling to fund the F-35 fighter. It needs to build 110 per year to replace the F-16 in a timely manner, but can only afford 48 per year in its budget.

Lt. Gen. Raymond E. Johns Jr., deputy chief of staff for plans and programs, said accelerating the F-35 isn't a viable option because that would introduce additional risk in the program, which has a carefully laid-out development and production plan.

"I can only ramp up the F-35 ... as it matures," Johns said. "I can't pump it up artificially."

There are no other good options, USAF officials said. They have ruled out buying more F-15s or F-16s because the versions being built for foreign sales are different than those USAF has. The service also doesn't want to backtrack from stealthy, fifth generation designs and buy more of what it considers obsolescing fourth generation fighters.

Moreover, Johns said, he can get the F-22s "faster" than he could get the other aircraft, because USAF would have to get F-15 or F-16 customer countries' permission to "cut into" their production runs.

Air Force officials said it would be nearly impossible to buy a foreign fighter such as the French Rafale or Eurofighter Typhoon, and in any case, the service would want the best available.

Maj. Gen. Paul J. Selva, the Air Force's strategic planner, said at a Capitol Hill airlift seminar, "Think about the emotion in this room when [USAF leaders] talk about having to hire [Russian and Ukrainian] Antonov transports to carry our armored vehicles because our C-5s don't work. Now think about the emotion in this room if we had to say, 'We're going to have to buy Sukhoi fighters.'"

Johns said the Air Force will probably want to let the F-15 structural issue "settle down" and then make a careful decision on how to press to flesh out the force beyond 183 F-22s.

However, he said, lives enter the calculation, and the F-15's days of being able to operate over hostile, modern air defenses are over.

"We're about warfighting capability," Johns said. "And I don't want to go into a fair fight. I never want to resource an Air Force to accept high casualties." ■

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Air Force World

By **Michael Sirak,** Senior Editor, with **Marc Schanz,** Associate Editor

USAF Targets 850 Officers

The Air Force plans to hold its first force-shaping board for Fiscal 2008 on March 31. In the crosshairs are some 120 lieutenants in eight specialties. The number changes almost daily as officers opt to take voluntary separation programs.

Late last year, the service identified about 850 officers in the 2005 year group who were serving in "overage" career fields, making them eligible to face the force-shaping board. Exempt from this force-shaping effort are officers in the civil engineer, intelligence, public affairs, and security forces career fields. The option to elect voluntary separation ends on March 20.

Overall, the Air Force has said it expects to cut fewer airmen in 2008, as it moves toward an end strength base of 316,000 by 2009.

C-17 Now Burns Synfuel

The Air Force flew a C-17 airlifter—burning nothing but a blend of synthetic and aviation fuels in its four engines—from Washington state to New Jersey, marking the first such transcontinental flight. Air Force Secretary Michael W. Wynne and a horde of energy and airline officials and others, including Rep. Jim Saxton (R-N.J.), met the aircraft at McGuire AFB, N.J., on Dec. 17.

The Air Force already has certified the synfuel blend for use on the B-52 bomber and expected to complete certification for the C-17 fleet early this year. As the largest military consumer of energy—80 percent of which is aviation fuel—the Air Force plans to pursue the use of a synfuel blend for all its aircraft, achieving certification for "every engine and every airframe" by early 2011 and purchasing 50 percent of its fuel requirement from domestically produced synfuel, according to William C. Anderson, assistant secretary of the Air Force for installations, environment, and logistics. Some have questioned the practicality of switching to a synfuel blend because there's no ready source, but Anderson said that estimates from the marketplace mark 2016 as "about the time that a robust commercial synthetic fuel market may be in significant growth stage."

New Aircraft To Appear at Cannon

Cannon AFB, N.M., saw the last assigned Air Combat Command F-16 fly off late last year, making way for Air Force Special Operations Command aircraft. By the end of this month AFSOC plans to have the 73rd Special Operations Squadron fully manned at the base. The unit flies the MC-130W and expects to receive its last of 12 aircraft by 2010.

Col. Tim Leahy, the commander of the 27th Special Operations Wing, said the base has undergone modification and has been constructing new facilities for the AFSOC aircraft, which this summer should include Predator unmanned aerial vehicles. The command's dedicated UAV squadron—the 3rd SOS—will be picking up and moving down from Creech AFB, Nev.

Part of the construction effort included UAV pads and ground stations for Predator operators, as well as conversion of simulation facilities and squadron operations office space.

And AFSOC plans to house a relatively new and low-profile airframe—the Pilatus PC-12—at Cannon. Leahy said the aircraft were the product of the emphasis placed on special operations forces in the last Quadrennial Defense Review. A more highly militarized version, the U-28A, is currently operated by the 319th Special Operations Squadron at Hurlburt Field, Fla.

AFSOC gained the small U-28 airlifter in August 2005, equipping it with advanced communications and navigation gear and various classified capabilities to provide specialized intratheater support to special ops forces.

—Marc V. Schanz

USAF Shifts Mx to Flying Units

The Air Force is moving ahead with its plan to realign aircraft maintainers with the operations units they support, at least for the fighter and combat search and rescue forces. The moves will begin this summer and conclude by November, according to a directive issued in December 2007 by Gen. T. Michael Moseley, Chief of Staff.

Moseley broached the idea publicly last summer, citing the long heritage of partnership between crew chiefs and aircrews. His predecessor combined maintenance and logistics as a means to broaden career possibilities for young officers. Moseley said that he took "inputs ... from crew chiefs to commanders" before deciding to reorganize the flying and maintenance squadrons, which he terms the "building block of the Air Force structure."

Now, fighter and CSAR squadrons will include aircraft maintenance units that support them, while other maintenance units will combine with logistics readiness squadrons and aerial port squadrons to comprise new materiel groups.

Langley F-22s Ready for War

Air Combat Command has declared full operational capability for the F-22A force at Langley AFB, Va.

Gen. John D.W. Corley, ACC commander, determined that the integrated

Northeast to Alaska. *Three F-16s wearing radically different colors soar above South Korea. For the moment, they belong to the 80th FS, Kunsan Air Base. However, this nest of Vipers is about to split up. The two in the foreground will transfer to the 18th FS, Eielson AFB, Alaska; they will become Red Flag aggressors. The nearest Viper sports the new black, white, and gray "arctic" scheme. The middle one wears standard aggressor markings. Kunsan maintainers helped out by painting the airplanes ahead of their departure time.*

01.09.2008

USAF photo by SSgt. Douglas Olsen

First Lt. Jason Edwards, part of this B-1B's air crew, conducts a preflight check of the big bomber's weapon load before a December mission over Southwest Asia. The 9th Expeditionary Bomb Squadron has become increasingly active in Operation Enduring Freedom, the war in Afghanistan.

active duty 1st Fighter Wing and Air National Guard 192nd FW at Langley, have "sufficient Raptors, equipment, and trained airmen" to sustain FOC "for many years to come."

The two units jointly fly and maintain 40 fighters, which are assigned to the 1st FW's 27th Fighter Squadron and 94th FS. Between the active and Air Guard units, there are 80 trained Raptor pilots.

USAF Seeks New Power Sources

At the request of two senior lawmakers on the Senate Energy Committee, the Air Force has been exploring whether an Air Force base would be "an appropriate host for a nuclear [energy] facility," according to William C. Anderson, assistant secretary of the Air Force for installations, environment, and logistics and the Air Force's lead on energy initiatives. Talking with Pentagon reporters in late December, he said that the service is "in the very infancy stages" of considering this request.

The two lawmakers were Sen. Pete V. Domenici (R-N.M.) and Sen. Larry E. Craig (R-Idaho).

USAF officials have met with the Energy Department and talked with technology leaders—most of whom, Anderson said, are foreign "at this point." They believe the latest technology, something called a "small-packaged nuclear facility," has potential. This spring, the service plans to gather financiers, developers, and operators together for a discussion. Anderson added, "It's worth continuing to look at."

F-22s Intercept Russian Bombers

The new F-22 force at Elmendorf AFB, Alaska, chalked up an operational first when it scrambled to intercept and monitor two Russian Bear-H bombers on Nov. 22.

Officials revealed the intercept in December, noting that the Alaskan NORAD Region launched F-22s assigned to the 90th Fighter Squadron at Elmendorf and tanker and command and control aircraft to identify and monitor the two bombers. Region spokesman Maj. Allen Herritage confirmed also that the mission was the first time F-22s had been called to support a NORAD mission in Alaska since Elmendorf received its first Raptors last August.

The Alaskan NORAD Region conducts air surveillance on all aircraft entering Alaska airspace, utilizing Alaska-stationed F-15Cs, E-3s, KC-135s, and now the F-22. This past summer, Russian President Vladimir V. Putin reactivated regular bomber patrols—a practice that had been dormant since the early 1990s.

This animated image sequence, produced by Boeing's Phantom Works, recreates the catastrophic Nov. 2 breakup of an old F-15C fighter over Missouri. The pilot, of the 131st FW of the Missouri Air National Guard, barely escaped death. USAF grounded all F-15s the next day, and nearly 200 have yet to resume flight operations.

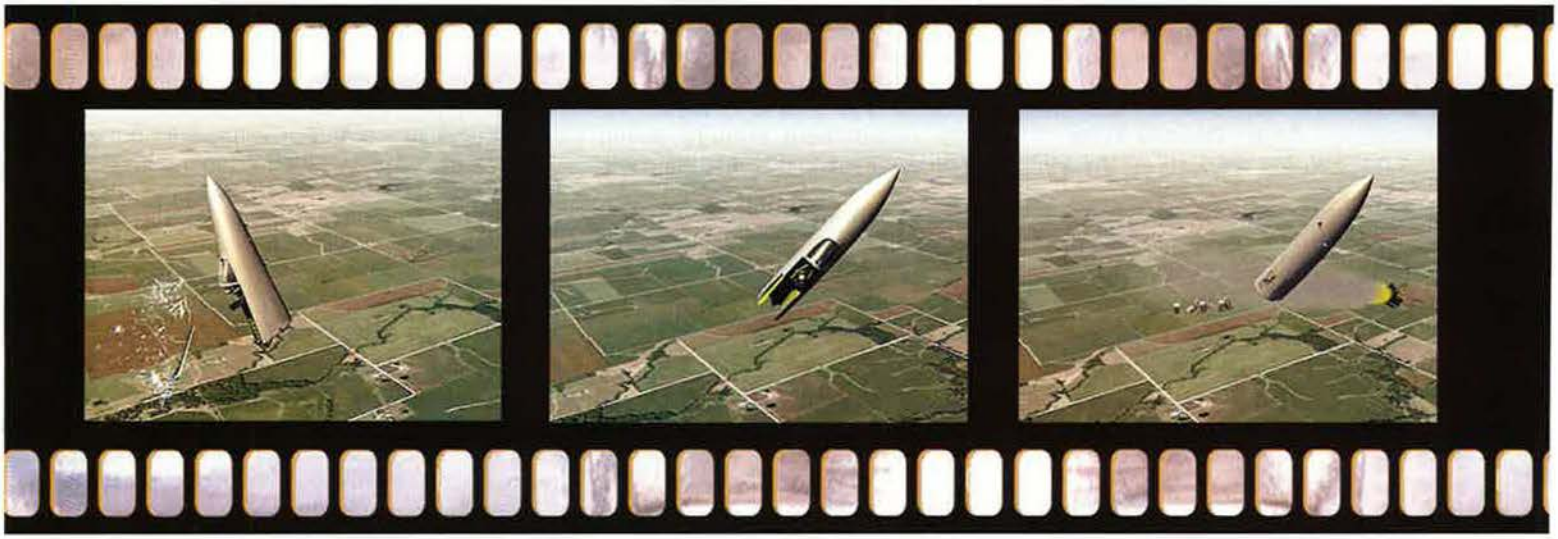
USAF photo by TSgt. Shane A. Cuomo

Maj. James Sage, having finally gotten back to flying, finishes off a Jan. 9 training flight in an F-15A—the first since all of the Air Force's old Eagles were grounded on Nov. 2. Sage is part of the Hawaii ANG's F-15 unit at Hickam AFB, Hawaii.

Test Proves High Mach Release

The Air Force and Boeing have demonstrated the ability to release munitions from an aircraft weapons bay while the aircraft flies at high supersonic speeds. The program is called High Frequency Excitation Active Flow Control for Supersonic Weapon Release, or HIFEX for short.

Using the High-Speed Test Track at Holloman AFB, N.M., researchers from Boeing Phantom Works and the Air Force Research Lab employed "active flow control" with a rocket sled to test the release of a Mk 82 Joint Direct Attack Munition at Mach 2. The AFRL program manager on the effort, Jim Grove, said this innovative technology "will enable safe separation of weapons from weapons bays of future high-speed aircraft."



Privatization Oversight Pushed

Sen. Mark Pryor (D-Ark.) and Sen. Saxby Chambliss (R-Ga.) have taken the next step in their drive to straighten out a housing privatization mess that has stalled Air Force housing projects at bases in Arkansas, Florida, Georgia, and Massachusetts. They introduced legislation that they hope will ensure "more effective oversight of funding" and require "a more vigorous process in vetting project bidders."

Pryor, Chambliss, and other Senators sent a letter to Air Force Secretary Michael W. Wynne, expressing their alarm and disappointment at "the level of failure at these four projects [Little Rock, Patrick, Moody, and Hanscom Air Force Bases], all of which have been under work stoppages for months, are years behind schedule, and are tens of millions of dollars over budget."

Carabetta Enterprises, through subsidiary companies, held the development contracts at the four Air Force bases and stopped work on them in various stages of completion. At Little Rock, the contractor completed only

Pentagon Identifies Missing Airmen From Past Wars

The DOD POW/Missing Personnel Office in December released the names of several newly identified airmen, following extensive investigations of remains from airmen missing from the wars in Korea and Vietnam.

Maj. Perry H. Jefferson of Denver was an aerial observer aboard an O-1 Bird Dog on a mission over Vietnam on April 3, 1969 when contact was lost with the aircraft. A three-day search and rescue effort failed to locate a crash site before hostile action shut down the search. Remains turned over in 1984 were identified in 2000 as those of the Bird Dog's Army pilot, 1st Lt. Arthur G. Ecklund. Another Vietnamese individual in 2001 turned over the remains that DPMO ultimately identified as Jefferson's.

Maj. Robert F. Woods of Salt Lake City and Capt. Johnnie C. Cornelius of Maricopa County, Ariz., were declared missing during the Vietnam War, when their O-2A aircraft crashed during a reconnaissance mission on June 26, 1968 in a remote mountainous area over Quang Binh Province. Interviews in 2006 led officials to two graves that were excavated last year. DNA and dental comparisons helped identify the remains.

Col. Douglas H. Hatfield of Shenandoah, Va., and Capt. Richard H. Simpson of Fairhaven, Mich., were two of 11 crew members on a B-29 flying from Kadena AB, Japan, on an April 12, 1951 mission over North Korea. The bomber crashed following a strike by MiG-15s. Of the 11, one died in captivity and two were repatriated. In 1993, North Korea turned over 31 boxes of remains of US servicemen. In 2000, a joint excavation recovered additional remains, including those subsequently identified as Hatfield's and Stratton's.

25 of 468 homes; at Hanscom, 17 of 784; and at Patrick, 163 of 552 homes. At Moody, the project begun in 2004 produced only two of 400 new homes, while the estimated cost of the project exceeded available funding by $25 million.

Questions About Rescue Arise

April 1 is the date set in the 2008 defense policy bill that calls for a report on the search and rescue capabilities available in the northwestern United States. Sen. Maria Cantwell and Sen. Patty Murray—Democrats from Washington—who have been trying to prevent the deactivation of the 36th Rescue Flight at Fairchild AFB, Wash., pushed the requirement through during the conference session late last year.

The primary mission of the 36th RQF is to support the USAF Survival School at Fairchild in training, but it often gets tapped to perform area rescues. In December, for instance, airmen of the 36th rescued a hiker stranded by an avalanche that killed two fellow hikers in the Snoqualmie Pass.

The Senators noted that the unit's UH-1 helicopters are used to "train thousands of aircrews each year and provide critical search and rescue capabilities for Northwest communities and the nation."

Is This the Month for Tankers?

Sue C. Payton, the Air Force's acquisition chief, told reporters last fall that the Air Force would delay its decision on the KC-X aerial refueling aircraft program until this month to ensure the process was as thorough as necessary. The competitors, Boeing and the Northrop Grumman/EADS North America team, are vying for a contract to produce the first 179 new tankers in an Air Force plan that would ultimately replace all of the service's current KC-135 fleet.

The service had hoped to announce the winner earlier, but, Payton said, "There is a price to be paid for openness and transparency."

She also clarified the KC-X evaluation factors, saying price is not the most important part of the competition. In fact, the Air Force deemed cost/price to be less important than mission capability, proposal risk, or past performance. Because the Air Force has a lot riding on its top acquisition priority, she declared that the service does not want to be bamboozled by unrealistic cost estimates.

USAF photo

Courtesy photo from Argos Georgia Ltd.

In a remarkable January mission, a C-17 aircrew drops key engine parts to a British fishing boat stranded in Antarctic waters. The C-17 and crews are assigned to the 62nd and 446th Airlift Wings, McChord AFB, Wash., but staged from Christchurch, New Zealand. With the parts, the ship was able to get under way again.

The War on Terrorism

Operation Iraqi Freedom—Iraq

Casualties

By Jan. 17, a total of 3,923 Americans had died in Operation Iraqi Freedom. The total includes 3,915 troops and eight Department of Defense civilians. Of these deaths, 3,191 were killed in action with the enemy while 732 died in noncombat incidents.

There have been 28,938 troops wounded in action during Operation Iraqi Freedom. This number includes 15,996 who were wounded and returned to duty within 72 hours and 12,942 who were unable to return to duty quickly.

F-16 Destroys Explosive-Wired House

Soldiers with the Army's 3rd Infantry Division conducting a foot patrol in the area of Maderiyah, Iraq, on Nov. 25 discovered an abandoned house with copper wires coming out of the windows—indicating the building was rigged with explosives.

Citizens in the area confirmed the house was abandoned and an explosive ordnance team was called. The team saw that the copper wires were attached to blasting caps on jugs filled with homemade explosives.

The team determined that approaching the house to destroy the bombs would be too risky so the area was cleared. An F-16 dropped a GBU-38 on the house, destroying it and the explosives.

Operation Enduring Freedom—Afghanistan

Casualties

By Jan. 12, a total of 476 Americans had died in Operation Enduring Freedom. The total includes 475 troops and one Department of Defense civilian. Of these deaths, 283 were killed in action with the enemy while 193 died in noncombat incidents.

There have been 1,855 troops wounded in action during OEF. This number includes 725 who were wounded and returned to duty within 72 hours and 1,130 who were unable to return to duty quickly.

Strike Eagles Take Out Taliban Weapons Smuggler

US Air Force F-15Es on Dec. 7 and 9 conducted precision strikes against Taliban leadership and weapons smugglers, who were known for equipping various enemy forces with assorted weaponry including explosives and even anti-aircraft weapons. Reports indicated one of the individuals was linked with attacks on coalition forces aircraft as well.

On Dec. 7, coalition aircraft conducted a precision strike against a Taliban commander responsible for attacks on Afghan and coalition forces in several surrounding districts of Musa Qala. Strike Eagles were called in to target a building on a compound in the district containing several militants and the Taliban commander. The F-15Es dropped a GBU-31 and GBU-38s on the compound, destroying the building and killing the militants. Multiple secondary explosions were also reported—indicating a sizable weapons cache.

On Dec. 9, coalition forces targeted a building in the Musa Qala district of Helmand Province that contained several Taliban-affiliated militants, including the smuggler who was transporting weaponry. Air Force F-15Es were called in and employed GBU-38s and cannon rounds on the compound, destroying the building and killing several militants. The on-scene joint terminal attack controller confirmed the mission a success as the enemy activity ended.

Air Force EOD Team Defuses Bombs at School

A team of Air Force explosive ordnance disposal technicians helped disarm two bombs at an Afghan girls' school on Nov. 29, after guards discovered grenades, mortar, and recoilless rifle rounds nearby.

When the team first arrived at the Poorak Girls School in Afghanistan's Logar Province, team leader TSgt. Michael Laskowski initially found a bomb underneath a footbridge in front of the school. The bomb comprised two 82 mm mortars, a recoilless rifle round, and a pound of explosives placed in a bag and wired with batteries. The team later discovered a hand grenade rigged to explode under the guard building at the school's entrance.

After collecting the explosives with other munitions in the area, the team detonated them at a site about 15 miles away from the town.

Fixing the Re-employment Hassle

Sen. Edward M. Kennedy (D-Mass.) and Sen. Daniel K. Akaka (D-Hawaii) have introduced legislation meant to protect employment rights of service members returning from duty in the War on Terror. The measure would impose deadlines on federal agencies to assist vets running into problems and implement efficiency changes recommended by the Government Accountability Office.

Despite a law that supposedly secures employment and re-employment rights, there are continued reports of problems, including reservists who say they face a "military service penalty."

Last fall, Kennedy released data from a year-old Pentagon survey in which some 11,000 reservists returning from the War on Terror reported problems in getting their jobs back; 22,000 said they had lost seniority; and 20,000 cited pension cuts.

Kennedy, who chairs the Health, Education, Labor, and Pensions Committee, said the data he pressed the Pentagon to release shows an "even more disturbing" reality: "Veterans who seek help face a Walter Reed-like nightmare ... [in which] they have to negotiate a maze of bureaucracy." Kennedy declared that "it's no wonder that 77 percent of all veterans say they don't even bother to seek help when they face re-employment problems."

War Mobility Hub Moves North

The Air Force said it can save more than $40.3 million a year and shave about 24 hours off cargo movement time by shifting the US center for Southwest Asia-bound cargo shipments from the southeast to the northeast. As a result, the service decided to make Dover AFB, Del., and McGuire AFB, N.J., the primary aerial ports instead of Charleston AFB, S.C.

The action took effect Jan. 1.

DOD was transporting much of the cargo via commercial trucks from northeast supply locations to Charleston, bypassing the closer Dover and McGuire airlift facilities. Charleston, USAF's premier C-17 base, now will focus on operations in South America and Africa, but it also will continue to ferry Mine-Resistant Ambush Protected vehicles to Southwest Asia.

F-16 Tests Boost-Phase Interceptor

The Missile Defense Agency successfully tested an AIM-9X missile modified with the Raytheon-developed Net-Centric Airborne Defense Element, firing it from an F-16 to intercept a boosting rocket used as a target boost-phase missile.

According to MDA, the Dec. 3 test over the White Sands Missile Range,

Senior Staff Changes

RETIREMENTS: Gen. William T. **Hobbins,** Maj. Gen. Arthur J. **Rooney Jr.**

NOMINATIONS: To be Major General: Cecil R. **Richardson. To be Brigadier General:** Christopher F. **Burne,** Dwight D. **Creasy,** Mark A. **Ediger,** Richard A. **Hersack,** Bruce A. **Litchfield,** Daniel O. **Wyman.**

CHANGES: Brig. Gen. Brooks L. **Bash,** from Dir., Combat & Info. Ops., STRATCOM, Offutt AFB, Neb., to Cmdr., Coalition AF Transition Team, Multinational Security Transition Cmd-Iraq, ACC, Baghdad, Iraq ... Gen. Roger A. **Brady,** from DCS/Personnel, USAF, Pentagon, to Cmdr., USAFE, Ramstein AB, Germany ... Brig. Gen. David H. **Cyr,** from Dir., USAF Chaplain Service Institute, Air University, AETC, Maxwell AFB, Ala., to AF Dep. Chief of Chaplains, USAF, Pentagon ... Lt. Gen. Richard Y. **Newton III,** from Asst. DCS/Air, Space, & Info Ops., Plans & Rqmts., USAF, Pentagon, to DCS/Manpower & Personnel, USAF, Pentagon.

COMMAND CHIEF MASTER SERGEANT CHANGES: Pamela A. **Derrow,** to CCMS, USAFE, Ramstein AB, Germany ... William C. **Gurney,** to CCMS, AFMC, Wright-Patterson AFB, Ohio ... Richard T. **Small,** to CCMS, AFSPC, Peterson AFB, Colo.

SENIOR EXECUTIVE SERVICE CHANGES: Francine **Blackmon,** to Sr. Advisor, Office of Human Resources, NRO, Chantilly, Va. ... Randy E. **Brown,** to Dep. Dir., Intel. & Rqmts., AFMC, Wright-Patterson AFB, Ohio ... Roger S. **Correll,** to Assoc. Dep. Asst. Secy., Contracting, Office of the Asst. SECAF for Acq., Pentagon ... Craig W. **Duehring,** to Asst. SECAF, Manpower & Reserve Affairs, Pentagon ... Michael J. **Dunn,** to Chief Technical Advisor, Global Positioning Systems Wg., SMC, AFSPC, Los Angeles AFB, Calif. ... John H. **Gibson,** to Asst. SECAF, Financial Management & Comptroller, Pentagon ... Richard V. **Howie,** to Dep. Dir., Log., AMC, Scott AFB, Ill. ... David M. **Jerome,** Dir., Sensors, AF Research Lab, AFMC, Wright-Patterson AFB, Ohio ... James J. **Kren,** to Executive Dir., (NATO) Battlefield Info. Collections Exploitations Systems Agency, Intel. Systems Spt. Office, OSAF, Brussels, Belgium ... Cathlynn B. **Novel,** to Dep. Auditor Gen. for Ops., Acq., & Log., AF Audit Agency, Pentagon ... William C. **Redmond,** to Executive Dir., AF Safety Ctr., Kirtland AFB, N.M. ... Joe **Sciabica,** to Executive Dir., AF Research Lab, AFMC, Wright-Patterson AFB, Ohio ... Theodore J. **Williams,** to Dep. Auditor Gen., Financial & Support Audits, AF Audit Agency, Pentagon. ▪

N.M., included a second modified AIM-9X that observed the intercept through its NCADE seeker and "was also on a trajectory to intercept the target."

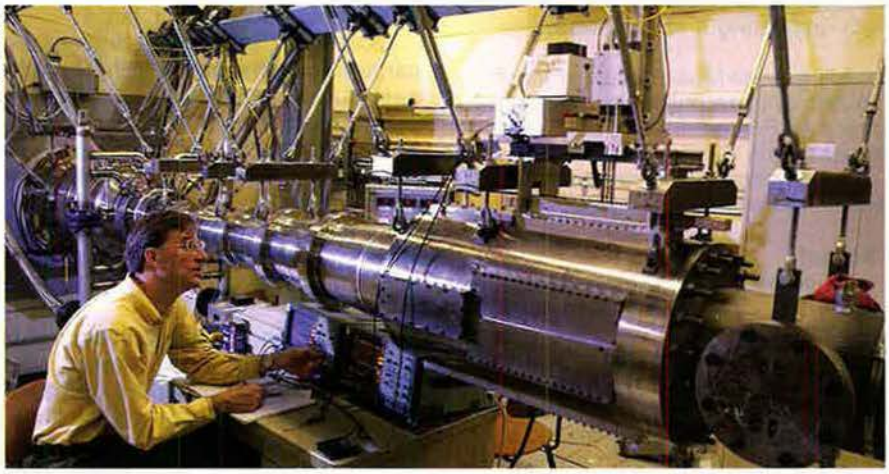
Raytheon Missile Systems Vice President Mike Booen said, "This test provides clear evidence that the NCADE seeker is a viable solution against a [short- and medium-range] boosting missile threat." MDA said that fighters or unmanned aerial vehicles could carry an NCADE-equipped missile where the aircraft could "penetrate to within about 100 miles of the [missile] launch site."

ANG to Consolidate at Andrews

The Air National Guard leadership broke ground at Andrews AFB, Md., just outside Washington, D.C., on a new $52 million ANG Readiness Center. The Air Guard plans to consolidate personnel from the existing center, also at Andrews, and Air Guard offices that currently exist in Arlington, Va.

Lt. Gen. Craig R. McKinley, ANG director, said the impetus for the new four-story complex was the post 9/11 force protection issue. All nine ANG directorates that oversee operations of Air Guard personnel and units around the world will occupy the new facility, slated to open in September 2011.

Courtesy photo



This wind tunnel, built at Purdue University in Indiana, is a one-of-a-kind item—the world's only quiet tunnel able to create the conditions of a Mach 6 flight. Built at a cost of $1 million, it is being used to aid in the design of new aircraft capable of hypersonic flight. Here, Professor Steven Schneider operates the device, funded by USAF's Office of Scientific Research.

B-2 Antenna Progresses

According to Northrop Grumman, the company has completed installation, integration, and initial flight testing of the developmental test units for the B-2's new radar antenna and has let a Northrop-led team "complete the comprehensive [radar modernization program] interrupted last year by integration issues."

The Air Force alerted Congress last year to "technical maturity" problems with the new antenna. Northrop B-2 Program Manager Dave Mazur said installation of the test units "is a major milestone" that "demonstrates not only the technical maturity of the highly complex radar itself, but also the ability of the B-2 industry team to identify and resolve technical issues in a positive, collaborative manner."

The Air Force urgently wants the new antenna to solve the B-2's spectrum problem. Service officials told Congress that the B-2 was getting kicked out of its spectrum. USAF tried to speed up the radar modernization program because the new equipment would incorporate the frequency change, but the new antenna needed more work.

SMC Issues Dual GPS Contracts

The Space and Missile Systems Center in Los Angeles awarded two contracts, each valued at approximately $160 million, to Northrop Grumman and Raytheon to develop trade studies, requirements definition, and engineering models for the control segment of the next generation Global Positioning System satellites.

Northrop Vice President Steve Bergjans said in a statement that the Northrop-led team would provide "a low-risk solution that will readily evolve to meet the ever-increasing operational demands placed on GPS." Raytheon's intelligence and information systems president, Michael Keebaugh, countered that Raytheon is uniquely qualified to deliver "the right control system."

The potential value to the winning company is more than $1 billion.

Lawmakers expressed concern about the GPS III ground segment last year in deliberations over the 2008 defense policy bill, ultimately removing $100 million from the GPS III budget request.

Nellis Brings in the Heavies

The Air Force Weapons School has conducted its first exercise showing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USAF photo by Randy Hepp

This C-17, overflies Manhattan on a brilliantly clear December day, after completion of the first-ever transcontinental airplane flight using a blend of synthetic and aviation fuel in all four engines. The flight began at McChord AFB, Wash., and ended at McGuire AFB, N.J.

weapons school crews how to meld mobility forces with fighter, space, sensor, and intelligence platforms during combat airdrop operations.

C-130s and C-17s from Little Rock AFB, Ark., and McGuire AFB, N.J., respectively, participated in the Nov. 20 exercise over the Nevada Test and Training Range.

Five months of effort produced an intensive, realistic scenario, including aggressor aircraft "attacking" some 30 airlifters. WPS student and C-17 mission commander Capt. Jaron Roux said it was "the first time we have done something of this magnitude, and there were no big mistakes; I think we did a good job."

Special Operations Command Remakes Melrose Range

Just a few months after the base transitioned to Air Force Special Operations Command, air commando officials at Cannon AFB, N.M., were prepared to ramp up training at one of the facility's key assets—the nearby Melrose Bombing and Gunnery Range. One of the big reasons why AFSOC decided to open their western base of operations in the High Plains of eastern New Mexico is the sheer space the range has to offer—about 60,000 acres. Some 8,800 acres are dedicated impact areas for day or night gunnery and bombing practice.

AFSOC expects by April to unleash its AC-130 gunships on the range as regular patrons. Lt. Col. Toby Corey, director of operations for the 27th Special Operations Support Squadron, said Cannon planned to open two dedicated gunship impact training areas this spring. The two areas—named "Spirit" and "Jockey" in honor of two gunships lost in Gulf War I and Operation Restore Hope, respectively—will be filled with about 26 targets. During his final flight before retiring as AFSOC commander, Lt. Gen. Michael W. Wooley helped demonstrate the "proof of concept" for the two areas by flying the AC-130 that shot the first live rounds.

Since the air commandos will have priority use on the range space, Corey said that AFSOC plans to begin regular temporary duty training rotations with gunship crews and will soon include training with special tactics airmen.

Corey said Cannon also would host special tactics training from AFSOC units based at Hurlburt Field, Fla. The 27th Special Operations Wing plans to work closely with the nearby 58th Special Operations Wing at Kirtland AFB, N.M. The 58th SOW, an Air Education and Training Command unit, is the schoolhouse for AFSOC's helicopter and MC-130 crews and has picked up the training role for the new CV-22. *—Marc V. Schanz*

Yokota Deploys C-12

The 459th Airlift Squadron at Yokota AB, Japan, last fall deployed, for the first time, one of its newly acquired C-12J turboprops to the Philippines under Operation Enduring Freedom. The Yokota team flew nearly 265 hours, transporting 552 passengers and more than 57,000 pounds of cargo over the two-month deployment.

Just last summer, the 459th AS traded its C-21 small transport jets for C-12J turboprops in a not quite even swap—four for three. The base had flown the C-21 for 21 years. The Air Force made the switch because the C-12s can haul more and land at some fields inaccessible to the sleek C-21.

Two Receive Airman Medals

The Air Force has awarded the Airman's Medal to MSgt. Noel Murphy for his actions to help save other military personnel when their helicopter crashed into a lake in Iraq. Murphy is assigned to the explosive ordnance disposal flight of the 96th Civil Engineer Squadron at Eglin AFB, Fla.

During a 2006 deployment to Iraq, Murphy witnessed a Marine Corps helicopter plunge into a lake during an emergency landing attempt, putting 16 personnel in full combat gear in the 300-foot-deep water. Murphy scaled a dam

USAF photo by SSgt. Angelique Perez

A B-1 bomber pulls away from a Kyrgyzstan-based KC-135 tanker after refueling over Afghanistan. According to the Air Force, B-1Bs deployed to the region struck and destroyed two al Qaeda safe havens in a devastating Jan. 10 strike near Arab Jabour, Iraq.

to reach the bank of the lake and dove in to pull people out of the helicopter. He made repeated efforts and, with others, was able to save 12.

The Air Force also awarded an Airman's Medal to Capt. David Burnett for his actions in June 2007 to save the lives of a mother and two small children trapped in their car after a major traffic accident. Burnett is commander of the 375th Military Personnel Flight at Scott AFB, Ill.

Throttle Cable Faulted in Crash

An accident investigation board has concluded that failure of a throttle cable led to the March 12, 2007 crash of an F-16CJ near the Tonopah Test Range Airfield in Nevada. About 46 minutes into a training flight, the engine remained stuck in full power. Repeated attempts by the pilot to disengage the afterburner failed before the engine flamed out from fuel starvation.

The F-16 was assigned to the USAF Weapons School at Nellis Air Force Base. It crashed about 8:50 p.m. near the end of the runway as it came in to land. The pilot ejected safely.

Trainers Collide, Predators Crash

Two T-6 Texan II training aircraft collided Nov. 28 around 1 p.m. over the Columbus AFB, Miss., auxiliary airfield in Shuqualak. The four airmen ejected safely; the aircraft crashed.

In Iraq, the Air Force lost two MQ-1 Predator unmanned aerial vehicles. One crashed on Dec. 17 at about 1:30 p.m., local time, and the other on Nov. 29 at about 11 a.m., also local time.

Accident investigations were under way on each incident.

Pilot Error Caused Collision

An accident investigation board reviewing the midair collision of an F-15C with an F-16 near Eielson AFB, Alaska, on June 11, 2007 concluded the pilot of the F-15 wasn't paying attention to his altitude. The two were

USAF photo by MSgt. Andy Dunaway

TSgt. Brad Pilgrim, a loadmaster with the 17th Airlift Squadron, Charleston AFB, S.C., preflights the setup of a Jan. 14 Joint Precision Airdrop Delivery System mission into Afghanistan. The C-17 crew air-dropped 40 bundles of humanitarian supplies into the war-torn country.

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taking part in a Red Flag Alaska training exercise.

The F-15 pilot from the 1st Fighter Wing at Langley AFB, Va., ejected safely, and his aircraft crashed into a rural area. The F-16 pilot from the 64th Aggressor Squadron at Nellis AFB, Nev., was able to land his fighter, but it sustained about $1 million in damage.

Air Guard To Activate CRG

The Kentucky Air National Guard plans to formally activate the 123rd Contingency Response Group in April. It will be the Air Guard's first contingency response group.

Kentucky declared its intent in 2006 to create a CRG, a unit designed to establish bare base operations anywhere in the world. The first 56 airmen of the planned 115-strong unit went through 22 days of training at Ft. Dix, N.J., home to the Air Force Expeditionary Center, last year. They learned air base assessment, initial airfield operations, force protection, and convoy and urban operations, among other skills.

Battlefield Airmen Wing Stands Up

Air Combat Command planned to activate late last month the 93rd Air Ground Operations Wing at Moody AFB, Ga. The new wing will oversee ACC's battlefield airmen—tactical air control party and combat weather—and specialized force protection elements.

The wing will comprise the 3rd Air Support Operations Group at Ft. Hood, Tex., the 18th ASOG at Pope AFB, N.C., and 820th Security Forces Group at Moody. Previously these units got support directly from a numbered Air Force, but ACC expects the new arrangement to make it even easier to standardize training and employment.

Progress on Assault Prevention

According to a new DOD annual report to Congress on sexual harassment and sexual violence at the service academies, all three schools have "made great progress in establishing robust and effective prevention and response programs." A survey released earlier this year showed that cadets, in general, felt safer than in the past from sexual harassment.

The new 290-page report, which covers the last academic year (from June 2006 through May 2007), addresses reporting procedures and policies implemented since the widely reported problems at the Air Force Academy of several years ago. ■

News Notes

■ On Nov. 30, Gen. Paul V. Hester relinquished command of Pacific Air Forces to Gen. Carrol H. Chandler. Hester formally retired from the Air Force last month after some 36 years of service. Chandler, a 1974 Air Force Academy graduate, last served as USAF's deputy chief of staff for operations, plans, and requirements.

■ Air Force Gen. Lance L. Smith turned over leadership of Joint Forces Command and NATO's Allied Command Transformation to Marine Corps Gen. James N. Mattis. Smith retired last month after 38 years of service.

■ Air Force Research Lab's Human Effectiveness Directorate plans to measure 3,000 current aircrew members for the first large-scale anthropometric survey it has conducted on USAF fliers in about 40 years. Now, though, the researchers will be employing techniques that include three-dimensional whole-body scanners instead of just tape measures.

■ Air Force Space Command deactivated the Air Force Space Battlelab at Schriever AFB, Colo., after 10 years of operation. The space battlelab, as with the seven other Air Force battlelabs, fell prey to the service's money woes.

■ The Mississippi Air National Guard's 172nd Airlift Wing has named one of its C-17s *Spirit of the Purple Heart*, recognizing the US military's oldest decoration. The airlifter, which in 2006 flew the one-millionth-hour mission for the C-17 fleet, now has a Purple Heart medal painted above its passenger door.

■ The government of India has decided to send elements of its air force to Nevada in August to participate in Red Flag. The US extended an invitation to the Indian Air Force in 2006.

■ Boeing selected Raytheon's active electronically scanned array radar to upgrade USAF's F-15E Strike Eagles, beginning this year. The service already is upgrading F-15C models with Raytheon's AESA radar.

■ A United Launch Alliance Delta IV heavy lift expendable launch vehicle boosted the last Defense Support Program satellite into orbit Nov. 10.

■ Maj. Bradley Downs and Maj. Daniel Roesch received the Cheney Award for their actions providing close air support to coalition ground forces in Afghanistan. Both serve as aircrew on Air Force Special Operations Command MC-130H Combat Talon II aircraft.

■ The 460th Space Wing, headquartered at Buckley AFB, Colo., activated the 11th Space Warning Squadron at Schriever AFB, Colo. The new unit, which replaces Det. 1 of the 460th Space Operations Group, will operate the new Space Based Infrared System satellite payload.

■ The Arnold Engineering Development Center in Tennessee has dedicated an F-4C Phantom it has on static display to two airmen who flew with the 555th Tactical Fighter Squadron during the Vietnam War. They are: Col. Lawrence Golberg and Maj. Patrick Wynne, the brother of Air Force Secretary Michael W. Wynne. Golberg and Patrick Wynne were killed on an Aug. 8, 1966 reconnaissance mission. ■

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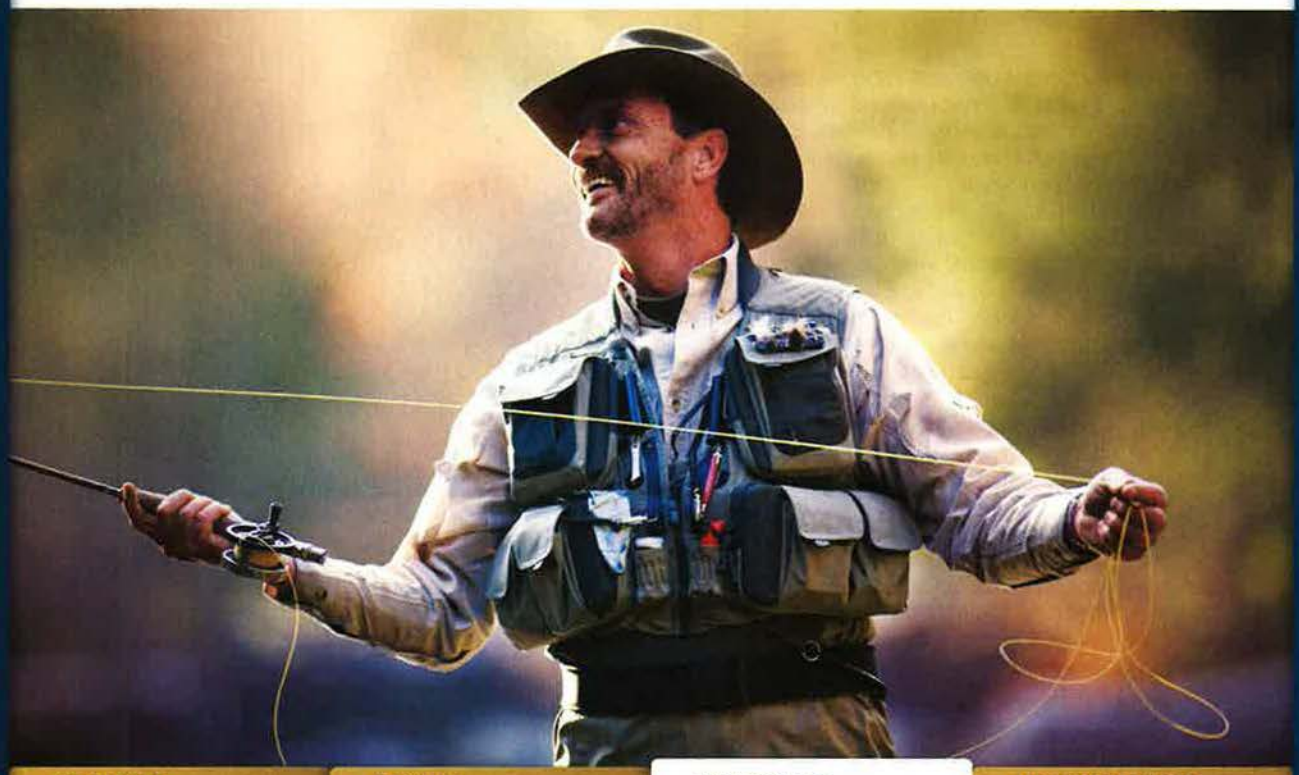

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Issue Brief

By **Adam J. Hebert,** Executive Editor

Of Bent Spears and Broken Arrows

"I don't know what's scarier—losing a nuclear weapon, or that it happens so often there's actually a term for it."—the character Giles Prentice in the film "Broken Arrow."

A recent lapse in Air Force nuclear security brought some peculiar terms into the public consciousness. When six nuclear-tipped AGM-129 cruise missiles were accidentally loaded aboard a B-52H and flown across the country last summer, what USAF had on its hands was a "bent spear."

This was very bad, but it wasn't the worst thing that could happen. You would rather have to grapple with a bent spear than a "broken arrow" or a "faded giant." And certainly nobody ever wants to have anything to do with an "empty quiver."

What do these terms mean? They designate categories of nuclear-weapon incidents, accidents, and even disasters. They are all itemized in DOD Directive 5230.16, "Nuclear Accident and Incident Public Affairs Guidance."

A **bent spear,** in Pentagon parlance, identifies a "significant incident" involving a nuclear weapon, warhead, or component, or a vehicle loaded with nuclear materials. A prime example of such an event was that mistaken B-52 transport of the six nukes from Minot AFB, N.D., to Barksdale AFB, La., where they sat undetected on the ramp for nine hours.

Even worse is a **broken arrow,** an actual accident involving a nuclear weapon, warhead, or component. It comprises unauthorized launch, nuclear detonation, or jettisoning of a nuclear weapon. There have been quite a few broken arrows over the years, often involving the crash of an aircraft carrying nuclear components. Some of these events are infamous:

- On Feb. 5, 1958, a B-47 carrying a nuclear weapon (but not the weapon's trigger—its nuclear capsule, or "pit") collided with an F-86 near Savannah, Ga. The damaged B-47 was unable to land with the weapon aboard. "The decision was made to jettison the weapon," states a recap in "Department of Defense Narrative Summaries of Accidents Involving US Nuclear Weapons 1950-1980." The weapon was dumped into Wassaw Sound and the crew landed safely. Without a nuclear capsule, it could not possibly have exploded. The bomb remains somewhere just under the sea bed.
- On Jan. 13, 1964, a B-52D encountered violent turbulence in a blizzard while ferrying two nuclear bombs. Part of the tail broke off, and the jet aircraft crashed in a mountainous area near Cumberland, Md. Only two of the five crew members survived. The nukes, covered by 14 inches of snow, were recovered.
- On Jan. 17, 1966, a B-52 bomber flying near Palomares, Spain, collided with a KC-135. Both aircraft crashed, seven airmen died, and four nukes were scattered. High-explosive materials in two bombs exploded on impact, releasing radioactive materials. Some 2.8 million pounds of "slightly contaminated soil and vegetation" were scraped up and sent to the US. Searchers recovered one intact bomb on land, the other, after a three-month search, in the Mediterranean Sea.

A **faded giant** is DOD's term for either an accident affecting a nuclear reactor or some other type of radiological accident. Such events are rare. The most recent known example was the disaster aboard the Russian attack submarine Kursk, which in 2000 sank to the bottom of the frigid Barents Sea with all hands and with a pair of nuclear reactors.

John Travolta (l) and Christian Slater (r) in "Broken Arrow."

Of all the nuclear scenarios, the most worrisome is the **empty quiver**—that is, seizure or theft of a functioning nuclear weapon. Hollywood offered its take on this nightmare in a 1996 thriller featuring John Travolta and Christian Slater, who played rival USAF officers battling over two stolen nukes. The movie was titled "Broken Arrow," presumably because "Empty Quiver" just didn't have much sex appeal.

The empty-quiver specter haunts US officials. "It is very clear that the al Qaedas of the world are interested in, and would be willing to use, nuclear terrorism," said Linton F. Brooks, a former head of the National Nuclear Security Administration. Even so, Brooks said, "they are not willing to die gratuitously for a failure." In other words, the US needs good nuclear security, and, more important, it must be seen to have good security.

In the period 1950-80, most bent spears and broken arrows took place during tactical ferry flights or in Strategic Air Command's "Chrome Dome" airborne alerts. Flight safety has improved enormously, and these events have become relatively rare.

US policy forbids discussion of nukes at any location. The Air Force made a one-time exception a few months ago so that it could present initial findings of its probe into the Minot-Barksdale fiasco. Lt. Gen. Richard Y. Newton III, who presented the findings, called the event "an unacceptable error" stemming from complacency and an "unprecedented stream of procedural failures." The Air Force's initial probe revalidated security procedures, but it found airmen had become complacent and lackadaisical.

Given the hysteria that sometimes attends the whole subject of nuclear arms, it should be noted that there has never been "even a partial inadvertent US nuclear detonation," according to DOD, "despite the very severe stresses imposed upon the weapons involved in these accidents." That may be the result of procedures, designs, or luck. Probably it is some of everything. Whatever the reason, may it continue. ■

More information: http://www.dod.mil/pubs/foi/ncb

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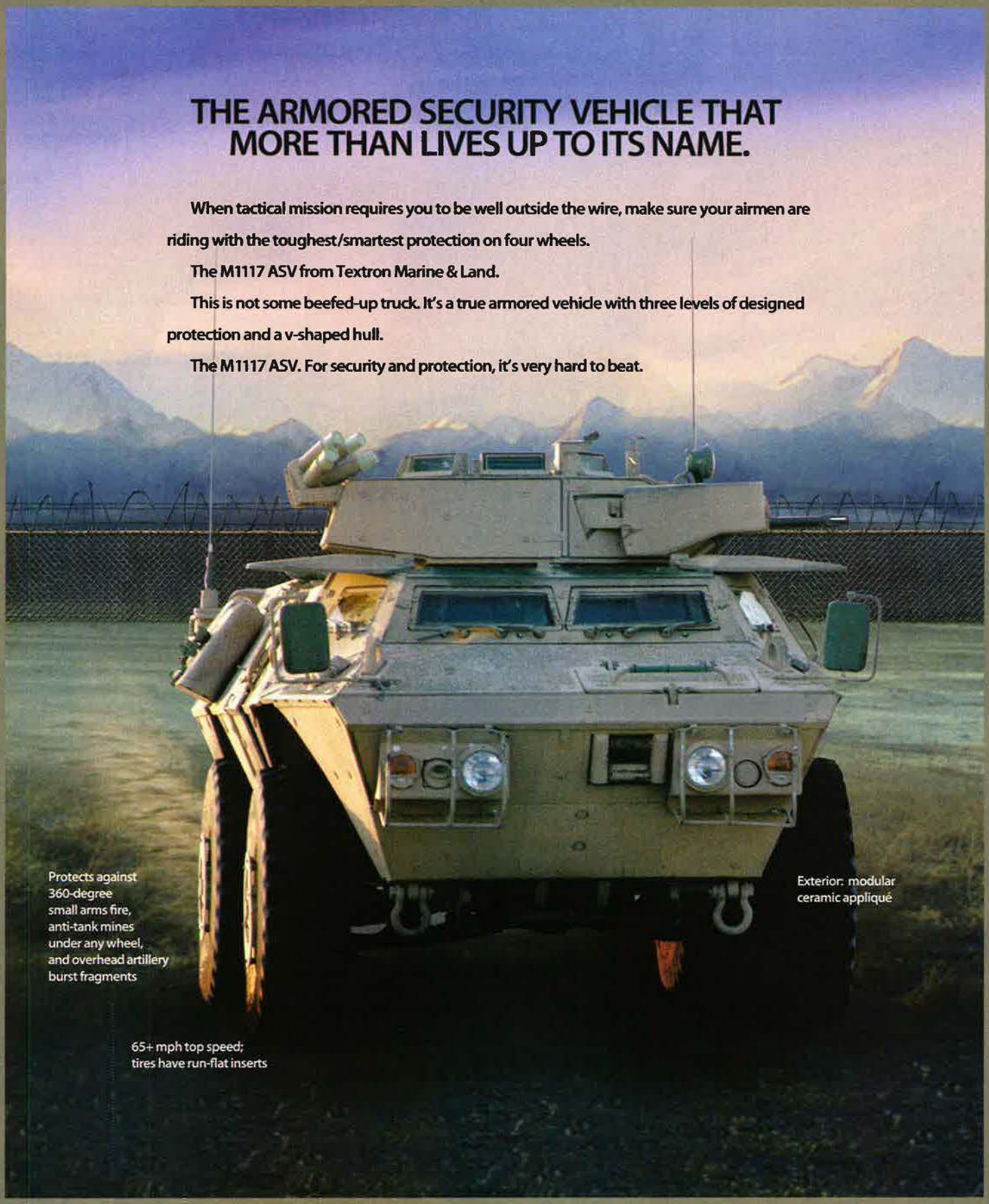

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A B-1B, which has been a heavy hitter in the War on Terror.

USAF photo by Capt. Justin T. Watson

USAF's 27,000-man force in Southwest Asia is showing the value of today's expeditionary airpower.

By Adam J. Hebert, Executive Editor

In recent times, Air Force combat operations in Southwest Asia underwent a dramatic change—two changes, to be precise. And therein hangs a tale about the value of expeditionary airpower, as currently generated by American airmen.

The first change began in the summer of 2006. The number of attacks against enemies in Afghanistan began to soar. They peaked in August 2007, when USAF air crews conducted 670 close air support strikes. In Iraq, a similar buildup of air activity began early in 2007, just as the US opened its "surge" of ground forces into the country. USAF's combat missions in Iraq spiked in July 2007, a month in which the force mounted 303 devastating CAS attacks against Iraqi insurgents.

Then came the second change. The number of strikes since summer underwent a sharp drop. In Afghanistan the number of CAS strikes fell to 98 last October, the lowest number since mid-2006. In Iraq, the story is much the same.

Does this mean that airmen now have withdrawn from the fight? Hardly. The number of combat air strikes may rise or fall over any given period, but the Air Force's overall level of effort—combat, intelligence-surveillance-reconnaissance, mobility, and other missions—has remained constant. Requirements are stable.

What the sliding scale of air attacks did show—in spades—was the enormous flexibility, power, and agility of USAF's 27,000-man force in the region. This air legion was able to go from a virtual standing start and, without any great augmentation, take on greatly expanded combat activity.

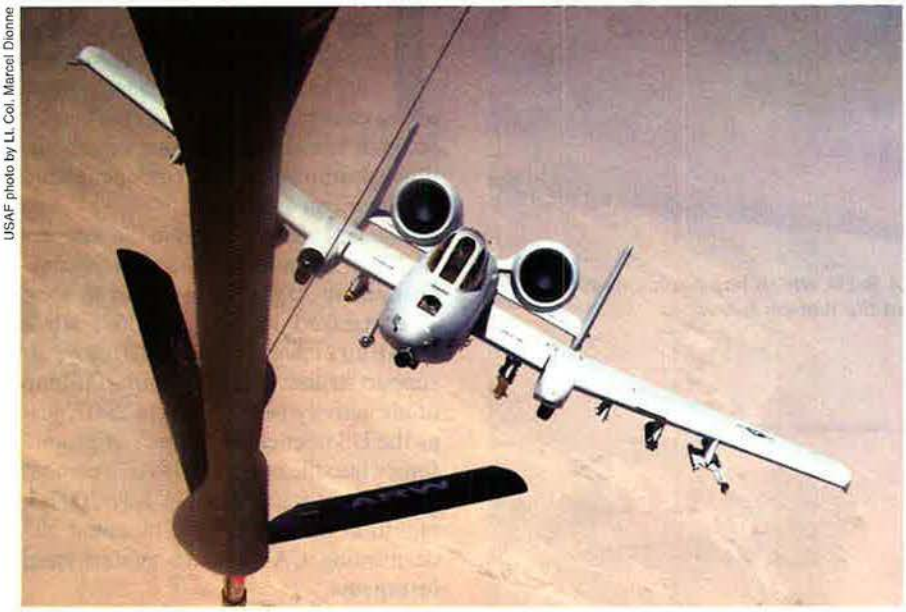
Put a different way, it was a surge in power without a need for a surge in manpower.

This capability didn't appear by accident. The nation's airmen have worked hard for years to create such a force.

USAF's network of six expeditionary wings and other forward bases is now highly refined. More than 5,000 airmen are forward based at Balad AB, Iraq. Another 5,000 are at an undisclosed location in Southwest Asia that hosts the Combined Air Operations Center and the 379th Air Expeditionary Wing.

(Several operating locations are not discussed publicly, at the host nation's request.)

The rotational assignment system of the Air and Space Expeditionary Force (AEF) keeps nearly 3,000 airmen at



USAF photo by Lt. Col. Marcel Dionne

An A-10 prepares to gas up for a combat mission in Operation Enduring Freedom. When combat needs changed, some A-10s shifted from Iraq to Afghanistan.

Bagram AB, Afghanistan; 2,000 airmen with the 386th AEW in Southwest Asia; 1,500 airmen with the 380th AEW at a third undisclosed location; and 1,000 airmen at Baghdad Airport.

The Air Force is moving to enhance its infrastructure at four bases. USAF's theater engagement strategy calls for developing long-term, stable relationships in the Middle East, and the Air Force is only present at bases where it is wanted.

The homes of the 379th and 380th AEWs are being beefed up, as are Balad and Bagram. The CAOC is currently housed in a thin-skinned converted medical warehouse; a new air operations center will be built there. A former ground equipment warehouse at the same base has been converted to storage for B-1 parts to support the bombers there.

At Bagram, lack of space is becoming a problem. The ramps and building spaces are now essentially full.

The CAOC supports operations in three distinct zones—Iraq, Afghanistan, and the Horn of Africa. Air assets swing between theaters as needed. US Central Command Air Forces officials say airpower must remain flexible to meet ground commander needs.

USAF is flying roughly 150 sorties a day over Iraq, half of which are counter-IED missions, designed to thwart enemy use of improvised explosive devices. Targeting-pod-equipped fighters have proved adept at this mission. Except for the B-1B bomber, all USAF combat aircraft operating over Iraq are now fitted with targeting pods.

The B-1Bs will be adding pods in mid-2008, but they already offer a significant capability in the theater. Col. Michael D. Rothstein, CENTAF operations director, said the bombers can hang out for six to eight hours over a target area and deliver 20 bombs on a target—or a single bomb on 10 different targets. The B-1Bs, based at a single location in theater, swing between Iraq and Afghanistan as needed.

High Tech, Low Tech

Officials are also looking forward to bringing laser guided Joint Direct Attack Munitions to the theater this summer. The laser JDAMs will offer satellite guided all-weather accuracy and the ability to hit moving targets.

Pilots have been using AGM-65E Maverick missiles with laser spotters as an "interim solution" for moving targets. It's been pretty effective. Example: A Maverick recently wiped out a pickup truck with a machine gun mounted in the back, used by Iraqi insurgents against US ground troops. In another instance, a USAF pilot, using an AGM-65E, obliterated a heavy-duty construction front loader that had run through two checkpoints while carrying a large load of explosives.

The wars remain a mix of high and low tech. The Air Force's Reaper unmanned aerial vehicle made its combat debut last fall. "I've got two of them flying in Afghanistan right now," said Lt. Gen. Gary L. North, commander of US Central Command Air Forces and combined force air component commander. "They're flying as programmed [and] doing incredible work."

Officials may send a batch of Reapers to Iraq next year to complement the manned fighter squadrons there. CENTAF could then "perhaps send a manned squadron home from the theater," North said.

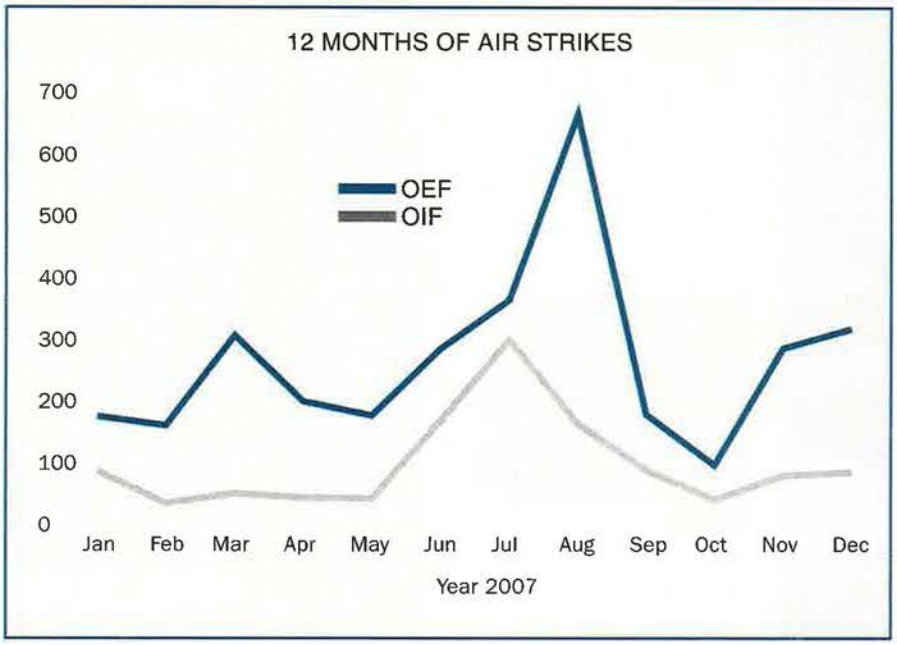
"We are seeing instances already where Reapers are coming back Winchester"—having fired all of their missiles at targets in Afghanistan, said Lt. Col. Wayne Straw, director of the CENTAF commander's action group.

While these remotely controlled flying robots are firing precision missiles, another, decidedly old-school weapon has made a comeback. "Twenty-five percent of every weapon we employ is a bullet," said North.

Airpower's flexibility has been sig-

USAF photo by MSgt. Ruby Zarzyczny

SrA. Shiloh White Hawk oversees a hydrant pumping fuel into a KC-10 at a base in Southwest Asia.



nificant. CENTAF had to implement a "significant number of workarounds" to offset a temporary F-15E grounding last fall. Planners looked across the theater to find the needed assets. "What we did was we picked up and moved an A-10 unit from Iraq back to Afghanistan," North said.

Col. Gary L. Crowder, deputy CAOC director in Southwest Asia, noted that A-10s were first based in Iraq early in 2007 to support the surge, and then were shifted to Afghanistan in the middle of their deployment to provide extra firepower when the Strike Eagles were grounded.

CENTAF also got larger contributions from coalition and naval aircraft, and left the F-15Es on ground combat alert. The Strike Eagles were launched several times during the general grounding, to support troops who had come under attack.

"In one of the cases where we launched them, we had a unit in the 82nd Airborne that was very heavily engaged, and the ground commander told me that if we had not launched the airplanes he probably would have lost his whole unit," North said.

The Warthogs and F-15Es remained in Afghanistan in late 2007, while the number of F-16s in Iraq has increased.

One of the initial drivers behind the AEF concept was the need to spread the pain during the days of the no-fly zones over Iraq in the 1990s. Small numbers of air superiority and other select units found themselves deployed to the desert over and over again.

The AEF system creates a much larger base of airmen to draw from and builds in training and recovery time, plus predictable schedules for many—but certainly not all. The high-tempo career fields have changed and now include CAS units, security forces, and special operators.

"In Lieu Of" Missions

SrA. Michael Newton was at the high end of the deployment spectrum. A high-demand explosive ordnance disposal technician with the 20th EOD Flight at Shaw AFB, S.C., Newton was back from a three-month stay at Balad last fall. His experience reflects the larger trends—Newton said that at the beginning of his deployment, he was disarming IEDs almost every day. Toward the end of his tour, the number of explosives needing to be disarmed "began to taper off."

Airmen continue to work closely with the Army on the ground, sometimes in their natural roles for missions such as terminal air control, and sometimes on temporary assignments to help the Army move more soldiers in ground combat missions.

Despite concerns about the practice at the highest levels of the Air Force, the number of airmen performing "in lieu of" missions for the land components has nearly tripled in the past two years. Less than 2,000 airmen were performing ILO missions such as interrogator and convoy driver in 2005. The number is now over 5,000.

The rotations are reaching into new areas of the Air Force. In the fall, the 20th Fighter Wing at Shaw was preparing for its first AEF deployments in years. Shaw has traditionally focused on the suppression of enemy air defenses mission (not a priority in post-2003 Iraq), and its fighters were recently upgraded.

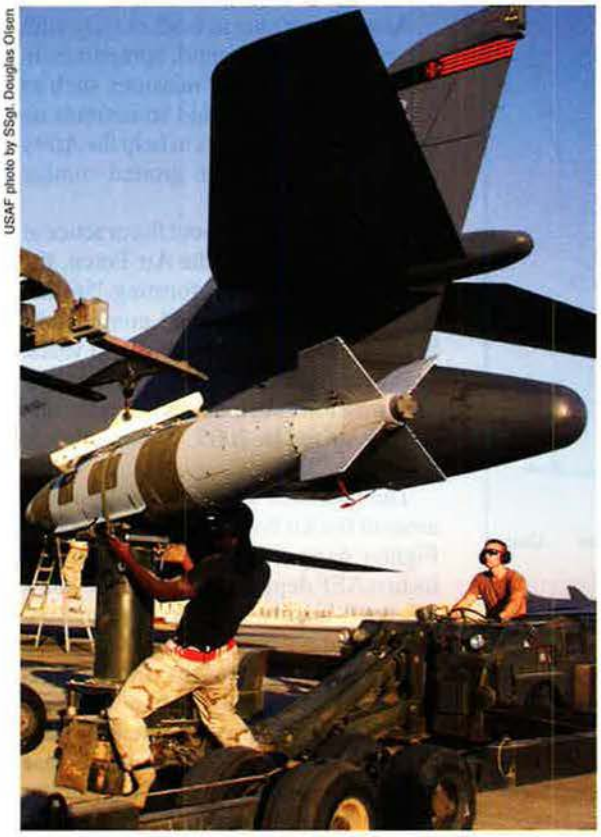
The 20th was tapped to relieve some of the burden on USAF's traditional close air support units, explained Col. James N. Post III, wing commander.

The wing's three squadrons of F-16CJs will deploy sequentially. The 79th Fighter Squadron will head to the Pacific region, and then the 77th and 55th squadrons will take turns in Southwest Asia, probably in Iraq. Post said the airmen have been building up their CAS skills through advanced training, deployments to Red Flags, and other measures.

Although their destination had not been announced by press time, Capt. Nathan Diller of the 79th FS said his squadron's

USAF photo by SSgt. Joshua T. Jesper

C-130s such as this one (overflown by Black Hawks) play a vital role air-dropping supplies to forward based troops.



USAF photo by SSgt. Douglas Olsen

At a base in Southwest Asia, A1C Daniel Morton secures a bomb to the ram jammer operated by A1C David Pownell. Some combat aircraft, such as this B-1B, can reach both Iraq and Afghanistan from a single expeditionary base.

training focus has been on the close air support requirements needed for the Korean Peninsula.

Capt. Bill Lutmer, an F-16 pilot with the 77th FS, said pilots have been working with Sniper targeting pods to build the skills needed in the desert. "Toward the end," he said, the training is expected to be "all CAS."

The pilots aren't the only ones getting ready for overseas tours. SMSgt. Mike Gilder, maintenance flight chief at Shaw, said maintainers start preparing for deployments at least six months ahead of time, and knock out scheduled inspections in advance. "We don't want broken jets on the flight line," in the war zone, he said.

Officials noted that once overseas, CENTAF's aircraft have the highest priority for spare parts, so wartime reliability has not been an issue in theater even for geriatric aircraft such as the KC-135 and C-130.

The tempo is extremely high in the desert. North said deployed F-16s fly at 5.8 times the normal rate, and F-15Es at four times the "peacetime" rate. The effect is mitigated by the AEF rotations, but a Viper on a four-month assignment to Iraq still accumulates nearly two years' worth of flying hours.

This war zone emphasis has a trickle-down effect, and further damages the reliability of old airplanes at their home stations, where parts are not as readily available.

Neighborhood Watch

In Iraq, the surge allowed US forces to increasingly move out of their main operating bases and into neighborhoods, affording them greater opportunity to interact with the Iraqi population. This has helped build trust and develop local support. Attacks on US forces are way down—even though there are now more Americans for insurgents to target.

In both theaters, airborne and ground intelligence continues to improve. Intelligence aircraft are overhead around the clock, and coalition forces have "wrapped up so many bad guys, either killed or captured," that the success now builds on itself, said North.

Predators, U-2 spyplanes, and other intelligence collectors are providing the "unblinking eye" over the battlespace that allows the Air Force to track suspected terrorists for extended periods and learn their habits, contacts, and routines. North spoke highly of the U-2's utility. "We are able to cross-cue these 'Cold War' systems that have been modified for the current war," North said, so that they can communicate directly with other aircraft and the joint terminal attack controllers on the ground. The days of film canisters are long gone, and today the end users have access to U-2 reconnaissance in near real time.

Meanwhile, three airmen working in intelligence units at Langley AFB, Va., and Wright-Patterson AFB, Ohio, "came up with a way to more efficiently align the patterns of these U-2s, and by doing that we are able to increase our take by 40 percent," North said. "Unbelievable."

Because of the Air Force's constant presence overhead in Iraq, the enemy fights in very small groups. They "shoot and scoot, use a lot of IEDs," North said. Insurgents rely on sniper and mortar attacks, and are often protected by urban surroundings. These tactics mean that the insurgents in Iraq are not presenting themselves as attractive targets, but it is similarly difficult for them to achieve anything of substance.

The same is not true in Afghanistan. "People try to correlate what we do in Iraq with what we do in Afghanistan, and, frankly, [they are] two completely different wars," said North.

The scheme of maneuver is "completely different," North said. In Afghanistan, "the enemy presents in larger

USAF photo by SSgt. Craig Seals

F-15Es, such as this one from RAF Lakenheath, Britain, have long been an important factor in the war in Afghanistan.

numbers, and is not as skilled as some of the enemy in Iraq." The country is also less urban, eliminating many of the collateral damage concerns that can restrict air strikes in Iraq.

Terrorists have been able to hold some territory in Afghanistan, but this has come at a high cost. CENTAF officials noted that 2007 was the deadliest year yet for insurgents in Afghanistan.

Supplying the forward bases, moving troops around, and refueling a 24/7 overhead presence are USAF's mobility forces. Brig. Gen. Alfred J. Stewart, who in December was serving as the director of mobility forces at the CAOC, noted that 70 percent of the sorties on CENTAF's daily air tasking order are mobility missions. This includes the movement of 3,000 passengers on a typical day (more than 500 detainees were relocated by air one day in early December), and the refueling of some 200 different US Air Force and other friendly aircraft.

KC-135s from one forward base are airborne at all times to meet the demand—and because there is not enough parking space for them all to be on the ground at once.

In Afghanistan, airdrops are growing in importance. US and NATO troops are increasingly moving into remote, high-altitude areas completely inaccessible for ground resupply. The 475 OEF airdrops in 2007 were a 13 percent increase over the year before.

Up in the mountains of Afghanistan there are now dozens of small forward operating bases. Those troops "can only survive in those high hills being resupplied by air," said North.

Stewart said the airdrop effectiveness in Afghanistan is nearly 100 percent. The Air Force doesn't want forces to have to "chase their supplies" while operating in dangerous territory, he said.

Large mobility aircraft are increasingly operating from the theater. Stewart said more than 40 tankers are stationed around the area of responsibility, along with 20 C-17s. Some of the tanker crews fly so many hours that they have to be replaced by fresh pilots halfway through their four-month AEF tours—the aircraft stay in theater.

Mobility is a Total Force effort. In December, all of the C-130s operating out of Bagram Air Base were Air National Guard aircraft.

The overall numbers of tanker, ISR, and airlift sorties have remained relatively stable from year to year. Even with the end-of-year declines, however, 2007 was a very kinetic year for CENTAF.

USAF photo

F-16 fighters, such as these on the flight line at Balad AB, Iraq, have become the workhorses of air operations over Iraq.

In 2007, air strikes in Iraq tripled the previous high since the end of major combat operations in 2003. Afghanistan's CAS strikes steadily ramped up from 86 in 2004 to 176, then 1,770, and finally to 3,247 in 2007.

Numbers Can Deceive

Ground forces are now deployed in larger numbers, are generally closer to the fight, and have suffered the majority of casualties in the War on Terror. The air component's contributions are often behind the scenes, overlooked, or hard to put in context.

The numbers can obscure the big picture. Maj. Gen. Maurice H. Forsyth, deputy CFACC, notes that even the daily airpower summaries put out by the CAOC can leave airpower's significance unclear.

Forsyth "often challenges the CAOC staff to look at the statistical data being presented and say, 'So what?'" officials acknowledged last fall. "The numbers are great, but what is the true impact? What progress is being made?"

Two case studies—one from Iraq and one from Afghanistan—help illustrate airpower's contribution.

On Sept. 25, coalition aircraft flew 53 CAS missions in Iraq. These included Air Force F-16s striking an enemy building with laser guided bombs, according to the day's airpower summary.

So what? That particular mission destroyed a safe house where Abu Nasr al-Tunisi, a leader of al Qaeda in Iraq, and two other operatives were meeting, killing all three.

ISR assets will follow individuals or groups for extended periods. "We wait and we plan, and we will find the time" to send in forces to capture or kill the target, North said.

Many successful operations are now coming directly from tips from concerned Iraqis. According to Multinational Force-Iraq officials, most high-profile terror attacks in Iraq, and 80 percent of the suicide attacks, are conducted by foreign terrorists. Al-Tunisi, for example, was Tunisian.

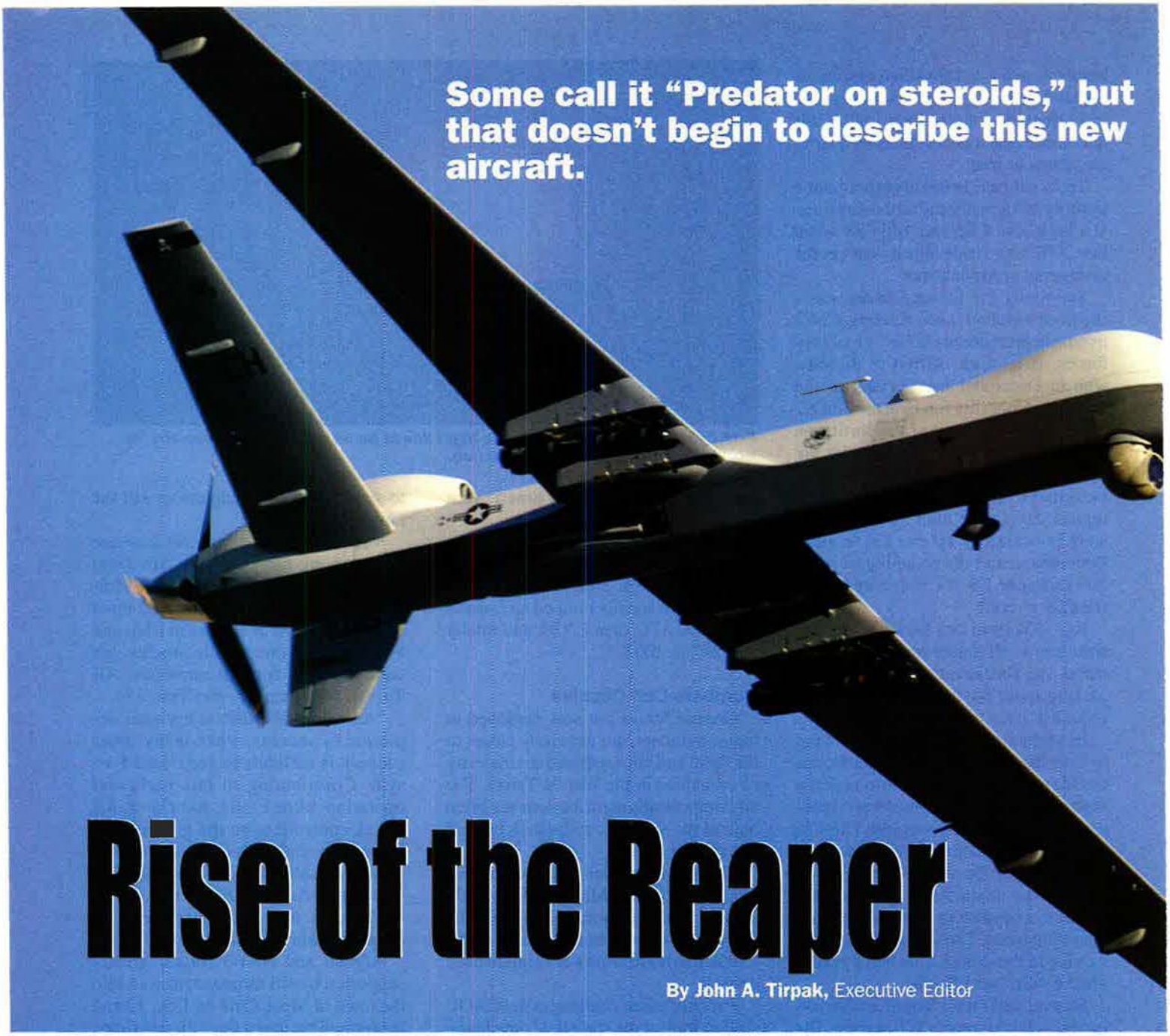
"An event like that is a visual depiction of success, when many times success is difficult to see," said Forsyth. Contributing to this particular operation were F-16s, joint terminal attack controllers on the ground, unmanned aerial vehicles, and space systems—satellites pass over War on Terror targets 560 times a day.

Then, in mid-December came an example from Afghanistan.

Afghan and NATO forces, greatly supported by US airpower, moved into the town of Musa Qala on Dec. 10 and recaptured the town the following day. British forces previously protecting the town had vacated it a year ago after brokering a deal to hand over security to the locals.

The Taliban promptly moved in and seized the town in February 2007, shortly after the British withdrawal. The Taliban turned Musa Qala into a stronghold in Afghanistan's contested Kandahar region.

By late 2007, enough was enough and NATO and Afghan National Army forces moved to recapture the town. CENTAF provided "the majority of the kinetics," for the days-long operation, North said. A-10 Warthogs, Apache attack helicopters, and airdropped US paratroopers all helped recapture Musa Qala, which was the last town of any significance held by the Taliban. ■



Some call it "Predator on steroids," but that doesn't begin to describe this new aircraft.

Rise of the Reaper

By John A. Tirpak, Executive Editor

In less than a year, the Air Force has brought into combat service its newest and most lethal unmanned aerial vehicle, the MQ-9 Reaper. A special squadron is simultaneously developing tactics, training flight crews, and operating the UAV in battle. This is taking place even though operational testing has barely begun and a full production decision is still a year off.

The Reaper drew first blood on Oct. 27, 2007, when it fired a Hellfire at insurgents attacking US troops in Afghanistan. Eleven days later, a Reaper dropped its first pair of laser guided bombs, silencing Afghan insurgents firing at US forces.

The Reaper's success is important if, as many believe, it is the first of a new breed of large unmanned combat aircraft.

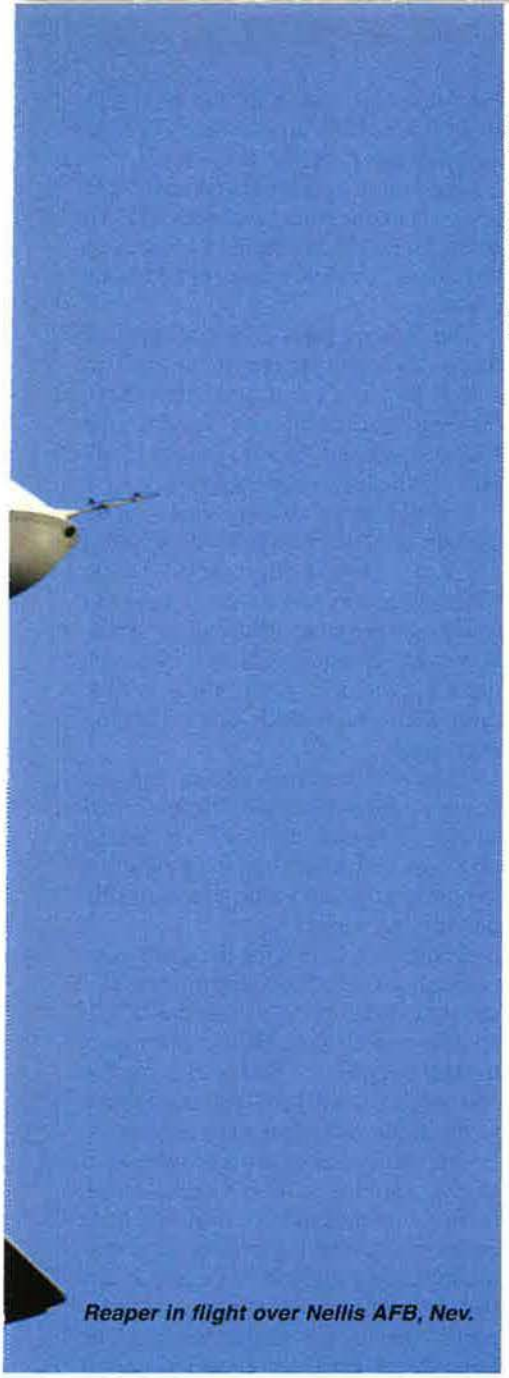
It was in late February 2006 that Gen. Ronald E. Keys, then commander of Air Combat Command, ordered acceleration of Reaper to operational service. Much has happened since then, said Lt. Col. Jonathan Greene, commander of the first MQ-9 unit, the 42nd Attack Squadron. The 42nd is based at Creech AFB, Nev., about 45 miles northwest of Nellis AFB, Nev.

Keys' order responded to demands of commanders in Iraq and Afghanistan for more "persistent" intelligence-surveillance-reconnaissance (ISR) aircraft as well as additional strike and close air support assets.

Greene said he and one other officer "started out in a cubicle at Nellis" with a "blank sheet of paper," assigned the task of inventing the first true unmanned combat aircraft squadron. By March 2006, he had a budget, a building at Creech, one aircraft, and orders to get Reaper into the fight by the fall. On Sept. 27, 2007, the first Reaper to fly a combat mission was launched from a base in Afghanistan.

The Reaper evolved from the MQ-1 Predator, but is a very different machine, with a different mission.

With a 66-foot wingspan, the Reaper is roughly the size of the A-10 attack airplane, and can carry 3,000 pounds of weapons—more than 10 times the capacity of the Predator. It can fly at up to 288 miles per hour, allowing it



USAF photo by MSgt. Robert W. Valenca

Reaper in flight over Nellis AFB, Nev.

to transit from an operating base to a patrol area almost twice as fast as the Predator. The typical on-station time is 15 hours. It can cruise at 50,000 feet "clean"—that is, without weapons—but typically flies at about 30,000 feet, fully loaded.

"People call it 'Predator on steroids,' but it's really more than that," Greene asserted.

The Predator is described as a "killer scout"—dedicated chiefly to ISR but with a limited ability to shoot at targets of opportunity. However, the Reaper is defined as a "hunter killer," meaning that it is dedicated to strike and yet still has sizeable ISR capabilities, including electro-optical, infrared, low-light TV, and synthetic aperture radar.

Air Combat Command compares the Reaper less to a Predator than to an F-16 fighter, which is meant to attack ground targets but which can use targeting pods to collect and transmit full-motion video to air operations centers and troops on the ground.

Guiding the Reaper

The typical Reaper weapons load includes two GBU-12 laser guided bombs and four AGM-114 Hellfire laser guided missiles, but it can carry up to four LGBs. It eventually will carry both 500-pound Joint Direct Attack Munitions and 250-pound Small Diameter Bombs. These GPS guided weapons will allow Reaper to precisely attack targets through bad weather.

The Reaper crew pairs an officer pilot with one enlisted sensor operator. They sit side by side in a trailer that can be set up almost anywhere, but that for now resides at Creech, next to a bank of satellite dish antennas.

The pilot sits on the left of the "cockpit," facing a main screen and several smaller screens showing him pictures through the aircraft's nose camera, its sensor turret, and displays of the status of various systems. He has joysticks that simulate throttle and stick, but there's a keyboard in front of him. Some of the screens are for instant-messaging type chat with various levels of command and control, such as the air operations center for US Central Command Air Forces. He can also communicate by voice or text with troops on the ground, half a world away.

The sensor operator's station is very much like the pilot's, but is more geared toward operating the cameras, infrared system, radar, and other sensors onboard.

Except for Greene, none of the Reaper pilots have prior experience with the Predator. They are experienced in F-15E, F-16, A-10, B-1, and B-52 aircraft.

The more senior sensor operators come from the Predator force. "The majority of them are fresh out of tech school, ... imagery analysts by trade," Greene noted. "But that's going to change. Our next group will be [enlisted] aircrew."

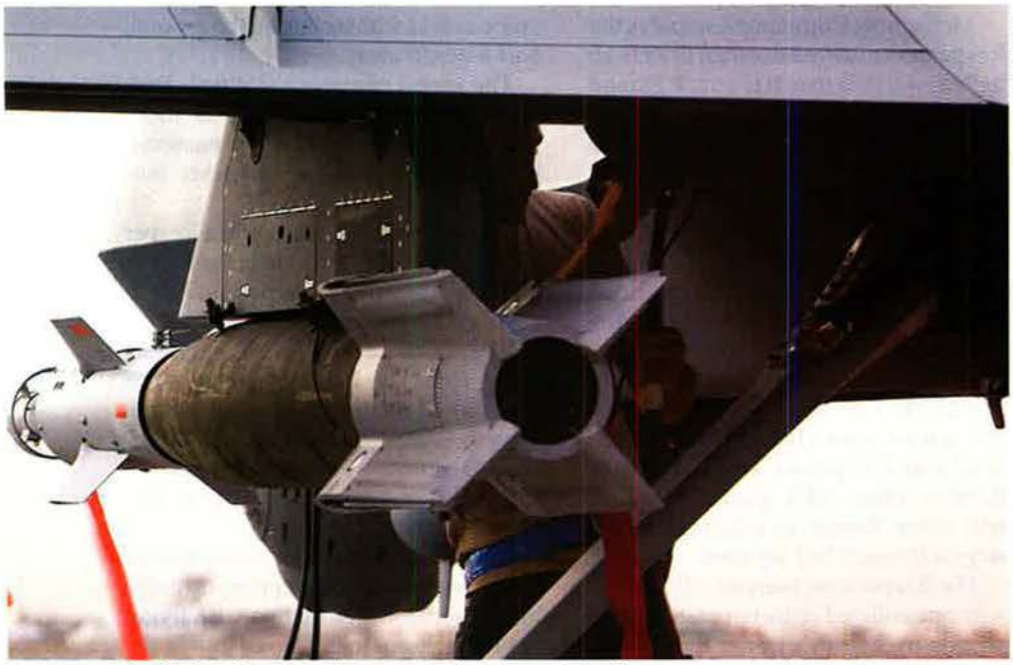
Greene said that his sensor operators have done a great job stepping up to the big responsibilities that go with flying the Reaper, but many have been in the Air Force less than a year, and officials decided that more seasoned aircrew will be a good fit.

Coming into the job, enlisted flight personnel "have a little more airmanship. They've been on an airplane, they know what it means to be on an aircrew, and they understand checklist procedures and how airplanes work." The next batch of sensor operators will all be "sensor operators from other airborne platforms."

After a training course of only a few months, graduates go directly to combat missions and help train new crews in how to fly and fight with the Reaper. In most

USAF photo

An MQ-9 Reaper undergoes inspection in Afghanistan.



USAF photos

In Afghanistan, an aircrew member inspects a Reaper weapons load.

systems, it usually takes many hours to upgrade to instructor, but Reaper crews do so not long after emerging from the "schoolhouse" themselves.

The trailer housing the flight crew is called a ground control station. It is connected by fiber-optic cable to a satellite uplink in Europe, which then communicates with the aircraft via satellite. That way, all radio communications can be "line-of-sight" in nature.

Real Pilots

Despite the speed of transmission, there's still a two-second delay between a pilot's input and feedback on his screen. During most of a mission, the delay doesn't matter. However, for takeoff and landing, a local pilot takes over the aircraft, and there is "no delay" in feedback, Greene reported.

Taking off and landing the Reaper is a challenge, he said, because there's only one view—through the nose camera—and no peripheral vision, stick pressure, sound, or "seat of the pants" sensations. The aircraft must be flown very precisely to avoid overcontrol, and can be especially tough to land in a crosswind. There's "almost no flare" in landing.

Greene said that a more sophisticated "cockpit," with more of these cues, is in the works but has yet to be matured.

The Reaper crew is included in the air tasking order issued by CENTAF. The crew briefs the mission just as it would with a manned aircraft. After the deployed takeoff crew gets the Reaper airborne and calibrates its lasers and other instruments, the Creech crew takes over and flies it to a patrol area. A typical mission features close air support for ground troops, but for an extended time and with the bonus of seeing over hills and around corners. The mission is called X-CAS.

"It can stay over the target area ... for hours," Greene said, "whereas an F-16 or Strike Eagle will have to go back to the tanker" and leave the ground troops uncovered.

The Reaper pilot can send ground forces an aerial image of the area in which they're operating if they have the right equipment, and if fire from the Reaper is needed, "it's easy to get a 'talk on' " to the target, Greene said.

Initially, there was apprehension on the part of pilots who knew they would not get airborne for several years. Reaper pilots do not have a companion trainer to preserve airmanship skills. However, Greene said, the concerns usually evaporate when pilots realize their airmanship skills are still being exercised.

"You're not physically in the air, but it's still challenging. You're still doing stick and throttle." He added that "you're still dealing with the same things: weather, air traffic control, traffic pattern ops, tactics."

Besides X-CAS, the Reapers also perform a sort of forward air control-airborne mission. "It's ... like a FAC-A, but you're not giving clearance for guys to drop weapons. ... You're like a traffic cop, working a kill box," routing fighters to the areas where they are needed.

Creech does an excellent impression of a forward location. It's a bare-bones facility surrounded by desert, with little in the way of housing and only one dining hall, open a few hours a day. It has two ground control stations. In years past, when it was Indian Springs Air Force Auxiliary Field, Creech was used by Nellis pilots for landing practice or as a marshaling site in large Red Flag or Gunsmoke events.

A Reaper takes off for a mission over Afghanistan.

Members of the 42nd talk in terms of "caps," which is the collection of aircraft, support gear, and persons needed to keep station for 24 hours a day, seven days a week. A Reaper "combat air patrol" requires four aircraft, one ground control station, and 10 crews, Greene said. The 42nd will be full up in 2010, when it will have six caps' worth of capability.

Many coalition uniforms can be seen. The Royal Air Force is acquiring and operating Reapers—they perform ISR functions only—and is setting up its own facility at Creech. British operators also serve as instructors for USAF flight crews. In Afghanistan, USAF and RAF crews share Reaper infrastructure. Plans called for a January activation of RAF 39 Squadron at Creech.

The 3-1 manual—tactics for the MQ-9—is being written on a daily basis. Speaking of his weapons tactics officer, Greene said, "He compiles all the lessons learned, he debriefs the crews, and he takes those and codifies them." Greene declined to get into the lessons learned or the tactics employed.

Creech lies close to the Army's desert training facility at Ft. Irwin, Calif. On training missions, Reapers will launch from Creech and fly through a specially designated air corridor to the skies over the training center and then work with Army troops preparing for deployment to Afghanistan. "They're the guys we'll be working with when they get downrange," Greene said.

The Air Force will say only that it has roughly 10 of the new Reapers. The "program of record" calls for buying 60 Reapers in the next few years. However, USAF added eight in the 2007 supplemental defense spending bill for use by Air Force Special Operations Command, and will add eight to the 2008 supplemental, for a total buy of 76.

Plans call for the ANG's 174th Fighter Wing at Hancock Field, N.Y., to convert to the MQ-9, using Ft. Drum, N.Y., as the launch-and-recovery facility. An operating location for AFSOC's Reapers hasn't been announced.

In Fiscal 2008, the Air Force will take delivery of four MQ-9s. The delivery rate is set to increase to nine in FY 09 and reach the maximum production rate of 11 in FY10. Those numbers do not include sales to Britain, other foreign operators, or other US agencies that will fly the MQ-9.

A maintenance official whose job it is to inspect the aircraft before accepting delivery on behalf of the Air Force said the aircraft so far have been "very clean. ... almost no write-ups." In fact, changes made at delivery are usually extras requested by the Air Force—"Things that we actually asked them to do, like add some chafing protection on some wires, things not part of the original aircraft design," the official said.

USAF photo

A Reaper aircrew performs a preflight check before a mission in Operation Enduring Freedom.

Spare Parts Problems

Despite the fact that his unit has been flying combat missions since last September, Greene said the initial operational testing and evaluation of the MQ-9 is only now getting under way. Likewise, his unit won't declare initial operational capability for about a year. The declaration of IOC involves many factors besides the readiness of flight crews: It also takes into account sortie rates, available aircraft, and a matured maintenance capability.

It is in the area of spare parts that the Reaper faces some of its biggest challenges, Greene acknowledged. Whenever a system is rushed from the factory to battle, it usually takes a while for the spare parts to catch up.

General Atomics continues to "build the spare parts and [wartime readiness] kits for us," and occasional shortages come from "the fact that the aircraft was fielded so quickly and it has so much desired capability that we need, that it's kind of 'the cost of doing business.'"

MSgt. Darin Mauzy, a maintainer with the 432nd Wing, said it's misleading to look at the maintenance facilities and see Reapers being routinely dismantled.

"It's not that the aircraft broke," he said, but rather that the parts are still so new that no track record of how they perform has been established. To be safe, maintainers will pull a component working perfectly well, as part of a process of collecting data on when it needs service. With more data, parts will be allowed to stay on the airplane for longer and longer periods, until there's confidence in how long they'll last.

"So, when you see one taken apart, it's mostly for time-change orders," not problems, Mauzy said. Operational test and evaluation should provide more of the knowledge needed to smooth out parts issues.

Another problem is tools. The Predator and Reaper—made mostly of composites and having little commonality with fighters—require unique tools, and there may be only two or three of a particular kind in the squadron. So, some downtime is a product of waiting for a turn with one of the gadgets that allow maintenance to be performed.

Greene said he's pleased with the squadron's effort to get Reaper operating. Although he is chided by pilots in other systems about flying a "video game," he shrugs off the barbs because his unit is directly involved in the action.

"When I sit in the GCS in the seat, and I look down and I see guys on the ground over in Afghanistan, and I'm talking to them and supporting them, it's unique and rewarding. We're fighting the war all the time—all the time. There's never a break." ■

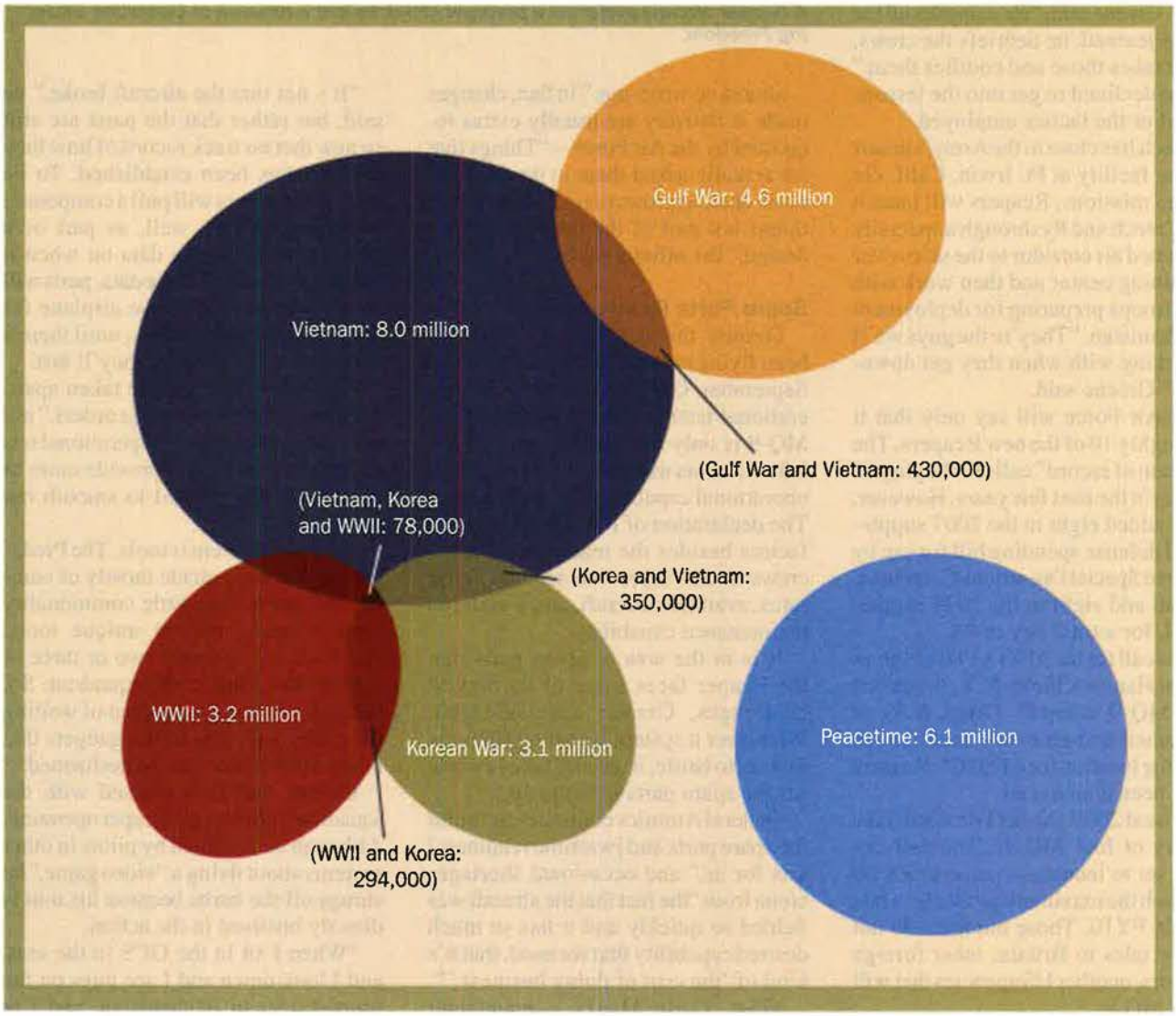
Chart Page

By Tamar A. Mehuron and Heather Lewis

The Generations of Veterans

Today, there are some 225 million adult Americans. Nearly 25 million—about 11 percent—are veterans of military service. They vary widely in age, but most are elderly. Indeed, 38 percent of US veterans are at least 65 years of age. This age bulge reflects the eras in which most veterans principally served. They were: Vietnam War era (1964-75), 32 percent; Gulf War era (1990-2008), 18.4 percent; World War II era (1941-45), 12.8 percent; Korean War era (1950-53), 12.4 percent. The remaining 24.4 percent served in the intervals between these war eras.

Veterans in Wars and Peace



Graphic from "Facts on Policy: Profile of Veterans," Nov. 6, 2007, The Hoover Institution, Stanford University. Data sources: "Veterans Day 2007, Nov. 11" US Census Bureau, Oct. 11, 2007; "Statistical Abstract 2008," US Census Bureau, 2007.

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Their attack on complex, high-technology weapons such as the F-15 stirred great excitement in Congress and the news media.

The Reformers

The Military Reformers were an obscure lot when they first emerged on the national stage around 1980. There were only about a dozen of them, mostly retired officers and midlevel systems analysts from the Pentagon and the defense industry. The outside world had never heard of them. They were not even called "Reformers" yet.

Their basic message was that the US armed forces were addicted to high technology and complex weapon systems. Such weapons were so costly that relatively few could be bought. Complexity made them hard to use and maintain, leading to readiness problems and reduced sortie rates. Even worse, the Reformers said, these complicated weapons were not as effective in combat as simpler, cheaper ones.

The Reformers took on tanks, missiles, and ships, but their primary target was tactical aircraft. In 1980, their home base was the Tactical Airpower division of the Program Analysis and Evaluation section of the Office of the Secretary of Defense. At the center of the movement were three individuals:

- John R. Boyd, retired Air Force colonel, air combat theorist, consultant to PA&E, and the spiritual leader of the Reformers.
- Pierre M. Sprey, engineer and PA&E systems analyst, who, along with Boyd, had been a key instigator of the Lightweight Fighter program in the 1970s.
- Franklin C. "Chuck" Spinney, who had worked for Boyd as a captain and followed him to PA&E. His briefing, "Defense Facts of Life," became the manifesto of the reform movement.

These three were protected and supported by Thomas P. Christie, head of the Tac Air division. He was an ally of Boyd's from previous days and had recruited him for PA&E.

The Reformers were adept at marketing their message to Congress and the public. Their slashing, take-no-prisoners style had great appeal for the news media. They were particularly relentless in their attack on the Air Force's F-15 fighter, which they said was inferior to the less expensive F-16. In fact, some of the Reformers said that what the Air Force really needed was the F-5—a simple day fighter variant of the T-38 trainer aircraft—in substantial numbers.

The movement's middleman was William S. Lind, a staffer for Sen. Gary W. Hart (D-Colo.). Lind introduced the Reformers to James M. Fallows, Washington editor of *The Atlantic Monthly*, who became the foremost cheerleader for the movement. Lind also helped Hart organize the Congressional Military Reform Caucus.

The Reform movement soon became a political and news media sensation. Spinney in 1983 appeared on the cover of *Time*. It looked for a while as if the Reformers might undermine public confidence in high-technology systems altogether. They dogged aircraft modernization programs for most of the decade, but the movement tailed off and dropped into slow gear in the 1990s.

The Reformers all knew each other. By 1980, they had been cooperating behind the scenes for years and already had several victories to their credit. The movement centered on Boyd, who attracted intensely loyal followers but whose abrasive personality made him legions of enemies as well.

Boyd was a Korean War F-86 fighter pilot and later an instructor at the Fighter Weapons School, Nellis AFB, Nev., where he was called "40-Second Boyd" for the

Retired USAF Col. John R. Boyd

Pierre M. Sprey

Franklin C. "Chuck" Spinney

speed with which he won in air-to-air competitions. He combined his experience as a fighter pilot with physics and computer analysis to reach conclusions about the most effective design for fighter aircraft.

In the 1960s, while a graduate student at Georgia Tech and during a follow-on assignment at Eglin AFB, Fla., Boyd developed his famous Energy-Maneuverability theory of air combat. It was at Eglin that he met Christie, then a civilian weapons analyst at the Air Force Armament Laboratory.

In Korea and at Nellis, Boyd made a discovery. Harry Hillaker, Boyd's friend and later the chief designer of the F-16, said that Boyd "found that he could gain the advantage under one set of maneuvering conditions and that his opponent could gain the advantage under another set of maneuvering conditions." Boyd also saw that "he lost that advantage when he allowed this [aircraft's] energy to decay to less than that of [his] opponent." His Energy-Maneuverability theory, said Hillaker, "concluded that maneuvering for position was basically an energy problem."

Without question, Boyd was enormously capable and intelligent but also, by all accounts, sarcastic, arrogant, intolerant, and profane. In "Genghis John," an article for the Naval Institute's *Proceedings,* Spinney described Boyd as "wildly gesticulating, loud, and irrepressible, an in-your-face type of guy, who smoked long thin stogies and blew smoke in your face, while he shouted and sprayed saliva at you in a head-on attack, from two inches, nose to nose."

In 1966, Boyd came to the Air Staff in the Pentagon to work on the F-X project, the future F-15. The Air Force wanted an air superiority aircraft to replace the F-4, which was a multimission aircraft developed by the Navy rather than a true air superiority fighter. The F-X, as proposed, was a heavy fighter with variable-sweep wings. In Boyd's opinion, it was too big, too clumsy, and too complex. His criticism was influential in getting the F-X redesigned. The F-15 that entered production was lighter and more agile, although not nearly as light and agile as Boyd wanted.

Whiz Kids

Boyd met Pierre Sprey in 1967. Sprey worked in the Office of the Secretary of Defense Systems Analysis shop—the "whiz kid" operation founded by Robert S. McNamara—which later became PA&E. Sprey was making waves by arguing that the important Air Force mission in Europe was close air support of ground forces and that deep interdiction was a minor mission. Sprey also had a hand in the design for the A-X, progenitor of the A-10. Boyd was not very interested in close air support, but he and Sprey got along.

Boyd and Sprey found a like-minded thinker in USAF Col. Everest E. Riccioni, who came to the Pentagon in 1969 as head of Development, Plans, and Analysis in Air Force R&D. Boyd called in Sprey to help plan a lightweight fighter that would be cheaper, smaller, and simpler than the F-15. Riccioni dubbed the advocates of the small fighter the "Fighter Mafia." The name stuck.

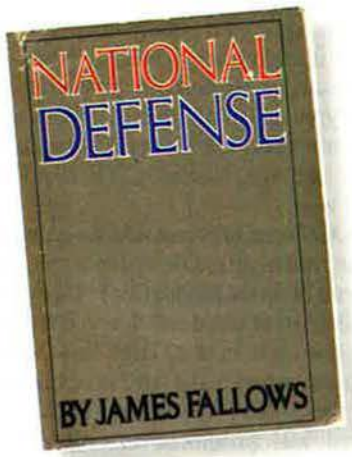
In many ways, the lightweight fighter idea resembled an "Advanced Day Fighter" concept USAF considered and abandoned in the mid-1960s. The Air Force did not welcome a program that competed with the F-15, but "F-XX," as the lightweight fighter program was designated, gained support in high places. The Air Force in 1971 issued a request for proposals to industry and in 1974 held a flyoff between two prototypes, the General Dynamics YF-16 and the Northrop YF-17. The YF-16 won.

The Air Force, however, added a ground-mapping radar and multimission capability (and weight) to the production F-16, much to the disgust of Boyd and Sprey. It would be the low element in a "High-Low Mix" of fighters, wherein the Air Force bought about two F-16s for every one F-15.

Boyd was promoted to colonel in 1971 and retired in 1975. Christie, in the meantime, had come from Eglin to head PA&E Tac Air. He hired Boyd as a consultant. Spinney also joined PA&E at this time, attracted by the chance to work again with Boyd.

The early Reform agenda was defined by three briefings:

- Boyd's "Patterns of Conflict." First given in 1976, it was four hours long with 160 charts. Boyd sought explanations for his experiences and observations, including the success of F-86s against MiG-15s in Korea, even though the MiG could out-turn and out-climb the F-86 in most parts of flight envelope. Part of the answer was that the F-86, with hydraulic flight controls, could transition from one maneuver to another faster than the MiG-15, which had a mechanical system. Building on these thoughts and his Energy-Maneuverability theory, Boyd developed his most famous construct, the "OODA Loop." The weird word was an acronym for observe, orient, decide, act. "Time is the dominant parameter," Hillaker said. "The pilot who goes through the OODA cycle in the shortest time prevails because his opponent responds to actions that have already changed."
- Sprey's "The Case for More Effective, Less Expensive Weapons Systems." It arrayed "cheap winners" against "expensive losers." The cheap winners included the F-16 and the heat-seeking, AIM-9 Sidewinder missile. Foremost among the expensive losers were the F-15 and the radar-guided AIM-7 Sparrow missile. "Not all simple, low cost weapons work, but war-winning weapons are almost always simple," Sprey said.
- Spinney's "Defense Facts of Life." It was presented in 1979 and was regularly revised and updated afterward. Spinney argued that complex, high-technology weapons were making the defense program unaffordable. "The case



James Fallows'* National Defense, *published in 1981, took the Reformers to a larger audience.

of Air Force tactical aviation suggests that budget constraints are not the source of the problem," he said. The problem was unnecessary complexity, which he called "a form of organizational cancer." He also said, "Our strategy of pursuing ever-increasing technical complexity and sophistication has made high-technology solutions and combat readiness mutually exclusive."

Soon, the Reformers went public. Christie leaked a copy of Spinney's briefing to Congress. However, the key to getting their case to the public was Lind, who introduced them to Fallows. Fallows, who had been a speechwriter for Jimmy Carter, heaped uncritically favorable publicity on the Reformers in an October 1979 article entitled, "Muscle Bound Superpower" and subsequent articles. His influential book, *National Defense,* followed in January 1981. Other reporters picked up the story line.

Lind got Spinney's briefing presented to Congressional members and staff in December 1980. Lind also gave the movement its name, "the Reformers," which was used publicly by Hart in a *Wall Street Journal* column in January 1981. That summer, Hart organized the Congressional Military Reform Caucus and soon had 45 members. Among those most receptive to the message were Rep. Newt Gingrich (R-Ga.) and Rep. Richard Cheney (R-Wyo.).

After the reform movement went public, Boyd faded to the background. He was still quoted, but Spinney, Sprey, and others became the main publicists.

In *National Defense,* Fallows introduced the latest ideas from Riccioni, now retired from the Air Force and employed by the Northrop Corp. Riccioni said there was a "phantom fleet"—the one that existed only on paper—and a "real fleet," the one that could actually be put into the air at any given moment. For the same amount of money, he claimed, the Air Force could buy 1,000 F-5s or 250 F-15s, but the difference did not end there. Because complex airplanes were less reliable and often under repair, said Riccioni, the F-5 could fly 2.5 sorties a day compared to one a day for the F-15. Thus, the "real force" could be 2,500 F-5 sorties per day, compared to 250 for the F-15.

Blue Force, Red Force

The obvious catch was the huge quality difference between the F-5 and the F-15. The F-5 was a variant of a trainer, offered for sale to developing countries. The F-15 was the most advanced air superiority fighter in the world.

The Reformers parried that difficulty with a resort to a series of tests—known as AIMVAL/ACEVAL—which became a major part of the Reform story. The acronym stood for Air Intercept Missile Evaluation/Air Combat Evaluation. These tests were flown in 1977 and 1978 on an instrumented air combat maneuvering range north of Nellis. The results were scored electronically.

AIMVAL/ACEVAL featured a "Blue Force" of F-15s and Navy F-14s, all "armed" with guns and missiles, and a "Red Force" of F-5Es from the Red Flag Aggressor force at Nellis, armed with guns and the AIM-9L missile. The tests had several purposes—to assess the operational utility of five existing and proposed infrared missiles and to determine the effects of force numbers in aerial combat in various matchups.

The results could be—and were—misconstrued to say that complex weapons such as the F-15 came up short against simpler ones such as the F-5. According to the *Chicago Tribune,* the F-15 had been "fought to all but a draw" by the F-5. CBS proclaimed the F-15 a "turkey." It wasn't true, but the reporters were having too much fun to listen.

***James Fallows, Washington editor of* The Atlantic Monthly.**

The tests were structured to explore specific questions. They simulated only part of the spectrum of air combat and were set up in a way that limited the advantages of the F-15 and amplified the capabilities of the F-5. The test scenarios were daytime visual engagements, which negated the value of the F-15's long range and radar guided missiles. Visual identification was required. Beyond visual range (BVR) engagements were forbidden. Ground control sites—which guided the F-5s to the F-15s—could not be attacked either. Everything happened in clear weather.

Even given all that, the F-15s still were not "fought to all but a draw." The kill ratio was 2.5 to one in favor of the F-15. The "complex" AIM-7 was responsible for the majority of the Blue Force kills.

The tests yielded valuable information. They demonstrated the value of the new all-aspect AIM-9L, an infrared missile then under evaluation. It was a "point and shoot" weapon soon adopted by the Air Force and the Navy. Another outcome was the commitment to the Advanced Medium-Range Air-to-Air Missile (AMRAAM).

The Reform program flowed from a limited view of the roles and requirements of airpower. It assumed that visual dogfighting in clear weather would dominate aerial combat. Engagement beyond visual range was neither needed—or wanted. The BVR avionics added weight and the radar functioned as a beacon, giving away the advantage of surprise and attracting an enemy attack.

In their 1986 book, *America Can Win: The Case for Military Reform,* Hart and Lind repeated the Reformers' conviction that radar missiles "have consistently performed poorly in combat." In Vietnam, they said, "our primary radar guided missile, the Sparrow, had a probability of kill (Pk) of just .08 to .10; we had to fire more than 10 Sparrows for each hit. In contrast, the infrared Sidewinder had a probability of kill of .19, and guns had a Pk of .24."

In fact, neither missile was very accurate in Vietnam. In depicting the "simple" AIM-9 Sidewinder as good and the "complex" AIM-7 Sparrow as bad, the Reformers did not tell the complete story. It was becoming a habit of theirs.

Of USAF's confirmed fighter victories in Vietnam, 50 were achieved with Sparrows, 33 with Sidewinders, and 41 with

the gun. The three top aces in Vietnam achieved 12 of their total of 16 kills with the AIM-7. The Sparrow, in the improved AIM-7M model, continued in service for many years. It gave good service in the Gulf War, although the Pk was still less than 40 percent.

As soon as US fighters crossed the border into North Vietnam, they were picked up and tracked constantly by ground radar. There was little surprise left to be lost by the use of radar missiles. The great majority of US losses in Vietnam were not in dogfights with MiGs but rather to radar-controlled anti-aircraft artillery and SAMs.

The Reformers saw a need for air-to-air capability. They liked what airpower did in support of ground forces. However, they didn't see much importance in long-range power projection. To Hart, the value of independent bombing was "a myth." Fallows conceded the critical impact of the atomic bombings of Japan in 1945. Beyond those two instances, he said, "It is hard to make a serious argument that deep interdiction bombing, far from the battlefield, has ever had a significant military effect."

Sprey (wrote Fallows) thought that the Air Force should not build another big bomber like the B-52 or B-1. It should go for something such as the A-1 attack aircraft, small and maneuverable, that could fly low along riverbeds and up canyons to avoid radar detection.

The Reform vision was perfectly suited to an imaginary war in which aerobatic fighters dueled in clear skies on sunny days. That war would never exist. In Europe, the Western allies faced a Soviet-led Warsaw Pact force that was superior in numbers and arrayed in depth across a broad front. Without an allied capability for interdiction and deep attack, the enemy would be free to mass in the rear echelons and reinforce the front. Supplies and reinforcements would move unimpeded by road and rail, and enemy air bases would stay in operation.

Furthermore, the Soviet Air Force was built to conduct BVR engagements. "Day-visual" restrictions would be crippling to allied air forces. In Central Europe in midwinter, airmen could count on no more than three flying hours a day in which lighting and weather conditions would allow visibility of more than 3.5 miles.

Among the Air Staff officers who responded to the freewheeling notions of the Reformers was Lt. Col. Walter Kross—a future four-star general—who explained that "in NATO and elsewhere, first priority will be given to destroying enemy aircraft ingressing at low altitude to bomb critically important targets. The US must be able to defend against such attacks—day or night, regardless of the weather." It would be a disaster, Kross said, to "run the risk of forfeiting first-shot advantage to a numerically superior enemy." Kross said, "Worse, it would establish yet another sanctuary for Soviet planners to exploit: the entire air combat envelope beyond visual range—be it on a clear day, dark night, or in poor weather."

Spinney's briefing landed him on the cover of* Time *magazine.

Weapons That Will Work

The Reformers, using the Carter defense program as their baseline, mistakenly attributed the readiness and supportability problems to weapons complexity. They passed lightly over the notorious "hollow force" phenomenon in which underfunded units fed upon themselves. Nor did they factor in the 1973-81 oil crisis, in which the price of jet fuel increased tenfold.

"The Reformers who focused on money saw the F-15 as too expensive at $20 million, seven times the cost of an F-4 and 20 times the cost of an F-5," said Clarence R. Anderegg, a veteran fighter pilot and now historian of the Air Force, in *Sierra Hotel: Flying Air Force Fighters in the Decade After Vietnam.* "They further argued that the airplane was so big and easy to see that the pilot of a small F-5-sized fighter could easily get inside the F-15 pilot's OODA loop and wreak havoc. Ironically, the very argument the Reformers used proved the case against them. The Eagle was big, but its radar and superb missiles not only gave the F-15 pilot the first chance to observe, orient, and decide, they also give him the first chance to act."

The year 1982 brought the unveiling of a second Spinney briefing—"The Plans/Reality Mismatch." His new theme was that US weapons acquisition policy was driving a wedge between resources and requirements. It was a briefing that got him on the cover of *Time* and that brought new fame to the Reformers. *Time* proclaimed that "the reform movement has attempted to focus attention on ... weapons that will work." Within weeks of the *Time* cover story, Spinney was called to give his briefing to four Congressional committees.

It was high tide for the Reformers. Also in 1983, Gary Hart sought to force the cancellation of a host of programs, including the F-15, improved versions of the F-16, the radar guided AMRAAM missile, the LANTIRN night targeting system, and an infrared version of the Maverick ground-attack missile. The effort failed, but Reformism was rippling through Washington.

The Reformers, though they focused on the Air Force's tactical airpower, also targeted some Army and Navy systems. One of Sprey's "expensive losers" was the M1 tank. The older M60 was cheaper and more effective, he said. Dina L. Rasor, founder of the Project on Military Procurement, picked up the campaign. In 1981, she accompanied a Congressional delegation to Ft. Hood, Tex., to see the M1. When she got into the tank, she discovered the Army had provided insufficient crew space. At 5 foot 6 inches, she said, she almost couldn't squeeze into the driver's seat herself. "I had the same problem until I adjusted the seat," said Fred Reed, who checked out the M1 for an article in the *Washington Post.*

In their 1986 book, Hart and Lind claimed that the day of the large aircraft carrier had passed. Nuclear submarines and powerful anti-ship missiles had made carriers anachronisms, they said. What the US Navy really needed was more submarines and about 40 "high adaptability surface combatants," which could serve as small carriers and in other roles.

In 1987, Hart left the Senate to run for president but dropped out of the race when caught with a woman, not his wife, aboard the yacht *Monkey Business.* Hart continued to send in Reform ideas from the sidelines. In 1989, he said the B-2 bomber "has been made obsolete by new political realities," a judgment that would be demolished in the air war over Serbia in 1999.

In the late 1980s, the Reformers wound up in the curious position of opposing the F-16. They were promoting the "Combined Arms Fighter," also called the "Mud-

William Lind (l) and Sen. Gary Hart (r) worked in tandem to promote the Reform agenda.

fighter," a close air support airplane that would be even more austere than the A-10, but with a 30 mm to 40 mm anti-tank cannon. The initiative failed.

Through the 1980s and into the 1990s, Boyd continued to develop and present briefings. He appeared at Air University, the Army War College, and elsewhere, but found his greatest reception and greatest respect from the US Marine Corps. Boyd parted ways with the Congressional Reform Caucus, regarding its members as insufficiently aggressive in supporting the cause.

What really took the ginger out of the Reform movement was the Gulf War. In that war, high technology undeniably worked. Its star performers included the much-maligned F-15 and all of the other systems that had been attacked by the Reformers.

Of the 40 USAF aerial victories, 33 were by F-15s. As for weapons used, 23 of the victories were by AIM-7Ms, five were by AIM-9Ms, and only two were with guns. Three were by air combat maneuvering, and one was by an F-15E firing a GBU-10 at a helicopter. The F-16 also did well. It flew more Desert Storm missions than any other aircraft type.

Many argued that the Gulf War was a preview of future conflicts and of a Revolution in Military Affairs, consisting of stealth, precision munitions, and information superiority. Chuck Spinney was having none of that. "At the core of the RMA is a radical hypothesis that would cause Sun Tzu, Clausewitz, and George Patton to roll over in their graves," he said.

The F-15's record book is not yet complete, but thus far, it has put together a victory tally of 104 to zero. Flown in combat by the US Air Force, the Israeli Air Force, and the Royal Saudi Air Force, the fighter has never been defeated in combat.

In 2004, David R. Mets of Air University noted that Air Force F-15s had killed 59 targets—all of them with air-to-air missiles. Moreover, said Mets, "Air Force F-16s had killed seven—none of them with the fine M61 gun." The Viper, Mets went on, "has seen its effectiveness greatly enhanced by the addition of the Advanced Medium-Range Air-to-Air Missile (AMRAAM), which gives most F-16s a beyond visual range (BRVR) capability for the first time." The F-16 also used updated Sidewinder missiles.

"The Korea-style dogfight seems to have all but disappeared from the air-to-air battle," Mets concluded. "The agility of both aircraft [the F-15 and F-16] remains highly useful in dodging surface-to-air missiles, but that is not what Boyd and the acolytes had in mind."

Where Are They Now

The Reformers have since turned their scorn on the F-15's replacement, the F-22, often with arguments similar to those leveled at the F-15 many years ago. Familiar faces from the Reform era still pop up with some regularity.

Bill Lind gained the spotlight briefly following the Sept. 11 terror attacks when he declared in March 2002 that "within 48 hours, we should have wiped Taliban-held Afghanistan off the map, using nuclear weapons."

Dina Rasor, founder of the Project on Military Procurement and foe of the M1 tank, started a new organization, the Project on Government Oversight, also known as POGO.

Everest Riccioni regularly takes part in POGO activities. At a press briefing in 2000, he said the F-22 was "conceived for a mission that no longer exists, and is totally irrelevant to modern warfare." On the POGO blog in 2005, Riccioni said the F-22 "represents no progress over the 30-year-old F-15C" and that the unit cost was "obscene."

Pierre Sprey left the Pentagon in 1986 because "it would be impossible to build another honest aircraft." He formed a music publishing business and records blues, gospel, jazz, and other music on his own label. In recent years, he has been an advisor to the Center for Defense Information, an organization that routinely opposes Pentagon programs. In August 2007, Sprey told Cybercast News Service that "the F-16, as it was in 1986, can whip today's F-22. You'd think the F-22 would be able to whip some antique."

The Reformers' star has declined, but not Boyd's. In the years since his death in 1997, there has been a resurgence of interest in his work. Two highly favorable biographies have been published, dozens of pro-Boyd articles have appeared in magazines and military journals, and countless Internet postings overflow with praise for him. The Boyd legend is still growing.

Two of the Reformers persisted for years in the Pentagon. Christie moved up the DOD ladder, spent nine years on the senior staff at the Institute for Defense Analyses, and returned to serve as director of Operational Test and Evaluation from 2001 to March 2006.

Spinney's allies in Congress provided him enough cover to block efforts to oust him. He continued at PA&E and published his criticisms in a series of some 500 "E-mail Blasters" on the Internet. Among those with whom he exchanged unfriendly words were *Air Force* Magazine and its editor, which at the time was me. In E-Mail Blaster #381 (Aug. 20, 2000), Spinney circulated a chart that showed the current defense budget as almost five times the size of the budget during the Vietnam War. *Air Force* Magazine pointed out in an editorial that Spinney reached this conclusion by ignoring the effects of 525 percent cumulative inflation since 1968.

Spinney, enraged, struck back. In Blaster #391 Oct. 11, 2000, he (1) declared the editorial "intellectual slime," (2) said the editor was an "ignoramus," (3) said he had taken note of the inflation offset in a different article published elsewhere, and (4) that it did not matter anyway since the effect of 525 percent inflation did not change his conclusion—that spending four percent of GDP on defense "would be tantamount to a declaration of total war on Social Security and Medicare."

Spinney retired in 2003 and received POGO's "Good Government Award" for all he had done. Today, there is not much left of the Military Reform Movement except for residual noise. ■

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

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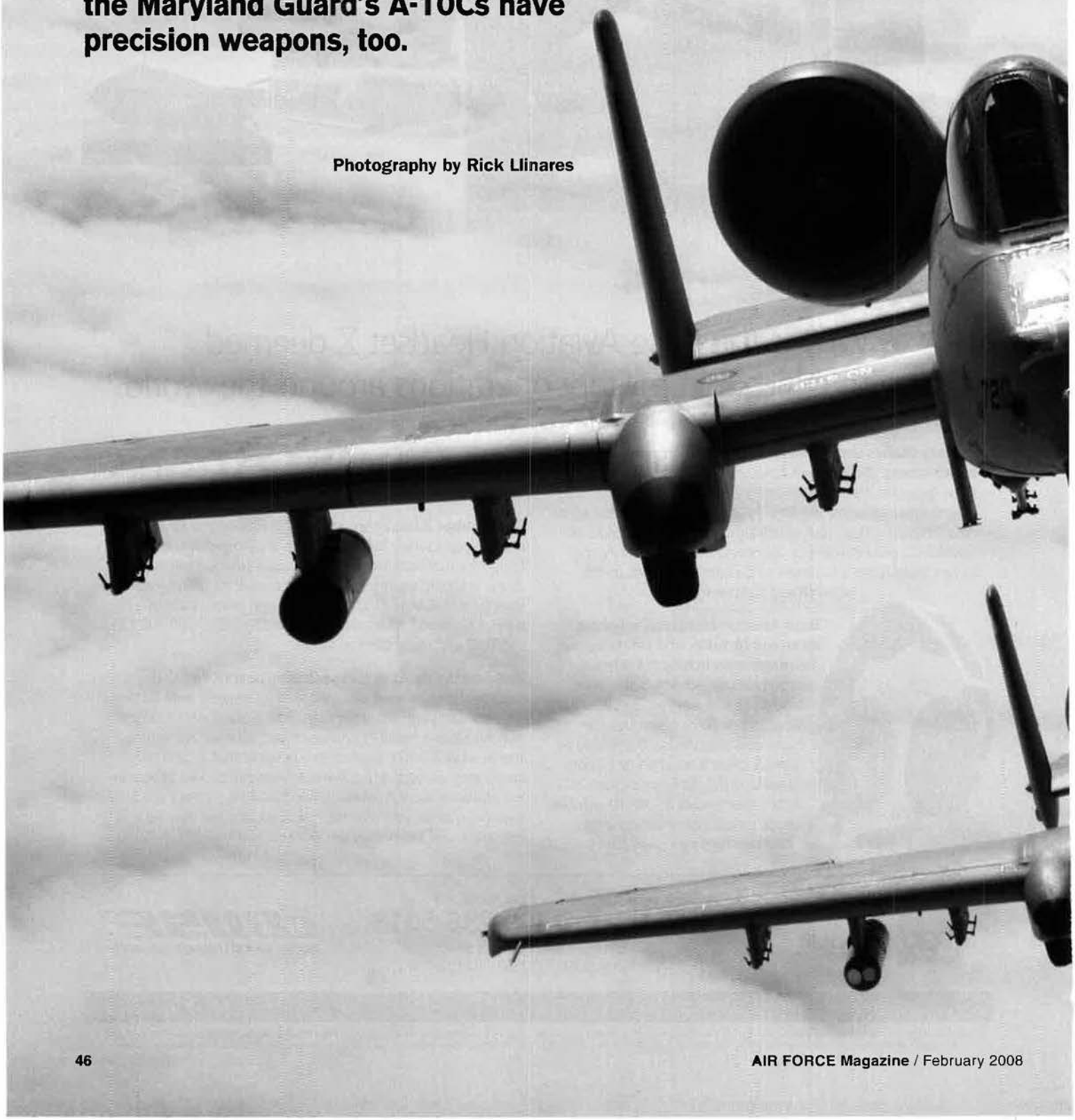
The A-10 was always a beast. Now, the Maryland Guard's A-10Cs have precision weapons, too.

Photography by Rick Llinares



A brace of A-10Cs—the latest, most powerful Warthogs yet—skims the cloud tops over Maryland.

THE A-10C is the product of the precision engagement upgrade to the standard A-10. The digital upgrade gives the Warthog the ability to use the latest precision weapons, plus up-to-date navigation, communications, and displays. ***|1|*** *An A-10C of the Maryland Air National Guard's 175th Wing shows off its 30 mm cannon.* ***|2|*** *Two uprated Hogs zoom in from the Chesapeake Bay followed by a Maryland ANG C-130J of the 135th Airlift Squadron.*

|3| *Crew chiefs prep a Hog at Martin State Airport near Baltimore, home of the 175th.* ***|4|*** *The 135th AS C-130J forms up on two of the 175th's A-10Cs.*

1

|1| The Maryland ANG's 104th Fighter Squadron not only was the first unit to be equipped with the upgraded A-10s, but it helped field the improvements package. The squadron worked closely with the 422nd Test and Evaluation Squadron from Nellis AFB, Nev., to perfect the upgrade. |2| The A-10's weapons repertoire now includes virtually every tactical weapon in the USAF inventory. A Maverick missile is carried here on a training sortie. |3| The A-10's fearsome 30 mm gun has been used extensively in Afghanistan, providing the precise close air support for which the aircraft was originally designed.

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|4| The Warthog's pilot is seated in an armored "titanium bathtub" that provides extra protection from small arms. The bulletproof canopy of diffusion-bonded acrylic offers further safety. |5| An A-10 shows off its belly and "false canopy" painted underneath. The optical trick is meant to keep enemies wondering about what the aircraft is about to do.

|1| *Lt. Chris Cisneros adjusts his earplugs on the noisy Martin State Airport flight line.* *|2|* *The A-10C upgrade gives the aircraft the ability to use advanced targeting devices such as the Litening pod carried here on the outboard right wing. The pods provide detailed target images from long distance, and also full-motion video feeds to a command center if desired.*

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|3| *Renowned for its versatility, the A-10 offers 11 hardpoints for carriage of fuel or weapons.* *|4|* *Maj. Eric Murphy in the A-10's front office. Many of the analog steam gauges have been replaced with color displays and computers as part of the precision engagement upgrade.*

Lockheed Martin photo by Guy Aceto

I1I The Warthog offers exceptional effectiveness at low levels, but the A-10C upgrade provides it with more punch from higher altitudes and through bad weather. I2I Originally built by the Fairchild Republic company, the A-10s have been upgraded by Lockheed Martin's Systems Integration group in Owego, N.Y., in partnership with Northrop Grumman and BAE Systems. The nose graphics feature the logo of Baltimore's NFL team, the Ravens. I3I Lt. Col. Robert Brawley leads wingman Lt. Col. Paul Johnson in maneuvers. The two Maryland Hog drivers are well-seasoned, with a combined 4,100 hours in the type. I4I An A-10 has surrendered its mammoth GAU-8/A Avenger 30 mm cannon for service. The seven-barreled gun and its ammo drum are 13 feet long and weigh more than two tons.

|1| *Lt. Col. Jim Tillie runs cockpit checks before a mission. "Boomhauer," the fast-talking character from TV's "King of the Hill" cartoon, graces the access ladder door.* *|2|* *A sharp pullup over Maryland's Eastern Shore.* *|3|* *Originally spec'd for 8,000 hours, most A-10s have already reached that milestone. The A-10C model first flew in January 2005, and the Maryland Air Guard got its first improved air frame in August 2006.*

|4| *TSgt. Anthony Tringler checks the paperwork as an inert cluster bomb dispenser is loaded on an A-10 pylon for training.*

Lockheed Martin photo by Guy Acelo

I1I A-10s and a new C-130J of Maryland's Air Guard fly over the Chesapeake Bay Bridge. I2I Two A-10Cs show off their self-defense capability: AIM-9 Sidewinder air-to-air missiles. I3I Besides the precision engagement upgrade, 242 A-10s will also get brand-new wings. The two upgrade packages should keep the Warthog in service through 2028. I4I A Hog driver presents a salute. First flown in 1972, the A-10 promises to be one tough-fighting bird past its 55th birthday. I5I Designed to thwart hordes of Soviet armor, the A-10 has earned its battle stars against the Iraqi Republican Guard and the Taliban of Afghanistan. ■

Air Force leaders want longer, tougher basic training to instill warrior values.

The Harder Line in Training

By Sig Christenson

Army, Navy, and Marine Corps recruits used to call the Air Force the "chair force." That's because airmen did just six-and-a-half weeks of basic training, compared to eight in the Navy, nine in the Army, and 13 in the Marine Corps.

That's changing, though. Starting this year, Air Force basic training jumps to eight-and-a-half weeks, the longest it has been since Eisenhower was President.

For some time, USAF has been preparing to begin tougher training with a goal of instilling warrior core values. The new wrinkles coming in the fall of 2008 are in some ways an extension of that service goal. The changes are a direct result of the Air Force's experiences in Iraq, Afghanistan, and other hot spots.

The extra time in training isn't about transforming airmen into dogfaces, officers say. It's about giving Air Force recruits more hands-on experience in learning such crucial skills as battlefield first aid and defending a base.

The harder line in training has already taken root. These days, recruits are issued demilitarized M-16 rifles at the start of boot camp. Come fall, they will spend a week in an austere environment that emphasizes old-fashioned warrior values.

"That's a positive thing for the Air Force," said retired Air Force Brig. Gen. Richard A. Coleman, a former director of the Air Force's security forces. "It's been needed for some time and it's the right thing to do. It puts everybody in the fight no matter what [specialty] you're in."

The 68-year-old Coleman recalls spending 11 weeks in basic. That was back in the mid-1950s, before training was turned into a two-phase, 11-week course in which basic lasted only six weeks, followed by five weeks of technical training. The Air Force still considered it an 11-week basic training program, but reduced the two-phase course to eight weeks in 1960, said Dave Smith, spokesman for Air Education and Training Command at Randolph AFB, Tex.

The six-and-a-half-week basic program has been the norm since October 1964. The first few days—as is true in all of the services—are reserved for "in-processing"—getting the time-honored haircut, standing in line for dreaded inoculations, and collecting uniforms. The name for those hours is "zero week."

Hand-to-hand combat isn't yet part of the basic training curriculum at Lackland AFB, Tex., the entry processing point for new airmen. However, recruits

USAF photo by SSgt. Matthew Hannon

SSgt. James Coppola, a training instructor with the 342nd Training Squadron, gently encourages trainees at Lackland AFB, Tex.

have been spending time in the field since 1999 when they began training at "Scorpion's Nest" on Lackland's Medina Annex.

In those days, the field training was a modest 36-hour exercise designed to give recruits a taste of the real world some troops were seeing in places such as Bosnia and Kosovo. The young boots ate meals, ready to eat, and were the first in years, if not decades, to train in semirugged conditions in the Texas sun.

Cover and Concealment

They awoke at 4 a.m. that July in eight tents, threaded their way through a hilly quarter-mile assault course, and hugged a winding, torturous sand trap. At dusk on the end of their first full day in the field, the fledgling airmen endured "Alamo's revenge," a mock probe of their camp defenses led by instructors known as "Hammer" and "Dark Angel."

Never far from sight or mind was a faded black POW/MIA flag at the center of their camp. It was a reminder of where, over the years, airmen no less than soldiers have been.

Coleman argues that it's essential for every airman to be ready for a firefight. "You need to know what cover and concealment means," he said.

Training these days puts airmen at the Medina rifle range only once during those whirlwind six-and-a-half weeks.

In the fall, the recruits will fire an M-16 once in their training, as they do now, but they'll also learn how to use an M-9 handgun. They'll put more emphasis on tactical maneuvers and base defense, but perhaps one of the biggest changes will be the amount of time every boot spends on buddy care first aid.

The Air Force has tried to teach recruits ways to help injured troops survive long enough to reach medical care. That has meant an hour in class, then an hour of application, but field training has not included any first-aid scenarios of the kind provided by the Army.

The new training regimen will increase to 16 hours the amount of classroom and field training, allowing young airmen to become more familiar with the intricacies of splinting a broken leg or closing off a shattered femoral artery.

"I think it will be a lot better when we go from six weeks to eight-and-a-

USAF photo by TSgt. Cecilio Ricardo

Basic military trainees traverse the "confidence course" at Lackland.

half because of the applications, the thoroughness of the classes that we will be able to provide for the trainees," said one Lackland military training instructor, MSgt. Magdalena Cortez. "We are on such a condensed schedule now."

The latest changes in basic training emerged after a tri-annual review of Air Force basic military training. The review brings in Air Force chief master sergeants and their analysis of lessons learned from around the world. The study looks at what airmen face on a day-to-day basis in such far-flung places as Iraq, Afghanistan, Kuwait, Mongolia, and the Philippines.

The Air Force is in other places as well, among them, Liberia and Morocco. Airmen find living and threat conditions far different from those at traditional rear bases. As the war on terrorism has expanded to places such as the Horn of Africa, the issue of how to get people ready for anything has only become larger and more complex.

"How do you prepare an airman to get into an austere environment with his gear, with his team, and do the job they're called upon to do?" asked Col. Robert J. MacDonald, head of Lackland's 737th Training Group.

The question goes to the purpose of Air Force boot camp: providing indoctrination, training, and education while focusing on the chief core values of integrity and excellence.

"Everybody knows about the tangible aspects of basic training, and that means those things that you can see, touch, and hear," MacDonald explained. "Anybody who's seen movies about basic training or has any understanding, those tangible aspects are evident everywhere."

Creating Warrior Airmen

The intangibles are just as important, however—how training instructors inspire their charges to dedicate themselves to excellence.

It is something that occurs at the "eyeball level" of training, MacDonald said, and begins with first-rate instructors who are the warfighters of boot camp in much the same way as pilots. He sees wall lockers and the Scorpion's Nest, which is undergoing construction in anticipation of the new basic training, as weapon systems, the kind used to create "warrior airmen."

The six-and-one-half weeks of boot camp today are used to introduce recruits to discipline, military deportment, and attention to detail—whether it's wearing a uniform, making a bed, keeping a wall locker organized, or even seemingly simple tasks such as rolling socks, shirts, and underwear.

The Air Force's beefed-up war skills training next fall dovetails with the now-familiar Air and Space Expeditionary Force concept that keeps airmen on deployed duty longer but has given airmen greater predictability in deploying overseas.

The result is that airmen are taught to be deployable at any moment. Special operations forces and tactical air control parties routinely do this in Afghanistan and Iraq.

These days, airmen begin to put their classroom instruction into practice during their third week at a Lackland facility called the "Torch Site," adjacent to Wilford Hall Medical Center. But this fall they'll return to a new $28 million expeditionary skills training exercise that replaces the famed Warrior Week. In its place will be BEAST—the Basic Expeditionary Airman Skills Training Exercise.

This area will have four encampment areas, each with a series of tents and a centralized tent for living and working. An entire class of 600 to 900 trainees will deploy to the training area for the

USAF photo by TSgt. Larry A. Simmons

Airmen trainees practice techniques to properly establish and defend a perimeter before they begin actual field training.

week and face a series of escalating challenges.

The BEAST

The recruits will be responsible for field security, integrated fighting positions to protect the camp, knowing entry control procedures, and operating in the area under simulated attack situations.

"The whole thing is based on being able to withstand an attack at an austere location and yet be able to continue air operations," MacDonald said.

Recruits will see what airmen on convoy escort duty endure on a daily basis—incoming mortar rounds, complex attacks, roadside bombs, car bombs, and unexploded ordnance. They'll be taught how to identify potential threats and who to report them to in their chain of command. BEAST week will be entirely devoted to scenario training, thanks to the extra classroom training time. As they take advantage of more field time to hone their newly acquired infantry skills, the recruits also will have more hands-on instruction in buddy care, culminating in a final exercise on Friday.

There, the recruits will experience the sounds, sights, and smells of combat in hopes of "inoculating" them against the fog of war—which in these days of explosively formed projectiles that blast through armor plating is exceptionally bloody.

One of the scenarios involves aggressors trying to gain access to your base, said Cortez, who has trained 11 flights since becoming a military training instructor two-and-a-half years ago. The aggressors come in shooting blanks, and the recruits have to react to that. "They're only doing that twice [today], and so throughout the entire week they'll get those scenarios more often."

Repetition and reinforcement, MacDonald said, is the key to this new era of basic training.

"You don't want people to be shocked by what they see," he said, "and be overcome once they reach the AOR." ■

USAF photo by Robbin Cresswell

Trainees unload duffel bags and check their issued items at Lackland.

USAF photo by TSgt. Larry A. Simmons

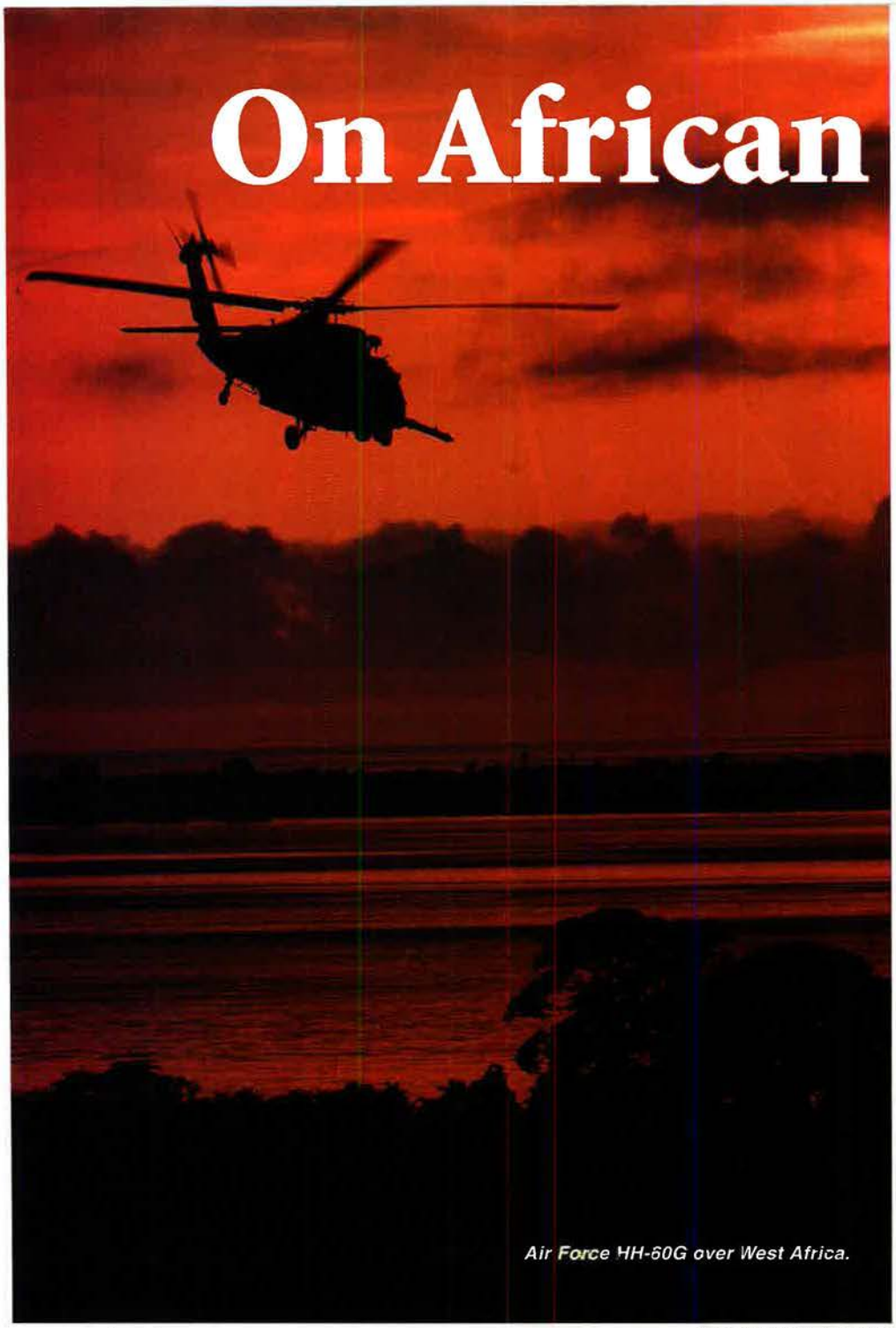
A training group crawls through the mud of a half-mile-long tactical training obstacle course at Lackland.

Sig Christenson is a writer covering military affairs for the San Antonio Express-News. *He has made five reporting tours to Iraq since 2003, and covers the military in San Antonio and Washington, D.C. This is his first article for* Air Force *Magazine.*

On African Ground

The American military is edging cautiously into complicated territory.

By James Kitfield



Air Force HH-60G over West Africa.

USAF photo by TSgt. Justin D. Pyle

Ike Skelton, the Missouri Democrat who chairs the House Armed Services Committee, is aware that Africa isn't on anybody's "short list" of pressing US military concerns, but he believes it could end up there, for several reasons.

First, Skelton notes, Africa "is a theater in the War on Terror," with legions of Muslim extremists hiding out in Africa's vast, ungoverned spaces. Next, he says, conventional wars often threaten friendly nations there. Finally, the oil that Africa supplies to the West is vulnerable to disruption.

If you combine those factors, warns Skelton, "you have the makings of some first-class security challenges."

Skelton may be onto something. Washington has begun paying careful attention to what happens in the vast and complex continent of Africa, and with something other than a purely humanitarian interest.

No one is claiming Africa compares to Europe, East Asia, or the Mideast in strategic importance.

What is undeniable, though, is that Africa no longer is a strategic backwater, as it always has been. Militarily, the US is stepping up its involvement there. Moreover, Africa today is the focus of Washington's expanding rivalry with China—a competition that influences, and is influenced by, all other challenges.

The clearest sign of change is Washington's reorganization of its military structure.

A little history is instructive. Washington, with massive postwar obligations in East Asia, created US Pacific Command in 1947. Next came US European Command, which emerged in 1952 after the Berlin Crisis. In 1963, with Fidel Castro making trouble in Latin America, DOD stood up US Southern Command. The creation of US Central Command, covering the Mideast, occurred in 1983, after the fall of the Shah of Iran, the Soviet Union's invasion of Afghanistan, and the Iran-Iraq War.

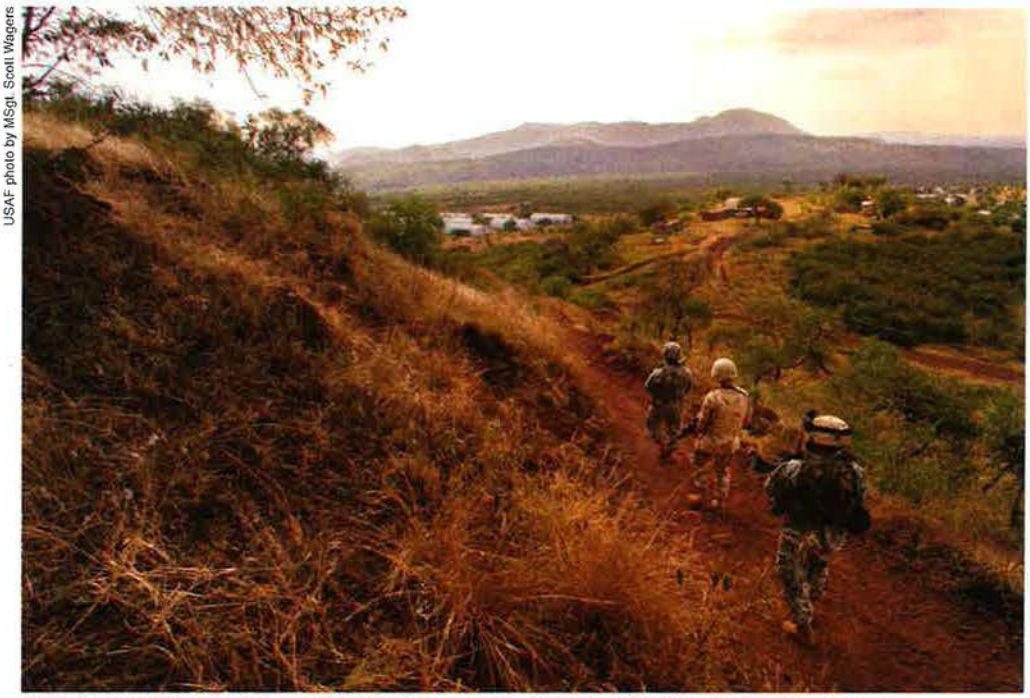
Then, nothing. Until last year. That's when the Pentagon announced the establishment of US Africa Command. Plans call for AFRICOM to coordinate US activities in all African nations except for Egypt—53 countries in all. (Egypt remains in USCENTCOM.)

"The fact that Africa is rising in significance ... is undeniable," said Ryan Henry, principal undersecretary of defense for policy. "The reorganization of our military structure ... is just a manifestation of that growing importance."

The term "Africa" is mostly a geographic expression, with little else

that fits a broad generalization. Africa has enormous rivers and vast deserts, soaring mountains and teeming swamps. The north is overwhelmingly Muslim, the south mostly Christian or animist.

It is a place of trackless and lawless wastelands, on one hand, and mega-cities on the other. Africans can be black, white, Asian, or Semitic. Some nations are rich (at least in resources) and many are dirt-poor. It is industrial and agricultural. There are brutal dictatorships and thriving democracies.



USAF photo by MSgt. Scott Wagers

A1C Steven Brumley (c), a USAF radio operator, deploys with two Army Guardsmen in Southern Ethiopia.

A Strategic Vulnerability

Of all the world's ungoverned spaces, none are vaster or further outside the reach of law and civil authority than those in Africa. The landscape of desert, seemingly endless savannah, and marshy and overgrown delta provides valuable cover for small bands of terrorists, just as sprawling urban centers mask the operations of countless criminal gangs.

After the 9/11 terrorist attacks, US officials tasked with developing a battle plan for the Global War on Terror saw Africa as a looming strategic vulnerability. The worry was that al Qaeda, driven out of Afghanistan, would move to reconstitute its safe havens on a new continent.

In truth, Africa had always played a central role in Osama bin Laden's schemes to construct a terrorist organization capable of striking at the United States. Al Qaeda's first attack on US forces—a failed bombing of a hotel used by US service members bound for Somalia—occurred in Africa.

Later, al Qaeda operatives helped train Somali militiamen fighting US forces. They passed along techniques for downing helicopters with rocket propelled grenades. The success of that tactic in a 1993 battle in Mogadishu—the infamous "Black Hawk Down" disaster—left 18 Army Rangers and Special Forces troops dead and led to the withdrawal of US forces from Somalia.

From 1991 through 1996, bin Laden maintained his headquarters in Africa, under the protection of Sudan's extremist leader Hassan al-Turabi. It was here that bin Laden began in earnest to build a terrorist internationale.

Even after he was exiled to Afghanistan in 1996, bin Laden remained active in Africa. He used his long-standing connections and African cells to plan and execute the August 1998 bombings of US embassies in Kenya and Tanzania.

Africa-based al Qaeda cells mounted the 2000 attack on USS *Cole* in the Yemeni port of Aden. The suicide attack killed 17 sailors and nearly sank a front-line Navy warship.

It was the Sept. 11 disaster, though, that propelled US military men on serious exploratory missions in Africa.

"The 9/11 attacks were a major turning point," said Princeton N. Lyman, former US ambassador to South Africa and Nigeria and a project director of "More Than Humanitarianism: A Strategic Approach Toward Africa," a 2006 venture sponsored by the Council on Foreign Relations.

After the 9/11 attacks, Lyman noted, European Command officials began traveling extensively in Africa. "They saw that Africa was dangerous territory in the context of failed states and terrorism," he said.

He went on, "There was already

USAF photo by MSgt. David D. Underwood Jr.

Rwandan peacekeepers board a USAF C-130 leaving the Darfur region of Sudan.

USAF photo by 2nd Lt. Shannon Collins

A USAF pararescueman jumps from an HC-130 during a training mission over Africa.

significant terrorist infiltration of the Sahel region and around the Horn of Africa, and great instability in the Gulf of Guinea, which is Africa's major oil producing region."

Subsequent events only reinforced US military apprehension.

In 2002, remnants of the al Qaeda cells responsible for those 1998 embassy bombings launched attacks in Kenya, killing 15 persons, and nearly brought down an Israeli airliner with a man-portable surface-to-air missile.

Al Qaeda recruited heavily in Africa. By one estimate, Africa supplied as much as 25 percent of the foreign fighters who joined the ranks of al Qaeda fighting US troops in Iraq.

The perpetrators of the devastating terrorist bombings in Madrid in 2004 were also aided and abetted by an Africa-based and al Qaeda-affiliated terror group in Morocco. The Salafist Group for Preaching and Combat, an Algerian band with a reputation for extreme violence, has pledged fealty to bin Laden.

The Somalia crisis that has unfolded over the past year underscores US concern about ties between failed states in Africa and Muslim terror. In 2006, an alliance of Islamic clerics and clan leaders—the Union of Islamic Courts—took over Mogadishu and imposed Islamic law there. US intelligence said the UIC included several al Qaeda-linked terrorists connected to the 1998 embassy bombings and the 2002 attacks in Kenya.

The US quietly backed intervention of Ethiopian troops to counter the Islamic forces. According to a recent *Time* magazine, US officials confirmed that USAF AC-130 gunships launched two attacks on convoys carrying al Qaeda-affiliated terrorists, possibly killing the man who served as bomb-maker for the 1998 embassy attacks.

Bare-Bones Facilities

The Pentagon has modestly increased its presence on the continent, and significantly stepped up its activity.

In 2002, Central Command established the Combined Joint Task Force Horn of Africa, based in Djibouti. The task force's complement of 1,200 to 1,800 troops conduct long-range interdiction operations, train foreign military forces, and perform outreach activities in local communities. It is the biggest concentration of uniformed Americans on the continent.

According to a recent report of the Congressional Research Service, the Pentagon can count on access, as needed, to various African air bases, ports, and "bare-bones" facilities maintained by local forces in Gabon, Kenya, Mali, Morocco, Namibia, Sao Tome and Principe, Senegal, Tunisia, Uganda, and Zambia.

A US-East Africa counterterrorism initiative, launched in 2003, is distributing $100 million to upgrade the capabilities of security forces in Ethiopia and Kenya. EUCOM also began building forward operating loca-

USAF photo by TSgt. Justin D. Pyle

Airmen unload an HH-60G Pave Hawk helicopter from a C-5 that has just arrived in Sierra Leone.

tions—with upgraded ports and airfields and pre-positioned fuel and critical supplies at several sites.

US operations were upgraded in 2005 with the Trans-Saharan Counterterrorism Initiative, an ambitious five-year, $500 million program to improve local security capabilities in Saharan and sub-Saharan nations. The initiative's coming out party was a 2005 regional exercise dubbed Flintlock, which featured 1,000 special operations forces.

"Past activities have made visible and measurable differences on the ground through professionalization of military units," said Army Gen. William E. Ward, commander of AFRICOM, in recent Congressional testimony.

Apart from concerns about terrorist infestations in Africa, the US is also worried about the security of African oil.

In 2003, for example, bin Laden urged followers in Africa to open a terror front in Nigeria, a country with enormous oil reserves. In 2004, moreover, Nigerian warlord Alhaji Dokubo-Asari drove world oil prices skyward with his threats to target and kill foreign oil workers there.

Africa today supplies 15 percent of US oil imports; in some projections, Africa would rival the Middle East—at about 25 percent—within a decade. Meanwhile, Africa has been providing China roughly a quarter of its oil imports.

Oil and Global Repercussions

EUCOM has begun a multilateral initiative called the Africa Partnership Station to increase US naval presence in the energy-rich Gulf of Guinea, an area thick with terrorists, drug runners, pirates, and oil thieves.

Still, the question of oil is sensitive, awakening old memories of Western colonialism and oil "concessions" worked out with the aid of corrupt local leaders.

As Skelton put it, "We often don't want to overtly link our national security to the flow of that resource," but "instability in the region not only threatens the region's economic development, but has global repercussions as well."

Two well-known oil producers are Arab states of North Africa—Libya and Algeria. Both are members of the Organization of the Petroleum Exporting Countries, the world oil cartel.

Even in sub-Saharan Africa, however, several nations in recent years have become important oil exporters. The biggest of these, according to a recent report of the Council on Foreign Relations, are as follows:

- Nigeria, the largest producer in Africa and also an OPEC member, has major clients in Western Europe and the US and pumps some 2.5 million barrels per day.
- Angola, another OPEC state and second to Nigeria, expects this year to produce upward of two million barrels of crude per day. It also has major offshore reserves of natural gas.
- Sudan, which daily pumps about 500,000 barrels of a light, easily refined crude, despite severe internal unrest.
- Equatorial Guinea is a niche producer of some 350,000 barrels per day, though proven reserves are estimated at about 1.28 billion barrels.
- Gabon, at 230,000 barrels per day, actually is producing less than it has in recent years, but has decent reserves.
- Republic of Congo, which averages production of roughly 235,000 barrels per day.

It is in Africa that the world most clearly sees China's hunger for oil to fuel its decades-long economic boom.

Beijing for years now has been aggressively courting oil producers and

USN photo by Mass Comm. Spec. 1st Class Michael R. McCormick

USAF MSgt. Chad Bohren, Combined Joint Task Force-Horn of Africa, communicates with sentries monitoring a bombing range off the coast of Djibouti.

USAF photo by TSgt. Lee Harshman

On a Djibouti runway, aircrews unload a Marine Corps CH-53E helicopter from a C-5 of the West Virginia Air National Guard's 167th Airlift Wing.

buying up supplies, all of which has tightened the world market and increasingly pitted Washington and Beijing against each other.

China raised world eyebrows in 2006 when it hosted the largest-ever Sino-African summit in Beijing. The outreach signified the culmination of Beijing's oil-centered diplomacy.

China's "come on" is deceptively simple, and it has proved effective with some of Africa's most despotic regimes: "We have money and an inexhaustible market, and we don't ask questions." Or, as China's then-Deputy Foreign Minister Zhou Wenzhong told one interviewer: "Business is business. We try to separate politics from business. ... You [the West] have tried to impose market economy and multiparty democracy on these countries which are not ready for it. We are also against all embargoes, which you have tried to use against us."

When Western governments tried to pressure Angola on some sensitive political issues, China stepped in with a $2 billion loan that eased that country's isolation.

Despite the ruthless suppression of political opponents by Zimbabwe's Robert Mugabe, who has driven his country to the brink of collapse, China has continued investing in Zimbabwe's roads, minerals, and farming. China has also supplied Mugabe's thuggish military with jet aircraft and other armaments.

A Many-Pronged Effort

Washington has pressured oil companies to stop doing business with Sudan because of that country's ties to terrorism and Khartoum's ruthless tactics against its own people in Darfur and in its earlier war against the south of Sudan. China predictably has stepped into the void. Its National Petroleum Corp. bought a 40 percent stake in Sudan oil fields and helped build a 930-mile-long pipeline, sending 10,000 Chinese laborers to work in Sudan on these projects.

US officials expect such economic and political competition in Africa to be a major feature of the Beijing-Washington relationship for years to come.

The devastation the HIV/AIDS epidemic has inflicted on Africa is also widely seen as a test case for the ability of the international community to respond to a global pandemic. In 2000, the US brought the HIV/AIDS issue to the UN Security Council, which, for the first time, recognized a health issue as a threat to international peace and security. In 2003, President Bush pledged to provide $15 billion over five years to address the AIDS disaster.

These factors will force the United States to develop a sophisticated strategy toward Africa that combines all elements of US power. While the primary goal of the Trans-Sahara Initiative has been to improve the ability of local security forces to patrol borders and interdict terrorists, for instance, it also includes significant funds for public diplomacy, law enforcement, and economic assistance. In fact, officials say that not more than 20 to 30 percent of the initiative funds are devoted to military-to-military activities.

"Military assistance is an important part [of what we do in Africa], but only a very small fraction of the kinds of assistance that we provide [through] our foreign assistance budget," Stephen D. Mull, acting assistant secretary of state for political-military affairs, said in recent Congressional testimony.

President Bush made that same point in November when he announced he would visit sub-Saharan Africa in 2008. "The new relationships that America has forged in Africa are a high priority for our nation," Bush said.

Or, as Skelton noted, "There are places in the world beyond Iraq and Afghanistan with which we need to be concerned." ■

James Kitfield is the defense correspondent for National Journal *in Washington, D.C. His most recent article for* Air Force Magazine, *"A Czar in the Making," appeared in the December 2007 issue.*

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For six decades, it has colored—some say distorted—opinion about airpower.

The Long Arm of the US Strategic Bombing Survey

By Rebecca Grant

When the report was first released, two months after the close of World War II, *Time* magazine did not hold back. "Awesome and Frightful" read the headline on its Nov. 5, 1945 story. It was, in *Time's* estimation, "the definitive source on man's inhumanity to man, pre-atomic style."

Gen. Carl A. Spaatz, the wartime head of US Strategic Air Forces and eventually the first Chief of Staff of the new US Air Force, supposedly refused to read it at all.

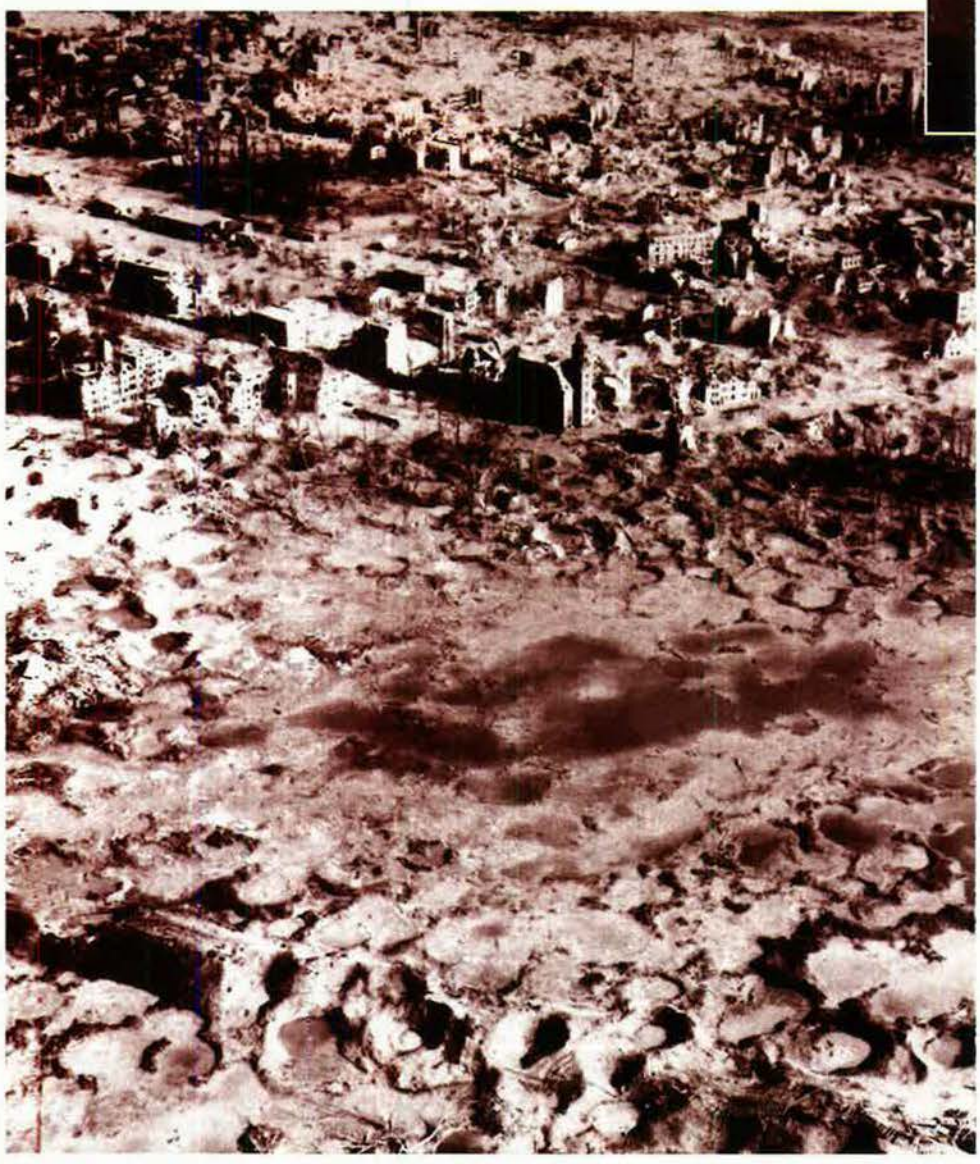
"It" was the *United States Strategic Bombing Survey,* a detailed and controversial look back at the huge 1940s air wars that the Allies waged against Germany and Japan.

Few documents can boast its staying power. For more than 60 years, the USSBS has colored—some would say distorted—opinion about the efficacy of airpower and the value of the Air Force to the nation. Most major works about airpower reference the survey and its findings in one way or another.

Not bad for a project run by an eclectic group of Wall Street financiers and professors recruited for their total lack of knowledge about airpower.

The authors of the 1992 *Gulf War Airpower Survey* took "as their standard" the words of USSBS Chairman Franklin D'Olier: "We wanted to burn into everybody's souls the fact that the survey's responsibility ... was to ascertain facts and to seek truth, eliminating completely any preconceived theories or dogmas."

The USSBS wasn't the first such survey.



Left: Eighth Air Force B-17s release a cascade of bombs over Berlin. Bottom: What remains of the German town of Wesel after an intense bombing raid by the Allies.

In 1919, the Army Air Service dispatched teams to more than 140 towns bombed by US, British, and French aircraft. That was a miniscule effort compared to the World War II bombing survey, though.

USSBS was a survey to end all surveys. Commissioned with a letter from President Franklin D. Roosevelt himself, it consumed the efforts of 300 civilians, 350 officers, and 500 enlisted men. At more than 200 volumes, the European Theater work alone created a unique record of everything from damage to German synthetic oil refineries to analysis of bombing effects on German railways. A second phase concentrated on Japan and the Pacific war. All told, the survey compiled more than 300 individual reports.

The staff comprised young economists—John Kenneth Galbraith, for instance—who later took up dominant positions in academia and government. D'Olier was the head of Prudential Insurance. Vice Chairman Henry C. Alexander ran J.P. Morgan, the blue-ribbon investment banking house. Survey director Paul H. Nitze, a Wall Street financier, went on to prominence in Cold War policy circles and served as Secretary of the Navy and deputy secretary of defense in the Johnson years.

By the middle of World War II, strategic bombing was taking the war directly to Germany long before ground forces engaged. The survey began in no small part as a way to look at the major targeting controversies (rail vs. oil, and so forth) that had so often consumed the attention of top Allied planners and leaders. Its original intent was to sweep up lessons from Europe for use in the ongoing war with Japan.

Staff members first set up shop in London in November 1944. Most came from anywhere but the air forces. D'Olier, then 68, had been an aide to Gen. John J. Pershing in World War I; he gave his team of 11 free rein. Nitze was a Roosevelt Administration insider brought to Washington at age 33 by James V. Forrestal, who at first kept him on the payroll of the Wall Street firm where both men were partners.

One day, Nitze met with Col. Guido Rinaldo Perera, the organizer of the survey. Perera told Nitze he was "looking for people who don't know anything about airpower or air attack or anything else, who have had nothing to do with it. Would you be interested?" Nitze was indeed interested and came aboard.

In a way, the economists who staffed the survey were latecomers. Many academics were already mobilized throughout the government in World War II. The Office of Strategic Services, forerunner of the CIA, was one big employer. World War II was "an economist's war," remarked OSS employee Paul A. Samuelson, later author of the standard textbook on macroeconomics.

Airpower was often a focus. Economists had since 1942 been at work on methods for prioritizing industrial targets. A young Milton Friedman worked for a time on optimum sizing of anti-aircraft shell pellets. Friedman said decades later that the economists and social scientists were useful chiefly because they were better at working with poor data—unlike physical scientists, who wanted controlled laboratory conditions.

Risks and Costs

Certainly the economists were innovative. According to University of Chicago economist Mark A. Gugliemo, they "realized that to have an impact on the enemy war effort, a bombing raid had to take into account both the depth and the cushion of the enemy industry." Depth referred to how long it would take the enemy to feel a shortage of tanks or fighters. Cushion measured the enemy military's capacity to absorb losses from any one industrial sector.

Nitze and others spent enough time with the air forces in Europe to be impressed with the risks and costs involved. Maj. Gen. Orvil Anderson served as a primary point of contact. In England, Nitze and the survey team also became aware of the heated debates between British and American targeting boards—and Nitze became fast friends with Solly Zuckerman, eminence grise of the British targeteers.

By 1945, survey staff had an unprecedented opportunity to gather empirical data—if they could get there fast enough. Nitze combed the Army manpower records for German speakers and Ph.D. holders and dispatched them to locations such as Schweinfurt to find out about depth and cushion.

Survey staff prided themselves on following the ground troops into key target areas. Their MO was to find factories, round up top production officials, take photographs, and then comb through plant accounts and records. They were so close to the action that four survey members were killed.

"We had to get unambiguous data in such

B-29s from the 20th Bomber Command release tons of bombs on a large Japanese supply depot in Burma.

fine detail that it couldn't be questioned because otherwise people wouldn't have believed it," Nitze said.

Interrogations also formed an important part of the survey's research. Although they talked to Hermann Goering and others, their greatest coup was the interrogation of Albert Speer, the Third Reich's minister of armaments and industry.

They found Speer holed up in Glucksburg Castle. Nitze, Galbraith, George Ball, and others flew to the site where American, British, and Russian teams were already in place. For 10 days, they grilled Speer in English and German.

Speer "leaned over backwards" to help, claimed Nitze. He "directed us to where we could find the pertinent records of what he had done during the period, including his personal reports to Hitler." Many of these were in a safe in Munich. Ultimately, Speer "gave us the keys to the safe and combination, and we sent somebody down to get these records," said Nitze.

The survey turned up real surprises. Germany's war machine had more depth and cushion than anyone realized. Galbraith calculated that Hitler did not truly mobilize the German economy until late in the war. Partial German demobilization after the fall of France in 1940 left the economy with excess capacity.

The Germans did not fully mobilize again until late 1944—a date that coincided with the tremendous increase in the weight of strategic bombing attacks. Conclusions about the capacity of the German economy rippled throughout the economics-based analysts of the bombing campaign. It led the survey's analysts to rate many famous attacks—including the bloody efforts at Schweinfurt and Regensburg—as less effective than attacks on oil targets.

"When it came to the attacks on the synthetic oil plants and the related chemical plants, those attacks were much more successful than the planners had anticipated," Nitze recalled.

Air attacks worked best on industries where repairs were difficult and alternatives were few. The European summary report pointed out that even the most heavily attacked industries had a way of reconstituting. In the case of ball bearings, there were extreme work-arounds and, of course, Swedish imports.

Airpower Was Decisive

As for morale, the survey found Germany's civilian economy had substantial cushion in consumer goods, a factor that helped keep up morale.

For all that, the European report was unequivocal in its assessment of the contribution of airpower.

Here is what it stated: "Allied airpower was decisive in the war in Western Europe. Hindsight inevitably suggests that it might have been employed differently or better in some respects. Nevertheless, it was decisive. In the air, its victory was complete. At sea, its contribution, combined with naval power, brought an end to the enemy's greatest naval threat—the U-boat; on land, it helped turn the tide overwhelmingly in favor of Allied ground forces. ... It brought the economy which sustained the enemy's armed forces to virtual collapse."

Had the survey ended its work after V-E Day, it might have remained just a fitting conclusion to the targeteering debates that surrounded strategic bombing during the war. Instead, Gen. Henry H. Arnold, the US Army Air Forces Chief, set the staff loose on the Pacific campaign while it was still going on.

Nitze came up with plans to halt firebombing in favor of concentrating on targets such as railway tunnels. Branching from this work, Nitze and colleague Fred Searls Jr., a geologist, conjured a targeting plan to force Japanese surrender through interdiction of the rail system and other lines of communications targets. Nitze estimated that, by bombing the right targets, Japan would be unable to hold out past March 1946.

All of that planning became moot when B-29s dropped atomic bombs on Hiroshima and Nagasaki in August 1945, ending the war.

President Harry Truman sought a full survey of the air war in the Pacific. Nitze once again took a leading role. This time, the survey was plagued with problems. It had to include the naval campaigns—a tasking that became the opening round of postwar roles and missions battles.

Once again, survey experts tracked down industrial and municipal records and gleaned details about the direct effects of the atomic attacks. They found that train passengers who'd been sitting near open windows suffered more radiation effects. Passengers with closed windows suffered cuts and wounds from shattering glass but gained some protection from radiation. It made for compelling reading.

The main findings of the Pacific war report were ready in June 1946. Like the European report, it praised airpower far

Paul Nitze, who directed the USSBS, held high national security posts in later Administrations.

B-17 Flying Fortresses of the 398th Bomb Group approach Neumunster, Germany, in 1945.

and wide, but it made a dramatic, bombshell claim:

"Based on a detailed investigation of all the facts," it read, "and supported by the testimony of the surviving Japanese leaders involved, it is the survey's opinion that certainly prior to 31 Dec. 1945 and in all probability prior to 1 Nov. 1945, Japan would have surrendered even if the atomic bombs had not been dropped, even if Russia had not entered the war, and even if no invasion had been planned or contemplated."

The summary report made the case that it was just a matter of time until Japan realized its "military impotence" and accepted the inevitable. In their opinion, air supremacy over Japan could have exerted enough pressure to bring about unconditional surrender.

This startling conclusion was directly traceable to the truncated targeting work performed by Nitze in early summer 1945. At that time, Nitze had pushed hard for the new targeting plan based on his experience in Europe and a quick survey of Japanese targets. He'd gone so far as to take the proposal to James F. Byrnes, who would become President Truman's Secretary of State.

Nitze's friend Forrestal, now Secretary of the Navy, had poured cold water on the idea. He pointed out that millions of men converging on the Pacific Theater couldn't be kept waiting for months in hopes Japan would surrender.

A bigger roadblock was the opposition of the Joint Chiefs of Staff. The Chiefs didn't see much military merit in wait-and-see operations, and they blocked it.

It was a bureaucratic slight Nitze did not forget. Unlike with the European work, where the USSBS staff conducted deep and searching interrogations, the abrupt end to the Pacific war caught the survey team with an open-ended theory and no data to prove it. Even so, Nitze and the report authors ended up putting the theory into the Pacific war summary.

The survey's widely published conclusions became source material for questions about whether the Hiroshima and Nagasaki attacks were a military necessity. While a group of scientists had written to Truman imploring him not to use the bomb, their objections rested on wider moral grounds. Nitze's assertions were the first to attempt an authoritative military case for another alternative.

The Only Possible Decision

When Nitze injected his theory into the Pacific war report, it sparked a controversy that has lasted for generations. Thirty years later, Nitze sat for an important oral history in which he allowed, "It seems to me that Mr. Truman made the only possible decision." By then, though, Nitze was too late. The Pacific war survey, with its hedging about atomic attacks, had already given critics the leverage they needed.

The speculations of the Pacific war volume and the cool statistical conclusions of the European war summary accounted for much of its staying power.

Yet part of the reason for the longevity of the USSBS was that the Army Air Forces commanders did not produce a comparable operational survey of their own.

In Britain, Air Chief Marshal Arthur T. Harris penned a final report titled, simply, *Despatch on War Operations.* This commander's history covered the period from February 1942 to May 8, 1945. It had a blend of tactical and operational detail not found in the US survey. It was too technical, in fact, for the RAF to declassify it after the war and the study languished for decades in the Public Record Office until finally printed in 1995.

The snappy statisticians of the USSBS cut to the chase with more statistics than adjectives. The terse and direct verbiage of the survey's two summaries served it well. Most of all, the analysis of industrial effects remained a guide to what might happen in a nuclear war.

The survey, then, endures as the main source document for views on strategic bombing. The survey's great strength was also its great deficit. By concentrating on effects, it left no room for the operational context of major campaigns and command decisions.

In the end, the survey left its deepest marks on the academic debates about strategic bombing and airpower in general. What Nitze, Galbraith, and others on the survey staff could not have predicted was that their careful and precise work would remain open to so many varying interpretations.

Writer Rick Atkinson, in his 1993 book *Crusade,* quoted verbatim a Pacific war survey sentence that he held out as evidence of how "historical baggage pressed" on Air Force planners commanding air strikes in the 1991 Gulf War. In 1994, controversy over the Smithsonian's plan to exhibit the *Enola Gay* bomber linked directly back to the doubts raised by the Pacific war summary volume of the survey.

A few years later, historian Thomas A. Hughes concluded his scholarly study of airpower and Operation Overlord with zingers on the failure of bombing. Hughes also complained that the USSBS "appropriated" accomplishments of tactical air by mushing together fighter and bomber results of attacks on transportation systems, for example.

For other authors, the survey stood out as gold-standard proof of the evils of strategic bombing. A recent example of this was Stephen Budiansky's 2004 book *Air Power,* which threw USSBS data together with others—some British—to make his case.

The survey itself was plain enough. It delivered its precise analysis of input, output, cushion, and depth. But its verdict on airpower was uncompromising. It was, in a word, decisive. That, too, has stood the test of time. ■

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Specialized Search Dogs, trained at Lackland, are the stars of the canine corps.

Mighty Dogs of the Military

By Robert R. Milner Jr.

Some 30 GIs are grouped at the edge of an Iraqi village, awaiting the arrival of a Specialized Search Dog team. In time, a helicopter arrives and offloads two passengers. The two-legged member of the SSD team is Army SSgt. Kevin Reese.

The other one is Grek, a yellow Labrador retriever wearing goggles and earmuffs for eye and ear protection during his flight.

Reese briefs the unit on Grek's capabilities: He operates off-leash out to 656 feet and is trained to detect the odors of most explosives as well as firearms. When Grek encounters an explosive odor, he sits to indicate its presence. He's proficient at searching open areas, vehicles, buildings, and routes.

And he's fast. Grek will search a house or courtyard thoroughly in as little as two minutes, thereby minimizing time spent in a danger zone and limiting the troops' exposure.

The soldiers who gathered around Grek were well aware of these facts. They had requested an SSD team, and Grek by name. He is a star in those parts—prior experience has led the soldiers to appreciate his considerable skills.

USAF photo by Robbin Cresswell

Above: TSgt. David Adcox restrains his military working dog Samo at a training demonstration. Right: SSgt. Rafael Melendez and Houston patrol the flight line at Soto Cano Air Base in Honduras.

Then, it was showtime. In a flash, Grek did his thing, and soon indicated there were no explosives on hand. The troops trudged forward once more, weary but confident they would not shortly be blown to bits.

Specialized Search Dogs serve as one of the best of all tools against improvised explosive devices, or IEDs—the roadside bombs that have caused most of the US casualties in Iraq. In fact, American forces have found nothing that will consistently outperform a military working dog's detection abilities, especially in a dirty environment.

Tactics have evolved in the IED battle. Radio-frequency triggers have given way to pressure switches and movement triggers. The bomb-makers

USAF photo by SrA. Mike Meares

can change the triggers or the tactical scenario, but fortunately the one thing they cannot change or hide is the odor of the device's explosives.

Today, the Air Force is going after the IED threat from the rear, by training the dog-and-handler teams to find IEDs and the bomb-makers' materiel caches, to disrupt the explosives supply chains.

Grek is the product of a Specialized Search Dog Program conducted by the Air Force at Lackland AFB, Tex. USAF is the executive agent for the DOD Military Working Dog Program. The Army needed a better way to thwart IEDs in Afghanistan and Iraq, and the SSD team concept is aimed at providing it.

In 2003, up to 60 percent of all insurgent attacks began with an IED detonation, often followed by direct fire. However, increasingly, more and more attacks have become IED stand-alone affairs as insurgents employ hit-and-run tactics.

The Nose Knows

As science uncovers new facts on canine performance, the role of dogs in the military will become even more important.

"The dogs' vapor sensing capability far surpasses the capability of modern measurement techniques," noted a 2002 Sandia National Laboratory report on the smell sensitivity of mine detection dogs. "Even so, with extrapolation and estimation techniques, we find that the dog is capable of sensing at extraordinary low levels, levels that approach that of one molecule per sniff."

Explosive-sniffing dogs have a long and illustrious history.

In the early days of World War II, military dogs were used primarily as sentries. Later in the war, they were used as scout and patrol dogs, messenger dogs, and mine detection dogs. The Army acquired more than 19,000 dogs during the war, but approximately 45 percent were rejected as unsuited for training.

The mine detection dogs (M-dogs) during World War II proved unreliable and thus were not heavily used. Later analysis revealed faulty training methods. During the Vietnam era, the M-dogs proved their worth.

More than 9,000 dog handlers served during the Vietnam War. Their dogs included sentry and patrol dogs, scout dogs, tunnel dogs, mine dogs, and tracker dogs.

Mine dogs and tunnel dogs worked

USAF photo by TSgt. Matt Hannen

Air Force SSgt. Adolph Rodriguez (l) and Army Sgt. Brodrick Kimble (r) work as a team to teach a military working dog to attack and release on command.

off-leash up to 120 feet away from their handlers. The mine dogs worked primarily along roads and railroad tracks searching for mines, booby traps, and trip wires. Tunnel dogs were trained to find trip wires and tunnels, and signaled a find by sitting about two feet from the tunnel entrance or trip wire.

The Army opened its first tracker dog program during the Vietnam War and turned to the British for help. The British Jungle Warfare School in Malaysia had been in operation since World War II and had seen counterinsurgency success in Kenya, Cypress, and Borneo.

To provide the nucleus of a tracker dog program, the US Army sent two platoons through the JWS. The British used Labrador retrievers for the tracker function.

During the Vietnam War in the 1960s and 1970s, scout, tracker, and mine/tunnel dogs piled up impressive statistics. Based on summaries of monthly after-action reports, scout and mine/tunnel dog teams conducted some 84,000 missions. These dogs were responsible for thousands of enemies killed and captured. They located supply caches, mortars, and exposed at least 2,000 tunnels and bunkers.

Today, the "customer" for the search dog teams is the Army field unit. Col. Randal G. Martin, commander of the Alabama Army National Guard 1169th Engineer Group, returned last September from a one-year tour in Iraq. Martin commanded five SSD teams that executed a number of finds and encountered very few false positives.

Two types of dogs are used for explosive detection. One is the mine detection dog that works on-leash and performs detailed coverage and clearance of minefields. The other is the Specialized Search Dog that works off-leash and searches for arms and explosives on roads and routes and in open areas, buildings, and vehicles.

Many Values

In 2002, Gen. John M. Keane, then Army vice chief of staff, directed the US Army Engineer Regiment to establish a dog detachment at Ft. Leonard Wood, Mo.

Jim Pettit, a civilian employee of the US Army Engineers at Ft. Leonard Wood, knew of the British Army's Arms and Explosive Search Dog Program and sent six Army engineers to England, where they went through the Defense Animal Center AES training course.

After completing the course, in 2004 these engineers deployed with their search dogs to Iraq. Their success in that theater generated a great demand for more SSD teams.

During 2005, Pettit trained 21 SSD teams at Ft. Leonard Wood. Their continuing success resulted in the SSD program moving to Lackland Air Force Base, under the umbrella of Air Education and Training Command's 341st Training Squadron. Tim Ori, director of operations for the 341st, got the course up and running at Lackland and added input from his observations of the Israeli Defense Force K-9 Unit.

Martin enumerated the value of the SSD teams.

First, they help take IEDs off the streets. He noted that after successful cordon and search operations with plenty of finds, there would follow a period with a reduction in numbers and quality of IEDs on the street.

Second, they reduce exposure. Martin noted that an SSD team can clear a three story building in as little as four minutes, thus allowing troops to finish searching a neighborhood quickly.

Third, the dogs boost morale. Martin arranged for periodic SSD missions to put the dogs in contact with his soldiers. He felt the opportunity to spend a little bit of time with a friendly Labrador retriever was a very effective stress reliever for GIs. Interviews with dog handlers echoed the refrain of the value of the dogs as a morale booster. Every handler mentioned the frequency of GIs thanking him or her for being there with the dog, because the teams

USAF photo by TSgt. Matt Hannen

During a training session at Lackland AFB, Tex., a working dog reacts to his trainer's voice commands and nonverbal gestures.

USAF photo by TSgt. Matt Hannen

Air Force SSgt. Shawn Alexander, after a day of training exercises, returns a dog to the kennel at Lackland.

save lives and provide a comforting canine companion.

The training of explosive detection dogs is international in scope. Currently the United Kingdom leads the world in training explosive detection dogs, with the British Army producing some of the highest quality dogs available.

One veteran of the British Arms and Explosive Search Dog Program is Paul C. Bunker, who had extensive experience as a handler and canine training instructor. He has brought his international expertise to Lackland as an SSD instructor.

Trained to Train

"The British Army has such a good AES Dog Program because it has been involved in counterinsurgency operations since World War II," said Bunker. "They were in Aden, Yemen, Cypress, Bosnia, and Northern Ireland." These operations gave great impetus and motivation to developing an effective detection dog program.

Bunker touted great searching speed as a major benefit of an AES dog, which can search 10 times faster and search 10 times more area with a much greater degree of thoroughness than a human.

He also highlighted the value of AES dogs in finding secondary devices. As Bunker reported, the Irish Republican Army in Northern Ireland was crafty about setting up secondary devices in locations where responders to the first device were likely to gather.

Many lives were saved by dogs finding the secondary devices before they could be triggered.

the initial 79-day block of instruction at Lackland. There, the duo learns to search for explosives in various environments.

The dog learns to report explosive odor by sitting. The handler learns how to train the dog. More importantly, a handler learns to read his dog's behavior. For success in the field, each handler must correctly interpret situations where the dog's alert might be fuzzy, a little short of a nice crisp "sit" alert.

To strengthen effectiveness, the dog and handler also learn to operate as an off-leash team.

After the basic 79-day course comes 14 days at Yuma Proving Ground in Arizona, where the teams get a full-blown dress rehearsal for Iraq. Here they take helicopter rides, witness extensive gunfire, climb ladders, and search mock Iraqi villages, complete with other dogs and livestock.


USAF photo by SSgt. Stacy L. Pearsall

TSgt. Harvey Holt (center) and his military working dog assist soldiers from the Army's 1st Cavalry Division on a patrol in Kahn Bani Sahd, Iraq.

The SSD course is headed by Orlando Nunez, a civilian Air Force employee with a 10-year history as an Army dog handler. Nunez manages 28 instructors, including four British Army retirees, two US marines, and 22 US Army instructors. Those instructors currently train approximately 100 SSD teams per year, with the bulk of the classes conducted at Lackland.

The success of the SSD teams depends on the cooperation and skills of both humans and animals, so a green handler and a green dog are paired for

The Air Force plays a key role in the production of SSD teams. The skills are sophisticated and perishable—development of the SSD training capability took five years to ramp up to production of 100 teams per year. Trends in global conflict and counterinsurgency operations indicate a long-term need for Specialized Search Dog capability. Until the IED threat vanishes, the Air Force-trained search dogs will be on the hunt for explosives and saving American lives. ■

Robert R. Milner Jr. retired from the Air Force Reserve in 1995. He is a graduate of Air Command and Staff College and the Air War College and the author of several books and articles on working dogs. He has deployed numerous times with Tennessee's Disaster Search Dog program as a Canine Handler, Search Team Manager, and Task Force Leader.

Their professional discipline turned ad-hoc test flights into superb testing techniques.

The McCook Pilots

By Walter J. Boyne

America's entry into the space age introduced a new hero, the astronaut. Yet 44 years before Alan B. Shepard Jr.'s epic May 5, 1961 flight in Freedom 7, another group of pilots captured America's imagination. They were the test pilots of McCook Field, Ohio, who made aviation history with their record-breaking flights.

The McCook test pilots advanced aviation by setting speed, altitude, and endurance records and by participating in the first trans-continental and -world flights. They pioneered a long series of aerodynamic innovations, ranging from controllable-pitch propellers and pressurized cabins through instrument flight, superchargers, self-sealing fuel tanks, high octane fuel, and in-flight refueling.

McCook Field established a tradition for integrity and excellence in engineering that endures to this day. Many of these advances contributed directly to victory in World War II, and all were laden with hazard. Seventeen members of the McCook Field Engineering Division died in crashes.

McCook pilots turned ad-hoc test flights into a professional discipline that was developed into today's superb aircraft test techniques.

America's entry into the World War on April 6, 1917 brought the fledgling Army Signal Corps an unprecedented flood of funds. Congress appropriated $694 million (nearly $11 billion in current dollars) to buy an air force. While most of the money was lavished on procurement and training, aeronautical research and development was also emphasized.

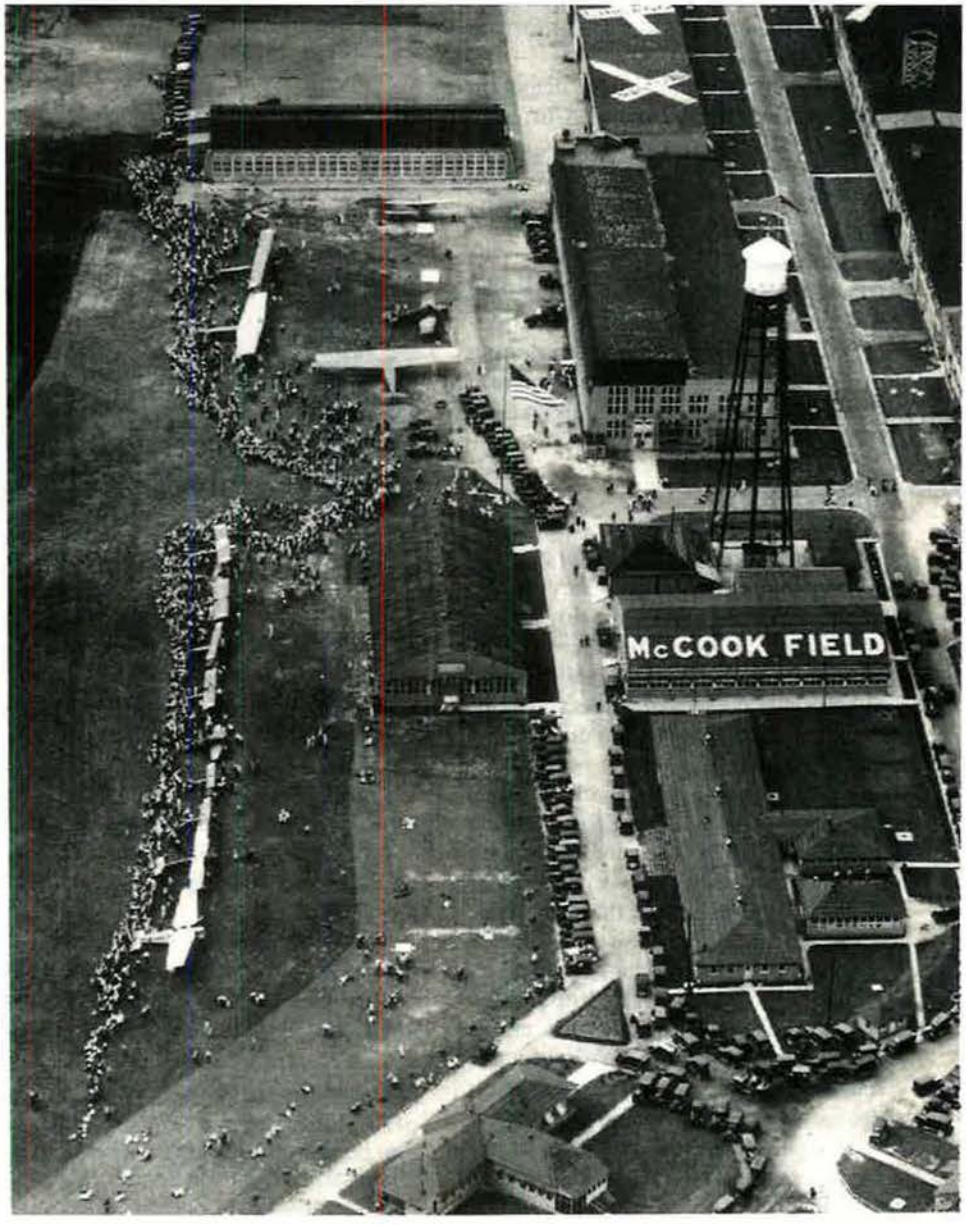
On Oct. 1, 1917, the Army acquired a field a mile-and-one-half from downtown Dayton, naming it McCook Field after a prominent Dayton family. McCook soon employed more than 2,300 personnel working on a wide variety of projects in 70 buildings.

The flight facilities at McCook were simple, bounded by the Miami River on one side and by private housing on the other. The flying area consisted of a series of wooden hangars strung along an easily flooded sod field harboring a 1,000-foot-long macadam and cinder runway.

A prominent hangar-front sign read "This Field Is Small—Use it All," still good advice. Despite its small size, there was so much flying activity at McCook that its pilots often operated out of nearby Wilbur Wright Field, where pilots and mechanics were trained.

For the next decade, McCook Field was the Army's center for developing and testing aircraft, engines, and equipment.

Much of the success was made possible by a single generation of brilliant pilots

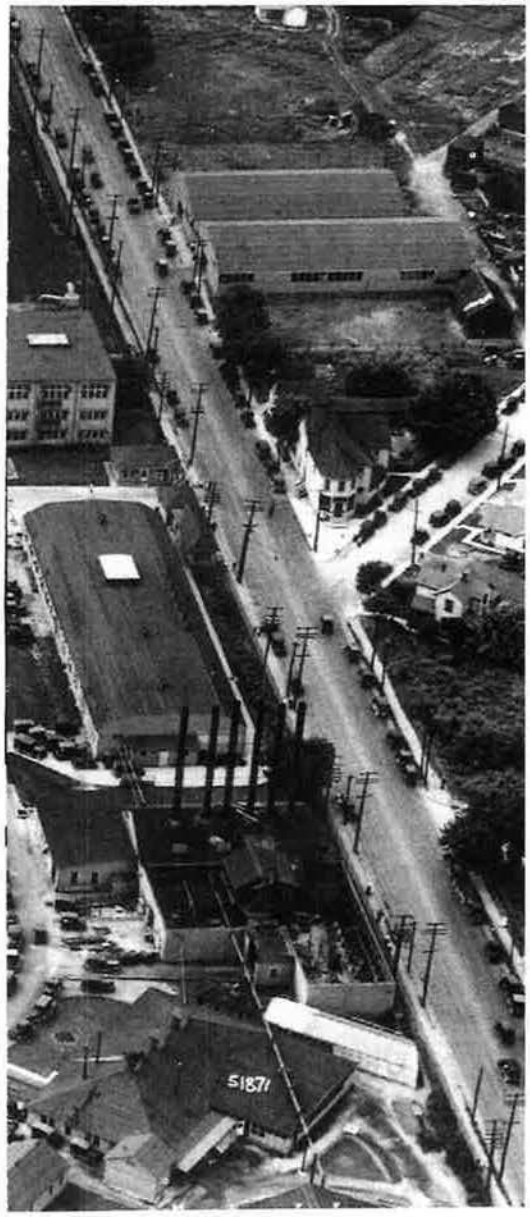


who gradually turned amateur test flying into a disciplined profession. They were challenged by unprecedented new missions, unproven aircraft, and radical new equipment.

Engineering and manufacturing techniques were unsophisticated and the new designs were often gravely flawed. The pilots also had to work their way through a spectrum of new aerodynamic phenomena, including control surface flutter and the effect of G forces. They did it in open cockpit aircraft with primitive instrumentation, no brakes, no heating, and, for too many years, no parachutes.

The Air Service recognized the public relations value of the test pilots and their record setting, and used it to the maximum extent to gain visibility when the 1918 armistice brought back a long era of penurious peacetime budgets.

Operations at McCook were blessed with good leadership early on. Edward A. Deeds, a dynamo behind the success of National Cash Register Co., the Dayton-Wright Airplane Co., and the Liberty engine, was commissioned a colonel in the Signal Corps Reserve and appointed head of the Equipment Division. Deeds was instrumental in establishing both Wilbur Wright Field and McCook Field.



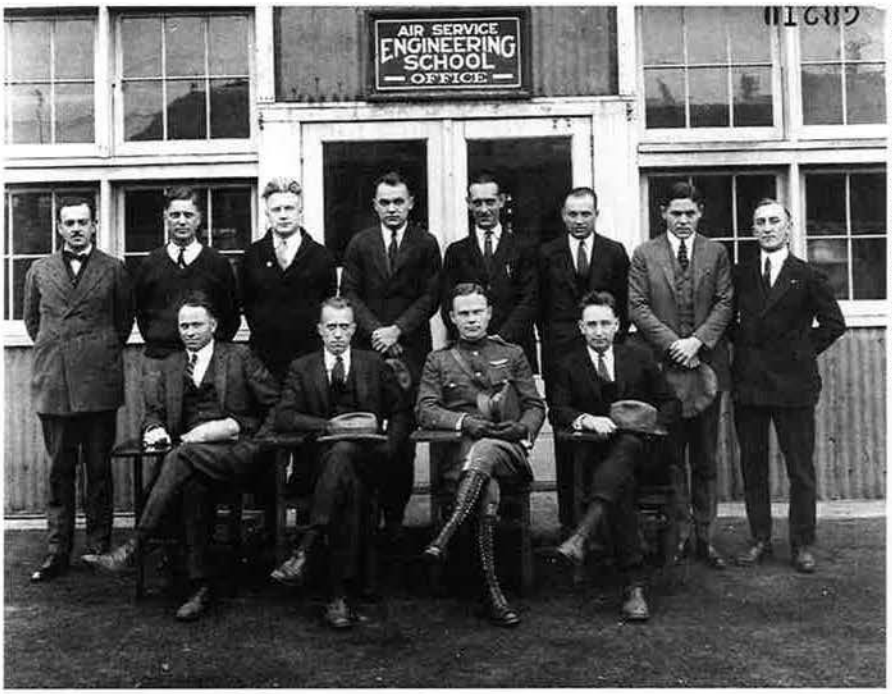


Photo courtesy of Aeronautical Systems Center History Office

Left: An aerial view of McCook Field taken on July 4, 1923. Above: 1st Lt. Edwin Aldrin (father of astronaut Edwin Aldrin Jr.), seated, second from right, was the assistant school commandant at McCook Field from 1919 to 1922.

Powerful Personalities

Lt. Col. Virginius E. Clark became McCook's first commanding officer, while Maj. Jesse G. Vincent served as his executive officer. Clark would later head the aircraft design division and contribute not only a series of excellent aircraft designs but also the famous "Clark Y" airfoil used in countless aircraft. Vincent oversaw aircraft engine development and, with Elbert J. Hall and others, brought the legendary Liberty engine into being.

It was Col. Thurman H. Bane, not an engineer, who guided the Air Service's Engineering Division and founded what ultimately became the Air Force Institute of Technology.

Bane laid the groundwork for the research and development efforts essential to victory in World War II and to the subsequent emphasis on research and development in the Air Force. Bane knew how to establish and manage organizations in which engineers and test pilots could prosper, and was assisted by 1st Lt. Edwin E. Aldrin, expert test pilot and father of Edwin "Buzz" Aldrin Jr., the second man to walk on the moon. Bane even tested the daunting de Bothezat helicopter when he deemed it too demanding for other pilots.

From the very start, powerful personalities dominated test flying at McCook Field, especially in the role of chief test pilot. Rudolph W. "Shorty" Schroeder, 6 feet 4 inches tall, began as a mechanic in a Curtiss exhibition team and learned how to fly on the job. He enlisted in the Aviation Section of the Army Signal Corps in 1916 and by 1919 was a major at McCook Field at age 33—old for a test pilot. He was a driving force behind the development of parachutes and was the first to wear one at McCook.

As chief of the Engineering Division's Flight Test Section, the rough-hewn Schroeder handed out the assignments, often reserving the most dangerous—and most noteworthy—for himself.

He gained his greatest fame in one of the Army Air Service's indigenous designs, the Packard-LePere LUSAC-11, a biplane powered by a supercharged Liberty engine. (The only surviving example of the LUSAC-11 is on exhibit at the National Museum of the US Air Force in Dayton.)

Schroeder gained experience by setting three successive high-altitude records, then on Feb. 27, 1920, he flogged his LUSAC-11 to a record height of 33,114 feet. His primitive oxygen equipment malfunctioned, and sensing that he was suffering from hypoxia, Schroeder pulled

Lt. John Macready is shown here with the LePere LUSAC-11 airplane in which he set a world altitude record.

the power back, letting his aircraft dive earthward as he lost consciousness.

In his open cockpit, the temperature had dropped to a minus 63 degrees Fahrenheit, freezing the moisture coating his eyeballs. He recovered consciousness and managed to land successfully back at the field.

Ice packs—the incorrect frostbite remedy of the era—were applied to his eyes, and he was hospitalized for several days, never completely recovering his vision.

A successor to Schroeder, Capt. John A. Macready was completely different in personality but maintained the same laser focus on achievements. A Stanford graduate in economics, he was early on stationed in San Antonio, where, as officer in charge of flying, he wrote the basic text for student pilots, *The All Thru System of Flying Instruction as Taught at Brooks Field.*

At McCook, he undertook a long series of dangerous altitude flights in the LUSAC-11 and later in the Engineering Division XCO-5.

On one mission, his supercharger blew up, while on another his propeller flew off its hub. There were several other misadventures, but he set records nevertheless.

Macready is the only pilot ever to have won the MacKay Trophy three times. The first was for his open cockpit world altitude record of 40,800 feet—7.7 miles—in 1921. The second was for his 35 hour, 18 minute world endurance record set on Oct. 6, 1922 with Lt. Oakley G. Kelly, while his third was for the first nonstop transcontinental flight. Taking off on May 2, 1923, he and Kelly flew the Fokker T-2 across the United States in 26 hours, 50 minutes.

On to Harris

Many other exploits distinguished Macready's relatively short Air Service career. In 1921, Macready used a Curtiss JN6-H Jenny to dust a grove of moth-infested catalpa trees near McCook Field. The experiment was so successful that it inspired the Delta Flying Service (later Delta Air Lines) to begin a crop-dusting service. In 1923, with Capt. Albert W. Stevens, he flew a photographic expedition across the United States. In 1924, he made the Air Services' first night parachute jump.

On May 2, 1924, again with Stevens, he set an unofficial two-person altitude record of 31,450 feet.

Stevens, a photography expert, set two records on this flight for the highest altitude at which a photo had been taken and for the largest area ever included in one photo.

The Air Service became unattractive to some high-spirited leaders because promotions were virtually frozen and low salaries were threatening to go lower. Macready left for civilian life in 1926. He was recalled to service in 1941 as a colonel, serving as inspector general of Twelfth Air Force. He died in 1979.

Another chief of the Flight Test Section at McCook was Lt. Harold R. Harris, whose ebullient personality both filled and lit up a room when he walked in. He possessed an endless repertoire of stories about his adventures in the Air Service and in his accomplished civil life, where he was a pioneer of both agricultural crop spraying and airlines.

Harris learned to fly in Foggia, Italy, soloing in a Maurice Farman biplane after just three hours of instruction. He went on to fly the huge trimotor Caproni bombers and became an instructor in the aircraft. Harris delivered a Caproni Ca.5 to the Army Air Service on July 25, 1918 by flying it across the Alps from Turin, Italy, to Lyon, France.

His experience made him the expert on large aircraft when he was assigned to be chief of the flight test branch at McCook

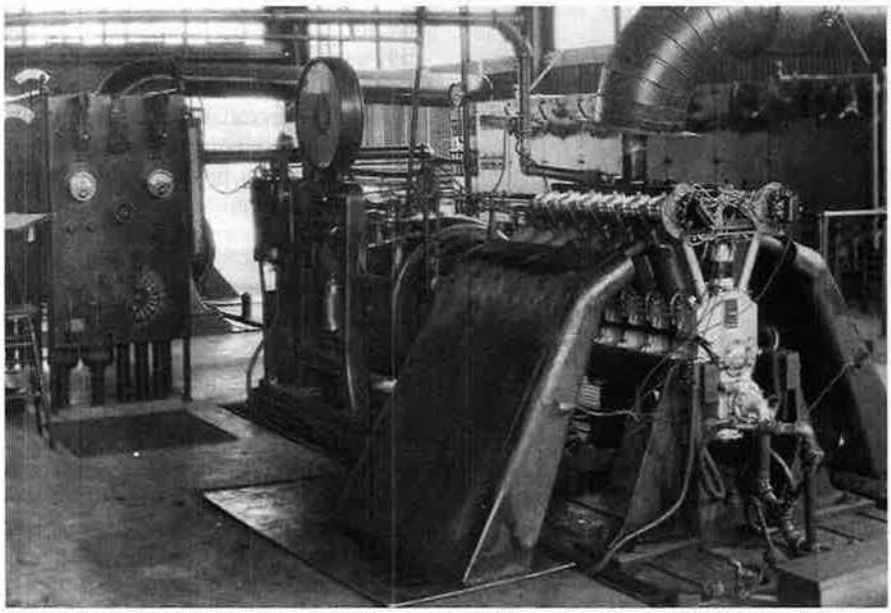


Photo courtesy ASCHO

A Liberty engine undergoes testing on a dynamometer. Liberty engines powered the LUSAC-11 on record-setting flights.

Photo courtesy ASCHO

Maj. Rudolph Schroeder flew a Packard-LePere LUSAC-11 biplane from McCook Field for a record-breaking altitude flight in 1919.

Field in October 1920. He worked with Brig. Gen. Billy Mitchell in the battleship-sinking tests before being tasked to test the huge triplane Barling NBL-1 bomber.

Harris managed to set several load-carrying records in the six-engine Barling, despite its low speed (96 mph) and short range (170 miles).

Harris' genius at storytelling could even make flying the Boeing GA-X—another triplane—sound like fun.

The GA-X was an unfortunate Engineering Division design, intended as a heavily armored attack aircraft to strafe trenches. Harris likened flying it to being inside a kettle drum during Tchaikovsky's "1812 Overture."

He had a similar fund of stories of his flights in the first pressurized cockpit aircraft, a converted USD9-A biplane. The Engineering Division had underestimated the size of the exhaust valve in the cockpit, while overestimating the size of the pressure inlet valve. The result was that as soon as he was airborne, Harris found himself pressurized at 3,000 feet below sea level with no way to relieve the pressure.

Visibility from the cockpit was poor, and the inside temperature was rising as Harris brought the aircraft around to land and slowly decompress. In telling the story, he bemoaned the fact that, as usual, he had flown in tennis shoes and thus had nothing to use to try to break the capsule's window.

As short as that flight was, it started the process toward the Lockheed XC-35, the first pressurized cabin aircraft.

Harris also flew a memorable mock dogfight against Lt. Muir S. Fairchild, for whom Fairchild Air Force Base is named. In a turn, Harris encountered a violent control vibration—flutter—that uncontrollably banged the control stick back and forth between his knees.

A Legacy of Invention

Certain that the aircraft would disintegrate, Harris leaped from the cockpit. He tugged on what he thought was the rip cord three times, only to note that it was his leg strap. At some 500 feet above the ground, he pulled the right handle and the parachute deployed.

He was thus recognized as the first Air Service member to use a parachute in an emergency escape and became the first member of the Caterpillar Club, an organization established originally by Irvin Air Chute Co. (Membership was gained by bailing out of an airplane during an emergency; William O'Connor used the company's parachute in an emergency bailout in 1920, but his feat was not officially recognized.)

Harris too left the Air Service and became vice president of Huff-Daland Dusters. There followed an airline career that saw him serve with numerous airlines before finally becoming president of Northwest Airlines.

During World War II, he returned to the USAAF, serving with Air Transport Command and retiring as a brigadier general.

Of all the noteworthy McCook Field test pilots, none became more famous than Jimmy Doolittle. He was noted for his pioneering instrument work and other daring test flights, but these were later overshadowed by Doolittle's intellectual contributions to science and to combat.

Among the many other famous names from McCook are "Dawn to Dusk" flier Lt. Russell L. Maughan, Lt. Eugene H. Barksdale, and Lt. Leigh Wade.

A skilled pilot, Maughan had scored four victories in World War I, won the 1922 Pulitzer race in a Curtiss R-6, and set an international speed record of 236 mph. Then, on June 23, 1924, he crossed the United States during daylight hours in a Curtiss PW-8.

Barksdale, for whom the Air Force base is named, scored three aerial victories during World War I and made a 575-mile navigation flight using only his flight instruments in 1924.

Barksdale died at McCook in 1926 when he had to bail out of a Douglas O-2 observation airplane and his parachute became tangled in the wires of the wing.

Wade was an overseas test pilot during World War I, where he flew both Allied and captured enemy aircraft. In 1924, he was one of the pilots who made the first around-the-world flight, from April 6 to Sept. 28. He left the Air Service in 1926 to become chief test pilot for Consolidated Aircraft. In 1941, he returned to active duty and commanded Batista Field in Cuba before retiring in 1955 as a major general.

The real story of the McCook Field test pilots lies not so much in their famous flights or dangerous escapes but in the aircraft and equipment they did so much to develop, working in close concert with the engineers.

As a single example, engineers such as Sanford A. Moss, Maj. George E. Hallet, and Adolph Berger created the supercharger that Macready used on the LUSAC-11. The joint result was the General Electric supercharger that enabled Boeing B-17s and Consolidated B-24s to reach altitudes and speeds that made them more difficult targets for the Luftwaffe.

McCook Field closed in 1927, but its flight test pilots passed the torch to new generations of test pilots. Perhaps most important, the rigorous tone of the Engineering Division's flight test division set the standard for the many other disciplines at Wright Field, Wright-Patterson Air Force Base, and ultimately the Air Force Flight Test Center at Edwards Air Force Base, Calif. ■

Walter J. Boyne, former director of the National Air and Space Museum in Washington, D.C., is a retired Air Force colonel and author and a member of the National Aviation Hall of Fame. He has written more than 600 articles about aviation topics and 50 books, the most recent of which is Soaring to Glory. *His most recent article for* Air Force *Magazine, "The Years of Wheelus," appeared in the January issue.*

Verbatim

By John T. Correll, Contributing Editor

The Airpower Advantage

"It's true that there aren't many boots on the ground in Afghanistan. The buzzword among military types there is 'under-resourced.' At the same time, given the circumstances, the use of airpower has been highly effective. It allows NATO a presence in every nook and cranny of the country, denies sanctuary to insurgents, and ensures a sustained offensive. Moreover, there's no empirical evidence that airpower is more deadly than equivalent ground engagements and no reason to think the civilian protections would be better if there were 400,000 troops on the ground, which is what Army counterinsurgency doctrine calls for."***—William M. Arkin,*** **Washington Post** ***blog, Dec. 11.***

McPeak Goes to the Movies

"Most war films are a waste of time. Rare great ones often treat war as a metaphor ('Catch 22,' 'Dr. Strangelove'). Vietnam was a rich source ('Deer Hunter,' 'Platoon,' 'Full Metal Jacket,' especially 'Apocalypse Now'). It's too soon to tell what the Gulf will produce, but 'Jarhead' is pretty good. It takes time for scar tissue to form. Ground fighting is portrayed with good fidelity ('Saving Private Ryan,' 'Black Hawk Down,' 'The Thin Red Line'), but it's hard to recreate the isolated cockpit world of air combat. 'Twelve O'Clock High' and 'The Bridges at Toko-Ri' are character studies set in war. 'The Hunters' is an exception, a realistic picture of air fighting. 'Top Gun' is interesting, but the technical flying stuff is a joke. ... The only film I own is 'Shane.'"***—Ret. Gen. Merrill A. McPeak, former Air Force Chief of Staff,*** **The Oregonian,** ***Nov. 23.***

Does the Internet Cause Idiocy?

"Thirty-six percent of respondents overall said it is 'very likely' or 'somewhat likely' that federal officials either participated in the attacks on the World Trade Center and the Pentagon or took no action to stop them 'because they wanted the United States to go to war in the Middle East.' ... The survey also found that people who regularly use the Internet but who do not regularly use so-called 'mainstream' media are significantly more likely to believe in 9/11 conspiracies."***—Scripps Howard News Service, reporting on Scripps Howard/Ohio University public opinion poll, Nov. 23.***

More for Diplomacy

"Funding for nonmilitary foreign affairs programs has increased since 2001, but it remains disproportionately small relative to what we spend on the military and to the importance of such capabilities. ... What is clear to me is that there is a need for a dramatic increase in spending on the civilian instruments of national security—diplomacy, strategic communications, foreign assistance, civic action, and economic reconstruction and development."***—Secretary of Defense Robert M. Gates, Kansas State University, Nov. 26.***

Again, Roles and Missions

"The roles and missions of our military services are largely unchanged since the Truman Administration and the Key West Agreement of 1948. After almost six decades, it's time to once again analyze the Defense Department's roles and missions, identify the services' core competencies, discover the missions going unaddressed, and examine possible duplication of effort among the branches."***—Rep. Ike Skelton (D-Mo.), chairman of the House Armed Services Committee, on requirement in FY 2008 defense authorization bill for major roles and missions review, Dec. 6.***

Strategic Squad Leaders

"We are asking soldiers, sailors, airmen, and marines to fight in cities among multiple cultures with different motives, affiliations, incentives [that] we never expected soldiers or marines to have to deal with on a daily basis. It has created the strategic company commander, the strategic platoon sergeant, the strategic squad leader."***—Ret. Gen. Larry Welch, former Air Force Chief of Staff, Government Executive, Nov. 28.***

Some Call It Jointness

"Goldwater-Nichols has created unintended consequences. It has resulted in a focus on military integration, but failing to develop a corresponding focus on incorporating all the elements of national power has delayed us from achieving true integration of all the pillars of national security. It has also led to an unsophisticated interpretation of jointness that drives some to seek homogeneity among the services, while others use 'jointness' as an excuse to seek participation in every possible mission. This has led some services to seek self-sufficiency rather than synergy—and to the degree they have been allowed to do so has actually resulted in divergence from the tenets of Goldwater-Nichols by some as they replicate other services' core competencies."***—Lt. Gen. David A. Deptula, Air Force deputy chief of staff for intelligence, surveillance, and reconnaissance,*** **Strategic Studies Quarterly,** ***Winter 2007.***

Afghanistan Is Secondary

"Our main focus, militarily, in the region and in the world right now is rightly and firmly in Iraq. It is simply a matter of resources, of capacity. In Afghanistan, we do what we can. In Iraq, we do what we must."***—Adm. Michael G. Mullen, Chairman of the Joint Chiefs of Staff, to the House Armed Services Committee,*** **Los Angeles Times,** ***Dec. 12.***

Space Enables Lethality

"Almost all of our lethality on the battlefield comes from space."***—Brig. Gen. Jay G. Santee, vice commander, 14th Air Force, on role and contribution of space in the air-space-cyberspace kill chain, Armed Forces Communications and Electronics Association, Dec. 5.***

Senators for F-22

"We understand that the Department of Defense is considering ceasing production of the F-22A Raptor following completion of the current multiyear procurement contract. We believe such a decision would be ill-advised and premature, given the recapitalization shortfalls facing our US Air Force and the rapidly emerging airborne and surface-to-air threats facing our nation's military."***—Letter from bipartisan group of 28 Senators to Secretary of Defense Robert M. Gates, Dec. 12.***

What senior leaders say about Air Force Magazine. . .

"If you read only one publication about the United States Air Force, make it Air Force *Magazine. Its editorial staff has forged strong working relationships with top officers and civilian officials, which is evident each month in its informed reporting, analysis, and commentary. They get it right month in and month out. For any airpower professional with a true need to know about USAF,* Air Force *Magazine is a must-read."*

Gen. Michael Moseley,
Chief of Staff

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For information on the Air Force Association, see **www.afa.org**

Action in Congress

By Tom Philpott, Contributing Editor

What's in the defense bill?; Moving ahead on Wounded Warriors; Tricare fee proposals ....

A Defense Bill—Finally

The much-delayed 2008 defense authorization bill that was finally enacted in January contains initiatives to raise military pay, enhance support for wounded warriors, and strengthen entitlements for disabled military retirees and surviving spouses, among other things.

Within the $696 billion defense policy bill, the generalized pay and benefit gains for service members, retirees, and surviving spouses include:

Pay raises. Service members received a 3.5 percent pay raise effective Jan. 1. The boost was delayed for a brief period while the White House and Congress wrangled over deletion of a single item in the bill. However, Bush directed the Defense Department to apply the full increase retroactively. However, Congress declined a chance to support a House-backed plan to continue to set military raises in 2009 and beyond a half percent point above private sector wage growth.

Adjustments in leave. Starting next Oct. 1, a service member will be able to carry up to 75 days of leave into a new fiscal year. The current limit is 60 days. This authority will expire Dec. 31, 2010 unless extended. Also, enlisted members who accumulate more than 120 days of unused leave will be able to sell back, on a one-time basis, up to 30 days of leave in excess of 120 days. Also, five days of rest and recuperation leave will be added to the 15 now allowed when an arduous overseas tour lasts longer than 12 months.

Expansion of CRSC. More than 13,000 "Chapter 61" disabled retirees with combat-related disabilities will be eligible to receive Combat-Related Special Compensation in addition to disability retirement. Chapter 61 retirees were forced to retired before 20 years because of combat wounds, training injuries, or other combat-related conditions. CRSC for them will be set like retired pay, at 2.5 percent of basic pay for each year served. It will be paid on top of disability compensation, thus ending for combat-injured veterans the ban on "concurrent receipt." CRSC payments would be paid retroactive to Jan. 1, 2008.

USAF photo by MSgt. Marvin R. Preston

The bill has something for active, Guard, and Reserve airmen.

IU retro pay. Thousands of retirees with 20 or more years of service and rated "IU," or unemployable, by Veterans Affairs will become eligible for full Concurrent Retirement and Disability Payment back to Jan. 1, 2005. The lump-sum retroactive payments won't be made, however, until Oct. 1, 2008. IU retirees draw disability at the 100 percent level only because they are unemployable. Their actual disabilities are rated 60 to 90 percent disabling. IU retirees were excluded from full concurrent receipt payments when they began three years ago. Congress agreed to pay full CRDP to IU retirees back to January 2005.

Survivors' indemnity. Survivors of disabled retirees see their Survivor Benefit Plan annuities reduced each month by the amount they draw in tax-free Dependency and Indemnity Compensation (DIC) from the VA. DIC is payable if the member died while on active duty or if retirees died from service-related conditions. Congress has voted to begin to eliminate this offset starting Oct. 1, 2008, by paying a $50-a-month "indemnity allowance" to survivors affected by the SBP-DIC offset. It increases every year by $10 until it reaches $100 a month in 2013. Due to high cost, Congress declined to restore full SPB to DIC widows.

Early reserve retirement. For Reservists and Guardsmen, the bill lowers the age 60 start date for retirement by three months for each 90 days served in support of an operational contingency. The change applies only to deployments after the date of the bill's enactment. Congress said it had no money to make the provision apply retroactively to the thousands who have deployed to Iraq and Afghanistan since 2001. Rep. Joe Wilson (R-S.C.) introduced the National Guardsmen and Reservists Parity for Patriots Act (HR 4930) a bill to require that early retirement benefit be applied to contingency operations since 9/11.

Reserve education benefits. Reserve personnel no longer have to remain in drill status to use benefits earned through the Reserve Educational Assistance Program, available for deployments of 90 days or longer. REAP was established by Congress three years ago to boost educational assistance to reserve component members called to active duty in response to war or national emergencies. To use these benefits, however, reservists needed to remain in drill status. Now they will have 10 years to use benefits after separating. Those who already have left reserve status will be able to rejoin and reclaim previously earned educational benefits and use them for 10 years following their next separation.

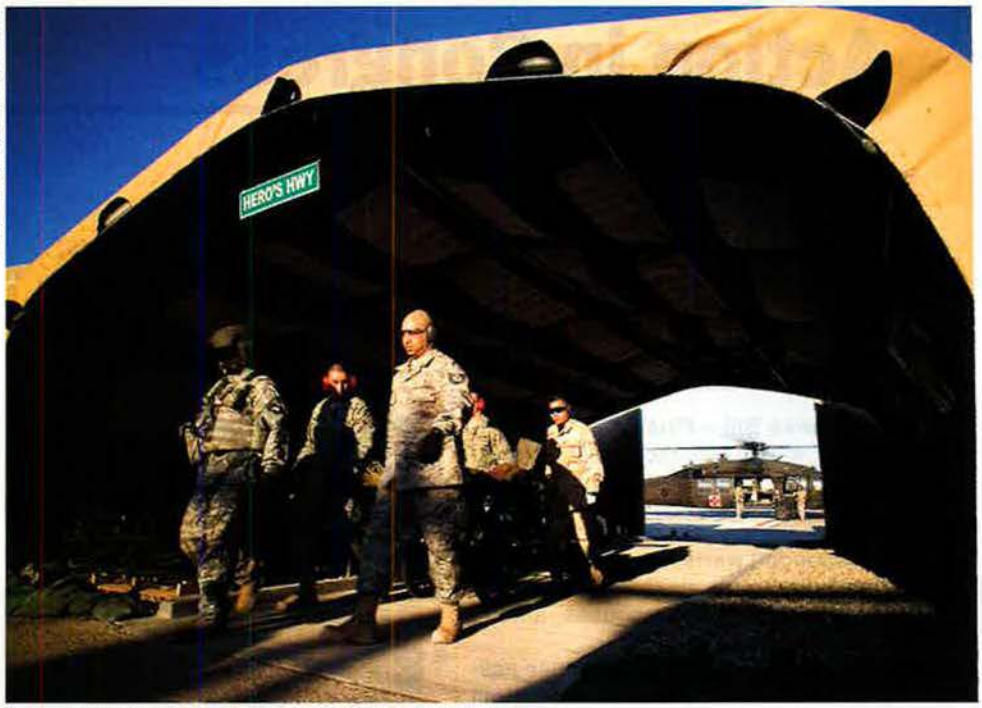
"Wounded Warrior" Matters

Within the authorization bill, a special "Wounded Warrior" section contained a number of specific orders that aim to improve care for military members suffering from injury.

- New contact center. Establishment of a Wounded Warrior Resource Center where service members, their families and primary caregivers would have a single point of contact to report deficiencies in facilities, to get assistance on health services, or to obtain benefits information.
- Other centers. Establishment of separate centers for excellence for diagnosis, treatment, and prevention of traumatic brain injury; mental health conditions; and eye injuries.
- Comprehensive policy. Development of a comprehensive policy by July 1, 2008, on care, management and transition of recovering service members. Rather than set standards on maximum case loads for recovery coordinators and patient managers, Congress orders DOD and the services to set their own uniform standards but to report to Congress every 90 days on whether they are being met.
- Evaluations. Combat veterans to receive mental health evaluations within 30 days of requesting one.
- Dental care. Veterans with service-connected dental conditions to have 180 days, rather than 90 days, after being released from active duty to apply for VA dental benefits.
- Increased leave. Those providing care for seriously injured service members must be allowed up to 26 weeks of leave, rather than 12, under the Family Medical Leave Act.

Task Force Seeks New Fees

After a year's study, the Task Force on the Future of Military Health Care in December delivered to Congress a final report calling for increases in Tricare fees, co-pays, and deductibles for retirees and their families.



USAF photo by MSgt. John R. Nimmo Sr.

Wounded warriors get special legislative attention.

The aim is to slow Tricare cost growth. It would also be "fairer" to taxpayers, the task force said, given that fees have been frozen since first set in 1996 but indexing and inflation have driven up benefits.

Co-chaired by Gen. John D. W. Corley, commander of Air Combat Command, and economist Gail R. Wilensky, the task force recommended other sweeping changes to the business of military health care.

Congress is expected to hold hearings on the task force recommendations this spring. Seven of 14 task force members were civilian compensation experts. The other members were active or retired general officers. They included retired Air Force Gen. Richard B. Myers—the former Chairman of the Joint Chiefs—and Lt. Gen. James G. Roudebush, Air Force surgeon general.

How Tricare Costs Would Rise

While the report made broad recommendations, the political lightning rod is its call for raising retiree cost shares. Here's a summary of the fee recommendations:

- Tricare Prime. The annual enrollment fee of $460 for families and $230 for individuals should be raised incrementally over four years. New fee levels would vary based on level of retired pay. A retiree drawing less than $20,000 would pay $570 the first year and $900 by 2011 for family coverage. Retirees with retired pay of $20,000 to $40,000 would pay $640 in 2008 and $1,190 by 2011. Those with annuities of more than $40,000 would pay $730 the first year and $1,750 by 2011. After fees are reset, they would be indexed for inflation.
- Tricare Standard. Deductibles for Standard would double to an average of $600 a year for families and $300 for individuals, up from $300 and $150, respectively. Standard deductible amounts, as with Prime enrollment fees, would be tiered, based on the level of retired pay. Under-65 retirees and their families using Standard also would begin paying $120 a year to enroll. This fee would be increased annually to keep pace with the cost of civilian-provided care to beneficiaries.
- Tricare for Life. Service elderly would pay a $120 annual enrollment fee for TFL coverage. Wilensky said this isn't a cost-savings move but is intended "to foster personal accountability and to be consistent with the task force philosophy that military retiree health care should be very generous but not free."
- Tricare Open Season. The task force would ban under-65 retirees and their families from shifting between Tricare Prime and Tricare Standard options except during a new "open season" period to be held annually.
- Pharmacy co-pays. Under the Tricare retail network, co-pays for drugs would be raised to a range of $15 to $45, up from $3 to $22. Many mail-order drugs would be free, to encourage use of this more efficient point-of-service for pharmacy benefit users. ■

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SYMPOSIUM REGISTRATION FEES:
The Symposium registration fee is $895.

GOLF TOURNAMENT:
The Central Florida Chapter of AFA will sponsor a golf outing on Wednesday, February 20 at Walt Disney World's Magnolia Palm Courses.

GALA
The Central Florida Chapter of AFA will sponsor their 24th annual black-tie Gala on Friday, February 22 at Rosen Shingle Creek Hotel.

Please visit the Air Force Association website at www.afa.org for additional information, and to register.

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We hope you join us!

AFA National Report

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By Frances McKenney, Assistant Managing Editor

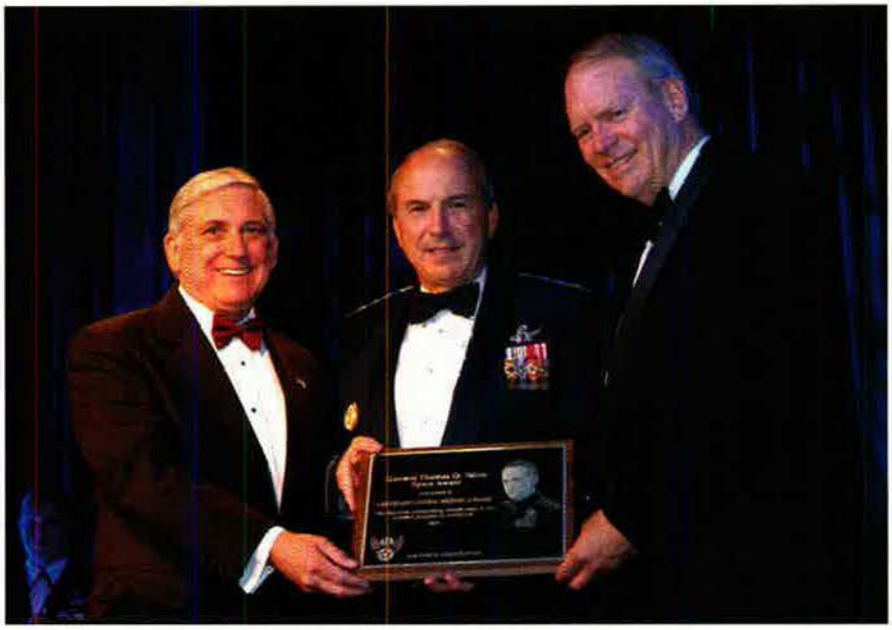
Los Angeles Ball

Lt. Gen. Michael A. Hamel, commander of Space and Missile Systems Center at Los Angeles AFB, Calif., received the prestigious Gen. Thomas D. White USAF Space Award at the Air Force Ball in Los Angeles in November.

The Air Force Association's **Gen. B.A. Schriever Los Angeles Chapter** sponsored this 36th annual gala, with the aid of the **General Doolittle Los Angeles Area Chapter** and the **Orange County/Gen. Curtis E. LeMay Chapter.**

The award recognized Hamel's leadership of an organization that completed 54 consecutive, successful launches, among its accomplishments in 2006.

The ball was a highlight of AFA's National Symposium on Space. It also paid tribute to the Air Force's 60th birthday, milestones in space achieved over the past year, and the late Gen. Bernard A. Schriever, who is often called "the father" of America's ballistic missile and space programs.



USAF photo by Ron Hall

At the Los Angeles Ball in November, Lt. Gen. Michael Hamel receives the Gen. Thomas D. White USAF Space Award from AFA Board Chairman Bob Largent (left) and Brian Arnold (right), chairman of the board for the Gen. B.A. Schriever Los Angeles Chapter.

More on the LA Ball

Another LA Ball honor recalled Schriever's role in Air Force history: The "Schoolhouse Gang" was named an AFA Gen. Bernard A. Schriever Fellow.

The Schoolhouse Gang was a nickname for the men and women who joined Schriever at Air Research and Development Command's Western Development Division in Inglewood, Calif., in 1954. They worked in an abandoned parochial school—thus their nickname. Under Schriever's command, they carried out the program for America's ballistic missile program.

Retired USAF Lt. Col. Bill Getz accepted the tribute on behalf of the group. S. Sanford Schlitt, AFA Vice Chairman of the Board for Aerospace Education; Martin Ledwitz, California state president; and Pam Levine, president of the Schriever Chapter, presented the award.

The Air Force Ball in Los Angeles raised $20,000 for AFA and the Schriever Chapter's education foundation. The general chairman for the ball, Roger A. Krone—Boeing president of network and space systems—told the audience that the foundation last year distributed $45,000 in scholarships and support to local Air Force personnel and units and sponsored 83 classrooms in the Visions of Exploration program. Visions is co-sponsored by AFA and *USA Today* newspaper and encourages elementary, middle, and high school students to study math, science, and technology.

Visiting Team Moody

AFA Chairman of the Board Robert E. Largent visited Moody AFB, Ga., in December, at the suggestion of the **South Georgia Chapter,** headed by Nick Lacey.

Over the course of two days, Largent received a comprehensive orientation to Moody's host unit, the 23rd Wing, and its missions of close air support, force protection, and combat search and rescue. At the 820th Security Forces Group, he listened to briefings and observed demonstrations of the unit's capabilities. He also presented the 2007 AFA national-level Civilian Program Manager of the Year award to the 820th's Robert D. LeFever, the group's chief of operations and training.

Largent met some of Moody's junior airmen when he addressed the Jason D. Cunningham Airman Leadership School, speaking to them about their tie to the legendary Flying Tigers. The 23rd Fighter Group of World War II initially owed its aircraft, several pilots, and the Flying Tigers nickname to Claire L. Chennault's American Volunteer Group. The 23rd FG became part of the 23rd Wing in August 2005, and the wing carries on the heritage of the Flying Tigers.

A live-fire combat search and rescue demonstration gave Largent a close look at Moody's combat capabilities, as an HC-130P dropped pararescuemen behind enemy lines, an A-10 provided close air support, and an HH-60G helicopter rescued an "injured" pilot.

Accompanying Largent on this orientation tour was Southeast Region President Don Michels, Georgia State President Gregory A. Bricker, and South Georgia Chapter member W. Parker Greene. Largent's hosts included Col. Kenneth Todorov, the wing commander, and Col. Eric Kivi, 347th Rescue Group commander.

Largent's visit to Team Moody received coverage, including several photos, on the base's and the Air Force's Web site, where he noted that the airmen impressed him with "their positive attitude, ingenuity, and articulate knowledge of their individual responsibilities."

AFA Explores a Group Approach

Air Force Association Chairman of the Board Robert E. Largent and Michael M. Dunn, AFA's president and chief executive officer, hosted a gathering of several Air Force-related associations in December to discuss establishing a federation. The federation of associations would share resources and information, explore synergies for efficient operation and cost savings, and band together to support the Air Force and Air Force family.

Attending the meeting at AFA headquarters in Arlington, Va., were representatives from the Air Force Historical Foundation, Air Force Navigator Observer Association, Air Force Sergeants Association, Airlift/Tanker Association, Air Rescue Association, Association of Air Force Missileers, and the Jolly Green Association. These groups and others plan to meet again to discuss common issues and strategies for working with Congress.

Joe Sutter, AFA's Vice Chairman of the Board for Field Operations (third from the left), and Alfred Coffman Jr. (far right) led the Gen. Bruce K. Holloway Chapter in arranging a visit to Washington, D.C., by 112 World War II veterans from Knoxville, Tenn. Standing with them at the Air Force Memorial are (l-r) Derick Seaton and Jack Westbrook. The Gen. Charles A. Gabriel Chapter in Virginia helped direct the tour and coordinated a luncheon for the visitors.

Pearl Harbor Remembrance

The **Long Island Chapter** sponsored the annual Pearl Harbor remembrance on Dec. 7 in New York, this year attracting the most attention yet. Event organizer Fred DiFabio called it "unbelievable" and noted that two national TV newscasts and several local TV stations and print news outlets covered the ceremonies.

More than a thousand spectators—including 11 members of the Pearl Harbor Survivors Association—gathered at the American Airpower Museum in Farmingdale, N.Y., to pay tribute to those who died in the 1941 Japanese attack.

David T. Buckwalter, a former AFA national director and former New England region president, was keynote speaker. A Navy bell chimed, as the names of Pearl Harbor veterans who died in the past year were read. The playing of Taps honored all vets who have died. Then P-40, P-51, and AT-6 warbirds flew 66 American Beauty roses—one for each year that has passed since 1941—to the waters around the Statue of Liberty. They dropped the roses into the water surrounding this icon at 12:55 p.m., the exact time on the East Coast of the Japanese attack in Hawaii.

Because of this, the Pearl Harbor remembrance is called the "Dropping of the Roses." It's a tradition started in 1970 by a Pearl Harbor survivor Joseph S. Hydrusko, who used to drop the flowers from his own airplane. After his death, Long Island Chapter members Irvin Hansen and the late Walter Zywan kept the tradition going. Nine years ago, the chapter took on the responsibility of conducting the ceremony.

Meet the Future

In Sumter, S.C., the **Swamp Fox Chapter** joined with Lockheed Martin to host two receptions to introduce base

and civilian leaders from two South Carolina facilities to their future: the F-35 Joint Strike Fighter.

The Air Force announced in late 2006 that Shaw Air Force Base outside of Sumter and McEntire Air National Guard Station, located near Columbia, would be among the first operational bases for the stealth fighter, so at two December receptions held at the Shaw Club, Lockheed officials presented a briefing on the JSF's capabilities and demonstrated them with an F-35 simulator.

As further preparation for the job ahead, Shaw's 20th Fighter Wing commander Col. James N. Post III and 169th Fighter Wing commander Col. Keith Coln, from McEntire, each received model-airplane JSFs—formally named the Lightning II—with appropriate wing markings.

The USAF leaders as well as local businessmen, Congressional staffers, and local elected officials had a chance to "fly" the simulator.

David T. Hanson, from the Swamp Fox Chapter, pointed out that the receptions were "an excellent opportunity to help educate the public about the future of the Air Force."

The conventional-takeoff JSF version for the Air Force began flight-testing in December 2006. Two weeks after the Swamp Fox receptions, Lockheed Martin rolled out the short takeoff and vertical landing version of the F-35 in Fort Worth, Tex. It is slated for Marine Corps use. A third, catapult-launched JSF version for the Navy is scheduled for first flight in 2009.

Salute!

Sue C. Payton, the assistant secretary of the Air Force for acquisition, was keynote speaker for the **Donald W. Steele Sr. Memorial (Va.) Chapter's** most recent Salute reception—this one spotlighting action officers in her directorate. Payton described a dozen lessons learned during her first year on the job, including—according to a chapter VP—"Washington, D.C., can be a dangerous and unforgiving AOR."

In reporting on Payton's insights, Tom Veltri, a chapter vice president, noted that this was the 11th annual chapter reception for SAF/AQ. The chapter holds such gatherings, called Salutes, several times a year to highlight the work of action officers in different sections within the Air Staff. Veltri serves as host and master of ceremonies for the events. He virtually single-handedly organizes Salutes from the ground up, arranging for the venue, ordering award plaques, and registering guests.

In November, 14 active duty and civilian members of USAF acquisition community receiving a Salute were: Col. Charles Bailey, Dan Barton, Mary Blasi, Shari Cohen, Cynthia Culpepper, Theresa Elliott-Brown, Donna Farrell, Ricky McMahon, Lt. Col. Kristen Nelson, Marti Ramirez, Al Rease, Ed Rosenberg, Lt. Col. Rob Schlegal, and Maj. Alexander Walan.

Gold Coast Chapter officers Milt Markowitz (holding wreath) and retired SMSgt. Joseph Roberts take part in a Wreaths Across America ceremony on Dec. 15 at the South Florida Veterans Affairs Cemetery in Lake Worth, Fla. The tradition began at Arlington National Cemetery 16 years ago with the laying of donated wreaths. In 2006, similar Wreaths Across America ceremonies began taking place concurrently at national and state cemeteries and veterans memorials nationwide.

Chapter-Cadet Teamwork

Through a guest speaker booking arranged by the **Everett R. Cook Chapter (Tenn.),** retired Lt. Col. Cecil H. Brunson returned to his alma mater to speak about his Air Force experiences to the current AFROTC cadets at Det. 785.

The 1970 graduate of the University of Memphis had a lot to tell. After earning his commission, Brunson trained as a navigator and was assigned to Korat AB, Thailand. He flew on 160 combat missions until, on Oct. 12, 1972, his F-4E was shot down over North Vietnam, some 50 miles northeast of Hanoi. The North Vietnamese held him captive until March 29, 1973.

After his release from six months as a POW, Brunson trained as an F-4 pilot and in 1980 joined the Tennessee Air National Guard, flying C-130s. Chapter President James A. Van Eynde reported that Brunson flies for FedEx today.

Van Eynde said that rounding up a guest speaker for the cadets' leadership lab gives the students "some firsthand connection with AFA and veteran members who can share their Air Force experience."

It is just one way the chapter works with the future Air Force officers, he said. The chapter awards several scholarships. It provides the cadets with copies of *Air Force* Magazine. Detachment commander Lt. Col. Steven E. Fell presents an AFROTC update at the annual chapter awards banquet. More recently, the chapter began allowing the cadets to keep $25 for each Community Partner that they sign up.

Outnumbered

For the **Prescott/Goldwater Chapter (Ariz.),** a chapter-cadet partnership has blossomed to the point where cadets now outdo chapter members in carrying out one of the chapter's annual projects.

As Chapter President Tom Rowney explained, the chapter has for several years been putting up holiday decorations in the extended care unit at the Bob Stump Veterans Affairs Medical Center in Prescott. About five years ago, the chapter invited Det. 28, Embry-Riddle Aeronautical University, to help with the project. Arnold Air Society cadets and their Silver Wings fellow student-supporters stepped forward.

"The cadets now outnumber the chapter members who volunteer," said Rowney. This past December, the largest group ever turned out. The cadets and students put up Christmas trees and decked the walls and ceilings on two floors of the VA facility. "The cadets did all the work," Rowney said. He and chapter members Jim Turner and Jim Muehleisen "supervised."

Arnold Air Society is an honorary service organization that helps AFROTC cadets develop the leadership, management, and organizational skills that they will need as Air Force officers. AAS is supported by Silver Wings, a coeducational service organization aimed at developing students into civilian leaders with an understanding of airpower.

More Chapter News

■ The **Iron Gate Chapter (N.Y.)** held a reception in December at the Soldiers', Sailors', Marines', Coast Guard, and Airmen's Club in midtown Manhattan. The event served as a Pearl Harbor remembrance and also honored Col. Norman E. Schaefer, an Air Force Reserve doctor, and George E. Burns, a Civil Air Patrol colonel. At the time of Desert Storm, Schaefer voluntarily closed his practice in New York City and lent his medical expertise and leadership to organize medical evacuations from Saudi Arabia to Ramstein AB, Germany. Burns received recognition for his longtime service to the chapter as well as the CAP. ■

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.

Reunions

reunions@afa.org

9th Air Force Assn and 391st BG. May 29-31 at the Sheraton Westport Plaza, St. Louis. **Contact:** John Peterson (719-380-1412) (john@ctcm.com).

55th Strategic Recon Wg and 55th Wg. May 14-18 at the Hilton Crystal City, Arlington, VA. **Contact:** Ricky McMahon (703-791-4133) (rick_carymc@comcast.net).

90th TFS, Bien Hoa AB, Vietnam, and all eras. June 22-26 in Dallas. **Contact:** Jack Doub (229-259-9399) (wgfp@mchsi.com).

100th BW, B-47/KC-97 era. May 16-19 in Fort Walton Beach, FL. **Contacts:** Charley Brown or Ken MacPike, P.O. Box 134, Fort Walton Beach, FL (ken@100threunion2008.org) (850-244-7194) (http://100thbw.homestead.com).

355th FW, WWII-present. April 24-28 at the Viscount Suites, Tucson, AZ. **Contact:** Bill Cook (330-541-2653) (bigbilldot@aol.com).

384th BG. Oct. 2-5 in Dayton, OH. **Contacts:** Ted Rothschild, 650 Snug Harbor Dr., Apt. 402, Boynton Beach, FL 33435 (phone: 561-734-5052 or fax: 561-731-5420) or Lloyd Whitlow (koeppwhitlow@live.com).

509th BW Veterans Assn. April 30-May 4 in Dayton, Ohio. **Contact:** Fred Smith (501-922-5990) (fj-loretta@suddenlink.net).

794th AC&W, including anyone ever stationed at Cape Newenham, AK. April 23-26 in Branson, MO. **Contacts:** Joel Cooper (plasterman2@hotmail.com) or Art Perron (artperron1@comcast.net).

7405th/7580th Operations Sq, Rhein Main AB, Germany (1980s). May 2-4 at the Holiday Inn, Beavercreek, OH. **Contact:** Mike Hushion (937-320-1998) (mhushion@woh.rr.com).

Battle of the Bulge veterans, including 8th and 9th AF. Sept. 9-14 in Columbus, OH. **Contact:** Ralph Bozorth, 608 Treaty Rd., Plymouth Meeting, PA 19462 (610-825-9409).

C-17 SATAF. March 15-16 in Charleston, SC. **Contact:** Paul Schmidt (724-353-2833) (paul@schmidt.net).

Firebird Assn, including 17th TAS, 17th TCS, 109th TA NYANG (Airlift Wing), 517th ALS. April 6-8 in Galveston, TX. **Contact:** Bruce Huff (713-827-7975) (b.huff@att.net).

Hahn AB, Germany, air traffic controllers and weather personnel (1966-74). April 7-10 in Las Vegas. **Contacts:** Bill Mosley (702-558-0776) (wmmosley2@cox.net) or Ron Axley (317-850-3504) (msgtron@aol.com).

Pilot Class 56-G. May 12-15 at the Marriott Hotel in Huntsville, AL. **Contact:** Porter Jones (615-876-0450) (56g_pjones@comcast.net).

Pilot Training Class 56-Q & Navigator Class 09. May 13-15 in Dayton, OH. **Contact:** Ned Derhammer, 2722 Covington St., West Lafayette, IN 47906 (765-463-4988) (ned3nola@gte.net).

SAC veterans. April 30-May 4 at the Holiday Inn, Fairborn, OH. **Contact:** Toby Romero (866-260-9203 or 520-203-8809) (jtrome-25@excite.com).

Selman Field Historical Assn, including WWII Army Air Corps navigators. May 2-5 in Monroe, LA. **Contact:** Swansea Katz (318-325-2998) (herrenja@bellsouth.net).

WWII bombardiers. April 30-May 4 in St. Louis. **Contact:** B. Thompson, 280 Sharon Dr., Pittsburgh, PA 15221 (412-351-0483). ■

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.

Keeper File

Ryan's Expeditionary Airpower

It had been eight years since Iraq invaded Kuwait, but stressed-out USAF units were still in the Gulf and top leaders struggled to deal with global contingencies. Something had to be done, and Gen. Michael E. Ryan, Chief of Staff, stepped before reporters to declare what it was—the Expeditionary Aerospace Force.

Ryan's announcement (made jointly with Air Force Secretary F. Whitten Peters) capped a long EAF gestation period. A first test case was Vigilant Warrior in October 1994, when US air units rushed to the Gulf in response to Iraqi threats. The return of forces presented sobering challenges. Early in his term, Ryan commissioned a small advisory group to devise a new framework for airpower. The product was the EAF, based on 10 "air expeditionary forces," each available for a 90-day deployment every 15 months.

Now, nearly 10 years later, the expeditionary view is ingrained in the Air Force—so much so that it is hard to recall the days when USAF was a "garrison" force. But it was.

"Expeditionary Aerospace Force"

Gen. Michael E. Ryan
USAF Chief of Staff
DOD News Conference. Washington, D.C.
Aug. 4, 1998

Find the full text on the Air Force Association's Web site
www.afa.org
***Air Force* Magazine**
"The Keeper File"

We think a real paradigm shift has occurred. ... We are away from a Cold War kind of strategy where we had ... collocated operating bases where we deployed into fixed structures ready to go. We have moved away from that, from a containment strategy to one of global engagement. ... We'll be operating from bases that have limited infrastructure, as we have seen occur over the past nine years. This requires an expeditionary approach. ...

We are engaged in all manner of expeditionary missions today. Since Desert Storm we have increased our optempo four-fold in these kinds of activities. Lots is happening across the globe, different kinds of demands on our forces, and we need to be responsive. ... We think it's going to be that way in the future. ...

We are capable of a rapid response with trained and ready forces that are capable, lean, agile, and structured so that they fit very rapidly into a situation, in a command and control structure, that makes them effective.

We know we're going to have to do this in a fiscally limited capacity. We know the optempo demands will still be there. We have to take care of our folks ... quality of life, and we think we will continue to have readiness challenges in the future. So we're starting right now to work on this better way to utilize the aerospace forces of this nation.

What is it? It's a systematic way to be able to present rapidly responsive forces that are light and lean, tailored to the needs of the CINC. It's an integration of our Total Air Force, ... using all of our capabilities across the spectrum in an effective way. It's institutionalizing in our force this expeditionary culture. ...

It addresses our capability to respond up through small-scale contingencies. If we default to a major theater war, that is a different construct. ...

If you look at where we've responded over the last few years, you'll find that we have stood up a group of expeditionary bases: Tuzla, Taszar, Brindisi, many bases in the Southwest Asia region. We've gone and opened, episodically, bases at hot spots around the world. We've taken our support forces and bedded them down to open up those bases to assure that we have good force protection and take care of our troops. ... Yet we have never ... upped our support structure to take care of that.

What has happened to us is that at our home bases we have had units deployed forward that are working 12 hours; and then the units that stay at home, if it's a security police force, it has to go on 12 hour shifts. Then we've rotated these forces in a way that we have put a great burden on our support forces across the United States Air Force. ... That's not right. ...

The AEF concept would take units from across MAJCOMs and virtually link them into approximately 10 air expeditionary forces. ... Those forces would be on alert or forward deployed, depending on the situation. ... Our concept has two AEFs at any one time on the bubble—that is ready to go, on alert. ...

We would have a forward deployed piece ... that would be available, trained-to-task, have habitual relationships before they go, to be able to take care of those kinds of requirements such as Bosnia and Southwest Asia. We would have an on-call force that's capable of responding to any contingencies that may be out there, in addition to the knowns. ...

About 75 airplanes would be able to meet, notionally, the capabilities that we have bedded down right now in Southwest Asia, along with our high-demand/low-density assets. ... About 75 forward deployed aircraft. About 100 on call. About 175 total. ...

Let's say [forces would deploy] on a 90-day schedule—we are still not sure that that's the right number, ... and a 15-month rotation....

We would select some lead bases—the most likely ones to be the command wing for that particular deployment. We would bulk up those bases ... with those kinds of large team tasks such as security police and medical. ... [There are] about 29 bases in this total concept. We would add about 5,000-plus folks to those support bases. ...

I think we thought that sometime in the future this kind of activity would go away. We'd go to Desert Storm and we'd come home, or we'd go to Bosnia and we'd come home. The realities of the world say that we'll probably stay for awhile. When we do that, we need to make sure that we resource what we have put forward, and this is our attempt to do that, take care of our folks. ... Our folks ... will do anything for us. What they look for, though, on a day-to-day basis, is some stability in their lives so they can plan on what happens next month or next year. ■

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Artwork by Zaur Eylanbekov

F-104 Starfighter

It was called "a missile with a man in it." Radically new for its day, Lockheed's slender, stubby-winged F-104 Starfighter was the first of USAF's Mach 2 fighters. It was designed by the legendary Kelly Johnson and his Skunk Works team, which produced a lightweight, high-speed fighter unlike anything seen before.

The spur for development of the Starfighter was the debut, in 1950, of the swift MiG-15 in the Korean War. The F-104 design emerged in late 1952, and it entered service in 1958. It soon set world records for speed (1,404.19 mph), altitude (103,395 ft), and time-to-climb. Though extremely fast, it was unforgiving and hard to fly. Also, USAF was never entirely sold on the lightweight idea. It bought fewer than 300 copies for itself. Indeed, the F-104 was more numerous overseas—especially in Germany, Italy, Japan, and Turkey. However, the German F-104 force was hampered by an alarming accident rate—292 of 916 crashed, killing 115 pilots—and controversy dogged it for years.

Truth to tell, F-104s were never a significant factor in combat. USAF deployed some to Florida during the 1962 Cuban Missile Crisis. Moreover, Starfighters flew 5,206 sorties in Vietnam, where 14 were lost. It was used in a variety of roles, including interceptor, air superiority, weather recce, Wild Weasel escort, and close air support. Despite a slender combat record, however, the F-104 is remembered as one of the most distinctive air weapons of the entire Cold War.

—Walter J. Boyne

This aircraft: F-104C—*#56-0907*—as it looked in January 1959 when assigned to the 479th TFW, George AFB, Calif.

Starfighter in action.

In Brief

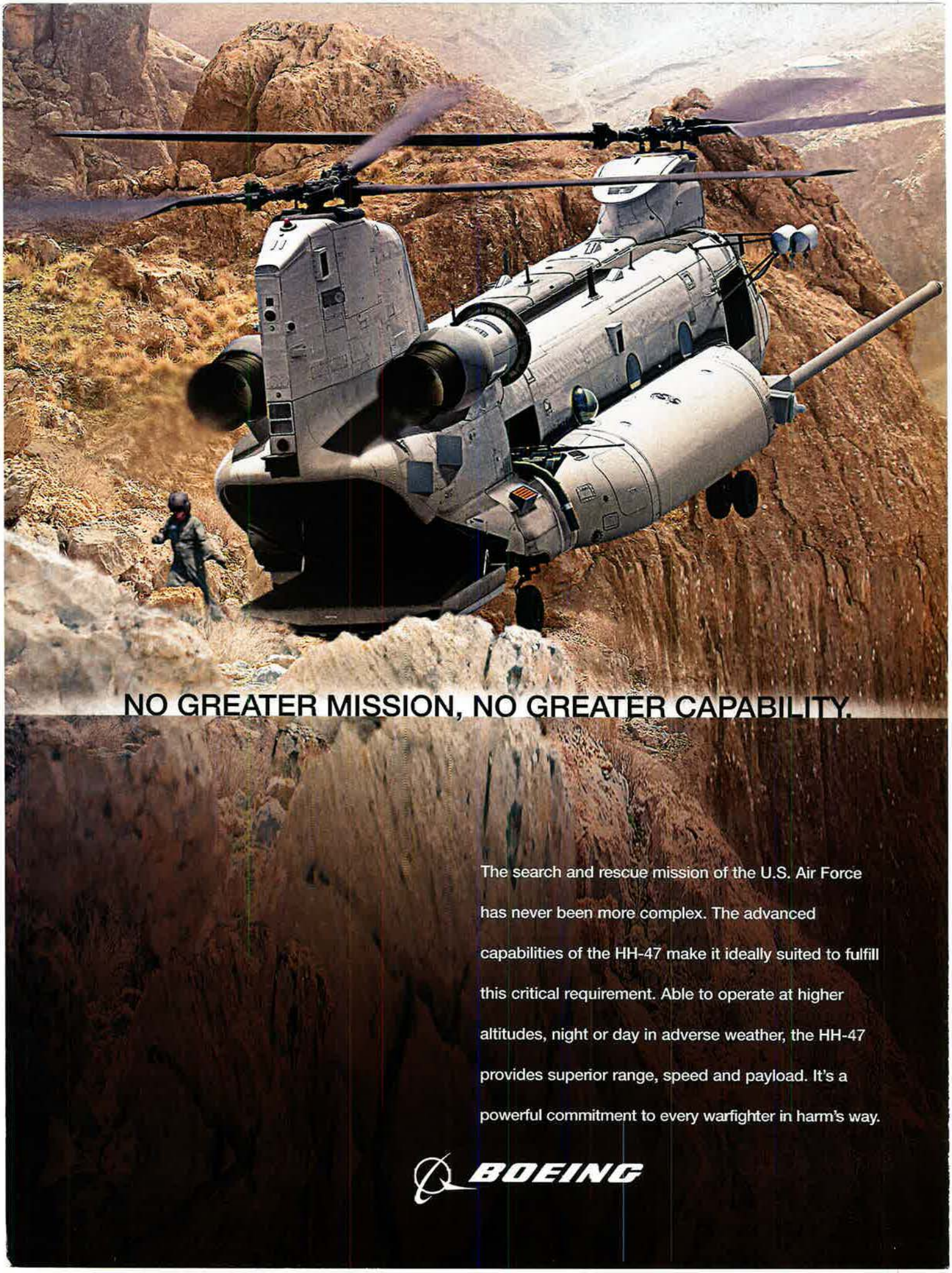
Designed by Lockheed ★ built by Lockheed, Canadair, Fiat, Fokker, MBB, Mitsubishi, SABCA ★ first flight March 4, 1954 ★ crew of one or two ★ number built 2,578 (296 USAF) ★ **Specific to F-104C:** one GE J79 turbojet engine ★ armament one 20 mm cannon; two 1,000-lb bombs or four air-to-air missiles ★ max speed 1,320 mph ★ cruise speed 575 mph ★ max range 1,250 mi ★ weight (loaded) 27,853 lb ★ span 21 ft 11 in ★ length 54 ft 10 in ★ height 13 ft 6 in.

Famous Fliers

World record setters: USAF Capt. Walter Irwin (speed), USAF Maj. Howard Johnson (altitude), USAF Maj. Robert Smith (altitude), USAF Capt. Joe Jordan (time-to-climb). **Other Notables:** Neil Armstrong, Thomas Delashaw, Iven Kincheloe Jr., Robert Lawrence Jr., Steve Ritchie, Chuck Yeager, Joseph Walker.

Interesting Facts

Awarded 1957 Collier Trophy ★ first to hold altitude and speed records at same time ★ nicknamed Zip 104 and Zipper in USAF; *Eikou* (Glory) in Japan; *Fliegender Sarg* (Flying Coffin), *Erdnagel* (Ground Nail), *Witwenmacher* (Widowmaker) in Germany; *Spillone* (Hatpin) in Italy ★ used for astronaut training ★ featured in films "The Starfighters" (1964) and "The Right Stuff" (1983) ★ flown in combat by Pakistan in 1965 Indo-Pakistani War ★ built with downward-firing ejection seats, later switched to upward-firing ★ influenced later U-2 design.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