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Journal of the Air Force Association

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February 2013, Vol. 96, No. 2



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About the cover: Troops board a C-17 at Bagram Airfield, Afghanistan. See "The Readiness Question," p. 40. USAF photo by SrA. Chris Willis.

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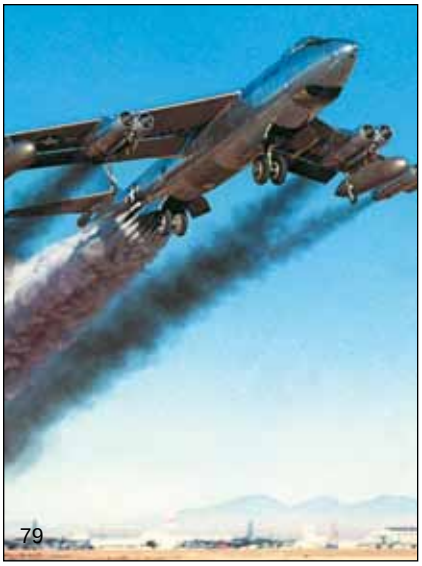
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www.airforce-magazine.com

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AIR FORCE Magazine (ISSN 0730-6784) February 2013 (Vol. 96, No. 2) is published monthly by the Air Force Association, 1501 Lee Highway, Arlington, VA 22209-1198. Phone (703) 247-5800. Perodical postage paid at Arlington, Va., and additional mailing offices. **Membership Rate:** $45 per year; $110 for three-year membership. **Life Membership (nonrefundable):** $600 single payment, $630 extended payments. **Subscription Rate:** $45 per year; $29 per year additional for postage to foreign addresses (except Canada and Mexico, which are $10 per year additional). Regular issues $5 each. USAF Almanac issue $8 each. **Change of address** requires four weeks' notice. Please include mailing label. **POSTMASTER:** Send changes of address to Air Force Association, 1501 Lee Highway, Arlington, VA 22209-1198. Publisher assumes no responsibility for unsolicited material. Trademark registered by Air Force Association. Copyright 2013 by Air Force Association.

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1501 Lee Highway • Arlington, VA 22209-1198

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Our mission is to promote a dominant United States Air Force and a strong national defense and to honor airmen and our Air Force heritage. To accomplish this, we:

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Leading The Situational Awareness Revolution

Editorial

By Adam J. Hebert, Editor in Chief

The Perils of Air Parity

The Air Force faces daunting long-term financial challenges. More than a decade of rising budgets during the wars in Iraq and Afghanistan were largely consumed by operational expenses and growth in a handful of mission areas. Overall, the so-called boom times have left the Air Force with fewer airmen and an aircraft fleet older and smaller than before the 9/11 terror attacks.

Budgets are expected to decline going forward, and in many ways the Air Force is already in a tougher position than it was back in 2001. Because of the high cost of manpower, USAF has shed thousands of uniformed personnel. The service has reduced end strength by more than 40,000 airmen since 2004 and is now approximately the same size it was in 1947.

Most Air Force aircraft inventories are geriatric. Some new purchases—such as the Block 30 Global Hawk unmanned reconnaissance aircraft and the C-27 small airlifter—may no longer be worth their operating costs as strategic needs change. And large new inventories of Predator and Reaper unmanned aircraft are tailor-made for operations in Afghanistan, where distances are short and air defenses nonexistent.

The Air Force will have to solve longstanding financial trials regardless of possible sequestration and the fiscal cliff. The challenge going forward is simple to describe but difficult to accomplish: USAF must preserve readiness, keep modernization programs on track, and recruit and retain top-notch airmen as available funds decline.

This is a budget balancing act the Air Force must get right. History is full of examples in which the US military has not dominated its enemies, and the cost is paid in lives.

In World War II, facing Nazi Germany, Eighth Air Force alone lost more than 4,000 aircraft in its bombing campaign against the occupied continent. Some 26,000 Eighth Air Force airmen died, thousands were injured, many grievously, and another 3,000 went missing. This was despite having a well-trained, massive force equipped in many cases with brand-new, advanced aircraft.

Less than a decade later, the Air Force was caught off guard in Korea. Jack Broughton recounts the early, difficult days of the Korean air war in this issue in "The Blooding of America's Jet Fighters." USAF's "young jet fleet was thrust into a trial by fire. Air Force P-80 pilots on a comfortable tour in Japan quickly became combat F-80 pilots," Broughton writes. "Most of the limited US Air Force units establishing positions in Korea were overrun," as the invading North Korean forces swept F-51s and F-80s aside on their drive south. Then, for a short time, the MiG-15 outclassed anything USAF had on the peninsula.

USAF must preserve readiness, keep modernization on track, and retain top-notch airmen as funds decline.

Experience, training, and new equipment such as the F-86 Sabre allowed USAF to battle back in the skies over Korea, but the early days were deadly and grim. By June 1951 the US held an advantage in the skies once again. Over MiG Alley, F-86s were outnumbered 10-to-one, but held an eight-to-one kill advantage against enemy fighters.

The Air Force again found itself frustrated over Vietnam. Aircraft were often ill-suited for their missions, and rules of engagement ceded many advantages to the North Vietnamese. Also in this issue, in "The Crucible of Vietnam," Rebecca Grant explains how the enemy exploited every advantage and took a horrendous toll on US airpower.

A small, outclassed enemy used surprise, hit-and-run tactics, deadly anti-aircraft artillery and surface-to-air missiles, and the ability to generate localized advantages to deadly effect. The Air Force lost 2,254 fixed wing aircraft in Southeast Asia, including 40 percent of the F-105s ever built. "The air losses left a permanent mark on future planning for airpower operations," Grant writes. "American reckoning with how a small air force could inflict such losses influenced the next generation of US fighter design"—not to mention war planning and aircrew training.

The Air Force has suffered far fewer fatalities in the wars since Vietnam.

Coalition air forces quickly gained control over Iraq in 1991. The Air Force's dominance was so clear that some of Saddam Hussein's jet fighters were flown to Iran for sanctuary.

In 1999, Serbian defenses were methodically ground down by USAF-led NATO airpower during Operation Allied Force.

Taliban air defenses were eliminated without much ado in late 2001, and Afghanistan has offered a benign operating environment ever since.

In the 2003 Iraq war, Iraq literally buried aircraft in the sand in an attempt to save them.

The professional, all-volunteer military force, high levels of readiness since the 1980s, state-of-the-art combat aircraft, and advanced training programs like Red Flag and the USAF Weapons School create an Air Force without peer.

The Air Force has made air dominance look so easy that many now take it for granted. A perception that the Air Force is already good enough works to USAF's detriment because security in the skies is not a birthright. It must be worked on continuously.

In January, Air Force Secretary Michael B. Donley described the specter of a hollow force—one with "more units and equipment than it can support [and which] lacks the resources to adequately man, train, and maintain them and keep up with advancing technologies." Declining budgets mean the Air Force is going to have to become smaller, and the inability to close any bases without Congressional approval makes avoiding a hollow force extraordinarily difficult.

Hollow forces still exist. In one last example from this issue, Peter Grier cites European cuts in "NATO's Wobble." "Most of Europe's military reductions have been horizontal, applied evenly across operations, maintenance, and investment accounts," Grier notes before quoting a National Defense University report: "These typical responses result in … forces that are not ready, not trained, and not sufficiently equipped or supplied."

Failure to maintain air dominance has historically been measured in deaths. Avoiding air parity is easier said than done. The Air Force has its work cut out for it. ■

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Letters

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Sniveling, Immature Whiners

["Editorial: Walking on a Cliff," December, p. 4] should be mandatory reading for every member of our "moaning-groaning" legislative and executive branches to inspire them to quit the argumentative partisan attitude and get this matter resolved in a mature and timely manner. The ramifications of letting this matter slide are treasonous. Our legislators (and President) are paid the "big bucks" to act on such legislative matters in a timely, reasoned, and mature manner. If they cannot, we need new people now. The quality of this group has degraded over the past few years into a sniveling bunch of immature whiners who are afraid to put their feet to the fire and would rather play the blame game. They should be ashamed!!!

Lt. Col. Richard C. Johnson,
USAF (Ret.)
Columbia, S.C.

Tiger Not Toy

I was quite surprised the "Airpower Classics" feature (December, p. 72) on the F-5 did not mention the Northrop F-5G/F-20 Tigershark. This remarkable aircraft (which unfortunately never entered production) more certainly owes its origins to the F-5 than does the YF-17. Northrop's proposed P-530 Cobra, which only reached the mock-up stage, led directly to the YF-17. The text should've also mentioned the N-156F prototype developed prior to the F-5A, as well as the RF-5E Tiger Eye recce variant, and the F-5's family relationship to the T-38. I've met no pilots who referred to the F-5 as the "Tinkertoy." Despite its limitations in range and payload, the F-5 was (and still is) a popular mount for its pilots.

Lt. Col. Barry A. Miller,
USAF (Ret.)
Poquoson, Va.

A Piper Cub Over Hanoi

As the former aide to CINCSAC Gen. John C. Meyer, I met with him right after Linebacker II was completed in January 1973. He told me his version of Linebacker II ending the Vietnam War *["Linebacker II," December, p. 52].*

He related that after six days of bombing and isolating Hanoi, President Nixon called him and questioned the continued use of B-52 bombing due to the loss of aircraft. Nixon told Meyer that the Joint Chiefs of Staff had recommended the bombing be stopped. Meyer told Nixon that he needed "only three more days of bombing and you will be able to fly a Piper Cub over Hanoi." President Nixon agreed to continue the bombing. Le Duc Tho told [Henry S.] Kissinger to stop the bombing and he would agree to sign a peace agreement. Kissinger told Tho to sign an agreement first and they would stop the bombing. The rest is history.

Lt. Gen. Richard A. Burpee,
USAF (Ret.)
Oklahoma City, Okla.

Your article on Linebacker II on the 40th anniversary of the 11-day bombing campaign made it appear that the B-52s were the only aircraft engaged in the campaign. There was very little discussion on the SEAD, CAP, rescue, and Navy and Marine fighter-bomber support sorties, not to mention the KC-135 air refueling support out of U Tapao and Kadena. I was a KC- 135 crew chief on the ground at Kadena. We had tankers parked in every available space, taxiways, hangar aprons—anywhere we could place a jet, before the days when planners worried about MOG. They were wingtip to wingtip, nose to tail! When we'd launch the missions out, the ramp was like a ghost town with only the "hard broke" (one tanker with a cracked left main landing gear trunnion bearing, its MLG assembly removed and left wing stacked up on railroad ties) jets staying behind. In his book *We Won And Then There Was Linebacker II: Strategic and Political Issues Surrounding the Bombing Campaign,* Albert Atkins said, "Without the dedicated tanker crews, Linebacker II would not have been possible." The BUFF crews did an amazing job and sustained the majority of the losses, but LBII would have never succeeded without the hard-working support missions and ground personnel out of Thailand, Kadena, and Guam.

Col. Charles R. Tupper,
USAF (Ret.)
Edisto Island, S.C.

Some of the losses of Linebacker II could have been prevented if the CINCSAC staff had listened to their experienced combat veterans, i.e., 8th Air Force at Andersen Air Force Base and its subordinate units. But in 1972, SAC still employed a top-down policy that only CINCSAC could make and approve the most minute of details involving mission planning for Linebacker II—the result being for the first three days there was virtually little to no change of tactics from mission to mission. One of the more egregious tactics was the Post Target Turn (PTT). One rationale for the PTT was that "we have always done it that way." Most likely it was developed in World War II when the two B-29s dropping the atomic bomb needed to exit the target area rapidly to avoid atomic blast.

The PTT was an immediate turn of 100 degrees at a 45-degree bank angle just after weapon release. The result of this maneuver was 30 to 60 seconds of no electronic countermeasure support

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because the jamming signals were being beamed away from NVA tracking systems. This was conducted in one of the most heavily defended areas in the world, Hanoi. The aircraft became highly vulnerable to SAM acquisition when the bomb bay doors were opened at the one-minute (B-52 Dash-1 procedures) mark—a fact that did not go unnoticed by aircrews that began to modify opening times to the absolute minimum. The PTT for the first days also resulted in turning into 100 knot headwinds which simply extended the vulnerability time. The majority of the losses in Linebacker II (to include damaged aircraft) occurred during the PTT. The bomb bay door open time plus the PTT was just too much.

There was one true leadership hero during this campaign, Brig. Gen. Glenn R. Sullivan, commander, 17th Air Division, U Tapao Royal Thai Navy Base, Thailand. After the first night he (as did the leadership at 8th Air Force) realized that the directed tactic of using the same IPs, routes, altitudes, etc., was a disaster in the making. Finally, after night three (known to some as the "slaughter of the Gs"), Sullivan sent a flash message direct to SAC that their tactics were going to result in more losses than already experienced unless changed. By this time, SAC was completely at a loss on what to do and criticism was coming from the JCS. Changes were made, planning was directed to 8th AF, and losses were reduced.

Col. John L. King,
USAF (Ret.)
Tulsa, Okla.

Giant and Fly

Regarding the article "Capital Defenders" *[December, p. 28],* I would like to comment on how I see the overall vetting of air traffic in the Washington area. The article outlines the procedures quite well regarding low altitude VFR traffic and the prevention of incursions into the "target rich environment." My concern centers on IFR traffic in, around, and over the Washington ADIZ, which covers the airspace only from the ground to 18,000 feet. While most traffic below 18,000 feet cannot approach the inner areas of Washington, IFR aircraft at 18,000 feet or above can and do fly near and over the D.C. area on a regular basis. You do the math: 18,000 feet is just three miles from this "target rich environment," at 240 knots in a dive (typical for a midsized turboprop aircraft) less than a minute. Now, how is an F-16 going to cope with an attacker with this lead time? Can't and won't happen. I point out this chink in the armor so that maybe someone has a solution or an answer. One answer would be to restrict the airspace above 18,000 feet, much like the lower altitudes, to increase the time available for interception. This solution would cause an air traffic nightmare. Another solution and less certain is intelligence and awareness. Practically every airport I visit has posters encouraging aircrews to be aware and to report suspicious activity. Perhaps General Sasseville has observed this lapse in defense and has an answer. I well remember the wringing of hands on Sept. 12, asking how did we let this happen. Let's not have a repeat. Intercepting Cessnas with an F-16 is questionable PR, like a giant swatting a gnat.

Maj. Dudley H. Johnston,
USAF (Ret.)
Germantown, Tenn.

Yee Haw and Cowabunga

I enjoyed reading the very interesting article in the December issue about the two C-17s "sky surfing" over California—saving fuel by flying in the vortex of the lead aircraft *["Air Force World: California Sky Surfing," p. 18].* It sounds a lot like they were actually drafting like cars have been doing for years in NASCAR racing. Maybe the



good ol' boys were way ahead of their time, and what goes around surely comes around.

SMSgt. David R. Caron, USAF (Ret.)
Las Vegas

Thor Was Innocent

Walter Boyne's article about Operation Dominic ("Big Bang") is a fascinating account of the atmospheric nuclear test program *[December, p. 57].* However, one sentence on p. 60 should be corrected. The statement "the vehicle and weapon blew up on the launch pad" implies that the explosion was the fault of the Thor rocket. In fact, an inexperienced missile flight control officer (MFCO) erroneously issued the destruct command. This was the Bluegill Prime launch attempt on 25 July 1962.

As the Air Force launch control officer for the final Thor launch from Johnston Island, I reviewed the official accident report and discussed the incident with several McDonnell Douglas engineers who were involved. The main engine LOX valve did not open fully, preventing the Thor from achieving sufficient thrust. Upon realizing that the missile was not lifting off, the MFCO should have issued only the destruct arm command, which would have immediately shut down the engines and likely would have prevented the explosion. Instead, the MFCO sent the destruct command as well, which triggered the flight termination ordnance and "single pointed" the weapon. The damage and contamination were considerable and caused a significant delay in the nuclear test program.

Eric G. Lemmon
Vandenberg AFB, Calif.

Been There, Done That

I read with much interest the "Reserve Reset" article *[December, p. 34]* by Marc Schanz. Very well presented. Lieutenant General Jackson presented his and the Reserve views very well. I believe there is something of importance missing. Let's go back for a moment to the very beginning of the Air Force Reserve—July 1949—and back to calendar year 1947.

I write with some personal history. Long before General Jackson was even a twinkle in his father's eye, I enlisted in the US Army Air Corps, Dec. 8. 1943. Graduated from flying school April 15, 1944, with a reserve commission of second lieutenant and as a rated pilot. Was placed on the Air Force retired list May 11, 1974, with an accumulated 7,707 flying hours and 31 years, five months, six days of Active Duty and Reserve time.

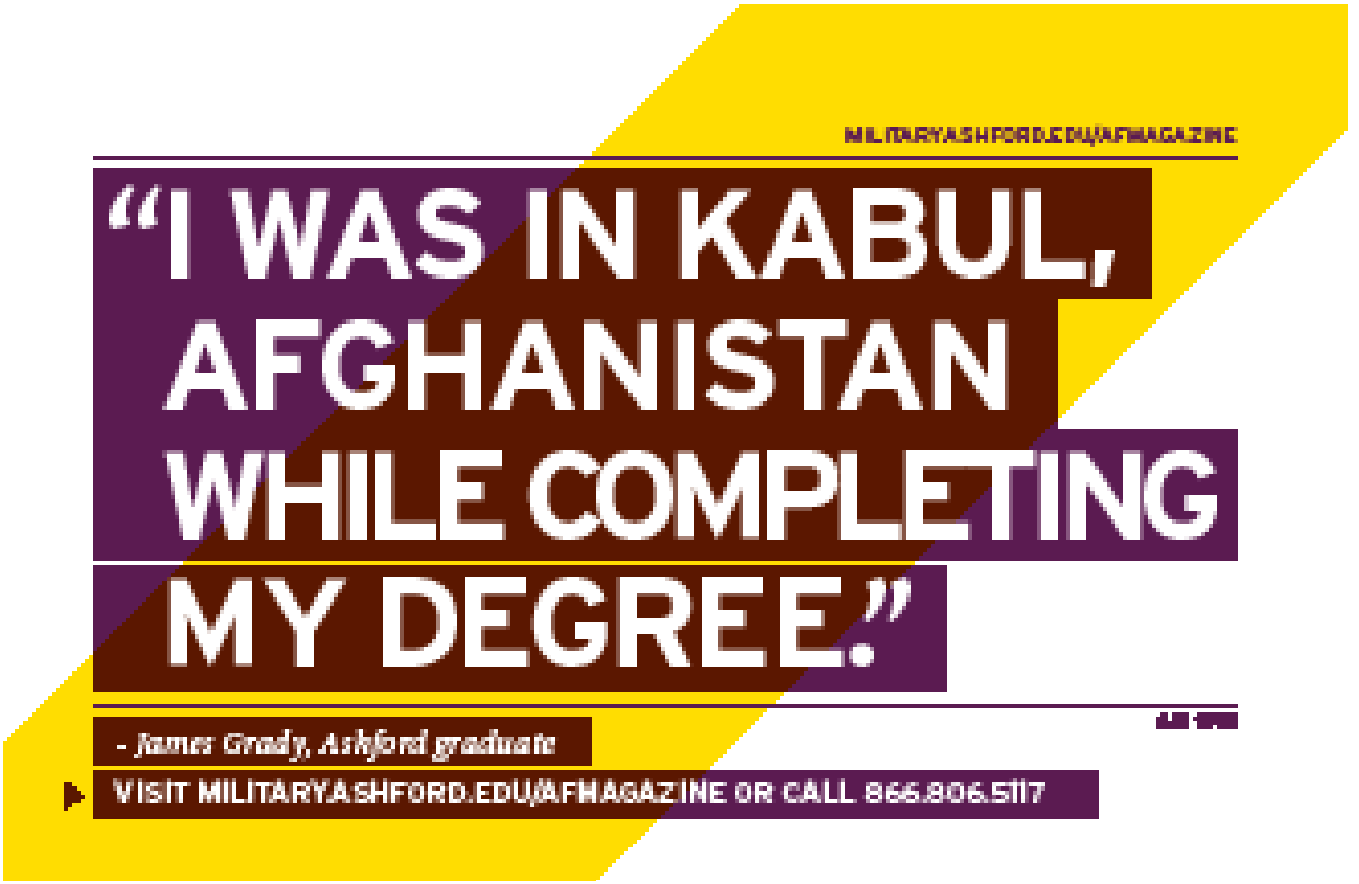
During 1947, a large gathering of past Army Air Forces members began an evening meeting in a downtown Portland, Ore., theatre. At Portland Airport, a contingent of AFTRAC was established by the new Air Force with a few flying machines(AT-6, AT-9, AT-11).

We pilots were checked out in the aircraft and renewed our flying proficiency. On July 1, 1949, the Air Force 403rd Troop Carrier Reserve Wing was activated with three squadrons of 16 new C-46 aircraft each and the aircrews and support groups. We flew for free in support of the Army airlift transportation needs. Some pay was created for specific training sessions. These combat Ready Reserve troop carrier wings were recalled to Active Duty during the Korean War. At the time I was in Korea, 1952, more than 90 percent of the Air Force personnel supporting that war were Reservists. During the Berlin Airlift, the Air Force recalled a large number of Reserve personnel. The Cuban Missile Crisis saw a large number of Reservists called to Active Duty.

When the Associate Program was established, this was the "proof of the pudding" that the Reserve forces could provide air transportation needs with far less costs. Then came the Total Force concept, recognition of what a resource it is to have highly qualified personnel from the reserve forces provide more services with less funding.

Let's educate our younger leaders on the history of the Air Force Reserve.

Col. Norm Happel, USAF (Ret.)
Elizabeth, Colo.



Washington Watch

By John A. Tirpak, Executive Editor

New Pentagon boss; Fiscal follies; Leon's legacy ....

HAGEL BRACES FOR A FIGHT

President Obama's nomination of former Nebraska Sen. Chuck Hagel to be Secretary of Defense could make Hagel, 66, the first former enlisted combat infantryman and veteran of the Vietnam War to run the Defense Department. Hagel received two Purple Heart awards for combat injuries as a squad leader and still carries shrapnel in his body.

Hagel served two terms in the Senate—retiring in 2009—and his résumé includes serving as CEO of the USO from 1987 to 1990 and an earlier job as deputy administrator of the Veterans Administration. In the 1990s, Hagel successfully ran a telecom company as its CEO. Recently, he has taught at Georgetown University and served on Obama's Intelligence Advisory Board.

In nominating him to be defense chief, Obama described Hagel as "a patriot," whom US service members see as "one of their own." Hagel went to college on the GI Bill and has vigorously defended veterans' benefits in Congress.

Accepting the nomination at a White House press conference, Hagel said he was pleased to have the opportunity to "serve our country again and especially its men and women in uniform and their families ... who have sacrificed so much over more than a decade of war." Taking care of the troops is "particularly important ... as we complete our mission in Afghanistan," he said.

Obama said his choice of a Republican for the top defense post "represents the bipartisan tradition that we need more of in Washington." Hagel, Obama asserted, has "earned the respect of national security and military leaders" for his "independence and commitment to consensus." Hagel's "willingness to speak his mind, even if it wasn't popular, even if it defied the conventional wisdom," represents "exactly the spirit I want on my national security team," Obama said.

Hagel's name had been floated around Washington for several weeks as the likely successor to Leon E. Panetta at the Pentagon. Some Republican opponents used that time to paint Hagel as an anti-Israel, Iran-appeasing political hack disloyal to the Republican Party. They justified that view based on Hagel's record of reversing his early support for the Iraq war, vowing to do all he could to oppose President Bush's "surge" in that country. He believed the surge would merely prolong the war and increase US casualties.

Hagel also famously made several comments that he was "not the Senator from Israel," and that "the Jewish lobby" is overly influential in Washington. Sen. Lindsey O. Graham (R-S.C.) said on the eve of Hagel's nomination that his former colleague would be the "most antagonistic" US Defense Secretary Israel would ever have to deal with. Supporters noted, however, that Hagel nearly always voted to support funding for Israel.

Graham also charged that Hagel's views are "out of the mainstream of thinking ... on most issues regarding foreign policy," but he stopped short of saying he would oppose the nomination. Sen. Carl Levin (D-Mich.), chairman of the Senate Armed Services Committee, has voiced his support for Hagel.



AP photo by Carolyn Kaster

In with the new in 2013.

A champion of using multilateral sanctions to get Iran to comply with UN directives on its nuclear program, Hagel specifically rejected unilateral sanctions by the US as "counterproductive." He has consistently voiced warnings that conflict with Iran could be costly in lives and treasure and urged his colleagues to be patient in seeking a diplomatic solution. He has also expressed an openness to negotiate with Hezbollah and Hamas.

At a press conference after Obama's announcement, White House press secretary Jay Carney acknowledged Hagel's attitudes and said that he and Obama are "in sync" in their views. Carney also described Hagel as a "staunch" supporter of Israel.

In an interview with the *Lincoln Journal Star* of Lincoln, Neb., published the day after his nomination, Hagel said he'd been unable to counter the "charges, falsehoods, and distortions" of his record until the nomination was officially made. He told the paper that he has always maintained "unequivocal, total support for Israel" and there is "not one shred of evidence that I'm anti-Israeli, not one [Senate] vote that matters ... hurt Israel." On some issues relating to Israel, Hagel said he "didn't sign on" because the measures were "counterproductive and didn't solve a problem."

He didn't support unilateral sanctions on Iran because "when it is us alone, they don't work and they just isolate the United States." He added that UN sanctions are having the desired effect, but "when we just decree something, that doesn't work." Hagel said he's consistently pointed out that Iran "is a state sponsor of terrorism." However, "I have also questioned some very cavalier attitudes taken about very complicated issues in the Middle East." Willingness to negotiate with Israel's enemies isn't a betrayal, he said.

"Furthering the peace process in the Middle East is in Israel's interest," Hagel told the *Star.*

Senate minority leader Mitch McConnell (R-Ky.) said Hagel would get "a fair hearing" in the Senate.

Many Democrats, too, offered tepid immediate responses to Hagel's nomination. Some—like Sen. Charles Schumer (D-N.Y.), known for advocating the "special relationship" between



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the US and Israel, said simply he is anxious to hear what Hagel has to say at his confirmation hearing.

Other Democrats fumed that Obama had, once again, selected a Republican to lead the Pentagon, having held over Robert M. Gates from the Bush Administration. President Bill Clinton also had a Republican defense chief, former Senator William S. Cohen. Self-styled liberal commentator Rachel Maddow said Obama's choice—given that there's plenty of "depth" on the Democratic bench—perpetuates "the myth ... that only Republicans" can manage defense.

Some Democrats also grumbled that Hagel had made some public anti-gay comments—comments for which Hagel has already apologized. Carney said that Hagel would, "of course, ... enforce" all Obama policies, including the repeal of "Don't Ask, Don't Tell."

Obama's choice, however, offers the President many pluses and few minuses. If Republicans voted against one of their own—a veteran wounded in battle, no less—it would play to Obama's assertion that the Republican Party has become extremist and cannot tolerate a moderate, even from its own ranks. Voting against Hagel would also be a public sneer at a bipartisan gesture. (Obama's Cabinet has one other Republican, Transportation Secretary Ray Lahood.) Senate Democrats likely would not deny Obama his choice.

Washington observers forecast Hagel would prevail in a close nomination vote, offering Obama a "win" in a fierce battle early in his second term. Moreover, if Obama relents to calls from within his own party to cut defense even more deeply than the plan laid out in the 2011 Budget Control Act—over the objections of Panetta—having a Republican making the case for those cuts makes it harder for Republicans to reject them.

Hagel told the *Star* he wasn't looking for a new job and agreed to serve because, he said, "I have great confidence" in Obama, whom he described as a "decent ... good man. He and I don't agree on everything, but he wants people who will be honest with him."

THE NEW MARCH MADNESS

In the nether hours of 2012, Congress and the White House hashed out a deal that would stave off sequestration—and mandated, draconian cuts to defense—postponing it until March 1. In the meantime, negotiations continue.

Pentagon Comptroller Robert F. Hale, in an address to the Brookings Institution in early January, said the deal—called the American Taxpayer Relief Act of 2012—reduces somewhat the pain that sequestration would inflict. Had the old law kicked in on Jan. 3, the Defense Department would have had to cut $62 billion from its programs, or about 12 percent of its topline. Under the new law, the bill will be $45 billion—if there is a sequestration—amounting to nine percent of the topline, Hale said. The changes stem from modifications in the statute; Congress "changed some of the caps," Hale explained.

However, "we still don't want it to happen," he added, noting that all the warnings about how destructive sequestration would be to the carefully calculated Pentagon budget would still be true, to an only slightly smaller degree. Moreover, DOD would have less than two months to figure out how to scale back more than 2,500 programs. Beyond that, a new fight over the federal debt ceiling is brewing, which would have to be resolved by March 27 or the country will risk going into default—again putting the defense budget at risk.

"It gives a whole new meaning to the term, 'March Madness,' and I can't wait for it to be over," Hale asserted.

Hale said the sequestration would be somewhat worse than face value because "we have to protect money for combat operations," which are supposed to be funded increasingly from the base budget rather than separate overseas contingency operations budgets. That will reduce funds for investment accounts, he said.

He also acknowledged that the defense budget request will probably be late this year.

"It will be OMB's [Office of Management and Budget] call," Hale noted, but "we would be transmitting data to OMB right now, and we're not ready to do that." He couldn't say how late the budget will be, but it is usually sent to Congress at the end of January.

The Pentagon leadership had no plans to issue guidance for sequestration, he said.

We "want to continue not to take specific steps in anticipation of sequestration" because the department is hoping Congress will avoid it. The threat of the sequester and the historically long continuing resolutions under which the Pentagon has been operating "hog-tie the department" and make planning extremely difficult, Hale said.

He described the overall situation as "a confluence of unfortunate events." If "we are allowed the authority to make choices" as to what cuts will be made with sequestration, "they'll probably be investment-heavy in the beginning" and force structure cuts will probably come later.

PANETTA: FINISHING OLD AND NEW BUSINESS

The controversial nomination of Chuck Hagel to be the new Defense Secretary overshadowed the looming departure of Leon E. Panetta, who presided over more significant milestones in his 19 months than most who have held the top Pentagon job.

On Panetta's watch, the US wrapped up its war in Iraq, having brought that conflict, in Panetta's words, to "an honorable conclusion." Despite dire prediction that Iraq would instantly become a sectarian free-for-all as soon as the last American left, the Iraqi government has maintained a reasonable semblance of order, and while civil unrest persists and there is still occasional bloodshed, it is nothing like what was expected. Panetta engineered the military exit artfully.

Muammar Qaddafi, a thorn in the side of the US and the West for 40 years, is gone—his regime replaced by one seeking democracy and a departure from radicalism. Panetta took over the Libyan conflict from predecessor Robert M. Gates and provided heavy support to what became an ally-led effort while keeping America's other two wars from going off the rails.

Left to its own devices, the Pentagon likely never would have come up with its new Pacific strategy and shift toward smaller, higher-quality forces. Interservice politics would have likely delivered a bland, excessively "joint" strategy giving all the branches equal status and importance, instead of emphasizing air and naval capability as the keys to achieving 21st century virtual presence and balancing a rising China. Panetta, in close coordination with the White House, managed an end run around the ground forces, which tried to ignore the fact that their roles—so important in Iraq and Afghanistan—were not the highest priorities in dealing with the long distances and higher-end threats of the Pacific.

It was also Panetta who calmly managed the end of the "Don't Ask, Don't Tell" policy, damping the controversy by working closely with Congress—where he had been a nine-term member of the House—and the White House, where he had been chief of staff under President Bill Clinton.

In a press statement regarding his impending departure as defense chief, Panetta said he was pleased to have had a role in "implementing the campaign plan to build an Afghanistan that can secure and govern itself by the end of 2014." He also noted that on his watch, DOD has provided "greater support for our Active, Reserve, and Guard forces, their families, and our wounded warriors." ■



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Air Force World

By Aaron M. U. Church, Associate Editor

Clarke Takes Over Air Guard

The Senate confirmed Lt. Gen. Stanley E. Clarke III as the new director of the Air National Guard, to succeed Lt. Gen. Harry M. Wyatt III early this year.

Clarke has commanded Continental US NORAD Region and 1st Air Force at Tyndall AFB, Fla., since August 2011 and previously served as deputy director of the Air Guard from May 2007 to June 2008. He has logged more than 4,000 flight hours in fighters, trainers, and intelligence aircraft.

Wyatt began his Air Force career in 1972 and led the Air National Guard since February 2009. He planned to retire from the Air Force in February, ending a 40-year military career.

President Obama tapped Clarke for the post in December and Senators voted in favor of Clarke's nomination Jan 1.

Finally, a 2013 Defense Bill

President Obama signed the $633.3 billion Fiscal 2013 defense authorization bill into law on Jan. 2, the White House announced. Lawmakers concluded work on the legislation in December, two months after Fiscal 2013 actually began.

Obama approved the legislation despite reservations on several points because, he said in a statement, "it authorizes essential support for service members and their families, renews vital national security programs, and helps ensure that the United States will continue to have the strongest military in the world."

The President said he was concerned the bill's restrictions on the Defense Department's "ability to retire unneeded ships and aircraft will divert scarce resources needed for readiness and result in future unfunded liabilities." By failing to agree to "prudent cost-sharing reforms" in Pentagon health care programs, "Congress may force reductions in the overall size of our military forces," he said.

At the same time, Obama also signed the American Taxpayer Relief Act of 2012. It delays budget sequestration by several months, among other provisions.

Bogdan Takes Over F-35

Lt. Gen. Christopher C. Bogdan took charge of the F-35 strike fighter program in a Dec. 6 Pentagon ceremony, putting an Air Force general officer in charge of the Defense Department's largest acquisition effort.

Bogdan became the F-35 deputy program executive officer in July 2012 and succeeds Vice Adm. David J. Venlet, who led the joint program office from May 2010 until his retirement.

"The work by Admiral Venlet and the team over the past two-plus years on the most complex program in history is incredible," said Bogdan, who received a third star for this assignment. "We are now very well-positioned for the future."

Bogdan led the Air Force's KC-46 tanker project before shifting to the F-35 program, which aims to develop and deliver some 2,443 stealthy strike fighters to the US military, including 1,763 for the Air Force. Hundreds more will be built for international partners.

"I'm committed to delivering these aircraft to our warfighters," said Bogdan.

North Korea in Orbit

North Korea launched a multistage Unha-3 rocket Dec. 11 and claimed to have successfully placed a small satellite dubbed Kwangmyongsong-3 into orbit.

NORAD officials said US missile warning systems detected and tracked the missile, starting at 7:49 p.m., flying along a southerly azimuth. "Initial indications are that the first stage fell into the Yellow Sea. The second stage was assessed to fall into the Philippine Sea. Initial indications are that the missile deployed an object that appeared to achieve orbit," NORAD stated in a news release the same day. "At no time was the missile or the resultant debris a threat to North America."

The missile passed over western Okinawa, Japan, according to *Stars and Stripes.* The White House summarily condemned the launch. This action is "yet another example of North Korea's pattern of irresponsible behavior," said National Security Council spokesman Tommy Vietor.

North Korea insisted it launched the satellite for peaceful scientific purposes, while US, Japanese, and South Korean officials asserted the



USAF photo by SSgt. Jon Polka

launch actually validated long-range ballistic missile technology that could eventually threaten the continental US.

Eglin Begins F-35 Training

Air Education and Training Command cleared the 33rd Fighter Wing to begin full-up F-35A pilot training at Eglin AFB, Fla., in January, following completion of its operational utility evaluation last fall.

AETC Commander Gen. Edward A. Rice Jr. made the decision following his review of the independent OUE results gauging the wing's ability to execute the training mission.

"The OUE showed the men and women at Eglin are ready" and "can conduct safe and effective flying operations in addition to academic training," said Rice. "I'm very proud of both those in uniform and the contracted support who put in years of hard work" to achieve the milestone.

During the OUE that concluded in November, four primary and two backup student pilots completed six flights along with the requisite classroom and simulator training to transition from the A-10 and F-16 to the F-35A.

At full capacity, Eglin's training operations are expected to support 100 student pilots a year, along with 2,100 maintenance students. Some 36 Air Force pilots are expected to go through the training program in 2013, according to Eglin's release Dec. 17.

SpaceX Wins DOD Mission

SpaceX won its first Air Force con-



12.16.2012

The ground crew works on a C-17 during its stopover at Pago Pago Arpt., American Samoa, on the way to a joint exercise in Australia. Tropical Cyclone Evan passed over the islands in December, leaving a huge puddle that reflects the aircraft and surrounding mountains.



Lockheed Martin photo by Darin Russell



Lockheed Martin photo by Tom Reynolds

Opening the Envelope: ***Above, F-35 AF-4 is outfitted with a spin recovery chute at Edwards AFB, Calif. Testers have recently expanded the flight envelope of the conventional takeoff and landing variant with several high-angle-of-attack tests (right) including the first intentional departure from controlled flight on Dec. 4, followed by 50-degree angle-of-attack tests.***

tract to boost national security payloads into orbit on two Evolved Expendable Launch Vehicle-class missions, the company announced Dec. 5.

USAF currently uses United Launch Alliance Delta IV and Atlas V rockets. The contract is among the first marking the service's effort to allow new launch providers to break into the military launch market.

"SpaceX deeply appreciates and is honored by the vote of confidence shown by the Air Force in our Falcon launch vehicles," said SpaceX CEO Elon Musk.

The Air Force plans to use a SpaceX Falcon 9 rocket to launch the Deep Space Climate Observatory vehicle in late 2014. It will ascend from the company's new pad at Cape Canaveral AFS, Fla.

This year, SpaceX plans the first test of the Falcon Heavy rocket configuration which is slated to carry the Air Force's Space Test Program-2 mission in mid-2015.

X-37 Begins Third Spaceflight

One of the Air Force's two experimental X-37B orbital test vehicles launched on the unmanned type's third space mission atop an Atlas V rocket from Cape Canaveral AFS, Fla., Dec. 11.

"We couldn't be more pleased with the strides we've made in this program," said Richard W. McKinney, the Air Force's deputy undersecretary for space programs, in a news release the same day. "However, it is important to keep in mind that this is an experimental vehicle, and a third mission is still relatively young for a test program."

After undergoing refurbishment following the first X-37 flight in April 2010, the first X-37 vehicle was reused for the December launch. On its first mission, the vehicle spent 224 days on orbit, while the second vehicle, which returned in June, spent 469 days in space.

"We are excited to see how this vehicle performs on a second flight," said Lt. Col. Tom McIntyre, X-37B program manager. He said the length of the vehicle's stay on orbit will depend on the execution of its assigned test objectives and its overall performance.



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Peninsula Hawks?

The Pentagon notified Congress of the possible $1.2 billion foreign military sale of four RQ-4 Global Hawk Block 30 remotely piloted aircraft and associated equipment and logistical support to South Korea.

The East Asian ally "needs this intelligence and surveillance capability to assume primary responsibility for intelligence gathering from the US-led Combined Forces Command in 2015," stated the Defense Security Cooperation Agency's press release Dec. 24.

The agency noted the proposed sale would "maintain adequate intelligence, surveillance, and reconnaissance capabilities and will ensure the alliance is able to monitor and deter regional threats in 2015 and beyond."

South Korean Global Hawks would carry a Raytheon-supplied electro-optical/infrared camera suite, a radar for synthetic aperture radar imaging and ground moving target indication, DSCA said.

BUFF It Out

The Air Force is slowly reducing the number of out-of-service B-52Gs held at Davis-Monthan AFB, Ariz. The bombers count as nuclear delivery platforms under the New START agreement until their airframes are cut up.

There were 30 B-52Gs in the Air Force's aircraft "Boneyard" in the Arizona desert still considered as "deployed heavy bombers" under New START counting rules, according to a State Department's fact sheet reflecting the arsenal as of Sept. 1, issued at the end of November.

The total was down by six airframes compared to the data in the previous fact sheet published last June, detailing the arsenal's composition through March 1, 2012.

To eliminate the aircraft from the nuclear capable inventory under treaty stipulations, the tail of each B-52G is severed from its fuselage to render the aircraft demonstrably unusable.

USAF maintains a force of more than 140 B-2A, B-52G (all retired), and B-52H nuclear capable bombers, according to the most recent fact sheet.

It plans to draw down the total nuclear capable bomber force to no more than 60 deployable bombers—20 B-2As and 40 B-52Hs—by February 2018 as part of the United States' overall reductions to meet treaty warhead and delivery system ceilings.

Instead of disposing of currently flyable airframes, the Air Force plans to convert several B-52Hs to conventional-only specs as part of its compliance plan.

Last Tactical Mile

Lawmakers ordered the Air Force to maintain 40 tactical airlifters to meet the Army's time-sensitive direct support delivery needs, according to the conference report included with this year's defense authorization bill.

The Air Force must ensure the direct support employment concept is "wholly incorporated" into Air Force's doctrine, strategy, and tactics by June 2013, stated the report, released Dec. 18.

Service leaders already earmarked eight C-130s for the task and the remaining 32 airlifters—either C-130s or C-27Js—will come from the pool of airframes the Air Force slated for retirement in its previous force structure proposal.

USAF's revised force structure proposal, published last November, was less ambitious than its original plan, which Congress rejected. Legislators gave the Air Force discretion to choose the exact mix, and USAF set up an Intratheater Airlift Working Group to recommend how best to comply with the measure by the end of January.

Now, Nine-Week Wonders

Starting in January, the Air Force Officer Training School's basic officer course at Maxwell AFB, Ala., was shortened to nine weeks, clipping three weeks from the previous course length.

School officials did this to streamline the curriculum and scheduling, OTS Commandant Col. Thomas C. Coglitore stated in a press release Dec. 4.

"Our staff was able to adapt its operations and curriculum in several innovative ways to save money and airmen's time while still producing fully qualified and capable second lieutenants," he said.

The pared-down syllabus now fulfills the minimum federal commissioning standards, and "I am comfortable that we are not lowering standards but becoming more efficient with how we schedule and conduct the training," said Coglitore.

In Fiscal 2012, 642 second lieutenants graduated from the course; 1,055 new officers are expected to graduate in this fiscal year from across the Air Force's Active Duty and reserve components, according to officials at Maxwell.

Return From Guam

An expeditionary squadron of F-22s returned to JB Elmendorf-Richardson, Alaska, in December, after nearly three months deployed on a theater security rotation to Andersen AFB, Guam.

The F-22 deployment "was a typical movement testing the squadron's capability to rapidly respond and deploy to any environment with minimal notice and full combat capability," said Elmendorf spokeswoman Capt. Ashley Conner Dec. 7.

While in the Pacific, the F-22 pilots—from the Active Duty 90th Fighter Squadron and Air Force Reserve Command's 302nd FS—flew just shy of 500 sorties totaling some 800 flight hours. F-22s also participated in exercise Valiant Shield with the USS *George Washington* carrier strike group.

More than 250 personnel and 12 jets deployed from Elmendorf in September. The 525th FS—Elmendorf's second F-22

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USAF photo by TSgt. Barry A. Loo



Jumping, Jacks: *Army paratroopers jump from an Air Force C-130 Hercules during Operation Toy Drop at Fort Bragg, N.C. Soldiers donate toys for children in need in exchange for the opportunity to jump from a USAF aircraft with a foreign jumpmaster. This earns them foreign jump wings.*

Back to Black Hawk

Several helicopter manufacturers announced they will not bid to replace the Air Force's aging Sikorsky HH-60G Pave Hawk rescue helicopters, leaving a variant of the same basic helicopter the leading—if not the sole—option.

After viewing the Air Force's request for proposal, Boeing, EADS North America, and Northrop Grumman (teamed with AgustaWestland) all confirmed they will not compete in the service's Combat Rescue Helicopter contest to supply the 112-airframe fleet, according to press reports.

All three vendors viewed the RFP as favoring an aircraft like the Black Hawk without rewarding extra capabilities their respective platforms could offer, Reuters reported Dec. 12.

Sikorsky, builder of the Black Hawk and Pave Hawk variant, confirmed, however, that it plans to submit an offer.

The Air Force press release on the CRH solicitation issued last October called for an "affordable" solution that leveraged "in-production air vehicles and training systems" integrated with "existing technologies."

Pentagon acquisition regulations prevent Air Force officials from openly discussing the state of the competition, but "the Air Force is committed to a fair, open, and transparent process," said a service spokesman. "To ensure this occurs, we are prohibited from releasing information while in the request for proposal and selection processes."

Bids for the new helo were due Jan. 3, and the Air Force plans to award a contract by September, with notional initial operational capability slated for Fiscal 2018.

The Pentagon's acquisition executive waived requirements for competitive prototyping. By law, major defense acquisition programs are now required to have that, barring extenuating circumstances.

squadron—left for weapons training at Tyndall AFB, Fla., as the expeditionary squadron returned from Andersen.

Beyond-ALCM Study

The Air Force plans to award contracts to study performance necessary for the service's next generation nuclear cruise missile, service officials said.

USAF aims to issue fixed-price contracts to Boeing, Lockheed Martin, Northrop Grumman, and Raytheon for trade studies to support the Long-Range Standoff Missile's (LRSO) technology development phase, according to a notice posted online Dec. 5.

LRSO is envisioned as the successor to the Air Launched Cruise Missile that B-52s carry as an element of the US strategic nuclear deterrent.

Service officials told Congress last year that the LRSO program would

begin two years later than originally planned, in Fiscal 2015, due to servicewide budgetary constraints.

The LRSO analysis of alternatives was scheduled for completion early this fiscal year. However, the Air Force doesn't expect a capability gap between retirement of the current ALCM—which it says is viable out to 2030 or beyond—and initial service of the LRSO.

Future Gunship's First Flight

The first MC-130J special mission aircraft slated for conversion to the Air Force's new AC-130J gunship configuration made its maiden flight in early December from Lockheed Martin's production facility in Marietta, Ga.

After modifications, the airframe will feature a scaled iteration of the modular Precision Strike Package of weapons and sensor suite already carried on Air Force Special Operations Command MC-130Ws.

The first AC-130J is scheduled to fly for the first time as a gunship in early 2014, the company stated.

The Air Force intends to acquire 16 new-build AC-130Js under a $1.6 billion recapitalization project meant to replace its legacy AC-130Hs and provide additional gunship capacity.

The Air Force has a requirement for 37 AC-130Js. The first is slated for initial operational capability in 2015, Lockheed Martin said.

Contract for AEHF 5 and 6

The Air Force awarded Lockheed Martin a $1.9 billion fixed-price contract for production of the fifth and sixth Advanced Extremely High Frequency military communications satellites, the company announced in January.

"This production contract affirms the government's confidence in Lockheed Martin's ability to deliver these spacecraft affordably and efficiently to meet the burgeoning demand from strategic and tactical users worldwide," said Mark Calassa, space systems communications vice president, in a Jan. 2 release.

The first two AEHF satellites are already on orbit and the third is expected to be launched into space in September, while assembly of AEHF-4 is progressing on schedule.

AEHF satellites complement and will eventually replace Milstar spacecraft, offering higher communications capacity. The new contract reflects evolution of the AEHF program to a fixed-price structure as part of a larger cost savings plan, company officials said.

Aloha and Mahalo, Montana

Montana Air National Guard F-15s handed over responsibility for protecting the airspace around the 50th state back to the ANG's 190th Fighter Wing at JB Pearl Harbor-Hickam, Hawaii, at the beginning of December.

F-15s from the 120th Fighter Wing deployed to Hickam from Great Falls in August 2010 to cover Hawaii's aerospace control alert mission while the Hawaii Air Guard transitioned from the F-15 to the F-22.

Because the Air Force grounded the Raptor fleet for five months in 2011, the Hawaii ANG's 199th Fighter Squadron—together with its Active Duty associate unit, the 19th FS—was delayed in launching Raptor operations.

As a result, Montana's F-15 deployment stretched from 14 months to more than two years. A detachment of some 40 Montana Guardsmen was deployed to Hickam at any one time, and all but a dozen rotated back and forth, according to Montana's *Great Falls Tribune* Dec. 7.

On their return, the 120th FW airmen were slated to exchange their F-15s for

The War on Terrorism

Operation Enduring Freedom

Casualties

By Jan. 14, a total of 2,166 Americans had died in Operation Enduring Freedom. The total includes 2,163 troops and three Department of Defense civilians. Of these deaths, 1,716 were killed in action with the enemy while 448 died in noncombat incidents.

There have been 18,188 troops wounded in action during OEF.

Air-drop Cessnas

The Air Force is looking to modify Afghan Air Force Cessna C-208 light airlifters with specialized equipment for cargo airdrop, according to a solicitation to industry published late last year.

Under the Afghanistan C-208 Airdrop Program, the contractor would initially ferry two Afghan C-208s from Shindand AB, Afghanistan, for testing of the air-drop modifications in the United States, Air Force Materiel Command stated in its Dec. 3 request for information.

Modifications would include fitting the aircraft with midair-operable cargo doors, pallet floor rollers, parachute static lines, slipstream fairings, air-drop signal lights, and a cockpit operator's panel.

On successful completion of flight testing at Eglin AFB, Fla., and Peterson AFB, Colo., the contractor would retrofit the AAF's Caravan fleet with the air-drop kits.

Dunford Confirmed as ISAF Chief

The Senate on Dec. 3 approved the nomination of Marine Corps Gen. Joseph F. Dunford Jr. to lead US and NATO forces in Afghanistan.

Dunford replaces Marine Corps Gen. John R. Allen, who has helmed the NATO-led International Security Assistance Force since July 2011. Dunford has served as Marine Corps assistant commandant since October 2010.

Obama tapped Dunford for the post in October, saying he would "lead our forces through key milestones in our effort that will allow us to bring the war to a close responsibly" by the end of 2014.

Obama has nominated Allen to the dual-hatted post of NATO's Supreme Allied Commander, Europe, and head of US European Command.

Condor Milestone

Air National Guard RC-26B Condors have provided overhead surveillance support in US Central Command's area of operations during more than five years of continuous deployment to the region, according to Air Guard officials.

Since its stand-up in 2007, the 45th Expeditionary Special Operations Squadron—comprising Guardsmen from 11 states—has amassed 42,000 combat hours in some 9,400 sorties, providing coverage over Iraq and Afghanistan for 64 straight months, stated the New York Air Guard's 174th Attack Wing in Syracuse.

The all-volunteer force originally deployed for a year in response to an urgent CENTCOM request.

Guardsmen adapted the counternarcotics aircraft to battlefield intelligence, surveillance, and reconnaissance, paving the way for what would become the Air Force's MC-12 Liberty platform.

These Air Guardsmen also developed tactics for the MC-12 and formed the Liberty's initial training cadre, according to the unit.

Senior Staff Changes

NOMINATIONS: To be Lieutenant General: Gregory A. **Biscone,** Lori J. **Robinson.**

CHANGES: Lt. Gen. (sel.) Gregory A. **Biscone,** from Dir., Global Ops., STRATCOM, Offutt AFB, Neb., to Chief, Office of the Defense Representative-Pakistan, CENTCOM, US Embassy, Islamabad, Pakistan ... Brig. Gen. Thomas F. **Gould,** from Vice Cmdr., 14th AF, AFSPC, Vandenberg, Calif., to Dep. Chief, Spt., Office of Security Cooperation-Iraq, Dep. of State, Baghdad, Iraq ... Lt. Gen. (sel.) Lori J. **Robinson,** from Dep. Cmdr., AFCENT, CENTCOM, Southwest Asia, to Vice Cmdr., ACC, JB Langley-Eustis, Va. ... Brig. Gen. Jay B. **Silveria,** from Dep. Chief, Spt., Office of Security Cooperation-Iraq, Dept. of State, Baghdad, Iraq to Vice Cmdr., 14th AF, AFSPC, Vandenberg AFB, Calif. ... Maj. Gen. (sel.) Kenneth S. **Wilsbach,** from Dep. Dir., Ops., PACOM, Camp H. M. Smith, Hawaii, to Cmdr., 9th Air & Space Exped. Task Force-Afghanistan, ACC, Kabul, Afghanistan.

SENIOR EXECUTIVE SERVICE CHANGES: Rafael A. **Garcia,** to Dir., Propulsion, AF Life Cycle Mgmt. Center, AFMC, Tinker AFB, Okla. ... Stephen R. **Herrera,** to Assoc. Dep. Asst. Secy., Financial Ops., Office of the Asst. SECAF, Financial Mgmt. & Comptroller, Pentagon ... Bobby W. **Smart,** to Assoc. Dep. Asst. Secy., Acq. Integration, Office of the Asst. SECAF, Acq., Pentagon.

COMMAND CHIEF MASTER SERGEANT CHANGE: CMSgt. Gerardo **Tapia Jr.,** to Command Chief Master Sergeant, AETC, JB San Antonio-Randolph, Tex. ■

C-130s, a move Montana lawmakers continue to oppose.

Raptor Runway Rash

An F-22 assigned to the Hawaii Air National Guard's 199th Fighter Squadron sustained $1.8 million in damage in a landing accident at Joint Base Pearl Harbor-Hickam Dec. 7, according to press reports.

The mishap occurred as the Raptor was returning to base after participating in a multi-F-22 ceremonial flyover during a commemoration of the 71st anniversary of Japan's surprise attack on Pearl Harbor, CBS News reported.

The F-22 scraped its tail and damaged its horizontal stabilizers on landing at Hickam, stated the report. The pilot suffered no injuries and Air Force investigators are looking into the incident.

Detachment Dry Run

F-16s from the 56th Fighter Wing at Luke AFB, Ariz., recently deployed to test the ability of Holloman AFB, N.M., to support the F-16 formal training unit that is relocating there from Luke in the near future.

"The F-16s will eventually be based here, training both pilots and maintainers," explained Col. Rodney J. Petithomme, commander of the 56th FW's Operation Location-Alpha detachment.

"This training gives us the opportunity to find problems now and gives us time to fix them before they arrive permanently," he said in Holloman's Dec. 13 release.

Luke's 309th Fighter Squadron sent 18 F-16s and 190 personnel to Holloman for the evaluation. The F-16s flew an average of 24 sorties each day—both instructor upgrade and weapons qualification flights—during their one-week stay, beginning Dec. 7.

The Air Force is shifting two F-16 training squadrons from Luke to offset Holloman's forthcoming loss of the F-22 flying mission.

Unbroken Arrow

Texas environmental authorities recently signed off on the Air Force's successful removal of uranium and lead contaminants from the site of a Cold War-era B-47 bomber crash near Dyess AFB, Tex.

"The site cleanup was a proactive, precautionary measure taken to provide for any potential future use of the land," said Judy Overbey, restoration program manager for Dyess' 7th Civil Engineering Squadron, in a base news release Dec. 12.

"The amount of contaminants found in the soil at the site was extremely low in most places," she said.

Atomic Energy Commission and base responders removed the majority of contaminants after the B-47 caught fire on takeoff and crashed into a privately owned field on Nov. 4, 1958.

Though the nuclear weapon the bomber was carrying did not detonate, the conventional explosives within the device did, scattering lead and uranium elements, some of which were left until final restoration efforts began in 2010.

According to Dyess, Texas' environmental agency issued a closure letter on Nov. 1, certifying the site's suitability for full agriculture and residential use.

F-16 Overshoots at Kunsan

An F-16 overran the runway in a landing accident at Kunsan AB, South Korea, Dec. 3, base officials reported.

The pilot sustained no injuries, said the base's 8th Fighter Wing press release. The Air Force will investigate the incident.

Another F-16 assigned to nearby Osan Air Base experienced engine failure and crashed just northeast of Kunsan in a separate incident last March. The pilot escaped injury.

Bent Scythe

An MQ-9 Reaper remotely piloted aircraft assigned to the 57th Wing at Nellis AFB, Nev., crashed at the Nevada Test and Training Range during a combat training mission Dec. 5.

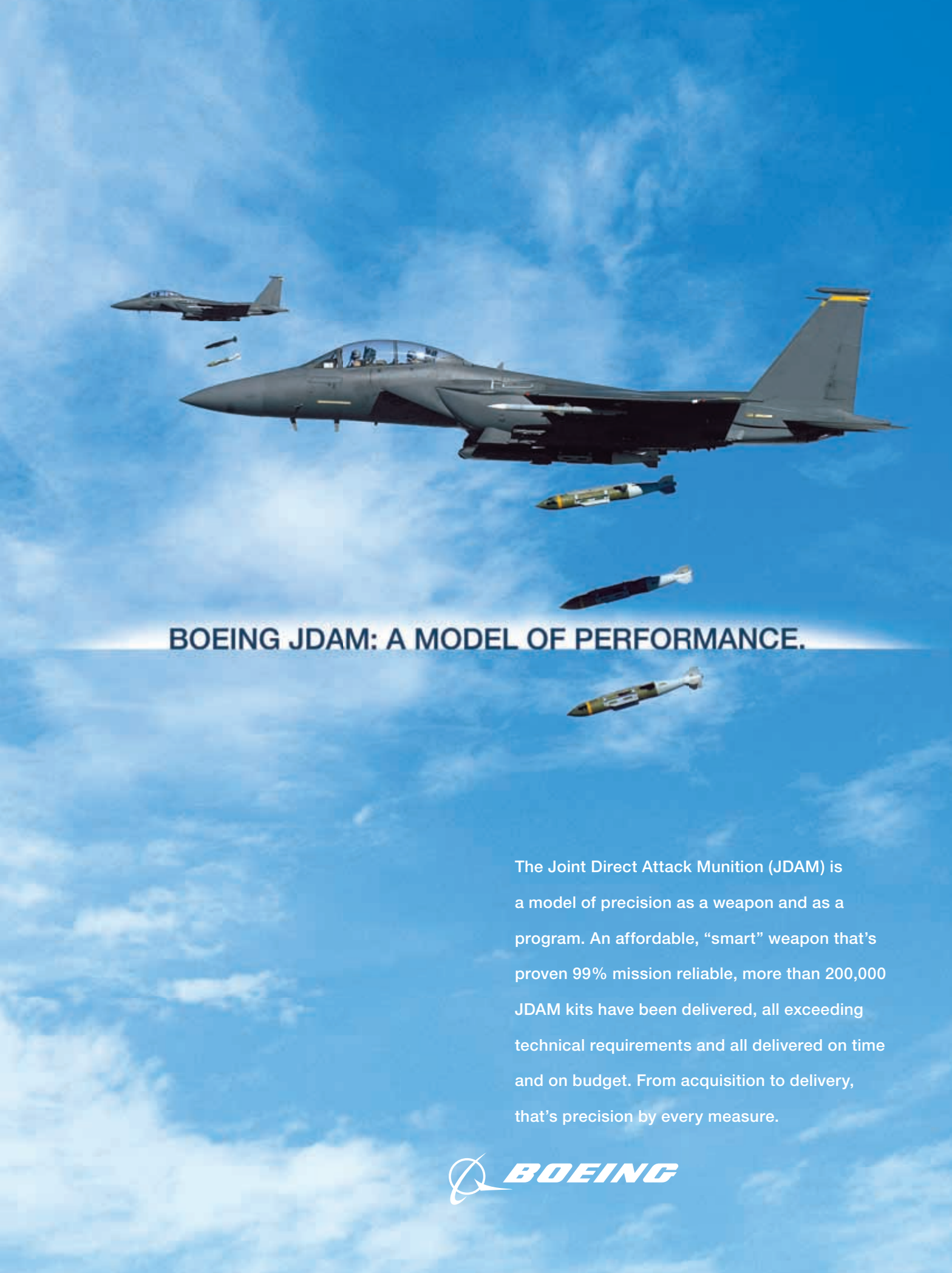
The mishap occurred in a remote location west of Hiko, and no one was injured in the incident, Nellis officials stated.

The training mission was part of the Air Force Weapons School's mission employment phase, which serves as



USAF photo by Greg L. Davis

Breathe, Just Breathe: *SSgt. Matt Turner (l) and Amn. Mandy Clark, both of the 436th Aerial Port Squadron, try out different levels of chemical protective gear during a training exercise at Dover AFB, Del., on Dec. 13. The 436th Maintenance Group was evaluating the deployment preparedness of its airmen.*


BOEING JDAM: A MODEL OF PERFORMANCE.
The Joint Direct Attack Munition (JDAM) is a model of precision as a weapon and as a program. An affordable, “smart” weapon that’s proven 99% mission reliable, more than 200,000 JDAM kits have been delivered, all exceeding technical requirements and all delivered on time and on budget. From acquisition to delivery, that’s precision by every measure.
BOEING

a capstone graduation exercise. Air Force investigators are looking into the cause of the crash.

Herc Tuning

Turboprop T56 engines modified by Rolls Royce yielded even better fuel economy and reliability than predicted with a legacy C-130H in recent trials at Edwards AFB, Calif., the company said.

The Air Force flight-test team "confirmed that by inserting new technology, we can bring dramatic improvements in fuel consumption and engine reliability to C-130 operators," said Tom Hartmann, Rolls Royce's senior vice president, in a company release Dec. 10.

Using a C-130H fitted with both standard and modified T56 engines, testers at Edwards found that Roll Royce's Series 3.5 upgrades reduced fuel burn by nearly 10 percent and increased reliability by 22 percent, the company claimed.

Series 3.5 modifications include fitting new turbine blades and compressor vanes, which the company says maintainers could perform during regular depot maintenance.

The Air Force estimates modifying its legacy C-130Hs with the new kit could save as much as $2 billion across the fleet out to 2040, Rolls Royce stated.

Space Launch Contracts Let

The Air Force let a $900 million indefinite-delivery, indefinite-quantity contract for space launch services under the Rocket Systems Launch Program, the Pentagon announced late last year.

Under this contract, Lockheed Martin, Orbital Sciences, and Space Exploration Technologies will provide launch vehicles through November 2017, states the contract description, included in the Defense Department's Dec. 3 major contract list.

RSLP uses commercial launch systems as well as deactivated Minuteman and Peacekeeper ICBM motors to place small spacecraft into a variety of orbits for DOD and other government agencies.

Bread Box Weathersat

Boeing announced that it delivered two tiny experimental weather satellites to the Air Force to help assess the value of small satellites in military space operations.

The Space Environmental Nanosat Experiment (SENSE) satellites weigh less than nine pounds and are no larger in volume than an average loaf of bread, the company stated Dec. 18.

Both satellites are scheduled to launch with the upcoming ORS-3 mission this summer. Once on orbit, they will collect and transmit weather data to aid weather prediction and assessment.

"We anticipate these nanosatellites will play a significant role as affordable and resilient assets in future Air Force space architectures," said Col. Scott Beidleman, director for development and planning at the Space and Missile Systems Center at Los Angeles, AFB, Calif.

"The SENSE nanosats offer customers an affordable, operationally robust option to conduct military missions," said Bruce Chesley, Boeing's director of advanced space and intelligence systems.

Leaning Lajes

USAF's uniformed contingent at Lajes Field, Azores, is being cut from a full wing down to a group to meet Pentagon cost-cutting demands, base officials said late last year.

"Lajes Field's strategic mission is important and valuable, and will not change, but the footprint with which we accomplish our mission will," said Col. Chris Bargery, commander of Lajes' 65th Air Base Wing, in a news release Dec. 13.

"The US force posture is being adjusted to meet fiscal challenges, while maintaining a strong, capable relationship with our Portuguese allies," he added.

More than 400 uniformed personnel and 500 dependents will depart the installation by the end of Fiscal 2014.The Air Force expects this will save $35 million in annual operating costs.

The Air Force plans to close the Defense Department school there and reduce services to support one-year unaccompanied tours to the Azores after 2014.

Babylon's Big Birds

Lockheed Martin delivered the Iraqi Air Force's first three C-130Js in De-

Global Hawk Block 30 Reprieved

Congress nixed the Air Force's plan to retire the Global Hawk Block 30 remotely piloted aircraft fleet in the Fiscal 2013 defense authorization bill's conference report.

The proposed cut was one of the Air Force's most prominent cost reducing force structure changes. The report, however, stated that the Air Force Secretary couldn't obligate funds "to retire, prepare to retire, or place in storage" any of the Block 30 aircraft this fiscal year.

Citing intelligence, surveillance, and reconnaissance requirements from combatant commanders, the conference report states that the Air Force Secretary "shall maintain the operational capability" of each Block 30 airplane out to Dec. 31, 2014.

This includes airframes already in the fleet as well as several that will enter the inventory over the intervening time, in total some 18 aircraft, Air Force officials stated.

The Senate version of the bill acceded to the Air Force's request to phase the fleet out, but lawmakers ultimately allocated $155 million to keep these Global Hawks flying in Fiscal 2013, including $133 million for operation and maintenance and $22 million for personnel expenditures.

Canada Reconsiders F-35

The Canadian government recently retreated from its commitment to procure the F-35 strike fighter, announcing that it is relaunching the search to replace its aged CF-18 Hornet fleet.

The Royal Canadian Air Force requirements "that led to the selection of the F-35 will be set aside and not used as part of this new evaluation of options," stated Rona Ambrose, Canada's minister of public works and government services, in a Dec. 12 release.

The Canadian government has taken this fighter procurement away from Canada's defense department and handed it to the public works agency after an unfavorable audit of the F-35's projected life cycle costs last April. Though Canada's Prime Minister Stephen J. Harper has repeatedly underscored his government's commitment to the F-35, the fighter has long been a political target of his Liberal Party opposition.

"Last April, we set out a Seven-Point Plan to hit the reset button on the process to replace the CF-18 aircraft," said Ambrose. Release of the plan's criteria back in December permits "a full consideration of the options available," she added.

Canada was an original partner in the F-35's development and planned to buy 65 strike fighters. The agency hasn't ruled out the F-35 entirely, but will consider options such as Boeing's F-18E/F Super Hornet, the Eurofighter Typhoon, or extending the service life of the legacy Hornets, reported Bloomberg Dec. 13.

cember, company officials said in a release.

Iraqi Air Force commander Staff Lt. Gen. Anwer Hamad Amen accepted one of the first C-130Js in a handover ceremony at Lockheed Martin's assembly plant at Marietta, Ga., Dec. 12.

The two other airframes departed for Iraq the previous day, completing half of the country's order for six C-130Js to reconstitute its intratheater airlift capability.

Iraq's initial cadre of C-130 pilots and maintainers trained with the Rhode Island Air National Guard's 143rd Airlift Wing at Quonset State Arpt., R.I. The final three airframes are slated for delivery this year, the company said.

Swifter Disarmament

The National Nuclear Security Administration dismantled more nuclear weapons than it planned in Fiscal 2102.

The weapons taken apart have been declared excess by the Administration, NNSA officials said.

NNSA achieved 112 percent of its target for Fiscal 2012, dismantling an undisclosed number of B61 and B83-0/1 bombs and W76-0, W80-0, W84, and W78 warheads, stated an agency press release Dec. 3.

"NNSA delivered on President Obama's commitment to reduce the numbers of US nuclear weapons declared excess to the stockpile and awaiting dismantlement," said Don Cook, NNSA deputy administrator for defense programs. "Our stockpile today is smaller, but the deterrent remains just as safe, secure, and effective as it was."

Fissionable material recycled from the process is used to refurbish other warheads, fuel the Navy's nuclear-powered ships, and is even "downblended" to power civilian nuclear power plants, according to NNSA.

Farewell, Marietta

Now that F-22 production is complete, Lockheed Martin is consolidating its fighter business by shifting F-22 sustainment and engineering work from Marietta, Ga., to its facility in Fort Worth, Tex.

"Operating from a centralized location will improve our overall affordability, streamline operations, foster an environment of greater collaboration, and ultimately enhance the level of support we provide our customers," stated Jeff Babione, Integrated Fighter Group vice president, quoted by the *Marietta Daily Journal* Dec. 5.

The company has offered some 560 salaried employees—mostly engineers—the chance to move to Fort Worth along with the F-22 work. Approximately 40 unionized employees, who currently refurbish Raptor canopies and apply low observable tail surface coatings, will remain in Marietta, stated the newspaper.

Lockheed Martin expects to save $250 million over five years through this relocation.

Final Qatari C-17 Delivered

Boeing delivered the fourth and final C-17 transport for the Qatari Emiri Air Force during a ceremony at the company's production facility in Long Beach, Calif., Dec. 10.

Qatar took possession of its third Globemaster III earlier last year. Handover of the fourth airframe completes the Middle East nation's order for two more C-17s in addition to the pair received in 2009.

"The C-17's reliability, along with its unique strategic and tactical capabilities, has expanded our reach and ability to support missions worldwide on a moment's notice," said Brig. Gen. Ahmed al Maliki, head of Qatar's airlift committee, in Boeing's news release. "Doubling our fleet strengthens our ability to support humanitarian, disaster relief, and peacekeeping missions."

Qatar's C-17s have supported NATO operations in Libya and delivered relief for drought victims in Kenya and earthquake victims in Haiti.

With this delivery, Boeing has now supplied 249 C-17s worldwide, including 218 to the US Air Force.

Pilot Cleared in Accident

A court-martial cleared C-17 pilot Capt. Jared Foley of all charges in the case of a West Virginia National Guard soldier killed during a parachute drop over Montana in 2011, reported *The News Tribune* of Tacoma, Wash.

Foley, assigned to the 62nd Airlift Wing at JB Lewis-McChord, Wash., stood accused of reckless endangerment and dereliction of duty for continuing a drop mission on July 10, 2011, after a paratrooper on a previous jump drifted outside the designated landing zone, according to the newspaper.

During the trial, the Army's drop zone safety officer testified that he had cleared Foley to continue the mission and that despite the drift, the ground conditions at the time appeared to be safe. On Foley's pass, Sgt. Francis Campion drifted off course, struck a building, and died when his parachute dragged him off the roof and he hit the pavement. Lt. Col. Eric Carney, the former commander of Foley's 7th Airlift Squadron, testified that Foley was a competent pilot and excellent officer. The 10-officer court-martial panel rendered its verdict Dec. 14.

Gen. Robert Bazley, 1925-2012

Retired Gen. Robert W. Bazley, who led Pacific Air Forces from November 1984 to December 1986, died Dec. 16 at his home in Chapel Hill, N.C., at age 87.

Bazley's military career spanned three wars and 35 assignments at home and abroad. In later years, he was vice commander-in-chief of US Air Forces in Europe and then Air Force inspector general before becoming PACAF's commander-in-chief.

Born in Pittsburgh on Dec. 5, 1925, Bazley enlisted in the Army Air Forces in 1943, receiving his navigator wings and commission in March 1945. He was recalled to Active Duty during the Korean War and flew as an RB-26 navigator before retraining as a fighter pilot.

He flew 257 combat missions in the F-100 as a squadron commander during the Vietnam War, was awarded the Distinguished Service Medal and Defense Superior Service Medal, and logged more than 4,500 flying hours before his retirement in 1987. ■

Accounting for Failure

In a letter to Defense Secretary Leon E. Panetta, the Senate Armed Services Committee leadership took the Air Force to task for scrapping the Expeditionary Combat Support System and asked for answers on how this acquisition effort failed so spectacularly.

"We believe that the public and the taxpayers deserve a clear explanation of how the Air Force came to spend more than a billion dollars without receiving any significant military capability," SASC Chairman Sen. Carl Levin (D-Mich.) and SASC Ranking Member Sen. John McCain (R-Ariz.) wrote Dec. 5.

The Air Force notified Congress in November that it was abandoning the ECSS supply chain management tool meant to transform the Air Force's logistics enterprise.

"From what we know to date, this case appears to be one of the most egregious examples of mismanagement in recent memory," Levin and McCain added.

The lawmakers called on Panetta to provide answers as to why the flawed procurement was allowed to continue for so long, why restructuring efforts failed, who would be held accountable, and what steps the Defense Department is taking to ensure something like this would not happen again.



Air Force Global Strike Command's bombers and missile forces are at an increasing level of readiness.

Sharpening the Nuclear Sword

A B-52H takes off on a training flight from Barksdale AFB, La. B-52s can carry nuclear ALCMs. The bombers regularly test unarmed ALCMs over a test range.



USAF photo by SrA. Marleah Miller

By Aaron M. U. Church, Associate Editor

Three years ago, USAF stood up Air Force Global Strike Command at Barksdale AFB, La., with the goal of revitalizing the service's nuclear enterprise, to ensure USAF's two legs of the nuclear triad are a safe, secure, and effective deterrent force, ready at all times.

Since then, the measurable readiness of USAF's intercontinental ballistic missile and nuclear bomber force has increased by 30 percent, according to AFGSC boss Lt. Gen. James M. Kowalski.

"A lot of what we've seen in improving our readiness has simply been the result of the Air Force reorganizing itself" and changing its cultural attitude, said Kowalski. "All of our airmen understand and embrace the special trust and responsibility of nuclear weapons." This is "foundational" to the ongoing renewal, he said in an interview.

Within Global Strike Command, two numbered air forces assure the day-to-day readiness of nuclear forces: 8th Air Force at Barksdale and 20th Air Force at F. E. Warren AFB, Wyo. They organize, train, and equip combat-ready nuclear forces for US Strategic Command. The ICBMs under the 20th are tasked to STRATCOM around the clock, while 8th Air Force's bombers serve both conventional and nuclear missions.

"To be clear, employment does not mean creating high-yield nuclear detonation," said Maj. Gen. Michael J. Carey, 20th Air Force commander. "It means the operation, maintenance, sustainment, and assured readiness of those forces, 24/7/365" to convincingly dissuade potential enemies from attacking.

To determine the combat readiness of its nuclear force, AFGSC considers weapons, personnel, and command and control. The Minuteman III system, for example, "is made up of the hardware—the missile itself—the men and women conducting the mission, and then the command and control elements that enable its proper use," Carey explained.

STRATCOM's entire nuclear command and control network exercises three times each day, from the national command level at the Pentagon all the way down to fielded ICBM forces scattered across the western United States. Coded messages pass to each launch control center (LCC) controlling all 450 of the Air Force's deployed ICBMs, and the responses are evaluated back up the chain of command.

Test, Test, and Test Again

In addition to the daily test of the "deployed" ICBMs, both bomber and missile forces take part in periodic strategic-level communications exercises to validate their deployment and strike protocols. In fact, evaluators have stitched together "no less than half-a-dozen types of tests, exercises, and readiness demonstrations" to make certain "our force is ready all the time," Carey said in an interview.

The sheer number of interdependent components, and the fact that ICBMs

USAF photo by SSgt. Miguel Lara III



A B-2 prepares to take off on a training mission during Red Flag-Alaska. USAF's B-2 bomber fleet can deliver nuclear gravity bombs.

are on constant alert, makes missile force readiness by far the most complex mission.

In terms of physical components, the bomber weapon system comprises aircraft, air launched cruise missiles, or nuclear free-fall bombs, and the data links to relay and authenticate orders.

For ICBMs, in addition to the missile itself, there is the command and control network, the LCC, and the electrical interface joining the LCC to geographically separate launch sites.

On top of the terrestrial network, there's an airborne component. Alternately, Airborne Launch Control System E-4Bs or Navy E-6B aircraft can control ICBM launches, and this element must be validated as well. As a result, AFGSC must "isolate elements of the test program," then piece them together to "gain confidence that each segment of the force is viable and ready" as a matter of pragmatism, said Carey.

Yearly Tests

Three times a year, the Air Force selects a single operational Minuteman III for an operational test launch over the Pacific Ocean. Since launching ICBMs from their deployed locations across the High Plains would scatter "tankage" debris over Canada—and perhaps panic friends and adversaries alike—live shots take place only from Vandenberg AFB, Calif.

To conduct such a test, operational missiles are pulled directly from their silos near Malmstrom AFB, Mont., Minot AFB, N.D., or F. E. Warren and transported to Vandenberg.

"It's a random selection of missile so that we can get a realistic cross-cut of the deployed missile force," as opposed to cherry-picking a missile that may not reflect the fielded force, Carey said.

For several years, Air Force Space Command testers with the 576th Flight Test Squadron handled all the assembly, preparation, and launching from Vandenberg. Now, underscoring AFGSC's intense operational focus, missileers and maintainers from each missile wing conduct a test shot each year. The LCC capsule underground at Vandenberg has the same equipment the missileers have in their own system, again, to underscore continuity.

During the most recent shot from Vandenberg on Nov. 14, a 341st Missile Wing crew from Malmstrom conducted the "key turn"—turning four switches at essentially the same time to launch a missile—in this instance, from a Navy E-6B Mercury airborne command post aircraft. For purposes of the test, the ICBM was fitted with an inert re-entry vehicle, replicating the flight characteristics of a nuclear payload. The missile was then launched on a ballistic trajectory positioning the re-entry vehicle for splashdown at a predetermined point some 4,200 miles away, at the Kwajalein Atoll range in the Marshall Islands.

Processes are the same at Vandenberg, so everything is tested: the "fly-out" hardware, the re-entry system, how

USAF photo by R. J. Oriez



SrA. Wayne Watts (l) sets the torque on a connector joining a missile guidance set with the propulsion system rocket engine of a Minuteman III. This procedure will prolong the operational life of the missile. A1C Robert Cooper observes.

the re-entry vehicle performs, plus the control interface.

Similar test activity happens in the bomber force during weapon evaluations, added 8th Air Force commander Maj. Gen. Stephen W. Wilson. Weapon testers regularly perform an "end-to-end test" of the B-52's nuclear ALCMs, including live shots of unarmed missiles over the test range, he said. The tiny nuclear capable B-2 stealth bomber fleet can also deliver air-dropped bombs, but does not fire the ALCM.

Though most tests go off as planned, occasionally there are surprises. In July 2011, testers at Vandenberg terminated a shot in midflight over the Pacific due to an unexplained anomaly. For both the Minuteman III and the ALCM, "one of the key reasons we fly those weapons out is so that we can do what we call an aging and surveillance program," said Carey. With Minuteman, the data gleaned from test shots allows the Air Force to "see how all the components in a weapon system that was deployed in the '70s are performing" and make improvements and replacements as needed.

"What we observed as we did test launches was that certain components age out at different rates," Carey said. "As technology evolves, we can find appropriate points to integrate new technology and upgrade our capabilities."

Keeping the Force Viable

A service life extension program now under way will extend the reliability of the 1980s-era ALCM until its replacement enters service, circa 2030. The primary focus is on the guidance, control, propulsion, and arming systems.

With the test data, Minuteman too has had a makeover that should keep it viable until 2020. "That's not to say that we don't have our own issues with components and subcomponents that still need attention," Carey confessed, but the missiles now have fresh propellant and upgraded guidance. The original warheads have also been swapped



USAF photo by SSgt. Chad Warren



USAF photo by R. J. Oriez

Above: SrA. Matthew Wallace (l) and TSgt. Ryan Asaria attach a GBU-31 JDAM to a B-52. BUFF crews must be proficient in both nuclear and conventional roles. Left: Maj. Gen. Michael Carey (l), 20th Air Force commander, and Col. Christopher Coffelt (c), 90th Missile Wing commander, speak with A1C Andy Monticello (back to camera) outside a launch facility in northern Colorado.

USAF photo



An overhead view of a Minuteman III launch facility shows the launcher door, access hatches, and some security features.

for more modern ones recycled from retired Peacekeeper ICBMs.

Since fly-out launches from Vandenberg don't test the operational infrastructure, AFGSC's missile wings conduct full-up dry runs known as Simulated Electronic Launch-Minuteman at their home bases.

Under normal circumstances, LCCs are interlinked to assure continuous control of each ICBM, even if one LCC goes offline. During SELMs, "we electronically isolate a select number of missiles and then run both the crews and the support systems through all their paces," said Carey. SELMs prove that the actual fielded systems are ready and that "the entire weapon system would function reliably" should the President ever order a launch.

The final piece of the puzzle is personnel: the bomber and missile combat crews actually performing the mission.

"We train, evaluate, and assess the readiness of our personnel both with written tests and practical evaluations, and then in-field evaluations" on a daily basis, Carey stated. Missile combat crews are constantly being quizzed on knowledge, protocol, and procedures. From an institutional perspective, though, the dual-tasked bomber force probably faces the most challenges with personnel readiness.

Turning Things Around

"Training missions are nuclear-focused on one day, then the next day we may be turning around and going to a Red Flag exercise" in the conventional role, said Wilson. The B-52 wings at Barksdale and Minot—and previously the B-2s at Whiteman AFB, Mo.—also rotate on six-month deployments to the Pacific. During continuous bomber presence stints at Andersen AFB, Guam, the crews exercise with joint forces under US Pacific Command and allies from Australia to South Korea, but the "primary focus is on conventional," Wilson explained. The crews must still maintain proficiency in nuclear procedures, though, and are routinely tested during deployments as they would be at home base.

"We put into place a number of nuclear modules to make sure that they don't have a big spin-up time when they get back," Kowalski said, noting that the really tenuous balance actually concerns the flying hours.

Aircrews get just enough flight time to stay proficient and ready for both missions, said Kowalski. Since AFGSC stood up, the swing role bombers have focused more on the nuclear mission—so far, without blunting their conventional skill. With readiness demands from regional combatant commanders and STRATCOM holding constant and budget cuts looming, the command is keen to guard the bombers' hard-won readiness across the mission spectrum.

"I would be very uncomfortable to take any further cuts in flying hours," Kowalski cautioned.

From the command level down, "we really do get it, and we're strengthening the legs that we control … to make them the most realistic and relevant deterrent out there," Wilson said. One of the biggest cultural changes AFGSC instituted has been to increase the accountability of squadron leaders for unit readiness. The command has also gone to great lengths to open communication and provide leaders with what they need to achieve requirements, according to Kowalski.

"We were very relentless in getting to the root cause of readiness reporting and making certain that the squadron commanders—that basic fighting level of the



USAF photo by Jet Fabara

Lt. Gen. James Kowalski, commander of Air Force Global Strike Command, operates a combat network system aboard a test B-52H at Edwards AFB, Calif. Kowalski says AFGSC has worked hard to institute accountability within the nuclear force.

Air Force—were personally involved," he said. "If it was something in their control, they were certainly going to be held accountable for it," and he credits this shift as probably the biggest reason for the marked improvement under AFGSC.

Under a single dedicated command, squadron level readiness has improved, thanks to the command's ability to shift manpower, funds, and equipment between units as needed. "If we had a unit reporting less than fully ready, ... we can do some movement of things to bring everybody up to the same level," Kowalski pointed out.

Emblematic of the command's push to return to a combat-ready operational focus is the new consolidated unit inspection, or CUI. This initiative began in 2007 as part of the nuclear enterprise inspection system's reinvigoration, and it took hold across the service.

Units had spent so much time preparing for and undergoing inspections that training and operations were disrupted and curtailed. Instead, leaders proposed bundling all the inspections into a single event every two years. The resulting inspection regime gives units more time to focus on the mission.

"By trying to put a little bit more time in the schedule, we're hoping to improve that training long-term and the maturity and experience of our folks going forward," explained Kowalski. AFGSC conducted its first CUIs of a bomb wing in 2011 at Barksdale and a missile wing in 2012 at F. E. Warren, with positive initial reviews from both.

No Falls or Slips

After three years of focused attention, most of the easily fixed readiness problems have been resolved through concerted effort. The remaining challenges present more-difficult issues, such as maturing personnel or stocking adequate spare parts to meet requirements.

Kowalski said AFGSC has identified a need for experienced personnel. It is "just going to take us some time to grow those people and get them in place, but we think we're on the right track," he said.

In terms of procuring "high dollar items that need to be on shelves, ... we're just bumping up against fiscal realities" of a tightening defense budget, he admitted. "Pretty much all of the low-hanging fruit has been picked. ... The problems are a little bit tougher now in terms of why we wouldn't be achieving the highest levels of readiness."

With the New START agreement and presidential initiative to reduce the US nuclear arsenal, AFGSC will almost certainly "take some reductions" in force structure in the next few years, Kowalski acknowledged. As a result, the readiness of each airman, bomber, and ICBM in the inventory will count that much more.

"However you imagine the force structure being reduced, one of the key things that has to be factored in is readiness and reliability. It's our duty to make sure none of those fall or slip," Carey said.

"We're going to have to think hard about how we do some of our business," said Kowalski. Regardless of the force size, "at the end of the day, this is an essential, foundational mission set, and I think our nation is going to choose to continue to execute it." Even with reductions and shrinking budgets, nothing on the horizon jeopardizes Air Force Global Strike Command's "special trust and responsibility" to mount a ready and effective nuclear deterrent US citizens can rely on, he asserted. ■

Practically everyone in aviation circles is aware of the Air Force's "Boneyard": 2,600 acres of Arizona desert where thousands of military aircraft, withdrawn from service, silently await their fate. The facility, located at Davis-Monthan Air Force Base in Tucson, is commonly perceived as an airplane cemetery, where the denizens are doomed to be scrapped for their valuable metals. That's only a fraction of the story, however.

In fact, the 309th Aerospace Maintenance and Regeneration Group, or AMARG, conducts a wide variety of missions in support of the Air Force, other services, and allied nations. While the seemingly endless lines of airplanes stored here all look destined for Death Row, a sizable number are here only temporarily and will fly again.

"People think the Boneyard is where old planes come to die," said Col. Robert S. Lepper Jr., commander of the 309th. In a November interview, he said that at the AMARG, "we generate aircraft" for the Defense Department, NASA, and "right now, ... for five different nations. ... So lots of these aircraft that come in will be returned to flying status."

Besides storing aircraft until they're needed again, the AMARG has a dizzying list of other missions. The facility conducts overflow depot maintenance on the A-10 attack aircraft and variations of the C-130; it has a verification role to play in the Strategic Arms Reduction Treaty on nuclear arms; it hosts a program that converts old F-4 Phantoms—and soon F-16s—into aerial target drones; it stores and reconditions aircraft that will be transferred



"Jaws" prepares to take another bite out of a mighty C-5A Galaxy being reduced to scrap at Davis-Monthan AFB, Ariz. Disposing of old airplanes, however, is just a fraction of what the AMARG is all about.

Living Boneyard

By John A. Tirpak, Executive Editor

The Aerospace Maintenance and Regeneration Group runs a warehouse, not a graveyard.

to allies under the foreign military sales program; it is an auxiliary facility of the National Museum of the US Air Force; it stores tooling for out-of-production aircraft; disposes of aircraft the US military no longer needs; and it helps keep Air Force "heritage flight" aircraft available for special flying occasions.

Chief among its missions, however, is supporting the flying Air Force with parts. It frequently makes the difference between aircraft being operational or grounded.

In Fiscal 2012, for example, the Boneyard "pulled" more than 10,000 parts, with a value of $472 million. That figure is down a bit from the totals of previous years, but Lepper said that's due in part to reduced demand, following the end of US operations in Iraq. During Fiscal 2012, the five fleets calling for the most parts, in order, were the F-15, B-1B, F-16, C-5, and C-135—collectively accounting for some 60 percent of the total. The only Navy airplane on the top 10 list, the P-3 Orion, came in sixth.

Moreover, those parts are usually pulled for an urgent need. Consistently over the last five years, "priority" orders accounted for an average of 76 percent of the parts pulled.

Lepper said the AMARG's "core workload" has been "fairly constant for 15 to 20 years," but "the fact that it's remained steady while the rest of the force has continued to drop is kind of a de facto increase."

When aircraft arrive at the AMARG, they are met by a small team under the direction of Gregorio Aguon, head of the receiving branch. Each aircraft brings along its entire



Staff photo by John A. Tirpak

Staff photos by John A. Tirpak





Left: Joe Gasak removes a flaperon bracket from an F-16. Hill AFB, Utah, urgently needed the part. It would probably get there within three days of the request. Above, another heavily harvested F-16 looks less like a fighter all the time.

history of documentation: the write-ups and maintenance actions over, frequently, dozens of years of service.

"The Air Force airplanes, they usually come with boxes of paper," he observed, while the Navy records are usually supplied on a disc. The records are kept in a special facility nearby.

Each aircraft is washed on arrival except for the giant C-5 transports; they get washed before they come. The washing is especially important for aircraft that have served aboard aircraft carriers or in tropical locations where they were subject to the corrosive effects of warm, salty air. Each airplane then gets a "flush" of its fuel and is run with a lightweight oil that puts a protective coating on all parts of the engine and fuel system. Explosive devices—ejection seat pyrotechnics, for example—are removed and any caustic chemicals drained. Other steps are taken to ensure the aircraft is safe for anyone to approach and work on. Also, the clocks and data plates are removed.

Why? "We have a high pilferage rate on these items" from visitors seeking a memento of a particular aircraft they flew, Aguon said. The clocks work and make a nice desk decoration, he noted, while the data plates are specific to an individual aircraft.

Once all that's done, the aircraft is then towed to wherever it will be stored.

"Some of these aircraft never leave the apron, ... will never sit on the desert," Aguon said, given that they may be shipped out again in a few weeks' or months' time.



This C-135—and one just like it—served as an Airborne Laser target. All three aircraft sit in the Boneyard. The ABL aircraft, not protected as a museum piece, could be a parts donor.



Staff photos by John A. Tirpak

During the latter part of 2012, the accession work was limited to Navy aircraft. In recent years, a heavy flow of F-15s, F-16s, and A-10s came to the AMARG in the wake of the "Combat Air Forces Redux," the early withdrawal from service of 250 front-line aircraft, to meet reduced operational funding. Last year, Congress balked at further reductions that would have hit the Guard and Reserve hard and barred the Air Force from retiring any more aircraft until it can be decided how USAF's three components will be equipped.

Aircraft at the AMARG are in-processed according to the type of storage they require. Type 1000 storage means an aircraft will be maintained in a condition where it can be recalled to duty and fly again. This is called "inviolate" storage, meaning no parts can be pulled from these aircraft without the express permission of the type's system program office at Wright-Patterson AFB, Ohio, which technically "owns" them. Only some 10 percent of the aircraft in the Boneyard are kept in Type 1000 condition.

Baking in the Sun

Type 2000 storage is similar to Type 1000, except the aircraft are designated as "cann birds" whose parts can be cannibalized for the flying fleet. Both Type 1000 and 2000 aircraft, after in-processing, will be given a treatment of "Spraylat"—short for sprayable latex—a two-stage sealing process covering gaps and holes and generally blocking the intrusion of moisture or wildlife. The bottom coat is black, but the topcoat is white. This tremendously aids in reducing the degradation of the aircraft in the desert heat. With the white coating, interior temperatures will usually remain within 15 degrees of the ambient air temperature. The Spraylat isn't cheap—it runs about $550 for a five-gallon bucket—but it lasts and pays back its cost in preservation of valuable parts that, as time goes by, may not be available anywhere else.

In summer, the spraylat also has to be applied before 10 a.m.; after that, aircraft



This MiG-21—provenance not stated—served as an aggressor with an elite secret USAF squadron. A half-dozen Soviet fighters sit with it. It may go to a museum or "petting zoo."

Staff photos by John A. Tirpak



If asked, AMARG will test parts, looking for fatal flaws. Here, a part soaked in a fluorescent dye reveals cracks and other imperfections under black light.

skin temperatures can exceed 120 degrees Fahrenheit, and the material simply won't stick. As a result, summer shifts for those working in the field tend to be quite early. Most fighter aircraft need about 50 hours of labor to be prepared for storage; it's 80 hours for helicopters because a box has to be built to protect their rotor heads. Big aircraft such as the B-52 can require up to 300 hours for mothballing.

Type 3000 storage—considered "temporary" visitors to the Boneyard—receive the most active care. Every 30 days, their engines are run, they are towed to lubricate their bearings, and their fluids are serviced.

Aircraft receiving the least active care are Type 4000. They usually only get the Spraylat treatment on engines and canopies, and their engines may be removed for storage elsewhere. The Type 4000 aircraft are generally the oldest and those least likely to ever be recalled to service. When all useful parts have been harvested from them, they are scrapped.

Aircraft can be moved to different categories as well and return to duty even after decades. The record for an aircraft returned to flying status after extended storage was an F-4 brought out of Type 2000 status and reconditioned to be a target drone after more than 20 years in the desert.

Orders for spare parts come in on a Form 44. It documents who needs the part, its priority, whether it supports a combat mission, whether it's classified, whether it needs special handling, whether it's nuclear-related, etc., as well as whether substitutions in the form of similar parts are acceptable.

Before aircraft come to the Boneyard, maintenance crews at their last base will swap out whatever newer parts are on them for the aircraft remaining in the flying inventory, said James Fletcher, lead reclamation planner with the 577th Commodities and Reclamation Squadron.

"That only makes sense," he said. "Why send new tires to the Boneyard?"

Source of Last Resort

As a result, most of the parts on the aircraft are not pristine. Requisitions come in specifying a part in "A," or like-new condition, and Fletcher's crews will try to find one that fits the bill. Sometimes, there must be some back and forth, Fletcher said, as in, "We don't have one from a Block 15. So we ask them if they can use a Block 10. And if they can, we ship it."

He said the Boneyard is the "source of last resort." Generally, technicians in the active force will try to obtain brand-new parts, to keep their aircraft as up-to-date as possible. The AMARG comes into play when there is no other source for a part, or perhaps a temporary is needed until a new one can be acquired. The incentive is to buy new, because logisticians are charged the as-new price for parts that come from the AMARG.

Sometimes the AMARG supplies parts not usable in their existing condition but repairable.

At any given time, about 40 "parts-pullers" work among the vast rows of aircraft, Fletcher said, and they are extremely experienced. Many have prior Active Duty service and possess an encyclopedic knowledge of the aircraft they work on, and most work on several different types.

"The experience of our workforce is beyond that of almost any other maintenance group commander's in the entire Air Force," said Lepper. In the Active



Staff photos by John A. Tirpak



Duty force, he said, most maintainers work on, at most, two aircraft, but "my crews work on nine different airplanes in a day ... and take parts off of six or seven different kinds of aircraft." He said, "Most of my people have 20 to 40 years of experience in aircraft maintenance. Most maintenance group commanders would kill for five years' average experience" across a workforce.

"We get the call for about 35 to 38 parts a day," Fletcher said, and his crews have some 100 parts requests in work at any given time. The busiest periods are just before holidays, when maintainers at flying bases want to "clear their screens" and get any grounded aircraft back to flying status, he observed.

A parts call will often include a request that it be tested. One of the group's capabilities is to check for hidden cracks or structural flaws. The part is soaked in a fluorescent dye, then examined under black light. Imperfections will glow.

Parts can often be shipped in three days or less. Based on the urgency of the request, a part can be shipped by a commercial overnight service. If it is going to a war zone where commercial service isn't available, it's routed on cargo or tanker aircraft headed to that base. A small assembly line of workers is busy most days building boxes, packing, and shipping them. It's rare that there isn't a stack of boxes on a pallet waiting for a pickup. Large parts—elevons, wing leading edges, propellers, and the like—go on pallets, covered in shrink wrap or other protective material.

When an aircraft has given up all the parts that anyone wants—and it's not required for historical purposes or any other reason—it becomes a candidate for "de-miling," or demilitarization.

Hazmat

"The first step is to take out anything hazardous," said Richard Ruley, AMARG's Demil Section supervisor with the 578th Storage and Disposal Squadron. The list of potential hazards is long. It includes materials such as asbestos, chemicals, beryllium, radioactive materials, gases, and depleted uranium. The depleted uranium, for example, was used as armor on A-10s. Lead—another hazard—was used in the armor on C-130s. Special equipment and protective gear is needed for working with these materials. After the hazards are removed, a Wright-Patt manager decides what federally managed facilities they'll go to for disposal and possible burial.

The AMARG used to separate critical materials from the aircraft, such as titanium, that are getting harder to obtain, under the Strategic Material Recovery and Reuse Program. However, that's been abandoned since the



Top: It's not just old airplanes. The tooling for the B-2 stealth bomber cockpit sits near retired bombers. A special treatment helps protect it from the elements. Above, Carlo Marinaz applies Spraylat to the forward edge of a KC-135's wing.



Having given up everything usable, a forlorn F-16 awaits the scrapper. It must first be "de-miled," meaning anything dangerous, such as toxic materials, will be removed.

Staff photos by John A. Tirpak



Defense Logistics Agency determined the labor costs were too high to make it a worthwhile effort. Now, buyers of the scrap can separate the metals themselves.

Once a carcass has been de-miled, the AMARG team signs a certificate that "all known hazards" have been removed, Ruley said. Then, scrappers make quick work of it. A mighty C-5 Galaxy, for example, can be reduced to flatbed-sized chunks in a matter of two or three days, using a giant apparatus known to the crews as "Jaws."

If an aircraft seems to have some special significance, or features noteworthy nose art, the demil crew can recommend that the museum consider saving some or all of it. Part of the recommendation might be what the AMARG would have to do to get the aircraft in condition to be shown as a museum piece or a pole model that requires little but the shell.

The AMARG plays waystation for some aircraft. In the last year, the Marine Corps bought 58 GR-9 vertical takeoff and landing aircraft from Britain as a source of spare parts. The GR-9 is the

USAF mothballed hundreds of front-line fighters in recent years, under the "Combat Air Forces Redux." Aft of the F-15 radomes, dates of inspection are stamped. Left and below, rows of F-15s bake in the Arizona sun, back-to-back with C-5 Galaxys. In older aircraft, Spraylat just covers canopies and engines. At bottom, stacks of fighter engines share space with scores of C-130 variants.





Preserving History, Making It Accessible

One of the Boneyard's functions is to preserve at least one example of almost everything the Air Force has flown over its 65 years. In some ways it serves as an overflow of the National Museum of the US Air Force, located at Wright-Patterson AFB, Ohio.

"History row" includes a number of one-of-a-kind or historical aircraft, such as the Boeing YC-14 short takeoff craft and a T-46, the canceled successor to the T-37. The sole YAL-1, the Airborne Laser laboratory, is also at the AMARG, although it does not yet enjoy protected status and could conceivably be a parts donor without action by Congress. Significant examples of aircraft "nose art" are also sometimes preserved by the AMARG.

However, the base lacks the manpower or facilities to accommodate large numbers of visitors. Former military members routinely call the base and ask if they can walk around and take photos, but they would have to be escorted due to the sensitivity of some of the items stored, and the base has no manpower billets for that task.

"We rely on the Pima Air Museum to help us" with the strong public interest, said Teresa Pittman of the AMARG's business office.

Pima, located just across the highway from the AMARG, is one of the largest nongovernmental air museums in the world, boasting a collection of more than 300 aircraft. Visitors can sign up for a bus tour of the AMARG. The tour follows a prescribed route through some of the most interesting parts of AMARG's inventory. Those on the tour can take all the pictures they want, but may not get off the bus while it's on Davis-Monthan.

"We are seeing a steady increase in visitors," said Tim Vimmerstedt, Pima's director of operations and community affairs. The museum got started in 1968 and has grown steadily and set a record for attendance in 2012. Visitors routinely report that the museum was a big influence on their decision to visit Tucson.



Staff photo by John A. Tirpak

This RF-4 is the last Phantom to be converted into a QF-4 target drone. They'll be supported through 2017; after that, some 210 QF-16s will take their place.

equivalent of the AV-8B Harrier that has been extended in USMC service due to delays with its replacement with F-35B strike fighters.

The AMARG is also used to store items that are not aircraft. Besides fuel tanks, missile bodies, and some vehicles, it also hosts rows of equipment that was used to build certain aircraft. The tooling for the B-2 bomber, for example, rests near B-52s and B-1s that are being harvested for parts. One of those B-1 fuselages was recently packed up and sent to Washington state, where Boeing will subject it to a stress test to determine the long-term service life potential of the remaining B-1B bombers.

The Boneyard has 12 miles of fence line, and security is a constant concern. The facility certainly attracts aviation enthusiasts seeking souvenirs of favorite airplanes, but others may have a more nefarious purpose, looking for parts or technology that could be used in combat—and potentially against the US.

In a much-publicized case, agents of Iran were able to obtain parts for that country's fleet of aged F-14s. The parts were obtained through a series of middlemen who bought them illegally through government surplus agencies—long after they were beyond AMARG's control—but the case illustrated the potential for misuse of Boneyard material. As a result, Congress ordered all the remaining F-14s destroyed. Only a dozen still exist at the AMARG, and all are destined for museums or to become pole-mounted "gate guards."

Whither Stealth?

"The security is very good here," Lepper said. Security forces from Davis-Monthan patrol the barbed wire-topped chain-link fence perimeter constantly. However, now that more late-model aircraft are beginning to be stored at the facility, more consideration is being given to "an intrusion detection system with cameras that will allow us to increase the security even further."

Lepper said that because there are aircraft always going out—in pieces, to be melted down—space has not been an issue at the AMARG, and no thought has been given to expanding the facility.

"The amount of real estate here right now is sufficient to continue to bring in assets," he said. However, encroachment around the edges of the facility might make it difficult to expand if that were ever necessary, he said.

Asked about what changes may lie ahead for the Boneyard, Lepper said the Air Force has only just begun to think about what it needs to store aircraft with stealth qualities. The materials used in stealth aircraft have traditionally required climate-controlled facilities to prevent degradation of those materials, which can lose their shape under prolonged heat.

The F-117 attack aircraft the Air Force retired several years ago, for example, are stored in their original hangars at Tonopah Test Range in Nevada.

Air Force Materiel Command is "starting to look at what might be required here from a [military construction] perspective," Lepper said. "It's something we're thinking about." However, he sees no reason the AMARG's mission won't continue largely as it has for decades.

Fletcher observed that AMARG "is a supply warehouse. It's not a junkyard."■



Money will come from somewhere, but Air Force leaders hope budget cutters don't create a hollow force.

The Readiness

To remain at a high state of readiness during the last dozen years of combat in Iraq and Afghanistan, the Air Force frequently had to raid its manpower, force structure, and procurement accounts to pay for critical operational requirements.

Now that the US is disengaging from Afghanistan, the Air Force is not resetting but immediately reorienting to new requirements for engagement, presence, and deployments in other theaters. With new budget cuts looming, there is a legitimate concern that defense leaders need to take care not to create a "hollow force." In the 1970s and early 80s, the Air Force had many units that looked great on paper but in reality were woefully unprepared to actually perform their missions.

Today, top leadership seems to understand that the services cannot be overtasked with missions and requirements unless they also receive the necessary readiness funding.

"I can't do all of that," said Air Combat Command chief Gen. G. Michael Hostage III in a November speech at the Center for Strategic and International Studies.

The Air Force, Hostage said, has already made significant reductions in personnel and force structure, leaving



USAF photo by Lt. Col. Bill Walsh

TSgt. Mark Graveline performs an operational check on a C-17 at Joint Base Pearl Harbor-Hickam in Hawaii.

Question

By Marc V. Schanz, Senior Editor

flying hours and readiness as the only pot left to pull money from. As the ACC boss, he fights "every which way we can to avoid hollowing the force" as the nation attempts to balance its books.

The situation and its implications for the future of USAF are of deep concern to the new Chief of Staff, Gen. Mark A. Welsh III. Speaking at the Air Force Association's Air and Space Conference in September, Welsh voiced his worry that, without adequate support from Congress, USAF may not be able meet expectations in carrying out its existing and anticipated missions across all domains and scenarios.

"I'm concerned about readiness," Welsh said, noting that just a few weeks into his new job, the Air Staff was trying to determine the right level of readiness funding as it built the next program objective memorandum for the service's desired future budgets.

"We have to pay attention to it," Welsh asserted, explaining that cutting flying hours and slashing support and training to pay for other accounts can only reduce budgets a limited amount. He also warned that the Air Force may not be "where we think we are" as far as being prepared to conduct its full range of missions.

The Air Force has become a master of the missions required in Iraq and Afghanistan, and combat experience is practically at an all-time high. The focus on this mission set, however—heavy in lift, intelligence, surveillance, and reconnaissance, and close air support—has allowed other skills to atrophy. Training for missions such as counterair, electronic warfare, and combat search and rescue against a first-rate adversary, among other tasks, has not been where the leadership would like it to be.

Critical Timing

The new defense strategy—along with pressing modernization requirements and fiscal uncertainty—presents a unique stress test for USAF's core functions. Defense leaders readily admit a dependence on air and space operations. If USAF's force structure shrinks, however, and those forces are less trained, maintained, and prepared, the ability to project power—and the threat of the use of that power on potential adversaries—changes.

Readiness means something different to the Air Force than to the Army or Navy. At the root of USAF's functions are speed, range, flexibility, and lethality, from global ISR to global strike.

Timing, according to Air Staff officials working the problem, is critical to everything the Air Force does and the foundation for the concept of gaining and maintaining air dominance—the key to a wide range of contingencies and operations plans.

"Whenever you talk about readiness, the first question you have to ask is 'readiness for what?'" said Col. James MacFarlane, director of operations integration and readiness on the Air Staff.

Air superiority, he said in an interview, requires a lot of forces and must be achieved quickly—a fundamental difference between the force generation models used by land and naval forces.

"I can't afford to have a bunch of people behind me who aren't ready because they're months away," he said. "We can't afford to get ready to get ready."

The Air Force's success in supporting counterterror and counterinsurgency operations over the past decade has set up some faulty assumptions, according to Air Staff officers. They're concerned by ideas circulating in private think tanks



USAF photo by SrA. Benjamin Wiseman

Maintainers in a hangar at Andersen AFB, Guam, clean a B-52 inside and out. Air Staff officials point to Guam bomber rotations as a good example of balancing requirements and readiness.

that presume USAF is now so combat-seasoned it can afford to relax on readiness and use the savings to pay other bills, for modernization, for example.

However, the combat experience has been built in missions not matching the environment the new national strategy forecasts. USAF swiftly achieved air superiority because Iraq and Afghanistan did not field capable air forces or effective air defenses. The next time the nation has to fight, these sort of benign operating conditions cannot be assumed.

The idea that USAF can live off its combat experience for a while is "a rational statement if all you are going to do" are operations such as Enduring Freedom and Iraqi Freedom, MacFarlane said. But the Air Force needs to be able to conduct "a range of military options," as dictated by the new strategy. It's "laid out pretty clearly," he said.

Are You Ready?

President Obama's defense strategic guidance, released in January 2012, laid the foundation for a great deal of the analysis leading to USAF's initial Fiscal 2013 budget proposals, MacFarlane said. The Air Force, and DOD, decided to begin recalibrating capabilities and make "selective additional investments" in a few mission areas, according to service guidance released in February 2012.

As a result of demands set forth in this strategy, the Air Force has attempted to further refine its aggregate "readiness" measurements across a wide swath of career fields, mission sets, and capabilities. MacFarlane explained the process as breaking down some 2,500 reporting units across the force into "understandable chunks" in a readiness reporting system. These include air superiority, global precision attack, global reach, and other areas. Congress, OSD, and senior leaders receive a quarterly report on the status of readiness in these areas. The information, most of it classified, is used to set priorities on what is and is not important, from a readiness standpoint.

This analysis, though, just begins the process. DOD's combatant commanders hold great sway in the requirements process, and have significant influence.

"If someone says, 'Are you ready for [operation plan X], we can give a pretty good answer," MacFarlane said. But the combatant commanders have their own metrics, and when two COCOMs execute plans at the same time, planning becomes complicated.

"So from a planning perspective," he said, "you have to account for that. We fight, and [we have to] deny, and there is the potential it could be in two different [areas of responsibility]."

Airmen load an F/A-18 Super Hornet onto a C-5 Galaxy at Kandahar Airfield, Afghanistan, for a trip back to its home station at NAS North Island, Calif. Officials say USAF needs to look closely at partnering opportunities with sister services and allies.



USAF photo by SrA. Corey Hook

This tension illustrates why the new strategy mandates strategic decisions in a number of areas with great consequence to the services—especially the Air Force.

The guidance changed the calculus of war planners in the Pentagon. The previous model demanded that US forces be capable of defeating two adversaries near simultaneously; the new model calls for a decisive win in one conflict while denying the enemy his objectives in a second—a shift from "defeat-defeat" to "defeat-deny."

The Air Force's budget guidance from February 2012 spells this out explicitly: "Even when US forces are committed to a large-scale operation in one region, they will be capable of denying the objectives of—or imposing unacceptable costs on—an opportunistic aggressor in a second region."

Translating that guidance to a funding plan is the challenge.

The Defense Department is "moving away from OCO," paying for war-related expenses using overseas contingency operations accounts, Deputy Defense Secretary Ashton B. Carter said in September. The services are to fold overseas operations spending into their baseline budgets, with no extra appropriations from Congress.

While the Army and Marine Corps aim for a "full reset" of replacing and modernizing with their baseline budgets, the Air Force doesn't expect any "stand-down time" to reset the force, MacFarlane said; combatant commanders will instantly put a demand on any assets freed up from US Central Command.

"How are we going to continue to pay for these rotations, if not out of an increase in baseline?" MacFarlane asked. "How does that sit with Congress?" So far, reconciling these factors has proved difficult.

Senior DOD leadership has hammered on the point repeatedly since the passage of the Budget Control Act.

"Sequestration would risk hollowing out our force and reducing its military options available to the nation," Joint Chiefs of Staff Chairman Army Gen. Martin E. Dempsey told the Senate Appropriations defense subcommittee in June, appealing for passage of the Fiscal 2013 defense bill.

"We would go from being unquestionably powerful everywhere to being less [visible] globally and presenting less of an overmatch to our adversaries," Dempsey continued, saying this would translate into a "different deterrent calculus" for potential adversaries.



USAF photo by A1C Stephany Miller

SSgt. Virginia Munro and A1C Ralph Dunn, maintenance apprentices at Mountain Home AFB, Idaho, train on an F-15 engine as MSgt. Tad Russell supervises. Using training aids frees up mission-capable jets to fly, improving readiness rates.

During his confirmation hearing in the Senate last July, Welsh made no secret of how he felt about the tradeoff between readiness, force structure, and resources, especially if a budget sequester cut hundreds of billions more from DOD accounts.

Just performing due diligence of operational activity in the field "would be affected instantly by sequestration," Welsh said, particularly from the perspective of training and readiness. "Our ability to provide ready, deployable units [would be] affected."

An 80 Percent Solution

The Air Force's ability to "keep airplanes flying and train [with] specific munitions to support counterterrorism activity" in US Central Command and Africa would be at risk, as well as its ability to train new air crews, particularly those operating remotely piloted aircraft, Welsh said.

In short, barring an increase in resources (which few in Congress or DOD anticipate), the variables for the Air Force to work with to keep operations going in a post-sequestration scenario would have to be readiness and modernization—a proposition Welsh called "horrible trade space to be operating [in]."

The Air Force is attempting to find savings in a number of ways—such as leveraging deployments as training events—as there is no sign the deployment demand will let up once assets are freed from CENTCOM.

MacFarlane pointed to the continuous bomber presence rotation on Guam, a US Pacific Command tasking, as an opportunity where USAF planners can improve efficiency and save money. The heavy bombers not only fulfill a forward presence function, but collaborate with the Navy and other allies during their Pacific interludes.

"They are doing exercises, [they are doing] partnership capacity," MacFarlane said. "As we move forward, we need to look closely at [arrangements like this]. ... We need to anticipate needs, but we still need readiness. We need to see where we can take care of both."

Aligning more cost-effective solutions for COCOMs is another approach. Ground-based control and reporting centers (CRCs), for example, might substitute for an E-3 Sentry and its associated support and logistical tail in a deployment if the AWACS' special capabilities are not specifically required.

"That's an 80 percent solution to some COCOMs," MacFarlane said. But it is being considered.

Component commands have also tightened up to save readiness dollars. For instance, at Mountain Home AFB, Idaho, the 372nd Training Squadron's five retired F-15A Eagles are used as training aids to teach maintenance students who normally work on F-15E Strike Eagles of the 366th Fighter Wing. The arrangement allows full mission capable jets to stay on the flight line, available for tasking.



USAF photo by Christopher Cokeing

SSgt. Joshua Bard straps Gen. G. Michael Hostage III into an F-22 for his qualification flight in June 2012. Flying hours are a big part of readiness, Hostage said, and can only be drawn down so far.

According to 372nd TRS maintainers, the initiative gives back roughly 2,000 valuable flying hours to the wing's operations group in a given year. Hostage visited the base in October and got a briefing on the program, as part of his effort to focus on commandwide readiness.

While flying hours are a big part of readiness, they can only be drawn down so far without hurting readiness, Welsh said. Tradeoffs are not always simple.

"Taking flying hours and augmenting training with simulator time is great if you fund the simulator," he said at last September's AFA conference. "If you don't, you're kidding yourself."

Welsh also expressed skepticism that the Air Force is really as ready as it considers itself to be and has asked for readiness reports from all the major commands.

Air Force leaders have sounded a steady drumbeat for readiness over the years, and modernization can be viewed as an element of future readiness. In April 2011, then-Air Force Materiel Command boss Gen. Donald J. Hoffman warned that DOD faced a severe test to maintain fiscal health.

"We're on an unsustainable path," Hoffman said at an acquisition conference in Dayton, Ohio. Modernization—in the form of the service's acquisition efforts—can affect long-term strategic outcomes if not handled properly. "If significant efficiencies aren't identified and wholly committed to, resources for modernization, readiness, and facilities will not be available," he cautioned.

One of the biggest challenges in the Air Force's ability to properly fund its accounts is the cost of overhead. Congress has consistently balked at letting USAF—and the other services—manage its budget by cutting unneeded bases. After the dust settled from the 2005 round of the base realignment and closure process, the Air Force found itself with a bill to realign its forces, without the benefit of being allowed to close any major bases.

The Cost of Dominance

In March 2012, Sen. Claire McCaskill (D-Mo.), head of the Senate Armed Services Committee panel overseeing base closures, stated unequivocal opposition to another BRAC round, saying DOD leaders had failed to make a convincing case on shedding more infrastructure.

The unstinting parochial opposition from Congress has placed the Air Force and other services in an untenable position, Air Staff officials and staff officers said. The Air Force now has too much infrastructure and not enough force structure to justify it. Absent more BRAC rounds, USAF will have to spend precious funds on unneeded bases rather than on readiness and modernization, then-Chief of Staff Gen. Norton A. Schwartz told Senators last March.

With basing off the table—and readiness and personnel held at minimal levels—modernization is under threat. The investment required for modernization far outstrips whatever savings accrue from retiring older aircraft. One USAF estimate pegged the procurement of a new squadron of F-35s at around $3.5 billion, while chopping one active duty F-16 squadron (with 21 aircraft) from the force structure saves USAF in the neighborhood of only $90 million a year.

A one percent reduction of funding for facilities sustainment, restoration, and modernization costs comes to some $24 million per year, while a similar reduction to baseline funding for weapon system sustainment accounts would net about $100 million per year. Four of the 10 largest investment programs in USAF's near term are space related efforts—launch vehicles, the GPS constellation, the Advanced EHF Satellite System, and the Space Based Infrared System—that accounted for nearly $5 billion of investment money in Fiscal 2012.

Many factors determining the force's state of readiness have been on a "steady downward trend" that can be traced back as far as the aftermath of Operation Desert Storm, said MacFarlane. The Air Force maintained steady operations in and around the Persian Gulf region for years after the conflict, until Iraqi Freedom began.

"I'm not saying operations tempo is the whole problem, but that is an element of it," MacFarlane said.

The Air Force's size and composition have changed significantly since the early 1990s, and along the way account funding has been horse-traded around. However, requirements and operations tempo have a tendency to wreak havoc with assumptions and plans; as senior USAF leaders often say, "The enemy gets a vote."

A large force structure, for most military planners, affords a certain degree of flexibility in responding to contingencies, MacFarlane noted. The Air Force, and DOD writ large, has made a strategic choice to shrink that force structure to keep what remains more agile, prepared, and ready for conflict.

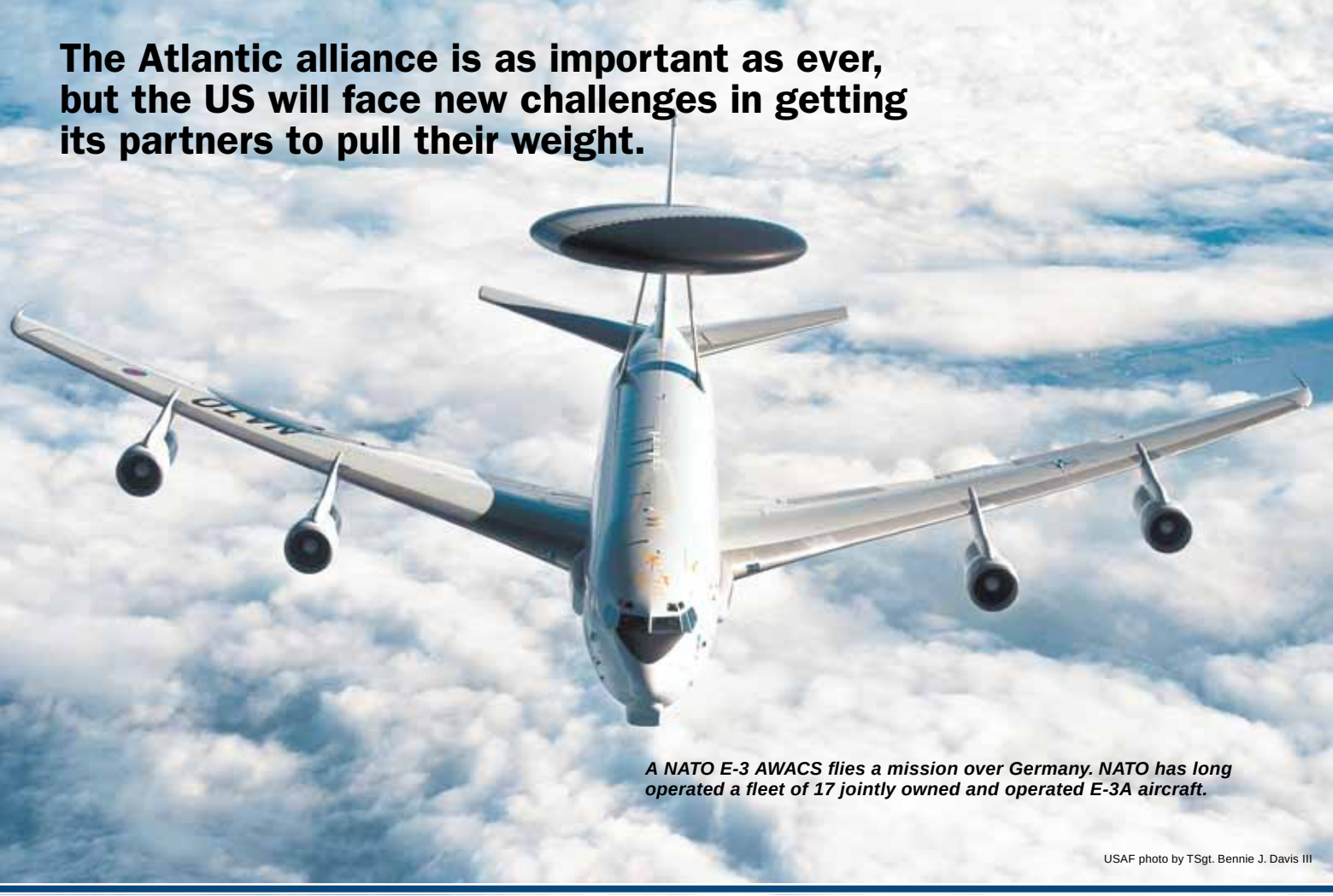
Due to USAF's core mission needs, speed, lethality, and reach are vital to a credible force—making a higher state of readiness vital to the conversation now taking place among the services and DOD leadership.

"It's true ... that force structure better have a higher state of readiness," MacFarlane said. "But it's also expensive." There are no easy answers, and for an airman, a careful path must be charted to the future.

"I don't want to fight a fair fight. I want to dominate. But how do I do that cost effectively?" MacFarlane asked rhetorically. The answer is to set priorities and make trade-offs. Managing those puts and takes is the subject of discussion with OSD, Congress, and others.

Little of this is a surprise, MacFarlane noted. The Air Force and the nation "have made choices over the last 10, 20 years on our force structure. These are choices and there are ramifications to those." ■

The Atlantic alliance is as important as ever, but the US will face new challenges in getting its partners to pull their weight.



A NATO E-3 AWACS flies a mission over Germany. NATO has long operated a fleet of 17 jointly owned and operated E-3A aircraft.

USAF photo by TSgt. Bennie J. Davis III

NATO's Wobble

By Peter Grier

Is Europe beginning a slow-motion abandonment of NATO? As the Atlantic alliance's long operation in Afghanistan winds down, some observers see this as the case.

European defense budgets have been on a downward slope for years, and this decline is likely to continue as the region struggles to recover from the recession and battered economies of the past four years. Defense capabilities are being meaningfully cut at a time when the technology imbalance between NATO haves and have-nots—evident in air operations over Libya—is already a serious Alliance concern.

While the US itself will focus additional strategic attention on Asia and the Middle East, some NATO-member capitals seem most concerned with defense closer to home. This preference is more in line with the Alliance's historic roots as a Euro-centric entity. Some Alliance members have declined to take part in Alliance contingency operations or have sent only token detachments.

Yet NATO has survived and will probably continue do so.

Post-Afghanistan Retrenchment

The reasons it came to be and has served as the most successful security alliance in history still hold. Europe wants a means to anchor the US in that continent. After centuries of conflict, most European governments still think the denationalization of defense is a fine idea. And there is always the need to guard against unpleasant surprises—such as an aggressive Russia or belligerent Iran.

Perhaps NATO is now entering its third era. The first was the Cold War against Soviet expansionism. The second was the scramble to accept new members while handling a variety of conflicts following the fall of the Berlin Wall. The third may well be a post-Afghanistan retrenchment. This could be a time of consolidation as allies work on making their militaries more complementary and reach out to neighbor groups in the Alliance near-abroad.

"NATO will survive as an alliance. We've moved a long way from the Cold War via different concerns, via different risks, but it's still a pretty robust alliance



USAF photo by Navy Petty Officer 1st Class Ryan Tab

The multinational Heavy Airlift Wing, based at Papa AB, Hungary, flew members of the NATO International Military Committee to Kabul, Afghanistan, in one of its three C-17 Globemaster IIIs. The 12-nation HAW was formed in 2009 to operate the airlifters under the Strategic Airlift Capabilty arrangment.

that's never everything we want it to be," said Malcolm Chalmers, research director of the Royal United Services Institute for Defense and Security Studies, at a Brookings Institution seminar last year.

The North Atlantic Treaty, which established the Alliance, was signed in Washington, D.C., on April 4, 1949. Since then member nations have often been embroiled in arguments about their mutual strategic direction. In the early 1950s, NATO struggled to accommodate historic adversaries Greece and Turkey within the military command structure. The 1979 decision to deploy new Pershing II nuclear missiles in Europe in response to Soviet SS-20 IRBMs was fraught with controversy. The collapse of the Soviet Union left the Alliance rudderless for a time.

The beginning of the latest era of NATO pontification came with Robert M. Gates' valedictory speech as US Secretary of Defense. In June 2011, Gates warned that a new generation of post-Cold War US political leaders might walk away from Europe due to exasperation over European dithering and continued defense cuts.

"In the past, I've worried openly about NATO turning into a two-tiered alliance, between members who specialize in 'soft' humanitarian, development, peacekeeping, and talking tasks, and those conducting the 'hard' combat missions. ... This is no longer a hypothetical worry. We are there today. And it is unacceptable," said Gates in a blistering address in Brussels, Belgium, to top European officers and officials.

More recently, British Minister of Defense Philip Hammond plowed the ground of NATO's Libya operation, saying the demands of enforcing a no-fly zone exposed the growing gap between Alliance countries. All 28 NATO members voted to approve the Libya mission, led by Britain and France. Half then agreed to take part, while only seven participated in actual strike operations. NATO quickly ran short of precision munitions and had to call on the US for resupply. Europe's lack of intelligence, surveillance, and reconnaissance assets meant Americans had to supply crucial ISR capacity.

The Libya operation "shone a bright light on relative military and political capabilities in terms of who 'could but wouldn't' and who 'would but couldn't,'" said Hammond in a November 2012 speech at the UK's Chief of the Air Staff airpower conference. Hammond added that with the US now rethinking its strategic options, Europe will have to accept more responsibility for its own security and for its periphery. That will mean shouldering a major burden in continuing stability operations in the Balkans and Mediterranean—and perhaps taking on a bigger role in North Africa and the Middle East.

"The bottom line is that Europe, as a whole, needs to do more, at a time when the reality is that, across the continent, aggregate defense expenditure is certain to fall in the short term and, at best, recover slowly in the medium term," Hammond said. So the challenge is, if Europe can't spend more, it must do things differently, he said.

Vertical Cuts

The word that might best describe NATO budgets is "constrained." The Alliance's informal goal is for members to spend two percent of their gross domestic product on defense.

According to figures compiled by the World Bank, which uses a broad measure for defense accounts, in 2011 the only NATO nations reaching this benchmark were France, Greece, Portugal, Turkey, the UK, and the US.

Taken as a whole, America's European allies spend about 1.5 percent of their GDP on the military, according to Council on Foreign Relations senior fellow Charles A. Kupchan. The com-



DOD photo by Cherie Cullen

Then-Secretary of Defense Robert Gates (r) attends the first session of the NATO Defense Ministers' meetings in Brussels, Belgium, on March 10, 2011. That June, Gates expressed exasperation over European defense cuts.



USAF photo by SSgt. Quinton Russ

TSgt. Jin Yum (r) and an Afghan counterpart perform a seven-day inspection on the rotor of an Mi-17 helicopter during a NATO training mission in Afghanistan. After NATO passes off security responsibility to the Afghans in 2014, some US trainers will remain to try to bolster indigenous capabilities.

parable figure for the US is more than four percent. The US is likely to scale back the Pentagon's budget in coming years, and that may make Washington even more sensitive to the ability of its partners to pick up their fair share of NATO responsibilities.

"Inequitable burden sharing has strained trans-Atlantic relations even in good economic times," said Kupchan in 2012 testimony to the Senate Committee on Foreign Relations.

There are disparities hidden within the overall downward trend of Europe's defense budgets. In general, the smallest NATO members have slashed the most. Lithuania cut its defense 36 percent in 2010 alone. Medium-size nations have implemented overall reductions around 10 to 15 percent, according to a Brookings Institution study on NATO defense cuts. Larger European Union nations such as Germany and the UK have limited cuts to around eight percent for the 2011-2015 period. Meanwhile, Poland (one of NATO's newer members) has actually increased military spending since the beginning of the continent's economic crisis.

Most of Europe's military reductions have been horizontal, applied evenly across operations, maintenance, and investment accounts. "These typical responses result in a growing array of forces that are not ready, not trained, and not sufficiently equipped or supplied—a widening 'invisible' gap across the Alliance," write National Defense University scholars Charles Barry and Hans Binnendijk in a recent report on the subject from NDU's Institute for National Strategic Studies.

A few nations have saved money through highly visible vertical cuts that eliminate a particular system or capability. Netherlands, for instance, has eliminated heavy tanks. In turn, this means the Dutch can afford missile defense radars for deployment on frigates.

The danger of vertical cuts is that they can take place without regard for what one's compatriots are doing. This could lead to a growing "self-selection" of roles within the Alliance, according to Barry and Binnendijk.

They judge that the current tight fiscal environment will last until at least 2018. "In the future, more cuts will be vertical as nations realize this is the only way to achieve real savings and to protect their most desired capabilities," according to the NDU scholars.

For its part, the US is already planning vertical reductions in Europe. In January 2012 the Obama Administration announced it would withdraw two Army brigade combat teams and an Air Force fighter squadron from Germany by 2014. These withdrawals—with associated changes in command structures—will reduce the US footprint on the continent by some 11,000 personnel. When they are finished, the American presence in Europe will stand at just under 70,000 personnel.

The brigade combat teams represent the last US heavy armor units deployed on European soil. Infantry and armored cavalry BCTs will remain.

To Pentagon budget-planners these adjustments may make sense. The lighter US units that remain in many ways are a better fit with Europe's own land armies. But European officials might take the change harder.

"The withdrawal of heavy brigades removes US main battle tanks in Europe for the first time since 1944. The symbolism of this passage for our allies is far more significant than it is for Washington. Reassurance of the US commitment to collective defense is at a premium not only because of US troop drawdowns; fears of gradual decoupling have been growing in recent years due to the US focus first on the Middle East/South Asia regions and now on the Pacific," write Barry and Binnendijk.

So how to keep the old NATO gang together? For a start, officials might concentrate on the positives.

In Libya, NATO aircraft helped drive



RAF photo

An RAF Tornado GR4 links up with a US Air Force KC-135 for refueling while on an Operation Odyssey Dawn mission over Libya. The technological imbalances among NATO nations were clear in that operation.

a tyrant from power in an operation led by Britain and France. NATO sea patrols have contributed to cutting the rate of piracy by three-quarters of previous levels in the dangerous waters of the Gulf of Aden and off the Horn of Africa. In the face of Russian complaints, NATO members reached a difficult political and military consensus on the deployment of ballistic missile defenses, and American BMD radar was deployed to Turkey and began operation in December 2011. Romania and Poland have agreed to host interceptor missile sites beginning in 2015 and 2018, respectively, and four interceptor-equipped Aegis warships will be based in Spain beginning in 2014.

In Afghanistan, the end is in sight for NATO's largest and longest combat operation. At the 2012 Chicago NATO summit, allies agreed to hand over defense of the country to Afghan forces in 2014. Afghanistan's future remains in question due to continued Taliban strength and endemic corruption in Hamid Karzai's government, but throughout the difficult Afghan experience NATO allies have largely stuck with the US—however much some may have been edging toward the exits.

After 2014 some NATO trainers will remain to try and bolster indigenous units, and the Alliance as a whole will defray the cost of this effort.

"Up to this point the US has been responsible for 90 to 95 percent of the cost of sustaining and building the ANSF, the Afghan [national security] forces. In the future, from 2015 onwards, this will be a shared responsibility," said US Permanent Representative to NATO Ivo H. Daalder. He spoke during a Council on Foreign Relations briefing following the Chicago meeting.

As to the future of forces in an era of defense cuts, clearly NATO must try to do more—or at least the same—with less. Already in Europe, governments are beginning to shift defense dollars away from personnel to investment, according to Daalder. The US has long complained that European defense forces are soldier-heavy and spend too little on procurement and research and development. Now the Germans, for instance, appear to have taken this to heart and are rebalancing their military budget.

In addition, NATO Secretary General Anders Fogh Rasmussen is pushing for more joint development, acquisition, and maintenance of assets via a "Smart Defense" initiative. Currently the Alliance boasts 24 multinational Smart Defense efforts, ranging from remotely controlled robots for clearing roadside bombs to the pooling of maritime patrol aircraft to multinational medical facilities. At the Chicago summit Denmark signed on as the 14th ally to join a group purchase of five Global Hawk remotely piloted aircraft for delivery around 2015.



USAF photo by TSgt. Jacob N. Bailey

Defense Secretary Leon Panetta (r) and NATO Secretary General Anders Rasmussen hold a press conference at NATO headquarters in Brussels. Rasmussen is pushing for more joint development, acquisition, and maintenance assets among NATO partner nations.

Co-op Shopping

"The Alliance will pay for the operation and support and maintenance as well as the infrastructure for these drones," said Daalder. "And as a result, we now have a capability that individual countries could never purchase themselves, and that's a real capability with real output down the line. And that's how we need to in these next few years focus on spending our dollars and Euros more wisely."

But co-op shopping isn't something the Alliance just discovered. NATO has long operated a fleet of 17 jointly owned and flown E-3A AWACS aircraft. There is also the newer and smaller joint strategic airlift wing of three C-17s, with NATO members representing most of the 12 partner nations.

Most of the projects listed as Smart Defense efforts are relatively small. Nobody is talking about something as revolutionary as a multinational air force—not yet.

In the wake of the Afghanistan operation it is clear NATO is unlikely to turn into a global security organization. That would be an unsupportable financial burden and create insurmountable political divides, according to Kupchan. "Trying to turn the Alliance into an all-purpose vehicle of choice for military operations around the world would likely lead to its demise, not revitalization," Kupchan told the Senate Foreign Relations Committee.

The Alliance needs to keep its military forces in as fine a shape as possible. Missions on Europe's edge or in its backyard of North Africa and the Middle East can emerge without warning. In 2010, few envisioned NATO-led Tornados over Tripoli.

But in coming years some of NATO's most effective contributions to global security may come in the form of capacity building, according to Kupchan. It could teach others the things that have served the Atlantic community so well: regional cooperation on military and political questions.

"Some of the most important security institutions of the 21st century are likely to be regional ones, such as the Gulf Cooperation Council, the African Union, the Association of Southeast Asian Nations, and the Union of South American Nations. NATO should be investing in the efficacy of these regional bodies," Kupchan said. ■

Peter Grier, a Washington, D.C., editor for the Christian Science Monitor, *is a longtime contributor to* Air Force *Magazine. His most recent article, "The Death of Korean Air Lines Flight 007," appeared in January.*

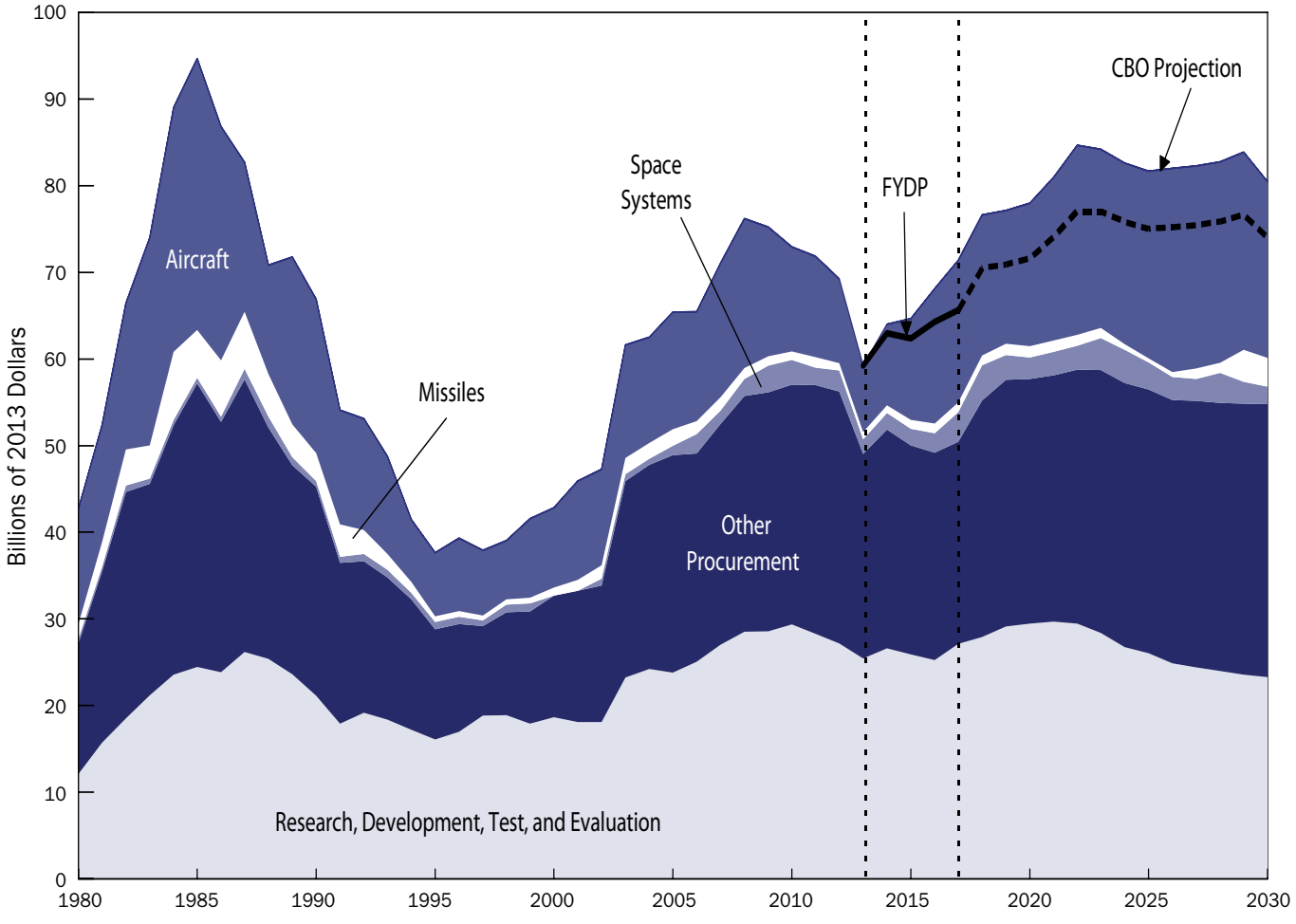
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Up, Down, Up, Down, and ... Up?

Air Force spending on acquisition—investment in weapons, equipment, research, and development—reached a modern peak in 1985, when the outlay hit a towering $95 billion in current dollars. Then came a long roller-coaster ride, with spending going down (to $35 billion), back up (to $75 billion), and back down (to $60 billion). Now, assuming that sequestration can be avoided, USAF's plans are headed back up. DOD's Future Years Defense Program has put acquisition on a trajectory to immediately reverse the recent declines, to hit about $80 billion in the early 2020s, and then level off. The Congressional Budget Office thinks DOD estimates are too low. The CBO projects USAF acquisition spending will hit $71 billion by 2017 and keep rising to $85 billion in 2022. The increase will be needed to fund new aircraft programs such as the F-35 fighter, KC-46 tanker, and a new long-range strike aircraft.

Costs of the Air Force's Acquisition Plans

Data for years 1980-2012 are actual. The FYDP years—2013-2017—are those for which DOD plans and costs have been fully specified. The 2018-2030 extension of the FYDP (shown as a dotted line) is a CBO projection from DOD's own assumptions. As can be seen, CBO's own projection—using its own assumptions—exceeds that of DOD.



Source: "Long-Term Implications of the 2013 Future Years Defense Program," Congressional Budget Office, Washington, D.C., July 2012.





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Brain Buckets, Hanoi Style

Photos via the National Museum of the US Air Force





The air equipment of the North Vietnamese Air Force evolved steadily throughout the Vietnam War. Headgear was no exception. In this photograph from the early 1970s, five North Vietnamese MiG-21 pilots show off their new Soviet-made, high-altitude helmets, which came into vogue among fighter pilots in the final two years of the war. The small photo shows the plain-vanilla helmet worn during most of the war years by communist MiG-21 pilots.

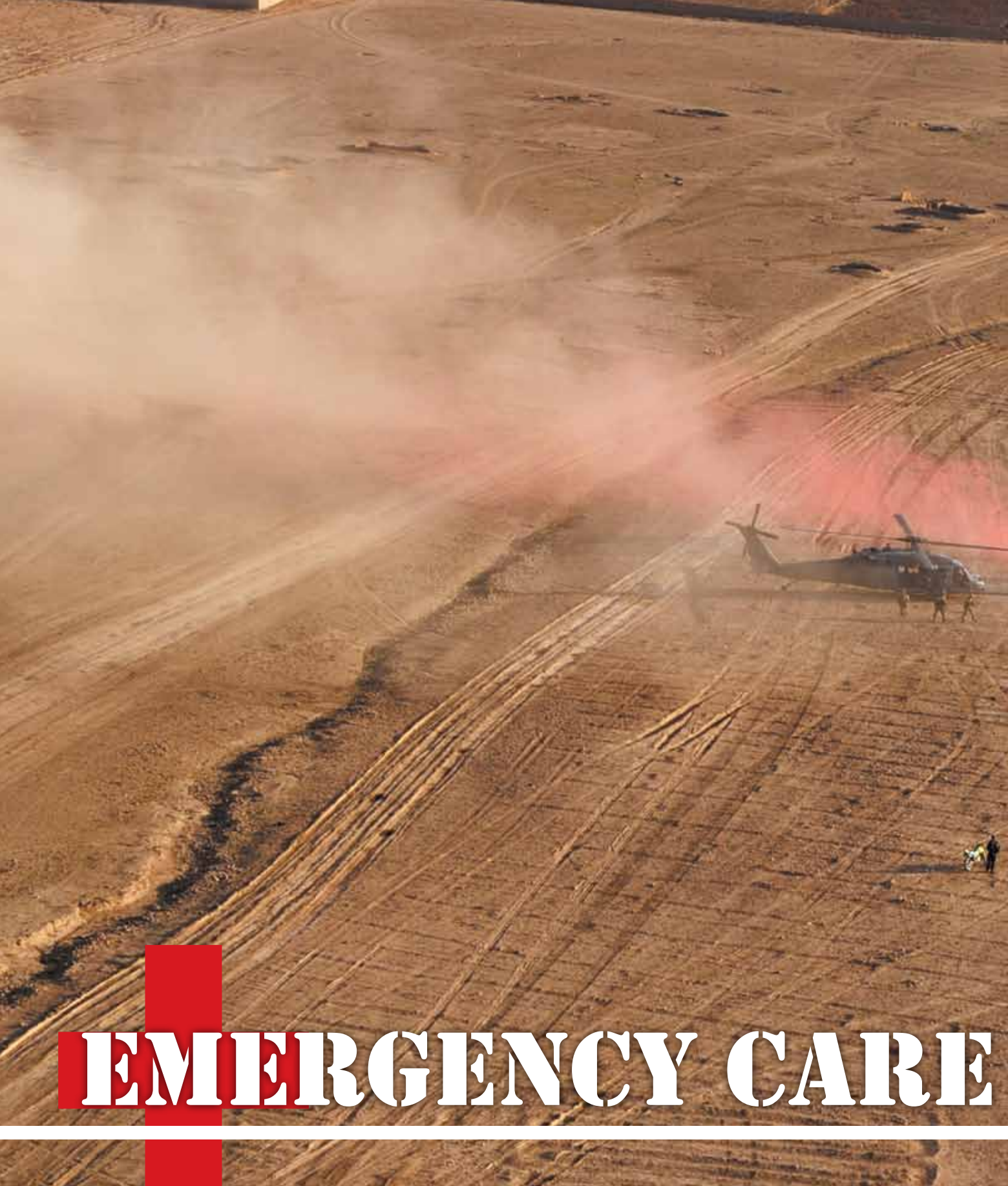


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EMERGENCY CARE

An Air Force Pave Hawk assigned to the 66th Expeditionary Rescue Squadron picks up a patient in Afghanistan. Casualty evacuation by air within the theater takes place almost entirely by helicopter.



USAF photo by SSgt. Manuel J. Martinez

BY AIR

Military aircrews are mastering the art of treating injured troops on the move.

By Marina Malenic

THE US military has fought two long, difficult ground wars since 2001, wars where troops were injured far away from bases, in remote and hostile territory. In many cases, surviving has depended on injured personnel quickly being transported to a secure medical facility.

Over the past decade, troops surviving their combat wounds have increased significantly in number, and they can thank, in part, the Air Force's en route care system.

"Major advancements in processes, training, technology, tactics, techniques, and procedures" have occurred over the past 10 years of war, said Brig. Gen. Bart O. Iddins, command surgeon at Air Mobility Command, Scott AFB, Ill. As AMC's senior medical officer, he has responsibility for establishing, coordinating, and sustaining USAF's aerial en route health care system. According to Iddins, the effectiveness and efficiency of that system, along with the development of a theaterwide trauma system, has transformed the management of combat casualties.

In 2009, then-Defense Secretary Robert M. Gates traveled to Afghanistan, promising troops more forward deployed medical capabilities. He told a group of marines his goal was "to provide the 'golden hour' here in Afghanistan that we have in Iraq," referring to a standard of getting troops to advanced-level treatment facilities within 60 minutes of their being wounded.

During the Vietnam War, it typically took about a month for wounded troops to reach care facilities in the United States. Today, the Pentagon's medical system has moved assets closer to the front lines to be more responsive to patient needs, and surgical teams are positioned closer to the troops. In addition, an extensive aeromedical evacuation capability quickly moves wounded warriors to progressively more advanced levels of care.

The emphasis in Afghanistan has clearly been on accessing medical care sooner rather than later. The battalion aid station provides first-level medical intervention. From there, patients move quickly to forward surgical teams that stabilize them, and when required, provide life- and limb-saving surgeries. Within hours, patients arrive at theater hospitals in Bagram or Kandahar via aeromedical evacuation, to receive highly specialized care.

After being evacuated from the battlefield and receiving advanced care at Landstuhl Regional Medical Center in Germany, the injured arrive at Walter Reed National Military Medical Center at Bethesda, Md., or San Antonio Military Medical Center in Texas in as little as three days.

Moving patients through this continuum of care wouldn't be possible without a robust en route medical care system.

Col. Mark Ervin, a general surgeon and the medical director for AMC's critical care air transport (CCAT) team, says

USAF's current formula shows a 91.2 percent patient survival rate within the entire en route medical care system.

There have been a "tremendous number of individual changes to [USAF's] CASEVAC [casualty evacuation] system," said Ervin. He said the most far-reaching improvements come from en route care that is seamless with what patients receive at their base-hospital destinations. "When this war started, we thought of those [elements] as distinct," he explained. "But since then we've worked to create a joint stream of care" without interruption.

Further, Ervin said, CCAT allows for the movement of very critical patients. "The system allows you to take care of much sicker patients than ever before," he said. "We have continued to expand what we can do within the en route care system. At the start of the [Iraq] war, we were able to move stabilized patients—still significantly ill but fairly stable."

Col. Robin Schultze, chief of the En Route Medical Care Division at AMC and an emergency nurse veteran of many CCAT missions, says USAF medical professionals have not let the combat environment constrain them. "They are continuing care as if they are still in a hospital at all times," she said. "That is a tremendous change since 9/11."

For example, USAF medical personnel have developed the concept of the "lung team" to move critically injured casualties who are on continuous heart-lung bypass. Some would previously have been too ill to move, she explained.

"Some of these patients would have died in theater, but medical professionals refused to accept that," she said. Moving patients on heart-lung bypass by air is a complex procedure, but Schultze said the capability to save them was born of the "refusal to accept that any patient is unsalvageable."

Because of emergency medicine physicians and critical care nurses who work aboard aircraft, "now the emergency room door is the helicopter door," she said.

"We are now saving casualties that in any prior war never would have been saved," said Ervin. "We are saving casualties that would never have made it to the first station." He attributes this success rate both to the innovations in the process of stabilizing casualties en route and to advances in medical technology and knowledge. For example, hemostatic dressings are chemically treated to stop bleeding. In addition, soldiers are equipped with tourniquets that can easily be self-applied.

Many Routes to Safety

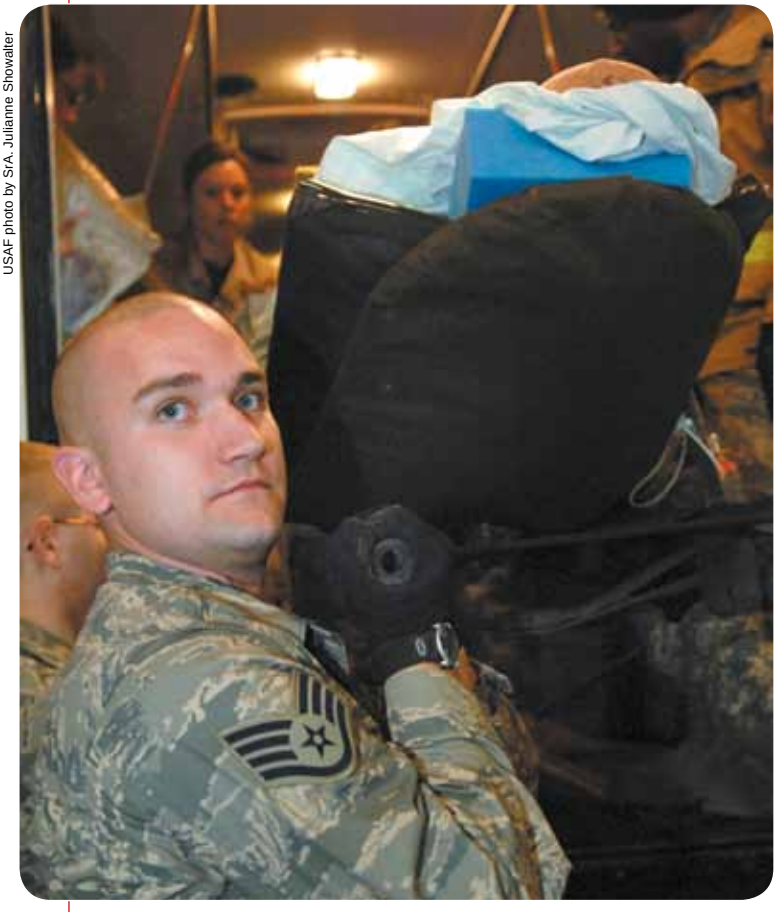
The US military's en route care system includes multiservice casualty evacuation and medical evacuation (MEDEVAC) typically run by the Army; tactical critical care evacuation teams, critical care air transport, and aeromedical evacuation usually run by the Air Force; and various related expeditionary patient staging systems handled by thousands of highly trained military medical personnel.

CASEVAC and MEDEVAC differ primarily because the latter uses a standardized and dedicated vehicle for providing en route care. Conversely, CASEVAC uses nonstandardized and nondedicated vehicles. The casualty evacuation system was designed to transport troops in need of evacuation from the battlefield but who do not have time to wait for a MEDEVAC, or for cases where a MEDEVAC team cannot get to the casualty.

The Geneva Conventions mandate MEDEVAC vehicles to be unarmed and marked with a red cross—the oft seen Army Black Hawks with a red cross in Afghanistan, for example. Firing on MEDEVAC vehicles is considered a war crime.

CASEVAC transports can be armed since they are used for other purposes. CASEVAC by air today takes place almost





USAF photo by SrA. Julianne Showalter



USAF photo by A1C Erin M. Peterson

Above: Airmen and soldiers from a contingency aeromedical staging facility carry a patient into a C-17 at Ramstein AB, Germany. From there, he will be flown to JB Andrews, Md. Below: Marine Cpl. Michael Meyer during his long trip from Okinawa to Hawaii to Iowa. Left: SSgt. Jason Leonard, a Reserve aeromedical technician, helps lift a patient during Iraqi Freedom in 2008 at Balad AB, Iraq.

exclusively by helicopter, a practice begun on a small scale toward the end of World War II.

Aeromedical evacuation uses fixed wing aircraft to transport patients between medical treatment facilities, typically over long distances.

Training is a big piece of the improving survival rates. All of USAF's tactical critical care evacuation team personnel—emergency medicine physicians, nurse anesthetists, and intensive care nurses—start in a CCAT training program. The CCAT course teaches these already experienced medical professionals to use their skills in a less friendly and more austere environment.

This training is followed by two weeks of advanced training at a center for trauma skills. Then comes the Joint En Route Care Course for rotary wing aircraft.

Survival, evasion, resistance, and escape training follows.

Finally, the nurses and physicians complete combat skills training with the Army to familiarize themselves with self-defense skills.

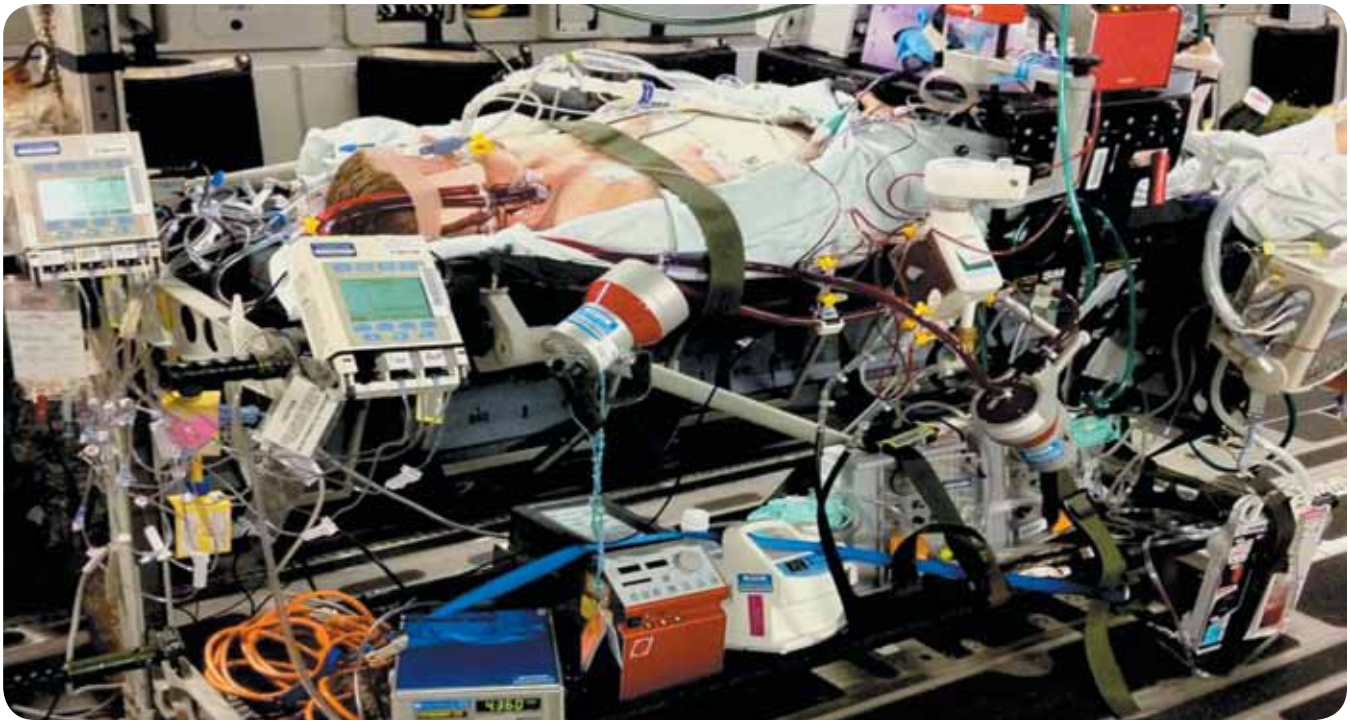
It Works

Examples of Air Force medical successes in the field abound. The March 2012 aeromedical evacuation of Marine Corps Cpl. Michael Meyer, who suffered complications from a lung infection and a collapsed lung, marked the first ever transfer of an extracorporeal membrane oxygenation (ECMO) adult patient by the US military in the Western Pacific region. ECMO provides cardiac and respiratory oxygen support for patients with a damaged heart and lungs.

For ECMO a surgeon inserts tubes into the patient's large blood vessels. Blood thinners prevent clotting. A machine then pumps blood to a membrane oxygenator, removing carbon dioxide and adding oxygen.

Meyer received care at the US Naval Hospital Okinawa at Camp Lester for several days before transfer to Kadena Air Base, to fly on a C-17 for specialized care in Hawaii.

The medical team transporting him comprised not only a USAF critical care air transport team, but also the Tripler Army Medical Center joint medical attendant transport team and



Sill photo from a video by University of Iowa Hospitals & Clinics



Photo by SrA. Tyler Placie

At Camp Bastion, Afghanistan, airmen and soldiers assigned to the 76th Expeditionary Rescue Squadron move a litter from an ambulance and prepare to transfer the patient into an HC-130 for medical evacuation.

civilians from a Honolulu hospital. A week later the 11-person transport team moved Meyer, via the aeromedical evacuation system on a C-17, to the University of Iowa hospital system in Iowa City, Iowa.

Meyer's lungs began to improve and, after 38 days of support, he was taken off the ECMO. By two months after his initial evacuation from theater, the marine could walk and eat and only required a tracheostomy mask collar for oxygen support.

After spending a total of 99 days in hospitals, Meyer was discharged.

Medical personnel from allied countries also take part in casualty evacuation, according to Ervin, and US medical personnel often treat partners' military and civilian personnel.

The United States Air Force School of Aerospace Medicine at Wright-Patterson AFB, Ohio, has graduated numerous international medical personnel in a variety of courses. For example, the Advanced Aerospace Medicine Course for International Medical Officers graduated two students from Bangladesh, four from India, four from Japan, one from Singapore, two from South Korea, two from Sri Lanka, and one from Taiwan in 2011. The Aerospace Medicine Primary Course graduated two students from Australia, seven from Malaysia, one from New Zealand, and one from the Philippines. The Critical Care Air Transport Course graduated five students from Australia, four from Japan, and two from South Korea, and the Flight Nurse Course graduated four students from Australia, one from the Philippines, three from South Korea, and one from Taiwan.

Last May, the US signed a framework agreement on aeromedical evacuation cooperation with three of its allies: Australia, Canada, and the United Kingdom. This proclamation of understanding will promote and support mutual cooperation and interoperability of the aeromedical aviation assets of the four air forces, the document states.

The four signatories promised to work toward providing compatible training, equipment, and procedures so teams can work together on the same aircraft. This so-called "Interfly" agreement solidifies initial proposals made by the four nations during a summit at Scott AFB, Ill., in November 2009. Flight clearances for aeromedical evacuation equipment from the respective nations are now facilitated by Interfly, but the Air and Space Interoperability Council national directors have asked a working group to develop systems to permit mutual recognition of engineering flight clearances with the "intent of enabling Interfly missions across the full range of transport aircraft" used by the respective teams.

Allied nations all benefit from this kind of international cooperation. Early in 2012, an Air Force certified registered nurse anesthetist was called on to move a 22-year-old Afghan National Army soldier. The soldier had suffered second- and third-degree burns to more than 35 percent of his body surface area in an improvised explosive device blast. He needed to be moved from Farah province to the Zafar ANA hospital in the city of Herat.

The patient received initial airway management and resuscitative surgery from a US Army forward surgical team at Farah, and then the "stabilizing" patient was put on a US Army helicopter while under the care of the Air Force nurse anesthetist and a US Army medic. This sort of cooperation is expected to continue.

As combat operations wind down in Afghanistan, the en route care mission "will be sized up or down to meet the requirement," said Iddins. "Even in the face of constrained budgets, we will always place the appropriate medical resources in the field and will always maintain an en route care capability" that is up to the task, he said. ■

Marina Malenic is the US aviation reporter for Jane's. Her most recent article for Air Force *Magazine was "Flying High," in the February 2012 issue.*

Verbatim

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By Robert S. Dudney

No Fun, Part I

"Let's not even pretend we're going to get a Secretary [of Defense] who can keep the force from going hollow. For the next couple of years, this job just isn't going to be a lot of fun."***—James J. Carfano, Heritage Foundation, McClatchey News Service dispatch, Jan. 1.***

No Fun, Part II

"This is an in-your-face nomination by the President to all of us who are supportive of Israel. I don't know what [Chuck Hagel's] management experience is regarding the Pentagon—little, if any—so I think it's an incredibly controversial choice, and it looks like the second term of [President] Obama is going to be an in-your-face term."***—Sen. Lindsey O. Graham (R-S.C.), on selection for Defense Secretary of former Sen. Charles T. Hagel (R-Neb.), a frequent critic of "the Jewish lobby," CNN, Jan. 6.***

Silver Lining

"To have jointness, the separateness of our services is a requirement. It takes 25 years to hone the expertise to be a competent division commander on the ground, a battle group commander at sea, or a theater air component commander. ... To optimally integrate service component capabilities under a joint force commander ... means that the services must evolve with the notion of interdependency, rather than self-sufficiency, as a guiding principle in building their service program and personnel plans. If there is any single 'benefit' that may result from reduced resources for the Department of Defense, it is that it may stimulate this kind of evolution within the services."***—Retired USAF Lt. Gen. David A. Deptula,*** **AOL Defense,** ***Jan. 2.***

Iowa, Indiana, Israel ...

"Failure to reach a satisfactory negotiated solution [on nuclear weapons] with Iran should not be viewed as the trigger for a new US-initiated war. ... A more prudent and productive course for the United States would be to continue the painful sanctions against Iran while formally adopting for the Middle East the same policy that for decades successfully protected America's European and Asian allies against the much more dangerous threats emanating from Stalinist Russia and lately from nuclear-armed North Korea. An Iranian military threat aimed at Israel or any other US friend in the Middle East would be treated as if directed at the United States itself and would precipitate a commensurate US response."***—Zbigniew Brzezinski, President James Carter's national security advisor,*** **Washington Post,** ***Jan. 3.***

Déjà Vu All Over Again ...

"Today, the scenario of Afghanistan is exactly like that of one year before the withdrawal of Soviet Union [in 1989]. The Americans and their allies are tired of fighting. They can neither bear the casualties nor the expenses of this war any more. They are left with no other option except withdrawal."***—Warlord Gulbuddin Hekmatyar,*** **Daily Telegraph** ***of London, Jan. 2.***

... And Again

"The Soviet Union did not understand religious and ethnic factors sufficiently and overestimated the capacity of Afghan society to move very fast toward a modern era, in this case socialism. Here I see similarities with the approach of the United States, especially with all the discussion about trying to leave behind an Afghanistan that is democratic and respects the rights of women—ideas that simply are not accepted across the broad society there."***—Svetlana Savranskaya, director of Russian programs at the National Security Archive in Washington, D.C.,*** **New York Times,** ***Jan. 1.***

True, and ...

"These leadership decisions are emblematic of the Marine Corps' effectiveness and high-level contributions to global military operations over the last decade."***—Rep. Duncan D. Hunter (R-Calif.), on why so many top joint service commands have been going to USMC officers,*** **Washington Times,** ***Dec. 31.***

... Also True

"They [marines] are better at politics."***—Retired USAF Lt. Gen. Thomas G. McInerney,*** **Washington Times,** ***Dec. 31.***

Except Without the Pimples

"The agency is a funny place, very insular. It's like middle-schoolers with clearances. ... Do you know how many CIA officers are jerks? If that was a disqualifier, the whole National Clandestine Service would be gone."***—An unnamed former CIA officer, in a story about the new film, "Zero Dark Thirty,"*** **Washington Post,** ***Dec. 10.***

Boy Scout Co-Prosperity Sphere

"Among the [war] criminals enshrined at Yasukuni is Iwane Matsui, commander of the troops that carried out the Nanjing Massacre, a six-week takeover of the Chinese historical capital in 1937 that resulted in the deaths of hundreds of thousands. ... At the shrine's museum, only two paragraphs are devoted to what happened in Nanjing, and neither describes a massacre. The museum explains in English and Japanese only how the Japanese Imperial Army occupied the city to discourage 'the Chinese from continuing their resistance.'"***—Story about the Yasukuni shrine in Japan,*** **Washington Post,** ***Dec. 10.***

Getting Worse, Not Better

"The problem [of military sexual abuse] is getting worse. It's not getting better. Part of the reason is people don't want to admit what everyone knows to be true: Men and women are human beings. They react to each other. They do things they are not proud of. Rank has nothing to do with it. It's not solely a gender issue. Both sexes are involved. All ranks. ... The only thing the military can do is try to encourage discipline instead of indiscipline, and try to avoid the kind of hazardous situations that just make it worse."***—Elaine Donnelly, Center for Military Readiness, quoted in the*** **Washington Times,** ***Jan. 3.***

A Huge Problem

"My message to the State Department has been very simple, and that is, we're going to solve this. We're not going to be defensive about it. We're not going to pretend that this was not a problem—this was a huge problem."***—President Obama, referring to lax security that contributed to the September 2012 terrorist attack on the US Consulate in Benghazi, NBC's "Meet the Press," Dec. 30.***

Keeper File

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What Wilbur Thought of Gas Bags

More than three years after Kitty Hawk, the Wright brothers, Orville and Wilbur, had still failed to market their airplane in the US. It was then that they received a request from a German arms dealer, Isidor Loewe. Loewe saw military potential in their invention and asked for a comparison of heavier-than-air flyers and airships. Hard as it is to believe today, France and Germany were pinning their airpower hopes on gas-filled dirigibles; France had just built a huge one, "La Patrie." Wilbur sent to Loewe a letter of reply. It is a classic of acerbic technical criticism, the point of which, as he accurately noted, was that airships indeed "were a thing of the past," and the future belonged to the airplane.

"Comparison of Airships and Flyers"

Wilbur Wright
Letter to Isidor Loewe in Berlin
Dayton, Ohio
July 19, 1907

Find the full text on the *Air Force* Magazine's Web site www.airforce-magazine.com "Keeper File"

An airship must displace a quantity of air whose weight is equal to that of the airship and its load. It must therefore be very large and unwieldy—in fact, 800 times larger than a boat of equal tonnage. This huge size entails many ill consequences: (1) the cost of construction is enormous; (2) the delicacy of the gas bag and the great area exposed to the wind makes it impossible to save an airship from destruction during ordinary gales without the use of a shed; (3) the cost of such huge sheltering sheds is very great; (4) the great size of the sheds requires that they be permanent installations, not removable from place to place so as to accompany an army; (5) a small army of attendants and a wagon train of gas generators and other equipment is required.

On the other hand, the aeroplane flyer is small and therefore cheap to construct. In a gale, only its edges are exposed to the wind, so the fiercest storm cannot wreck it when at anchor. It can be taken along with an army throughout a campaign and requires but trifling attendance and equipment.

The cost of an airship of the type "La Patrie," including its equipment, is fully 10 times as great as that of a flyer with its equipment, and there is a similar disproportion in the cost of upkeep.

It results that airships must necessarily be used in small numbers and for that reason under conditions which preserve them from danger of destruction by the shots of the enemy. But the cheap aeroplane flyer can be supplied to the army in such numbers that they can be used with the greatest freedom without fear of great monetary loss or of exhaustion of the supply if one is destroyed by the shots of the enemy now and then.

But cost and convenience in handling are really secondary matters. The real advantage of the aeroplane flyer over the gasbag airship lies in its enormously greater speed and serviceability. Since the airship is a floating body it follows the law that power must increase as the cube of the speed, the size remaining constant. But as larger engines require larger gas bags, it practically results that in order to merely double the speed it is necessary to increase the contents of the gas bag and also the power of the motors 64 times!

La Patrie, on the 14th of July, in a dead calm, traveled its length (60 meters) in seven seconds, so its true speed under ideal conditions is 8.7 meters a second, which is about 20 miles an hour, or several miles less than its claimed speed. Its motors are of about 70 horsepower. An airship of the same excellence of design to go 40 miles an hour would need to be 64 times larger and carry motors of more than 4,000 horsepower. ...

The relatively insignificant speed of the airship entails another very serious disadvantage. Since a flight of 50 miles against a 15-mile wind requires from 18 to 15 hours, while a similar flight by a flyer requires only two hours, it follows that the probability of a failure in the machinery or motor is at least five times as great in the first case as in the second. Up to the present no airship has succeeded in remaining in the air as long as four hours in daytime, nor has a circuit of 50 miles been made even in the lightest wind, though the French have been working on war airships for more than 20 years.

The flying machine, on the other hand, is constructed on the principle of the inclined plane, and the resistance is, within narrow limits, a constant factor of the weight. Therefore its velocity may be doubled with only doubled horsepower, and speeds up to 75 miles an hour are easily attainable, even by small machines. The 1905 Wright flyer flew 24 miles in 38 minutes in a circular course, a speed of 38 miles an hour. Against a 10-mile wind it would advance three times as fast as "La Patrie," against a 15-mile wind five times as fast. (The 1907 machines will do still better, as their speed will be 45 miles an hour in a calm.)

The difference is really greater than this, because airships in strong winds pitch about, veer from side to side, and often make complete circles in spite of all attempts to hold them to a direct course. All this greatly increases the resistance and reduces the nominal net speed. The speed of flyers is little affected by local variations in the direction of the wind.

But the flying machine has still another advantage of the greatest importance. It is so small and inconspicuous, and moves so fast, that it is safe from the shots of the enemy at comparatively short distances. It comes and goes before the gunners can train their pieces and get the range. Moreover, shots piercing the cloth do no serious harm. But the enormous airship with its slow motion and vulnerable gas bag cannot safely approach nearer than 3,000 yards, at which distance observations are of no military value under ordinary atmospheric conditions, since numbers cannot be estimated, nor wagon trains distinguished from cavalry and artillery. At critical times, 20 or even 50 flyers can be sent out at once to obtain knowledge of the enemy's movements and concentration of forces. If only one-half should return bringing the desired news, the cost in life and money would be less than that of an ordinary reconnaissance. ...

The airship has reached its limit and must soon become a thing of the past. The future is for the speedy, cheap, and hardy flyer. The results already attained with flyers make it manifest that the airship will be superseded within a few years and that money spent in attempts to improve the latter will be practically wasted. Every recognized scientific student of aeronautics in the world favors aeroplanes as against airships. ■

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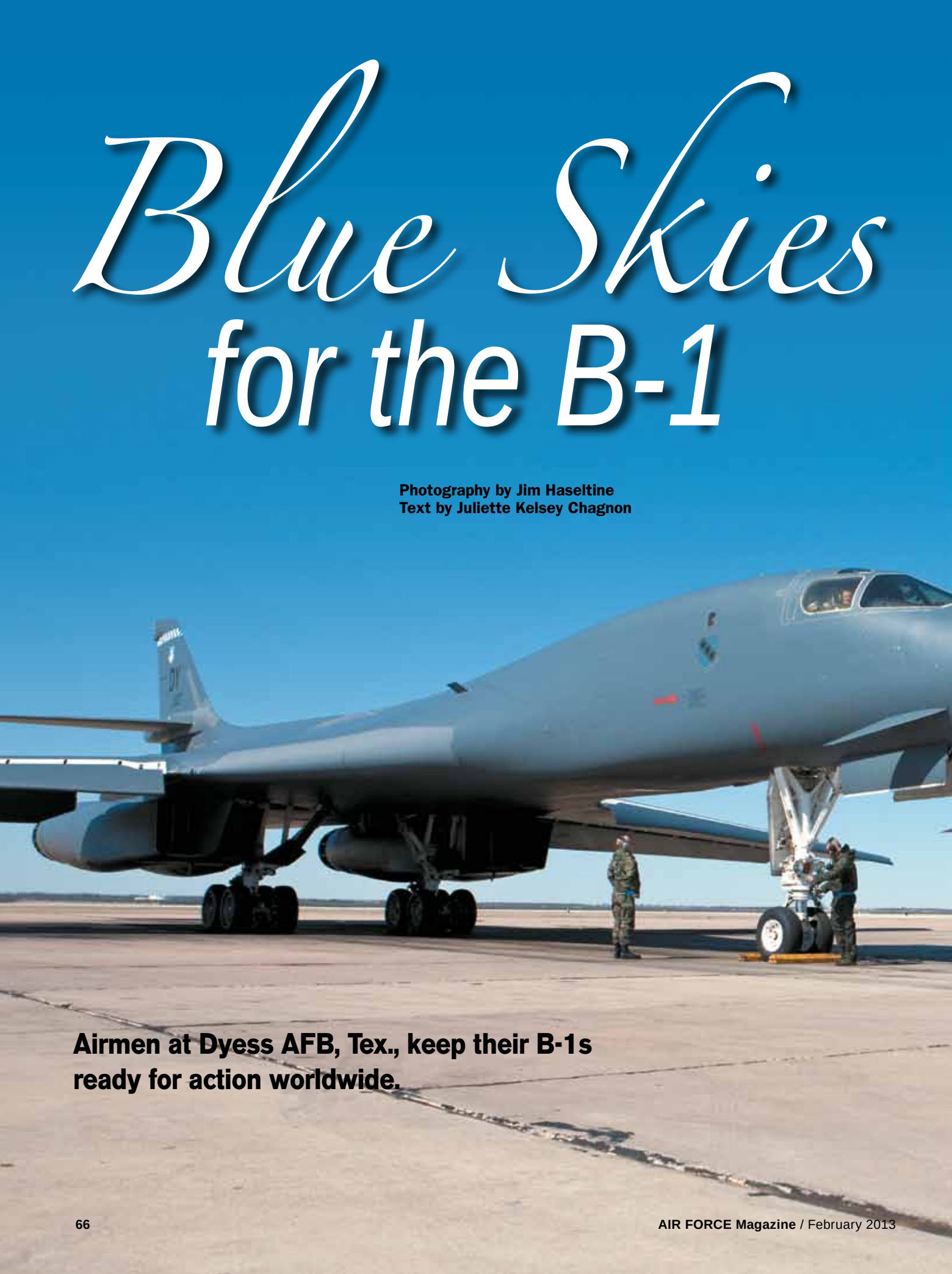


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Blue Skies for the B-1

Photography by Jim Haseltine
Text by Juliette Kelsey Chagnon



Airmen at Dyess AFB, Tex., keep their B-1s ready for action worldwide.



7th Bomb Wing B-1B Lancer air and ground crews perform preflight checks before a mission at Dyess AFB, Tex.

The B-1 Lancer began as a development program in the 1970s, as a replacement bomber for the B-52. The B-1B first arrived at Dyess AFB, Tex., in 1985 and first faced combat during Operation Desert Fox, the December 1998 US-British missile and bombing campaign against Iraq. It then participated in NATO's Operation Allied Force over Serbia, Enduring Freedom in Afghanistan, Iraqi Freedom, and Odyssey Dawn over Libya. B-1s have taken part in the continuous bomber presence at Andersen AFB, Guam. The heavily tasked bomber has benefitted from careful maintenance and a long list of recent upgrades. ***|1|*** *B-1s on the ramp at Dyess in 2010. Informally known as "the Bone," the B-1 is also based at Edwards AFB, Calif., and Eglin AFB, Fla. Another operational wing is at Ellsworth AFB, S.D.* ***|2|*** *Maj. James Dykas (l) and 1st Lt. Eric Luppold run through preflight checks in the cockpit before a 2010 mission from Dyess.* ***|3|*** *SSgt. Teddy Miro maneuvers a jammer holding an AGM-158 JASSM while (l-r) SSgt. Dontaye Taylor, TSgt. Robert Rose, and SSgt. Miguel Garza prepare to load it onto a B-1.* ***|4|*** *Four 2,000-pound Joint Direct Attack Munitions on a trailer ready for uploading.*













|1| *(l-r) SrA. Jason Crane, A1C Jeremiah Jansen, and SSgt. Scott James, crew chiefs at Dyess, work on a B-1's wing carry-through spring panel. The aircraft has variable-geometry wings and employs its forward wing setting for takeoff, landing, air refueling, and some high-altitude weapons scenarios. For combat and high subsonic or supersonic flight, it uses the aft wing sweep configuration.* **|2|** *A 9th Bomb Squadron B-1 takes to the sky on a training mission from Dyess. The 7th Bomb Wing hosts the Air Force's only B-1 formal training unit.*



|1| *On a 2011 mission, Capt. Kyle Schlewinsky uses a laptop and a side-stick controller in the aft cockit of a B-1B to operate the Sniper targeting pod. The Sniper pods, added to B-1s in 2008, have enhanced the bomber's ability to perform close air support—a role the fleet has excelled at in Enduring Freedom and Iraqi Freedom.* ***|2|*** *A Bone takes on fuel from a KC-135 during a training mission over New Mexico in July 2012.* ***|3|*** *The wings begin to sweep aft as a B-1 maneuvers on this training mission.* ***|4|*** *A nose-on view illustrates the aircraft's sleek, low radar cross section.*


1


4


2


3











|1| *A tail on the ramp at Dyess in 2010.* ***|2|*** *Rose goes over technical orders while Garza prepares an AGM-158 Joint Air-to-Surface Standoff Missile for loading.* ***|3|*** *This right chin view shows a Sniper targeting pod on its pylon. The Sniper enables precision strike missions through positive target identification, autonomous tracking, coordinate generation, and precise guidance from extended standoff ranges.* ***|4|*** *A close-up of the pod.*











|1| *Capt. David Grasso demonstrates the Bone's power and agility, making a near-vertical climb over Texas in 2011.* ***|2|*** *A B-1B cruises over the New Mexico desert.* ***|3|*** *Taylor lifts a JDAM with a jammer as Rose (c) and Garza prepare to load the satellite guided bomb into a weapons bay.* ***|4|*** *The view from the cockpit as another Lancer lines up on the runway for takeoff.*



1



2



3

|1| *A Bone over New Mexico on a training mission last summer. The aircraft boasts electronic jamming equipment, radar warning receiver, and countermeasures to allow penetration of hostile airspace.* ***|2|*** *In the fading Texas light, a Lancer performs a touch-and-go at Dyess.* ***|3|*** *The ramp at Dyess. The base is home to two Active Duty bomb squadrons. The massive bombers can carry the largest payload of guided and unguided munitions of any aircraft in the Air Force. Upgrades under way include the Integrated Battle Station, to replace obsolete flight instruments and increase situational awareness for the B-1's four-person crew.* ■

From 1964 to 1973, the Air Force paid a terrible price in lives and aircraft.



Scherbakov/RIA Novosti photo

THE CRUCIBLE OF

For the past four decades, the Air Force has lost relatively few aircraft in combat. This level of combat success was not always the norm.

As recently as the Vietnam War, USAF and the United States struggled to control the air, failed to achieve safety from enemy air defenses, and struggled to overcome an adversary air force. Many of the problems were self-inflicted, but the fact remains that the years 1964 to 1973 were tremendously difficult for the Air Force and American airpower.

The airspace over Vietnam was a lethal environment for airmen. At times, the USAF advantage in air-to-air combat slipped perilously close to parity. Airmen paid the price in aircraft down, lives lost, and survivors taken prisoner.

Overall, USAF lost 2,254 fixed wing aircraft from February 1962 to October 1973 in the Southeast Asia theater of operations. Some 1,737 fixed wing aircraft were combat losses, and another 517 aircraft went down in related noncombat operations. Losses occurred nearly every day. It was rare for a week to pass without an aircraft lost in combat operations.

Above: The wreckage of a US Navy A-6 Intruder draws a crowd of North Vietnamese in 1968. USAF's aircraft losses were devastating, and the Navy and Marine Corps also lost many aircraft. Right: An F-105 "Thud" crash-lands at Udorn RTAB, Thailand, in 1967. Forty percent of the F-105 inventory was lost during the war.

Some of the cumulative totals were shocking: The Air Force lost 40 percent of its total production of F-105s

VIETNAM

By Rebecca Grant



via Vietnamese News Agency

North Vietnamese pilots from the 923rd Fighter Regiment walk past a MiG-17. Pilots flying MiGs shot down 67 US aircraft. North Vietnam lost 137 of theirs.

to combat in Vietnam. Approximately one out of every eight F-4s ever built by McDonnell Douglas—for all services—was destroyed in Vietnam.

The North Vietnamese Air Force (VPAF) had between 60 and 75 aircraft in service at most points during the war. Yet the MiG-17s, MiG-19s, and MiG-21s shot down 67 USAF aircraft against a loss of 137 of their own, leaving the US Air Force with barely a two-to-one exchange ratio over the course of the war.

What led a nation with such an enormous technological and industrial edge to suffer such air losses?

Part of the answer was the mission itself. As the war escalated, more US ground forces deployed. They soon required emergency close air support plus air interdiction, seeking out enemy vehicles and strongholds. Added to this, major separate campaigns attacked fixed targets and war materiel across North Vietnam and into Laos.

Air operations peaked with ground operations from 1966 to 1968. The Air Force flew a total of 101,089 combat and combat support sorties in 1967, its busiest year. Losses piled up as airmen took risks to complete ground support missions. Ultimately, more than 83 percent of USAF's total combat losses were to ground fire—mostly anti-aircraft guns.

Now-retired USAF Chief of Staff Gen. Merrill A. McPeak saw it firsthand. Many aircraft were lost to gunfire because they were slow movers, he wrote in his memoir, *Hangar Flying.* But "guns also bagged lots of modern fighters, not all of them flown by careless or inept pilots," he said. In his view, the compromises required to handle surface-to-air missiles made US aircraft more vulnerable to guns and interceptors.

China and Russia

The volume of losses tracked with number of sorties flown. But there were other factors. The lethality of the air war derived from the deadly combination of anti-aircraft fire, SAMs, and handfuls of MiGs creating a multilayered problem for strike packages.

A small number of MiGs inflicted some of the most intriguing lessons of the war.

The aerial combat war in Vietnam had two major phases—from the first kills of mid-1965 to 1968, and then again from December 1971 to December 1972.

North Vietnam had begun building its air force after driving out the French in 1954. Several main airbases such as the new jet field at Yen Bai in the North were built in the late 1950s and early 1960s.

China and the Soviet Union supplied aircraft, air defenses, and fighter training. According to Istvan Toperczer's definitive *MiG-17 and MiG-19 Units of the Vietnam War,* pilot training began in the late 1950s and continued through the war. Vietnamese pilots took Russian language lessons and ground school at Bataysk, Russia, then transferred to Primorsko-Akhtarsk for flight training in the Yak-18 or later the L-29. At "Ahtari" base, Vietnamese pilots were forgiven for flight training mishaps and given preference over comrades from Hungary, Cuba, and other countries because of the urgency of returning them to their fight back home.

By the early 1960s, North Vietnam also had pilots training on the MiG-17 in



Photo via Bert Hester, www.preservingourhistory.com



Via Vietnamese News Agency


USAF photo

Left: In front of Chinese-made MiG-19s, North Vietnamese pilots listen to a briefing on dogfighting tactics. The MiG-21 superceded the MiG-19. Right: A USAF fighter pilot's gun camera records the destruction of a MiG as the left wing erupts in flames and disintegrates.

China—with Chinese pilots flying and fighting in North Vietnamese airspace at the beginning of the war.

Records indicate that the first air-to-air kills by MiGs were credited to Chinese pilots. Fortunately, these were kills of the AQM-34 Firebee reconnaissance drones.

The year 1965 marked the beginning of steady losses to anti-aircraft fire, surface-to-air missiles, and MiGs. Among the first USAF losses were more Firebees. By mid-1965, several manned aircraft were lost due to ground fire, lack of fuel, mishaps, and other causes, and many aircrews were already prisoners of war.

The increasing pace of flights provided a target-rich environment for North Vietnamese pilots. On June 20, 1965, a USAF F-4C based at Ubon RTAB, Thailand, was gunned down by a MiG-17. This was the first F-4C lost in combat.

Navy A-1 Skyraiders from USS *Midway* were among those launched as part of the rescue air patrol when they, too, encountered MiG-17s. "At 12,000 feet and [196 mph] we looked like Tweetybird to Sylvester the Cat," recalled Navy Reserve pilot Capt. Clinton B. Johnson in a widely reprinted memoir. "Our only hope was to get down low and try to outturn the MiGs."

Chasing MiGs at low altitude, Johnson and his wingman flew around a hill to see a MiG-17 ahead of them lining up on other A-1s. When they fired a short burst, the MiG-17 "turned hard into us to make a head-on pass." The Navy pilots gunned him for the kill.

These were deliberate tactics. Flying MiGs that day were members of North Vietnam's 921st Fighter Regiment, a unit whose pilots were in action for nearly a year by then. "A handful of young, inexperienced pilots would be flying obsolete aircraft against a numerically and technically superior enemy," wrote Toperczer of the regiment. But they had an advantage: "They would be flying over their own territory, with backup, however limited, from radar and anti-aircraft units."

The Vietnamese pilots of the 921st called the MiG-17s "Silver Swallows" for their bright metal fuselages. USAF Col. Robin Olds called the MiG-17 "a vicious, vicious little beast."

Rules of Engagement

British historian Christopher M. Hobson believed the North made a careful decision about how and when to use its precious MiGs. "The MiG force was held back until the Rolling Thunder strikes began to reach the 20th parallel," wrote Hobson in his book *Vietnam Air Losses*.

Day 1 of the air-to-air war might be traced to April 4, 1965. On that day, MiG-17s surprised and mauled flights of F-105s on a mass raid to bomb the Thanh Hoa Bridge. Four MiG-17s dove across a package of F-105s then disengaged. Down went two F-105s, with both pilots killed.

This was the first blast of the classic hit-and-run tactics MiGs would use throughout the war. They took shots but preserved aircraft for future opportunities, which were sure to come as the US flew more and more sorties. As long as the US rules of engagement barred strikes on their bases, the MiGs could operate almost at will as raiders and stretch their small aircraft force into a thin but consistent threat.

The MiG-17 was a known gun killer. It carried three 23 mm cannons; some of the airplanes were later modified with a radar scope. A direct descendant of the MiG-15 of Korean War fame, the MiG-17 also took advantage of the light weight and maneuverability characteristics of the MiG family.

Over time, the numbers added up. Pilots such as Nguyen Van Bay capitalized on the MiG being swift, small, and hard to spot. Van Bay claimed seven kills in the MiG-17. At least five matched US records, making him North Vietnam's top Fresco ace.

The US response was to implement combat air patrols to keep the airspace open. Numbers again made the task harder for the US. Not knowing where the MiGs might pop up, combat air patrols had to be in place to cover every mission from bombing to rescue operations. For years it took bases in South Vietnam, bases in Thailand, and carriers on station to provide enough fighters to keep airspace open for aircraft on interdiction and CAS missions.

Soon, along came the MiG-21.

The MiG-21 was an all-new supersonic jet nearly twice as fast as the MiG-17. The MiG-21 also carried the heat-seeking K-13 Atoll missile, which its pilots used effectively.

The MiG-21 came into use in early 1966. One of the first encounters between a USAF F-105 and a MiG-21 ended as an instructive tale. The USAF pilot locked in combat with the MiG-21 ran out of fuel and had to eject. The F-105 was chalked up as a victory for the North Vietnamese pilot, who was able to return to base.

To the North Vietnamese, the primary value of MiGs lay in combining layered anti-aircraft fire and SA-2s with a few, well-trained flights guided by disciplined tactics. When plans came together they imposed high costs on US forces.

In response, Olds' Operation Bolo bagged seven MiGs in one day in a

dramatic engagement in January 1967. "The MiGs seemed to be hiding after Bolo," Olds later wrote. "We wouldn't see any again until the middle of March."

But suppression was an ongoing task. Olds, even after Bolo, described the environment as worse than anything he'd seen as a 22-year-old squadron commander fighting over Europe in World War II.

"Missiles streaked past, flak blackened the sky, tracers laced patterns across my canopy, and then, capping the day, MiGs would suddenly appear—small, sleek sharks, cutting and slashing, braving their own flak, firing missiles, guns, harassing, pecking," he wrote in his memoir, *Fighter Pilot.*

Just a few months later, MiG-17 pilot Van Bay led the 923rd Fighter Regiment pilots through several days of effective engagements. On April 19, 1967, MiG-17s engaged and shot down an F-105. Maj. Leo K. Thorsness pursued another MiG and shot it down with guns. Thorsness intercepted more MiGs lining up for an attack and nearly ran himself out of fuel while acting as a decoy to save other airmen. For his heroic acts, Thorsness was awarded the Medal of Honor.

Wrong Aircraft for the Mission

However, North Vietnam's 921st and 923rd Fighter Regiments weren't done with their little operational surge. On April 24, eight MiG-17s surprised a package of Navy F-4s attacking Kep, north of Hanoi. The F-4s first ran into heavy AAA, then MiG-17s. The MiGs took advantage of strike packages heading for identified locations and lurked in wait—adding extra menace in an environment already filled with lethal ground-based defenses.

While the MiGs provided suitable home defense, USAF was discovering it had entered the war with air forces that were not as good a fit for their current missions. Most aircraft types were built for Cold War operations, not counterinsurgency warfare.

One stalwart, the A-1 Skyraider was not built even for the Cold War. It was a World War II design, which first flew in March 1945 with the idea of carrying a 2,000-pound bomb on a 1,000-mile flight from carriers to Tokyo if need be. Instead, the Skyraider pilots found themselves strafing, covering rescues, and chasing MiGs. The Air Force lost 150 A-1s in combat, while the Navy lost another 65 and the South Vietnamese Air Force lost 225.

USAF photos



Above: Revetments and F-4s of the 8th Tactical Fighter Wing—the "Wolf Pack"—line the ramp at Ubon RTAB, Thailand. The US flew combat air patrol missions from bases in Thailand, South Vietnam, and carriers. Below: Col. Robin Olds paints a victory star on an F-4 he flew while downing a MiG-21. The F-4 suffered the highest USAF aircraft loss total of the war.



Perhaps the most severe operational disappointment was the F-105. The "Thud" was designed for a nuclear bombing mission, so its wing loading deliberately cut corners on maneuverability. "The Thunderchief was designed to fight a nuclear war in which the delivery of one nuclear weapon at low altitude and high speed was all that was required," wrote military aviation historian Kenneth P. Werrell in 1998.

The F-105s were powerful bombers but vulnerable to guns, MiGs, and SAMs. The Vietnam War claimed 334 F-105s as combat losses, out of a total production run of 833 aircraft for an astonishing attrition rate of 40 percent. Twenty-three F-105s fell to MiGs, while SA-2s took out 31 more.

Despite those numbers, it was not the F-105 but the F-4 that suffered the highest Air Force losses. A gruesome 382 F-4s fell in combat, while total losses



F-105 pilots (l-r): Capt. Harold Johnson, Maj. Leo Thorsness, Capt. Larry Waller, and Capt. James Padgett at Nellis AFB, Nev., in 1966, just before deploying to Takhli RTAB, Thailand. Johnson and Thorsness were shot down in April 1967, and Padgett was shot down in 1972. They spent the rest of the war as POWs.

reached 445 when other operational losses were included. Adding Navy and Marine Corps Phantom losses put the number of F-4s lost at 671. This was 12 percent of the fleet—or the equivalent of one out of every eight of the F-4s ever produced.

The C-130 was a much better matchup of aircraft to the Vietnam mission, but even so, 60 of the cargo lifters were lost in the war. With them, 395 crew members lost their lives.

For fighters and bombers, the combination of layered defenses and the critical ground support mission stoked continuing losses. The debut of the SA-2 in Vietnam erased any medium- or high-altitude sanctuary from anti-aircraft fire. SAM suppression could be a lethal business, too, as was the case when six F-105s from Takhli Royal Thai Air Base and Korat RTAB, Thailand, were lost in raids on SAM sites on July 27, 1965.

Still debated and controversial is the role the People's Republic of China played in the US-Vietnam air losses. China served as a supplier of equipment and training, and their personnel manned anti-aircraft batteries for long periods. Chinese sources claim its crews fought 558 battles against US aircraft and had a hand in shooting down 597. Given the hundreds of attack and fighter aircraft lost to anti-aircraft fire, the numbers claimed are not outrageous.

Also intriguing are the few cases of Chinese pilots in air-to-air combat against the US, and American airmen had already met Chinese pilots in the skies over Korea.

Vietnam is on China's border and stray drones and aircraft often met their fate at the hands of People's Liberation Army Air Force MiGs. According to historian Walter J. Boyne, the PLAAF provided "much training and assistance" to North Vietnam and gleaned experience for their own purposes, too. "On a number of occasions, the PLAAF shot down US aircraft that had strayed into Chinese airspace," Boyne observed.

Woefully Unprepared

Chinese MiGs shot down seven Air Force and Navy aircraft from 1965 to 1968, by Hobson's count. Another source added at least a dozen AQM-34 Firebees to the count through 1967.

Whatever role China played, it was largely over by the late 1960s, as the Cultural Revolution disrupted even China's military, and activity by Chinese pilots declined. China and North Vietnam also came to be at odds in the Sino-Soviet split.

The Air Force's aerial combat losses paused after 1968, but losses to ground fire continued. Records of those years show the same steady rates of attrition.

"High threat" was a relative term. McPeak's "Misty" forward air controller unit lost 14 aircraft in the first half of 1969 alone. Loss rates were lower in 1970 and 1971 in particular, but USAF still lost nearly 247 aircraft in those two years.

A typical example from these years came on June 18, 1970. An F-4E strafing a truck on a road in Cambodia was struck by small-arms fire. The Phantom was flying so low it crashed before the crew could eject. Similar stories often involved pilots making a third or fourth strafing run over a target area.

Forward air controller units also continued to take losses during the war's two quieter years. In June 1970, an OV-10A Bronco went down in Laos, and the Jolly Green HH-53 sent to pick up the airmen was itself shot down, killing all crew onboard.

Still, the Vietnam air war had one last violent chapter left. In 1972, US airpower surged back to the region to fend off North Vietnam's spring offensive and then to drive home the culminating pressure of Linebacker II. The Air Force lost another 195 aircraft in 1972 while the Navy lost 91 and the Marines lost 22.

The darkest years of the war did bring on some tactical fixes. Air combat with the agile MiGs vectored by ground control inspired the US to replicate the threat at USAF's Red Flag and the Navy's Topgun school. The idea in both cases was to get back to fundamentals of air combat maneuver and training and to give pilots their first deadly combat exposure in a controlled setting.

The larger issue showcased the inherent advantage for Vietnam of fighting over its own territory. Werrell did not flinch from concluding USAF was "woefully unprepared" for Vietnam because of its focus on the nuclear mission. Certainly airmen did all they could to improve tactics and integrate technological fixes during the war.

In Werrell's view, USAF "rose to the challenge of the war in Vietnam but paid a high price."

The air losses left a permanent mark on future planning for airpower operations. American reckoning with how a small air force could inflict such losses influenced the next generation of US fighter design—and especially the F-15 Eagle. ■

Rebecca Grant is president of IRIS Independent Research. Her most recent article for Air Force *Magazine was "Meet the New PLAAF" in the January issue.*

The B-47's Deadly Dominance

By Walter J. Boyne

The Boeing B-47 Stratojet was the perfect strategic weapon for its time, so feared by its enemies that the bomber never had to perform its lethal nuclear mission.

The Soviet leadership knew the B-47—swiftly deployed in ever greater numbers—gave the United States an unstoppable nuclear strike force.

Sadly, the B-47 also suffered losses on a scale that would be utterly intolerable today. Over its lifetime, 203 aircraft (about 10 percent of the total procured) were lost in crashes, with 464 deaths. This article focuses on the two peak years, 1957 and 1958, when 49 B-47s crashed—incurring 122 fatalities.

There were a number of reasons for this doleful toll. The Stratojet, never called so by its crews, introduced a new flight performance regime requiring new skills and greater precision.

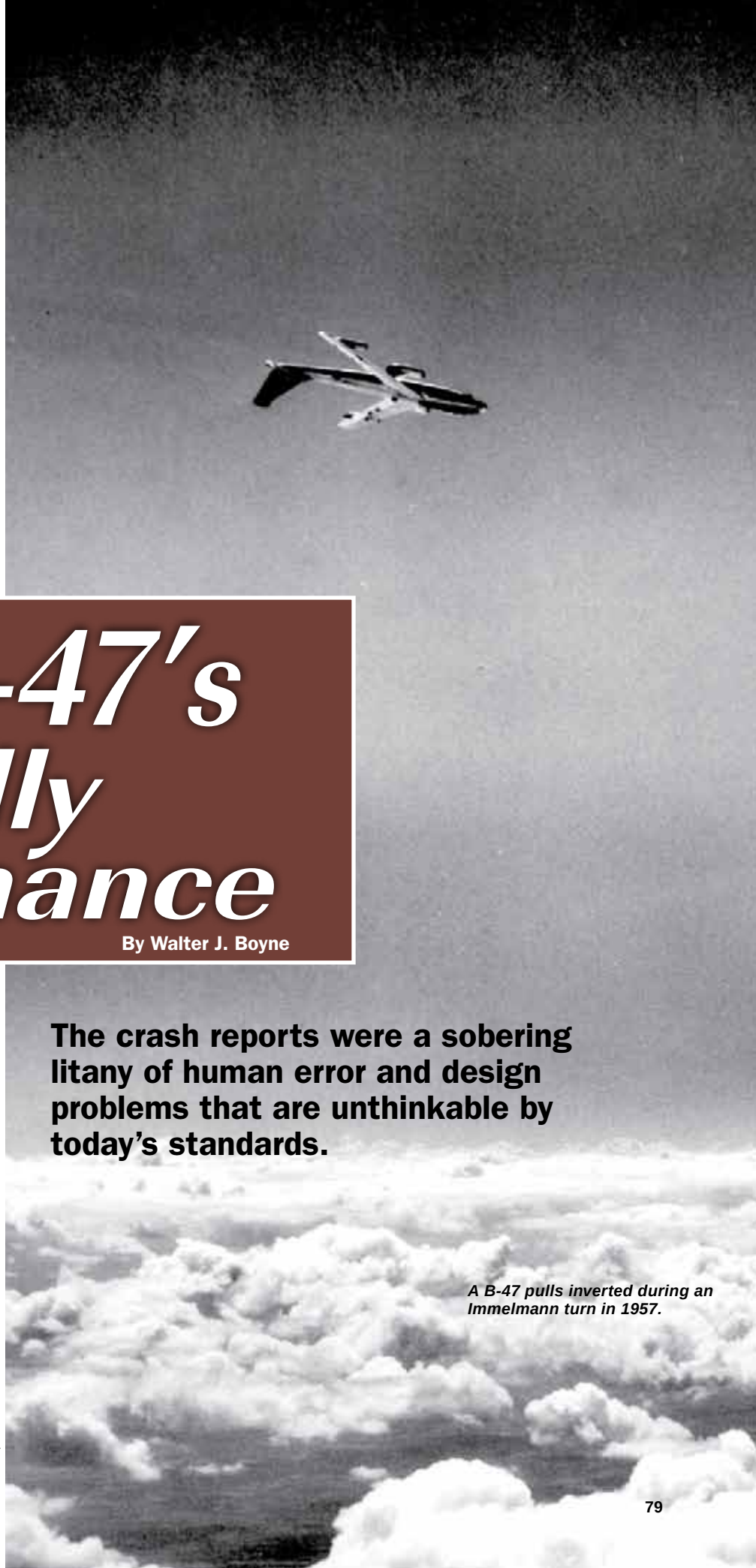
It was a hybrid of World War II metallurgy, construction techniques, and aerodynamic theory that was sometimes inadequate for the new era of jet engines.

From its very first flight, USAF tried to maximize the B-47's effectiveness with ever greater demands for performance, flexibility, and mobility.

Perhaps most important, the bomber debuted at a time when Strategic Air Command was undergoing an explosive expansion in size that diluted standardization efforts and the effectiveness of training and safety procedures.

After four years of intensive development the XB-47A made its first flight on Dec. 17, 1947, one of two prototypes built under a $10 million contract. It was the product of Boeing expertise and the information engineer George S. Schairer garnered from captured German data on swept wings and high-speed flight. The prototype was so radical that one of its

The crash reports were a sobering litany of human error and design problems that are unthinkable by today's standards.



A B-47 pulls inverted during an Immelmann turn in 1957.

USAF photo





USAF photos

primary engineers, Holden Withington, was still not certain it would fly as he watched it taxi out for its first takeoff.

The XB-47 featured slender, shoulder-mounted swept wings. A huge bubble canopy housed the fighter-like cockpit for the pilot and copilot-gunner. The navigator-bombardier-radar operator was tucked away in the nose and in later models had no outside visibility at all.

Six General Electric engines were mounted, four in inboard underwing pods and two near the wingtip. The engine placement provided aerodynamic benefits while strengthening the wing. The "bicycle landing gear" previously tested by Martin on a B-26 and the XB-48 was adopted because the thin wing provided no storage space.

Slow Acceleration

The selection of the ultrathin wing created both structural and aerodynamic problems. It had to be built with great strength to withstand huge deflections, as much as 17 feet in flight. But it was also flexible chord-wise, so that at speeds above 489 mph, the ailerons acted as a tab, twisting the wings rather than inducing a bank. At 525 mph, the ailerons were totally ineffective, and the control wheel could not budge from side to side. Ironically, in the course of B-47 development, the Boeing engineers discovered a thin wing was not absolutely necessary and designed the B-52 with huge thick wings and ample fuel storage.

Static structural tests proved the B-47 could survive 150 percent of its design limit load. Unfortunately, at the time there was no way to compute the cumulative effect of repeated cyclic loads imposed by operations.

Flying the aircraft at approach and landing speeds was demanding because the engines were so slow to accelerate. A drogue parachute was used to allow approach and landings to be made with the engines still carrying enough power to enable rapid throttle movement. After landing, a 32-foot brake parachute and an anti-skid brake stopped the aircraft.

Mass production was delayed by both postwar defense cuts and technical difficulties. The latter included a tendency to "Dutch Roll" and to pitch up. A specially designed "yaw damper"

Above left: A Stratojet makes a rocket-assisted takeoff in 1954. Left: A B-47 lands with both drag chutes deployed.



B-47 Crash

(Continued from page 1).

also hospitalized, overcome by smoke.

More than a dozen Upper Heyfordians were treated at the dispensary for smoke inhallation, exhaustion and minor cuts following the accident. All except four were released after first aid treatment.

A2C Lawrence Kapp, A2C Virgil Sykes, and A3C Robert Major were held overnight at the base dispensary.

British Help

During the emergency, while all available base fire fighting equipment was in use, a pumper truck from the Bicester branch Oxford District Fire Brigade stood by to handle any additional emergency calls here. British policemen of the Oxfordshire Constabulary also res-

Photo via raf-upper-heyford.org

Debris from a May 1964 B-47 crash litters RAF Station Upper Heyford in England. At right, a clipping from a SAC newspaper describing the deadly crash.

fixed the first problem, while a host of small airfoil shaped vanes called "vortex generators" solved the latter.

For a few years the difficulties were of such a magnitude that despite the B-47's terrific performance, with its 606 mph top speed and 3,000 mile combat radius, many at Boeing believed the B-50 series would continue to be their bread-and-butter warplane.

The 1953 National Security Council Document 162/2 called explicitly for maintenance of a strong military force, emphasizing the capability of inflicting massive retaliatory damage by offensive striking power. Strategic Air Command became that force, led by Gen. Curtis E. LeMay.

SAC embarked on an unprecedented peacetime growth in strength and proficiency. From 1951, the year the B-47 arrived in the force, to 1957, SAC expanded from 144,525 personnel to 224,014. It grew from 12 to 1,285 B-47s and from one B-47 medium bomb wing to 28—each with 45 aircraft. Boeing, Lockheed, and Douglas all built B-47s to meet the delivery schedule. The total number of aircraft in SAC went from 1,186 to 2,711.

This growth demanded an enormous logistics buildup. By far the most important supporting element to the B-47's effectiveness was the creation of a large fleet of aerial tankers. This began with less-capable Boeing KB-50s and KC-97s until the long-lived KC-135 arrived on scene. First introduced in 1957, the KC-135 fleet expanded rapidly. The tankers gave "legs" to the B-47 fleet and established it as a global threat.

Attention Critical

To support this aerial team, SAC swiftly set up a tremendous infrastructure of new Air Force bases, new schools for training air and ground crews, and huge depots for maintenance and repair. A corresponding industrial infrastructure of companies large and small grew up to meet the needs of this expansion. Overseas bases were organized to give the B-47s quick reaction time.

As the pell-mell re-equipment of SAC with B-47s went forward, there were errors in component supplies, training, and operational procedures.

SAC's flight program actually saw a decline in the rate of accidents per 100,000 flying hours, but it was still inadequate for the demands of the jet age. The cost was staggering by today's standards.

From 1953 to 1959, B-47s suffered 296 Class A and Class B mishaps, resulting in 242 fatalities. During this time annual flight hours for the B-47 rose from around 105,000 to a peak of 584,000.

In 1957 alone there were 35 Class A and Class B accidents; of these 24 were crashes that cost 63 lives. Almost as deadly was 1958—there were 33 Class A and B accidents, with 25 aircraft crashed and 58 fatalities. The vast majority of crashes came down to human error, with pilots assigned principal blame.

There were many reasons for this. The three-man crew flew a vastly more complicated aircraft than had the 10-man crews of the B-29 or B-50. It was easy for any crewman, particularly the aircraft commander, to have his attention diverted momentarily from the task of flying the aircraft. And missions sometimes ran 24 hours.

Crew coordination was essential, and could be easily disrupted when an emergency occurred. Yet attention to flight control was absolutely critical at all times.

The extremely clean lines of the B-47 enabled both its performance and its problems. A pilot concentrating on a new situation—course change, a sudden red light, radio instructions, anything—might let his attention wander for a few seconds and find himself banking in a dive that pushed his speed to a point where recovery was impossible. This proved to be a frequent scenario during instrument flight.

Where the B-50s of the time might let down in an instrument approach from a holding point in leisurely 1,000-foot increments, the B-47 descended at a hell-bent-for-leather 6,000 feet per minute rate that sometimes led to lethal miscalculations.

The B-47 required much closer attention than previous aircraft to preflight planning, fuel distribution, trim settings, and airspeed control. It was

deceptively easy to fly, but extremely precise operation was required during takeoff, in-flight refueling, instrument flight and landing. This became even more important with the introduction of new tactics that included higher takeoff weights, minimum interval takeoffs, three-ship cells for in-flight refueling, tankers with marginal performance, and operation from alternate airfields.

Using KC-97s as refueling aircraft caused many problems. The KC-97 could not fly fast enough with a full load of fuel to keep the B-47 from stalling. This forced the tanker into a descent to maintain enough speed. Operating with the KC-97 was particularly difficult for three-B-47 cells, especially at night or in weather.

Other factors intervened as well. After Oct. 1, 1957, SAC sought to keep one-third of its bombers and tankers on alert, with weapons loaded and the crews ready for takeoff within 15 minutes. Extra demands were imposed by "reflex" operations requiring 90-day overseas tours.

Each of these new requirements placed increased demands on the relatively new B-47 and its crews. An increase in gross weight from 125,000 pounds in the B-47A to 206,700 in the B-47E was offset by more powerful engines, water injection, and jet-assisted takeoff bottles. These combined to increase the strain on wings and fuselage.

One of the most important changes was SAC's establishment of the Hair Clipper training program for low-level flight and the use of the LABS (low altitude bombing system) maneuver. In this, the B-47 entered a half-loop at maximum speed, pulled up at 2.5 to 3.5Gs, automatically released its bomb at a predetermined point, then rolled out at the top in an Immelmann turn at a frighteningly low airspeed. The bomber dived away from the target to regain speed.

The concept was based on experience from operating SAC's F-84 fighter-bombers. It was believed a low-level approach at high speeds would reduce the efficiency of Soviet defenses and cut B-47 losses.

An almost predictable series of accidents forced cancellation of Hair Clipper on March 5, 1958, a little over a month after the first public demonstration.

Weather Hazards

There were also several "toss bombing techniques"—all dangerous. In the "pop-up" maneuver, the B-47 would fly in at 489 mph indicated airspeed until some 60 seconds prior to bombs away, then climb to 3,500 feet above the ground, level off, drop the parachute-retarded bomb, and make an immediate turn to escape. The general strain on the aircraft structures caused by the stress of atmospheric turbulence at low altitudes was exacerbated by a higher tempo of operations. This required more frequent refueling missions and increased numbers of takeoffs and landings.

The much-redacted crash reports of 1956-1957 are a sobering litany of human error and design difficulties impossible to understand by today's safety and training standards. Some of the accidents were inexplicable. In others, aircraft disappeared on a mission. There were two accidents where the aircraft commander was not physically fit to fly, and in another, a crew elected to attempt a takeoff even though they and ground control knew their right outrigger tire was blown.

The majority of accidents occurred with crews where the aircraft commander was a reserve officer with relatively high total flying hours, but only a small amount of time in the B-47. In addition, records show both mishap pilots usually had a limited amount of instrument and night flying time. The pilot was all too often a young first lieutenant, usually with less than 500 hours total time and perhaps 50 hours in the B-47. Time and again, the accident board concluded the primary cause was operator error: Faulty technique "allowed the aircraft to get into a position from which they were unable to recover."

Marginal flight conditions were particularly hazardous when conducting in-flight refueling with KC-97 aircraft. When the tanker aircraft was forced to change course because of weather or other reasons, the conditions were set for midair collisions. In one case a B-47 flying at near stall broke contact and wallowed into the tanker's prop wash. It was thrown into a 90-degree turn it could not recover from. In another instance the accident board attributed the accident's cause to operator error by the lead tanker aircraft commander and the No. 3 bomber aircraft commander. But it then added, "The main fault lies in the incompatibility of the tanker-bomber as witnessed by the extreme difficulty or impossibility to maintain proper formation."



The Lincoln AFB, Neb., fire crew smothered this B-47 in foam after an accident in the early 1960s.

Many of the accidents occurred on takeoff, all with a similar pattern. The high gross weight takeoffs appeared normal until a few seconds after liftoff. Then a wing dipped, struck the runway, and the aircraft crashed and burned. Analysis revealed a loss of power (engine failure, failure of water injection) that induced yaw. When this happened, the B-47 entered a stall, and a crash was unavoidable.

Takeoff crashes also resulted from incorrect preflight planning. In one instance, the aircraft commander failed to include the weight of 2,200 gallons of external fuel in his calculations, rotated too soon, stalled, and crashed. In another, the crew set the elevator trim incorrectly because it was using an outdated manual.

Vertigo caused several crashes, including one harrowing LABS maneuver in an overcast sky. In others even a few seconds of vertigo resulted in the aircraft assuming an attitude where recovery was impossible. In one low-altitude bombing disaster, the airplane was flown by a crew that the board deemed "especially well qualified in the LABS maneuver." Their aircraft disintegrated immediately upon entry into the maneuver, the left wing falling off first. The report states, "The aircraft had performed 508 Immelmanns and 253 rolls." If this is accurate, the sudden disintegration is understandable.



Photo via lincolnafb.org

Of all the 1957 accidents, one is the most difficult to fathom. Perhaps the most qualified B-47 pilot in the Air Force, Col. Michael N. W. McCoy, commanded the 321st Bomb Wing. He had 8,661 hours flying time and his copilot, Lt. Col. Charles Royce, had 3,855 hours. McCoy, an instructor pilot, had flown 1,093 hours in the B-47, while Royce had 813 hours in the aircraft. Both men had done well on recent proficiency checks.

On Oct. 9, 1957, McCoy took off from Pinecastle AFB, Fla., in a DB-47B, modified to carry the GAM-63 Rascal missile, with Maj. Vernon D. Stuff as navigator. The aircraft did not have ejection seats. The purpose of the flight was an instrument check for McCoy and an orientation ride for a visiting RAF officer, Group Capt. John Woodroffe.

Lessons Learned

The flight was conducted by visual flight rules, with little communication to or from the base after McCoy took off. A little after 11 a.m., the aircraft was reported seven miles west of Orlando, Fla., flying at an altitude of 1,500 to 2,000 feet, wings level in a descent. Shortly thereafter it was reported passing the Orlando Country Club in a left turn that became a vertical bank. The aircraft disintegrated about three miles from Orlando. All four men were killed.

While much of the report remains blacked out, it is difficult not to infer from the context that Woodroffe was in the rear seat for his orientation ride. Either he or McCoy was flying the aircraft at low altitude and at high speed. The bomber inadvertently entered a descent, accelerating to a speed that pushed it beyond the point of safe recovery. A violent effort to reverse the turn caused the aircraft to disintegrate.

It was a sad end to a great career for McCoy, and a reminder of just how dangerous the B-47 became with an inattentive pilot, however skilled.

The year 1958 had an almost equally dismal record, peaking in March and April, when six aircraft broke apart while flying low-altitude missions. Two of the aircraft were very low time B-47Es, one with only 1,265 hours. Of the six crashes four were directly attributable to structural fatigue failure. These crashes served notice that flaws might show up in any B-47, whatever its flying time.

The B-47 was supposed to serve as SAC's primary bomber until 1965; by 1958 there was already discussion that it might have to be phased out completely. SAC reacted in April by limiting the B-47 to 357 mph indicated airspeed and 1.5G maneuvers. Low-level flying was banned, gross weight could not exceed 185,000 pounds with external tanks, and banks were limited to 30 degrees. Restrictions were placed on flight through turbulent air, stalls, and touch-and-go landings. Specific limits were placed on refueling practices. Aircraft were carefully inspected for cracks indicating fatigue.

On May 29, 1958, the primary fix arrived, via kits necessary to reinforce the wing root of the fleet. All three contractors and Air Materiel Command worked on what became known as the Milk Bottle program. The name derived from the large milk bottle-shaped pins used to fasten the wings to the fuselage.

By January 1959, some 1,622 B-47s received this modification. Additional fatigue problems appeared later, especially in the upper fuselage longerons, but for the most part, B-47s were cleared for flight.

Although the response to the emergency was ultimately successful, the results were not immediate. Despite a dramatic dip in flying hours, there were 22 more B-47s destroyed in 1958.

Not until 1960 did the corrective efforts take full effect, and as the B-52 fleet grew, economics dictated the B-47 phaseout would follow. By 1966, only 16 RB-47s were left operating.

For a time, the B-47's high performance and diligent crews provided the United States with an overwhelming strategic advantage, but the experience was a sobering one.

SAC learned from it. It vastly improved training and flying safety procedures, and the B-52 quickly became the Air Force's principal nuclear bomber. ■

Walter J. Boyne, former director of the National Air and Space Museum in Washington, D.C., is a retired Air Force colonel. He has written more than 600 articles about aviation topics and 40 books, the most recent of which is How the Helicopter Changed Modern Warfare. *His most recent article for* Air Force *Magazine, "Big Bang," appeared in December 2012.*



AP Photo by

EMISSARIES from Gen. Francisco Franco met with German leader Adolf Hitler just before midnight on July 26, 1936, part way through the Wagner festival at Bayreuth, Germany. Hitler, always stirred by Wagnerian opera, was in a buoyant mood after a performance of "Siegfried" when he received the visitors that night.

Franco, leader of the rebel faction—called the Nationalists—in the Spanish civil war needed Hitler's help. The best of Franco's forces were in Spanish Morocco and he wanted German aircraft to fly them to the fighting front in Spain. Hermann Goering, chief of the Luftwaffe, was in Bayreuth that night and opposed such involvement, but when the ebullient Hitler said yes, Goering switched to enthusiasm for the project.

Franco's request was for 10 transport aircraft plus infantry weapons and antiaircraft guns. Hitler gave him more than he asked for, sending 20 Lufthansa Ju 52 airliners—repainted to disguise their origin—and six He 51 biplane fighters.

It was the first big military airlift in history. Over the next three months, the Germans flew 13,500 Nationalist troops to bases in southern Spain. The trimotor Ju 52s were stripped bare inside and the soldiers sat on the floor in back, their rifles between their knees. Each aircraft made as many as four flights a day, carrying up to 40 passengers instead of the official maximum of 17. By October, the Germans had established air superiority over the Strait of Gibraltar and the transfer of men and materiel continued by sea transport.

That was only the beginning of German assistance, which culminated in the deployment of the Condor Legion and the rotation of Luftwaffe aircrews through the Spanish Civil War from 1936 to 1939, serving as a dress rehearsal for blitzkrieg in World War II.

The popular assumption is that Germany was drawn into Spain by the opportunity for testing and training for the Luftwaffe, but that was secondary. Hitler's real reasons were strategic. The Condor Legion supported a fascist takeover of Spain, established a military challenge on the flank of France, opened access to seaports on the Atlantic, and distracted Europe from Germany's own preparations for war.

Franco and the Nationalists are often remembered as the villains. In actuality, it was a brutal war with atrocities common on both sides. However, intellectuals, authors, and journalists from all over the world flocked to the cause of Franco's opponents, called the Republicans or the Popular Front, who finally lost after a three-year struggle.

"The Spanish civil war remains one of the few modern conflicts whose history had been written more effectively by the losers than by the winners," said historian Antony Beevor.

In the 1930s, a loose coalition of Communists, Socialists, and anarchists, supported by labor unions and tenant farmers, gained control of Spain, traditionally a monarchy in which conservatives, large landowners, the military, and the Catholic Church had been dominant. The coalition soon moved into the orbit of the Soviet Union.

The civil war began in July 1936 when senior army officers in cooperation with the fascist Falange party and other groups rose in revolt against the left-wing government of the new republic. They called on Franco, the most decorated officer in

The Condor Legion

By John T. Correll

In the Spanish Civil War, the Luftwaffe practiced for World War II.

the Spanish Army, to lead the revolution. The Popular Front had posted Franco to a command in the Canary Islands to keep him out of the way, but he flew to Spanish Morocco to take charge of the Army of Africa, 30,000 strong. It included the Spanish Foreign Legion, regarded as Spain's best troops, and other experienced units.

The armed forces were divided, with part of the army and most of the navy remaining loyal to the government. In all, counting the frontier guards and national police, the Nationalist forces had about 130,000 men, compared to 50,000 for the Republicans. The Republicans kept most of the military aircraft, but they were obsolete and essentially worthless. Both sides had large political militias.

Some 32,000 ideologues from 54 countries joined the International Brigades, organized from Moscow by the Comintern, the international arm of the Communist Party. About 2,400 volunteers from the United States went to Spain with the Abraham Lincoln Battalion. The Popular Front also hired foreign mercenary pilots, but unlike the politically motivated International Brigades, the mercenaries were attracted by a salary of $1,500 a month plus a $1,000 bonus for every Nationalist aircraft shot down.

History and literature have romanticized the Republicans. The leading example is Ernest Hemingway's novel, *For Whom the Bell Tolls*, published in 1940 and celebrating the service of a young American in the International Brigades. Hemingway held court for writers and war correspondents at the Hotel Florida in Madrid and spent time with the Republican Army in the field. He used Robert Merriman, commander of the Lincoln Battalion, as the prototype for his fictional hero, Robert Jordan.

The Condor Legion lived up to its reputation for wanton slaughter, but moral high ground was hard to find in the conflict. In his authoritative history of the war, Hugh Thomas estimates the total loss of life at 500,000—of which more than a fourth were murders and executions, 75,000 of them by the Nationalists and 55,000 by the Republicans. The offenses committed by the Nationalists are better known, but even the supporters of the Republicans recoiled from their vendetta against Catholics, who were identified with the right wing and opposed to social reform. In the summer of 1936 alone, 13 bishops, 4,184 priests, and 283 nuns were hunted down and killed.

Imported Airpower

Most foreign nations followed a policy of nonintervention. In the United States, the Neutrality Act of 1935 made it illegal to sell or transport arms to belligerents. In January 1937 Congress specifically prohibited shipment of arms to Spain by a vote of 81-to-zero in the Senate and 406-to-one in the House. First Lady Eleanor Roosevelt, a fervent admirer of the Popular Front, tried without suc-

National Archives photo



Above left: German Chancellor Adolf Hitler, flanked by Maj. Gen. Wolfram von Richthofen, the last commander of the Condor Legion, salutes German troops as they return to Berlin after bolstering fascist dictator Gen. Francisco Franco's troops in Spain. Right: Ju 87s such as these flew their first operational missions with the Condor Legion in 1938.



Image via Wikipedia

The June 1939 issue of* The Eagle, *Germany's Air Ministry-published magazine, blared, "Condor Legion to the Front!" and was subtitled, "German volunteers fought for Spain."

cess to persuade her husband to get the embargo lifted.

Three nations were direct participants: the Soviet Union on the side of the Republicans, and Germany and Italy in aid of the Nationalists. Their most significant contributions were airpower. The USSR provided pilots and about 1,000 airplanes. Italy sent more than 600 airplanes and a substantial ground force. Various totals are given for German aircraft. Many Luftwaffe records were lost or destroyed during World War II, but the best estimate is that Germany deployed about 800 aircraft of all types, including trainers and liaison aircraft, to Spain.

Concurrent with the airlift in July, the Luftwaffe dispatched six He 51 fighters to Spain to protect the air transport force. The German pilots were forbidden to fly operational missions other than escort for the airlifters, but after the poorly trained Spanish pilots crashed three of the airplanes, the Germans took over the flying. The three remaining He 51s engaged the hodgepodge Republican air force in late August and shot down the old Breguets and Nieuports with ease. The Ju 52 transports were reconfigured and pressed into service as bombers.

The Nationalists quickly gained control of a third of Spain, holding all of the northwest except for the Basque provinces along the Bay of Biscay. The government held most of the south and east, and the capital at Madrid in the middle of the country.

The situation changed with the arrival of top-quality fighters and experienced pilots from the USSR. The Polikarpov I-15 biplane and I-16 monoplane were superior to the He 51s and on a par with the agile Italian Fiat CR.2s. The Russian airmen gave their best performance in March 1937 when their fighters and Tupolev SB-2 bombers wreaked havoc on an Italian army corps strung out on the road near Guadalajara. "It was the first time in history that airpower had stopped a major ground offensive," said Carl Posey in *Air & Space* magazine.

The Republican advantage in the air did not last long, though. The Luftwaffe had already decided to withdraw first-line fighters and bombers from units at home and send some of its best combat aircraft to Spain.

The Only Condor in Spain

In October 1936, three months into the war, the Germans upgraded their involvement to the Condor Legion, a composite force named for the great bird of the Andes. There were no condors in Spain, but the linkage carried over in the German mind from South America where Lufthansa operated a subsidiary airline, Sindicato Condor. The force in Spain was designated a legion to preserve the fiction that its members were volunteers.

The Legion consisted of a bomber group and a fighter group, plus reconnaissance, anti-aircraft, and support units, and a ground component with tanks and anti-tank weapons. Elements of the German Navy functioned separately. The Condor Legion operated under German tactical command subject to strategic direction from Franco.

The commander was always a Luftwaffe general. The first of them was Maj. Gen. Hugo Sperrle, who looked like a Nazi from central casting, complete with monocle. In fact, he was a good officer who worked well with his Spanish allies.

Following the cover story, Condor members were discharged from the Luftwaffe and joined the Nationalist forces. They wore Spanish khaki-brown uniforms with Nationalist rank insignia. Their aircraft went to war with Nationalist markings—a stylized St. Andrew's cross on the rudder and the same device reversed out of black roundels on the



Deutsches Museum photo from *Architects of Air Power*

Spanish Moroccan infantrymen gather at an airfield in Tetuan, Morocco, to be flown to Seville by a German Ju 52 transport. The workhorse aircraft, loaned to Franco from Hitler, carried as many as 40 troops to the front, despite its official maximum capacity of 17.



Image via Wikimedia Commons

Pablo Picasso's iconic painting depicting the destruction by the Condor Legion of the Basque town of Guernica was sent on a world tour to rally support for the Republican cause in Spain.

wings. They served nine- to 12-month tours before returning to their units at home and, while in Spain, held spot promotions one grade above their regular rank in the Luftwaffe.

Strength of the Condor Legion seldom exceeded 100 aircraft and 6,000 men, including support staff. In all, about 19,000 German military members gained wartime experience in Spain, rotating through the Condor Legion and other units.

Better aircraft were coming, but replacement took time so the Condor Legion had to make do with the He 51s and the converted Ju 52 bombers through 1936 and into 1937.

The He 51 continued to have some success in the fighter role because of the skill of the Luftwaffe pilots, but it was increasingly relegated to ground attack missions. The Ju 52 was regarded as past its effectiveness as a bomber. However, it was these two aircraft that were responsible for the devastation of Guernica in the most notorious event of the Spanish civil war.

The Destruction of Guernica

In April 1937, the Nationalists were rolling up the last pockets of Republican resistance in northwestern Spain. Twenty-three Basque battalions were retreating westward toward the provincial capital at Bilbao, and the little hill town of Guernica—which had great historical and cultural significance to the Basques—lay across their line of retreat. The two main escape routes intersected there.

In the late afternoon of April 26, 1937, a single He 111 flew over and bombed the town center, probing for possible air defenses. There were none and 15 minutes later, Condor Legion He 51s bombed and strafed Guernica. They were followed by the Ju 52s, attacking in line-abreast formation and carpet bombing the town in relays for two-and-a-half hours with anti-personnel and incendiary munitions. Three-quarters of the buildings in Guernica were destroyed.

From there, Guernica passed into legend. The Republicans and their supporters described it as terror bombing of a defenseless town with no military significance. The popular claim, still repeated today, was that half of the people living there were casualties, 1,654 killed and 889 wounded. The actual death toll was between 200 and 300.

The Popular Front commissioned a painting by Pablo Picasso. "Guernica," a mural-size oil painting in stark grey, black, and white, is one of his most famous works, showing people, animals, and buildings in the throes of bombardment. Its exhibition on a world tour later in 1937 rallied support for the Republican cause.

The Condor Legion attempted briefly to claim that the Basques themselves had set fire to Guernica, but nobody believed it. The Germans showed no particular regret for the casualties. Bilbao surrendered June 19 and the Nationalists consolidated their control in the north and west. Disagreement continues about whether Franco knew of or approved plans for the bombing.

Exaggerated reports about Guernica worked to Hitler's benefit, creating the impression that the Luftwaffe could wipe out a whole city in a few hours. Europe regarded Germany with new fear and respect.

Condor Re-equips and Rebounds

Of the various types of aircraft arriving to re-equip the Condor Legion, three were of special interest and significance: the superb Messerschmitt Bf 109 fighter, the He 111 medium bomber, and the fearsome Ju 87 Stuka dive bomber, which showed up late in the war and in limited numbers.

The sleek Bf 109 was the world's most advanced fighter when it was introduced in 1935 and was still good enough a decade later to score more aerial victories than any other aircraft in World War II. The Condor Legion got a few Bf 109s in 1936 but they did not appear in Spain in substantial numbers until the spring of

1937. They drove the Russian I-15s and I-16s from the sky whenever they met.

The He 111, best and fastest of the German bombers, made its combat debut in March 1937. The Luftwaffe had no satisfactory bomb sight, so the success of high-altitude horizontal bombing was limited. However, the Germans were generally satisfied with the He 111's performance and it remained the workhorse of the Luftwaffe bomber force in World War II.

Replacement of the He 51s and Ju 52s proceeded gradually, but in the middle years of the Spanish civil war, they operated alongside the new aircraft. Adolf Galland, who went on to become a leading Luftwaffe ace in World War II, was an He 51 squadron leader in the Condor Legion in 1937-1938. He flew 280 ground attack sorties but got no missions in the Bf 109 and no aerial victories. His claim to fame in Spain was devising a makeshift munition called "flambo." Galland filled a drop tank with a mixture of gasoline and engine oil and strapped it to a 22-pound bomb. Upon impact, the tank burst open and the bomb detonated with a flaming result that was the forerunner of napalm.

The Luftwaffe's solution to bombing accuracy was the Stuka, short for Sturzkampfflugzeug or "diving fighting plane." Two biplane Stukas, the He 50G and the Hs 124, were employed early in Spain but they were soon forgotten as the name was attached exclusively to the definitive Stuka, the Ju 87, which flew its first operational mission with the Condor Legion in February 1938.

Diving on its target at an 85-degree angle, the Ju 87 was extremely accurate. The Condor Legion never got more than a handful of them but they flew two to four sorties a day each. Unchallenged by enemy fighters, they were so effective that the Luftwaffe put great emphasis on the Stuka in its future plans and decided that every bomber should have a dive-bombing capability.

Condor Innovations

Resourceful officers of the Condor Legion developed tactics and concepts to get more effectiveness out of the new weapons. The most notable fighter innovations were the work of Capt. Werner Moelders, who succeeded Galland as commander of one of the fighter squadrons as it transitioned to Bf 109s. Moelders would become the leading Condor Legion ace with 14 victories, but his larger contribution was a lasting change to the standard fighter formation.

Previously, fighters flew in a tight three-airplane "V" and, in Moelders' opinion, spent too much of their attention on avoiding collisions. At his instigation, the Condor Legion shifted to a formation called the Rotte with a fighter pilot and his wingman flying about 600 feet apart, allowing them to concentrate on the enemy instead of each other. Two Rotten combined to form a Schwarm.

"When viewed from above, each plane flew in the location of the four fingertips of a horizontally extended hand, palm down, with fingers straight and slightly spread," said aviation writer Walter Musciano. The new formation was adopted around the world as the classic "Finger Four."

The bomber theoretician was Wolfram von Richtofen, who began his flying career with his famous cousin, Manfred von Richtofen, and the Flying Circus in World War I. On his first tour in Spain, he was chief of staff to Sperrle and planner of the attack on Guernica. He returned in November 1938 as a major general and the last commander of the Condor Legion.

Von Richtofen steadily readjusted the Legion's priorities to increased support of the Nationalist army and improved the tactics for ground attack and dive bombing, especially after the presence of the Stuka introduced new possibilities.

It is inaccurate to say, as some have, that in Spain the Luftwaffe discovered close air support and became the instrument of the ground forces. Germany was a continental nation, with no oceans or geographic barriers separating it from its key neighbors. "One major defeat on land might well seal the fate of the Reich before the Luftwaffe could have an impact," said historian Williamson Murray. The importance of the ground war was already recognized.

At the same time, the emerging concept of blitzkrieg led to greater tactical subordination of airpower to the needs of the ground force. The Luftwaffe canceled development of the four-engine "Ural" bomber, but that was mostly because of technical and economic programs. Germany would enter World War II with its dive bombers and medium bombers, proven in Spain and believed to be sufficient against the nations Germany was most likely to fight—France, Czechoslovakia, and Poland. The grand scheme unraveled for a host of reasons, including the vulnerability of the Stuka to counterattack.

Victory Parade

Franco had the advantage of air superiority from 1937 on, and waged an extended war of attrition in which the Republicans were pushed back into an enclave in the southeast, along the Mediterranean. The government surrendered unconditionally March 26, 1939, and Franco declared the war over on April 1.

The consensus is that the Condor Legion was an instrumental factor rather than a decisive one in the Nationalist victory. As expected with the Bf 109 in action, the Germans won the air-to-air battle, shooting down 327 Republican aircraft while losing 72 of their own. The most critical contribution was the airlift, without which Franco probably would have been defeated. Also of great value was the training by the Luftwaffe of more than 500 Spanish aircrews and thousands of soldiers in assorted military skills.

The Condor Legion went home May 28 and marched in review before Hitler and other officials in a huge parade in Berlin June 6 that reunited 14,000 veterans of the war in Spain. Three months later, Germany invaded Poland to begin World War II.

Sperrle and von Richtofen were promoted to field marshal. Von Richtofen died of a brain tumor in 1945, but Sperrle survived the war. He was tried for war crimes at Nuremberg but was acquitted.

Between 1939 and 1941, Moelders accumulated 101 more aerial victories to go with his 14 from Spain. He was promoted to major general but was killed when the He 111 in which he was a passenger crashed in bad weather in 1941.

Galland became the youngest general in the German armed forces when he replaced Moelders as head of the Luftwaffe air arm. He scored 104 aerial victories in World War II, gained popularity among his former adversaries, and was honored at the Air University Gathering of Eagles in 1984.

Franco declared Spain a "nonbelligerent"—a designation he invented—in World War II. He was sympathetic to the Axis powers that supported him in the civil war, but Spanish forces did not engage in combat.

Franco ruled Spain until his death in 1975. ■

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The first US pilots in Korea had to learn on the job, in the toughest possible way.

The Blooding of America's Jet Fighters

By Jack Broughton

When North Korea ignited its war against South Korea in June of 1950, the US was not ready. America was still discarding World War II hardware, struggling with budgets, and discharging excess pilots.

The Air Force's young jet fleet was thrust into a trial by fire. Air Force P-80 pilots on a comfortable tour in Japan quickly became combat F-80 pilots. As the bitter winter of 1950-1951 approached, US marines were securing positions close to the Chinese border when disaster struck: Waves of communist Chinese forces rolled across the border. American forces were brutally routed as they retreated southward, nearly driven from the peninsula. Most of the limited US Air Force units establishing positions in Korea were overrun.

With a series of heroic actions, US ground forces had held a tenuous line at the Pusan Perimeter near the southern tip of the peninsula in 1950 and fought for their lives at places such as The Punch Bowl, Heartbreak Ridge, and Sandbag Castle in 1951, and Pork Chop Hill in 1953. Close air support was vital.

The 49th Fighter-Bomber Group was based at the airfield designated as K-2, near the town of Taegu, and I was one of its pilots. This was 60 miles north of Pusan. Along with an Air Force F-51 unit on our left flank and some Marine Corps and Navy units on our right, at the time, we were the extent of the fighter force in Korea.

All of our birds were C models, and though we operated off 5,000 feet of rough, undulating pierced plank runway, nestled in the valley of the dry Naktong River, we could still carry two huge external fuel tanks and lots of bombs, rockets, and napalm. We topped that off with six very accurate .50 caliber machine guns in the nose, superb for strafing.



Air superiority in Korea was not assured until F-86s, such as these, arrived on the peninsula.

Photo by Richard Schoeneman via Warren Thompson

Photos via Jack Broughton



Our maintenance troops were working out of tents, surrounded by nothing but dirt. Operational aids were about nonexistent with no radio range or instrument letdown procedure, and no runway lighting—and a close to worthless 500-watt radio compass homer.

Regardless of the mission, the briefing cycle was pretty much the same, with one a.m. and one p.m. general briefing. Pilots who were on the schedule would assemble in group ops to be brought up to speed on the overall war situation. The weather gent would present his wild guess and finish up with what we might expect when we got back, closing with, "If you can't get in here, go to Pusan."

Enter FACs

Pusan was on the south coast and usually had a few feet of separation between the clouds and the ocean. If you could determine you were close to Pusan, you could let down outbound over the water and hope to break out with enough room to turn back toward the coast and see if you could find a place to land.



Broughton as a first lieutenant with his F-80 at K-2, shortly after he was assigned No. 844 as his primary aircraft. He and his crew chief labeled it with their names and got first call for the bird when his mission schedule coincided with the aircraft being ready for combat. At left: 1st Lt. Joe Connley (l) and 1st Lt. Joe Frey compare notes after a mission in 1951.

After the briefing, each flight leader took his three wingmen back to the squadron for the important planning of their particular mission.

On close air support, pilots worked within a few yards of the US troops, and since there was usually little radio contact with ground units (the forward air controller concept was not quite fleshed out yet), we had to depend on colored cloth panels to define bomb lines.

Ground forces would stretch out 40-foot-long cloth panels for us that were half red and half green to define the bomb line. Over the red: Hold your fire; over the green: Go get 'em. We blew the enemy away with our bombs, or wiped them out with napalm, or ripped them



Above: Broughton's F-80, No. 844. He had flown a mission that morning. In the afternoon, he loaned "his" airplane to a newly arrived lieutenant—who promptly crashed it on the runway.

up with pinpoint .50-caliber fire. Fuel permitting we hunted north of their positions, as we did on one morning when we spotted over 200 enemy marching to the ridge we had just cleared. We decimated them with our guns. The North Korean plan to attack that night was terminated.

Airborne outfits staged through our base before jumping into a bitter battle—and one was immediately pinned down and outnumbered by the enemy. The next day we flew CAS, and they recognized the colored marking on our aircraft noses. You could see them standing up in their foxholes, waving and cheering as we whizzed over their heads to clear the nasty brown hillside ahead with napalm and gunfire. When they rotated out of combat and came back through K-2, we couldn't buy a drink at the club if there was one of them in sight.

Suddenly there was a requirement for a forward air control program. Fifth Air Force reached into the squadrons to pull protesting fighter pilots out for temporary stints with the Army units. The FACs were given a jeep, a radio, and one or two airmen and told to get on the road and report to a specific Army commander in the midst of some lopsided battle. Unfortunately, these air controllers had no training for this job, and coordination and communications were far from adequate. Slowly, the airmen tried to make it work.

Sometimes we worked with pilots flying our old AT-6 trainers as "Mosquito" aircraft. The Mosquitos would search out targets, then call us in and direct us onto what they had found. Most of the Mosquito guys were frustrated fighter pilots, and they did a superb job, armed only with target-marking smoke rockets and white phosphorus markers. It took a lot of balls to fly low and slow while searching for people who were anxious to shoot you down. Soon, the enemy learned if they fired on a Mosquito and identified their position, a flight of fighters would come down to root them out.

Taegu was one huge piece of scraped out dirt; thus the support troops worked in mud, or ice and snow, or hot and humid blowing dust. Each squadron had a section of dirt where they parked their aircraft. The heavy maintenance folks had no equipment such as lifting devices, so battle-damaged hulks were fork-lifted onto three or four used fuel barrels, to possibly be repaired, but probably to serve as a spare parts hulk. One maintenance tent was allotted to each squadron for aircraft records processing, storage, and a coffee pot. But the support airmen never faltered and, despite the harsh conditions, usually had a smile when they greeted the pilots.

Security could be a problem on a scantily guarded patch in the midst of civilian territory. One morning about 4 a.m., after finishing preflight preparation, I trudged across the dark dirt thinking about the details of takeoff. As I approached my bird my crew chief had just spotted a Korean civilian preparing to stuff a handful of hacksaw blades down my air inlet. He yelled and, unarmed, charged the intruder, and as the civilian tried to run away the nearby air policeman blew the intruder away with his .45 sidearm.

I had to tippy-toe past the body. As I hoisted a foot onto the cockpit ladder, I found my thinking had switched to our support guys' dedication.

Due to moving units around and weather conditions, our fighter outfits sometimes utilized each other's airstrips. Then 5th Air Force decided to try bringing in another entire group to fly with us on a joint mission out of K-2, in what was laughingly called "coordinated action" or a major air strike.

Five Before Breakfast

You could bet on chaos. Each fighter group would provide about 24 fighters. The groups would stage at opposite ends of the runway and take off in opposing directions. The missions were usually scheduled for the hottest time of day, ensuring the takeoff show would be dramatic. More often than not the air and ground would be saturated with tumbling external stores and disintegrating aircraft—from both directions. The group penalized with the tailwind behind them would take off first, and the guys at the other end would brace for the ensuing terror show of aborting aircraft, burning brakes, jettisoned bombs, tanks, and Jet Assisted Takeoff bottles tumbling toward them.

On at least two occasions, fatally flaming and crashing aircraft came into the opposite staging area. It was scary, with no tactical benefit, but 5th Air Force insisted on trying it a few times before tossing the idea.

The arrival of the 4th Fighter-Interceptor Wing and its F-86s blew another hole in North Korea's plans as the Sabre pilots repeatedly cleaned house in "MiG Alley." US air superiority was guaranteed, there would be no MiG harassment, and the Korean air lanes belonged to the US.

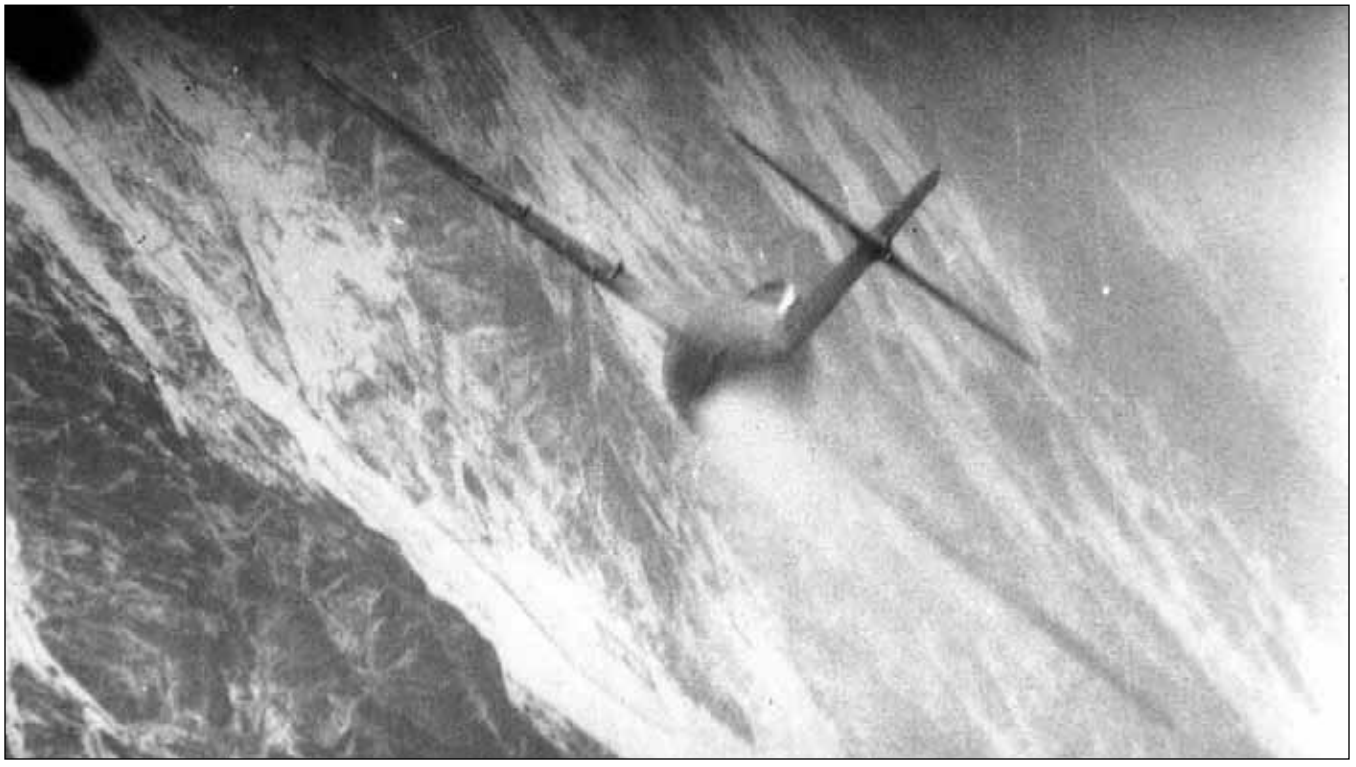
As our forces pushed north, so did our missions. We sought out and destroyed the enemy's capability to reach the front lines. The immediate effect for us was some neat missions, like the one where my flight hit five live locomotives before breakfast.

Predawn missions out of K-2 were not usually fun rides. They could be unusually demanding, especially if it was very dark and wet—like it was one morning when we briefed for a predawn armed reconnaissance mission in the Wonsan area. By the time we bounced down the pierced plank runway on takeoff there was a sliver of predawn light, and I stayed under the weather and started a 270 degree turn to the left. My flight zipped into position as I approached the 270 point and we rolled out at about 200 feet headed for the homer on top of the control tower.

Photo via Jack Broughton



USAF photo via Warren Thompson



Left: 1st Lt. George Womack "salutes" the 16 MiG pilots he and Broughton outdueled in a 22-minute dogfight as operations officer Maj. John Anderson looks on. Below: Film from an F-86 Sabre shows a damaged MiG's pilot desperately trying to reach safety in Manchuria. He didn't make it.

The needle on my radio compass was flopping around, even at that minimum range, but gave a firm position and time hack to establish my outbound course. I eased back on the stick and we were on the gauges as I set up a time and distance course toward Wonsan.

An hour and 15 minutes later we were still on the gauges, but time and distance said we should be someplace close to Wonsan. The maps we had weren't accurate, and the printed height of the mountaintops was a guess. I always added a thousand feet, but even that was not comfortable as you sneaked down in the murk over unknown terrain. As we descended to drop dead altitude there were no breaks and I was about to pack it in when a few wisps of cloud broke apart and fluttered past my nose. After descending another hundred feet I was looking into a three-mile-diameter bowl, with decent visibility and scattered rain showers, and sure enough, the surrounding mountain peaks were poking up into the clouds at just about my 1,000-foot adjusted drop dead altitude. Straight ahead was a fat, black, steam-puffing live locomotive.

Stitch and Boom

That morning those running the Vladivostok to Wonsan rail line figured the lousy weather would protect them and were not expecting any crazy Americans to be milling about in the storm-covered mountains. By dawn they had parked their boxcars in tunnels until the next night run. But they were late in parking their locos inside the secure mountain tunnels that were at opposite ends of the railroad track that crossed the floor of the bowl below us.

Chugging blithely beneath us was not one but five live locomotives.

I was already lined up on the closest loco in the southwest corner of the bowl. I stitched his boiler and he went boom. My element hit the one racing for the northeast tunnel and we took turns blowing two of the three caught in between the two dead ones. That left one spooked train driver madly alternating between forward and reverse as his exits closed and the chase narrowed. Finally, going full chug toward the southwest, he realized he had goofed and was heading full throttle toward a stationary, steaming ruptured buddy. You could see the fire covering his molten wheels as he locked the brakes and ground the metal wheels flat. I hit the train just as the driver ran head-on into what was left of No. 4 locomotive.

It would be a while before they cleared enough of that mess to get supplies flowing to the south again.

The first stages of stalemate were appearing amidst political-military struggle, and to the pilots it meant frustration as it slowed or halted our advances. It did however again enlarge our mission scope to include armed reconnaissance, as far north as the Chinese border. That meant we were in MiG country.

One afternoon we drew an armed reconnaissance assignment just south of the Yalu River. My No. 4 aborted on takeoff, and that left me with George Womack, a real good old stick, as No. 3, but No. 2 was a rookie second lieutenant. He was also on his first mission in a while, because I had disciplined him with a week on mobile control—sitting in a booth at the end of the runway, making sure landing fighters' gear was down—because he had wandered out of formation on a similar mission.

As we approached the Yalu River and started a turn, I saw No. 2 sliding out of formation, as before, just as George blurted out, "Utah Charlie, MiGs at four o'clock—closing!" I was already trying to move to cover my errant wingman's vulnerable tail as I commanded, "Break right." Too late. A MiG picked him off on the first pass.

That left George and me with a unique opportunity. We had 16 MiGs cornered, all to ourselves.

A lot of the MiG pilots were locals, and often not too well experienced or motivated, but their Russian instructors were usually good. They had a huge speed advantage and the ability to yo-yo on us at will. George and I knew how to get max performance out of our birds, and you could turn the aircraft tightly, especially with cannon fire coming from your six. If we could hang together as a flight of two, avoid giving them a good shot at us, and work them far enough south so their fuel state required them to go home, we might have a chance.

Their lead guy and his wingman were on my tail almost instantly and George and I were standing on a wingtip watching them miss. They just kept coming, element after element. Some of them were not too tough to beat, but there was never a break in the attack. When they did get close enough to pull the trigger, it seemed their ammo went all over the place. Their guns must have been poorly harmonized—which was fine with us.

We wound up tangling with those 16 MiGs for the unheard-of duration of 22 minutes, which was a real test of muscle, endurance, and acrobatic skill for us. I was sweating like a pig, my sunglasses wet and smeared, sweat burning my eyes, but I did manage to blurt out a radio call for any help, especially F-86 MiG-killer help, but nobody responded. I had just gotten rid of a MiG element and was breaking back hard left, when for the first time in a while I could not see any MiGs—bad news. I rolled to inverted, and there he was, the lead guy, under me and behind me, nose coming up on my tailpipe and closing fast.



Photo by Jack Broughton

Broughton's commander wanted a gunnery range near K-2, theoretically requiring an agreement between the US and South Korean governments. Broughton and another pilot scouted the area, found a spot near some dwellings, and loaded their jeep with cigarettes, cookies, candy, and canned goods to "sweeten" the deal for the villagers. A handshake and a shared smoke later, the "international" deal was done.

The Symbol of the Blooding

When he pulled the trigger the sky lit up with what looked like a shotgun blast of tracers without concentration on me. I kept pulling and rolling as his speed flung him past my right side. I was upside down looking right down into his cockpit, a few feet away, and he looked frustrated. He was all hunched over, still staring at his gunsight and churning the stick around trying to hit something, but he had no shot on me. I continued my roll, then kicked hard right rudder and as I skidded into trail I clamped down on the trigger and let go with a six-gun .50-caliber blast right up his tailpipe. Since I was close to stalled out from max performance turning, and he had a bag of speed, he wasn't in range very long.

I don't know what damage I did, but he rolled into a split S and headed back to Antung with 15 sloppy MiG drivers behind him.

The F-86s continued to do great work in MiG Alley, and some of their newest model Sabres, with superstars such as Walker M. Mahurin among those flying them, were involved in air-to-ground missions. Newer F-84s replaced the F-80s, and I found them comfortable to fly in combat, but stalemate and winding down dictated a different scenario. The F-80s and their pilots remain the symbol of the blooding of the US jet fleet.

Those of us who worked with Korea's early FACs can marvel at the high degree of sophistication of today's counterparts. It is an entirely different approach, with imbedded FACs equipped with GPS, modern weapons, and superior communications, who train and learn and live in company with their Army comrades. They call on highly trained pilots with aircraft such as the A-10, F-15E, and F-16, equipped with precision guided munitions. The people and the equipment are different—but the mission is the same. ■

Jack Broughton is a retired USAF colonel and fighter pilot. During his time on Active Duty he was the recipient of four Distinguished Flying Crosses, two Silver Stars, and the Air Force Cross. He is the author of two memoirs from the Vietnam War era, Thud Ridge *and* Going Downtown. *This article was adapted from Broughton's* Rupert Red Two, *published in 2007. His most recent article for* Air Force Magazine, *"Pain and Gain in the Century Series," appeared in September 2012.*

With control of the skies, the Army Air Forces relentlessly pounded the Germans.

By late November 1944, Adolf Hitler's Greater German Reich was a thing of the past. That year—the year of great invasions—the Allies forced the Nazi regime on the defensive.

On land, the German Army was caught in a tightening pincer between the Anglo-American and Red armies. At sea, the Kriegsmarine's few U-boats faced annihilation from seemingly omniscient surface vessels and ocean-ranging patrol airplanes. Its once-feared capital ships had been sunk, wrecked, or stayed in the Baltic, serving as coastal artillery.

Aloft—as US Army Air Forces Gen. Henry H. "Hap" Arnold recalled—American airmen were "roving at will over all Germany, and the Luftwaffe's air and ground defenses [were] helpless to do anything about it." Oil and transportation attacks had robbed the Nazi air service of fuel and parts, even as steady attrition cost it pilots and airplanes. No safe airspace existed anywhere, and any German airplane faced the risk of Allied fighters striking any time out of threatening skies.

Simply No Answer

From the Great Hall at the Berghof, Hitler's lofty Alpine retreat, guests looked out into nights reddened by distant burning cities. Five years of constant war had drained the Luftwaffe, exposing many weaknesses in leadership, equipment, and organization that drove two of its senior generals, Ernst Udet and Hans Jeschonnek, to suicide. In early 1944, the AAF had targeted the Luftwaffe's fighters for destruction. Generalleutnant Adolf J. F. Galland, the "General of Fighters" lost half his available airplanes in March, half of their survivors in April, and half of those that remained in May. That last month, 25 percent of his fighter pilots also perished, many of whom were veterans of combat over Spain, France, Britain, Greece, Iraq, the Western Desert, and Russia.

Consequently, on June 6, 1944, the Allies owned the air over Normandy. "From the very first moment of the invasion, the Allies had absolute air supremacy," Galland recalled.

With control of the air, the AAF's strategic and tactical air forces (and those of the Royal Air Force as well) could concentrate on pounding German positions and forces. On D-Day alone, Gen. Dwight D. Eisenhower's airmen flew nearly 11,000 tactical air support sorties. Heavy and medium bombers hammered railheads, junctions, and bridges. Fighter-bombers forced Nazi troops and vehicles off roads, leading German Field Marshal Erwin J. E. Rommel to complain that "the enemy's air superiority has a very grave effect on our movements. There's simply no answer to it."

Days later, he found the risks out for himself. Planners divided Normandy into sectors, each with a spotter that functioned much like Desert Storm's killer scouts nearly a half-century later. Cued by a Canadian Mustang recce fighter, two RAF Spitfires found and strafed Rommel's big Horch staff car, which went off the road and overturned. Gravely injured, the "Desert Fox" was out of the war. Subsequently, while convalescing, he was coerced into suicide on Oct. 14 after the Gestapo uncovered his involvement in the failed July 20, 1944, bomb plot against Hitler.

Rommel's replacement, Field Marshal Guenther A. F. von Kluge, wrote Hitler that "in the face of the total enemy air superiority, we can adopt no tactics to compensate for the annihilating power of air except to retire from the battlefield." He, too, committed suicide, on Aug. 18, suspecting the Gestapo had discovered his own ties to the bomb plot.

After the war, flak commander Lt. Gen. Wolfgang Pickert reported that whenever the Allies enjoyed clear skies, moving vehicles by daylight "was practically tantamount to their certain loss." But night offered little respite, for after sunset, twin-engine AAF and RAF night intruders attacked out of the dark, blasting airfields, sup-



Photo via National Museum of the US Air Force



A swarm of Eighth Air Force B-17s fly to a target. Flying Fortresses struck marshaling yards and other interdiction targets inside Germany to deny advancing German columns fuel and other supplies.

minance From mandy to the Bulge

By Richard P. Hallion

ply points, and bridges and prowling roads and railways as well.

Tactical air commanders—AAF major generals Elwood R. Quesada, Hoyt S. Vandenberg, and Otto P. Weyland and Britain's Air Marshal Arthur Coningham and Air Vice Marshal Harry Broadhurst—made their airmen even deadlier. They had fighter-bomber pilots ride in radio-equipped tanks of advancing armored columns to control air strikes, had tactical air control parties with VHF radios assigned to infantry units, and adapted microwave early warning radar to direct strike flights and even enable blind bombing at a distance.

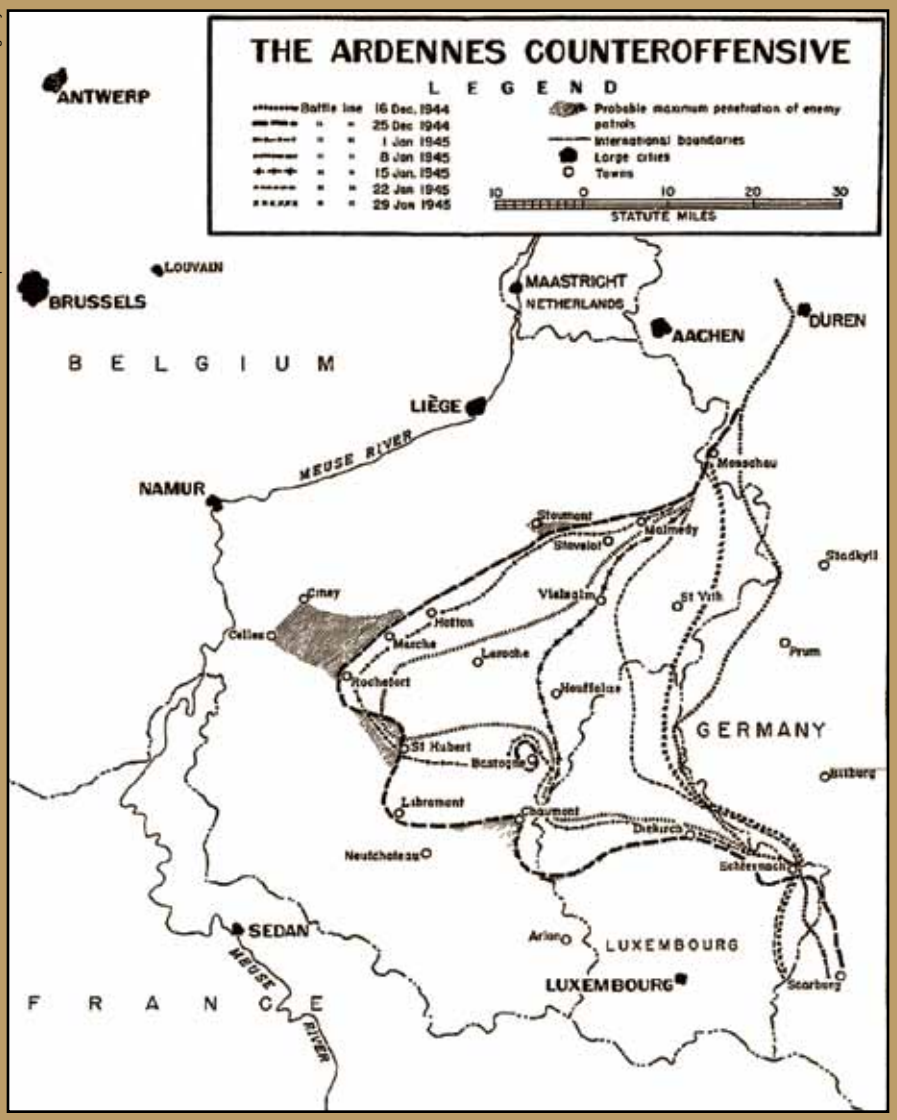
AAF and RAF fighter-bombers devastated exposed Panzers and infantry. In his after-action report, Eisenhower gave airpower chief credit for halting a Nazi armored thrust at Mortain, France, that threatened to split the invasion forces, particularly singling out the RAF's rocket-firing Typhoons. Enduring bombing, rocketing, strafing, and artillery fire controlled by airborne spotters, German troops complained with increasing exasperation, "Where is the Luftwaffe?"

At the end of the Normandy campaign, Lt. Gen. Omar N. Bradley, 12th Army Group commander—an airpower skeptic until converted by Quesada—expressed his gratitude to Arnold, writing, "In my opinion, our close cooperation is better than the Germans ever had."

Army Maj. Gen. J. Lawton Collins, whose VII Corps began the Allied breakout across France after heavy bombing shattered German resistance in front of it, reported, "We could not possibly have gotten as far as we did, as fast as we did, and with as few casualties, without the wonderful air support that we have consistently had."

Normandy left Hitler downcast but he clung to delusions of victory. Well before the last German soldier trudged

Map via Air Force Historical Research Agency



Above: A map shows the shifting battle lines between mid-December 1944 and late January 1945. Below: A US Army machine-gun team dug in at the Ardennes, ready for the next enemy assault.

across the French frontier, Hitler had conceived a new operation, one to split the Allies, capture lost ports, and perhaps even force Britain and America into a settlement enabling Germany to continue fighting Stalin's surging Red Army. Consequently, on Aug. 19, Generaloberst Alfred J. F. Jodl, operations chief at the High Command prepared "to take the offensive in November," adding significantly, "when the enemy air forces can't operate."

Autumn Mist

Planning began immediately. The Allies pressed on all fronts—and too recklessly. The German Army always evinced a surprising ability to reconstitute, and at Arnhem, in late September, the Allies suffered a costly defeat when Operation Market Garden—an ill-conceived airborne assault—collapsed in the face of surprisingly organized and bitter resistance.

Market Garden's dismal outcome heartened Hitler and the High Command as they planned their new offensive. In 1940, German Panzers had erupted out of the thinly wooded Ardennes, launching the blitzkrieg that gained them control of the continent. Now, four-and-a-half years later, Hitler hoped for a repeat, using infiltration; deception (including fluent "American English"-speaking infiltrators in GI uniforms); and armor assault by heavy tanks—all supported by artillery, assault guns, battlefield rockets, airborne troops, infantry with anti-tank rockets and new automatic weapons, and the remnants

Photo via US Army Center of Military History



of the Luftwaffe, including the new Messerschmitt and Arado jets.

On Dec. 6, senior American commanders—including generals Carl A. Spaatz, George S. Patton Jr., Jimmy Doolittle, Weyland, and Vandenberg—met in Nancy, France, to discuss Operation Tink, a proposed air-land action to crack the Siegfried Line. Tink was set to launch on Dec. 19. As preparations for it went forward so, too, did Hitler's plan for his own offensive, now called Herbstnebel, or Autumn Mist.

Not quite a week after the Nancy meeting, Hitler met with his generals at a forward headquarters at Bad Nauheim. There, in a rambling speech, he stressed that though the Allies had "complete air superiority," the offensive would succeed. His senior commanders little shared this optimism, presciently fearing that they had too little fuel and too little protection other than weather from the potential depredations of Allied airpower.

An intense artillery barrage began the campaign in the early hours of Dec. 16. More than 20 divisions under the command of Field Marshal Gerd von Rundstedt fell upon four American ones strung across the snowy Schnee Eifel, between Monschau, Germany, and Echternach, Luxembourg. Von Rundstedt's assault achieved total surprise. Allied intelligence—including Ultra messages, other communications intercepts, aerial photography, battlefield observation, and prisoner interrogations—had reported German units moving toward the Ardennes. Unfortunately, analysts concluded they were buttressing the Siegfried Line, not preparing for an offensive.



Photo via Air Force Historical Research Agency

A US soldier examines the hulk of a German Sturmgeschuetze mobile assault gun, destroyed by airpower from XIX Tactical Air Command.

Deep Into Belgium

As tanks and mechanized infantry pushed deep into Belgium, eventually forming a bulge as far west as Rochefort, a picture of impending disaster emerged. It recalled Operation Michael, the Kaiser's last-ditch 1918 offensive that nearly secured victory for Germany in the World War I. Though circumstances were vastly different, Herbstnebel threatened to seriously disrupt and delay the final campaigns against the Third Reich.

Already it showcased the Nazis at their worst: At Malmedy in Belgium, SS troopers of Kampfgruppe Peiper massacred 84 captured GIs.

Eisenhower immediately divided the Ardennes into northern and southern sectors, the former commanded by Field Marshal Bernard L. Montgomery and the latter by Bradley. Quesada's airmen, who worked with Bradley's soldiers, were temporarily assigned to Coningham's Second Tactical Air Force. Coningham was a remarkable air commander and the father of Anglo-American air support doctrine and operational art. He knew Quesada from the Western Desert over a year previously and, impressed by the aggressive young airman, authorized him to apply IX Tactical Air Command's airpower as he saw fit.

In the south, Tink was delayed, then canceled. Weyland reactivated XIX TAC's mobile command post to accompany Patton, who asked for more aircraft, and to help him out, Vandenberg loaned him additional fighters and reconnaisance aircraft from Quesada's embattled IX TAC. Though these shifts triggered strong protests from both Coningham and Quesada, Vandenberg insisted the transfers stand.

On Dec. 17, 18, and 19, in steadily deteriorating flying conditions, Allied



Photo via National Museum of the US Air Force

A railroad marshaling yard near Limburg, Germany, lies in ruins, pounded into rubble by a Ninth Air Force raid on Dec. 23, 1944.

Photos via US Army Center of Military History



Above: Lt. Gen. Omar Bradley (l) speaks with Lt. Gen. George Patton in Bastogne, Belgium, after the successful resupply of the troops hunkered down there. Below: 101st Airborne Division troops watch as C-47s from the 81st Troop Carrier Squadron drop supplies into Bastogne on Dec. 26, 1944.

airmen went aloft, countering Luftwaffe raids and attacking advancing German columns. AAF fighter pilots shot down more than 125 German airplanes, while Army ground fire destroyed more than a hundred others. Though sporadic air attacks persisted, this largely ended the air threat to American ground forces, analysts subsequently noting that "despite its new aggressiveness," the Luftwaffe "achieved at no time and in no place even temporary air supremacy" over the Bulge.

The AAF took a heavy toll on advancing German forces over the first three days. Reviewing the record of air attack in the opening phase of the Battle of the Bulge, Bradley singled out for special praise "the offensive action of the fighter-bomber in blunting the power of the armored thrust, and striking specific targets on the front of the ground troops."

In one case, on the 17th, a squadron of P-47s from the 365th Fighter Group—the famous "Hell Hawks"—caught a mechanized column in the Prether River valley, destroying at least 50 of its vehicles. Elsewhere that day, Hell Hawk pilots destroyed dozens of other vehicles plus artillery. The next day, Quesada's IX TAC destroyed approximately a hundred vehicles of various types. By the end of the following day, fighter-bombers had claimed more than 500 vehicles of all types.



Nuts!

But then the weather closed, and the ground situation immediately worsened. Now unimpeded by air attack, von Rundstedt's forces pressed onward, racing for distance versus dwindling fuel, reaching to within five miles of the Meuse River. St. Vith fell after a heroic resistance that disrupted the Nazi timetable. At Bastogne, encircled paratroopers of the 101st Airborne and tankers from the 10th Armored Division were running low of ammunition, food, and supplies. Even so, they staved off attacks by the XLVII Panzer Corps. Army Brig. Gen. Anthony C. McAuliffe, the 101st commander, famously replied, "Nuts!" when a German emissary demanded surrender.

Dec. 23 dawned clear and crisp, signaling the beginning of a five-day period of extraordinarily good weather.

With clear skies, the vast might of Allied tactical air forces took to the air: 18 groups of fighters and bombers, and from England, the heavy bombers of Eighth Air Force. More than 600 Ninth Air Force bombers, augmented by 417 B-17s from Doolittle's "Mighty Eighth" hammered rail and road bridges, communications centers, marshaling yards, and railheads, the heavies striking interdiction targets in Germany.

Ninth Air Force fighters launched nearly 700 sorties, some to suppress flak so that the IX Troop Carrier Command could drop 334 tons of supplies into Bastogne. Flying low to hit the lim-

ited drop zone, the resolute airlifters and their slow C-47s ran a veritable gauntlet. The C-47s "came back with a mess of bullet holes," Martin Wolfe of the 81st Troop Carrier Squadron recalled. "[We had] no fancy tactical planning, no elaborate flight paths this time. Just straight on in, jettison your loads over the position markers west of Bastogne, and get the hell out of there." The airdrop stiffened both Bastogne's resistance and the morale of its heroic defenders.

The change in weather dismayed German commanders, who knew what would follow. "From the 23rd and 24th of December on, the Allied air forces were able to operate freely," Lt. Gen. Hasso von Manteuffel, commander of the 5 Panzerarmee, said. "They found worthwhile targets throughout the whole area of our offensive. Bomb carpets were laid down on the roads and railways behind the front, and our already inadequate supply system was throttled. The mobility of our forces decreased steadily and rapidly."

For the five days the weather held, Allied pilots had the advantage. Late one afternoon near Houffalize, in "sparkling sunshine and unlimited visibility," unwisely fired flak alerted patrolling Spitfires to a truck column on a narrow road; they soon left behind, as RAF Group Capt. James E. Johnson said, "a half-mile of blazing, ruined vehicles."

Late on Dec. 26, the 4th Armored Division, capped by P-47s, reached Bastogne. Third Army's after action report commended the transformation of Bastogne from "an isolated outpost [to] the tip of a dagger pointed at the enemy's tactical security." That day, Third Army reported Weyland's fighter pilots destroyed almost 450 vehicles, while bomber crews cut 14 rail lines and bombed three marshaling yards.

By then the offensive was running out of fuel, both because of its scarcity and because Allied air attacks had destroyed numerous fuel trucks. After the war, Bradley's 12th Army Group Air Effects Committee reported that Generalleutnant Fritz Bayerlein "particularly noted the disastrous and calculated selection of fuel tank trucks as fighter-bomber targets. He and others have vivid memories of precious forward gasoline dumps lost through air attack." In one case reported by Bradley's committee, the destruction by an anonymous Allied fighter-bomber of just a single tanker carrying three tons of gasoline sufficed to prevent an SS Panzer division from seizing Liege, Belgium. Certainly, the combination of fuel and interdiction attacks destroyed German mobility, dooming the offensive to eventually come to a halt. By year's end, it was spent.

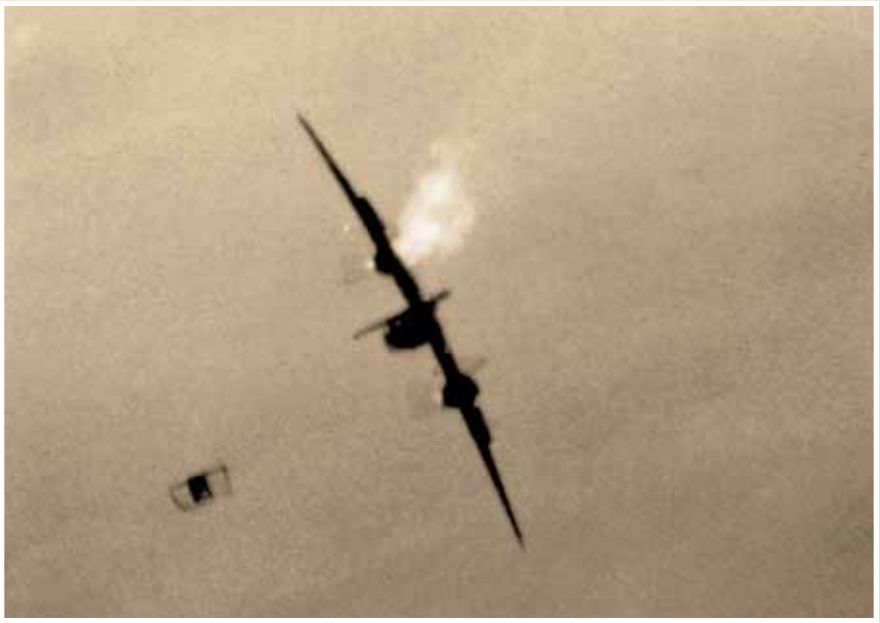


Photo via National Museum of the US Air Force

A battle camera catches the last moments of a Messerschmitt Me 410 shot down in 1944. In a rambling speech in December 1944, Hitler complained the Allies had "complete air superiority." He was right.

A Unanimous Verdict

Many more bitter months of fighting remained before war's end, but the Bulge had constituted the Wehrmacht's last offensive gasp. On Jan. 1, the Luftwaffe launched one final mass assault in a desperate bid to stave off the inevitable. Though careful planning kept it secret until German fighters appeared over Allied airfields, it caused more disruption than destruction, and the losses in Luftwaffe men and aircraft were, at this point, hopelessly irreplaceable. Going into the new year, the Allies had every prospect for success, not failure.

After the war, German generals were unanimous that airpower played the most significant role in their defeat. The Air Effects Committee said von Rundstedt told interrogators the main reason for the failure of the Ardennes offensive was his own lack of fighters, i.e., the Luftwaffe's failure to control the air. The 5 Panzerarmee's F. W. von Mellenthin believed "the Ardennes battle drives home the lesson that a large-scale offensive by massed armor has no hope of success against an enemy who enjoys supreme command of the air." They and others concurred that "when mobility and maneuver are lost, the loss of battles and campaign follows," reported the Air Effects Committee.

After the war, the committee summed up countless interrogations of Nazi personnel, concluding, "From the high command to the soldier in the field, German opinion has been agreed that airpower was the most striking aspect of Allied superiority."

Allied air supremacy enabled the cross-channel invasion of Europe, the breakout across France, and prevented a war-lengthening disaster in the Ardennes. More than this, it played the essential role in defeating Hitler's regime.

On March 21, 1945, sitting in his increasingly squalid quarters, daily threatened with AAF bombing and harassed at night by droning RAF Mosquitos, Joseph Goebbels, Hitler's propaganda minister, confided details of a conversation he had with der Fuehrer: "Again and again," he wrote in his diary, "we return to the starting point of our conversation. Our whole military predicament is due to enemy air superiority." ■

Richard P. Hallion is an aerospace historian who served 11 years as the Air Force historian and has written widely on aerospace technology and airpower topics. His previous article for Air Force *Magazine, "The Winter War," appeared in the September 2012 issue.*

AFA National Report

natrep@afa.org

By Frances McKenney, Assistant Managing Editor

How To Make a Big Splash

When Howard L. Burke of the **Red Tail Memorial Chapter** in Florida received his Air Force Association Medal of Merit, he garnered prominent coverage—both for himself and for AFA.

The local *Star-Banner* daily newspaper in Ocala, Fla., and its online Ocala.com gave generous space to Burke, describing his Air Force career, from 1959 to 1979, as a B-52 and KC-135 engine technician at Fairchild AFB, Wash., and on Guam during the Vietnam War.

Florida Region President Michael H. Emig of Ocala told the newspaper reporter that Burke earned the AFA national-level award because "Howard is my left- and right-hand man and serves as executive vice president and membership chairman."

Emig worked an unusual amount of information about AFA into this shot at media coverage. He detailed the association's founding by Gen. Henry H. "Hap" Arnold; the Tuskegee Airmen history that gave the local chapter its name; and the fact that only five Florida AFA members received Medals of Merit in 2012. This prompted the newspaper headline: "Air Force Vet in Exclusive Club."

Along with mentioning AFA's mission—including its science, technology, engineering, and math education focus—and even plugging CyberPatriot, Ocala.com posted a video on Burke.

During the five-minute clip, he displays Vietnam War-era model aircraft that he assembled. He reminisces about being called away from a Christmas dinner because all eight engines on a B-52 needed changing, due to a bird strike. And Burke shows old photos and unit patches from his time in the Air Force.

Emig explained that he received this comprehensive coverage because he has submitted articles to the newspaper repeatedly over the years and built up a relationship with its staff members. "The key is never to give up," he advised.

Pearl Harbor Remembered

New Yorkers remembered the 71st anniversary of Japan's attack on Pearl Harbor with the annual "Dropping of the Roses" in the waters around the Statue of Liberty on Dec. 7. The **Long Island Chapter** has organized this event for the past 17 years.



Photo by Jacqui Janetzko/Ocala *Star-Banner*

Red Tail Memorial Chapter member Howard Burke holds up one of his model aircraft—a Vietnam War-era B-52D—during a TV interview in Ocala, Fla.

The commemoration began on this latest December morning in a hangar at the American Airpower Museum in Farmingdale, N.Y. Five survivors of the 1941 bombing and strafing of US military facilities on Oahu attended the service: Richard Abeles, Gerard Barbosa, Bernard Berner, Seymour Blutt, and Michael Montelione.

Chapter President Fred Di Fabio reported that the nearly 500 guests included local politicians and Col. Thomas J. Owens II, commander of the 106th Rescue Wing at Francis S. Gabreski Arpt., N.Y. Owens, a chapter member, helped present AFA Citations to the Pearl Harbor vets.

The ceremony culminated with a blessing of 71 American Beauty roses, one for each anniversary year. Navy sailors carried the roses out of the hangar to a World War II-era SNJ-2 flown by an airshow outfit called the Geico Skytypers. The pilot took off from Long Island and timed his arrival at New York Harbor so his backseater could open the canopy and drop bouquets of roses into waters around the Statue of Liberty at exactly 12:55 p.m., the East Coast time of the Pearl Harbor attack.

"This event reaches thousands of Long Islanders," commented Di Fabio. "Long Island Channel 12 cable news network covered the event and broadcasts the 'Dropping of the Roses' story throughout the day."

Joseph S. Hydrusko, a native of Massapequa, N.Y., carried out the first commemoration in 1970, casting the flowers from a 1929 Curtiss Robin. He had been painting a Navy hospital ship at Pearl Harbor that Sunday morning 71 years ago. The Japanese sank USS *Oklahoma,* near Hydrusko, and in a letter printed in Life Magazine in 1957, he described how he joined a group of rescuers in using an acetylene torch and then an air pressure chisel to rescue sailors trapped inside the battleship.

Hydrusko conducted the Dropping of the Roses until his death in 1983.

Cowboy Grub

At Luke AFB, Ariz., in November, the

More photos at http://www.airforce-magazine.com, in "AFA National Report"



At the Virginia State Meeting's dinner, hosted by the Langley Chapter in Newport News in December, several guests pause for a photo. L-r: Barbara Van Cleef, AFA Vice Chairman for Field Operations Scott Van Cleef, Louise Wilson, State President Peter Jones, and Blair Ellis. All Virginia chapters sent representatives to the gathering.

Frank Luke Chapter hosted one of its regular dinners for families of deployed airmen.

Some 75 guests went through the buffet line, set up at the base's chapel annex. The room's decorations conveyed the western theme: checkered tablecloths, metal washtubs, boots, and a saddle. The "cowboy grub" featured western ranch chicken and meatloaf, baked beans, corn on the cob, and cornbread, all prepared by chapter member Don Harris.

Serving up the vittles were chapter members Harry Bailey, Luisa C. Bailey, Doris Goetz, Sharon Marvin, Fred G. Seifritz, and other volunteers.

Chapter VP Holly J. Gramkow opened the evening by introducing the 56th Fighter Wing's new command chief, CMSgt. David R. Staton, and representatives from the Family Support Center and base legal office. All spoke briefly about the services available to families of deployed military members.

Chapter Communications VP Luisa Bailey said the chapel pays for the food for these gatherings, held each month, but sponsoring organizations like the Luke Chapter handle food preparation and other details.

Along with the buffet, this month's party offered live music from a local guitarist, face painting for the youngsters, and 50 gift bags donated by the base exchange.

More toys 'n goodies came from Community Partners such as the mayor of nearby Peoria, Bob Barrett, and the Commemorative Air Force wing in Mesa; they donated an airplane ride in a vintage Stearman. Even the base commissary pitched in, with two cakes.

October Outing

In Sumter, S.C., in October, the **Swamp Fox Chapter** co-sponsored an annual golf tournament fund-raiser with local units of the Military Officers Association of America and the Daedalians.

"Very good turnout," said Chapter President David T. Hanson. Some 40 players teed off at the Sunset Country Club.

Afterward, the three sponsors split the overall profits—just over $1,300 for each—generated by entry fees and by selling ads displayed at the tees. The chapter uses its share for a $500 scholarship awarded to a University of South Carolina Sumter student and to





56th Fighter Wing Command CMSgt. David Staton holds a young guest at the Frank Luke Chapter's dinner for families of airmen deployed from Luke AFB, Ariz. Staton is a new chapter member.

support its 22 Visions of Exploration classrooms.

Chapter member Pete Watcher served as the golf outing's director, with C. J. Troyer as treasurer and Tony Myers handling the fund raising. Hanson said 60 local businesses bought tee box ads.

Low Country Boil

"Here in South Carolina," wrote E. G. Shuler III, "we call it Low Country Boil." The president of the **Columbia Palmetto Chapter** was referring to the region located along the state's coast and to the main dish at the group's November meeting: Shrimp in their shells, kielbasa sausage, chunks of potatoes, and corn on the cob, boiled together in a flavorful broth.

A new chapter member, Doug Truax, came up with the idea of hosting the shrimp boil, Shuler said. Truax donated 25 pounds of the shellfish, did the prep work, and cooked. Judy Truax set up for the dinner, held at the club on McEntire Joint National Guard Base in Columbia.

Shuler said the chapter gained two new members that evening.

Next up: More regional cooking. The chapter is considering a fish fry, this spring.

More Chapter News

■ Claude J. Farinha, for whom California's **C. Farinha Gold Rush Chapter** is named, died Sept. 18, 2012, and chapter members gathered in November to remember him and to honor his family. Chapter President Ronald Azarcon wrote that Farinha's wife, Shirley, had been named California Air Force Association Spouse of the Year for 2011, "but due to her husband's deteriorating health had never been presented the award." He gave the award to her at the Nov. 29 chapter event that Farinha's three daughters—Lori Robinson, Jana Cira, and Sheri Farinha—also attended. Chaplain Whit Woodward spoke to the audience about Claude Farinha's background, encompassing 35 years with Air Force Logistics Command and a myriad of volunteer activities after retirement in 1986 from the Senior Executive Service ranks.

■ The **Blue Ridge Chapter** in North Carolina met in December to collect clothing for the Asheville Buncombe Community Christian Ministry's Veterans Restoration Quarters. Chapter Secretary William D. Duncan Jr. reported that chapter members donated socks, sweatshirts, coats, shoes, and thermal underwear to the facility. Through volunteers backed by a Department of Veterans Affairs grant and per diem contract, the Veterans Restoration Quarters houses more than 240 veterans. It provides training and personal-skills building to help vets land a job and find more-permanent housing.

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■ In Louisiana, the **Maj. Gen. Oris B. Johnson Chapter** gathered in November for a holiday celebration that featured Louisiana State University in a big way. Past Chapter and State President Michael F. Cammarosano hosted the dinner and meeting. He reported that the guest list included LSU cadets, members of Silver Wings—a service organization supporting AFROTC—and three chapter members associated with Det. 310: Chapter President James P. Jones, Luke A. LaVergne, and Lt. Col. Mary McKeon. Jones was LSU corps commander from 1992 to 1995. LaVergne was an instructor in the late 1970s, and McKeon heads the unit today. ■

Reunions

reunions@afa.org

157th Fighter Sq/169th Fighter Wg/ SCANG Pilots. May 4 at McEntire JANGB, SC. **Contact:** Bones Marshall (803-776-8693) (bonesmarsh@aol.com).

444th Fighter-Interceptor Sq. April 14-16 at the Sheraton Hotel, Charleston, SC. **Contact:** Wallace Mitchell, 535 Mimosa Rd., Sumter, SC 29150 (803-469-3297).

525th FIS, Bitburg, Germany. April 26-28 in Las Vegas. **Contact:** Frank Litt, PO Box 33435, Fort Worth, TX 76162 (817-294-1136) (525bulldogs@sbcglobal.net).

Air Force Navigators & Observers Assn. April 8-10 in Savannah, GA. **Contact:** Jim Bannerman (386-257-3853) (jimmybannerman@cfl.rr.com).

Air Force Public Affairs Alumni Assn, retired, active military, and civilian members in public affairs, broadcasting, band, and multimedia fields. April 25-28 at the Monte Carlo Resort & Casino in Las Vegas. **Contact:** John Terino (703-239-2704) (johnterino@afpaaa.org).

All 3 Wars Veterans Assn, WWII, Korea, & Vietnam, all services. May 16-19 at the Crowne Plaza Hotel in San Antonio. **Contacts:** Lee Yagel (623-399-9355) (all3wars@aol.com).

Aviation Cadet Pilot Tng Class 54-G. April 11-14 in Phoenix. **Contact:** John Schaefer, 18894 N. 69 Ave., Glendale, AZ 85308 (623-561-5000) (johntomoko@cox.net). ■

E-mail unit reunion notices four months ahead of the event to reunions@afa.org, or mail notices to "Unit Reunions," *Air Force* Magazine, 1501 Lee Highway, Arlington, VA 22209-1198. Please designate the unit holding the reunion, time, location, and a contact for more information. We reserve the right to condense notices.



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Artwork by Zaur Eylanbekov

C-47 Skytrain



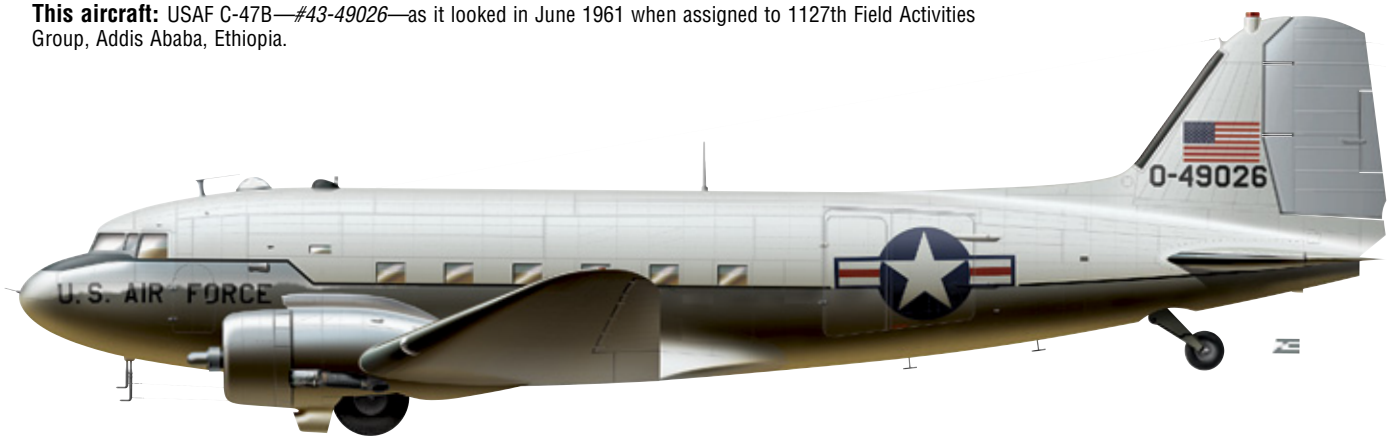
The C-47 Skytrain transport, commonly and lovingly referred to as the "Gooney Bird" by its crews, was a bright star of World War II. Gen. Dwight D. Eisenhower pegged it as one of the four weapons most critical to victory (with the bazooka, jeep, and atomic bomb). It was long-lived, serving also in the Korean War and Vietnam War. In the latter, it took on the attack role as the AC-47 "Spooky" gunship, a highly successful venture.

Douglas derived the C-47 from its DC-3 civilian liner, whose speed and range revolutionized air transport in the 1930s. It was unquestionably the top piston-engine transport in history and arguably the most important transport, period. The all-metal, low-wing, twin-engine aircraft featured retractable landing gear and controllable pitch propellers. Its structure and wings were immensely strong. When war came in the 1940s, the Army Air Forces adapted it to carry troops, haul cargo, tow gliders, and drop paratroopers.

In World War II, the Gooney Bird was a mobility system par excellence. It seemingly was everywhere. It hauled supplies over the towering Himalayas to supply Allied forces. During the July 1943 invasion of Sicily, C-47s towed hundreds of gliders and dropped 4,381 paratroopers in a single day. The Normandy Invasion of June 6, 1944, saw the aircraft drop 60,000 paratroopers and tow several thousand CG-4 gliders. Its service continued after that war. C-47s were used extensively in the 1948-1949 Berlin Airlift. In one notable Korean War achievement, C-47 crews flew 4,689 casualties out of the Chosin Reservoir area in five days.

—Walter J. Boyne

This aircraft: USAF C-47B—*#43-49026*—as it looked in June 1961 when assigned to 1127th Field Activities Group, Addis Ababa, Ethiopia.



USAF photo



Air Force C-47 and Navy Douglas R4D aircraft unload at Tempelhof Airport during the Berlin Airlift.

In Brief

Designed, built by Douglas Aircraft ★ first flight Dec. 17, 1935 ★ number built approx. 22,000 (USAF 10,654; Japan 2,500 under license; USSR 8,882 under license) ★ crew of three (pilot, copilot, flight engineer-loadmaster) ★ max load 27 troops or 10,000 lb of cargo ★ armament none ★ **Specific to C-47B:** two Pratt & Whitney R-1830-90C/D Twin Wasp radial engines ★ max speed 232 mph ★ cruise speed 160 mph ★ max range 1,513 mi ★ weight (loaded) 25,200 lb ★ span 95 ft ★ length 63 ft 9 in ★ height 16 ft 11 in.

Famous Fliers

Medal of Honor: John Levitow (Vietnam, in AC-47). **Notables:** Many, including John Alison, Walter Boyne, Jack Frye. **Test pilots:** Dan Beard, Frank Collbohm Jr. (flight engineer), Carl Cover Jr., Fred Herman, Ed Stineman Jr., D. W. Tomlinson, Elling Veblen.

Interesting Facts

Kept same basic DC-3 specs throughout its history ★ awarded the 1935 Collier Trophy ★ built under license by Fokker (Holland), Amtorg (USSR), Nakajima (Japan), and Airspeed (Britain) ★ nicknamed, variously, "Gooney Bird," "Dak," "Tabby," "Spooky," "Puff the Magic Dragon" ★ featured as ski-equipped system in 1951 sci-fi film "The Thing From Another World" ★ appeared (as C-53 Skytrooper) in airdrop sequences of 1977 film "A Bridge Too Far" ★ one tested as a glider, after removal of engines.

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FIGHTS HARD.
DAY AND NIGHT.

COMBAT · HUMANITARIAN · LOGISTICS · RESCUE · SPECIAL OPS

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