

March 2009/\$4

# AIR FORCE

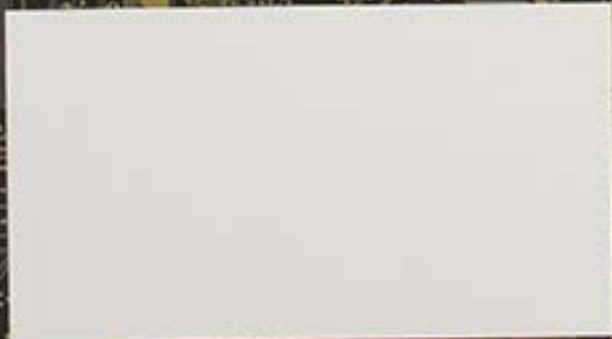
JOURNAL OF THE AIR FORCE ASSOCIATION

MAGAZINE



## The Cyber Menace

Pararescuemen  
Beyond Reachback  
Air War Over Serbia







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# AIR FORCE

JOURNAL OF THE AIR FORCE ASSOCIATION

March 2009, Vol. 92, No. 3

MAGAZINE



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## The 75 Percent Force

**M**ERE days after Barack Obama became President, his budget chief, Peter R. Orszag, pulled out his pen and cut \$57 billion from the new Pentagon budget, slashing it from \$584 billion all the way down to \$527 billion. Orszag returned the plan to its author, Defense Secretary Robert M. Gates, for a major rewrite.

Gates' \$584 billion plan for 2010 had no real chance. Critics derided it as "bloated." Others saw it as inappropriate at a time of economic crisis. Rep. Barney Frank (D-Mass.) wanted a 25 percent cut. The press quoted one unnamed White House aide dismissing it as nothing more than a military "wish list."

The military took a far different view. Gates claimed a smaller budget would not keep pace with inflation or account for the cost of US wars. USAF and Army leaders said the new plan added \$20 billion to their greatly underfunded weapon programs.

It is true that Gates' plan would have produced the largest "core" budget (excluding war cost) of the post-9/11 era. It would have been 43 percent higher than in 1998—not saying much, given that 1998 was the nadir of the Clinton defense famine. Two reasons for the recent cut were publicly cited:

First was a perceived need to free dollars for Obama's economic stimulus package. That logic, however, is exactly backward, noted Harvard economist Martin Feldstein. "The overall weakness of demand," he wrote, "implies that ... military spending ... should rise." Second was the desire to rein in deficits; the Pentagon, however, accounts for just 20 percent of federal spending.

Unfortunately, and as might be expected, there seems to be more to the story than a sudden desire for fiscal hygiene.

In a late January Senate hearing, Gates warned, "The spigot of defense spending that opened on 9/11 is closing." He appeared to be saying, in so many words, that the robust expenditures that had prevailed in the Bush years simply had run out of political support in this new political era in Washington.

If Gates' belief is true—and all signs are that they could well be—then the impact will be large, immediate, and long-lasting.

With less money, the services will have to find ways to muddle through. Coping mechanisms could include cutting force structure, slowing modernization, hanging on to old hardware, buying cheaper and less capable systems, or ... maybe something else.

Note that, within days of Orszag's action, DOD officials already had proposed imposing some or all of the following cuts: \$3.2 billion from joint F-35 fighter program; \$1.1 billion from Navy F-18E/F fighter program; \$2.5

**Under the new regime,  
weapon buying "is  
going to be more of a  
Wal-Mart approach than a  
Gucci approach."**

billion from Navy DDG-51 destroyer program; \$1.9 billion from Army Future Combat System.

The budgetary issue is especially acute for the Air Force, which is struggling to carry on with a large inventory of aircraft that have been kept in service far longer than planned. Virtually all aircraft that USAF flies today operate under restriction.

The average age of the Air Force's fleet is 24 years, with some aircraft nearing 50 years in service. The average fighter age has crept up to a shocking 21 years. As one USAF general put it, "The Air Force fleet of airplanes is not an aging force; it's a worn-out force."

According to *insidedefense.com*, a trade publication in Washington, D.C., DOD later convinced the White House to restore \$10 billion, for a total of \$537 billion. This rejection of nearly \$50 billion leaves DOD with essentially a zero-real-growth budget, a problem to which Gates already seemed reconciled.

In Jan. 27 testimony on Capitol Hill, Gates told lawmakers that the budget pressures will force "hard choices" through the entire defense program.

He's not kidding. He is privately preparing a list of programs for possible termination. He has identified harsh principles that will guide his upcoming budgetary decisions. Among them:

■ No "across-the-board adjustments," nibbling away at programs but keep-

ing them all alive. Entire programs will go.

■ No duplication. He will "invest more in the future-oriented program of one service and less in that of another."

■ No nice-to-haves. He will, he said, "critically and ruthlessly separate appetites from real requirements."

Given the new austerity, Gates has indicated he will give special scrutiny to what he derisively terms "exquisite systems"—those that far surpass any in the hands of current adversaries or potential adversaries. He says he will be alert to distinguish "those things that are desirable in a perfect world from those things that are truly needed."

Ever since the 1950s, the services and civilian overseers considered their principal and essential duty to be to prepare to fight a war of national survival, against a large and formidable military foe, even if that is a remote danger. Under Gates, that is no longer true. The defense leader has even coined a pejorative term for this belief: "next-war-itis."

In Gates' view, the "typical" military approach is to seek "99 percent exquisite" weapons that nevertheless take years to build. Those days are over. Now, he said, "We will pursue greater quantities of systems that represent the 75 percent solution."

Or, as it was put by a Pentagon official to *Los Angeles Times* reporter Julian E. Barnes: "It is going to be more of a Wal-Mart approach than a Gucci approach." The Pentagon, for example, is listening to calls for purchasing more last generation F-15E and F/A-18 fighters as a substitute, at least in part, for stealthy and more expensive F-35s, a "fifth generation" aircraft.

It should be obvious to everyone that the defense budget shortfall is real, and it is serious. If nothing else, the mere favorable mention of a "75 percent solution" to US defense problems by the nation's top defense official should have eliminated all doubt about that.

We will know for sure when the new Orszag-friendly defense budget arrives. Due in April, it likely will only confirm what everybody already knows—America's armed forces are in for a very rough patch. ■





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## The Downdraft

[Regarding Air Force Magazine's December editorial, "Air Supremacy in a Downdraft," p. 2]: The Air Force must recognize that it has to change its culture to eliminate all resistance to being open to meaningful change so it, like the rest of our military, becomes as relevant as possible to current and future medium term realities, not those of the Cold War.

Christopher Dye  
Plainfield, N.H.

## UAVs: Epiphanies

Yogi Berra said it better than USAF's senior leadership's UAV pronouncements in the January 2009 magazine: It's like *deja vu*, all over again. The USAF director of operations said, "We want to go to a dedicated career field because we can see this as a force that we're going to need in the future not only at the tactical, but at the operational and strategic [level]" ["UAV Pilots," p. 34]. The article then says, "This realization has begun to affect the approach to the problem taken by the Air Force's senior leadership."

That realization had a 14-year gestation in the USAF Operations Directorate. USAF pilots have flown Predator, now MQ-1, aircraft since the Advanced Concept Technology Development (January 1994 through June 1996). The 14-year USAF UAV track record, with some exceptions, is marked by "leper colony" and "expedience." Both are issues pointed out by the CSAF in the same article: The Air Force "must promote a strong and healthy [UAV] community, not a 'leper colony' or an agency of expedience."

USAF spent the first Predator decade plugging the holes in the dike. USAF removed pilots from their original weapon systems for two-year Predator tours as "nonflying operators" then returned those pilots to their original commands and weapon systems. Imagine fielding a new weapon system with USAF leadership direction that no "pilot" would ever have more than two years' experience in that system. Fourteen years later, where are the senior USAF leaders with UAV experience? When will USAF produce a general officer who has MQ-1, MQ-9,

or RQ-4 listed as an aircraft flown, in the official biography?

At the very beginning of USAF's Predator program, senior USAF leadership studied and debated the qualifications for its Predator pilots. What did it decide, after pouring through an AFRL study that included nonrated officers and mountains of staff papers? USAF took the expedient (and expected), but lukewarm solution: USAF pilots. Why lukewarm? The UAVs on USAF's mid-1990s windscreen (Predator, Global Hawk, and Dark Star), if fielded, would eventually swamp USAF's static pilot production of 1,100 pilots per year.

Facing static pilot production and growing UAV pilot requirements, the operations directorate chased multiple solutions during the decade, including alternative USAF pilot production and use of USAF navigators. All ended up in the bureaucratic wastebasket. Now, "the Air Force will also begin beta testing a class of 10 active duty officers (up through the rank of captain) from various technical and nontechnical fields, to see if it can teach them how to fly armed UAVs." In other words, USAF says that if the Air Force uses the existing pilot acquisition process (aptitude, skill sets, flight physical, initial flight screening at Pueblo, Colo.) and forgoes simulator and in-flight aircraft training with simulator-only for instrument flying qualification, it should graduate USAF UAV pilots. Fourteen years ago, AFRL said essentially the same thing.

Lt. Col. Doug Henley,  
USAF (Ret.)  
Yorktown, Va.

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### Airpower's Six Phases

Rebecca Grant reaches too far [*"The Six Phases of Airpower"*, January, p. 46] to create scenarios to justify "conventional warfare" requirements for air dominance planning.

For example, she cites the newspaper *Izvestia*—not always the most reliable source—declaring that Russia would respond to US missile defense systems in Poland and the Czech Republic "by basing strategic bombers in Cuba." First, it is unlikely that the Russian government would commit any of its relatively few long-range bombers to foreign basing and its implicit political control—especially to bases some 90 miles from the continental United States.

Second, Cuban officials, seeking better relations with the United States, are unlikely to allow Russian combat forces of any kind on their territory. As evident from my week in Cuba, the Cubans—officials and citizens—distrust the Russians and want very much to be friends with the Americans.

Ms. Grant, in attempting to build a case for a potential conventional conflict with China, states: "USAF must be certain it can prevent [Chinese] Red Air and missile defenses from creating a lockout in the Taiwan Strait, for example. F-22s will have to hunt and kill SAMs."

Does the Air Staff seriously consider operating F-22s (or any aircraft) over mainland China to kill SAMs? If so, we are really in trouble. And where would those F-22s be based? Taiwan? The airfields on that island probably have a wartime life expectancy measured in minutes (how long does it take for a cruise missile or IRBM from China to strike Taiwan?). Will we be eating up tankers and F-22 flight hours to fly such anti-SAM strikes from Japan or Okinawa? Or engaging Chinese fighters over their territory or even in the strait, where they have the benefits of ground radar and intercept control and nearby bases?

If the decision is made to strike Chinese territory, it will be done with air- and submarine-launched cruise missiles.

The specter of future conventional conflicts should certainly be used in our efforts to justify conventional (non-irregular warfare) military forces. But more realistic scenarios must be derived than those given here.

Norman Polmar  
Alexandria, Va.

■ *Mr. Polmar, I hope you are right about Russia not becoming a threat. Scenarios aside, it will take more than standoff cruise missiles to hit mobile targets like air defenses which can drive well out of harm's way in the flight time of a sea-launched cruise missile. As*

*Air Force Chief of Staff Gen. Norton Schwartz reminded us in February 2009, the F-22 will be important for suppression and destruction of enemy air defenses.*—REBECCA GRANT

Dr. Grant's article, "The Six Phases of Airpower," shows that hard-won lessons learned in combat concerning irregular warfare have not been learned by all. Fortunately, AFDD 2-3 *Irregular Warfare* distills the lessons learned during joint-combined actions in the 21st century in a key foundational doctrine statement: "IW is not a lesser-included form of traditional warfare. Rather, IW encompasses a spectrum of warfare where the nature and characteristics are significantly different from traditional warfare" (p. viii).

Combat action at any point in the spectrum of war by any service does not take place in a vacuum. The idea that an adversary, once engaged in combat, would enjoy a sufficiently permissive acquisition environment as to allow them to rapidly deploy counterair systems in sufficient numbers to change suddenly the air environment is unrealistic. This attempt at a cautionary tale does not consider the coordinated use of a nation's—or a coalition's—other instruments of power. Further, it assumes a lack of foresight

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Maj. David Hook,  
USAF (Ret.)  
San Antonio

### Ups and Downs of Space Radars

The introductory sentence in the article "Ups and Downs of Space Radars" (January 2009, p. 67) states that future Maj. Gen. [David D.] Bradburn entered the US Army Air Corps in 1946. In fact, the USAAC had been renamed the Army Air Forces in June of 1941.

MSGt. James B. Walker,  
USAF (Ret.)  
Dayton, Ohio

*Neither Jeffrey Richelson nor James Walker gets it exactly right, but Richelson gets it more right. Bradburn's official USAF biography states the following: "After graduating from the US Military Academy as a rated pilot, General Bradburn was commissioned as a second lieutenant in the US Army Air Corps." Thus, Bradburn may have "entered" the AAF in 1946, but he also would have entered and been commissioned in the Air Corps. The status of the Air Corps, created by statute in 1926, did change during the war. Nor was it abolished or renamed in 1941. It continued to exist until 1947, and substantial numbers of officers and airmen were appointed, assigned, or detailed to it during the AAF years.—THE EDITORS*

### Cold War From on High

I thoroughly enjoyed your article "Cold War From on High" in the January 2009 issue [p. 38]. I would like to point out that the photo captioned as "the SR-71's super-secret forerunner, the A-12, circa 1962" is actually the third YF-12A, 1960-6936, one of three A-12s converted by Lockheed to test the feasibility of a Mach 3 interceptor. This aircraft was used to set three world speed and altitude records on May 1, 1965.

Of the three YF-12A aircraft, 60-6934 was damaged during a landing at Edwards AFB, Calif., and the rear half of the aircraft was later used to build the SR-71C trainer. Aircraft numbers 60-6935 and 60-6936 were subsequently flown by NASA; 60-6936 was lost when a fire broke out due to a fuel line fracture while on approach at Edwards on June 24, 1971, and 60-6935 is now on display at the Air Force Museum, Wright-Patterson AFB, Ohio.

MSGt. Robin Thurston,  
USAF (Ret.)  
Colorado Springs, Colo.

On p. 40—The comment that "Lockheed based the aircraft (U-2) on the main fuselage of the F-104 fighter" is not quite correct. The original CL-282 study

was based on the fuselage of the XF-104—which differed considerably from the later production configuration.

On p. 43—the top photo is incorrectly attributed to my good friend and Lockheed Martin photographer Denny Lombard; it was, however, taken by my good friend Lockheed Martin photographer Eric Schulzinger.

On p. 45—The third caption noting "The D-21 ... could be launched from the back of an SR-71" is incorrect. The only Blackbird family aircraft capable of carrying the D-21s were two purpose-built M-21s (A-12 derivatives). These aircraft, when carrying D-21s, sometimes were referred to as M/D-21s.

Jay Miller  
Fort Worth, Tex.

### Arc Light

[In regard to: "Arc Light," January, p. 58]: Arc Light B-52 missions staged out of Guam were successful, in part, through the air refueling support of KC-135 tanker crews on two- to six-month TDYs at Kadena AB, Japan, from Stateside SAC bases. Most of the B-52s required enroute refueling on every mission to complete the 12-hour round-trip to target and return. The Kadena tankers did this essential job, rendezvousing with receivers at the refueling track over Luzon.

It was essentially a navigator's mission. After takeoff, lead navigator coordinated with lead bomber's estimate to the rendezvous point, striving to arrive just one minute ahead of the converging B-52s, then turn down track for hookup and offload. The timing was critical—arriving too early caused an extended refueling track, additional time and fuel. Arriving too late was not an option. Tanker navigators used a "timing triangle" enroute to make any needed adjustments for precise time arrival.

Refuelings were conducted regardless of weather conditions. From bright sunny days, to dark, stormy night offloads in typhoon-like conditions, missions were not aborted for weather.

After refueling, tankers broke off and started the two-hour return to Kadena. Recovery weather was always a concern, mindful of low fuel reserves and no available alternates. Kadena landings were often made in marginal weather, especially during the monsoon season. Approaches in heavy rain squalls and gusty crosswinds were common, knowing that a mere seven-degree wing-low at touchdown could scrape an outboard engine. Any remaining adrenaline was used in stopping the empty -707 on a wet runway before reaching a drop-off at the end. Reverse thrust would have been nice. Crews generally flew 10 consecutive missions before earning a short day of R&R.

A lot of unsung activity took place in

support of Arc Light and Linebacker II. Flight crews, maintenance personnel, schedulers, and staff all worked overtime to survive and succeed in the overall mission. Thanks for the memories!

Lt. Col. Joe Tichenor,  
USAF (Ret.)  
Dunwoody, Ga.

The article on Arc Light brought back a few memories of my B-52 days and experience in planning and flying on some of the missions while assigned to the 91st BW. I think that there was a mistake when the picture of the B-52D on p. 58 and 59 was identified as being assigned to the 93rd BW. To my knowledge, and backed up by an inquiry to the AFHSO, the 93rd BW did not participate in the Arc Light operation. The 93rd BW did furnish an aircraft and crew to Eglin AFB, Fla., in early 1962 to drop the first iron bombs from the B-52. I was the EW on that crew. S-78 was probably not your typical SAC crew, at least by our ranks; we had four lieutenant colonels, one major, and our gunner was a master sergeant. Yes, some of us had spot promotions.

Col. Edward Mutch,  
USAF (Ret.)  
Bellevue, Neb.



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Lawmakers and the F-22; The Chinese doppelganger; Taiwan, the major irritant ....

## Just Build It

In the first months of 2009, nearly half the Congress expressed a belief that President Barack Obama should certify the F-22 fighter as a critical defense program and keep it in production, at least until more up-to-date analysis verifies exactly how many more might be needed.

In separate January letters to Obama, bipartisan groups of 199 members of the House and 44 members of the Senate urged the new President to push past the Bush Administration's goal of 183 Raptors. That number is too low to meet the threat, they asserted, and continuing production will keep up to 95,000 people employed who otherwise would soon see their jobs disappear.

Releasing many of those workers would also make the line closure almost irreversible, even if it should be later decided that not enough of the fighters were built, the legislators wrote.

"We urge your certification of continued production of the F-22," the Senators said. They noted that the F-22 is the only fifth generation fighter "in full-rate production" and that after subtracting aircraft in test, maintenance, and training, "only about 100 F-22s would be immediately available for combat at any given time." More than 30 air campaign studies over 15 years have validated a need for far more than 183 F-22s to replace more than 800 F-15A-D air superiority fighters, they said.

The "certification" to which they referred stems from 2008 legislation requiring the President to decide, by the first of this month, whether the F-22 should remain in production and whether funds Congress provided should be spent to buy further long-lead parts and materials—particularly titanium.

Without action, the long-lead activities of F-22 production will stop this month, and more and more workers certified to do the work will be released. Lockheed Martin, the builder of the F-22, has said that, after a period of months of inactivity, the bill to restart the production line would run into the billions of dollars of new costs.

Without Obama's certification, "layoffs will begin as this critical supplier base shuts down, and it will quickly become expensive or perhaps impossible to reconstitute," the Senators wrote.

"Some have suggested filling the remaining F-22 requirement with other aircraft, like the F-35 Joint Strike Fighter," wrote the Senators. However, the F-35 is designed for multirole strike missions and "not optimized for ... air dominance" as is true of the F-22.

Defense Secretary Robert M. Gates has frequently opined that he thinks the two airplanes are comparable, and that the F-35 can substitute for the F-22 in establishing air dominance. The Air Force firmly believes otherwise, though.

## It's the Threat, Stupid

The Senators pointed out that several "potential adversaries" have announced development of their own F-22-like aircraft and expect to be building them within five to 10 years.

"Additionally, sophisticated and highly lethal" air defense systems are proliferating worldwide which could demand that the US achieve control of the air "in multiple theaters simultaneously," the lawmakers wrote.



USAF photo by S/A Clay Lancaster

*It's the moment of truth.*

In their letter, the Representatives concluded, "It is clear that such a lean F-22 fleet is not consistent with America's national security interest." The two letters, though not identical, sounded similar themes and cited the same numbers.

The House letter called the F-22 project a "model production line," and noted that unit flyaway cost has dropped by 35 percent since full-rate production began.

Making an economic argument, the Senators said that the F-22 "annually provides over \$12 billion of economic activity to the national economy," and that over 25,000 direct jobs and an estimated 70,000 more indirectly result from the F-22. The program relies on more than 1,000 suppliers in 44 states, they said.

"As we face one of the most trying economic times in recent history, it is critical to preserve existing high-paying, specialized jobs that are critical to our nation's defense," the Senate letter read.

Extending F-22 production will buy time for the Pentagon to conduct "a more in-depth analysis" of how many of the fighters are needed, as DOD conducts its 2009 Quadrennial Defense Review, the lawmakers pointed out.

In their letter, the Representatives said, "With these points in mind—growing worldwide threats, substantiated requirements for larger numbers of F-22s, a high-performing production capability, and a vital industrial base that sustains high quality jobs—we urge you to expeditiously certify that continued production of the F-22 Raptor is in the economic and national security interest of the United States of America."

Pentagon acquisition, technology, and logistics chief John J. Young Jr. charged late last fall that the F-22 has turned in lackluster performance and has failed to meet key performance parameters in both combat capability and maintenance. Since then, the Air Force has declined to provide numbers that would either back up or refute those claims.

However, in late January, Lockheed Martin officials told reporters that the F-22 has met all of its KPPs such as radar cross section, speed, turn rate, etc. Company officials also noted that the F-22 is not expected to live up to KPPs for main-





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tenance until “maturity”—that is, after the fleet has amassed over 100,000 hours of flying time. That milestone won’t be reached until 2010, they said. Even so, they argued, the F-22 is turning in good reliability and maintainability for an aircraft so recently introduced.

### The Chinese Copy

If imitation is the sincerest form of flattery, China is paying the Air Force a high compliment by using it as a model for its own air service.

According to the most recent Chinese defense White Paper, that country is busy transforming the People’s Liberation Army Air Force into a facsimile of USAF, boasting state-of-the-art technology and operating concepts, an overhauled system of professional military education, and enhanced “strategic” capabilities. The mimicry even extends to developing RED HORSE-like capabilities to quickly erect expeditionary airfields and installations.

According to the White Paper, released in January, the PLAAF places great importance on developing new types of fighters, air and anti-missile defense weapons, and command automation systems “to satisfy the strategic requirements of conducting both offensive and defensive operations.” It noted recent improvements in its air-to-air weaponry, precision guided attack munitions, upgrades to its electronics, and improvements to “the basic networks for intelligence and early warning, command and control, and communications.”

Throughout the Chinese military, the watchword has become “informationization”: the use of high-speed communication and networks to enhance the overall force structure. A key component will be cyber operations, which China hopes to use to level the playing field with other major militaries as it develops its conventional power.

For now, the PLAAF will rely on “third generation” aircraft and missiles as the backbone of its force, relying on second generation aircraft and missiles “as the supplement,” it said. However, its definition of what constitutes a “third generation” aircraft seems to differ from that widely used in the West. China’s new J-10 fighter—considered comparable to early F-16s—as well as Russian Su-27 Flanker variants, definitely falls into the category of “fourth generation” machines, and they will soon become the dominant types in the PLAAF. China has also stated elsewhere that it is pursuing fifth generation fighter types comparable to the F-22. While its new White Paper didn’t specify such an aircraft, it did note that China is building a defense industrial base with an eye toward “leapfrogging” current technologies.

The Chinese forces are also pursuing improvement in intelligence-surveillance-reconnaissance capabilities as well as power-projection forces such as bombers and aerial tankers.

The PLAAF “is working to accelerate its transition from territorial air defense to both offensive and defensive operations, and increase its capabilities for carrying out reconnaissance and early warning, air strikes, air and missile defense, and strategic projection, in an effort to build itself into a modernized strategic air force,” according to the document.

The paper boasted of new “high-caliber personnel” and officers with increasingly “interdisciplinary” or joint experience. It also noted new and continuing air force colleges for command, aviation, engineering, and radar, a kind of air force academy, seven pilot training colleges, and a school for noncommissioned officers. An air force “Military Professional University” was established in 2008.

While acknowledging its double-digit increases in military spending in recent years, China maintained that much of the increase has gone to troop pay and benefits, which it said still compare unfavorably with civilian pay, but are catching up fast.

The RED HORSE-like capability was called out in a paragraph on logistical development. The PLAAF seeks to



PLAAF calls J-10s third generation fighters.

“strengthen its logistical forces for rapid construction of air defense projects, bomb elimination at and repair of airfields which have suffered attack.” It’s also seeking a better system to store and rapidly deliver critical military supplies. Toward that end, it’s seeking to reduce the size of its ground support gear and make it “more versatile in function and fitter for field operations.”

The comment about airfield repair was noteworthy in that China has been putting the majority of its new combat aircraft in a mainland arc facing Taiwan, and these airfields would be subject to counterattack in any action involving Taiwan.

Although it did not elaborate, the PLAAF also has advanced its capabilities in electronic countermeasures and “chemical defense.”

Regarding Taiwan, the White Paper seemed to relax some of China’s recent bellicose talk about what it considers the breakaway province. It said that “the situation across the Taiwan Straits has taken a significantly positive turn,” and that efforts to push for Taiwanese independence have “been thwarted.”

### Internalized Conflict

Taiwan still ranks among three specific security threats called out in the White Paper—the other two being independence movements in Tibet and east Turkistan. China has had to deal with “disruption and sabotage by separatist and hostile forces from the inside,” even as it faces “strategic maneuvers and containment from the outside.”

China also upbraided the US for continuing to supply Taiwan with military equipment and support “in violation of the principles established in the three Sino-US joint communiques, causing serious harm to Sino-US relations.” Elsewhere in the paper, though, it commended efforts at military exchanges with the US and other countries.

The White Paper extolled China’s determination to make a “peaceful” rise to military power that matches its economic clout, and noted that competition for resources represents a likely friction point with other powers in the future, as are “hot spots” with the potential to draw major peers into conflict.

The paper also noted with seeming trepidation the rise of “new emerging developing powers,” which it left unnamed. Taken together with a growing multipolarity in the world, there is “a profound readjustment brewing in the international system.”

Still, given the world economic and political situation, the White Paper authors judge that factors are at work which contain militarism, and that there is a “willingness to cooperate” among major powers that are “keeping low the risk of worldwide, all-out, and large-scale wars for a relatively long period of time.” ■



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## Airman Dies in Iraq

SrA. Omar J. McKnight, 22, of Marrero, La., died Jan. 17 in a noncombat incident in Iraq. McKnight was deployed to Joint Base Balad from the 6th Security Forces Squadron at MacDill AFB, Fla.

As of late January, there was no further information available on the cause of his death.

## CSAR-X Bids Come In

Boeing, Lockheed Martin, and Sikorsky all met the Jan. 20 Air Force deadline for submitting updated bids for USAF's Combat Search and Rescue Replacement Vehicle competition.

Barring any programmatic changes by the new Administration, the Air Force will announce the new winner in the contest this spring or summer. The selected helicopter will replace the HH-60G Pave Hawk.

Boeing, proposing its HH-47 design, won the initial CSAR-X contest in November 2006. However, the Air Force reversed course in the wake of two rounds of successful legal challenges by Lockheed and Sikorsky, which had proposed, respectively, the HH-71 and HH-92 aircraft.

Those firms challenged the way the Air Force evaluated the initial bids, causing the Air Force to accept revised bids and redo its evaluation.

## Gates Suggests Bomber May Slip

The Air Force's goal of fielding a next generation bomber aircraft in 2018 may be delayed due to the impact on Pentagon spending caused by the nation's economic crisis, Secretary of Defense Robert M. Gates told the Senate Armed Services Committee Jan. 27.

Sen. John R. Thune (R-S.D.) asked Gates how to ensure that the new bomber would be operational in 2018 given comments made last year by Gates that over-the-horizon strike capability will be at a premium and will require a shift in defense policy from short-range to long-range systems.

"I made that speech at a time when the economic outlook was rather different than it is now and the prospects for the defense budget perhaps different," Gates responded. But he added that

the future bomber will be "a focus" of the Quadrennial Defense Review that is expected to start this month.

## Airman Dies in Training

SSgt. Kenneth J. Wilburn, a 30-year-old combat controller apprentice from Union, S.C., died Jan. 12, three days after he lost consciousness during a water-treading exercise at a training pool at Lackland AFB, Tex.

Air Force officials said Wilburn, assigned to Lackland's 342nd Training Squadron, did not respond to emergency life-saving efforts on the scene and never regained consciousness at Wilford Hall Medical Center. His death was under investigation.

## A-10 Woes Affect Deployments

Lingering concerns over wing cracks on some A-10 ground-attack aircraft caused the Air Force to modify its plans to send an A-10 unit to South Korea this month on a rotational deployment to relieve Army Apache attack helicopters there.

Instead, the service will dispatch a contingent of 12 F-16s in their place, US Forces Korea said Jan. 13. The decision to send the F-16s is "due to increased requirements for inspections and repairs to the A-10 fleet," USFK stated.

Last October, the Air Force grounded a sizable portion of the A-10 fleet due to wing cracks on those airframes with comparatively thinner skinned wings. As of the end of 2008, many of these A-10s had not been cleared to return to flight. It may take until June until all are repaired and return to flight status.

## Fast(er) Track for KC-X?

Secretary of Defense Robert M. Gates told the House Armed Services Committee Jan. 27 that the Pentagon may be able to restart the Air Force's KC-X aerial tanker program "by early spring" and have responses to a new request for proposals "soon after the first of next year."

His timetable matches the one posited by Air Force Chief of Staff Gen. Norton A. Schwartz late last year, if the service doesn't have to start the KC-X contest over from scratch.

USAF photo by MSgt. Kevin J. Gruenwald





Gates also came out anew against a dual buy in which both Boeing and Northrop Grumman each would build new tankers. He said it is "an absolutely terrible idea and a very bad mistake for the US taxpayer, not to mention the US Air Force."

#### Raptors Arrive in Pacific

The Air Force dispatched a contingent of 12 F-22s and nearly 300 airmen from Langley AFB, Va., to Kadena AB, Japan,

in mid-January and a second group of 12 F-22s and about 270 personnel from Elmendorf AFB, Alaska, later that same month to Andersen AFB, Guam. Both deployments were part of normal Air and Space Expeditionary Force rotations to the region.

Each Raptor force was expected to spend three months at the Pacific bases training with other Air Force assets as well as joint and coalition forces. Langley F-22s first spent time on Kadena back in

February 2007, while Elmendorf sent a Raptor cadre to Guam last summer for three weeks of training.

#### Wing Passes Nuke Inspection

The 62nd Airlift Wing at McChord AFB, Wash., passed its most recent nuclear surety inspection held Jan. 7 to Jan. 12, receiving "the highest possible grade" of satisfactory.

The C-17 wing, in addition to its daily duties of hauling routine cargo and



02.10.2009

*This big B-52H bomber (span 185 feet, length 159 feet), part of the 23rd Expeditionary Bomb Squadron, leads five small boys over Andersen AFB, Guam, as part of Exercise Cope North in the Pacific. Flying off the B-52's right wing are two F-2 fighters of the Japanese Air Self-Defense Force. Off the left wing are (l-r) two F-16s of the USAF 18th Aggressor Squadron and one US Navy EA-6B Prowler of VAQ-136. Some 60 JASDF airmen participated in the 11-day exercise, which is designed to enhance bilateral air operations.*



personnel around the globe, serves as the nation's primary nuclear airlift force, with responsibility for transporting nuclear weapons and associated equipment and persons.

The Air Force is beefing up nuclear inspections as part of its broader push to improve upon its nuclear stewardship. The high bar set for passing them caused several of the services' ICBM and bomber wings to come up short last year, prompting retests.

**C-17s Reach Darfur**

Two Air Force C-17s flown and supported by crews from Travis AFB, Calif., delivered about 150 tons of heavy equipment from Kigali, Rwanda, to Sudan's Darfur region Jan. 13 to Jan. 16 in support of Rwandan soldiers who are part of the African Union-UN peacekeeping mission there.

The equipment included oversize vehicles, water purification systems, water trailers, tents, and spare parts. The airlift was the first large-scale peacekeeping support mission for US Africa Command and 17th Air Force, its air component, since they became fully operational last October.

**Presidential Aircraft Sought**

The Air Force announced in January its intent to acquire a new fleet of three



USAF photo by Maj. Sam Highley

**Fly UAE:** Lt. Col. Mike Benham straps in for an orientation flight in an F-16 belonging to the United Arab Emirates. Benham acted as the operations officer for the US aircraft and personnel at the Aero India 09 air show in Yelahanka, India.

highly modified commercial widebody aircraft to serve as the primary Presidential transport. The new "Air Force One" aircraft will replace the two Boeing VC-25s that have flown US Presidents since 1990. First delivery is planned in Fiscal 2017.

The VC-25, based on Boeing's 747-200, is approaching the end of its design life and the Air Force's analysis of alternatives found that replacing it would be "the most cost-effective option."

Boeing appears to have the upper hand in winning the rights to supply these aircraft since EADS North America announced in late January that it will not compete, meaning there will be no Airbus airplane pitted against Boeing's expected bid.

**Provisional Nuclear Headquarters Activated**

The Air Force formally activated Air Force Global Strike Command Provisional Jan. 12 at Bolling AFB, D.C. The provisional command, a temporary unit led by Brig. Gen. James M. Kowalski, took the lead that day in tackling the manpower and resource issues associated with standing up AFGSC, the new nuclear-focused major command that will commence operations in September to oversee the service's nuclear-capable bomber and ICBM operations.

"We look forward to laying the foundation needed to stand up Global Strike Command," said Kowalski.

AFGSC(P) will also be involved in helping to identify the final location for the new command's eventual permanent headquarters, which will be at a place other than Bolling. On Jan. 21, the Air Force announced the finalist HQ locations: Barksdale AFB, La., F. E. Warren AFB, Wyo., Malmstrom AFB, Mont., Minot AFB, N.D., Offutt AFB, Neb., and Whiteman AFB, Mo.

The Air Force said it will decide on the HQ site no later than the end of June. "Current performance of a significant operational function associated with strategic nuclear forces is an overarching requirement" in the selection, the service said.

AFGSC(P) does not have any manpower authorizations, and USAF will inactivate it on the standup of the permanent major command. Supporting the provisional organization are detachments of subject matter experts at the headquarters for Air Combat Command and Air Force Space Command at Langley AFB, Va., and Peterson AFB, Colo., respectively.

These contingents, along with personnel from Air Force headquarters, formed a temporary HQ element of about 55 airmen. The provisional command is working closely with the Air Staff's Strategic Deterrence and Nuclear Integration office (A10), Air Force Materiel Command, and US Strategic Command to refine the roles and responsibilities of AFGSC.

**Air Guard Pave Hawk Crashes**

An HH-60G Pave Hawk helicopter deployed to Afghanistan from the New York Air National Guard's 106th Rescue Wing at Francis S. Gabreski Airport in Westhampton Beach, N.Y., crashed Jan. 16 near Kabul with no injuries to crew or passengers, the Long Island *Newsday* reported.

The 106th RQW airmen were on a medical evacuation mission at the time of the incident.

**Finalists Named for Cyber HQ**

The Air Force announced Jan. 21 that Barksdale AFB, La., Lackland AFB, Tex., Langley AFB, Va., Offutt AFB, Neb., Peterson AFB, Colo., and Scott AFB, Ill., are the six finalist locations to host the eventual permanent headquarters of Air Force Space Command's 24th Air Force, the new cyber numbered air force. Barksdale has been the temporary seat of USAF's cyber operations since 2007.

The service said it will determine the winning site no later than the end of June. Attributes such as a base's proximity to



## Curtain Lifts on Project Liberty

The Air Force plans to have the first of its newly acquired MC-12W intelligence-surveillance-reconnaissance aircraft deployed to Southwest Asia by April, Brig. Gen. Blair E. Hansen, director of intelligence, surveillance, and reconnaissance capabilities on the Air Staff, told reporters Jan. 23 in the Pentagon. This was USAF's first in-depth public discussion on the new platform.

The concept for these manned, medium-altitude platforms came out of the Office of the Secretary of Defense ISR task force last year as a means to quickly bolster the overhead ISR assets already in Afghanistan and Iraq and, in particular, to relieve the heavy burden being placed on MQ-1 Predator and MQ-9 Reaper unmanned aerial vehicles.

The MC-12Ws are known as Liberty Project Aircraft after the World War II effort to quickly press "Liberty ship" cargo vessels into the fight in Europe. LPA will contribute to the fight by passing valuable full-motion video and signals intelligence data directly to ground troops at the tactical level.

Planned is a fleet of 37 aircraft, all of which are expected to be in the Air Force's hands by year's end, Hansen said. The first seven airframes are based on the Beechcraft King Air 350 model. The remaining assets are built upon the King Air 350 Extended Range design, which provides greater on-station time. There will be two operational squadrons of 15 aircraft each and seven assets used for training.

Hansen said the aircraft's crew (two pilots and two sensor operators) will have the ability to communicate in real-time with ground forces, just as Predator and Reaper operators do today, via voice and video communications links.

Supporting the aircrews in disseminating the intelligence will be a force of about 100 airmen who will operate out of small-size cells at various locations throughout the theater.

other cyber operational missions, access to scientific and technical expertise, and communication and bandwidth capabilities will be key determinants.

Meanwhile, Texas delegations began to come out in force in January to lobby, respectively, for Goodfellow Air Force Base, near San Angelo, and Sheppard Air Force Base in Wichita Falls to be home to cyber training. Each is competing, along with Keesler AFB in Biloxi, Miss., to host the mission.

### New B-2A Radar Approved

The Air Force awarded a production contract worth approximately \$468 million Dec. 29 to the Northrop Grumman-led industry team that is upgrading the radar on the B-2A stealth bomber.

Under the terms of the deal, the team, which includes radar-provider Raytheon,

will supply the remaining 14 sets of new active electronically scanned array radar units, plus two spare sets, for the Air Force's 20-aircraft B-2A fleet. Already Raytheon has provided six production-representative sets that will be used operationally on six aircraft.

The service is upgrading the bomber's existing AN/APQ-181 multimode radar under the \$1.2 billion B-2 Radar Modernization Program through the addition of these modern arrays. Each aircraft will get a pair of new arrays, one array for each side of the cockpit. The upgrades will be complete around 2011.

### New Energy Policy Issued

The Air Force issued a new energy policy in December that will serve as the blueprint for how it institutes en-

ergy efficiency and conservation in all aspects of its operations.

The document lays out an energy future that is "secure, efficient, and environmentally sound," wrote Air Force Secretary Michael B. Donley in a Jan. 6 release. It outlines the efforts to reduce the service's energy demand while increasing supply—especially from domestic sources of renewable and alternative energy—and ushering in a cultural change so that airmen make energy conservation a daily consideration.

Among the activities, the Air Force seeks to reduce aviation fuel use per hour of operation by 10 percent by 2015, increase renewable energy use at USAF facilities, and be positioned to acquire half of its domestic aviation fuel via an alternative fuel blend by 2016.

### Walk of Heroes Dedicated

The Air Force dedicated the Enlisted Heroes Walk Jan. 2 at Lackland AFB, Tex. The new memorial, located next to the base's parade ground, is dedicated to the enlisted airmen who have received the Medal of Honor, Air Force Cross, and Silver Star. It comprises 1,024 bricks of which 164 are engraved with the names of those recipients.

Appearing at the dedication ceremony, CMSAF Rodney J. McKinley, who helped conceive the walk, said the event marked his "second proudest day" in the Air Force because the walk honors enlisted heroes. (His proudest day was the dedication of the Air Force Memorial in Arlington, Va., in October 2006.)

The service has created a new ceremony under which newly minted airmen who have completed Lackland's basic military training program will walk across the new memorial.

### Airmen Receive Bronze Star Medals

A1C Antonio Antunez, a member of the 99th Security Forces Squadron at Nellis AFB, Nev., received a Bronze Star Medal with Valor Device Jan. 26 for his actions in Iraq, during which he saved the life of an interpreter while risking his own.

Also receiving Bronze Star Medals were: Maj. Dan Belden from Los Angeles AFB, Calif., for work in reconstituting the Iraqi Air Force; Capt. Andrew Scott, an Air Force ROTC instructor, for directing an air strike to aid Afghan troops and US Army trainers; and Capt. Pamela Tan of Eglin AFB, Fla., for her work in Iraq as an electronic warfare officer with an Army unit.

Other recipients were: TSgt. Patrick Ashford of Shaw AFB, S.C., for aiding a unit under attack in Iraq and TSgt.

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## Air Force Restarts TSAT Competition

Draft versions of the revised solicitation for the Air Force's Transformational Satellite Communications System program began circulating in late December and the service may be in a position to release the final solicitation around April, Gary E. Payton, deputy undersecretary of the Air Force for space programs, told reporters Jan. 16 in Washington, D.C.

Doing so would make it possible for the Air Force to award the highly anticipated \$11 billion contract early next year for the development of these next generation communications satellites, said Payton. Boeing and Lockheed Martin have been working under Air Force sponsorship to reduce the risk to critical technologies envisioned for these satellites.

The revised solicitation reflects the programmatic restructure directed by the Office of the Secretary of Defense in December in order to achieve first launch of a TSAT satellite in 2019, with each successive placement in orbit about a year apart. Among the changes being instituted, the initial Block 10 constellation of four satellites, plus one spare asset, will rely on Internet protocol routing for network management and moving data to deployed forces on the move.

Payton said the Air Force will let combat needs drive the schedule for when capabilities, such as laser and Ka-band communication links, are incorporated into later blocks.

TSAT satellites will represent a "huge step" in capability with their ability to provide wideband and secure communications down to the squad level of ground troops, Payton said. Tying disembodied soldiers to the US military's information-sharing networks is "absolutely pivotal" to future warfighting concepts, he said.

Payton emphasized that the Air Force remains committed to the TSAT program. In fact, it is allotted the largest share of the Air Force's military satellite communications budget in the service's forthcoming six-year spending plan that starts with Fiscal 2010, he said.

Overall, the program's total projected lifetime cost hovers between \$15 billion and \$20 billion.

James Thompson of Izmir, Turkey, for his force protection work in Iraq.

CMSgt. James Tauscher of Hickam AFB, Hawaii, received a Bronze Star Medal—awarded in May 2008—for his actions as a combat aviation advisor in Iraq.

## Rhode Island Eyes More Airmen

Rhode Island officials in January started a campaign to convince the Air Force to assign an active associate element of some 400 airmen to work with the Air National Guard's 143rd Airlift Wing at Quonset State Airport.

According to a Jan. 15 report by the *Providence Journal*, Gov. Donald L. Carcieri and state Air Guard officials are not only lobbying for the airmen but also for another four C-130J transports. The wing lost four of its 12 C-130s under BRAC 2005.

"We have just started to promote this," Carcieri told the newspaper. "This is highly competitive." But a Guard spokesman, Lt. Col. Denis J. Riel, told the *Journal* that Rhode Island is "on the short list" of the facilities where USAF wants to establish associate units.

**Up and Out:** A CV-22 Osprey from the 8th Special Operations Squadron at Hurlburt Field, Fla., swoops over the Florida coastline on a training mission in January. The crew practiced operating a hoist, used in rescues.

USAF photo by S/A. Jullienne Showalter





### Operation Iraqi Freedom—Iraq

#### Casualties

By Feb. 17, a total of 4,245 Americans had died in Operation Iraqi Freedom. The total includes 4,234 troops and 11 Department of Defense civilians. Of these deaths, 3,410 were killed in action with the enemy while 835 died in noncombat incidents.

There have been 31,035 troops wounded in action during Operation Iraqi Freedom. This number includes 17,370 who were wounded and returned to duty within 72 hours and 13,665 who were unable to return to duty quickly.

#### Iraqi Air Force, USAF Advisors Celebrate Training Milestone

Iraqi airmen and their USAF advisors celebrated a milestone for rebuilding the Iraqi Air Force on Jan. 14 when the IqAF's flying training squadron at Kirkuk Regional Air Base reached the 5,000 flying-hour mark.

The Iraqis, who are training with the help of USAF's 52nd Expeditionary Flying Training Squadron at Kirkuk, hit the mark when student pilot Lt. Hassan (the Iraqis often give only the first names of their pilots for security reasons) flew a regularly scheduled sortie in his Cessna 172 to practice basic flying patterns with another aircraft.

The Iraqi wing's pilots have seen remarkable success recently, said Lt. Col. Nathan Brauner, 52nd EFTS commander. The pilot trainees needed only 41 days to accumulate the last 1,000 flying hours, whereas it took the wing 177 days to amass the first 1,000 hours after its launch in late 2007.

Brauner said the training wing is rapidly expanding to its planned capacity of 130 students. For that, the wing needs to train about 40 Iraqi instructor pilots. As of mid-January, there were five Iraqi instructor pilots at the training wing and another six students were training to instruct classes.

Leading up to the January milestone, the size of the wing had doubled in the previous six months and saw its first graduating class.

### Operation Enduring Freedom—Afghanistan

#### Casualties

By Feb. 17, a total of 647 Americans had died in Operation Enduring Freedom. The total includes 646 troops and one Department of Defense civilian. Of these deaths, 428 were killed in action with the enemy while 219 died in noncombat incidents.

There have been 2,689 troops wounded in action during OEF. This number includes 949 who were wounded and returned to duty within 72 hours and 1,740 who were unable to return to duty quickly.

#### Combined Operations Strike at Taliban Networks and Leadership

Coalition forces killed two Taliban commanders and 19 militants during multiple operations Jan. 19 in eastern and southern Afghanistan, according to US and Air Force officials.

In Kapisa, forces killed Taliban commander Mullah Patang and 18 others during operations to disrupt the Taliban's network in the Tagab Valley, north of Kabul. Patang was responsible for several roadside bomb attacks and attacks on Afghan troops and civilians.

As coalition ground forces approached targeted compounds, groups of militants came out of nearby buildings and began to fire at the force with small arms and maneuver against them. Returning fire, coalition forces requested air support, which responded and prevented the militants' movement against the coalition troops. After neutralizing the enemy, coalition forces searched the targeted buildings, finding more than 20 AK-47s, grenades, and ammunition.

Near Kandahar, coalition forces killed a second Taliban commander, Mullah Abdul Rahim Akund, and another militant while targeting an improvised explosive device network. The Taliban commander was linked to efforts to plan and coordinate roadside bombings in the region.

#### North Lauds UAV Operators

Lt. Gen. Gary L. North, commander of Air Forces Central and commander of 9th Air Force at Shaw AFB, S.C.,

said Jan. 13 the airmen operating the service's MQ-1 Predator and MQ-9 Reaper unmanned aerial vehicles over Afghanistan and Iraq are "absolutely

incredible" and "writing history" with their exploits in supporting ground combat forces.

He made the comments during his visit that day to the 432nd Wing and its co-located 432nd Air Expeditionary Wing at Creech AFB, Nev., hub of Predator and Reaper operations.

"From my perspective, the airmen of the 432nd AEW are the finest in the world," said North, who said he has observed the work of these airmen both in Southwest Asia and now firsthand at Creech.

#### C-5 Flies With Synfuel

A C-5A transport with the Tennessee Air National Guard's 164th Airlift Wing at the Memphis Airport took to the skies in mid-January running for the first time on the synthetic fuel blend that the Air Force wants all of its aircraft cleared to operate by 2011.

During the first flight test on Jan. 13, only one of the aircraft's four General Electric TF-39 engines ran on the blend, which is a 50-50 mix of traditional JP-8 jet fuel and synthetic paraffinic kerosene. On the following day, this new fuel powered all four of the C-5A's engines.

So far, the Air Force has certified the B-1B, B-52H, and C-17 for full operations with this synthetic blend. The F-15, F-22, KC-135, and T-38 have also flown with it in tests.

#### First UFC Pilots Graduate

The first of the Air Force's newly minted undergraduate pilots selected to proceed to unmanned aerial vehicle cockpits rather than going immediately to follow-on manned aircraft training completed a four-week unmanned aircraft systems fundamentals course, or UFC, Dec. 22 at Randolph AFB, Tex.

During the training, the nine new pilots completed 100 hours of computer-based simulation and academic classes. They moved on to a two-week joint firepower course in late January at Nellis AFB, Nev., and then proceeded to actual UAV flight training at nearby Creech Air Force Base.

These pilots are part of a two-pronged effort by the Air Force to get more UAV operators faster. The other element is taking nonpilot officers and training them from scratch to pilot UAVs.

#### F-35 Test Aircraft Completed

Lockheed Martin rolled out the first weight-optimized F-35A test aircraft from its assembly plant at Fort Worth, Tex., on Dec. 19. This asset, designated AF-1, is "at its core, the same aircraft" that will enter operational service with the Air Force starting in 2010, the company said.



## Senior Staff Changes

**NOMINATION: To be Lieutenant General:** Michael C. Gould.

**CHANGES:** Brig. Gen. Mark A. **Barrett**, from Cmdr., 1st FW, ACC, Langley AFB, Va., to IG, ACC, Langley AFB, Va. ... Maj. Gen. David E. **Clary**, from Dir., Air Component Coordination Element, Multinational Force-Iraq, ACC, Baghdad, Iraq, to Spec. Asst. to the Cmdr., ACC, Langley AFB, Va. ... Brig. Gen. (sel.) Carlton D. **Everhart II**, from Dep. Dir., Intel. & Air, Space, & Info. Ops. for Flying Tng., AETC, Randolph AFB, Tex., to Dep. Cmdr., Political-Mil. Affairs, Combined Security Transition Command-Afghanistan, CENTCOM, Kabul, Afghanistan. ... Maj. Gen. Burton M. **Field**, from Vice Dir., Strat. Plans & Policy, Jt. Staff, Pentagon, to Sr. Mil. Asst. to the US Spec. Rep. for Afghanistan/Pakistan, Pentagon ... Lt. Gen. (sel.) Michael C. **Gould**, from Dir., Ops. & Plans, TRANSCOM, Scott AFB, Ill., to Supt., AF Academy, Colorado Springs, Colo. ... Maj. Gen. Stephen L. **Hoog**, from Cmdr., USAF Warfare Ctr., ACC, Nellis AFB, Nev., to Dep. Combined Forces Air Component Cmdr., CENTCOM, Al Udeid AB, Qatar ... Brig. Gen. Stanley T. **Kresge**, from Dir., Air, Space, & Info. Ops., AFSPC, Peterson AFB, Colo., to Cmdr., USAF Warfare Ctr., ACC, Nellis AFB, Nev. ... Maj. Gen. Darren W. **McDew**, from Dir., Public Affairs, OSAF, Pentagon, to Vice Dir., Strat. Plans & Policy, Jt. Staff, Pentagon ... Brig. Gen. (sel.) Michael W. **Miller**, from Sr. Exec. & Dir. of Staff, Office of the Surgeon General, USAF, Pentagon, to Asst. Surgeon General for Medical Plans & Prgms., USAF, Bolling AFB, D.C. ... Maj. Gen. Stephen P. **Mueller**, from Dir., Operational Capability Rqmts., DCS, Ops, Plans, & Rqmts., USAF, Pentagon, to Dir., Air Component Coordination Element, ACC, Kabul, Afghanistan ... Brig. Gen. John D. **Posner**, from Dir., AF Smart Ops. 21, OSAF, Pentagon, to Dep. Cmdr., Combined Air Ops. Ctr. 7, Component Command-Air Izmir, Allied Command Ops. (NATO), Larissa, Greece ... Maj. Gen. Douglas L. **Raaberg**, from Dep. Combined Forces Air Component Cmdr., CENTCOM, Al Udeid AB, Qatar, to Spec. Asst. to the Cmdr., ACC, Langley AFB, Va. ... Brig. Gen. Joseph **Reynes Jr.**, from IG, ACC, Langley AFB, Va., to Dir., Air Component Coordination Element, Multinational Force-Iraq, ACC, Baghdad, Iraq ... Maj. Gen. David J. **Scott**, from Dep. Cmdr., Combined Air Ops. Ctr. 7, Component Command-Air Izmir, Allied Command Ops. (NATO), Larissa, Greece, to Dir., Operational Capability Rqmts., DCS, Ops., Plans, & Rqmts., Pentagon ... Brig. Gen. Lyn D. **Sherlock**, from Dir., Air Ops., & Tng., DCS, Ops., Plans, & Rqmts., USAF, Pentagon, to Dir., Regional Affairs, Office of the Dep. Undersecretary of the AF (Intl. Affairs), USAF, Pentagon ... Brig. Gen. John F. **Thompson**, from C/S, AFMC, Wright-Patterson AFB, Ohio, to Cmdr., 303rd Aeronautical Sys. Wg., ASC, AFMC, Wright-Patterson AFB, Ohio ... Brig. Gen. Gregory J. **Touhill**, from Cmdr., 81st Tng. Wg. AETC, Keesler AFB, Miss., to Chief, Office of Mil. Cooperation, US Embassy, CENTCOM, Kuwait ... Brig. Gen. Tod D. **Wolters**, from Dep. Cmdr., Political-Mil. Affairs, Combined Security Transition Command-Afghanistan, CENTCOM, Kabul, Afghanistan, to Dir., Air, Space, & Info. Ops., AFSPC, Peterson AFB, Colo. ... Maj. Gen. Mark R. **Zamzow**, from DCS, Strat. Communications, Multinational Force-Iraq, CENTCOM, Baghdad, Iraq, to Spec. Asst. to the Cmdr., 3rd AF, USAFE, RAF, Mildenhall, UK.

**SES RETIREMENTS:** Judy A. **Stokley**, Mary L. **Walker**.

**SES CHANGES:** James W. **Cluck**, to Dep. for Acq., SOCOM, MacDill AFB, Fla. ... Charles R. **Henderson**, to Dep. Asst. C/S, Strat. Deterrence & Nuclear Integration, USAF, Pentagon ... John R. **Sammartino**, to Dep. Dir., Business Plans & Ops. Directorate, Office of Contracts, NRO, AFSPC, Chantilly, Va. ... L. Bruce **Simpson**, to Dep. PEO for Weapons & Exec. Dir., Air Armament Ctr., AFMC, Eglin AFB, Fla. ■

USAF photo by Lt. Col. Tyeshi Tung



**Round-Trips:** Airmen from the 931st Air Refueling Group load sick and wounded troops onto a KC-135 Stratotanker at Bagram Airfield, Afghanistan. The airmen volunteered for a 12-day aeromedical evacuation mission that took them on four round-trips between Germany and Afghanistan.

Unlike AA-1, the first F-35A test aircraft, AF-1 is structurally identical to future operational F-35s. While AA-1 has a production-representative external shape and internal systems, its internal structure was designed before a 2004 weight-savings initiative that resulted in structural revisions.

The rollout of AF-1 came two days after the completion of AG-1, a full-scale nonflying, static F-35A test article that will be used in ground tests. On Jan. 21, Lockheed Martin completed BF-4, the first F-35B test aircraft with a full mission systems suite.

### Nuke Warehouse Completed

The Air Force finished renovating a 48,000-square-foot warehouse on the grounds of Hill AFB, Utah, at the end of last year for storage of the service's nuclear weapons-related materials, and began moving the materials into the facility in January.

The Air Force Nuclear Weapons Center at Kirtland AFB, N.M., USAF's lead organization for nuclear weapons sustainment, will oversee the warehouse, which was formerly owned and operated by the Defense Logistics Agency.

The Air Force is assuming oversight of its NWRM from the DLA and consolidating them at the warehouse as part of the many changes that it is making to improve its nuclear stewardship. These materials are mostly related to the nation's Minuteman III ICBMs but also go with other USAF nuclear systems.

### Montana ANG Makes Switch

The Montana Air National Guard's 120th Fighter Wing at Great Falls Airport conducted its first F-15 Eagle sortie Jan. 15, Great Falls' KRTV news reported.

The unit began replacing its F-16s with F-15s last year, courtesy of BRAC 2005, and expects to have all 18 of its Eagles in place before the end of 2009, said wing spokesman Maj. Rick Anderson.

Unit pilots are spending about five months making the transition from the smaller air-to-ground F-16s to the larger air-to-air F-15s.

### Final WGS Satellite Funded

Boeing announced Jan. 15 that it has received full funding for the Air Force's sixth Wideband Global SATCOM satellite. The money came via a final installment by Australia of \$234 million.

Australia joined the WGS program in November 2007, receiving access to WGS communications services worldwide for the Australian Defense Force in exchange for funding the sixth



## Fighter, Bomber Readiness Rates in Serious Decline

The high pace of operations, coupled with increasing aircraft age, is taking its toll on USAF's fighter and bomber readiness. Service data show a decline in mission-capable rates over the past five years.

According to DOD, the designation "mission-capable"—or MC—means an aircraft is in sufficiently good condition to perform at least one, and potentially all, of its designated missions. The MC rate refers to the percent of a fleet that is in this condition.

The MC rate for USAF fighters reached a recent peak in 2005, at 77.5 percent and has been declining at the rate of about one percentage point per year. It now stands at 72.1 percent, according to the data, which run into late 2008.

The MC rate for bombers peaked in 2004 at 70.3 percent, but has declined more steeply and now sits at 58.2 percent.

MC rates alone do not tell the whole story on platform availability. Indeed, the situation is worse than it appears. When one factors in the fighters and bombers that are in depot for routine overhauls, availability numbers fall precipitously.

For example, using that criterion, the fighter availability rate is now about 58.9 percent, down from a recent high of 69.2 percent in Fiscal 2005. And only 44.8 percent of the bomber fleet is ready to go now at any time, down from a peak of 57.2 percent in Fiscal 2002. In fact, the worst availability rate of any platform belongs to the B-2A stealth bomber, which is available for combat now only 36.8 percent of any given time.

On an up note, the airlift MC rate climbed to about 75 percent in Fiscal 2001 and has hovered between 73 and 75 percent ever since. And the trend for intelligence-surveillance-reconnaissance platforms, including unmanned aerial vehicles, has risen steadily, from 70.8 percent in 2000 to 84.3 percent today.

Even the MC rate for KC-135s, which are among the oldest aircraft in service, has improved since 2000, when it was 71.1 percent, and now stands at 79.7 percent.

The MQ-1 Predator UAV is USAF's most available platform, ready to go 80.6 percent of the time.

satellite, which is the final spacecraft under USAF's current program of record.

The first WGS satellite began operational service in April 2008. Its capabilities have "substantially exceeded the warfighter's expectations," the Air Force said. The second satellite is set for launch later this month from Cape Canaveral AFS, Fla.

### First F-35 Pilots Tapped

The Air Force announced in late January that it selected Lt. Col. Stephen Pieper and Maj. Chad Lewis, two F-16 pilots stationed at Luke AFB, Ariz., as members of its initial cadre of pilots to transition to the new F-35 Lightning II stealth fighter.

These two pilots will serve as the first F-35 instructor pilots, along with eight additional airmen, to train the next group of instructors. The Air Force plans to buy more than 1,700 F-35s and will draw its initial group of pilots from its A-10, F-15E, and F-16 communities.

A delegation of Arizona state and local representatives came forward in December to lobby for Luke to host an F-35 training schoolhouse at some future point.

### Holloman Builds Up F-22s

Four F-22s arrived at their new home of Holloman AFB, N.M., in mid-December, giving the 49th Fighter Wing six of the 40 F-22s that will eventually be based there.



**Tapping Diagnostics:** A1C Aaron Tate, assigned to the 27th Fighter Squadron based at Langley AFB, Va., uses a portable maintenance aid to run a check on an F-22 Raptor at Kadena AB, Japan. Maintainers can plug the new laptop computer-like devices into aircraft and review oil and fuel levels, diagnose problems, and perform auxiliary power unit ground operations.

The wing's 7th Fighter Squadron and 8th FS will each get 20 F-22s. The 7th FS, first to get its full complement, is expected to be declared ready for operations by Nov. 1.

Meanwhile, Air Force Reserve Command's 301st Fighter Wing, Det. 1, continues to expand at Holloman with the goal of transforming itself into the 44th Fighter Group later this year to work side by side with the active duty 49th FW in operating and maintaining the F-22s.

### Range Changes Get Scrutiny

Maine Gov. John E. Baldacci said Jan. 7 his state's Air National Guard had received "verbal confirmation" that the Air Force would conduct a full environmental impact assessment of the Air Guard's plan to expand fighter aircraft training in the Condor Military Operation Area, which includes airspace in Maine. He also said he asked for written confirmation.

The Air Guard seeks to increase the portion of Condor in which Massachusetts and Vermont F-15 and F-16 Air Guard units may fly at altitudes as low as 500 feet to train in countering cruise missile or small airplane attacks.

Baldacci has been critical of the Air Guard's intent to press on with the changes without a full environmental impact study, saying he is not certain the Condor range "is the only space [where] such training can be done."

### More SBIRS Satellites Planned

The Air Force announced in mid-December that it intends to procure a fifth and sixth Space Based Infrared System satellite next decade from manufacturer Lockheed Martin for early warning of missile launches from positions in geosynchronous Earth orbit.





**Live Inspection:** Capt. Patrick Applegate inspects the M117 ordnance on a B-52 Stratofortress at Andersen AFB, Guam. The B-52 and Applegate were participating in a live-drop mission as part of Tropic Fury. The exercise trains aircrews on the use of different missile weapon systems.

While “no firm decisions” have been made yet on how to fund these two spacecraft, designated GEO-5 and GEO-6, the Air Force said it is building its initial budget estimates assuming that the satellites would be “c ones” of the preceding pair (GEO-3 and GEO-4), meaning that any changes would be driven solely by parts obsolescence. Under notional schedules, the service

plans to award the contract for these two satellites around Fiscal 2011 for launch in Fiscal 2017 and Fiscal 2018, respectively. The first SBIRS satellite, GEO-1 is scheduled for launch in Fiscal 2010.

#### World War II Airman Gets His DFC

The Air Force on Jan. 29 rectified a 65-year-old clerical error by presenting

a Distinguished Flying Cross to former Army Air Forces 1st Lt. Joseph Moser, 87, at an awards ceremony at McChord AFB, Wash.

Moser, who flew P-38s with the 474th Fighter Group, earned the DFC for a “highly successful bombing mission over a heavily fortified target on July 30, 1944,” according to a Jan. 26 McChord release.

But two weeks after that mission, he was shot down over Germany and held as a prisoner of war. The AAF misplaced the DFC paperwork and Moser never learned of the award until the early 1990s when he read a squadron diary.

#### Korean War Ace Dies

Retired Air Force Col. Ralph D. Gibson, 84, who shot down five enemy fighters during the Korean War, died Jan. 2 as the result of an accidental fall in Tucson, Ariz., where he lived.

Gibson, born in Keensburg, Ill., and raised in nearby Mt. Carmel, joined the Army Air Forces in 1943 and graduated from flying school the following year, but did not see combat in World War II. He later trained in jet aircraft, flying the F-86 Sabre with the 4th Fighter Interceptor Wing during the Korean War, where he scored his five victories over MiG-15s.

From 1961 to 1962, Gibson led the Thunderbirds air demonstration squadron. He later commanded the 433rd Tactical Fighter Squadron during the Vietnam War, flying 105 combat missions in the F-4 Phantom. ■

## News Notes

■ The Air Force Research Laboratory announced in mid-January that the launch of the Tactical Satellite-3 would not occur until later this year due to the need to resolve an issue with the experimental spacecraft’s avionics.

■ A C-17 from the 315th Airlift Wing at Charleston AFB, S.C., was damaged on Dec. 23 at Kandahar Air Field, Afghanistan, when it departed the hard surface of the runway at about 6:20 a.m. local time, Air Forces Central said. Another Charleston C-17 was damaged the following month during a Jan. 30 “wheels up” landing at Afghanistan’s Bagram Airfield.

■ MSgt. Terence Jackson, a KC-10 flight engineer with the 305th Air Mobility Wing at McGuire AFB, N.J., surpassed 10,000 flight hours on Jan. 23 during his deployment to the 908th Expeditionary Air Refueling Squadron covering Southwest Asia operations.

■ The “Warrior Airmen” exhibit opened Jan. 12 at the National Museum of the US Air Force in Dayton, Ohio. It highlights the contributions of airmen

to the Global War on Terror, both in the air and on the ground.

■ Maj. Jon Williams, an air battle manager on E-3 Airborne Warning and Control System aircraft from Tinker AFB, Okla., surpassed 8,760 flight hours—the equivalent of one full year airborne—during a Jan. 15 mission over Southwest Asia.

■ A C-130 transport crashed shortly after takeoff near Baghdad Airport, Iraq, on June 27, 2008, due to the stall of three of its four engines while the pilot was reacting “in accordance with applicable directives” to a defensive system alert, Air Force accident investigators reported in January.

■ Rolls-Royce announced Jan. 12 that its LibertyWorks advanced research shop in Indianapolis successfully completed the initial test of the YJ102R high-Mach propulsion system that it is developing under the Air Force-DARPA High Speed Turbine Engine Demonstration, or HiSTED, program.

■ SrA. Victoria Drefs, a technician with the 376th Expeditionary Logis-

tics Readiness Squadron’s Petroleum, Oils, and Lubricants Flight, on Dec. 26 reached the milestone of pumping two million gallons of fuel into KC-135 tankers during her four-month deployment to Manas AB, Kyrgyzstan.

■ The Air Force is sponsoring the No. 43 car for a new NASCAR Sprint Cup team that Gillett Evernham Motorsports and famed driver Richard Petty of Petty Holdings are forming for the 2009 racing season. The Air Force will use the car as a recruiting tool.

■ The first E-8C Joint Surveillance Target Attack Radar System aircraft fitted with new Pratt & Whitney JT-8D-219 engines made its maiden flight Dec. 20 from lead contractor Northrop Grumman’s facility in Melbourne, Fla. This flight began military air worthiness certification testing of the engines.

■ The Air Force debuted a career badge for the new 38F Force Support Air Force specialty code in December. The new code incorporates services with the previously merged personnel and manpower career fields. ■





**FACT: COMBAT PROVEN, PRODUCTION READY.**

The search and rescue mission of the U.S. Air Force is a high priority. And the HH-47 is most ready to respond. With a low-risk, hot production line and high commonality with combat-proven state-of-the-art H-47 platforms, the HH-47 best meets Air Force requirements. The warfighter needs the HH-47. When the mission is saving lives, there's not a minute to lose.

 **BOEING**



## When Airpower Kills Civilians

**C**ivilian casualties are endemic to war. In World War I, death claimed not only 8.5 million troops but also some 13 million noncombatants. Disease and starvation dominated. Still, many were killed by military forces—unintentionally or by design.

The problem, on a much smaller scale, is present in the war with the Taliban and al Qaeda. Take, for instance, two lethal air strikes in Pakistan launched three days after the inauguration of President Obama. The Jan. 23 attacks, carried out by Predator drones, killed 22 persons. These reportedly included numerous terrorists, but civilians also died. This generated outrage in Pakistan.

Civilian deaths in war are unfortunate but probably unavoidable. Now that Obama is pondering the commitment of 30,000 more troops to Afghanistan, more civilians may become accidental victims in the war. Deaths caused by air strikes generate the most attention, and there are frequent calls for the US to stop these attacks.

This creates a dilemma. Washington cannot bow to extreme calls for a total halt to air strikes. Nor can it escape their consequences. To defeat the Taliban and al Qaeda, the US needs assistance from the populations of Afghanistan and Pakistan. Civilian deaths undercut that support.

One should note, up front, that the champion civilian-killer is the Taliban. The enemy wears civilian clothing, hides among civilians, and pretends to be civilian to gain a military advantage. The Taliban uses "human shields," seeking civilian deaths for propaganda purposes.

Human Rights Watch, in a recent study, said at least 3,102 Afghan civilians died in "fighting related to the armed conflict" between 2006 and mid-2008. Of those, at least 2,016—two thirds—died in insurgent attacks such as suicide bombings that often directly target innocent civilians.

The civilian deaths by air strike would end today if the Taliban and al Qaeda laid down their weapons. If NATO and the US went home, however, the killings at the terrorists' hands would continue.

Yet none of that matters when large numbers of civilians die in a high-profile air event, such as the NATO attack last July that killed 47 members of an Afghan wedding party.

The Human Rights Watch study said Afghan civilian deaths from air attacks totaled 116 in 2006, 321 in 2007, and 119 in the first seven months of 2008. These fatality numbers more or less track with USAF attack data, which show US and NATO forces dropped 1,770 bombs in 2006, 3,572 in 2007, and 3,369 in 2008.

Not all air attacks are equal. Planned attacks on predetermined targets are not the problem. HRW found "civilian casualties rarely occur during planned air strikes on suspected Taliban targets." Indeed, there is only believed to be one such attack that led to civilian deaths in 2006 and one in 2007.

USAF minimizes the danger to civilians by tracking Taliban leaders and studying their habits, allowing targeters to attack at opportune moments with minimal firepower and great precision.

The real problem arises when there is no time for meticulous planning. Most often, this happens when an American or NATO ground force finds itself in an unexpected firefight and calls on airpower to bail it out.

### Air Strikes Up in Afghanistan

Southwest Asia Airpower Statistics (as of Dec. 31, 2008)

	2004	2005	2006	2007	2008
Type of Sortie					
DEF CAS Sorties	6,495	7,421	10,519	13,965	19,603
DEF Munitions Dropped	86	176	1,770	3,572	3,369

DEF= Operation Enduring Freedom in Afghanistan

(Beginning in 2006, DEF includes NATO's International Security Assistance Force)

Source: 2004-08 Combined Force Air Component Commander Airpower Statistics

*The number of close air support sorties in Afghanistan has steadily increased from year to year. Last year, US, coalition, and NATO airmen dropped nearly eight times the number of weapons in Afghanistan than in Iraq.*

These are the "troops-in-contact" dustups. "High civilian loss of life," said Human Rights Watch, "almost always occurred during the fluid, rapid-response strikes ... carried out in support of ground troops after they came under insurgent attack."

Such unplanned strikes include situations where small special operations teams are ambushed, US or NATO forces are pursuing an enemy that has retreated into a village after a battle, or when ground forces call in airpower for "anticipatory self-defense" attacks to defeat an imminent threat from the Taliban or al Qaeda.

The stress and confusion of a running battle greatly increase the odds that civilians will inadvertently find themselves in the middle of an exchange. "Civilian casualties increase when forces on the ground do not have a clear picture of the location and number of combatants and civilians in an area," noted HRW. The Taliban's propensity to disguise itself as civilians contributes to this problem, as fleeing civilians are easy to mistake for retreating terrorists. And the fact that much of Afghanistan's population is armed doesn't make it easy to distinguish threats.

When airmen have time to prepare a strike, collateral damage is low. When an attack is ordered on the spur of the moment, collateral damage is often very high.

Still, troops-in-contact situations are vitally important. When ground forces are ambushed, surrounded, outnumbered, or outgunned, timely air support often means the difference between life and death.

Which brings us to the current expansion of ground forces in Afghanistan. Army Maj. Gen. Michael S. Tucker, deputy commander of NATO forces in Afghanistan, recently told *USA Today*: "If we got more boots on the ground, we would not have to rely as much" on air strikes.

The evidence, however, points to the exact opposite conclusion. More ground forces will bring more operations, more operations will bring more troops-in-contact situations, and more TIC situations will bring more unplanned, last-minute, emergency air strikes.

The outcome is regrettably predictable. ■

**More information:** <http://www.hrw.org/reports/2008/09/08/troops-contact-0>



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# THE CYBER MENACE

The world has yet to see all-out cyber-war, but it's getting closer.



By Rebecca Grant

It was a milestone in the short but nasty history of cyber-war. In November, Washington suffered from a severe, painful, and widespread attack on the Pentagon's most sensitive computers. The most worrisome aspect was evidence that the attack had official Russian state origins.

Defense officials said the strike damaged networks in US Central Command, overseer of US wars in Iraq and Afghanistan, and affected vital computers

in combat zones. Moreover, the attack penetrated at least one highly protected and classified DOD network, according to published reports.

"This one was significant; this one got our attention," a defense official told the *Los Angeles Times*.

The world has yet to see an all-out, no-kidding cyber-war, but the skirmishes are growing larger, and more numerous, a fact that does not go unnoticed in US security circles.

Russia, which has picked around the edges of DOD cyber systems for years, may finally have done it. Several intelligence sources say there is evidence of Russian government involvement, making this the first time a major cyber power has successfully invaded classified US military networks.

The specific threat in this incident was "agent.btz," a computer worm. Computer experts have reported that agent.btz can allow attackers remotely



to take control of computers and rifle their files. The infection spreads via removable disk such as a flash drive. Knowing this, DOD banned the use of external computer drives—a drastic move.

USAF's Chief of Staff, Gen. Norton A. Schwartz, received a specialized briefing about the attack. Officers at the Air Force Network Operations Center outlined efforts to halt the spread of the agent.btz worm and protect military computers.

Events in 2008 have made it only too clear that cyber threats have become everyday dangers. Leaders of USAF and other government bodies have moved from merely ruminating about threats in cyberspace to treating them as real and present dangers, especially regarding potential effects on US military forces.

Call 2008 the year that cyberspace—its vulnerability, its defense, and its exploitation—passed the point of no return as a major issue for national security officials. International events and the confluence of several major government moves drove the subject of cyberspace higher up the list of priorities.

Overseas, the August 2008 conflict between Russia and the small neighboring state of Georgia included a wave

of Russian cyber assaults directed against the government of Georgia; civilian computer experts had to step in to restore services.

### Attack of the "Botnets"

With cyberspace, the challenges are large and onerous. They range from mastering the forensic tasks of attack attribution all the way to much broader questions about proportionality of response and legitimacy of certain targets.

Even before the agent.btz attack last November, there had been a string of foreign-origin attacks on networks at the State, Commerce, and Homeland Security departments, as well as on the Pentagon.

As last year's Russian attack on DOD systems illustrated, cyber peers are already here. Most agree on the need for strong, offensive cyber options. The steady drumbeat of attacks on US systems underlines the point.

The potential threats are difficult to characterize. Said Michael G. Vickers, assistant secretary of defense for special operations, low-intensity conflict, and interdependent capability: "Nation states and nonstate actors continued to seek ways and means to counter the advantages we obtain from our use of information and to turn those same ad-

vantages against us in both conventional and unconventional ways."

Air Force Gen. Kevin P. Chilton, commander of US Strategic Command, speaking with Pentagon reporters in Washington, D.C., expressed growing concern from a military standpoint. "I firmly believe we'll be attacked in that domain," said Chilton. "Our challenge will be to continue to operate in that domain."

Chilton later said: "The kind of attack that you would worry about is [what] we saw in Estonia [in April 2007]—a denial-of-service attack, where they flood the system with so many e-mail 'botnets' you don't shut the system down, but you slow it down to the point that it's unusable."

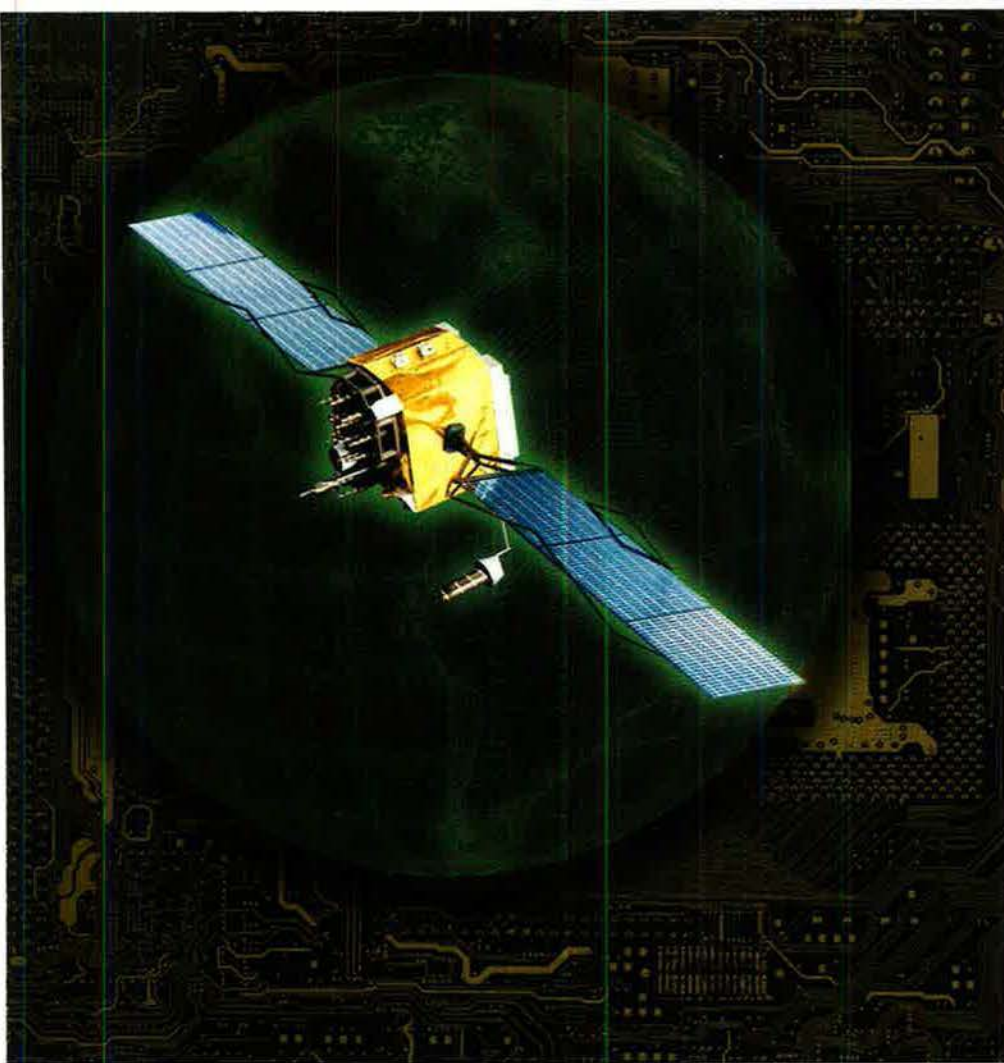
Russia is not the only problem. China is also on the move. There, cyberspace operations already have been incorporated into a sophisticated "layered" national defense strategy, the point of which is to confuse Taiwan's military reactions to any Chinese aggression and to slow down the anticipated deployment of US forces in response.

*Airmen and other Air Force cyber personnel are briefed at USAF's Global Cyberspace Integration Center at Langley AFB, Va.*



USAF photo by Amelie Dennell





Staff illustration by Zaur Elyenbekov

Lt. Gen. David A. Deptula, USAF's deputy chief of staff for intelligence, surveillance, and reconnaissance, had this to say: "In terms of computer network operations, the PRC remains the greatest state-sponsored threat." Deptula went on to call attention to China's proliferating abilities to deny, degrade, and disrupt cyberspace operations, labeling it a "major threat" to joint force operations.

The greatest nightmare for the US is that of an intrusion by a software program able to reach command and control or early warning systems. The November attack did not appear to reach that level, but its success was still worrisome.

At home, Washington launched a multistep program to put cyber security on a more urgent footing. President Bush in early 2008 signed a directive expanding Intelligence Community powers to monitor Internet traffic and repel mounting attacks on federal government computer systems.

The classified memorandum—National Security Presidential Directive 54/Homeland Security Presidential Directive 23—applies to several agen-

cies, including the Department of Homeland Security and the National Security Agency. It authorized a new task force, headed by the director of national intelligence, which now manages US efforts to identify the source of cyber-attacks against government systems. DHS will work to protect the computer systems; the Pentagon will prepare plans for counterattacks.

### A Big Change of Course

The approval of the combined NSPD/HSPD marked the most far-reaching effort to date by the United States government to neutralize threats in cyberspace. Meanwhile, the Air Force and Navy both tightened their focus on cyberspace with key organizational changes to cyberspace commands, while NATO stood up a cyber response organization.

The shock of the cyber-attacks' scope and magnitude was a point of consensus among top government officials.

With threats on the rise, the Air Force and the wider defense, intelligence, and security community spent much of the past year juggling how they will

organize to meet cyber challenges. A series of major reviews, international events, and a big change of course for the Air Force shook out more details of this new warfighting domain.

Concluded a February 2008 report of the Defense Department's inspector general: "DOD mission-critical systems may not be able to sustain warfighter operations during a disruptive or catastrophic event."

"The most important conclusion we reached is that credible offensive capabilities are necessary to deter potential attackers," testified James A. Lewis, lead author of a new report on cyberspace for President Obama.

The task of coping with cyberspace attacks never ends. As a result, the cyber defense mission is less about stopping cyber-attacks than it is about configuring and training national military forces to be able to fight through them.

Chilton has said that the US needs to be able to operate, defend, and attack in the domain, and also across various domains.

For the Air Force in particular, this crucial domain is a source of opportunity and vulnerability. USAF is the quintessential "net-centric" force. What that means, in practical terms, is that virtually all data and information of value pass at some point through cyberspace.

Brig. Gen. Mark O. Schissler, director for cyber operations on the Air Staff, explained that cyber was a bit like electricity. "Many assume it's always available," he said by way of comparison. "I assume we'll have to work to have it."

The constellation of cyber capabilities is too important—and too tempting a military target—for the Air Force ever to take it for granted. "It's not if we'll be attacked, it's if we'll be prepared for the attack," said Schissler.

With that and other operational imperatives in mind, USAF had planned to stand up in late 2008 a new major command responsible for cyber operations and defense.

Yet the service was in for a big course correction. In August 2008, Schwartz, the new USAF Chief of Staff, put that plan on indefinite hold. "Transfers of manpower and resources, including activation and reassignment of units, shall be halted," a memo from USAF headquarters stated.

There were a number of motives for the stop order. First, the Air Force's





**DOD conducts both offensive and defensive network warfare operations at the National Security Agency at Ft. Meade, Md.**

efforts to consolidate its extensive cyberspace units and budgets generated pushback almost from the start. Some in other service branches derided the planned stand-up of Air Force Cyber Command as a power grab by the Air Force.

The move toward a major command was controversial within the service, too. Indeed, the internal debate over the best way to structure cyber organizations had a bit of a history.

In 1999, for example, USAF seriously considered standing up a numbered air force to present cyber and information operations as a combat unit. "You go to war with a NAF, not a major command," noted one general who was involved in the decisions then.

That logic remained compelling to many. In fact, according to Schissler, forging a numbered air force was one of the original options presented by the Secretary of the Air Force Cyberspace Task Force in 2006. Many cyber planners remained convinced a NAF was the best way for the Air Force to go.

The Air Force's cyber plans have been "largely misunderstood," said Schissler, who characterized the strategy of then-Secretary of the Air Force Michael W. Wynne as "a wake-up call, not a takeover."

Gordon England, the recently departed deputy secretary of defense,

spelled out a broad Pentagon view in a May 2008 memo. It stated: "Because all combatant commands, military departments, and other defense components need the ability to operate unhindered in cyberspace, the domain does not fall within the purview of any one particular department or component."

At the Corona conference in fall 2008, the Air Force put the cyber mission back on track toward the numbered air force solution. Under the new plan, USAF will stand up the new 24th Air Force under Air Force Space Command in mid-2009.

### Natural Fit

This NAF thus will become the Air Force's cyber combat element. It will combine network operations as well as offensive and defensive cyberspace capabilities for presentation to the joint warfighter, US Strategic Command.

Although this decision was announced at about the same time as USAF's choice to create the new MAJCOM-level Air Force Global Strike Command, the decisions were actually unrelated.

Among the key elements that will move under 24th Air Force are the existing 67th Network Warfare Wing and the Air Force Information Operations Center, both located at Lackland AFB, Tex. The two units currently fall under 8th Air Force, which is part of Air Combat Command. When those

units become part of the new 24th Air Force, however, they will align under Space Command.

While the stand-up of 24th Air Force tracks with earlier thinking, the choice of Air Force Space Command as the home for cyber is an about-face on how to manage the new domain.

Previously, some worried that linking cyber to space would blur the budget authority and career path for cyber-warriors. The old decision to tuck cyber into Air Combat Command reflected those concerns.

In 2007, Gen. Ronald E. Keys, then commander of ACC, explained the logic of keeping cyber within the combat command. "There's a dynamic in Washington, when you have something new [like Cyber Command]: Either they will stiff you, or they will run with you because they think there's money they can get from you," he said. "So we have hooked all the cyber/Internet systems into Air Combat Command."

Missionwise, the cyber world may have a more logical connection with Space Command, however. "It's a natural fit," commented Schissler.

As many as 8,000 airmen will become part of 24th Air Force. Many of these are in place at other organizations, and Air Force units host cyber specialists from other organizations. The Air Force has announced six possible locations for the headquarters of 24th Air Force. A final decision is expected by June, an Air Force news release said.

Schissler also envisions a big role for Guard and Reserve forces. "They have remarkable capabilities and potential," he said. Many Guardsmen and Reservists work in private-sector information technology positions. Meanwhile, many of the nation's Total Force units are slated to lose their traditional flying missions.

Other parts of the cyber bureaucracy were in motion, too. Two particular changes were aimed at strengthening cyber security by recasting the battlespace.

The first focused on the Department of Homeland Security. The second involved the agency at the core of US cyberspace missions: the National Security Agency, home of elite cryptologists and those most skilled in offensive and defensive operations.

January 2008 brought a new Comprehensive National Cyber Security Initiative (CNCI). It wasn't exactly





Staff illustration by Zaur Eylanbekov

unveiled, as the initiative is classified, but some of its content seeped out in appropriations discussions and other settings.

Released on Jan. 8, 2008, the classified, joint directive reportedly authorized a 12-step program to improve the overall security situation. The steps took aim at everything from intrusion detection and trusted Internet connections to classified network security and global supply chain security.

The CNCI also tasked NSA to monitor all federal networks to improve cyber intrusion detection. Those not complying could have their access turned off.

Early in 2009 came word of another decision with great significance for cyber warfare. This was the move to put the NSA director in charge of US Strategic Command's Joint Task Force for Global Network Operations.

For many years, a network warfare component has resided within the supersecret cryptological agency based at Ft. Meade, Md. This component has focused mostly on defense of national networks from intrusion and exploitation. Personnel from various armed

services work at NSA in cyber warfare roles. The Air Force, in particular, has a large number of cyber specialists working there within that component.

What's new is the formal assignment of both offensive and defensive cyber roles to a component at NSA.

The Air Force's Schissler observed that this new national arrangement is actually building on a proven pattern: It mirrors the organizational concept embodied in the Air Force's 67th Network Warfare Wing, in that it puts "the main exploiters" and the "main defenders" together under one roof.

#### Determining Attribution

Outsiders cannot tell at present exactly what NSA will do with this authority. Schissler said one prospect was for NSA to create a national cyber center resembling the National Counterterrorism Center, a multiagency organization within the Office of the Director of National Intelligence.

In Schissler's view, the goal would be to forge a single, joint monitoring center combining the intelligence, military, homeland security, and law enforcement cyber specialists. It could also serve as a command post for offensive and defensive cyber options. With the current fragmented system, Schissler noted, "we make it work," but it's not easy.

Many think the United States needs to do more to develop an offensive cyber-war capability rather than just focus on defending its networks from attack.

Yet the concept of military campaigns in cyberspace is still hung up on the issue of attack attribution.

"We have a tremendous amount of trouble determining attribution: ... where an attack actually came from, who was responsible, who might have been behind that computer," former White House cyber security official Paul Kurtz told the House Intelligence Committee in recent testimony. "And we have a very, very long way to go on that. Until we start to get clarity in that piece, it's going to be very difficult to contemplate the military option, of responding appropriately."

Schissler confirmed the difficulties of knowing "who in a country has attacked you." Any peer is likely to have strong network capabilities, he said, and "our most dangerous opponents are the militaries and intelligence services of foreign governments."

One thing is certain: The services will continue to provide a large share of the personnel dedicated to cyberspace. "Secretary of Defense [Robert M.] Gates has told us to fill all the seats" at joint cyber schoolhouses, noted Schissler.

Cyberspace still is not part of DOD Directive 5100.1, an omnibus document covering official department responsibilities and authorities. Thus, neither the Air Force nor any other service has a special claim on it. Yet it is the services that have recognized their dependence on the cyber domain and set out to organize, train, and equip forces for cyber operations.

The way is wide open for someone to step forward and give shape to the new challenge. Said Schissler, "It's a Billy Mitchell moment." ■

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*Rebecca Grant is a senior fellow of the Lexington Institute and president of IRIS Independent Research. She has written extensively on airpower and serves as director, Mitchell Institute, for AFA. Her most recent article for Air Force Magazine was "The Murky Future of Stealth," which appeared in the February issue.*

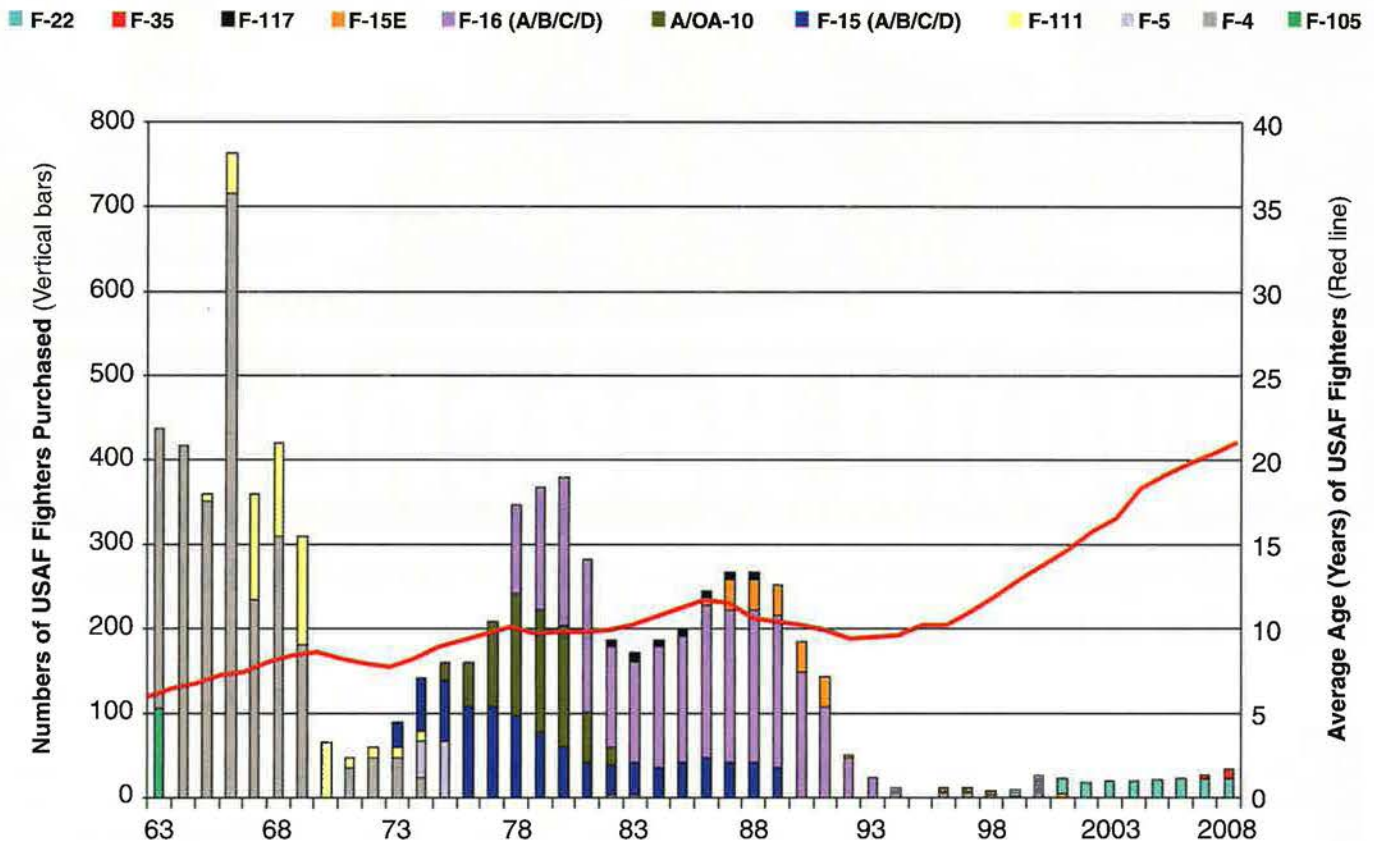


## Desolation Row

If you want to know why USAF fighters are so old, look no further. In the '60s, '70s, and '80s, fighter purchases (vertical bars) generally oscillated between 150 and 400 a year. Turnover was heavy, so average age (red line) hovered around 10 years. Then, in 1992,

came the crash. Fighter purchases fell to almost nothing and have stayed in that desolate spot through three Presidencies. With no replacements, fighters have stayed in service, growing long in the tooth. The average fighter is now an unprecedented 21 years old.

### Air Force Fighters: Dwindling Purchases, Rising Age



Basic Data: US Air Force





# Beyond Reachback

**New ISR systems and techniques put awesome intel at the fingertips of practically any warfighter.**

By John A. Tirpak, Executive Editor

**F**or much of the past decade, the Air Force employed a concept termed “reachback.” A commander in the field would “reach back”—electronically, of course—to US-based offices for vital information. This entailed tapping Stateside intelligence experts thousands of miles from a war zone.

Simply put, intelligence-surveillance-reconnaissance (ISR) aircraft in the battlespace would transmit data to

these US-based analysts. They would exploit the data, send their interpretation back to the theater, and stand by for commander inquiries.

That was then. Today, cyber networks, lightning-quick communications systems, and increased bandwidth have pushed those ISR analysts directly into the fight, even though they are still physically half a world away from the war zone.

Reachback began as a logistical tool; it allowed USAF to keep entire units at US bases, eliminating the need to move them and their equipment into a theater and keep them sustained once they were there.

Today, logistics is the least of it. The modern analyst resides, figuratively, at the fingertips of practically any foot soldier, and this change is paying big combat dividends.



Image courtesy of 9th Reconnaissance Wing



USAF photo by SSgt. Angelique Perez

The battlefield edge is provided by the Distributed Common Ground System, a series of five interconnected clearinghouses of ISR. In this system, USAF personnel gather data and send it rapidly to where it is needed. They collect feeds from Predators, Reapers, Global Hawks, U-2s, RC-135s, and even the targeting pods on fighters. The DCGS network provides commanders at all levels with the knowledge—and not just the data—needed to win.

### DCGS, in the Fight

Col. Kevin B. Wooton, commander of the 548th Intelligence, Surveillance, and Reconnaissance Group at Beale AFB, Calif., is in charge of Distributed Ground System-2, one of the five clearinghouses. Wooton, summing up his view of DCGS, said, “This is a weapon system.”

Each distributed ground system (DGS) looks much like an air operations center. In a large, darkened room, banks of computer terminals with multiple screens are crewed by dozens of military personnel. Some are watching video feeds, others maps, some are talking into headsets, and still others are typing in Internet chat rooms.

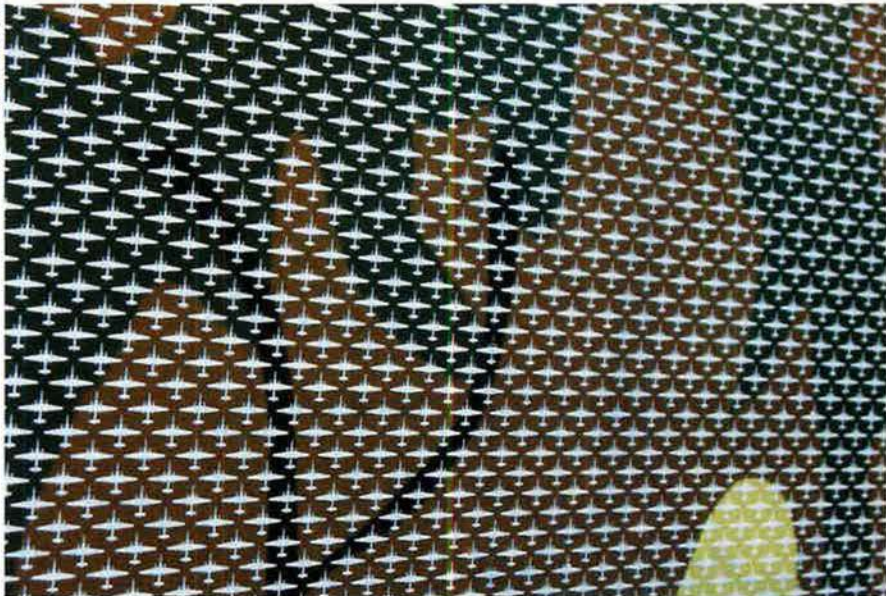
*Far left: Elements of the Global Hawk system and examples of its product on display. Left: MSgt. Chris Thompson, a joint terminal attack controller, communicates using a ROVER in Southwest Asia. Below: A U-2 spyplane makes a high speed takeoff.*



USAF photo by TSgt. Erik Gudmundson



Staff photo by John A. Tirpak



**These U-2 aircraft symbols are mission markers painted on a distributed ground system at Beale. Each airplane represents a single U-2 mission over the Middle East.**

Sometimes, they pass along raw information. At other times, they perform and transmit “value added” analysis, meaning they connect the dots and assemble the big picture for a commander.

Wooton maintains that his DGS technicians are very much “in the fight.” They must train for their jobs to learn how to interpret imagery; how to talk to other parts of the US military; proper procedure for issuing and taking requests for information; when to skip regular channels and go right to the user; and how to alert ground forces to danger. They must observe crew rest periods and take “check rides.”

The outside of their facilities bears squadron insignia and mission markings to denote their contributions and successes.

**The Glue Is DCGS**

“The strength of Air Force ISR is the systems working together,” Wooton explained. “Sometimes, all people need is ... to look over that next hill. We have a lot of capability to do that.”

The DGS will often pipe data directly to troops on the ground. That, however, is merely using the formidable ISR network as high-tech binoculars, Wooton said.

“If you want to start developing intelligence, where a commander can

make some kind of a decision to take out an enemy,” analysis and fusion are needed.

“The glue holding it all together is the DGS,” he said.

Wooton’s DGS-2 has traditionally processed, exploited, and disseminated the intelligence products of the U-2 spyplane and, more recently, the RQ-4 Global Hawk recce drone. He works for US Southern Command, and the long-legged U-2s and Global Hawks at Beale sometimes undertake direct ISR missions to South America.

US Air Forces Central is supported by DGS-1 at Langley AFB, Va. DGS-3 is at Osan AB, South Korea, and supports forces on the peninsula there; DGS-4 at Ramstein AB, Germany, supports US Air Forces in Europe; and DGS-5, supporting Pacific Air Forces, is located at Hickam AFB, Hawaii.

All of the DGS locations are interconnected and, in many ways, function as a single entity. The analysts in each location are mere seconds away from each other by voice or chat. Sometimes, the most expedient way to answer a question is to roll a chair two stations away and ask the expert.

“The fastest way we have of getting information [to a user] is voice or a chat room. Most of the day-to-day intel is passed by chat,” Wooton noted.

The chat rooms allow everyone with a stake in a particular area, mission, or even an individual being watched to quickly communicate what they have,

**Maintainers of the 55th Wing, Offutt AFB, Neb., prep an RC-135W Rivet Joint for a mission.**

Photo by Jim Haselline







USAF photo by Lt. Col. Leslie Pratt

what they need, and how they can make things go more smoothly.

In the “room” will often be a joint terminal air controller (JTAC), connected by his field laptop, as well as the air operations center and other interested parties. Pilots of U-2s or crew on RC-135s can also participate by voice.

“It is a discussion led by commanders,” Wooton explained. “It’s not multiple hierarchies that force you to wait” for approval or clearance. The organization is flat—deliberately so—to get information where it needs to go, fast.

In a Predator mission, for example, Wooton said the chat room will be populated by representatives of Nellis AFB, Nev., the JTAC, the combined air operations center (CAOC), the DGS, and various intelligence organizations.

“If we have to keep certain people out, those things can be password-protected,” he noted. “We do work with [special operations forces] and protect their data differently.”

The chat method has vastly sped up the process of taking and answering requests, Wooton noted, and has almost eliminated “playing telephone” in which one person is told to tell another to tell another, etc. The most direct communications are used.

“When I’m telling a sergeant, I’m simultaneously telling his entire chain of command in a chat room,” Wooton

noted. But it would be wrong to think of those other recipients as merely being copied on a message.

Wooton waved off such a notion as “linear think.” Rather, “everyone gets the same information at the same time.” Moreover, it’s not freestyle conversation. There are strict rules developed by US Central Command over the years, and “chat room discipline.”

Requests for data filter through the DGS system. Frequently, an answer is already in the database. Sometimes, a mission is already under way to collect the needed data. If not, an aircraft in flight may be diverted to get the answers.

#### Real Value Added

In the current fights, tactics, techniques, and procedures are developed “on the fly,” Wooton said, because the capabilities of new systems such as the Global Hawk and Reaper are still being discovered. With battle experience, though, DGS personnel are learning how to “focus” the array of sensor aircraft and create a long-term view, which is the real “value added” of the system, he said.

When a request comes in from the field, experts at the DGS frequently talk directly to commanders or “the guy who needs the information. And [they] make sure we’re answering the right question and that he’s asking the right question.”

**An MQ-1 Predator, armed with Hellfire missiles, performs an interdiction and armed reconnaissance mission over Afghanistan.**

To help educate field commanders about what ISR capabilities are available to help them, the DGSs have liaisons who serve at every CAOC and with every ground force division commander. They “help it happen,” Wooton said. “I don’t think we need to sell” anyone on the capabilities anymore.

All this is possible because of new communication links and larger bandwidth. Wooton said that also puts the ultimate subject experts at the fingertips of the commanders.

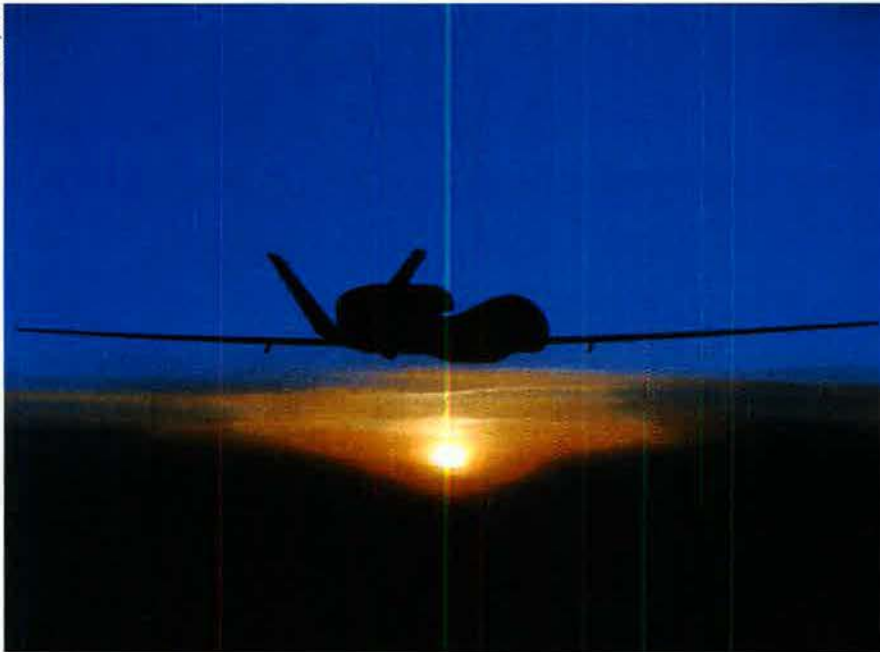
“The term ‘reachback’ is really archaic,” Wooton asserted.

The term is “Cold War mentality. It’s passive.” The term suggests that if a field operator needs information, he knows where to call. The reality of today, though, is “we’re more likely to call them ... [or] we’re mostly online with each other as we go, via those liaison officers.”

He offered as an example a recent collaborative effort to warn a convoy of an ambush.

“One of my crews working U-2 received intel from another source [saying] a coalition convoy is going to be attacked. My crews alerted another part of the DGS” that had helped plan





**An RQ-4 Global Hawk loiters over a target. Such ISR aircraft are being exploited with new USAF systems.**

a U-2 flight then in the area and they contacted the convoy.

After examining the convoy route, the U-2 was “turned” and collected a radar image of the road ahead. Sure enough, enemies were lying in wait, ready to finish the convoy off after buried mines went off.

“That was not a request [the convoy] made, obviously,” Wooton said, but the fusion of expertise and capability discovered the trap and pushed the warning right to the convoy drivers.

“That convoy had a JTAC who was able to call in B-1s, and we ambushed the ambushers, with 50 enemy killed in action,” Wooton noted. “A very bad day” for the bad guys.

He added that “success stories get around. That convoy operation? We work with those guys all the time. They love us.”

Similar episodes are typical, he added. Between 2007 and late 2008, Wooton said, the DGS had participated in 305 “troops in contact” situations “where our guys helped the ground troops. So, nearly one a day.” That total didn’t include 300 confirmed discoveries of improvised explosive devices, or IEDs, and many more that were not confirmed.

If there are many pulls on an ISR platform all at once—the original mission, plus multiple requests from varied operators asking for ISR assistance—the CAOC makes the call as to who gets priority, Wooton said.

“We’re not a rogue operator,” he asserted. It’s the CAOC’s job to set

priorities, but it makes the call “in close consultation with the guys on the ground. Nothing is done independently or in a cavalier way.”

Still, it requires discipline in the DGS for all the experts to stay focused on their own missions. When ground troops are in trouble anywhere, it’s apparent to everyone in the DGS, and “everyone wants to help,” Wooton said.

### The Art of Interpretation

The 9th Intelligence Squadron, one of six in Wooton’s group, is responsible for processing intel brought in by the U-2 aircraft. The U-2 is unique in being the only high-altitude recon system with cameras that use wet film.

Wooton said the U-2 continues to be a champ in providing solid baseline data for mapping and threat-location purposes. In short, not all urgent requests for ISR data have to be answered with a fresh flyover.

“We are getting very good at, within a couple of hours of a request, going back through old, hard-copy imagery and pulling out the needed information, Wooton noted. The image is then scanned, digitized, and can be sent to the user “a bunch of ways.” The fastest method is using the network—“assuming you have the bandwidth”—for the extremely high-resolution data. The unit has “some of the largest servers and more digital scanners than anybody else in the world,” Wooton reported.

However, “when a unit goes down-range, we have the ability to provide

them ... the latest and greatest mapping of their area.” He added, “We give it to them in a hard drive.”

The 9th Intelligence Squadron is the only unit that works with the large rolls of film, with the exception of a shop in the Defense Intelligence Agency in Washington, D.C. The 9th can deploy its capability, as well.

Gen. John P. Jumper, Air Force Chief of Staff from 2001 to 2005, envisioned that future AOCs would feature a “data wall”: a large digital map of an area of responsibility on which commanders could simply click on an area or a unit and instantly get the most up-to-date information about it, in near-real time, developed automatically by computers. Asked if this device is becoming a reality, Wooton said, “We’re not there, yet.”

He reported that USAF has many of the tools to bring the data wall to fruition, but the process of overlaying optical imagery with radar imagery and determining, for example, if an IED is buried in a particular place still requires a trained analyst.

If such automatic target characterization were attempted today, “you’d be inundated with false calls. You need the trained eye to say, ‘That is man-made.’ We’re at the tool level, but not at an automated level.”

In fact, the art of studying an area and applying all the available data—temperature, electro-optical images, infrared, microwaves, etc.—is so specialized that Wooton has had to hire former USAF airmen back as consultants for some of the trickier analyses.

If combat winds down rapidly in Iraq and Afghanistan, what would all the analysts do? Wooton said that the expertise that has been developed for the two ongoing fights will likely be useful in any area of interest, and the desire for good, actionable ISR is unlikely to diminish.

New missions also pop up. The Air Force’s ISR aircraft played a significant role in assessing hurricane damage over the last decade, and last year, Wooton said his group was able to provide both ISR sensor data as well as analysis to firefighters battling wildfires in California. Many of the skills involved in assessing combat situations happen to translate well to characterizing a broad area fire and where it’s likely to go next, he noted.

“We were told we saved lives,” he said. ■



## Really Shrewd Question

"Can We Get the Nuclear Genie Back in the Bottle?"—*Headline, USA Today, Dec. 15.*

## Not a Choice

"We would do well to avoid notions that we can pick and choose the kinds of wars in which we want to be involved and prepare only for them."—*Gen. David H. Petraeus, commander, US Central Command, Foreign Policy, January.*

## Slow Starter

"Lieutenant Warner is interested in exerting just enough effort to get by."—*Lt. John Warner's 1951 Marine Corps fitness report, read at a testimonial dinner as he retired from the US Senate after 30 years, eight of them as chairman of the Armed Services Committee, Washington Post, Dec. 22.*

## Hooey

"One of the mythologies is that it was the vice president that somehow was pulling the strings on foreign policy in the first term and made it very ideologically driven and that somehow in the second term, the vice president's influence is in decline and therefore, somehow, the real Bush has come forward and we have a more pragmatic foreign policy. That's just hooey—it's just hooey."—*Stephen J. Hadley, then national security advisor, reflecting on eight years with President George W. Bush, Washington Post, Jan. 2.*

## The End Is Near

"There's a 55 to 45 percent chance right now that disintegration [of the United States] will occur. ... It would be reasonable for Russia to lay claim to Alaska; it was part of the Russian empire for a long time."—*Igor Panarin, dean of the Russian Foreign Ministry's academy for future diplomats, predicting that the United States will break up into six parts by 2010, Wall Street Journal, Dec. 29.*

## The Amazing Becomes Ordinary

"For Air Mobility Command airmen, we consider it simply part of what we do, but in reality, it is quite remarkable to have two aircraft meeting less than

50 feet apart, at more than 20,000 feet above the ground, traveling at speeds close to 400 miles per hour, while a tanker replenishes another aircraft with the fuel necessary to continue the mission."—*Gen. Arthur J. Lichte, commander, Air Mobility Command, Dec. 30.*

## Mind Your Own Hemisphere

"As America reassesses its role in the world under a new President, it should consider a return to the Monroe Doctrine, which called for noninterference in problems or relations with Europe, and nonexpansion by European countries of their colonial hegemony toward America. This principle of noninterference should be extended by and for all countries of the world."—*Muammar Qaddafi, leader of the Great Socialist People's Libyan Arab Jamahiriya, Washington Times, Dec. 23.*

## Priorities

"You're a member of the DOD team first, you're an airman second, and then whatever functional discipline you're in is third. We are members of a fighting force that is prepared, willing, and able to do what is necessary when called."—*CMSgt. Stephen C. Sullens, Air Combat Command's command chief master sergeant, Joint Base Balad, Iraq, Dec. 18.*

## Old Tankers Are Good Enough

"Frankly, I hope the tanker deal is one thing that does not survive the transition. Basically, there's really nothing wrong with the existing KC-135 tankers, and any case for replacing them is completely made up."—*John Pike, founder and director of globalsecurity.org Web site, Orlando Sentinel, Jan. 12.*

## Tanker Bids and Rebids

"I don't know if we'll ever build the next generation tanker, but we're sure building some good law firms in the process."—*Loren B. Thompson, Lexington Institute, Orlando Sentinel, Jan. 12.*

## Staying There

"Maybe not at current force levels, but I think we'll see a presence there for decades."—*US Army Gen. Bantz*

*J. Craddock, NATO Supreme Allied Commander, Europe, on commitment of NATO and US forces to Afghanistan, Bloomberg News, Jan. 9.*

## Leaving There

"We're going to get the heck out of Afghanistan. We have to resist putting a lot of troops in, thinking that's going to solve it. That's what they said in Vietnam. When I was there, we had a couple hundred thousand [troops in the country]. They went up to 500,000. It didn't do it."—*Rep. John P. Murtha (D-Pa.), chairman of the House Appropriations Defense subcommittee and a Marine officer in the Vietnam War, National Journal, Jan. 10.*

## Military Limits

"I believe we should be more willing to break this cycle and say when armed forces may not always be the best choice to take the lead. We must be just as bold in providing options when they don't involve our participation or our leadership, or even when those options aren't popular."—*Adm. Michael G. Mullen, Chairman of the Joint Chiefs of Staff, New York Times, Jan. 13.*

## Learning From the Experts

"Birds, bats, and insects can fly in turbulent environments with fast, unpredictable wind gusts. Yet they can react almost instantaneously and adapt with their flexible wings. ... If handled appropriately, flexible wing structures can delay stall, enhance stability, and increase thrust."—*Wei Shyy, University of Michigan aerospace engineering professor, on research for the Air Force adaptations from biology for micro air vehicles, Air Force Print News, Jan. 7.*

## FOUO Is OBE

"Controlled Unclassified Information (CUI) is the new generic term to be used for information that is not releasable to the public. ... For Official Use Only (FOUO) is being phased out and CUI will replace all current DOD markings used on unclassified information including Privacy Act, and Law Enforcement Sensitive."—*Department of Defense message quoted by Washington Post, Dec. 15.*



# In for the Long Haul

In Iraq, airmen see progress, but no one's celebrating just yet. There's too much hard work that remains.

By Marc V. Schanz, Associate Editor

USAF photo by TSgt. Erik Gudmundson



**“B**ack when we were flying during the surge, when we were doing [convoy] top cover [flights], you could see machine gun fire, you could see IEDs exploding,” said Capt. Ron Nolte, a C-130E navigator deployed from Little Rock AFB, Ark., to the 777th Expeditionary Airlift Squadron at Joint Base Balad in Iraq. “It was chaotic.”

Nolte went on: “Now, guys are up there for 10 hours and they’ll see maybe one [IED] go off.”

The war in Iraq, by most accounts, has turned a corner and is moving into a new phase—emphasizing institution-building more than door-kicking and munition-dropping. Bombs still explode and firefights still erupt, but the heavy fighting has subsided.

Every airman in Iraq has a perspective on the changed situation. They know that, whatever happens with ground forces, the Air Force units will not be packing up and heading home anytime soon. Rather, airmen are in a countrywide mission and resource shift.

The United States is drawing down its combat forces and consolidating its



USAF photo by Capt. Teresa Sullivan

bases through a process Multinational Force-Iraq officials call “shrink and share.” This is the effort to draw down US capacity in some mission areas by handing off responsibilities to the Iraqis, all the while helping build up indigenous capacity.

Clary, the Air Component Coordination Element director for MNF-I in November 2008. “The Iraqis will decide how much or how little we’re going to support them,” said Clary, who for the past year has been the most senior airman based in Iraq.

The US is committed to supporting Iraq through coalition training and acquisition programs, Clary noted, but also in institution building—the process of capitalizing on the security gains made in the surge.

### The Growth of Diplomacy

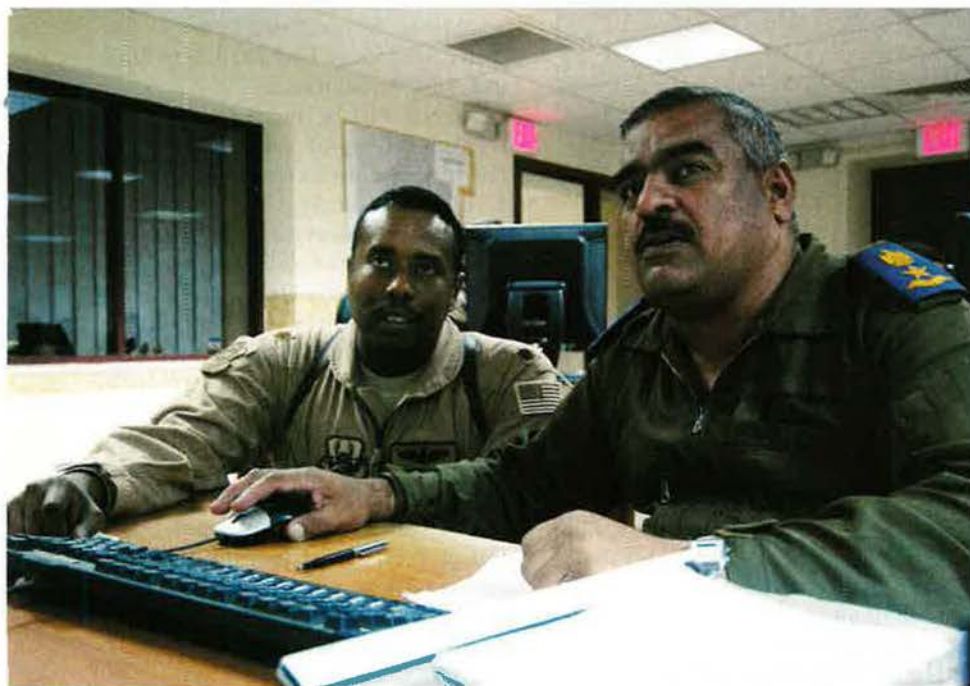
Control and use of the skies is a huge part of this new phase of war. Tactical airlift is crucial in conducting government business and vital in reorienting US and Iraqi forces across the country as part of the drawdown.

“There’s always a give and take with the governance and the provinces,” Clary said. Senior Iraqi leadership, MNF-I officials, and local leaders must often go out and work local governance issues face-to-face, especially where “sectarian issues” remain at play.

Airlift is also critical in facilitating the growth of diplomacy with Iraq’s neighbors in the Gulf region, as they restore and solidify the country’s regional ties.

With the raging insurgency now in the rearview mirror, Clary conceded, outsiders might have trouble seeing an immediate need for airpower.

“We’re not as well-versed or understood by the public or some in the service about COIN [counterinsurgency],” he said. “Airmen are doing



USAF photo by SSgt. Christina M. Styer

*Left: The setting sun peeks out from behind the tail of a C-17 Globemaster III at Joint Base Balad, Iraq. Top: A1C Zachary Kelhi (kneeling) and SSgt. Tommy Greeness end a long night of delivering cargo and making airdrops over Iraq. Above: Maj. Kingston Lampley (l) advises an Iraqi airman as part of USAF’s military transition team at Camp Victory, Iraq.*

US forces play a key role in the transition—especially as the Iraqis take over more mission areas traditionally performed and maintained by the coalition.

“The real driver ... is: What does the government of Iraq want from the coalition?” said Maj. Gen. David E.





An Iraqi 737-200 taxis at Baghdad Airport. The airport's civilian runway operates on the east side.

nontraditional things in this fight, and individuals who belong to the joint organizations are making significant contributions to this campaign.”

With about 145,000 combat troops remaining in Iraq, a good portion of US Central Command's aviation sorties is dedicated to sustainment. In early January, about 130 mobility missions were flown every day to restock and resupply the US forces around Iraq.

As the US and coalition posture slowly changes course, a large chunk of activity is playing out at Sather Air Base and the sprawling Victory Base Complex (VBC) in Baghdad.

Sather was named in honor of SSgt. Scott D. Sather—an Air Force combat controller who was killed in Iraq in 2003. Sather is the home of the 447th Air Expeditionary Group, a component of the VBC, which surrounds Baghdad Airport. VBC is home to the headquarters

of Multinational Force-Iraq and several other camps and logistics hubs, such as Camp Stryker, Camp Slayer, and Camp Liberty.

Col. David P. Pavey, commander of the 447th AEG in November, said the USAF presence at Sather should remain constant as it plays a large role in the shifting of combat power in country. The 447th Air Expeditionary Group runs the aerial port operations, command and control of the military runway at the airport, medical support, and aerial control at Sather.

#### A Split Facility

The airport's civilian runway operates on the east side, along with the terminal used for Baghdad's international civil flights.

After Balad, Sather is the Air Force's primary in-country hub—seeing approximately 1,000 personnel transition through its ramp on any given day.

“We're the No. 1 mover of people in Iraq,” Pavey, a Reservist deployed from the 446th Operations Group at McChord AFB, Wash., said.

Many of the locally based US units are decreasing in size or shifting outside the country, he said. The result of the shrink and share effort means many old missions will end and be handed off to Iraqi units as they manage more properties.

“Our job is to make sure [the materiel] keeps flowing,” Pavey added. “If we lose a pallet, in this day and age, it's a big deal. If we find a way of getting a pallet to a warfighter sooner or more expeditiously, we just helped win the war.”

Many of the units and functions previously headquartered in the International Zone will transition to the VBC. The 447th AEG's relationship with the commander of New Al Muthana Air Base, down the street from Sather, is important. The two installations share taxiways and conduct joint exercises.

At the end of 2008, 14 airfield facilities across Iraq were controlled and operated by coalition forces. The Iraqi Air Force is in the midst of a large buildup, and will be expanding operations beyond the bases it currently utilizes at Kirkuk, Basra, Taji, and New Al Muthana.

“There will be more of them and eventually less of us,” Pavey noted. The IqAF is considering future use and development at Al Asad, Ali, Balad, Al Kut, and Suwayrah, among others, as part of the transition.

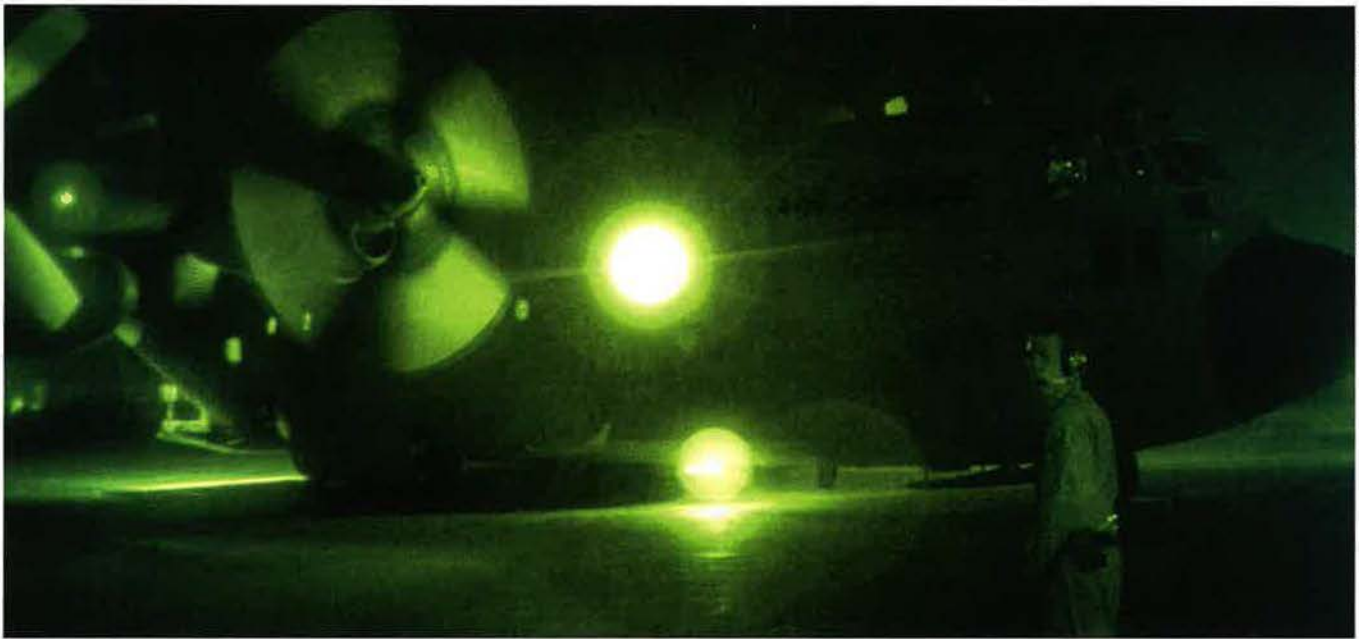
On New Year's Day, a significant transition occurred as the International Zone, commonly known as the Green Zone, was formally handed over to the Iraqi government.

The long-awaited status of forces agreement (SOFA) between the US and Iraq, first signed in late 2008, faces a nationwide referendum by the end of July. If ratified, most combat troops will be withdrawn by the end of 2011.

This already affects US and coalition air operations across Iraq, as the new status of forces rules are now in effect.

In November, Clary's office was tracking the agreement's evolution. The SOFA will define both the duration and nature of the US presence in Iraq. “That will change the whole nature of coalition support and, in turn, air support,” he said. “There will be ramifications for all.”





USAF photo by TSgt. Erik Gudmundson

Still, coalition operations were proceeding with few large roadblocks. As the agreement stands, the US and Iraq are undergoing a two-phase transition of Iraqi sovereignty of its airspace from the coalition to Iraqi civil and military authorities. According to MNF-I statements and documents, the first will be achieved early this year.

Phase 1 moves include: approval of an implementation plan by the Iraqi civil aviation authorities and the IqAF; partial transfer of aeronautical information system functions from the combined force air component commander; and development of an agreement between the CFACC and the Iraqis, defining coordination and delegation of airspace.

As of Jan. 1, the Iraqis officially gained sovereignty of their airspace above 24,000 feet. Airmen with the 447th AEG are part of this transition, as its controllers supervise the tower at Baghdad Airport, Pavey said. "The day-to-day operations of the tower [are] run by Iraqis, but US advisors are with them," he said.

According to Clary's office, coalition air assets using airspace above 24,000 feet coordinate with Iraqi air traffic controllers to transit that area. The Iraqis have, however, requested that the US continue to control airspace at or below 24,000 feet until Iraq's capabilities "mature."

There will therefore be no noticeable effect on air operations below 24,000

***A1C Delmar Karnes keeps a sharp eye out as a C-130 warms up its engines on the flight line at Baghdad Airport.***

feet—a key factor in conducting a range of US operations from aeromedical evacuation to close air support for troops in the field.

"There has been no significant impact to coalition use of airspace or air operations since implementation of the security agreement," MNF-I confirmed in a January statement. Previously established coordination procedures also help ensure that unmanned aerial vehicle operations continue unhindered.

The procedures governing air strikes are unchanged, as US air traffic control liaisons are positioned with Iraqi air controllers to ensure airspace is clear before conducting a strike.

### **Looking Toward Phase 2**

New rules of engagement are being coordinated with the Iraqis, according to MNF-I, but details are not released for security reasons. "US forces, as always, retain the right of self-defense," MNF-I officials said.

Phase 2 of the airspace transition will focus on long-term development of the Iraqi Civil Aviation Authority, to gain compliance with the International Civil Aviation Organization, Clary said. This requires work on management and oversight, infrastructure development, improved communication, navigation and surveillance upgrades, and creating a trained workforce of air traffic controllers.

USAF photo by TSgt. Jeffrey Allen



***A C-130 taxis on the flight line during a dust storm at Sather AB, Iraq. Sather is located on the west side of Baghdad Airport.***





**USAF airmen unload pallets of cargo from a C-17 at Sather AB, Iraq, as airmen file in front of the airlifter.**

“The military flavor of this place is shifting to a much more standardized operation,” Pavey said of the process at Baghdad Airport. The threats have declined, and as the airport becomes more like a regular international airport, US forces are facilitating the flow of civilian passengers.

A small building next to Air Force House in the VBC—where the Iraqi air operations center is located—will become the focal point for deconflicting Iraqi military and civilian airspace.

Gen. Wamid Lutfy, commander of the Iraqi air operations center, said his country is divided into four air defense sectors, each of which is overseen in a small room with 10 workstations, using basic VHF/UHF technology, cell phones, and Internet chat.

Operating since March 2007, the AOC complies with a master plan from the Ministry of Defense and the IqAF. The operations center tracks and controls most Iraqi military air traffic in country and deconflicts civil traffic. Schedules, flight patterns, and sorties are coordinated with MNF-I headquarters and the combined air operations center.

“We are working with new technology, but this takes time and people,” Lutfy said.

Iraqi control over 24,000 feet effectively doubles national responsi-

bilities, and US and coalition forces have seen the demand for coalition controllers at Baghdad and Basra airport towers nearly halved.

Results of the transition are already apparent. Insurance rates for civilian carriers dropped in half over the previous six months.

### Security First

“As security continues to improve, nationally flagged carriers will be more inclined to come here,” said Clary in November. The MNF-I Air Component Coordination Element staff helped brief insurers in London late last year, working with the US Embassy.

These seemingly bureaucratic details reveal the fruits of the US and coalition efforts in Iraq. “Security is important [and] it is the foundation of the other lines of operation,” Clary said. “The growth of the Iraqi economy, the growth of government—... if security is good, we can do those things.”

Capt. Steve DeHaas, a veteran C-130 flight commander who flew US missions and worked as a training advisor with the IqAF during the surge, said his experiences with his Iraqi counterparts were a clear indication that the country was becoming safer.

The Iraqis were the ones who told him something was working, he recalled. On his first deployment to Baghdad, “we

were getting mortared all the time; there were attacks downtown. ... One of our loadmasters was murdered by a death squad in broad daylight.

“By the time I left,” DeHaas continued, “they were shopping with their families, going out to eat. ... That’s when I knew.”

As large units roll through the VBC and the Iraqi infrastructure improves, the work of airmen at Baghdad Airport and Sather will remain fluid.

Pavey’s assessment of the situation reflects a snapshot of the mood of airmen across Iraq, as the six-year anniversary of the conflict approaches. From security forces walking patrols outside the wire to loadmasters on ramps across the country, there is a general sense of progress. Nobody is celebrating yet, and most are very realistic about the hard work remaining—and how long it will take.

“This is a living thing,” Pavey said, reminiscent of earlier missions in his career. In short, he believes the airmen on the ramp will be among the last to leave. “I’ve done other contingencies in the last 20 years, ... and pretty much the last airplane out is the C-130 with a loadmaster climbing up the ramp on the way out,” he concluded. ■



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# The Balkan Air War



The European war that began 10 years ago this month was fought—and won—with airpower alone.

By Adam J. Hebert, Executive Editor

DOD photo by SrA. Mitch Fuqua

It was 10 years ago this month that Slobodan Milošević, the strongman of Serbia, rejected peace talks and launched a massive, brutal attack on the ethnic Albanian population of Kosovo. This amounted to a direct challenge to NATO, which responded with Operation Allied Force, the air war designed to compel Belgrade to halt its bloody operations.

Allied Force was poorly planned, launched with a false expectation of quick success, constrained by artificial political limitations, and aimed at a ruthless and despotic leader who was only too determined to absorb the air attacks and fracture the Western alliance with his intransigence. In short, it seemed doomed to fail.

Remarkably, though, Allied Force proved to be a success. After 78 days of bombing, with no use of ground forces, the US-led NATO air campaign forced Serbia to capitulate and withdraw from Kosovo. Military historian John Keegan, formerly a harsh airpower critic, wrote that “the capitulation of President Milošević proved that a war can be won by airpower alone.”

This war’s immediate cause was Milošević’s unwillingness to come to



Staff map by Zaur Elyar bekov





USAF photo by SrA Jeffrey Allen

peaceful terms with Kosovo's ethnic Albanian majority. After the collapse of the Rambouillet talks attempting to replicate the Dayton Peace Accords (which came after Operation Deliberate Force and settled Milosevic's previous conflict with Bosnia), regular Serb forces moved into Kosovo and initiated a deadly ethnic cleansing campaign.

NATO long before had promised it would resist such a move, and on March 24, Operation Allied Force began with a series of air strikes and cruise missile attacks. These were extremely limited, though. On March 24, there were only 400 aircraft committed to the campaign—just 120 of them strike aircraft.

"I don't see this as a long-term operation," sniffed Secretary of State Madeleine K. Albright. Javier Solana, the NATO secretary general, said he expected the war to be over before NATO's 50th anniversary summit began April 23.

Moreover, NATO political officials announced the alliance's military intentions in advance. President Clinton himself immediately ruled out the use of ground forces, saying the day the

**Opposite, an Air Force F-15E Strike Eagle takes off from Aviano AB, Italy, for an Allied Force mission in March 1999. The operation was dominated by US airpower, but wholly reliant upon the European allies for logistical support. Left, targets in Serbia and Kosovo together formed a war zone roughly the size of Kentucky.**

war began, "I don't intend to put our troops in Kosovo to fight a war."

From the beginning, therefore, this was to be an air-only operation, and Milosevic knew it. Recently retired Adm. Leighton W. Smith, who led the Deliberate Force attacks, said telling the enemy which military options you consider to be off-limits is "the absolutely dumbest thing you can do."

### Target Limits

Once the bombs started to fall, Milosevic accelerated his planned ethnic cleansing campaign. He dispersed his Yugoslav army forces and hunkered down in an attempt to wait out the anticipated punitive campaign.

The alliance faced other serious problems as well. The need to keep all 19 NATO members on board slowed down decision-making, produced highly limited target lists, and forced the alliance to embrace only the most cautious rules of engagement. Any NATO member could reject any target, and the war was highly unpopular in some member countries. As then-Maj. Gen. Ronald E. Keys put it, there was no single target that could win the war, but there were many sites that, if hit, could potentially lose the war.

Therefore, alliance leaders initially put off-limits entire categories of targets, including any in downtown Belgrade, for fear of causing civilian casualties.

Similarly, most NATO aircraft on combat missions were kept flying above 15,000 feet to reduce the risk of being

**At Aviano, airmen from Shaw AFB, S.C., load a cart with AIM-120 air-to-air missiles as F-16s in the background await their next Allied Force mission.**

shot down by Serbia's deadly surface-to-air-missile network. This protected the aircrews but made it more difficult to visually identify small mobile targets in the Balkan terrain.

The absence of a credible ground threat meant Milosevic's forces did not have to mass in defensive positions, where they would be easy targets for airpower. They were instead free to disperse as single trucks or tanks, hide under trees, and spread out through neighborhoods.

Initially at least, airpower was most effective as a strategic weapon. "What had begun as a coercive NATO ploy aimed at producing Milosevic's quick compliance quickly devolved into an open-ended test of wills between the world's most powerful military alliance and the wily and resilient Yugoslav dictator," wrote RAND analyst Benjamin S. Lambeth.

This was far from ideal. "I'd have gone for the head of the snake on the first night," said USAF Lt. Gen. Michael C. Short, who ran the air war for NATO. "I'd have turned the lights out" in Belgrade immediately, he said.

"Airpower could not [directly] stop the door-to-door ... thuggery and ethnic cleansing," added Chief of Staff Gen. Michael E. Ryan. Targeting critical nodes in Belgrade was "the only way





**The wreckage of this MiG-29 was one of five Serbian MiGs that NATO fighters shot down in the early days of the campaign. Enemy SAMs proved harder to kill.**

you were going to be able to do that.” Unfortunately, the need for unanimous consent prevented this from happening until many weeks into the campaign.

Many observers and participants felt that caution was a higher priority than success, but in other cases the need to “do something” meant the limited target set was hit repeatedly.

“We began bombing the first night with our objective being to demonstrate NATO ‘resolve,’” said Short. It is “tough to tell [pilots] at Aviano to go out and put [their lives] on the line to ‘demonstrate resolve.’ We need to know what our military objectives are, and we need to understand what we are trying to accomplish.”

The war began conventionally. The US-led NATO forces focused on enemy air defenses and fixed military targets, while Serbia did its best to hide and then harass and hit the attackers. NATO fighters shot down five Serb MiG-29s in the first three days, and NATO was able to knock most Serb airfields out of commission relatively quickly.

The enemy’s integrated air defense system was another story altogether. Despite NATO’s best effort to knock out the Serb air defenses, enemy missiles and radars remained a threat to allied aircraft almost to the bitter end.

Learning from Iraq’s experience in Desert Storm, Serb air defense forces left their radars “off” at almost all times, only turning them on long enough to fire a quick volley of SAMs at attacking aircraft. Since many of these

systems were small and mobile, they were extremely difficult for NATO to find and destroy. In fact, the number of SAMs fired at allied aircraft actually increased from week to week early in the war.

On the fourth night of the campaign, the unthinkable happened. An F-117 stealth attack aircraft, previously regarded as being untouchable, was shot down. Its pilot was saved from approaching Serb forces after a harrowing overnight rescue mission. Later, a USAF F-16 was shot down, too; its pilot also safely recovered.

### Count on the JDAMs

The tenuous political situation, the early combat losses, and NATO’s squishy goals could have led to the alliance declaring victory and going home without really accomplishing anything. Milosevic forced NATO’s hand, however.

As the scope and magnitude of the Serb brutality emerged into public view, several things became clear. Serb forces were marauding across Kosovo. There would be a massive humanitarian crisis if hundreds of thousands of displaced people could not return home by winter. There was no reason to believe this ethnic strife would end in Kosovo. Milosevic was directly challenging the credibility of NATO and the United States.

NATO had to find a way to force the Serb forces from Kosovo and allow displaced civilians to safely return home.

This meant more aircraft were needed to hit additional targets, and the attacking forces had to take more risks.

Precision munitions, including cruise missiles, were in short supply. Weapons grew so scarce, in fact, that Gen. Richard E. Hawley, the head of Air Combat Command, memorably commented that it was “really touch and go as to whether we [would] go Winchester on JDAMs before ... the next delivery.”

Lousy weather in the Balkans meant that the US satellite guided Joint Direct Attack Munition was often the only weapon that could be counted on to hit its targets. Only the B-2 bomber could carry the brand-new JDAM. The Air Force had received just 19 stealth bombers at the time, but many of them flew round-trip missions from Whiteman AFB, Mo., to hit multiple targets. Short said he quickly came to expect 16 different designated impact points from each B-2 mission. Once, a B-2 on a single mission destroyed two enemy airfields.

It took 12 days for the allies to hit the same number of targets as the Desert Storm coalition had hit in the first 12 hours of that war. The need for consensus bred a cautious, incremental campaign that was disturbingly reminiscent of the Rolling Thunder air campaign in Vietnam. Attacks on mobile ground targets didn’t begin until the second week of April, and Belgrade was still off-limits.

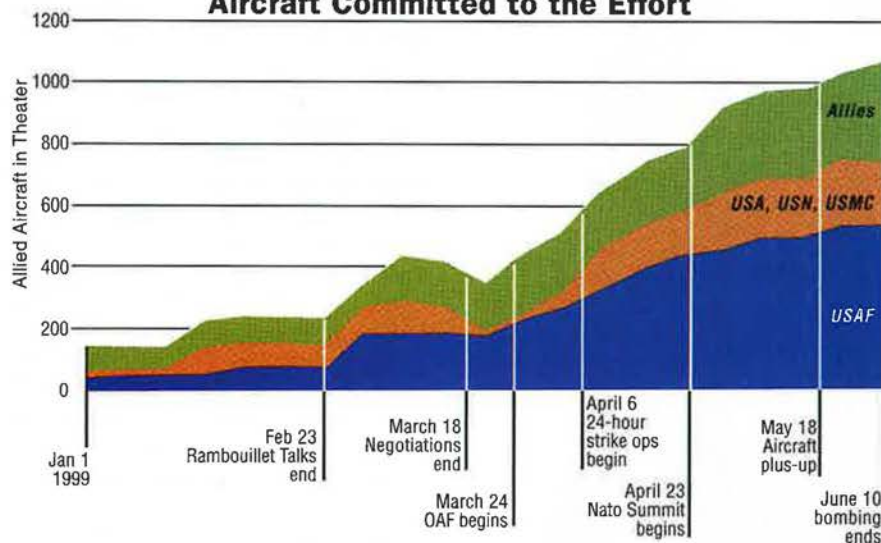
The gradual ramp-up in attacks let Milosevic and the Serbian people adjust, acclimate, and build an expectation that they could absorb NATO’s best hit. For a while this was true, but more and more combat power was applied to a growing target set in an area the size of Kentucky.

On April 6, Milosevic moved to fracture the alliance by declaring a unilateral cease-fire. His obvious objective was to set at odds those favoring continuation of the war and those ready to throw in the towel. As it turned out, though, NATO had by that time resolved to stay with the bombing campaign and see it through to victory.

Defense Secretary William S. Cohen said that within NATO, asking for anything other than a gradually expanding air campaign would have scuttled the whole operation. And although the US provided the lion’s share of Allied Force’s aircraft, it was wholly dependent upon European allies for logistics—including overflight rights and access to 47 bases by war’s end.



## Aircraft Committed to the Effort



**As NATO got serious about the operation, the number of aircraft dedicated to Allied Force steadily increased. By June 3, the paltry initial total of 400 aircraft had increased by two-and-a-half times, flying from 47 bases.**

The only allied casualties came on May 5, when two Army Apache pilots died in a crash during a training flight in Albania. This was the second Apache attack helicopter crash in two weeks, and put a tragic exclamation mark on the Army's Task Force Hawk deployment.

Army Gen. Wesley K. Clark, Supreme Allied Commander, Europe, requested 24 Apaches early in the war to provide low-level firepower when most fighter missions were being flown above 15,000 feet. Task Force Hawk's deployment was a fiasco, however.

The US Army in 1999 was not configured or trained for expeditionary missions. The deployment required 7,745 troops—337 per Apache—as 23 helicopters ultimately made the trip. The support materiel ate up 269 C-130 sorties and nearly 500 C-17 sorties. The Germany-based Apaches took 17 days to reach Albania, a short flight away. Yet after this enormous logistical undertaking, the Apaches never flew a single combat mission.

Task Force Hawk was an anomaly, however: As the war dragged on, most things improved. The number of aircraft and weapons steadily increased, the target list and rules of engagement were slowly but surely upgraded, aircrews became familiar with the war zone, diplomatic pressure on Milosevic increased, the weather cleared, and Serb air defenses were relentlessly attacked.

Outside observers were largely unable to detect the results of the improv-

ing campaign because official statements did little to inspire confidence. Many were quick to judge Allied Force a failure, and many more said victory would be impossible without land forces joining the fight.

All the while, though, Serbia's will and ability to resist were being eroded.

For Allied Force, there was no equivalent to World War II's D-Day, a hinge event. The closest thing to a turning point was not even military in nature; it was NATO's 50th anniversary summit in Washington, D.C. The April 23 event was supposed to be NATO's Golden Anniversary, but it in fact became an Allied Force strategy session. The allies reaffirmed their commitment to success and agreed they were in this battle for the long haul.

### Grinding Down the Opposition

The importance of the unified front was highlighted May 7, when satellite guided bombs dropped from an Air Force B-2 bomber destroyed the Chinese Embassy in Belgrade. The drop was a perfect strike, but an intelligence disaster. The embassy should never have been targeted; NATO thought it was striking the headquarters of the Yugoslav Federal Directorate of Supply and Procurement. A series of Intelligence Community errors had failed to place a new Chinese Embassy at that particular location.

The attack killed three Chinese nationals and led to a three-week halt of bombing in Belgrade as maps and

databases were double-checked—but it did not fracture the alliance. Nor did a handful of other highly publicized bombing mistakes that accidentally killed civilians.

NATO and the US dealt with problems that have since become common. One was Serb military forces hiding in civilian areas and using "human shields" to deter attacks. Another was the challenge of the 24-hour news cycle that turned every bombing mishap into an instant worldwide story.

Neither side could claim to have won the public relations war, however: The world was also fully aware of the humanitarian crisis brought on by Milosevic's thugs in Kosovo. Then, on May 27, Milosevic was indicted by a United Nations tribunal on war crimes charges.

It is now clear that the war was entering its final phase. Still, there were few outward signs that Serb resistance was about to crumble. In late May, NATO expanded the targeting list once again, and began to take the war to targets affecting the Serb people. Factories, communications systems, and power grids were damaged or destroyed, putting Serbia under more duress than it had felt up to that point.

"I would say the air campaign is working," opined Clark on May 30.

Details were painfully hard to come by, as they had been throughout the campaign. However, by June 3, NATO had committed to OAF duty some 1,045 aircraft—two-and-a-half times the initial number—flying from 47 bases. Some days saw the alliance mount more than 400 strike missions.

The cumulative effort slowly but surely ground down the Serbian opposition. Roads and railways throughout Serbia were destroyed. Allied bombs dropped Belgrade's bridges over the Danube: Across the country, 70 percent of the road and 50 percent of rail bridges across the Danube were brought down.

The economy began to stutter. Once NATO agreed to go after them, critical industries were hard hit. One vehicle and munitions factory that was destroyed left 15,000 Serbs out of work and affected 40,000 other subcontractors. Belgrade's electrical power was knocked out and roughly 30 percent of Serbia's radio relay networks were damaged.

There was another trend as well: As Rebecca Grant noted in 1999, "Good weather and long summer days ahead





**Slobodan Milosevic was turned over to a UN war crimes tribunal when voted out of office after OAF. Here, he is seen under guard at The Hague in 2001.**

meant that more of Milosevic's country and his military forces would be exposed to devastation."

In Kosovo, direct military targets became more vulnerable as the weather improved and NATO pilots learned the lay of the land. Tanks, artillery pieces, and armored personnel carriers were hit with increasing frequency, and Serbia's losses kept piling up. A NATO assessment after the war estimated that roughly 600 pieces of heavy equipment had been hit—about a quarter of Milosevic's total inventory.

Permanent military facilities in Serbia were hammered as well. Over time, the Serb Army's ability to wage war was being destroyed.

By the end of the war, 100 percent of the Serb petroleum refining facilities were destroyed, ammunition production was 65 percent destroyed or damaged, aviation repair capabilities were down 70 percent, and armored vehicle repair was 40 percent destroyed or damaged. Serbia's economic output was reduced by more than half. The pressure on Milosevic, his army, and the Serbian people was quickly becoming unbearable.

On June 5, Clark called special attention to "the accuracy of the precision weapons, the avoidance of losses, and the increasing destruction of the Serb forces." Four days later, NATO and the battered Serbian forces agreed on the terms of a Serb withdrawal from Kosovo. The bombing stopped June 10.

The war was won, and the alliance had employed only air forces to do the job. Before long, however, a host of

"boots on the ground" advocates began struggling to recast history in a different light. Some claims were fanciful—for example, Army Lt. Gen. John W. Hendrix said Belgrade capitulated as a result of the threat of a ground invasion. "The reason Slobodan Milosevic finally caved in—a primary reason—was the presence of US Army ground forces in Albania," he explained.

Other claims willfully ignored reality. The standout in this category was *Newsweek*, which asserted that allied air forces had managed to destroy only 14 enemy tanks during the entire 78-day war. This claim, unfortunately, was parroted by credulous news outlets around the world.

### The Indispensable Condition

For the record, a comprehensive Air Force study led by Brig. Gen. John D. W. Corley (now the commander of Air Combat Command) fully documented 93 successful tank kills.

In any event, it ultimately did not matter if allied forces destroyed zero enemy tanks, because the end result was the same—Serb defeat and withdrawal without the use of NATO ground forces.

Clark, the NATO supreme commander, told the Senate a few months after the end of the war, "I believe the indispensable condition for all the other factors was the success of the air campaign itself." As late as early 2001, Clark was declaring, "The US Air Force saved me, and it saved NATO."

However, Clark had a strange sort of Road-to-Damascus moment in the af-

termath of the war. Clark evidently had his eyes opened to a new reality, at just about the same time as the publication of his book, *Waging Modern War*. In it, Clark claimed he was worried that "the air campaign was in serious trouble if it persisted on its present course" and that "planning and preparations for ground interventions were well under way." Even though there is no objective evidence supporting Clark's claim, and even though it would have taken many months for NATO to build up a ground offensive, Clark maintained, "I am convinced that this, in particular, pushed Milosevic to concede."

Retired Marine Corps Lt. Gen. Bernard E. Trainor found much to dislike about, of all things, airpower's effectiveness; he thought it was too much of a good thing. "Another troubling ... aspect of the so-called 'immaculate' air campaign," wrote Trainor, "is the ability to drive an enemy to his knees without shedding a drop of the bomber's blood." Yes, by "the bomber," Trainor meant the American airmen sent into battle. Evidently, he found their safety to be objectionable.

Those with no commercial or political axes to grind tended to see things in a different light. What they saw was 11 weeks of combat against a competent and determined enemy, the result of which was military victory, a safe return for displaced Kosovars, a total of two allied deaths, zero combat fatalities, and unprecedented safety and precision.

OAF's biggest weakness was that it took too long to gather steam, giving Milosevic time to ransack Kosovo. Yet more than 38,000 sorties were flown, 28,000 bombs were dropped, and fewer than 500 noncombatants died, despite numerous attacks on Belgrade. Given the normal fog and friction of war, these results are remarkable.

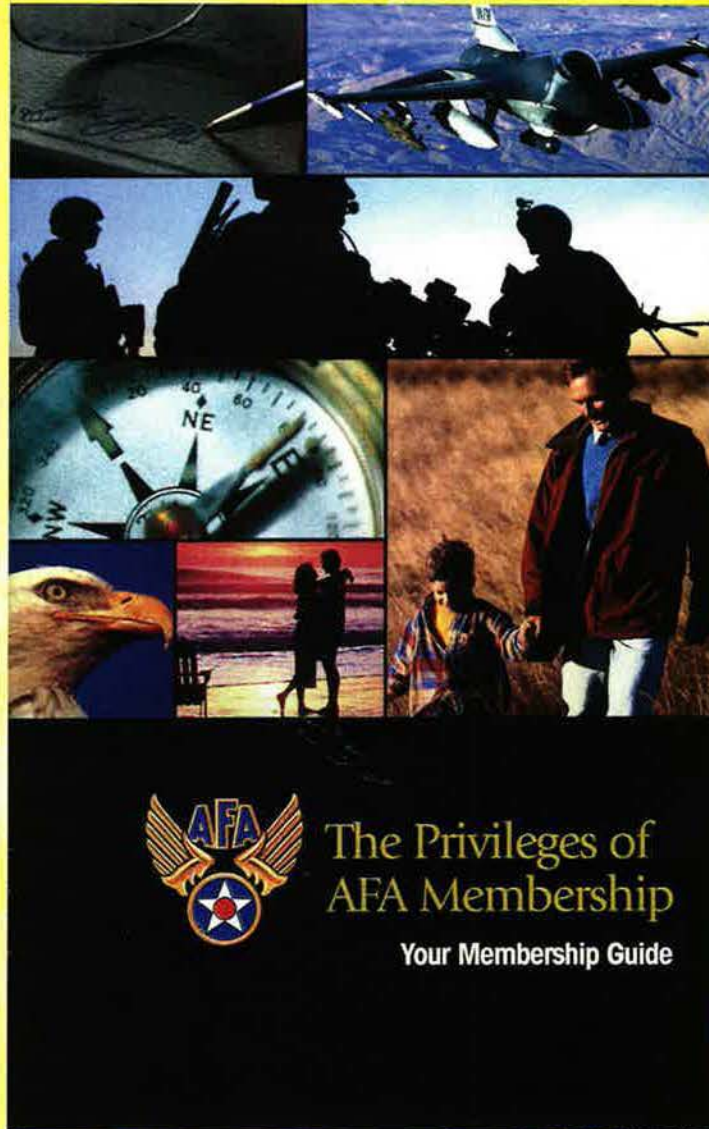
NATO-led peacekeepers promptly moved in to protect Kosovo, giving land force advocates the presence they had long sought. In a few months, Milosevic was turned out of office in the national election of 2000. He was later arrested by Yugoslavia's new government so he could be tried in The Hague on war crimes and genocide charges. Milosevic died in his prison cell in March 2006, before the trial was complete.

On Feb. 17, 2008, Kosovo declared its independence from Serbia. Two million Kosovars live in the democracy that is now Europe's newest nation. ■



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# THE PARARESCUEMEN

**The Air Force's PJs are a tough breed and always ready to jump into action.**

**Photography by Rick Linares**







***Pararescuemen of the 106th Rescue Wing, New York Air National Guard, are hoisted aboard an HH-60G during a September 2008 training exercise at Francis S. Gabreski Airport, Westhampton, N.Y. Ascending to the chopper are MSgt. Erik Blom and MSgt. Jules Roy.***



**T**he pararescueman belongs to a tough breed of airmen, an all-business blend of warrior and paramedic. The PJ—initials for an earlier name, “pararescue jumper”—often must fight his way to a combat save, provide medical care to a downed flight crew, and fight his way out. PJs in recent years have helped save civilians caught in hurricanes. These dual roles underline their status as USAF operators and Guardsmen. The 106th Rescue Wing operates HC-130 Hercules fixed-wing transports and HH-60G Pave Hawks from Gabreski Arpt., N.Y. I11 SrA. Tony Yusup, a 103rd Rescue Squadron PJ, heads out to locate a downed airman. PJs typically carry about 100 pounds of gear. I2I Covering the PJs are door gunners. This M134 minigun is being manned by SSgt. Ryan Helf of the 101st Rescue Squadron.



I3I An airman simulating injury is readied for extraction by Blom, Roy, and Yusup. I4I The Pave Hawk carries a crew of four: two pilots, a flight engineer, and a gunner. Shown here are SSgt. Michael Algozzino and SSgt. Raymond Mitchel, gunner and engineer, respectively. I5I Getting to a downed airman sometimes requires a steerable jump from an HC-130. PJs often jump at night. Upon landing, they conceal their 'chutes, link up, and use GPS gear to stealthily seek the downed flight personnel. I6I An airman with simulated injuries is tended by SrA. Phillip Dwyer.





1



2



4



5



3

1| A 106th RQW Pave Hawk hovers near the Statue of Liberty in New York Harbor. Fulfilling a state mission, the unit deployed to lower Manhattan to assist in recovery efforts after the Sept. 11, 2001 terrorist attacks there. 2| The HC-130 is a long-range version of the venerable Hercules, configured to enable the CSAR mission. It can refuel Pave Hawks in flight and at night, and has night vision gear. 3| A Pave Hawk raises dust as it settles down at Gabreski Airport. 4| Maj. John McElroy coordinates a CSAR training mission. 5| Blom and Roy deploy communication gear in search of a convoy hit by a simulated mine.



**111** In an exercise, TSgt. Mark Busch plays the role of an airman needing treatment after his two-vehicle convoy struck a simulated IED. Dwyer and SSgt. Michael Talbot provide help after jumping from an HC-130. The "wounded" were airlifted out via Pave Hawk after the PJs provided first aid and secured the area. When picking up downed aircrew, PJs treat airmen as if they might be impostors until their identity is established. Aircrew know to "assume the position." **121** Blom secures the perimeter in an exercise at Gabreski. PJs from the 106th RQW played the enemy ground forces. **131** During an extraction, one Pave Hawk will fly cover as the other makes the pickup. Helf mans the minigun.



**141** The HC-130s in USAF service are evenly divided between active and Guard units. The type first flew in 1964. **151** SMSgt. John Krulder, a flight engineer, assists two PJs ready to be hoisted aboard an HH-60G. **161** SMSgt. Brian Mosher is about to touch down after a 10,000-foot descent from an HC-130.





111 Blom awaits extraction during a Gabreski exercise. 121 The M134 minigun offers a 7.62 mm punch for the Pave Hawk, at 3,000 rounds per minute if needed. This HH-60 is forming up on an HC-130 off Long Island. 131 Dwyer and Talbot secure their parachutes after hitting the

ground at Gabreski. 141 A pair of Pave Hawks lifts off after rescuing injured airmen in an exercise. Part ambulance, part gunship, they can fight into and out of a hot spot if necessary. 151 PJs must be physically as well as mentally strong. Here, Dwyer, Mosher, and Talbot haul their

considerable gear and parachutes to a waiting HC-130. 161 An HC-130 prepares to refuel a Pave Hawk of the 101st RQS. The Air Force hopes to give the PJs a new ride in the near future: A replacement for the Pave Hawk should be chosen this year. ■





**For USAF, the defense of air bases was mission-critical.  
And it still is.**

# The Lessons of Salty Demo

By Christopher J. Bowie

**I**n the spring of 1985, the countryside around Spangdahlem Air Base in Germany's Eifel Region reverberated to the shrieks of low-flying jet fighters, the moan of sirens, and the crump of heavy explosions. USAF was conducting Salty Demo, a multiweek airpower exercise. Its goal: Assess whether a modern air base could survive in the face of a heavy and sustained attack.

The Air Force was then in the throes of a major effort to guard its ability to generate airpower in Europe. Salty Demo put the effort to the test. USAF was surprised by much of what it learned. Casualties were high. Confusion was great. Sorties were curtailed. Lowly pieces of equipment—for instance, the humble bulldozer—proved to be critically important.

The findings helped guide the Air Force's investment plans in Europe during the waning days of the Cold War. Even today, though, many of the lessons that emerged from Salty Demo can be and, in the view of many, should be applied to overseas air bases.

The idea of Salty Demo could be traced to the June 1967 Middle East War. In that conflict, Israeli Air Force fighters and medium bombers executed a devastating pre-emptive strike against the Egyptian Air Force and delivered serious blows to the air arms of other Arab nations.

Egypt was the main target. The Israeli aircraft struck nine Egyptian bases simultaneously in the opening minutes of the conflict. They closed Egyptian runways using rocket-assisted runway penetrating weapons and then shot up

the trapped Egyptian aircraft on the ground.

Within an hour, Egypt had lost more than 100 aircraft. The IAF fighters recovered, rearmed, and took off for a new round of attacks. This was repeated several times. Five hours after the first shot, 300 Egyptian aircraft—half of the Arab nation's air arm—had been destroyed.

The IAF also struck at targets in Syria, Jordan, and Iraq to destroy a total of 400 aircraft during the first day of combat.

For NATO military men looking on, the implications of this strike for their own forces were profound. The Atlantic alliance relied on airpower as its trump card in the balance of military power to support NATO's flexible response strategy. NATO military commanders assumed that they would gain control





Two F-16 mock-ups wait on a fake runway during Salty Demo in 1985.

DOD photo

of the air and thus exploit this advantage to execute ground attack missions against invading Warsaw Pact armies and, importantly, to remain poised to launch nuclear strikes if necessary.

Now, they weren't so sure. They worried about the possibility that massed Soviet air forces could launch a big and successful strike on alliance airfields, much as Israel had done to shattering effect. A rerun of this in Europe could blunt NATO's airpower edge and undermine the West's overall military position.

France's withdrawal from NATO's unified military command structure in 1966 already had aggravated the air base problem in the crucial Central Region. French territory, which housed nine USAF air bases and numerous Army installations, provided critical strategic depth and lines of communication for

US forces, yet France had demanded the departure of all of these units.

US and NATO plans called for the Air Force to augment its forward based fighter forces with hundreds of additional aircraft from the United States. In response to their eviction from French soil, US forces were soon concentrated on a smaller number of airfields closer to enemy airpower. Moreover, the Warsaw Pact was fielding growing numbers of longer-ranged, more capable aircraft to bolster its offensive strike power.

Many in NATO also studied results from the next round of the Arab-Israeli conflict—the October 1973 Middle East War.

### NATO's Initiatives

Stung by the 1967 disaster, Syria and Egypt had hardened their airfields, and the results were instructive. Because the IAF did not have munitions capable of penetrating the thick Syrian and Egyptian shelters, Israel employed runway attacks.

After F-4 Phantom strikes, the Israelis observed that the Syrian fields were capable of generating aircraft sorties in less than an hour. With sustained attacks, however, the time required for repairs increased to the point that some Syrian pilots were forced to eject from their aircraft because of their inability to find an undamaged landing surface.

After flying hundreds of sorties against Syrian and Egyptian bases, however, the IAF was able to destroy only an estimated 22 enemy aircraft on the ground—compared to more than 400 just six years earlier. The hardening had made the main operating bases much tougher targets.

Recognizing the danger of airfield attacks, NATO planners worked diligently to mitigate the threat to its air forces.

One critical initiative was the Collocated Operating Base program. The COB program would expand the number of available combat airfields, which would reduce force concentration and decrease vulnerability.

By 1984, the US had agreements to some 60 COBs in Europe, with plans to develop similar agreements with Greece and Turkey. In NATO's Central Region alone, USAF planned to operate from almost 30 fighter COBs in addition to its roughly 20 main fighter bases. Some strategists argued that NATO should move to an even more dispersed posture by operating small flights of aircraft from roads or other dispersed airfields, but the logistics required to support such

operations made the concept highly unattractive.

A second initiative called for raising the lethality of NATO's air defenses. This was accomplished in several ways: by fielding advanced air superiority fighters armed with advanced missiles; by replacing advanced surface-to-air missile systems such as Patriot batteries in the forward and rear area missile belts; by adding better radars to maintain coverage; and by developing procedures to coordinate defensive activities.

Attacking enemy fighters would need to fly through a gantlet of short-range guns and missiles, then radar guided SAMs, and finally NATO fighters.

NATO worked to increase its offensive striking power by fielding more capable strike forces to take the war to the enemy's bases. These included such aircraft as the European Tornado and USAF's F-111.

The alliance also developed and fielded more lethal specialized weapons to attack airfields, such as the French-US Durandal runway penetrator and Britain's JP 233, a pod containing both runway-cratering munitions and area-denial mines.

Finally, NATO, recognizing that there would always be "leakers," embarked on an extensive base hardening program. By the end of the Cold War, approximately 100 of some 400 fighter-capable airfields in NATO featured hardening. The most visible symbol of this effort was the erection of protective shelters (known in USAF as TAB-Vs) for aircraft and maintenance gear.

These large shelters, shaped like a half-cylinder, were equipped with heavy doors and their own power generation systems. The hardened aircraft shelters offered protection from blast and fragments (but typically not a direct hit), and can still be seen dotting the landscape of Europe. Other, smaller shelters were constructed to provide protection to air base personnel and flight crews.

The critical question was this: How would the various NATO initiatives fare in the face of sustained Warsaw Pact attacks?

The RAND Corp. had developed a highly detailed computer simulation of an airfield that, in the early 1980s, indicated Warsaw Pact strikes against USAF bases in Europe during the first week of hostilities would cut sortie generation rates by almost 40 percent and destroy 40 percent of deployed aircraft. Such results would obviously severely damage the alliance's military position.





**Snow-covered F-16 mock-ups crouch on a Salty Demo "runway" at Spangdahlem AB, Germany. USAF also built a parallel operating surface to realistically assess repair techniques following the Salty Demo "attacks."**

Another group of RAND analysts stated in the mid-1980s, "In Europe, main operating bases (MOBs) and support equipment previously thought survivable may become extremely vulnerable." These were, at best, educated guesses. Nothing could take the place of real-world experience, but the Air Force thought an exercise might answer some questions. USAF therefore thought up Salty Demo, the purpose of which was to provide a realistic assessment of the various NATO initiatives.

Maj. Gen. Lawrence E. Day was the wing commander at Spangdahlem during the Salty Demo exercise. In an interview long after the event, Day recalled that the wing spent about a year preparing and practicing for the exercise.

In the buildup, Spangdahlem's manpower was increased significantly—the Air Force housed around 1,500 additional people in a tent city outside the airfield. Among these were an additional 25 explosive ordnance disposal personnel. The Air Force also deployed heavy construction gear: bulldozers, excavators, dump trucks, and heavy equipment operators to help repair damaged runways and facilities.

Finally, USAF built a new parallel operating surface to realistically test runway repair techniques following test explosions. The additional runway would also provide operating surface redundancy when the exercise was over.

US planners estimated the number of Warsaw Pact strike aircraft that would penetrate NATO's defenses. The Air Force then simulated an attack of "moderate severity" on Spangdahlem.

For training realism, the 50th Tactical Fighter Wing at nearby Hahn Air Base

conducted the simulated attacks, hitting Spangdahlem two or three times a day using raids of 16 aircraft delivering 30 to 40 weapons per attack.

Evaluators then calculated the damage, hung "damaged" placards on buildings, turned off power to simulate the cutting of electrical lines, and told some personnel that they had become "casualties."

### When Everything Goes Wrong

"The results were a sobering demonstration of the synergistic chaos that ensues when everything goes wrong at the same time," wrote John T. Correll in *Air Force Magazine's* 1988 review of the exercise.

Correll's article went on: "Thirty-one percent of the base's personnel were casualties, half of them killed and nearly a third of the wounded unable to return to duty. There was considerable

destruction and heavy damage to aircraft, vehicles, buildings, communications, and power systems. ... Fires burned all over, and unexploded ordnance lay about everywhere. It was difficult to assess the damage accurately. Repair teams were shorthanded and, in some cases, did not have the equipment and supplies they needed."

Day, reflecting on the results, said properly delegating authority is critical to operating an air base under attack. He delegated flying operations to his director of operations and focused his attention on "fighting the base."

Following an attack, Day noted, the most important issue was to get a damage assessment. How many personnel were killed or injured? Which surfaces and facilities were damaged? Were submunitions scattered about? What were the locations of unexploded ordnance? Was it possible for aircraft to launch from the remaining surfaces? If not, which craters had to be repaired first?

Once a picture of the damage was formed, Spangdahlem's staff had to prioritize repair efforts. Decisions on where aircraft should land, which take-off surfaces could be used, and how to coordinate sortie generation activities were complex but needed quickly.

Communications were not a major problem: Spangdahlem had multiple buried landlines, and if these were cut, personnel could use backup radios.

Besides people, the most critical resource turned out to be heavy equipment. Day said this machinery was used 24 hours a day in the exercise and was so critical he elected to put it in shelters to protect it. With the airfields and structures requiring constant repair,



**Mock F-16s were placed on a fake flight line to simulate what would no doubt be a tempting target for enemy firepower.**





**An armored bulldozer clears debris and live ordnance from the runway after one bombing run during the base survivability exercise.**

Day was paradoxically willing to lose an aircraft, but not a bulldozer.

The loss of the wrong piece of heavy equipment could totally shut down sortie generation capability.

Another critical piece of equipment was the mobile arresting gear supplied by the Marine Corps. If a runway was damaged, Spangdahlem's staff would plot out a surface to recover aircraft, fill craters if necessary, and then position the arresting gear.

In Salty Demo, the Air Force did not simulate losing fuel. Spangdahlem was supplied by three large above-ground tanks, and fuel trucks distributed the fuel to fighters. Yet if the tanks were lost, the base would have to shut down operations until alternative means (such as bladders) were positioned.

Power supplies, which Day had been concerned about before the exercise, did not prove a significant problem. All important buildings and shelters had been equipped with emergency backup power generators. The wing had prepped these during the buildup to the exercise and rarely had any problems—Day said the generators were “in tip-top shape.”

A few times, people forgot to fill fuel tanks, causing a short-term blackout, but these cases were rare.

A variety of alternative techniques—quick-set concrete, slabs, and aluminum planks—was employed to heal the dozen jagged craters left by test explosives on the newly constructed alternative launch and recovery strip.

All three techniques proved successful; the wing was able to conduct takeoffs and landings on the alternate runway after the repairs.

“We were impressed by how much we learned going through it, compared

to what we thought we knew,” Day said after the exercise. “We were impressed that we could fly at all, given all the damage.”

### Severe Degradation

It became clear that NATO's bases needed an adequate supply of bulldozers and a tank-like specialized vehicle to sweep mines. Maintaining sufficient manpower was an important issue. The tent city housing the 1,500 additional personnel was deemed off-limits to attack, but without these airmen, air base operations would have been difficult.

The Spangdahlem staff also found that access to the operating surfaces from the shelter complexes was a major headache.

Single runway, opposite direction takeoffs and landings had to be used frequently to get aircraft back to available shelters.

As a result, additional access points to the runways and taxiways were added in subsequent years.

Day concluded that to operate effectively under attack, the Air Force needed to exercise under those constrained conditions more regularly.

Even with all the preparation, Day felt that USAF had a lot to learn to effectively manage the “recovery after attack” phase. It was critical to establish the repair priorities for sortie generation. The unit had the aircraft, the aircrews, and the munitions but needed to find better ways to get them airborne.

“The results,” said Tidal W. McCoy, then assistant secretary of the Air Force for readiness support, “showed even a fairly moderate Soviet attack could reduce our ability to generate sorties. The degradation was especially severe in the first critical week of this demonstration.” McCoy also observed that the outcome of the simulated attacks proved a “shock” to the Air Force.

Over the next several years, Air Force planners developed detailed proposals to coordinate air base improvements. With the knowledge provided by Salty Demo, the Air Force proposed to commit significant resources to:

- Better defend against attacks by enemy special operations forces and commandos.
- Construct more personnel shelters.
- Develop and deploy better chemical suits.
- Increase use of camouflage, concealment, and deception.
- Improve the damage assessment process.
- Deploy more heavy construction vehicles, including armored bulldozers.
- Increase the number of operating surfaces and taxiways.
- Deploy more sets of mobile arresting gear.
- Stockpile runway repair equipment and supplies.

Before the project could get firmly under way, however, history intervened. The Soviet Union began to wither, Warsaw Pact satellite states began to pull away, and the Cold War began to flicker and fade out. In turn, the US defense budget went into decline, and only the most critical military construction projects managed to get funding. Moreover, Congressional enthusiasm for spending money on airfields in Europe was never strong, and the lessening of the threat there only increased the antipathy on Capitol Hill.

The Air Force did carry out some of the planned improvements, but did not come close to executing the full range of initiatives envisioned in the air base operability program. Those monuments to the Cold War—the hardened aircraft shelters and runways—will remain in Europe for decades to come. ■

*Christopher J. Bowie has held a variety of positions with RAND Corp., the aerospace industry, and the Air Force. He served recently as USAF's deputy director for strategic planning and today is director of strategic studies for Northrop Grumman Integrated Systems. His last article for Air Force Magazine, “How the West Would Have Won,” appeared in the July 2007 issue.*



To deal with ballistic missiles, the US has assembled an impressive defense system. Will it work as advertised?

# Bullet Vs. Bullet

By Richard Halloran



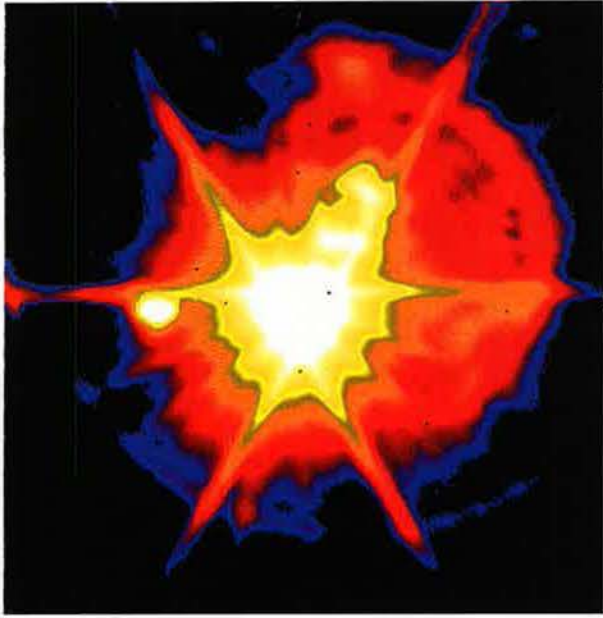
Photos by MDA

**T**he next time that North Korea launches a ballistic missile, the projectile will be sighted by a Japan-based US radar perched on a bluff overlooking the Sea of Japan and turned west to face the Korean peninsula.

That radar is the sharp point of a highly sophisticated US-led tracking system that would quickly spring into action.







*Opposite page l-r: The Dec. 5, 2008 launch of a ground-based interceptor at Vandenberg AFB, Calif., and the launch of the long-range target it successfully intercepted out of Kodiak, Alaska. Here, an infrared image of the collision.*

Image courtesy of MDA

Some moments after the radar “sees” that North Korean missile, the weapon would be picked up by the Cobra Dane radar, a national intelligence sensor, on Shemya in the Aleutian Islands. At about the same time, the missile would be detected by another radar, encased in what looks like a giant golf ball and floating aboard a barge off the Alaskan coast.

Next to pick up the North Korean missile would be a satellite over the Pacific Ocean, the radar of a US Navy Aegis destroyer or cruiser sailing in the north Pacific, and yet another radar at Beale AFB, Calif.

All of this missile data will be instantly transmitted to a USAF command center at Yokota AB, Japan, west of Tokyo, where the take will be shared with Japan’s Self-Defense Forces. The data will be flashed to the 613th Air and Space Operations Center at Hickam AFB, Hawaii, and the US Pacific command operations center on a hill overlooking the US Navy base at Pearl Harbor.

At the same time, fused data will be sent on to the US Northern Command operations center at Peterson AFB, Colo., the US Strategic Command underground operations center in Omaha, Neb., the National Military Command Center in the Pentagon, and the Situation Room in the White House.

Simply put, many military commanders and the Commander in Chief will be warned of the missile launch instantly and almost simultaneously.

On those screens will appear a tracking “fan” covering potential targets,

with nontargets disappearing as sensors get a better fix on the missile’s trajectory. “That fan narrows pretty fast,” said Lt. Gen. Loyd S. Utterback, commander of Pacific Air Forces’ 13th Air Force at Hickam. “The computers tell us where the missile will hit and where we can hit it.”

### All in the Planning

Ballistic missiles speed through three phases: Liftoff and boost, mid-course (when they leave behind their rockets and may shoot out decoys and multiple warheads), and terminal—when they hurtle toward their targets. Shooting down a speeding warhead anywhere in that sequence is akin to hitting a bullet with a bullet, but it’s been done before. DOD’s Missile Defense Agency, which is developing America’s missile defenses, plans to succeed with such intercepts.

For a defensive “bullet” to hit an attacking “bullet” requires sorting through many variables and rapidly integrating the relevant data: missile launch points, sensors, trajectories, possible targets, and data on the interceptors themselves.

MDA says it has plotted more than 50 scenarios, called Engagement Sequence Groups, for the computers to sort out. “It’s all in the planning,” said Rear Adm. Charles Martoglio, PACOM’s operations director.

In the scenario of the North Korean missile launch, the integrated defense is designed by MDA and actually executed by the Air Force, Navy, and Army. Computers at Ft. Greely, Alaska,

would begin selecting interceptors to fire at the incoming missile from either Ft. Greely or Vandenberg AFB, Calif. Another fire control center does the same at NORTHCOM.

For all the high-tech glitz of this system, however, the “man in the loop” makes the decision on whether and when to pull the trigger. If the missile were aimed at Honolulu, it would take 23 minutes to get there. That would give the NORTHCOM commander, Air Force Gen. Victor E. Renuart Jr., fewer than 20 minutes to confer with the Defense Secretary or possibly the President before making a decision to fire.

If the target is in PACOM’s area of responsibility but outside of Alaska or Hawaii, that firing decision would fall to the PACOM commander, Adm. Timothy J. Keating.

This decision would not be as sudden as it sounds, because there may be days or even weeks of strategic signals providing warning of a pending launch. Utterback puts it this way: “Having a man in the loop started long before that missile was launched.” He means that US officials had been watching and listening to key factors all along.

First is the general state of US relations with potential adversaries.

Second is a coiling of forces indicating a strike is planned. North Korea’s missiles require liquid fuel, which takes time to pump.

There may be less strategic warning of a pending Chinese ballistic missile launch, because most of China’s missiles are solid fueled, ready to fire, and mounted on hard-to-locate mobile launchers.

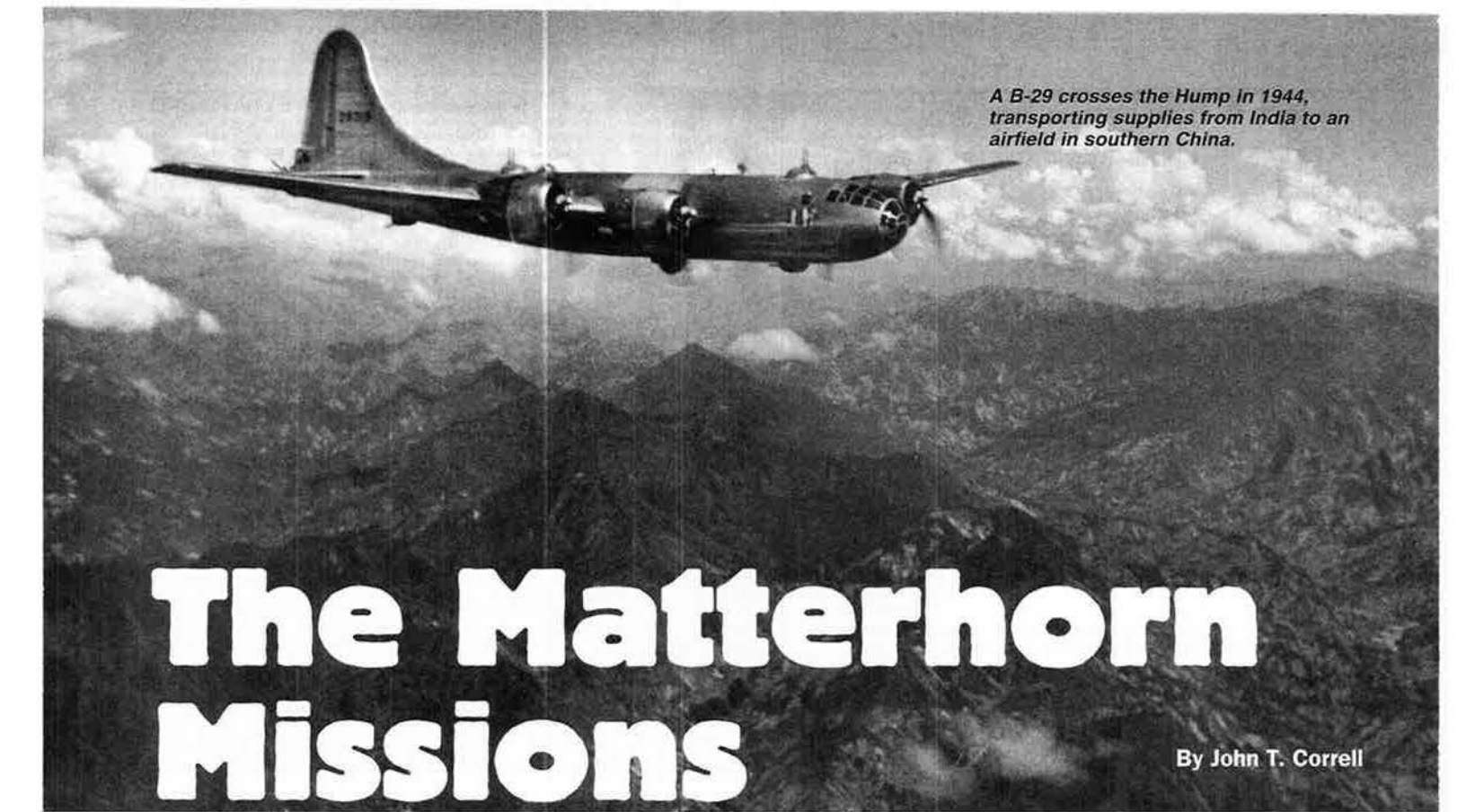
“We watch capability more than rhetoric or intent,” said Martoglio. “Intent can change on a dime but capability can’t.”

In recent decades, large ballistic missiles have proliferated as the technology has spread. Where nine nations had them in 1972, the Arms Control Association now lists 32 missile-packing nations, from Afghanistan (where Soviet invaders left behind Scuds after withdrawing in the 1980s) to Yemen, which had been acquiring Scuds from North Korea.

MDA cited more than 100 foreign ballistic missile shots in 2007 and a similar number in 2008.

Initially, the threat from North Korea drove America’s land-based ballistic missile defenses. Daniel A. Pinkston, a specialist on North Korea’s missile





A B-29 crosses the Hump in 1944, transporting supplies from India to an airfield in southern China.

# The Matterhorn Missions

By John T. Correll

**The B-29 was rushed into production and sent to India to strike at Japan through staging bases in China.**

**W**hen the Army Air Forces got the B-29 Superfortress, the United States finally had a weapon to strike the Japanese homeland. There had been no US aircraft over Japan since the Doolittle Raiders bombed Tokyo in April 1942, but the B-29, with a combat radius of more than 1,600 miles, was about to demonstrate the vulnerability of Japan.

The Boeing Superfortress was the first airplane to be classified as a very heavy bomber. It had more speed, range, and payload than its predecessors, the B-17 and the B-24, which were rated as heavy bombers.

So great was its promise that the B-29 was rushed into production and then rushed into war. The purchase order for 1,664 airplanes was placed before the first prototype flew. Production aircraft rolled off the line in 1943 before flight tests were completed. It was the most complex airplane US industry had ever built and it went into operation before the bugs were worked out.

Fortunately, the pilots and copilots were handpicked men with experience in B-17s and B-24s. Late deliveries of aircraft cut training in the United States to an average

of 30 hours per man for the first crews deploying to combat in 1944. Few had ever fired the guns or dropped a bomb from their B-29s before departing.

Most critical of all, proper bases were not available. The B-29 could have reached every important target in Japan from the Marianas—Guam, Saipan, and Tinian—but the islands were still in Japanese hands. The Soviet Union would not allow its US ally to operate from eastern Siberia, which was only 700 miles from Tokyo. Parts of Japan were within range from western China, but it was not feasible to have main operating bases there. The Japanese held all of the seaports and strategic waterways and had cut off the land access route from the west, the Burma Road.

The solution hit upon was Operation Matterhorn, which called for basing the B-29s in India and staging them through forward airfields in China to strike at targets in Japan, Manchuria, and east Asia. They would be sustained by ammunition, fuel, and other military supplies, every pound and gallon of which had to be flown across the “Hump” of the Himalayas to the China bases. Tankers and transport aircraft were in short supply, so the B-

29s had to do much of their own hauling, initially including all of the fuel used on missions flown from China.

“The scheme of operations had been dreamed up like something out of ‘The Wizard of Oz,’” said Gen. Curtis E. LeMay, the officer who commanded the operation at its peak. “No one could have made it work. It was founded on an utterly absurd logistic basis. Nevertheless, our entire nation howled like a pack of wolves for an attack on the Japanese homeland. The high command yielded. The instrument wasn’t ready, the people weren’t ready, nothing was ready. Folks were given an impossible task to perform.”

Impossible or not, the four B-29 bomb groups of XX Bomber Command from June 1944 to January 1945 tried valiantly to make the Matterhorn plan work, flying combat missions in one of the most complicated strategic operations ever attempted.

Much of the push to get the B-29 in action came from President Roosevelt, who wanted to buck up flagging Nationalist Chinese spirit and keep China in the war. Roosevelt promised the Nationalist leader, Chiang Kai-shek, that bombers would strike Japan from China.



Roosevelt was displeased when operations did not begin in 1943 and groused that, if the B-29s were not ready, "we have several other types of bombing planes." As Roosevelt knew full well, the bomber with the next best range, the B-24, could not reach Japan, but Gen. H. H. "Hap" Arnold, Chief of the AAF, got the message.

Arnold was under pressure to make an expensive program pay off. Development of the B-29 had cost \$3 billion; by comparison, the US would spend only \$2 billion for the entire Manhattan Project to develop the atomic bomb.

Arnold needed to establish a strategic plan for the B-29 before one of the other theater commanders could grab it. Both Gen. Douglas MacArthur in the Southwest Pacific and Adm. Chester W. Nimitz, who commanded the broad sweep of "Pacific Ocean Areas," wanted the B-29 to support their surface campaigns. The Joint Plans Committee was inclined to give it to MacArthur, whose air chief, Maj. Gen. George C. Kenney, proposed to base the B-29s in Australia and use them against regional Japanese installations.

Rather than dribbling the B-29s out on tactical targets, Arnold wanted to use them as strategic weapons against Japan to achieve results that might shorten the war. To keep them out of the hands of regional ground commanders, Arnold sold the idea of a strategic air force—Twentieth Air Force—which he would command himself as executive agent of the Joint Chiefs of Staff.

All of the B-29s were assigned to Twentieth Air Force. A subordinate element, XX Bomber Command, was activated in November 1943 and began training at Smoky Hill Field near Salina, Kan., with two bomb wings.

Constant churning of the program made it even harder to bring B-29s on line on an accelerated schedule. Even before the first test flight, military officials had ordered some 900 modifications, and they kept coming. Deliveries fell behind, and there were not enough airplanes for training.

Arnold went to Kansas March 9 to see the B-29s off to war and discovered that none of them were ready to go. The famous Arnold temper erupted in what became known as "The Battle of Kansas" and a crash program had the first 11 B-29s deploying to the combat theater by the end of March, with more to follow.

The Joint Chiefs of Staff approved Operation Matterhorn, directed at targets in Manchuria and Kyushu, the southernmost of the Japanese home islands, which could be reached from bases in

China. XX Bomber Command and one of its bomb wings, the 58th, deployed to the south of Bengal state in India. The other wing, the 73rd, was held in the United States until bases were available in the Marianas.

The first commander of XX Bomber Command was Brig. Gen. Kenneth B. Wolfe, who had been in charge of the B-29 production, testing, and training program. His headquarters in India was at Kharagpur, about 90 miles west of Calcutta. Each of the 58th wing's four bomb groups had a base in Bengal. The four forward bases in China were 1,000 miles to the northeast, around Chengtu, the capital of Szechuan Province. By May 1944, Wolfe had 160 B-29s in India.

### Arnold Pushes for a Large Strike

Modification kits followed the B-29s to India as shakeout of the new system continued under combat conditions. It was tough going. The aircraft in-commission rate in July was 27 percent and 36 percent in August.

The worst problem was the powerful Wright Cyclone R-3350 engine, which had a tendency to overheat and catch fire. Accidents, crashes, ditchings, aborts, and diversions were common events. Eventually, the original R-3350-13 engines were replaced with improved R-3350-21s.

According to James L. Pattillo, a former B-17 instructor pilot and one of the first B-29 pilots, the "engine was a disaster the first year in combat, but as [it] became more reliable, noticeable by May-June 1945, the B-29 proved to be the world's best heavy bomber of World War II and a good, reliable airplane."

The first B-29 combat mission was not against Japan and did not use the China bases. On June 5, Wolfe launched 98 bombers from their bases in India against the Makasan railway yards in Bangkok. More than a dozen B-29s aborted, but 77 hit the target. It was officially rated an operational success but the damage inflicted was modest.

Arnold was pressing for a large strike on Japan. On June 15, Wolfe finally had enough fuel pre-positioned in China to send the B-29s, on their second combat mission, against the Imperial Iron and Steel Works at Yawata on Kyushu. They left Bengal battle loaded, refueled in China, and flew their 3,200-mile round-trip mission from there. Of the 68 bombers launched from the China bases, two crashed, 10 had mechanical problems, and nine diverted to other targets. Forty-seven of them reached Yawata, which was obscured by cloud cover. Most of the B-29s bombed by radar and there was only one direct hit on the iron and steel works. Some of the bombs landed miles away. However, the eight news correspondents who went along on the mission filed favorable reports and the new vulnerability of the Japanese islands to air attack made the front pages of newspapers in the United States.

On July 4, Arnold relieved Wolfe, who was not meeting his expectations, and the 58th Bomb Wing commander, Brig. Gen. LaVerne G. Saunders, took over XX Bomber Command temporarily. No successor was named to command the wing, which faded into the background, and, under an organizational realignment, the four bomb groups reported directly



Brig. Gen. Kenneth Wolfe (second from left) and XX Bomber Command officials exhibit a B-29 to British Adm. Louis Mountbatten, supreme allied commander, Southeast Asia Command (far right), and his staff at an air base in India in 1944.





**B-29s tasked to fly cargo missions over the Himalayas displayed their mission count with camel silhouettes. A camel symbolized a "hump."**

to XX Bomber Command for the rest of their time in India.

Maj. Gen. Curtis LeMay, who had achieved great success as a B-17 commander in Europe, arrived Aug. 29 to head XX Bomber Command. LeMay, 38 years old, was the youngest major general in the Army Air Forces.

For LeMay, as it had been for Wolfe, the biggest drag on the operation was getting supplies, especially fuel, to the forward bases in China. Air Transport Command was running a regular airlift over the Hump to its main terminal at Kunming, 400 miles south of Chengtu. ATC had its hands full supplying the US Fourteenth Air Force and Chiang Kai-shek's forces and was limited in the support it could give to Matterhorn. Thus, XX Bomber Command carried a substantial amount of its own cargo to the forward bases, using B-29s and three assigned squadrons of C-46 transports.

Fuel was the critical commodity. Air Transport Command did not haul gas to China for XX Bomber Command until the last part of 1944, so the B-29s had to do it. Combat B-29s could carry three tons of aviation gasoline in tanks temporarily installed in their bomb bays. Some of the B-29s were converted to tankers, with all of their combat equipment except for tail guns and basic radar stripped out. They could carry seven tons of fuel.

"It meant seven flights with a B-29 off-loading gasoline—just putting on enough gas to get back—to build up a reserve of enough gas for that B-29 to fly a mission against Japan," LeMay said.

Other supplies had to be brought forward as well, and in all, 12 round-trip

flights over the Hump were required to support one combat sortie. For a time in late 1944, Pattillo was the officer in charge of 468th Bomb Group's forward base at Pengshan. "The motor pool of each advanced B-29 base consisted of two Jeeps, two weapons carriers, and two 6 x 6 trucks," he said. The trucks, too large to load onto transport airplanes, had to be cut in half in India and realigned and welded back together in China. "I don't remember ever seeing any emergency equipment, fire truck, [or] ambulance at a XX Bomber Command China base," Pattillo said.

### The Combat Box

"On a typical mission, we would fly up to Chengtu with the bombs loaded on the plane," LeMay later recalled in *Superfortress: The B-29 and American Air Power*, which he wrote with Bill Yenne in 1988. "Once we had a good night's sleep, we would give the crews a briefing, get gassed up and checked out, and we'd be off. We would fly across China in a pretty loose formation, because we didn't get any attacks from Japanese interceptors based there. We'd make a run on the target and come back in the same way.

"We would usually loosen up on the formation coming back to save gasoline, because we didn't get intercepted on the way back either, and anybody who had engine problems could land someplace. The main force of B-29s would get back to Chengtu and then the crews would go to bed for the night. The day after a bombing raid against Japan, we would fly back to India and start all over again. How soon we'd go back to Chengtu for a bombing

mission always depended upon how much gasoline we had up there. It was at least a week, normally, but we'd make flights up there with fuel all the time."

In late 1944, XX Bomber Command received a few dozen C-109s, tanker versions of the B-24 bomber, but soon transferred them, along with most of its C-46s, to Air Transport Command's India-China Division.

LeMay brought with him two innovations that he had introduced and used successfully in Europe: his 12-ship "combat box," which replaced the four-ship formation, the "diamond four," the B-29s had been flying, and the lead crew system, in which the B-29s would drop their bombs on signals from the lead airplanes rather than bombing individually.

"In those days, I was trying to teach my crews to bomb in formation as we had done with the -17s in Europe: Put a pattern of bombs down," LeMay said. "These weren't green crews by any means. They'd been bombing individually at night, but had absolutely no formation training in bombing. So I set up a training schedule to produce formation patterns." He also opened a lead crew school at Dudhkundi, one of the bases in India. The crews called it "Dudhkundi Tech."

"I picked out the lead crews—not necessarily the best crews, but people I had learned would be the ones who were most likely to hit the target regardless," LeMay said. On visual bombing missions, the following aircraft in the formation took their signal from the lead bombardier. When bombing was by radar, the lead radar operator had the responsibility.

Bombing results improved. More of the aircraft taking off reached the target area in the 12-ship box formation. Even LeMay could not solve some of the problems, though. The weather over East Asia and Japan was unforgiving and the meteorological information available to XX Bomber Command was fragmentary. Accordingly, the command was seldom able to take advantage of favorable weather, which was infrequent anyway, for high-altitude visual bombing.

XX Bomber Command pounded Japanese targets in Japan, Formosa, and Manchuria. In October, the Japanese aircraft industry became the priority objective and the aircraft factory at Omura was a regular target. At the request of Maj. Gen. Claire L. Chennault at Fourteenth Air Force, the B-29s struck the main Japanese Army supply base in China at Hankow Dec. 18. They used incendiary bombs, which destroyed the military storage area and left Hankow burning for three days.





**Maj. Gen. Curtis LeMay took over XX Bomber Command in August 1944. Despite improved bombing results, B-29s were pulled from China.**

It was a preview of things to come in 1945, when LeMay would use firebombs with devastating effect against the highly inflammable wood and paper structures in the Japanese home islands.

Before he left China, LeMay gained the support of Mao Tse-tung, the communist leader and the mortal enemy of Chiang Kai-shek but an ally in fighting the Japanese. Mao controlled enormous areas in the north, northwest, and east. Mao, hoping for American recognition of his regime, provided assistance to downed airmen, allowed LeMay to put a radio relay station at Yen-an, and improved an emergency landing field at Yen-an for the use of B-29s. "General Mao offered to build airdromes for us up in the north," LeMay said. "He told me, 'I can construct any number you wish.' I replied that frankly we couldn't supply the ones we already had, down there in Chengtu."

Meanwhile, US forces had captured the Marianas. From there, the B-29s could reach targets in Japan—including Tokyo—that were beyond range from China and they could obtain their fuel from tanker ships at local harbors. The first B-29s landed on Saipan Oct. 12, and XXI Bomber Command, headed by Brig. Gen. Haywood "Possum" Hansell Jr., flew its first combat mission Oct. 28. The first strike on Tokyo was Nov. 24.

XX Bomber Command under LeMay regularly got better results than XXI Bomber Command under Hansell, but the disadvantages of operating from China were so overwhelming that in December, the Joint Chiefs of Staff decided to phase out Operation Matterhorn and transfer

the B-29s and their crews to Tinian. In January 1945, XX Bomber Command stopped operations from the China bases and pulled back to India. The last mission from China was flown against Formosa Jan. 15.

#### **Legendary Success for LeMay**

Arnold was not satisfied with Hansell and brought LeMay to Guam to replace him as commander of XXI Bomber Command Jan. 20. Pushed relentlessly by LeMay, the B-29s finally achieved their full potential in the months ahead.

Brig. Gen. Roger M. Ramey took over at XX Bomber Command, which continued to fly missions from India through March in support of the allied Southeast Asia Command. The last mission was a 29-ship attack on Singapore March 30. The aircraft and crews, assigned to a reactivated 58th Bomb Wing, moved to the Marianas to join XXI Bomber Command. XX Bomber Command, no longer operational, was finally inactivated in July.

The effectiveness of the B-29s flying from the Marianas under LeMay's command is legendary—but the preliminary Matterhorn round in the China-Burma-India theater is relegated to a lesser place in history.

From June 1944 to March 1945, XX Bomber Command in India and China flew 49 bombing missions, a total of 3,058 sorties. To put that in some perspective,

Eighth Air Force in Europe flew 62 missions, 5,353 sorties, during a comparable period of its history. The difference was not so much in the number of airplanes assigned. It was mainly because of the logistics peculiar to Matterhorn. The most frequent targets in the Matterhorn missions were Japan (nine missions), Singapore (nine missions), and Formosa (six missions). XX Bomber Command also flew more than 250 photo reconnaissance sorties.

Japanese air defenses fared poorly against the B-29s. The best Japanese interceptors could reach B-29 altitudes, but it took them a long time and most of their fuel to get there. The gun pods on the Superfortress often picked off those that got too close. XX Bomber Command lost only 22 aircraft to enemy fighters, considerably fewer than were lost in accidents.

There was not enough bombing of Japan in Operation Matterhorn to make a strategic difference. The indirect results were more substantial and included rallying the Chinese, demonstrating the vulnerability of Japan, combat testing the B-29, and the maturing of the B-29 force.

It is generally agreed that Matterhorn failed to meet its strategic objectives and was not worth the great effort and high cost. The shortcomings were not the fault of the crews, who persevered and often excelled under difficult circumstances. The Matterhorn missions that employed the main planning premise lasted only seven months. It should be noted that neither Eighth Air Force in England nor XXI Bomber Command in the Marianas achieved much success in their first months either and they did not have to carry their own gasoline over the Hump.

Hansell gave his assessment of Matterhorn at a XX Bomber Command reunion in Fort Lauderdale, Fla., in 1985. "From an operational point of view, it was not a success," Hansell said. "You just couldn't supply B-29s over the Hump and carry on a successful campaign. But from the standpoint of strategic effect, I think it was a tremendous success. If we had not ventured upon that, XX Bomber Command would have wound up in the Southwest Pacific under MacArthur, and the XXI would surely have wound up under Nimitz, the air assault on Japan would have been postponed indefinitely, and surely there would have been an invasion, with enormous loss." ■

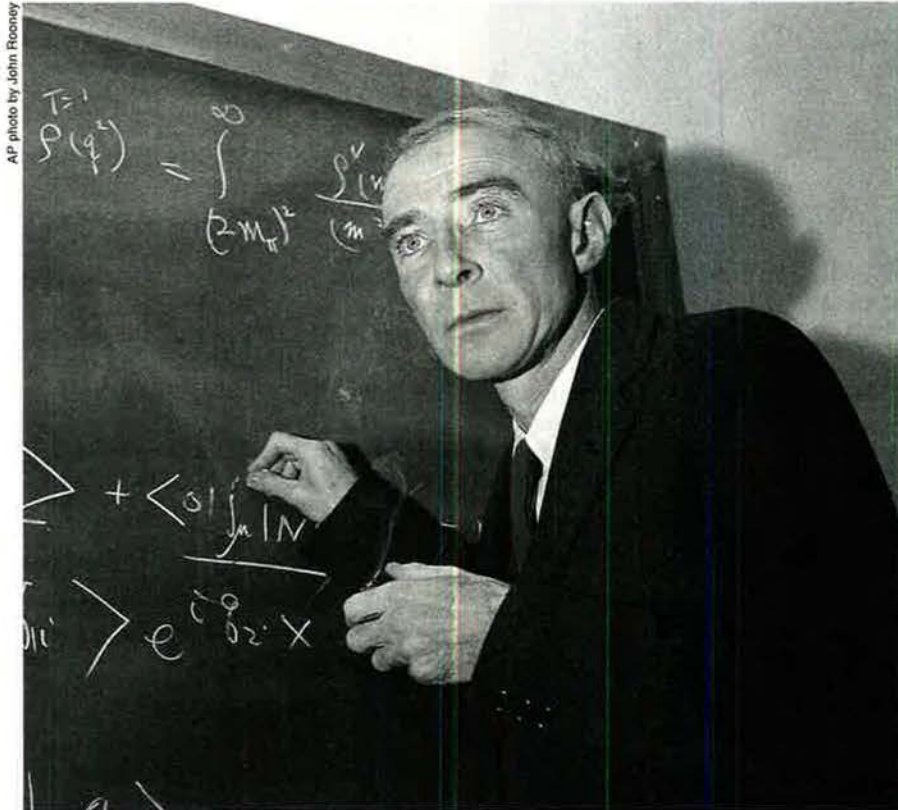
*John T. Correll was editor in chief of Air Force Magazine for 18 years and is now a contributing editor. His most recent article, "Arc Light," appeared in the January issue.*



The nation was divided about the thermonuclear weapon, but Truman concluded, "We have no choice."

# Making the H-Bomb

By Herman S. Wolk



AP photo by John Rooney



AP photo

**D**uring the early years of the Cold War, the United States developed and fielded a hydrogen bomb in the face of repeated military and political provocations by the Soviet Union. The explosion of a Soviet atomic device in 1949, in fact, gave major impetus to the US hydrogen bomb project.

A decision on whether to proceed with a thermonuclear bomb required the US to push the envelope of nuclear technology while memory of the atomic bomb attacks that ended World War II was still fresh. What resulted was a heated controversy among scientists, politicians, the military, and governmental officials ending in President Harry S. Truman's landmark January 1950 decision to proceed.

The United States came out of World War II in sole possession of the atomic bomb, but it was rapidly demobilizing. The push to "bring the boys back home"

reduced the US military from a wartime peak of 12 million to only two million in uniform by July 1946.

The Soviet Union was already casting a shadow over the postwar world. Despite massive wartime material and manpower losses, it had the largest army in the world, and countries in Eastern Europe were being turned into Soviet satellites.

In a historic speech in February 1945, Soviet Premier Joseph Stalin declared that there could be no collaboration between communist countries and "the dying, corrupt" capitalist democracies. Supreme Court Justice William O. Douglas called Stalin's speech a "declaration of World War III," while British Prime Minister Winston Churchill warned that an "iron curtain" was descending across Europe, dividing East from West.

In February 1948, the communist coup in Czechoslovakia sent what Truman called "a shock throughout the civi-

lized world." Then, in June, the Soviets blocked access to Berlin, sealing off land and water routes, threatening two million Berliners with starvation.

In response, the US and Britain organized the Berlin Airlift and Truman approved the movement of non-nuclear Air Force B-29s to the United Kingdom.

Because of these and many other instances of hostility, the US made the decision to build a long-range atomic deterrent force. That decision would actually pose fewer difficulties than the question of whether to develop a thermonuclear bomb.

Truman, a hard-money man, had Defense Secretary Louis A. Johnson reign in defense spending. In conjunction with the Berlin Airlift and the onset of the Cold War, Johnson's tight-fisted budgets in 1948-49 aggravated an already tense roles and missions confrontation between the Air Force and Navy over the atomic mission.



In China, meanwhile, the communists of Mao Zedong had triumphed and driven the Nationalist government to Taiwan. The Alger Hiss trials revealed accusations that a high State Department official had passed government documents to a Soviet agent.

Into this dangerous world of limited resources and Soviet provocation came a world-changing event. On Sept. 3,

the Joint Chiefs, Truman announced on Sept. 23 that the Soviets had exploded an atomic bomb, ending the American nuclear monopoly.

The Administration's austere defense funding continued even in the wake of the Soviet atomic explosion—despite increasing pressure from Congress and the public. Johnson continued to trim the defense budget for Fiscal Year 1950.

building a bomb of enormous power from uranium.

In early 1942, a group of theoretical physicists recruited by Oppenheimer at the Radiation Laboratory of the University of California Berkeley studied the thermonuclear problem. They simultaneously developed the atomic bomb and probed the question of whether nuclei of deuterium, or heavy hydrogen, could



Lawrence Livermore National Laboratory

1949, an Air Force WB-29, flying east of Russia's Kamchatka peninsula, collected a radioactive air sample.

After additional flights, USAF's Long-Range Detection Division informed the Atomic Energy Commission of its findings. The AEC convened a panel headed by Vannevar Bush with J. Robert Oppenheimer, who during World War II had been instrumental in developing the atomic bomb. The AEC panel concluded that the air samples carried products of nuclear fission consistent with an atomic explosion in the Soviet Union in late August 1949.

### End of a Monopoly

Informed scientific opinion in the United States had predicted that a Soviet atomic bomb was years away, but the USSR already had the bomb.

Gen. Hoyt S. Vandenberg, Air Force Chief of Staff, informed Truman of the Soviet atomic explosion. At the urging of

The path to initiating a concerted thermonuclear program remained difficult and controversial. The scientific community was divided about whether to proceed, with many leading scientists opposing an H-bomb project. The controversy became the postwar intersection of science and politics, setting up a tense atmosphere of scientist against scientist.

Theoretical work on the possibility of a thermonuclear reaction—a fusion of small nuclei into larger units, the opposite of fission—began in the US in the 1930s. An expatriate Russian, George Gamow, and Hungarian-born theoretical physicist Edward Teller studied thermonuclear problems centering on the lightest of elements, hydrogen.

Also in the late 1930s, fission was discovered and the possibility of an atomic bomb became a reality. On Aug. 2, 1939, Albert Einstein wrote President Roosevelt, noting the possibility of

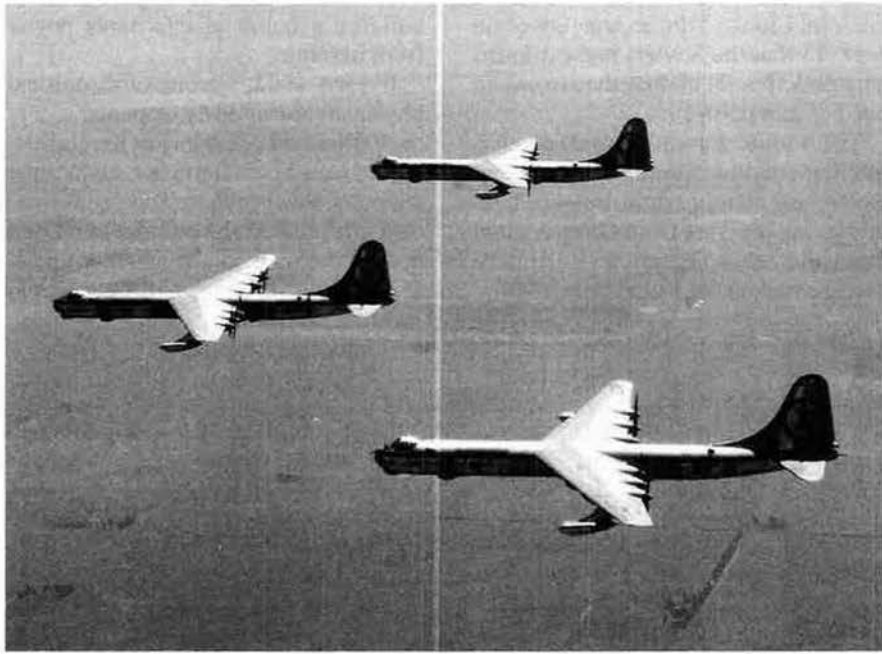
*L-r: J. Robert Oppenheimer at Princeton University. Soviet leader Joseph Stalin, President Harry Truman, and British Prime Minister Winston Churchill at the Potsdam Conference in 1945. Edward Teller, in 1958, as director of Lawrence Livermore National Laboratory.*

be exploded. These physicists became convinced that a thermonuclear explosion could be accomplished.

This work led to Los Alamos National Laboratory's creation in 1943, under Oppenheimer's direction. Oppenheimer was instrumental in the laboratory's founding and he and Teller led the recruitment of scientists to work there. Some small thermonuclear research continued but was clearly secondary to the immediate, intensive work on the atomic bomb—the Manhattan Project, headed by Maj. Gen. Leslie R. Groves.

After the war, many of the physicists left Los Alamos, refusing to work on





**SAC B-36s on a training mission during the Cold War. The decision to build a long-range deterrence force was easier than deciding to proceed with the H-bomb.**

a hydrogen bomb. Some thought the US had no need for a thermonuclear weapon, others felt the Soviet Union was many years from developing their own nuclear weapons.

In any event, there was little support for development of a thermonuclear bomb in the years just after World War II. Then came the Soviet nuclear blast, and much changed right away.

The AEC's General Advisory Committee, headed by Oppenheimer, convened to consider whether to develop a thermonuclear bomb. The AEC's GAC had been created in December 1946 to advise the AEC "on scientific and technical matters relating to materials production and research and development."

The committee unanimously recommended against developing a hydrogen bomb, a decision also supported by three out of five members of the AEC.

"We all hope that by one means or another, the development of these weapons can be avoided," the report stated. "We are all reluctant to see the United States take the initiative in precipitating this development." The committee noted, "The extreme dangers to mankind inherent in the proposal wholly outweigh any military advantage that could come from this development."

A minority report, curiously similar to the majority, signed by Enrico Fermi and Isidore I. Rabi, argued that the H-bomb presented a danger to humanity. It was important for the President "to tell the American public

and the world that we think it wrong on fundamental ethical principles to initiate a program of development of such a weapon," it read.

"I am convinced that if, after Hiroshima, men of Oppenheimer's stature had lent their moral support—not their active participation, but only their moral support—to the thermonuclear effort, the United States would have shaved four years from the time it took this country to develop a superbomb," wrote Teller, who would come to be known as the father of the hydrogen bomb, in his memoir.

### **There Is No Choice**

Following the GAC meeting, but unaware of its formal report, Teller, anxious to tackle the theoretical and engineering intricacies of developing the H-bomb, met with Sen. Brien McMahon, chairman of the Congressional Joint Committee on Atomic Energy. Teller emphasized that proceeding with development was important to the nation's security.

"There was no way to assess the military implications of thermonuclear weapons without knowing more about them," he argued, and McMahon agreed.

Vandenberg testified to McMahon's committee that the superbomb would make the strategic deterrent more effective, becoming the major weapon in the arsenal of Strategic Air Command.

The scientists at Los Alamos needed approval from the top, however. McMahon, AEC commissioners Lewis

Strauss and Gordon Dean, and other members of the Joint Committee on Atomic Energy urged Truman to proceed. Strauss proposed "an intensive effort to get ahead [of the Soviets] with the super[bomb]."

The Joint Chiefs made the case to Truman that the hydrogen bomb "would improve our defense in its broadest sense, as a potential offensive weapon, a possible deterrent to war, a potential retaliatory weapon, as well as a defensive weapon against enemy forces."

Truman then formed a special committee of the National Security Council with Secretary of State Dean Acheson; Johnson; and AEC chairman David E. Lilienthal. This committee recommended that work on the hydrogen bomb proceed with a concurrent re-examination of US foreign and defense policies.

At a committee meeting on Jan. 31, 1950, Truman asked: "Can the Russians do it?" All agreed that they could. Truman replied, "We have no choice, we'll go ahead."

The same day, he publicly directed the AEC to develop the hydrogen bomb. "It is part of my responsibility as Commander in Chief of the armed forces," Truman stated, "to see to it that our country is able to defend itself against any possible aggressor. Accordingly, I have directed the Atomic Energy Commission to continue its work on all forms of atomic weapons, including the so-called hydrogen or superbomb."

The detonation of the Soviet atomic device had been foremost in Truman's decision. Then, within a few days of Truman's announcement, it was revealed in London that physicist Klaus Fuchs, a member of the British Mission at Los Alamos, had been passing atomic bomb data to the Soviets since 1941.

"Atomic bombs in our possession had seemed absolute weapons," Teller said. "Atomic weapons on both sides now seemed to herald absolute uncertainty." Even if the US failed to develop a hydrogen bomb, the Soviets might well build one.

Truman, however, wanted a long-range reassessment that integrated foreign and defense policies into an effective national security program, putting economic and military objectives in priority order. With this in mind, concomitant with the hydrogen bomb decision, he directed a re-examination of foreign policy and strategic plan-





**The first hydrogen bomb exploded at Eniwetok atoll in 1952. It generated the equivalent of 10.4 million tons of TNT.**

ning in light of the Soviets' "probable fission bomb capability and possible thermonuclear bomb capability."

Acheson and his policy planning chief, Paul H. Nitze, headed the State-Defense team that structured the document that became known as NSC-68. It was submitted to Truman in early April 1950 and was still being studied when the Korean War erupted in June 1950. NSC-68 stated a basic incompatibility between the political systems of the US and USSR and recommended a massive defense buildup—including development of a hydrogen superbomb.

NSC-68 estimated that the Soviet stockpile would increase from 20 atomic bombs in mid-1950 to approximately 200 by 1954.

This would bring about an atomic stalemate, while the Soviets maintained their conventional war superiority. "The actual and potential capabilities of the United States ... will become less and less effective as a war deterrent," the seminal document stated. The US would have to maintain "the capability of conducting powerful offensive air operations against vital elements of the Soviet war-making capacity." NSC-68 failed to make specific cost estimates but emphasized that increased defense expenditures were justified due to the critical nature of the threat.

Meanwhile, the Joint Chiefs had recommended "immediate implementation of all-out development of hydrogen bombs and means for their production and delivery."

In March 1950, Truman gave H-bomb research the highest priority.

The developmental challenges were severe. It had yet to be demonstrated that a hydrogen bomb—a quantum jump in nuclear technology—was technically feasible. As Truman described the situation, "Everything pertaining to the hydrogen bomb was ... still in the realm of the uncertain."

### **First, But Just Barely**

There were other difficulties as well. An all-out H-bomb effort would slow the building of the atomic stockpile and divert critical Uranium-235 resources. Above all, the question remained: Would the hydrogen fusion process work?

The answer was not long in coming.

At Los Alamos, Teller and Stanislaw Ulam evolved a design that featured a fission bomb trigger staged with fusion fuel—nuclear fusion resulted from a radiation implosion compressing and igniting the fusion field. This Teller-Ulam trigger design opened the way for development and production of the hydrogen bomb.

At Princeton University, John von Neumann had led the computer calculations for the project, which was extremely important to the Los Alamos hydrogen project.

The first hydrogen bomb was exploded in the "Mike" test at Eniwetok atoll in the South Pacific on Nov. 1, 1952. Teller had left the Los Alamos laboratory and returned to the University of Chicago, and was invited to watch the explosion, generating the equivalent of 10.4 million tons of TNT, at the seismograph at the University of California Berkeley.

"I believe that everyone who was closely or distantly connected with this effort—along with those who have made subsequent contributions—was driven by the knowledge that the work was necessary for the safety of our country," he said.

Teller then supported the opening of a second laboratory—opposed by Oppenheimer—which subsequently was established at Livermore, California.

Physicist Harold Brown joined the Lawrence Livermore Laboratory when it opened, became its third director, and in 1965 was named Air Force Secretary. At Livermore, Brown led the drive to improve the effectiveness of thermonuclear weapons in cost, yield, and weight.

The hydrogen bomb was successfully developed despite the opposition of many in the scientific community—Oppenheimer, Fermi, and Einstein among them. These scientists opposed the H-bomb project primarily on moral grounds.

Teller himself became a controversial figure, some scientists arguing that his fixation with developing a megaton-yield device—rather than a high-kiloton yield—actually slowed development of the H-bomb. In 1954, Oppenheimer ignited another controversy when, after an AEC hearing, his security clearance was revoked due to his associations with members of the Communist Party.

The importance of the H-bomb decision was made manifest when in August 1953—just nine months after the first US hydrogen explosion—the Soviet Union announced its own thermonuclear explosion and then conducted its first major hydrogen bomb test in November 1955.

Truman's final decision to go ahead with the H-bomb project showed that the nation was prepared to do whatever it thought necessary to preserve the US edge in strategic nuclear deterrence during the Cold War. ■

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*Herman S. Wolk retired as senior historian, US Air Force History Support Office. He is the author of The Struggle for Air Force Independence, 1943–1947 (1997) and Fulcrum of Airpower (2003). His most recent article for Air Force Magazine, "Mason Patrick's Inside Game," appeared in the July 2007 issue.*



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In the schools around Eglin AFB, Fla., Leo Murphy has created a regional aviation hotbed and a pipeline to college. For that, he is AFA's National Aerospace Teacher of the Year.

# Expanding the Envelope

By Bruce D. Callander



Leo Murphy directs Okaloosa County aviation programs.



Murphy supervises high school student Kristi Klaburn as she operates the Link Trainer.

**A**fter serving for 30 years as a Navy aviator, Leo F. Murphy decided to try his hand at teaching in the civilian world. Today, he oversees aviation programs in five high schools, runs similar courses in elementary and middle schools, and teaches night classes at the undergraduate and graduate levels.

His role in creating an aviation institute program for schools in Okaloosa County, Fla., earned him the Air Force Association's 2008 National Aerospace Teacher of the Year Award. Murphy is credited with incorporating guest speakers, field trips, and hands-on activities to get his students excited about careers in aviation and aerospace.

"I'm really fortunate because my students are interested in flight, and because of that, we share a common bond," said Murphy. "They want to be there with us and learn about flying."

In addition to his teaching, he developed a low-cost, local college degree completion alternative that allows his

students to live at home and attend nearby state junior colleges and universities to obtain degrees in aeronautics. He is also a member of the Embry-Riddle Aeronautical University faculty in Daytona Beach, Fla.

He has extensive aviation credentials. After earning his wings at Pensacola, Fla., Murphy served with a P-3 squadron flying the Orion in anti-submarine warfare duty. He served aboard ship and was stationed at bases in Bermuda, Iceland, and Hawaii, and retired as a lieutenant commander.

When Murphy was stationed in Pensacola as director of the Navy's Aviation Training School, nearing retirement, he decided to get a master's degree from Embry-Riddle.

Teaching a night school course for the university, he learned of a new aviation program in Okaloosa County. Murphy visited the school and wound up accepting the position as director.

"I was an instructor my whole Navy career," he said. "From my first squadron

on, I was either a ground or flight or simulator instructor and I really enjoyed teaching."

Murphy noted that the more senior officers become, the more mentoring they tend to do, and he had "plenty of podium time" as well.

The program Murphy signed on for originally was designed for only one high school, Choctawhatchee (commonly shortened to Choctaw) in Fort Walton Beach. About two weeks before school started, however, he was asked to start a second program at Crestview High School, about 30 miles away.

Then, the schools that feed students to the first two were added to the program. Students from Niceville and Fort Walton Beach are bused to Choctaw, while those from Baker and Laurel Hill are brought to Crestview.

The program continued to expand. The second year, the middle school teachers asked for their own program. "So I started a program with middle



school students and shortly after that, the elementary school teachers said, "What about us?" Murphy recounted. "So I now have elementary, middle, and high school programs, and I also teach night school at Choctaw High School."

Also offered are both undergraduate and graduate classes, so "we have parents sitting in their children's classrooms at night working on their bachelor's or master's degrees. That means that the whole program now spans elementary through master's degrees."

Okaloosa was the first Florida school district to offer a course in unmanned aerial vehicles, flying model aircraft. Students learn to build and program their UAVs.

Murphy credits Cindy Gates, Choctaw principal, with having the vision to support aviation and aerospace education. He also praises his Choctaw mentors—Judy Ring, Judy Kane, and Valerie Chubb—with helping him transition from teaching naval officers to teaching high school students. They told him to cut his syllabus from 15 pages to two.

This year, for the first time, the program began offering a program at Niceville High School as well. Murphy said serving the schools means driving 120 miles a day in some cases.

Murphy's classrooms are full of models and training aids. Explaining them, Murphy said, "I'm a big scrounger."

For example, he read in a magazine where someone had obtained and restored a Link Trainer, and he thought that would be nice to have for his courses. Up to that point, he had only seen them in museums, but this professor was using one in an engineering program. Murphy called him, and the professor said they will occasionally pop up on eBay. Then, sure enough, one did show up and Murphy got a grant to buy it. He and his son flew to Cleveland at their own expense and rented a truck to bring it down.

He found a retired engineer at Eglin AFB, Fla., who was able to restore it. The engineer told him he was lucky because the Link ran on vacuum tubes, and younger engineers have never seen one.

There was trouble with the trainer, however. The Link had a bellows arrangement supporting it and, when they put a large high school student into it, the trainer leaned to one side. A former World War II pilot explained that the problem was that the student was con-

siderably heavier than the typical pilot from that era.

Murphy found a second Link, got another grant to buy it, and he and an assisting engineer combined the parts to make the trainer sturdy enough to hold a varsity lineman.

### Out in the Field

Another time, Murphy learned that a nearby museum had a large model of the Wright brothers' first powered airplane, about two-thirds the size of the original Wright Flyer. The model had been built for the centennial celebration of the first flight, and the institution no longer wanted it.

Murphy recruited a couple of the students' fathers who had helped with projects, and they drove to the museum, disassembled the model, brought it back, and reassembled it. The Wright Flyer now hangs in the Choctaw classroom.

Murphy has seen similar models selling for more than a million dollars.

One of Murphy's former students, Kevin Yates, spoke to a Choctaw class on his job as a helicopter medic. Not only did he tell about the duty, he brought the crew and helicopter with him to give the students a close-up view.

When he can't bring aviation into the classroom, Murphy takes his students to where it is happening. Twice a year, he teams with the Young Eagles program of the Experimental Aircraft Association to give his students a field trip to an airport. The EAA group gives young people age 8 to 17 an opportunity to fly in a general aviation airplane.

In 2006, the field trip was to Crestview's airport, where a friend of Murphy's brought in a World War II primary trainer, the PT-23. The friend, retired Maj. Jim Jansa, bought the airplane when he was stationed in Maine and flew it on weekends. Jansa had sold the trainer in the early 1950s but found it in a barn on a return trip to Maine years later. Jansa bought it back and restored it.

Murphy said there are three levels of training. "First is a boring lecture from me," he said. Second is flight simulators. Third is when "you get into a real airplane—and now the classroom is bouncing up and down," Murphy said. "You should see the looks on their faces when they come off the first airplane flight in their lives."

Most of Murphy's courses now fall into the elective category, but he hopes that will change as the classes become more popular. However, there is a lot of competition for students' time. "High school students' schedules are getting fuller and fuller," he said.

Many of his students are interested in technical fields, but many others just want to be pilots. He encourages them to try for an engineering degree or some other broader job qualification.

At the moment, Murphy admits, the aviation field has fallen on hard times. A year ago, he said, Embry-Riddle couldn't keep its flight instructors because they were moving quickly to other jobs. And airline recruiting has really dropped off.

Meanwhile, it is always difficult to get a military flight slot. Both the Navy and the Air Force have cut back on their pilot requirements.

Murphy's long-term goal is to see more of his students go to college. About three years ago, he asked how many were going to continue their education. "Only four out of 26 students were going to college, and I couldn't believe it," he said. "I was absolutely floored. ... It turned out that in most cases, nobody in the home had ever been to college, and they were intimidated by the whole application process."

That's when Murphy started a program to encourage more to apply for college. "I picked Embry-Riddle because they have a really easy online application process," he said. "I got them to waive all the fees so it doesn't cost the students anything." Murphy had every student complete the application, and tracked their application progress. "Last year I had over 18 accepted."

Murphy also instituted a transition program that helps students looking for a lower-cost alternative to navigate a path from their local community college to a four-year university.

Murphy said one of his greatest satisfactions comes when a student rushes to his office waving an acceptance letter from a college, something they previously hadn't imagined they could achieve.

These success stories happen often enough that Murphy is enjoying himself immensely. He said, "If you're not having fun," you're doing it wrong. ■

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*Bruce D. Callander is a contributing editor of Air Force Magazine. He served tours of active duty during World War II and the Korean War and was editor of Air Force Times from 1972 to 1986. His most recent article for Air Force Magazine, "The Force Was With Her," appeared in the March 2008 issue.*



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By Frances McKenney, Assistant Managing Editor

## Bigger and Better

Air Education and Training Command's symposium, carried out with the **Alamo Chapter** in San Antonio in January, set an attendance record when more than 3,300 crowded into the Henry B. Gonzalez Convention Center to attend seminars, the AFA technology exposition, and the AETC-AFA ball.

AETC officials reported that this exceeded last year's count by more than 1,000 guests.

The symposium of some 70 seminars, divided into six major topics, was so well attended that "The Coming War With China?" and "American History Lessons for AFRICOM" had standing room only. "Understanding Differences Between American and Arab Culture" began early when the room filled to capacity before the scheduled start time. "Wounded Warriors"—with SSgt. Christopher M. Slaydon, an explosive ordnance disposal technician recovering from wounds sustained in Iraq—was not only SRO, more than 100 watched a video replay.

The chapter's expo filled its hall with more than 100 exhibits running the gamut from F-22 and F-35 flight simulators to scale-model aircraft such as the C-27 and full-sized items such as an M915 tractor truck, used by airmen for convoy-protection training. Even military working dogs from Lackland AFB, Tex., had a booth.

Keynote speakers were Gen. William M. Fraser III, the Air Force vice chief of staff; Gen. C. Robert Kehler, head of Air Force Space Command; and Maj. Gen. William T. Lord, commander of Air Force Cyberspace Command (Provisional).

The AETC-AFA ball completed the two days of information sessions and the expo. More than 1,100 attended the black-tie affair.

Chapter President Gary Copsey termed the trio of events a "complete success." In his chapter newsletter, he credited John J. Politi, a former Air Force Association Chairman of the Board and now the chapter's executive vice president, for leading the project and rounding up major sponsors. Copsey also noted the work of chapter members Randy Coggins, Richard P. Mihalik, Michael P. Nishimuta, David Pope, and Edward T. Reynolds III.

The ball and expo raised funds for the chapter's scholarship program.



*At a Gen. Bruce K. Holloway Chapter event, Col. Tim Dearing describes operations at McGhee Tyson ANGB, Tenn. Listening in are (l-r) AFA Board Chairman Joe Sutter; Alfred Coffman, state president; James Mungenast, chapter president; and chapter member James O'Brien. Dearing commands the base's 134th Air Refueling Wing.*

## Steering Kids Toward Aviation

In Florida, the **Gold Coast Chapter's** workshop for teachers had two goals this year. First: Familiarize teachers with a nearby resource, a general aviation airport. Second: Show them how to teach material their students need for an aviation career.

The chapter's third Aerospace Teachers Workshop began with a tour of Pompano Beach Airpark, a city-owned facility. Virginia Knudsen, the chapter's aerospace education vice president, arranged this orientation, and chapter member Steven Rocco, the airport manager, gave the guests a history and overview of its operations. The airpark dates to World War II, when it was an off-site training field for a naval air station at Fort Lauderdale.

In the workshop's afternoon session, several instructors demonstrated how to incorporate aviation topics into the science and math curricula. Knudsen, who is a pilot as well as the organizer for this workshop, introduced a NASA teaching approach called "FlyBy Math." It helps students in grades 5 through 9 solve problems involving distance, rate, and time.

The chapter's Teacher of the Year, Randy Selnick from Crystal Lake Middle School

in Pompano Beach, conducted demonstrations of science principles related to weather. Chapter member Patricia M. Lovarco, a retired science teacher, covered propulsion.

A. J. Tolbert, an assistant professor of aviation and director at Florida Memorial University in Miami Gardens, spoke to the workshop about how to encourage students to pursue aviation careers and his school's role in preparing them. Also a retired American Airlines pilot with the rank of captain, Tolbert has extensive experience in speaking to schoolchildren about becoming a pilot.

Chapter Secretary Virginia S. Montalvo reported that the participants gave the workshop "outstanding" ratings in after-action evaluations.

## Awards in Fort Wayne

In Indiana, Thomas Eisenhuth received the Member of the Year Award at the **Fort Wayne Chapter's** annual awards dinner, held at a hotel-conference center on Dec. 7.

Eisenhuth is the chapter's immediate past president and was joined in the winner's circle by Samuel Conte, who received the Distinguished Service Award;



Brandon M. Monticue, who took home a Special Recognition Award; and Hyrle A. Ivy Jr., Community Partner Gold Award recipient.

Civil Air Patrol scholarships went to David Minser and Caleb Alley.

An honor guard from the Wayne High School's IN-941 AFJROTC unit posted the colors. A pianist played music from the 1940s and 1950s during the dinner, and Ron Smith, a local singer, provided other entertainment.

Special guests included Michael Malast, president of the **Central Indiana Chapter**.

**More Chapter News**

■ In Pennsylvania, **Total Force Chapter** Vice President Douglas C. May presented TSgt. Leanne A. Horgan with a Pitsenbarger Award at a Community College of the Air Force ceremony in January. Horgan, who is now a chapter member, is from the 911th Airlift Wing (AFRC) at Pittsburgh Arpt./ Air Reserve Station. AFA's Pitsenbarger Awards are grants of \$400 that go to top airmen graduating from CCAF and planning to pursue a bachelor's degree.



*At the AETC-AFA symposium ball in San Antonio, Sandy Schlitt, AFA's Vice Chairman of the Board for Aerospace Education (far left), and Alamo Chapter President Gary Copsey (right) thank Maj. Gen. William Lord, a keynote speaker. The chapter plans to present a scholarship in his name to a University of Texas student. At the podium is Lloyd Newton, master of ceremonies. (See p. 75.)*



*Participants in the Gold Coast Chapter's aerospace education workshop take shade under the wing of a Cessna at Pompano Beach Airpark. (See p. 75.)*

■ AFA officials in Oklahoma represented the association at an informal dinner for Air Force Chief of Staff Gen. Norton A. Schwartz, who was on a two-day visit to Vance AFB, Okla., in January. Terry Cox, the Texoma Region president; James J. Jacobs, Oklahoma state president; and Dan Ohnesorge, president of the local **Enid Chapter**, were among the guests at the Vance Club dinner, invited by the 71st Flying Training Squadron. Schwartz traveled to Vance to speak to the 19 graduates of Joint Specialized Undergraduate Pilot Training Class 09-04.

■ Retired Lt. Col. Stuart S. Carter, from

the **Cochise Chapter** in Arizona, donned his uniform to represent the Air Force at a Wreaths Across America ceremony in Sierra Vista, Ariz., in December. Carter joined Civil Air Patrol cadet Bethany McNeil in placing a wreath at the base of the Air Force flagpole at the Southern Arizona Veterans Memorial Cemetery. Wreaths Across America began 13 years ago when the Worcester Wreath Co. of Harrington, Maine, began placing wreaths at headstones in Arlington National Cemetery. Other cemeteries took up the practice, and the company reported that on Dec. 13, 2008, more than 350 locations held simultaneous wreath-laying ceremonies. Chapter President Ross B. Lampert attended the ceremony hosted by the CAP squadron in Sierra Vista.

■ Helped by some original Red Tails themselves, the **Red Tail Memorial Chapter** ran an AFA membership table at a Collings Foundation air show at the Ocala, Fla., airport in January. Chapter President Michael H. Emig said 17 chapter members

**AFA Conventions**

May 8-9	<b>South Carolina State Convention</b> , Charleston, S.C.
May 28-30	<b>California State Convention</b> , March ARB, Calif.
June 5-6	<b>Oklahoma State Convention</b> , Enid, Okla.
June 13	<b>Virginia State Convention</b> , Richmond, Va.
July 10-11	<b>Florida State Convention</b> , Jacksonville, Fla.
July 17-19	<b>Texoma Region Convention</b> , Dallas
Sept. 12-13	<b>AFA National Convention</b> , Washington, D.C.
Sept. 14-16	<b>AFA Air &amp; Space Conference</b> , Washington, D.C.

**More photos at <http://www.airforce-magazine.com>, in "AFA National Report"**



helped run the AFA display. Among those viewing the foundation's B-17, B-24, and P-51 warbirds were three Tuskegee Airmen: Haldane King, Bob Walker, and Steve Lawrence. In World War II, Tuskegee Airmen flew fighter aircraft—like the Mustang at this air show—with tails painted red and thus gained the nickname “Red Tail.” The nonprofit Collings Foundation is based in Stow, Mass., and provides “living history” and a tribute to the military by sending aircraft on tour around the US.

■ The **Tidewater Chapter** in Virginia Beach, Va., sponsored a regional drill meet in December, with eight AFJROTC units participating: Six came from Chesapeake; two came from Suffolk. Judges represented all the armed services and the Coast Guard. Though they came from a school that only opened in 2007, the unit from Grassfield High School in Chesapeake won the top trophy. Chapter President William M. Cuthriell said this was undoubtedly due to chapter member Gordon Strong, the unit's aerospace science instructor, who had been specifically recruited by the Grassfield principal to lead the cadets.

■ **Tidewater Chapter** officials also arranged an F-15 orientation flight for a Community Partner. Gerald Yagen, who owns the new Military Aviation Museum at the Virginia Beach Airport, supports Air Force and Navy events in the area with his collection of World War I and World War II



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## AFA's National Committees for 2008-09

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**Finance Committee.** Steven R. Lundgren (Chairman), James F. Diehl, Stephen J. Dillenburg, John J. Murphy, Nora Ruebrook, Thad A. Wolfe, Joseph E. Sutter (ex officio).

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aircraft. For the chapter in particular, his museum is now the site of the annual gala and displays AFA membership applications at its entrance. He has been a chapter guest speaker and provided a flyover to memorialize a chapter member. Yagen owns aviation maintenance schools, and according to the museum newsletter, his background is in general aviation. Capt. Bradley Brumbaugh, 71st Fighter Squadron, 1st Fighter Wing, at Langley AFB, Va., provided the orientation flight.

■ When former AFA national director Vivian P. Dennis from the **Edward J. Monaghan Chapter** was promoted to lieutenant colonel at Elmendorf AFB, Alaska, in November, several AFA officials gathered from across the state—and even from the lower 48—to congratulate her. AFA National

Treasurer Steven R. Lundgren and Alaska State President Fredrick A. Stein traveled down from Fairbanks for the ceremony. Former AFA Chairman of the Board Robert E. Largent flew in from Arkansas. Closer to home, Chapter President Kara Moriarty was also on hand. ■

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.

## Reunions

reunions@afa.org

**20th Air Police Sq**, RAF Wethersfield, England (1964-74). May 7-10 in San Antonio. **Contact:** Roy Johnson, 12919 Satterlee Rd., Anacortes, WA 98221 (360-929-3791) or Gerald Dickey (724-799-0919) (raf\_wethersfield@yahoo.com).

**20th/81st Tactical FW**, England. Sept. 16-20 in Williamsburg, VA. **Contact:** Dave Hayes (330-225-7153) (buzzardsinn@webtv.net).

**27th Air Transport Gp**; 310th, 311th, 312th, and 325th Ferrying Sqs; 86th, 87th, 320th, and 321st Transport Sqs; 519th and 520th Service Sqs. Oct. 15-18 in Oklahoma City. **Contact:** Fred Garcia, 6533 W. Altadena Ave., Glendale, AZ 85304 (623-878-7007).

**351st BG**, Polebrook, England (WWII). July 23-27 in Branson, MO. **Contact:** Gatherings Plus, PO Box 1023 (417-338-4048) (pamb@bransonmilitaryreunions.com).

**667th, 932nd, 933rd, 934th AC&WS**. April 26-30 in San Antonio. **Contact:** William Chick (803-932-9596) (littlechick@msn.com).

**BAD2**, Warton, England. Sept. 10-12 in Omaha, NE. **Contact:** Mick Wickham, 315 N. Grant St., Fremont, NE 68025 (402-727-5283) (mw@tvsonline.net).

**FB-11A** reunion, all are welcome. Oct. 1-4 in Fort Worth, TX. **Contact:** Gerry Patterson, 104 Amberjack Ct., Georgetown, TX 78633 (512-863-9363) (gpatter445@aol.com).

**JTF 1-79, Desert One**, Ricebowl, Iran Rescue (all personnel). April 24-25, 2010 in Fayetteville, NC. **Contact:** Ron Lenahan (757-565-1737) (lenahans3@msn.com).

**Nagoya/Komaki AB**, 5th AF. June 7-10 at the Lodge of the Ozarks Hotel, in Branson, MO. **Contact:** John Campo, 8905 NE 109th Terr., Kansas City, MO 64157 (816-407-0055) (jaymcee@aol.com).

**USAFSS Misawa AB** reunion. June 11-14 in SeaTac, WA. **Contact:** Andy Anderson (360-724-4663) (soggyacres@msn.com).

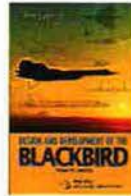
Seeking members of **US Strategic Bombing Survey** for a reunion. **Contact:** Curtis Curtis, 13063 5th St., #38, Yucaipa, CA 92399 (909-446-8410) (909-801-0779). ■



**Arms and Innovation: Entrepreneurship and Alliances in the Twenty-First-Century Defense Industry.** James Hasik. The University of Chicago Press, Chicago (773-702-7000). 189 pages. \$35.00.



**From Archangel to Senior Crown: Design and Development of the Blackbird.** Peter W. Merlin. American Institute of Aeronautics and Astronautics, Reston, VA (800-639-2422). 202 pages. \$39.95.



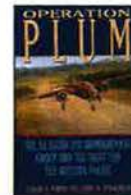
**Northrop's Night Hunter: P-61 Black Widow.** Jeff Kollin. Specialty Press, North Branch, MN (800-895-4585). 198 pages. \$39.95.



**The ATL-98 Carvair: A Comprehensive History of the Aircraft and All 21 Airframes.** William Patrick Dean. McFarland & Co., Jefferson, NC (800-253-2187). 407 pages. \$75.00.



**Griffon Spitfire Aces.** Andrew Thomas. Osprey Publishing, Westminister, MD (866-620-6941). 96 pages. \$22.95.



**Operation Plum: The Ill-Fated 27th Bombardment Group and the Fight for the Western Pacific.** Adrian R. Martin and Larry W. Stephenson. Texas A&M University Press, College Station, TX (800-826-8911). 364 pages. \$29.95.

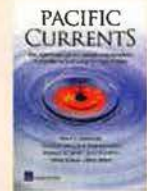
**B-47 Stratojet: Be a Nuclear Deterrent to the Nuclear Threat of the Cold War.** Louis Malucci. Order from: www.lulu.com. 234 pages. \$37.17.



**Hawai'i Homefront: Life in the Islands During World War II.** MacKinnon Simpson. Bess Press, Honolulu, HI (800-910-2377). 216 pages. \$29.95.



**Pacific Currents: The Responses of US Allies and Security Partners in East Asia to China's Rise.** Evan S. Medeiros, et al. RAND, Santa Monica, CA (877-584-8642). 279 pages. \$52.00 (also available online at [http://www.rand.org/pubs/monographs/2008/RAND\\_MG736.pdf](http://www.rand.org/pubs/monographs/2008/RAND_MG736.pdf)).



**Base Politics: Democratic Change and the US Military Overseas.** Alexander Cooley. Cornell University Press, Ithaca, NY (607-277-2211). 309 pages. \$29.00.



**Insurgency, Terrorism, & Crime: Shadows from the Past and Portents for the Future.** Max G. Manwaring. University of Oklahoma Press, Norman, OK (800-627-7377). 290 pages. \$34.95.

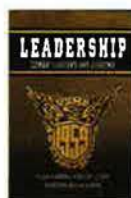


**Sources of Weapon Systems Innovation in the Department of Defense: The Role of In-House Research and Development, 1945-2000.** Thomas C. Lassman. GPO, Supt. of Documents, Washington, DC (866-512-1800). 153 pages. \$16.00.

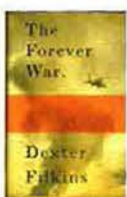
**Defeat and Triumph: The Story of a Controversial Allied Invasion and French Rebirth.** Stephen Sussna. Xlibris, Philadelphia (888-795-4274). 717 pages. \$24.64.



**Leadership: Combat Leaders and Lessons.** Col. James L. Abrahamson, USA (Ret.), and Col. Andrew P. O'Meara Jr., USA (Ret.), eds. Order from: [www.standupamericausa.com/bookstore.html](http://www.standupamericausa.com/bookstore.html). 195 pages. \$19.95.



**The Two Thousand Yard Stare: Tom Lea's World War II.** Brendan M. Greeley Jr., ed. Texas A&M University Press, College Station, TX (800-826-8911). 227 pages. \$40.00.



**The Forever War.** Dexter Filkins. Knopf, New York (800-733-3000). 368 pages. \$25.00.



**Night Fighters: Luftwaffe and RAF Air Combat Over Europe, 1939-1945.** Colin D. Heaton and Anne-Marie Lewis. Naval Institute Press, Annapolis (800-233-8764). 188 pages. \$27.95.



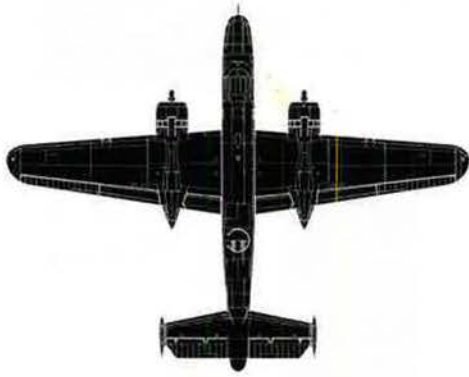
**Why Vietnam Matters: An Eyewitness Account of Lessons Not Learned.** Rufus Phillips. Naval Institute Press, Annapolis (800-233-8764). 398 pages. \$35.06.



# Airpower Classics

Artwork by Zaur Eylanbekov

## B-25 Mitchell



On April 18, 1942, Army Air Forces Lt. Col. James H. "Jimmy" Doolittle, leading a force of 16 B-25B medium bombers and crews, took off from the aircraft carrier USS *Hornet* and bombed Tokyo and other targets. It was the first time US aircraft had struck at Japan, and the raid immortalized both Doolittle and the B-25 Mitchell. The North American Aviation bomber went on to become a workhorse in every theater of World War II.

North American proposed the new Model NA-62, derived from a series of earlier prototypes, in a 1939 competition. The Army bought it right off the drawing board, ordering 184 of the airplanes. The clean, lean lines of the B-25 delivered good performance and facilitated both mass production and maintenance. Built in 10 major models, with numerous variants, the B-25 was particularly adaptable to field modifications. These included installation of heavy armament such as Paul I.

"Pappy" Gunn's fabled 75 mm cannon. The Mitchell was never the fastest, most maneuverable, or best-looking medium bomber. However, it grew to be the most heavily armed and was more versatile than any—even the German Junkers Ju 88.

Noted for its excellent handling characteristics, the B-25 performed remarkably well in many roles, including medium- and low-altitude bomber, close air support, photo reconnaissance, anti-submarine warfare, patrol, and—when occasion demanded—tactical fighter. Later it was used as a pilot and navigator trainer, and became much beloved in that role. In peacetime, it served as an executive transport, firefighter, camera airplane, test vehicle, and crop duster. The last B-25 trainers remained in service at Reese AFB, Tex., until finally retiring in January 1959—nearly 17 years after the bomber's most famous mission.

—Walter J. Boyne

**This aircraft:** USAAF B-25B Mitchell—#40-2242—as it looked in early 1942. It flew in the famous April 1942 Doolittle Raid over Tokyo, landed in Russia, and was scrapped there.



### In Brief

Designed, built by North American Aviation ★ first flight Aug. 19, 1940 ★ crew of five or six (pilot, copilot, plus three or four of bombardier, radio operator, nav, bombardier, gunners) ★ two Wright R-2600 engines ★ number built 9,816 ★ **Specific to B-25J:** max speed 275 mph ★ cruise speed 230 mph ★ max range 1,275 miles (loaded) ★ armament (attack version) 16 .50 cal machine guns in nose, side, waist, top turret, tail turret ★ bomb load, up to 4,000 lb ★ weight (max) 41,800 lb ★ span 67 ft 7 in ★ length 53 ft 6 in ★ height 16 ft 4 in.

### Famous Fliers

**Medal of Honor:** Ralph Cheli, James Doolittle, Raymond Wilkins.  
**Other notables:** 79 Doolittle Raiders (other than James Doolittle), H. H. Arnold, William Bann, Dwight Eisenhower, Thomas Gerrity, Paul Gunn, John Henebry, Joe Jackson (MOH in Vietnam), George Kenney, Robert Ruegg.

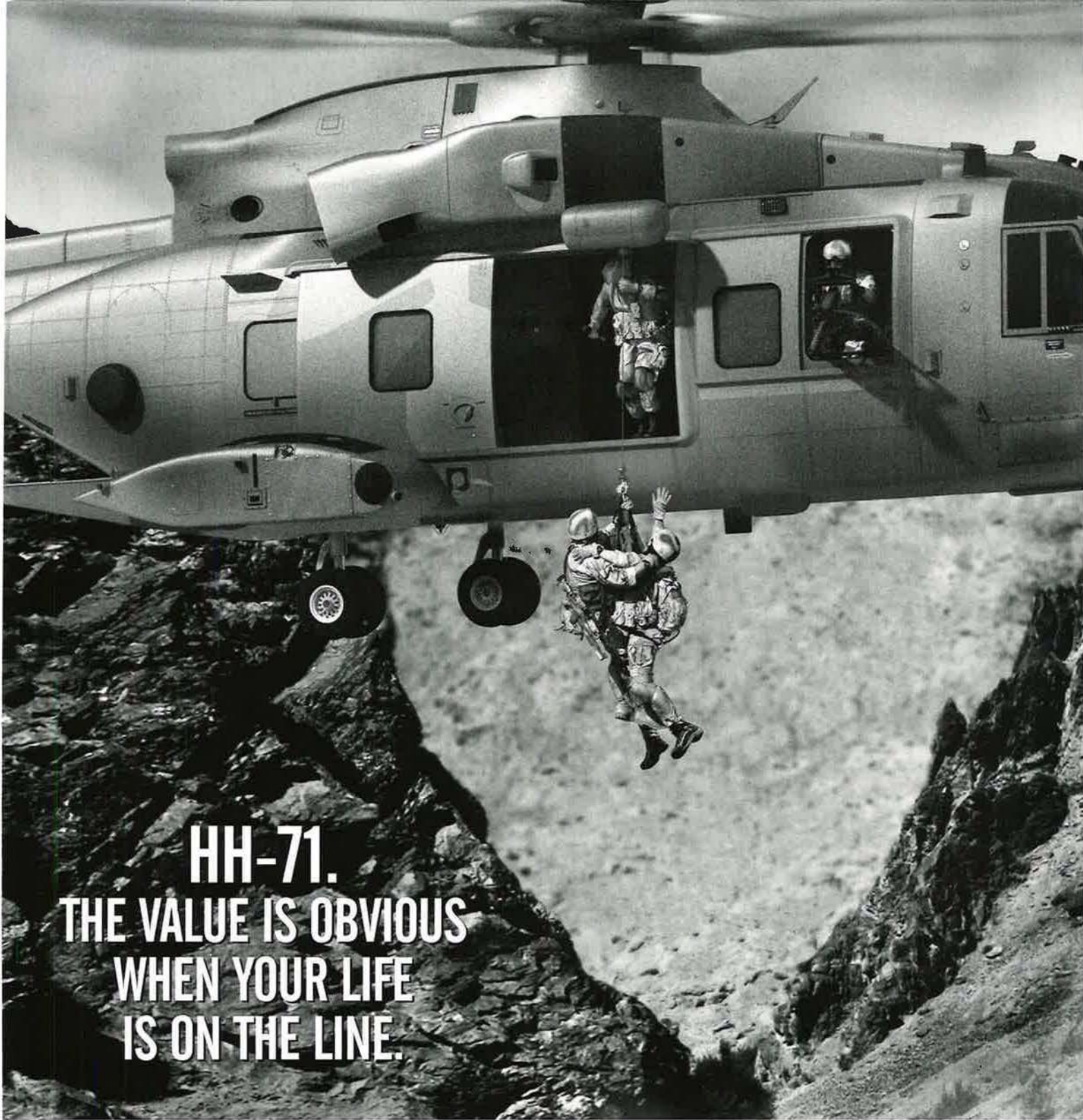
### Interesting Facts

Named after airpower pioneer Billy Mitchell ★ built in numbers exceeding any other US medium bomber ★ used in World War II by Navy and Marine Corps as well as Australia, Britain, Canada, China, France, Holland, Soviet Union ★ pioneered thermal de-icing ★ crashed into cloud-shrouded Empire State building on July 28, 1945 ★ featured in films such as "Thirty Seconds Over Tokyo" (1944), "Catch-22" (1970), "Hanover Street" (1979), "Forever Young" (1992).



*The B-25 became a true workhorse.*





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A close-up photograph of a man with brown hair, wearing clear safety glasses with blue frames and a blue and white striped shirt over a red t-shirt. He is looking down with a focused expression at a complex, tangled white cable assembly he is holding. The background is blurred, showing blue structural elements of what appears to be an aircraft or industrial machinery.

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