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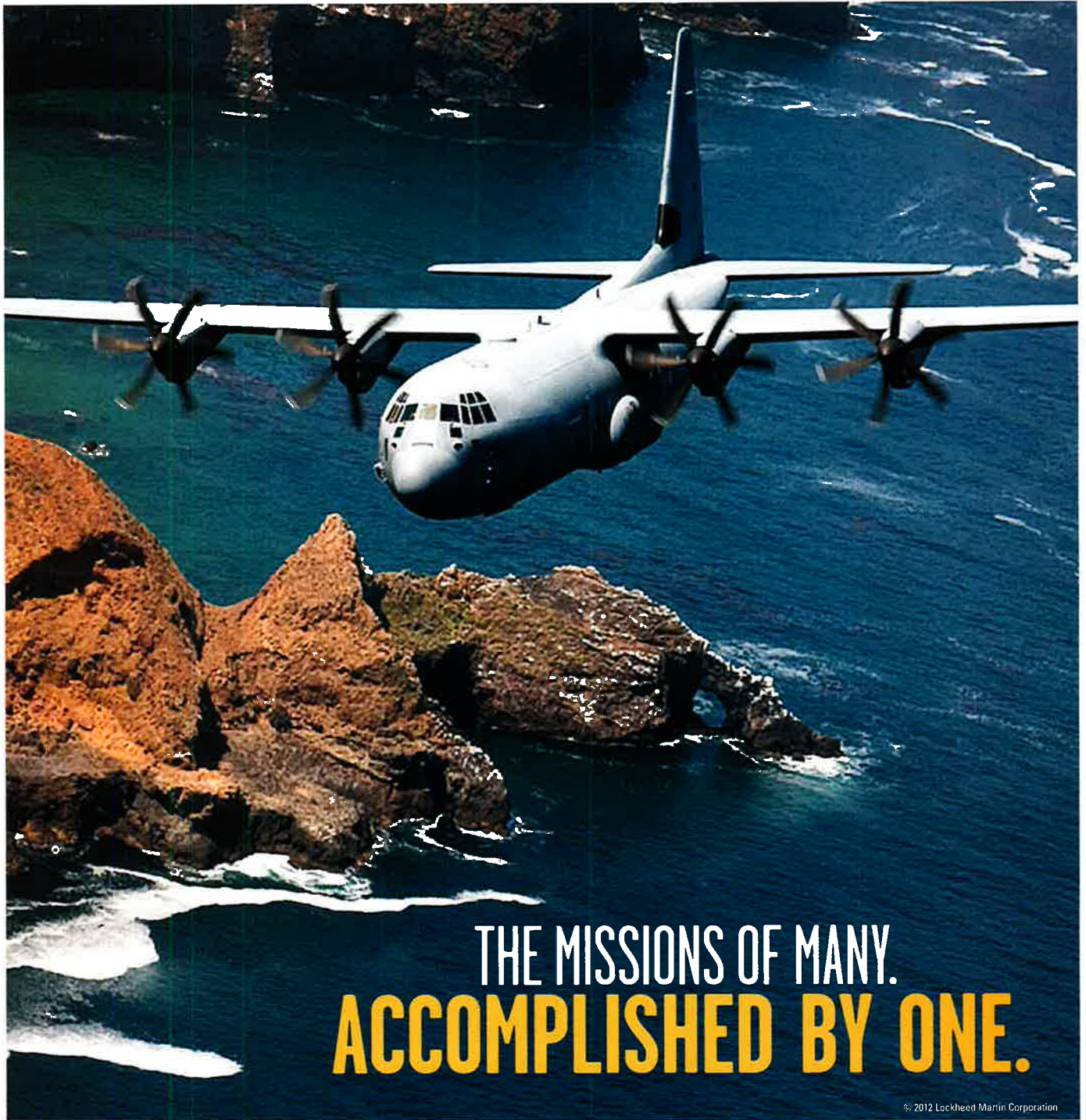
Journal of the Air Force Association

AIR FORCE

MAGAZINE

The Last Raptor

Airpower Adversaries and Allies:
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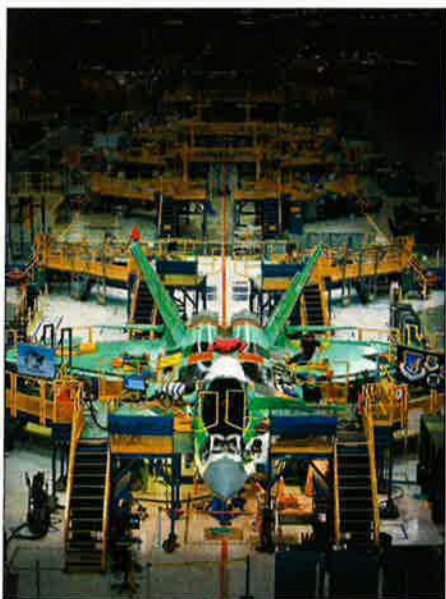
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About the cover: The last F-22, on the line at Lockheed Martin's plant in Marietta, Ga. See "The Last Raptor," p. 36. Lockheed Martin photo by Damien A. Guarnieri.

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Beyond the Ground Wars

JUST days after the last US troops left Iraq, the Obama Administration unveiled new national security guidance, developed in close consultation with the nation's military leadership.

The Pentagon has been preoccupied with manpower-intensive land wars, but it is time to think about what comes next. The new guidance delivers a sensible break from the thinking of the past decade.

The very short version: Military capabilities needed to address threats in Asia, the Pacific, and the Middle East will be prioritized (see "Washington Watch," p. 8). With DOD's budget expected to increase only at the rate of inflation, there will have to be cuts. This requires tough decisions.

Indeed, critics found plenty to criticize when the guidance—really more of a priority list than a strategy—did not meet their preconceived notions.

From the left came familiar complaints that it does not cut enough defense spending, personnel, or equipment.

The strategy also came under fire from the right. Howard P. "Buck" McKeon (R-Calif.), House Armed Services Committee chairman, was apoplectic, releasing a statement condemning the strategy that seemingly refused to be influenced by what was actually in it.

This serves a useful purpose, however, by allowing for an exposition of exactly what the policy does—and does not—advocate. What follows is an annotated version of McKeon's Jan. 5 press release. The statement, in italics, is presented in its entirety.

This is a lead-from-behind strategy for a left-behind America.

Where and how has the United States been left behind? The US has the world's largest economy, the most capable military, and is the undisputed leader of numerous international military and political organizations. The guidance defends America's leadership in organizations such as NATO and acknowledges that spending must be restrained, in a calculated effort to reduce debt and rebuild the nation's economic strength.

The President has packaged our retreat from the world in the guise of a new strategy to mask his divestment of our military and national defense.

The so-called retreat is actually an overdue reallocation of forces, and divestment is an interesting word choice for a plan to hold Pentagon spending roughly level, including inflation, over the next 10 years. The Asia-Pacific region and the Middle East will be prioritized, as they should be.

This strategy ensures American decline in exchange for more failed domestic programs.

Planning for China, Iran, North Korea, and such was derided as "next-war-itis" during a decade of land war domination.

It is time to think about what comes next.

These threats will now get the attention they deserve. Meanwhile, commitment to the Asia-Pacific, Middle Eastern, and European regions will reinforce American leadership where it matters most and protect vital economic and military ties.

In order to justify massive cuts to our military, he [Obama] has revoked the guarantee that America will support our allies, defend our interests, and defy our opponents.

In reality, there are no massive cuts, only reductions relative to long-range spending plans. The strategy itself explicitly states that the US will uphold its commitments to its allies, defend its interests, and defy opponents—with force when necessary.

The President must understand that the world has always had, and will always have, a leader.

We agree, and the new strategic guidance helps ensure the United States will remain that leader.

As America steps back, someone else will step forward.

The US is not stepping back from its leadership position, but from secondary priorities. Most observers feel China is the nation most likely to challenge US hegemony, and this plan moves the US more securely into the Pacific—China's neighborhood.

An honest and valid strategy for national defense can't be founded on the premise that we must do more with less, or even less with less.

McKeon voted for the 2011 Budget Control Act, which said otherwise. The act ordered the Pentagon to make do

with less by cutting more than \$450 billion from DOD's spending plans, and set up the "sequester" mechanism which could pull another \$500 billion from Pentagon coffers.

Rather, you proceed from a clear articulation of the full scope of the threats you face and the commitments you have.

We might quibble on whether any eight-page planning guide can clearly articulate a full scope of threats, but the document does a commendable job of succinctly laying out the priorities and refocusing military effort.

You then resource a strategy required to defeat those threats decisively.

We live in a world in which money, time, personnel, patience, and capabilities are all limited. This has always been the case. The US had struggles and resource limitations in World War I, World War II, Korea, Vietnam, the Cold War, Afghanistan, and Iraq.

One does not mask insufficient resources with a fuzzy world view and a strategy founded on hope and a hollow force.

This document shifts the nation away from the sorts of grinding ground wars that minimized US advantages. It is a rational assessment of where America's future dangers and opportunities lie. Regarding a hollow force, the document states, "We will resist the temptation to sacrifice readiness in order to retain force structure and will in fact rebuild readiness in areas ... de-emphasized over the past decade." Importantly, it makes "reversibility" a key tenet, by protecting military structures and industrial capabilities needed to quickly rebuild the military's size if necessary.

McKeon is to be commended for his commitment to US security and our armed forces, but clinging to obsolete strategies and spending goals will do more long-term harm than good.

To bring this plan to fruition, the Administration must now follow through, beginning with the 2013 budget request.

"I'm pleased with the outcome," said Army Gen. Martin E. Dempsey, Joint Chiefs of Staff Chairman. "There will be people who think it goes too far. Others will say it doesn't go far enough. That probably makes it about right." ■

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Undiplomatic Bombers

Rebecca Grant paints an exciting picture of “bomber diplomacy” (December 2011, p. 30). She declares: “Call it also bomber diplomacy—a method for a lean force to reassure allies and deter potential adversaries.”

Does anyone really believe that a “lean force”—a dozen or even two dozen strategic bombers—flying from Guam will deter China’s leaders from their objectives? Let’s see: Guam is how far from Chinese territory, and how many tankers are needed, and will jammers and fighters be required to permit those bombers to reach targets in China? China has more than 1,000 fighter-type aircraft supported by AWACS aircraft and an extensive network of ground radar and control installations, plus surface-to-air missile batteries around important locations.

And would a US President sanction conventional air attacks against Chinese territory? Perhaps the supporters of “bomber diplomacy” believe that these aircraft could deter a Chinese naval force in the South China Sea. Using what weapons? Harpoon anti-ship missiles or mines? How many bomber crews are qualified, and how many weapons are available, especially mines, in the US inventory? Are any on or near Guam?

More important is finding and recognizing the naval targets. The article delves into “history” to justify the concept. Several US and Australian warships were attacked by US Air Force planes during the Vietnam War. And no other nation but those two had destroyer-sized warships in the Gulf of Tonkin during that conflict. Or, how useful were the B-47s that SAC used for overwater reconnaissance during the Cuban Missile Crisis?

And should Guam be used as a base for strikes against Chinese territory or naval forces, one wonders how long it would take for the Chinese to employ land- or submarine-launched missiles with conventional warheads to destroy the US airfield.

There is a definite and useful role for manned bombers. Believing that they can undertake a diplomatic role

is both misleading and potentially very dangerous.

Norman Polmar
Alexandria, Va.

Accidental Sabotage

You probably aren’t going to believe this, but back about 1953, in North Syracuse, N.Y., I knocked out the Pinetree Line [*“Pinetree Line,” December, p. 44*]. I was 13 years old. My father was a captain in the old Civil Defense System. Because of his job with the school district in North Syracuse, he had to be a member.

My father’s favorite thing to do was to penetrate what they called secure areas and prove them wrong. This time, he sent me in to penetrate. My objective was Grove Street in North Syracuse. On Grove Street there was this big frame thing that had big string cords like a harp, and you could hear it sing, sometimes.

I was almost there when I realized I had two adult men on my tail, so I took off at a dead run for that big harp. Luckily, the snow was deep and it was easier for me to get through the snow than them. When I reached the harp, I went through an open space right near the middle. When I did, I must have moved or broken something. I kept moving out until I got to where my father was waiting for me with the car. Next day at school I found out that the Pinetree Line went down.

Roy Clement Jr.
Hondo, Tex.

The Beat Goes On

I was surprised that the author did not include the continuing evolution of the loadmaster job [*“Loadmaster Evolution,” December, p. 60*]. Since the first flight of the KB-50 to the future of the KC-46, there was no mention of the boom operators who accomplish the loadmaster duties. During the past half-century, boom operators have loaded millions of tons of cargo and delivered it to war zones all over the world. In the late ’80s the KC-135s started hauling cargo as part of a primary mission called the Channel from the West Coast to Yokota AB, Japan. KC-10 aircraft haul most of the supplies for a fighter wing deployment

when they deploy. So the evolution is ongoing and the boom operators are an important part of this evolution.

SMSgt. Tim Wical,
USAF (Ret.)
Rapid City, S.D.

Hate to do this, but that RCAF helo on p. 50 was a Bell 47, not an H-47, which is today’s Chinook used by the US Army, among others [*The Pinetree Line, December, p. 44*]. And on p. 60, that photo was not taken in 1941, but sometime after the fall of 1943 when the white rectangles were added to the sides of the star and surrounded by a blue border [*“Loadmaster Evolution”*].

MSgt. David Menard,
USAF (Ret.)
Dayton, Ohio

A Crime in Other Ways, Too

Ms. Mulrine’s article “An Air Force War on Sexual Assault” [*January, p. 42*] provides excellent background on the issue. As a nurse researcher providing care for veterans, I offer additional considerations. Besides the obvious amoral and illegal aspects of sexual assault, it is also one of those stressful events that can result in post-traumatic stress disorder or PTSD. The hallmarks of PTSD are (1) reliving the traumatic event, (2) avoidance of family, friends, and activities, and (3) hypervigilance. Military members with PTSD often have a difficult, if not impossible, time when attempting to perform their duties.

Another point to consider is that a military member who sexually traumatizes another military member without

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repercussions is hurting unit readiness and the mission. Ms. Mulrine's quote from assistant deputy Charlene Bradley, "Proactive leadership is absolutely the key to attacking this," is on target.

Col. John M. Starzyk,
USAFR (Ret.)
Riverside, Calif.

Digging Up Dirt

I would like to comment on the letter you published in the December 2011 issue on p. 7, entitled "It Happened in Vietnam, Too," by Michael W. Rea.

The "legend" of a MAC C-133 carrying an F-105 from Udorn RTAB, Thailand, with battle damage back to the States for repair is true. I was the navigator on the crew of a MAC C-133B that picked up a battle-damaged F-105 Thud from Udorn on Dec. 20, 1968. The gear either would not come down or it collapsed upon landing, and the Thud skidded off the runway. Apparently none of the damage was so severe to indicate that the plane should be scrapped. Rather, they took the wings and vertical stabilizer off, built a wooden skid around the fuselage, and loaded it all onto our plane for repair back in the States. We were only on the ground for 3+45. Although the load was bulky, it was not particularly heavy.

But the trip turned out to be interesting for other reasons, also. Our normal route home was Kadena, Midway, Travis. However, because the load was lighter than normal, when we took off from Kadena for Midway, we climbed to higher altitudes and encountered very favorable jet-stream tail winds, and decided rather than stop at Midway, we would fly on to Hickam in Hawaii. It took 13+20 which was the second longest flight for me ever in a C-133B.

But the story continues. When we landed in Hawaii, as usual, we were met by both a customs official and an official from the agriculture department. Customs was no problem; however, the ag man got very upset. It turns out that when the Thud had run off the runway, the lower skin had ruptured and acted like a scoop. We had about a wheelbarrow full of dirt and vegetation from Southeast Asia in the body of the Thud. The ag people and maintenance personnel worked all night to clean out the Thud so that we could continue on next day.

Col. Ludvik Z. Svoboda,
USAF (Ret.)
Aurora, Colo.

Who Knew?

Well, I am now sure that the old adage, "All history is warped by the passage of time," is true.

Here I've been thinking over the years, being an enlisted air combat crewman

(staff sergeant, left waist aerial gunner), that the Eighth US Army Air Force was mostly relieved of its duties after the surrender of Nazi Germany in May 1945. The December 2011 *Air Force Magazine* article by an apparent Eurocentric author with high scholastic credentials, makes mockery of our efforts in the Twentieth US Army Air Force under General Curtis E. LeMay ["How Bombers Defeated Japan," p. 56].

Participating in 26 aerial missions of bombing, both night and day, over mainland Japan in the spring and summer of 1945, and having been awarded a Distinguished Flying Cross and several Air Medals, I am appalled

at not even an honorable mention for the "very heavy" campaign as was waged by our 20th USAAF.

My deceased (KIA) comrades, commissioned and enlisted, aboard downed B-29 Superfortresses would hardly recognize this skewed article.

Lt. Col. Richard B. Vogenitz,
USAF (Ret.)
Oceanside, Calif.

■ *The author noted LeMay's approach with Twentieth Air Force "was risky, but it worked... and the results were devastating to the Japanese economy and its military capability" even before Eighth Air Force arrived on scene.—THE EDITORS*

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Leaner force, just as mean?; Kansas bait and switch?; Not the end of the world

A POSTWAR DEFENSE STRATEGY

President Barack Obama rolled out a new national security strategy in January meant to guide the force against the threats the US will confront in the coming decade.

This is a "moment of transition," Obama said at a Pentagon press conference on Jan. 5. Flanked by top defense leaders and the Joint Chiefs of Staff, he argued that even without the financial crisis gripping Washington—which will drive the defense budget down collectively by at least \$487 billion through 2021—the end of the war in Iraq, the winding down of the war in Afghanistan, and international developments such as the "Arab Spring" would have demanded a strategic reassessment anyway.

The new strategy, Obama said, will focus on the Asia-Pacific region and the Middle East. The Army and Marine Corps will no longer be sized for long-term "stability operations" and will shrink by tens of thousands starting in 2015, but there will be modest increases in some capabilities

Panetta reiterated his pledge that the US military will not become a "hollow force" and readiness will be protected.

Obama said some other functional areas emphasized in the new strategy include intelligence, surveillance, and reconnaissance, counterterrorism, countering the proliferation of weapons of mass destruction, cyber capabilities, and the ability to defeat anti-access capabilities.

The text of "Sustaining US Global Leadership: Priorities for the 21st Century"—a mere eight pages—also specifically calls out the need for a "new stealth bomber."

The outgoing defense policy undersecretary Michele Flournoy said she could envision the US reducing its nuclear stockpile, and Obama said the US would divest itself of "outdated Cold War-era systems," but the defense team resolutely avoided giving any program specifics, deferring to the release of the 2013 defense budget.

Nevertheless, Deputy Defense Secretary Ashton B. Carter admitted that every category of defense spending will see "major changes" and that "includes modernization."

Panetta said the pace and timing of changes will be organized "in such a way that they can surge, regenerate, and mobilize capabilities needed for any contingency." He said hallmarks of the strategy and its implementation will be "reversibility and the ability to quickly mobilize."

Joint Chiefs Vice Chairman Adm. James A. Winnefeld Jr. said the reversibility of the changes was a central element in the strategy, because "we could get this wrong."

Similarly, Carter said the condition of the defense industrial base and its ability to reconstitute will be an important consideration.

Panetta said the cuts in the 2013 budget are as far as the Pentagon can go without suffering real damage. He urged Congress not to "fail" in agreeing on overall deficit reduction so that sequestrations that would strip a further half-trillion dollars from defense are not enacted. He also said that throughout the strategy, the Pentagon will "keep faith" with uniformed people and continue to take care of them and their families.

CLOSING THE WICHITA LINE, MAN

Boeing announced in early January it will close its sprawling Wichita, Kan., facilities by the end of next year, shocking and infuriating state lawmakers who had worked to secure the KC-46 tanker contract for Boeing on the assumption the airplane would be assembled there.

Instead of 7,500 new KC-46 jobs coming to Wichita, 2,160 jobs on a variety of programs will leave.

Boeing Defense, Space, and Security Vice President Mark Bass, who runs the unit's maintenance, modifications, and upgrades division, said in a press conference that the company's flight is being driven entirely by the need to cut costs. Work on other Boeing programs at the facility, such as on the B-52, is "winding down," Bass said, and given the

USAF photo by SSgt. Marc Lane



Panetta: We will not hollow you out.

ties deemed more suitable for the future, such as special operations forces.

The US military will be "leaner," Obama said, adding however that US strength also depends on its economic health, and that means "putting our fiscal house in order."

The new strategy doesn't abandon the concept that the US must be able to fight more than one war at a time, Deputy Secretary Leon E. Panetta insisted.

New conditions demand "flexibility to shift and deploy forces to be able to fight and defeat any enemy anywhere," Panetta said. "How we defeat the enemy may very well vary across conflicts. But make no mistake, we will have the capability to confront and defeat more than one adversary at a time." Directing comments at Iran and North Korea, Joint Chiefs of Staff Chairman Gen. Martin E. Dempsey warned, "We can and will always be able to do more than one thing at a time. ... Wherever we are confronted, and in whatever sequence, we will win."

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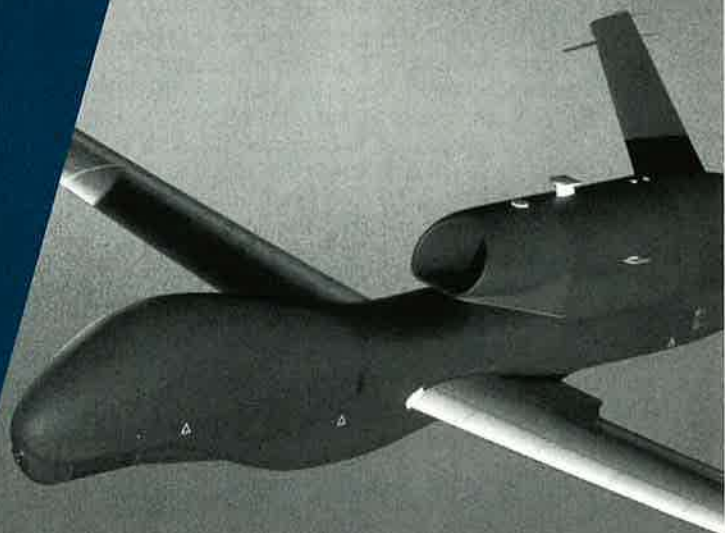
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deep budget reductions coming to defense, there is little prospect of finding new work for the facility.

As those other programs decline, moreover, the overhead expense of a 97-building, two-million-square-foot plant would be tacked onto the KC-46. That cost would “become unaffordable for our customer,” Bass said. It will also be a bit cheaper to do Wichita’s planned KC-46 work in Puget Sound, Wash., instead, because that plant is close to Seattle, where the “green” 767 airframes that are the basis of the KC-46 will be built. Wichita was supposed to do “finishing and delivery” of the tankers.

Bass also frankly admitted “the cost of labor” is too high in Wichita—it’s a union shop—and carrying the overhead of the plant makes Boeing uncompetitive with other companies that only have “two hangars and an office building.” Other states have also offered “incentives” to companies that move in, he said.

Sen. Pat Roberts (R-Kan.) released a statement on the heels of Boeing’s announcement, expressing his anger over an apparent bait-and-switch.

“Boeing’s chairman sat in my office 22 months ago during that battle and promised me” that if the tanker competition were reopened and the Chicago-based aviation and defense giant won, “Boeing would stay in Wichita,” Roberts said. Then-Sen. (now Kansas Governor) Sam Brownback (R) and then-Rep. Todd Tiahrt (R-Kan.) were also in the meeting, Roberts said. Boeing repeated its pledge to stay in Wichita as recently as February 2011, when it won the tanker work, Roberts added.

Sen. Jerry Moran (R-Kan.) released a statement expressing his “outrage” over the move and said he’ll “strongly urge” Boeing to reconsider its plans. Rep. Michael Pompeo (R-Kan.) said he’s asked for meetings with Boeing executives to get more fulsome explanations. Brownback released a statement expressing his disappointment and pledging he’ll work to bring new jobs to the “world class” aviation facilities in Wichita.

The decision to leave Wichita was under review at Boeing for months but wasn’t made public until Dec. 30, Bass asserted.

Boeing’s remaining B-52 work will move to its facilities in Oklahoma City, where Tinker Air Force Base does programmed depot maintenance on the bomber. Other work will be done in San Antonio.

Bass said because Boeing has some 470 suppliers in the state making parts for its in-demand airliners, the company will actually spend \$3.2 billion per year in Kansas—more than it spends there now.

ONE OF OUR DRONES IS MISSING

A top-secret, stealthy Air Force RQ-170 Sentinel remotely piloted aircraft crashed in Iran in early December and was soon paraded on international TV as a prize of war. The Air Force, however, insists that Iran’s capture of the aircraft will not derail its plans for current or upcoming stealth aircraft.

The incident was reminiscent of when Russia shot down a U-2 spyplane in 1960. In response to Iran’s claims of having hacked an intruding drone’s controls and bringing it down intact, the Air Force at first cautiously admitted only to having lost a remotely piloted aircraft in the Afghan-Iran border region. Soon, however, Iran was displaying the damaged aircraft—festooned with anti-American slogans—on its state television, much like Russia’s surprise revelation that the U-2’s pilot, Francis Gary Powers, had been captured alive.

President Obama asked for return of the hardware, but Iran refused.

The Air Force had previously only barely acknowledged the aircraft. When unofficial photos of the airplane circulated on the Internet several years ago, the service refused to release any



Boeing photo illustration

Boeing: Blame the KC-46.

information about its mission or capabilities—as it continues to do—except to confirm that it was indeed a USAF asset and was built by Lockheed Martin.

Air Force Magazine asked USAF if the compromise of the RQ-170’s secrets would now require a rethink of the service’s plans for its next generation bomber, given USAF plans to use off-the-shelf stealth technology on the new aircraft to keep costs down and shorten the development cycle.

“Plans for the new bomber are unchanged,” an Air Force spokesman said. While USAF would not comment directly on what Iran could learn from the RQ-170, the spokesman noted that it took about 15 years for the B-2 and F-22 “to go from program start to fielding” and suggested it will likely take a “near peer”—read China or Russia—a long time to develop stealth technology and fully exploit its capabilities.

“The employment of [low observables] is very complicated and the US maintains a superior advantage in the tactics, training, and maintenance” of stealth systems, the spokesman said.

On the new bomber, “using proven technologies will help to maintain program emphasis on affordability and provide senior leadership information needed to make the capability and cost tradeoffs to hold procurement unit costs at estimated target.” The Air Force’s plans to deliver a new bomber by the mid-2020s remain unchanged, he said.

USAF likewise doesn’t think having the RQ-170 fall into hostile hands will upset the service’s air superiority plans, which hinge on the stealthy F-22 and F-35, both also manufactured by Lockheed Martin.

“Any operational assessment of a potential adversary would be speculative,” the spokesman stated, “but we are confident in our ability to retain the initiative with our fifth generation fighters, our superior training, and the advanced TTPs [tactics, techniques, and procedures] that our airmen have honed over the past several decades.”

Air Force officials said privately the RQ-170 loss could be tolerated. One senior USAF official noted that MQ-1 Predators and MQ-9 Reapers have been lost periodically in combat conditions, so it was expected that a Sentinel, too, could eventually go down in an accident.

“This is not the end of the world,” the official said. He also discounted Iran’s claims that it had used electronic warfare or cyber attack to bring down the RQ-170. Though he did not confirm this scenario, he said it was “possible” a data link failed and the aircraft ran out of fuel waiting to restore contact with its operators. ■

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Guard Now on the Joint Chiefs

The National Guard now has a permanent seat on the Joint Chiefs of Staff, thanks to the Fiscal 2012 defense authorization act.

Congress overruled unanimous objection by the service chiefs, requiring in addition that the National Guard Bureau's vice chief be a three-star, and eliminating the two-star position of director of the bureau's joint staff.

Air Force Gen. Craig R. McKinley, National Guard Bureau chief, said Guardsmen were grateful to the various propo-

nents of this measure, which McKinley championed despite stiff opposition.

He said the Guard looks forward to "working alongside the other Joint Chiefs to provide our nation's senior leaders with a fuller picture of the nonfederalized National Guard as it serves in support of both homeland defense and civil support missions."

Defense Bill Signed

President Obama signed the Fiscal 2012 defense authorization bill into law Dec. 31, despite reservations over lan-

guage covering the military detainment of suspected terrorists.

The act authorizes \$662.4 billion for national defense programs, including \$530 billion for the Pentagon's base budget, \$115.5 billion for overseas contingency operations in places such as Afghanistan, and \$16.9 billion for Energy Department national security activities.

"The fact that I support this bill as a whole does not mean I agree with everything in it," said Obama in a White House statement. He had particular "serious reservations with certain

★ screenshot



USAF photo by TSgt. Arian Nead

provisions that regulate the detention, interrogation, and prosecution of suspected terrorists."

Obama said he ultimately decided to sign this bill because not doing so "would have jeopardized the safety, security, and liberty of the American people."

USAF Seeks Volunteers To Leave

The Air Force is expanding voluntary separation measures for officers in Fiscal 2012, building on ongoing force-management initiatives enacted in September.

Among the new measures, a waiver now allows active duty officers at the rank of lieutenant colonel and below, in selected specialties, to request retirement or separation prior to completing specific commitments.

In addition, a time-in-grade waiver program allows lieutenant colonels in some competitive categories and specialties, with two years in grade and 20 years

of active service, to request retirement in grade.

The Palace Chase program will also allow lieutenant colonels and below, in selected specialties, to transfer from active duty to the Air National Guard or Air Force Reserve.

Tasked with drawing down to its congressionally mandated end strength of 332,800 active duty airmen by the end of Fiscal 2012, the service released a list of similar programs for the enlisted force last November.

Air Force Keeps MC-12

The MC-12 Liberty intelligence-reconnaissance-surveillance aircraft will stay with the Air Force, under provisions of the defense authorization bill. The Senate had wanted to transfer the fleet to the Army, but withdrew the change from the final conference bill, signed by President Obama on Dec. 31.

"The conferees accept [the Defense Department's] judgment" that "the Air Force should continue to operate and manage the MC-12 Liberty fleet," stated the conference report accompanying the authorization bill.

The conferees voiced concern, however, over USAF's proposal to shift the fleet to the Air National Guard. Though the panel wasn't opposed to the ANG operating the fleet per se, it questioned the Guard's ability to sustain the MC-12 fleet in-theater at the required deployment schedule.

Stick a Fork in It

General Electric and Rolls Royce pulled the plug on their alternative engine for the F-35, ending a long-running battle between the Pentagon and Congress.

The partners announced they would stop funding development of the F136 engine at their own expense due to "con-

01.05.2012

Maintainers ready an AWACS aircraft in Southwest Asia, while an F-15 takes to the sky behind them. An E-3 Airborne Warning and Control System aircraft assisted in the rescue of a downed AH-64 Apache crew in Afghanistan in December. When the E-3 crew received the Mayday call, it swung into action, communicating with F-16s for armed overwatch, a KC-135 tanker for fuel, the Apache pilots on the ground, and the combined air and space operations center.



A Double Helping of F-16s

Lockheed Martin received an \$835 million contract in December to supply 18 F-16 Block 52 aircraft to the Iraqi Air Force. Less than two weeks later, the Pentagon alerted Congress to a potential second sale of 18 Falcons to Iraq.

Under the current foreign military sales arrangement agreed to with Iraq, Lockheed will supply 12 F-16Cs and six two-seat F-16Ds as well as associated weapons, equipment, and support services.

A potential follow-on deal could double the total order to 36 new-built F-16s, worth an estimated \$2.3 billion.

"We hope that the Congress will approve another group of F-16 airplanes to Iraq because our Air Force was destroyed completely during the war that Iraq entered into," stated Iraqi Prime Minister Nouri al Maliki during a Dec. 12 press conference with President Obama at the White House.

"The proposed sale will allow the Iraqi Air Force to modernize its air force by acquiring Western-interoperable fighter aircraft, thereby enabling Iraq to support both its own air defense needs and coalition operations," the Defense Department stated in a release the same day.

Iraqi's initial cadre of F-16 pilots is already undergoing training in the United States, though delivery of the country's first F-16 is not expected until at least 2015.

tinued uncertainty in the development and production schedules" for the F-35.

The F136 was intended to be a competitor to Pratt & Whitney's F135, selected to power the F-35. It was expected that competition would drive down costs and increase quality, as experienced in the "Great Engine War" between GE and Pratt & Whitney in the 1980s for F-15 and F-16 power plants. However, Defense Secretary Robert M. Gates decided the second engine was an unnecessary expense and ordered it terminated. Congress objected, and the issue became a political tug-of-war for several years.

Though "GE and Rolls Royce are proud of our technology advancements and accomplishments on the F136, ... difficult circumstances are converging that impact the potential benefit of a self-funded development effort," said Fighter Engine Team President Dan McCormick, explaining the decision Dec. 2.

The two companies chose to continue funding maturation of the F136 on their own dime after the Pentagon terminated the F136 contract last April, hoping to leverage congressional support to offer the alternative engine in future F-35 production lots.

With the F136's demise, the F135 will remain the sole engine option on the Lightning II.

Locklear for Pacific Command

President Obama has selected Adm. Samuel J. Locklear III, commander of NATO's Allied Joint Forces Command, to lead US Pacific Command.

If confirmed by the Senate, Locklear will replace Adm. Robert F. Willard, who has served in the position since October 2009.

Locklear is a 1977 graduate of the Naval Academy and also serves as commander of US Naval Forces Europe and head of US Naval Forces Africa.

He commanded Joint Task Force Odyssey Dawn, the US-led portion of NATO's engagement in Libya, last year.

Unmasked Avenger

The Air Force recently ordered a Predator C Avenger remotely piloted aircraft for test purposes.

Built by General Atomics Aeronautical Systems, the multirole jet aircraft will help the service mature concepts and technologies for the next generation of RPAs.

Do the Hustle: Members of the 26th and 46th Expeditionary Rescue Squadrons scramble for a personnel recovery mission at Camp Bastion, Afghanistan, in late December. From notification of a rescue, the crews have 15 minutes to be airborne and strive to have patients back to Camp Bastion within one hour.



USAF photo by SSgt. David Carbajal

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"This aircraft will act as the test vehicle to develop those next generation [RPA] sensors, weapons, and tactics, techniques, and procedures (TTPs), ensuring a quick, smooth, and efficient fielding of these advanced capabilities to the area of operations," USAF stated in a document outlining the project.

Procurement will allow developers to advance Avenger "into a platform able to carry a greater variety of sensors and weapons, up to and including 2,000-pound stores, which is double the ability of current [RPA] platforms."

General Atomics discussed its self-funded development of a stealthy member of the Predator family for years, but did not unveil the Avenger until April 2009.

Stick Around, U-2

Congress has directed the Air Force to keep the U-2 reconnaissance airplane in service at current capability levels through 2016.

Beyond 2016, defense authorizers stipulated USAF must seek congressional approval to retire the fleet and ensure the RQ-4 Global Hawk is ready to assume full responsibility for high-altitude intelligence missions.

In the conference report accompanying the Fiscal 2012 defense policy bill Congress stated that the Air Force "may take no action" to prevent it from maintaining the U-2 fleet "in its current configuration and capability beyond Fiscal Year 2016."

To retire the U-2, Pentagon officials must certify that the Global Hawk's operating and sustainment costs "are less than" those of the U-2, and the Global Hawk's capability is "equal [to] or greater" than the U-2's.

F-35 Fifth Lot

The Defense Department and Lockheed Martin have agreed to tentative terms for production of the fifth lot of F-35 strike fighters.

While low rate initial production (LRIP) Lot 5 will be a fixed-price contract, according to the F-35 Joint Program Office, it will contain an exception for DOD and Lockheed to split the cost of modifications needed to address issues discovered during concurrent development and production.

The Pentagon will use an "undefinitized" contract action to allow Lockheed to begin work on LRIP 5 aircraft and simply bill the government for incurred costs.

DOD will announce the exact value of the LRIP 5 contract and the number of aircraft procured through the normal contract announcement process, according to the JPO.

Mission Complete in Iraq

Pentagon leaders officially ended the US military mission in Iraq in a ceremony saluting the nearly 4,500 US troops killed and 32,000 wounded in Operations Iraqi Freedom and New Dawn over nearly nine years.

"On this very historic occasion for both the Iraqi people and the American people, no words, no ceremony can provide full tribute to the sacrifices that have brought this day to pass," said Defense Secretary Leon E. Panetta, speaking at US Forces-Iraq headquarters on Sather Air Base, in Baghdad, Dec. 15.

"For more than 20 years, Iraq has been a defining part of our professional and our personal lives. The road we have traveled was long and it was tough," said Joint Chiefs of Staff Chairman Gen. Martin E. Dempsey at the ceremony. "Our journey was a lesson in courage, affirmation of shared sacrifice, and a monument to sheer will."

After the ceremony, several hundred troops departed Sather. All US military personnel were out by mid-December. Five hours after the last US airmen crossed the border from Iraq to Kuwait, the Air Force cased its expeditionary colors, officially standing down its units in theater.

Officials inactivated the 9th Air and Space Expeditionary Task Force-Iraq, along with the 321st Air Expeditionary Wing, 368th Expeditionary Air Support Operations Group, and 467th Air Expeditionary Group, at an undisclosed base in Kuwait Dec. 18.

"It's been an honor to serve with so many men and women who poured their heart and soul into this mission," said Maj. Gen. Russell J. Handy, task force leader since August 2010.

Handy highlighted the sacrifice of military members who died in Operation Iraqi Freedom-Operation New Dawn as well as the wounded. "Understandably, many of you will look back and wonder if it was worth the price. That question is one we all will have to ask ourselves because sacrifice is a deeply personal thing," said Handy.

"As you all depart here very soon, hold your heads high as proud members of a specialized fraternity of warriors."

Lockheed will incorporate redesigned structural components in the wing assemblies of the Air Force F-35A variant and Marine Corps F-35B for the first time in Lot 5.

\$5 Billion Later ...

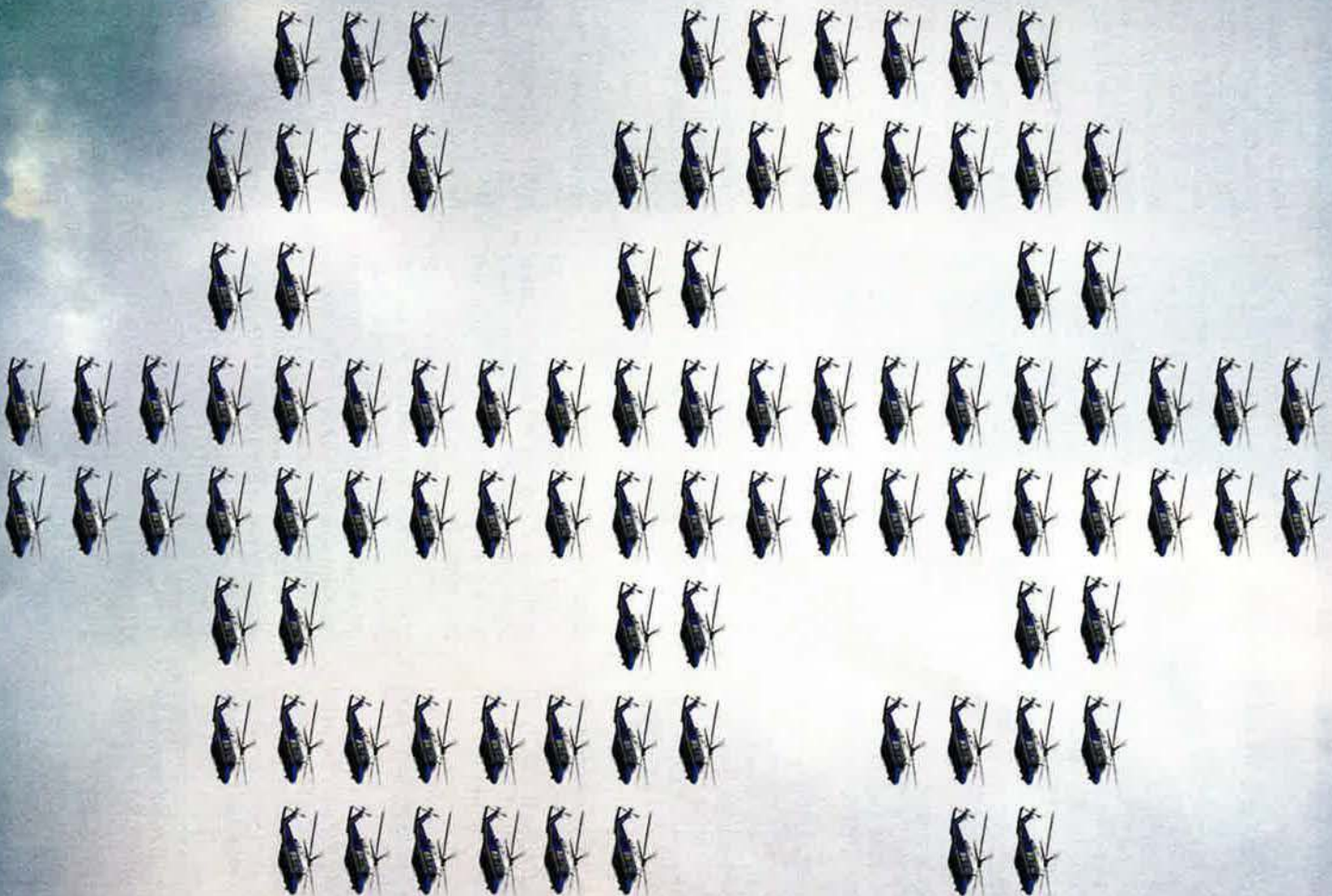
The Missile Defense Agency an-

nounced it will dismantle the heavily modified Boeing 747 that served as the Airborne Laser Test Bed. The ALTB will be placed in permanent storage.

The Pentagon invested more than \$5 billion in the Airborne Laser Test Bed, which was meant to serve as the pathfinder for a fleet of aircraft that

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Raptor Pilot Faulted in Fatal Crash

A pilot's "failure to recognize and initiate a timely dive recovery" was the most direct cause of a fatal F-22 crash in November 2010 in Alaska, according to Pacific Air Forces accident investigators.

According to a summary of findings, "channelized attention, breakdown of visual scan, and unrecognized spatial disorientation" resulted in the loss of both aircraft and pilot. The Air Force specifically ruled out problems with the on-board oxygen system as the direct cause of the crash. Problems with the oxygen system grounded the F-22 fleet for months last year.

On a three-ship night training sortie from Joint Base Elmendorf-Richardson, Capt. Jeffrey Haney's Raptor suffered "an engine bleed air leak malfunction" depriving several systems—including his oxygen system—of power, according to the accident investigation report released in December.

Haney quickly cut the engine to idle power, initiating a shallow dive from approximately 41,000 feet to lower altitude.

Several seconds later, he sharply increased the dive angle, rolling the aircraft inverted.

At roughly 5,500 feet, Haney initiated a 7.4G pull-up. Nevertheless, the aircraft struck the ground at a 48-degree angle and a speed greater than Mach 1.1, roughly 140 miles northeast of the joint base.

The board cited issues such as training deficiencies and "personal equipment interference" as contributing factors. "Due to the extensive damage and limited evidence recovered, the cause of the bleed air leak could not be determined," investigators said.

could shoot down boosting ballistic missiles via a high-powered chemical laser fired through a nose turret. ALTB successfully shot down both solid- and liquid-fueled missiles during tests in February 2010.

The program was ultimately felled by its operational concept, cost, and employment limitations.

Experiments yielded critical insight into future design, highlighting the need for next generation anti-missile lasers to pack greater power into a smaller platform capable of higher altitude operations, said Army Lt. Gen. Patrick J. O'Reilly, MDA director.

MDA is "very close" to a prototype that will operate off an "unattended air vehicle" at extreme altitude, he added.

Bombed Up

The Air Force's next generation bomber program got a hefty funding increase in Fiscal 2012 from congressional defense appropriators, who added \$100 million to the service's \$197 million request.

Congress allocated \$297 million for the bomber's development, according to the final version of the Fiscal 2012 defense spending bill signed by President Obama.

Lawmakers included no language in the omnibus bill or accompanying conference report explaining why the funds were added.

The Air Force intends to field a force of 80 to 100 new long-range bombers starting in the mid-2020s, but has yet to nail down specific requirements for the future platform.

Laser Lancer

The Air Force has cleared B-1B bombers to employ the GBU-54 Laser Joint Direct Attack Munition to strike moving targets, thanks to a targeting pod upgrade.

Though the B-1 has used the Sniper pod in combat since 2008, the Laptop Controlled Targeting Pod Phase II upgrade allows the Sniper's laser to send constant updates to the aircraft's avionics via laptop computer.

"Perhaps the greatest benefit of this upgrade will be the ability to streamline

the targeting process and get bombs on target faster," said Lt. Col. Matthew Brooks, 9th Bomb Squadron commander at Dyess AFB, Tex.

After successful development and operational testing the 9th BS will become the first B-1 unit to field the Laser JDAM in combat on the B-1.

Pension Pending

Six of USAF's 66 B-1B bombers can now proceed to retirement as USAF requested, under conditions specified by Congress in the Fiscal 2012 defense bill.

USAF can retire the aircraft as long as it plows more of the savings back into the B-1 force. Congress didn't like USAF's plan to reinvest "less than 40 percent" of the savings in the Lancer fleet.

In addition, no B-1s may be retired before the Air Force details its plan to modernize and maintain the Lancer fleet through 2022, including "an estimate of the savings that will result" each year until then.

The authorization also stipulates the Air Force must maintain at least 33 combat-coded B-1s through Fiscal 2016.

BUFF Under the START Axe

A total of 39 retired B-52G bombers stored at Davis-Monthan AFB, Ariz., will be cut up under the New Strategic Arms Reduction Treaty with Russia.

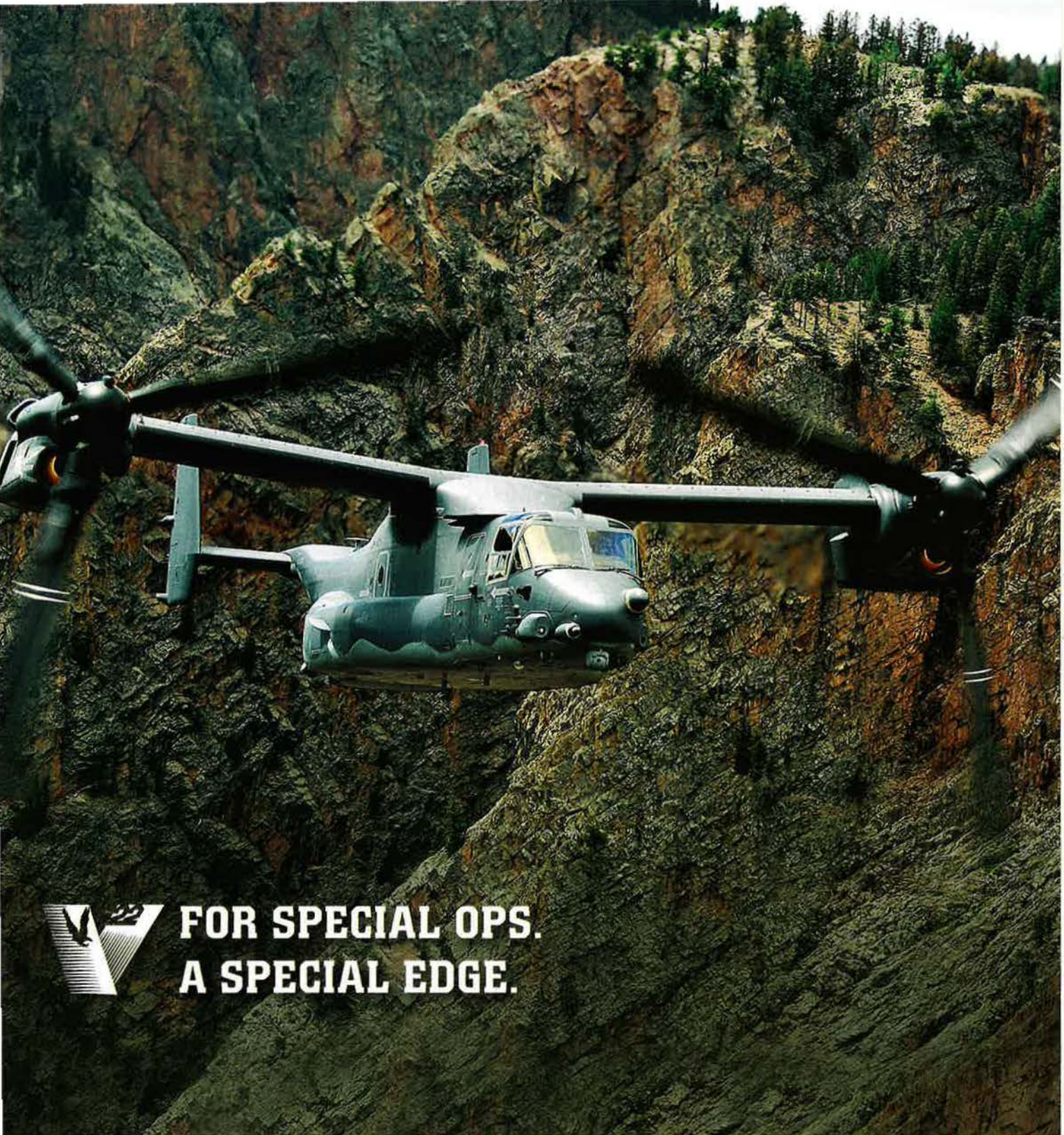
Stored relatively intact, the bombers currently count against the US "deployed" heavy bomber limit—as do portions of the B-2A and B-52H fleets—under treaty rules, according to the State Department.

To finally render the bombers incapable of nuclear delivery, according to



So Very Versatile: A1C Jamal Browne fixes avionics equipment on a B-1B at a base in Southwest Asia. Since the aircraft received the Sniper Advanced Targeting Pod in 2008, B-1Bs have played a role greatly expanded from their traditional function as a bomber, and now also provide intelligence to ground forces.

USAF photo SSGT Nathanael Cellon



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treaty requirements at least, the Air Force will sever the tail section from each of the aircraft fuselages "at a location obviously not an assembly joint," said officials with the Air Staff's nuclear directorate.

Though multiple options existed for compliance with treaty protocols, this method effectively demonstrates the "completion of elimination" of the old airframes.

The Air Force intends to cut its fleets to no more than 60 deployable nuclear-capable bombers to meet New START ceilings on strategic nuclear warheads and delivery systems by February 2018.

A Familiar Drone in Iraq

Despite the pullout from Iraq, Predator remotely piloted aircraft will continue to fly unarmed reconnaissance flights over the country's northern border region, flying from Incirlik AB, Turkey.

The US is aiding its NATO ally Turkey against the Kurdistan Workers Party, known as the PKK, which the Turkish government has branded as a terrorist organization.

"As you know, we do provide some technology to assist [the Turks] in their efforts against the PKK," said Defense Secretary Leon E. Panetta, during an official visit to Ankara Dec. 17.

The PKK continues to launch attacks against the Turkish government from havens in northern Iraq and is listed as a terrorist organization by the State Department.

As such, Panetta said he made it "very clear" to Turkish officials that the United States would continue to assist efforts to confront the PKK.

The US military reportedly began flying Predator missions monitoring the PKK from bases in Iraq beginning in 2007, and the *Washington Post* reported that Panetta conveyed that the Iraqi government has agreed to permit the overflights.

First in Glass

The first C-130H upgraded by USAF technicians with a glass cockpit under the C-130 Avionics Modernization Program went into low rate initial production at Robins AFB, Ga.

As of December, the first aircraft was undergoing functional testing while a second aircraft was 85 percent of the way through the upgrades.

The C-130 AMP adds new air traffic management, defensive suites, navigation instruments, and instrument landing systems to USAF's fleet of legacy Hercules.

The first aircraft required significant troubleshooting to smooth the upgrade process for later aircraft. Two additional C-130s are scheduled to arrive on the AMP line later this fiscal year.

The War on Terrorism

Operation Enduring Freedom

Casualties

By Jan. 17, a total of 1,864 Americans had died in Operation Enduring Freedom. The total includes 1,861 troops and three Department of Defense civilians. Of these deaths, 1,487 were killed in action with the enemy while 377 died in noncombat incidents.

There have been 15,204 troops wounded in action during OEF.

Blame To Go Around

Pentagon investigators vindicated US forces acting in "self-defense and with appropriate force after being fired upon" by Pakistani troops in a mistaken engagement on the Afghan border last November.

USAF Brig. Gen. Stephen A. Clark, who led the investigation, stated that "inadequate coordination" between governments, incorrect mapping information, and communication failures also contributed to the death of 24 Pakistani soldiers Nov. 25-26.

Pentagon spokesman George Little expressed the Defense Department's "deepest regret" for the lives lost in the crossfire and ensuing air strikes.

US, NATO, and Afghan investigators conducted some 60 interviews to unravel what Clark termed a very "complicated situation." He added that the allies "did not benefit from Pakistani participation" in the investigation.

"That's a significant element there that is missing because there're always two sides to a particular event," said Clark.

First Afghan-based UPT in 30 Years Begins

Seven Afghan Air Force lieutenants recently began the first undergraduate flight training course held entirely in Afghanistan in more than 30 years.

The small group at Shindand Air Base on Dec. 10 began the roughly year-long course with more than 200 Afghan and coalition air advisors present at an opening ceremony. During training, they will receive some 60 hours of academic instruction and flight screening in the Cessna182T then break into separate fixed- and rotary-wing tracks.

Before beginning undergraduate pilot training, all seven had graduated from the National Military Academy, received initial officer training in Britain, and passed English studies at Kabul English Language Training Center.

First Afghans Graduate From Laughlin's SUPT

The first three Afghan airmen to undergo specialized undergraduate pilot training in the United States graduated at Laughlin AFB, Tex.

One of the Afghan lieutenants receiving his wings Dec. 18 called the experience a "dream come true."

Selected from among more than 350 candidates, the airmen completed a year's worth of intensive English language courses at JB San Antonio, Tex., before stepping onto Laughlin's flight line.

Over the last year, each flew roughly 200 hours in the T-6 Texan II; this amounted to more than 140 sorties.

"Now I'm going back to Afghanistan with my wings as an official pilot," said one of the airmen. Upon returning to Afghanistan, all three pilots will begin advanced training on the C-27A airlifter.

Reaper Crashes in Seychelles

An unarmed Air Force MQ-9 Reaper remotely piloted aircraft crashed Dec. 13 at the Seychelles Airport on the island of Mahe near the capital, Victoria.

The crash caused no injuries. US military and Seychelles civil aviation authorities coordinated removal of debris, and the airport reopened to normal traffic not long after the crash, according to a USAF release.

The Defense Department first confirmed the presence of unarmed MQ-9s in the Seychelles in 2009 for counter-piracy in the Gulf of Aden and the Indian Ocean.

The cause of the incident is under investigation.

The One We Lost

The F-15E that crashed in Libya March 21 during Operation Odyssey Dawn was felled by an unrecoverable spin induced

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Senior Staff Changes

RETIREMENT: Lt. Gen. Loren M. Reno.

NOMINATIONS: To be Major General: Mark A. Ediger. **To be AFRC Brigadier General:** Brian E. Dominguez, Merle D. Hart.

CHANGES: Brig. Gen. Darryl W. Burke, from Cmdr., 82nd Tng. Wg., AETC, Sheppard AFB, Tex., to Dep. Cmdr., Jt. Functional Component Command, Intel., Surveillance, & Recon., STRATCOM, JBolling-Anacostia, D.C. ... Lt. Gen. Frank Gorenc, from Cmdr., 3rd AF, USAF, Ramstein AB, Germany, to Asst. Vice C/S, USAF, Pentagon ... Maj. Gen. James J. Jones, from Dep. Cmdr., AFCENT, Southwest Asia, to Dir., Operational Planning, Policy, & Strategy, DCS, Ops., Plans, & Rqmts., USAF, Pentagon ... Brig. Gen. Robert D. McMurry Jr., from Dep. Chief, Support, Office of Security Cooperation-Iraq, CENTCOM, Baghdad, Iraq, to Dir., Space Prgms., Office of the Asst. SECAF, Acq., Pentagon ... Maj. Gen. Harry D. Polumbo Jr., from C/S, AFRICOM, Stuttgart, Germany, to Cmdr., 9th Air & Expeditionary Task Force-Afghanistan, ACC, Kabul, Afghanistan ... Maj. Gen. Lori J. Robinson, from Dir., LL, OSAF, Pentagon, to Dep. Cmdr., AFCENT, Southwest Asia ... Maj. Gen. Tod D. Wolters, from Cmdr., 9th Air & Space Expeditionary Task Force-Afghanistan, ACC, Kabul, Afghanistan, to Dir., LL, OSAF, Pentagon.

SENIOR EXECUTIVE SERVICE CHANGES: Barbara J. Barger, to Dir., AF Language, Region, & Culture Prgm. Office, DCS, Manpower, Personnel, & Svcs., USAF, Pentagon ... Michael R. Deis, to Dir., Sensors Directorate, AFRL, AFMC, Wright-Patterson AFB, Ohio ... Ava Sue Dryden, to Dep. Asst. SECDEF, Materiel Readiness, Office of the USD, Acq., Tech., & Log., Pentagon ... Lynda T. O'Sullivan, to Dep. General Counsel, Acq., Office of the AF General Counsel, Pentagon. ■

by uneven fuel and bomb distribution on the aircraft during combat maneuvers, USAF has determined.

Investigators found the Strike Eagle pilot employed an Air Force-approved maneuver—albeit at a previously untested altitude—egressing the target area after dropping a single weapon.

Weight imbalance resulting from a software glitch rendered it impossible to drop ordnance mounted on its right wing, contributing significantly to the loss of control.

The ordnance imbalance was further exacerbated by the underwing fuel tank on the same wing emptying too slowly.

Assigned to RAF Lakenheath, Britain, the aircraft was operating from Aviano AB, Italy, in the opening days of the NATO air campaign.

Both the pilot and combat systems officer ejected and suffered minor injuries from the crash near Benghazi. The total loss of equipment was valued at an estimated \$48.2 million.

Still More BACN

Northrop Grumman will equip two additional RQ-4 Global Hawk Block 20s with Battlefield Airborne Communications Node payloads through a \$47.2 million contract with the Air Force.

The service will provide these two Global Hawk air vehicles, designated AF-11 and AF-13, to Northrop for integration of the BACN payloads at the company's facility in Palmdale, Calif.

The service expects the payload integration on AF-11 to be completed in August and on AF-13 in December.

USAF operates two BACN-equipped Global Hawks, recently designated EQ-4, supporting operations in Southwest Asia.

Alongside the manned BACN equipped Bombardier E-11A Global Express jet aircraft, the EQ-4 serves as an overhead communications-relay for ground troops.

Another Shuttle?

The Air Force recently selected Lockheed Martin to demonstrate a winged, rocket-powered spacelifter under a five-year indefinite-delivery/indefinite-quantity contract worth up to \$250 million, according to the company.

The Air Force is potentially interested in the craft, known as the Reusable Booster System, as a more economical alternative to expendable launch vehicles.

"We are very pleased to be selected by the Air Force to support them on the Reusable Booster System program," said John Karas, Lockheed's vice president and general manager of Human Space Flight.

After initial experimentation, the company is scheduled to launch a demonstrator, dubbed RBS Pathfinder, to validate requirements for the design of an operational vehicle in 2015.

Pathfinder will be tested from Spaceport America, the nation's first purpose-built commercial spaceport, in southern New Mexico, according to Lockheed officials.

Economy Herk Announced

Lockheed Martin plans to offer a low-cost variant of the C-130J early this year, specifically aimed at budget-conscious international customers with less-intensive mission needs.

Dubbed the C-130XJ, the new aircraft will boast a "significantly lower price," incorporating sizable "growth capability, post delivery," said Lockheed Martin spokesman Peter Simmons.

Though the C-130XJ will be optimized for "low-threat" movement of personnel and supplies, particularly tasks such as firefighting and search and rescue, it retains all "provisions necessary to fully configure the aircraft for combat operations should the need arise," noted Simmons. Lockheed's Enhanced Cargo Handling System is the only feature that cannot be retrofitted to the XJ, he said.

Since the C-130XJ uses the same power plant and avionics as the C-130J, Lockheed Martin could potentially offer

USAF photo by SSgt. David Carbajal



Don't Fear the Reaper: Members of the 62nd Expeditionary Reconnaissance Squadron speak to Afghan military members and civilians about the MQ-9 Reaper aircraft at an open house hosted by the Afghan Air Force at Kandahar Airfield, Afghanistan. The Jan. 1 open house was the third such annual event held at Kandahar. Hundreds of schoolchildren and Afghans attended and got an opportunity to see the UAV.

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Konnichiwa, Lightning II

Japan's Defense Ministry selected the F-35 strike fighter as the next generation fighter for the Japan Air Self Defense Force, Lockheed Martin revealed Dec. 19.

The initial order is for 42 F-35A conventional takeoff and landing variants, replacing Japan's aged F-4EJ Phantom fleet. Japan has an eventual total requirement for some 200 new fighters, according to Lockheed Martin executives.

Lockheed Martin's bid emerged the winner from Japan's F-X fighter competition, beating out the F-18E/F Super Hornet and the Eurofighter Typhoon. The initial contract for four aircraft will come from Japan's Fiscal 2012 spending, beginning April 1, stated Lockheed.

"We are honored by the confidence the Japanese government has placed in the F-35 and our industry team to deliver this fifth generation fighter to the Japan Air Self Defense Force," said Robert J. Stevens, Lockheed Martin chairman and CEO.

As a result of its decision to procure the F-35, the Japanese government also announced it will lift its longstanding policy banning export of any defense-related systems or components. This modification will allow Japan to compete for F-35 component manufacturing for all of the nations participating in the program.

Nine F-35 partner nations—United States, Australia, Britain, Canada, Denmark, Italy, the Netherlands, Norway, and Turkey—will buy the F-35, and Israel has also committed to buying it, making Japan the 11th customer for the Lightning II.

a similar package for its stretched C-130J-30, at a customer's request.

Lockheed is also developing a "next generation" Hercules, designated C-130NG, incorporating "increased fuel efficiency and reduced overall operating costs," available around 2030.

Saudi Eagle Deal Sealed

Saudi Arabia and the US have formalized a deal for the kingdom to buy 84 advanced new-build F-15SA aircraft under a \$29.4 billion foreign military sale.

The two nations signed a letter of offer and acceptance including modernization of 70 of existing Saudi F-15s, as well as munitions, spares, training, and support.

"This agreement reinforces the strong and enduring relationship between the United States and Saudi Arabia and demonstrates the US commitment to a strong Saudi defense capability," said a White House spokesman announcing the deal Dec. 29.

The Obama Administration disclosed its intent to make the sale last year, and delivery of the first new aircraft is anticipated in early 2015, said Pentagon policy official James N. Miller in a press briefing.

Sigint To Go

Lockheed Martin delivered an airborne signals intelligence payload specifically configured for the C-130J for acceptance testing in December.

The Senior Scout tactical sensor suite is designed to locate enemy communications, reporting them directly to air and ground commanders, stated a company press release Dec. 7.

Senior Scout is mounted in a cargo-bay-length palletized container that air-

men can easily load and off-load from a Super Hercules.

Lockheed said it enhanced the latest Senior Scout shelter for structural compatibility with the C-130J, while updating systems and interface to improving maintenance access.

One More C-17

Congressional appropriators have added funds in Fiscal 2012 to buy the Air Force one more C-17, a replacement for the transport lost in a crash at JB Elmendorf-Richardson, Alaska, in July 2010.

USAF didn't request the airlifter, but lawmakers included the \$225 million in

the 2012 omnibus spending bill signed by the President late last year.

The extra aircraft will bring the fleet size up to its authorized 223 airframes, raising the service's total buy to 224 C-17s.

Boeing is already under contract for 218 of those airframes, but as of early January, the replacement aircraft had yet to be added to the company's production schedule at Long Beach, Calif., according to an Air Force spokesman.

Delivery of the aircraft is expected in 2013.

Wideband Widens

The Air Force tapped Boeing to begin work on the eighth Wideband Global Satellite Communications spacecraft, WGS-8, exercising a contract option for \$296 million, USAF space officials announced in December.

The option builds on \$58 million signed to Boeing in August for the long-lead-items and work associated with fabricating WGS-8, bringing the satellite's cost to \$354 million.

WGS-8 is part of the Block 2 follow-on contract encompassing Wideband Global Satellites -7, -8, and -9.

The Air Force already operates three WGS Block 1 satellites in geosynchronous orbit supporting simultaneous X-band and Ka-band military communications around the globe.

The first more capable Block 2 satellite—WGS-4—was scheduled for launch in January from Cape Canaveral AFS, Fla.

As of December, WGS-5, -6, and -7 were in various stages of production.

Recognizing Angel Thunder

The personnel recovery exercise Angel Thunder, run at Davis-Monthan AFB, Ariz., has attained official Defense De-



Solemn Moments: Soldiers carry the remains of Army Spc. Pernell Herrera at Dover AFB, Del., as a C-5 takes off from the base. The USAF Mortuary Affairs Division at Dover provides support to families of all services who travel there for dignified transfer of their loved one's remains. A service-specific team performs the transfer.

USAF photo by Adrian R. Rowan



Photo by Jim Haselme

partment accreditation after six years as a base-level exercise.

"This is a David and Goliath story of an exercise being founded by rescue airmen in the trenches because what we needed was not in the system," said Brett Hartnett, exercise coordinator.

Air Combat Command sponsorship over the past few years paved the way for Joint National Training Capability certification Nov. 30.

"With no budget, we built the world's largest and most dynamic rescue exercise in our spare time. In turn, ACC recognized our success and made us their official personnel recovery exercise," summed up Hartnett. JNTC credentials affirm that the exercise offers a consistent standard of quality training each year.

Held in October, last year's Angel Thunder hosted 46 aircraft and more than 1,000 personnel from 17 countries.

Cuts at Home, Sales Abroad

US foreign military sales for Fiscal 2011 exceeded \$30 billion for the fourth consecutive year. In fact, the Defense Security Cooperation Agency, which oversees the Pentagon's transfer of military equipment to allies and friends, recorded \$34.8 billion in equipment sales for the fiscal year ending last September.

Government-to-government FMS programs accounted for the bulk of sales, totaling \$28.3 billion.

The top three FMS customers were: Afghanistan (\$5.4 billion), Taiwan (\$4.9 billion), and India (\$4.5 billion), according to the agency.

Rounding out the top 10 were Australia (\$3.9 billion), Saudi Arabia (\$3.5 billion), Iraq (\$2.0 billion), the United Arab Emirates (\$1.5 billion), Israel

(\$1.4 billion), Japan (\$0.5 billion), and Sweden (\$0.5 billion).

DSCA forecasts that FMS will reach a similar total in Fiscal 2012.

C-17 To Air Force Museum

T-1, the first C-17 Globemaster III built, has been earmarked for display at the National Museum of the US Air Force in Dayton, Ohio, on its retirement later this year.

C-17A serial No. 87-0025 first flew in September 1991 and served primarily as a test asset at Edwards AFB, Calif., during its career.

The Globemaster's specific arrival date at Dayton has yet to be determined.

Narrowed To Four

Candidate hosts for a regional security forces training center recently narrowed to four installations under Air Force training consolidation efforts.

Officials at Air Force Security Forces Center headquarters are evaluating Camp

New Kid in Town: An MC-130J refuels a CV-22A Osprey over New Mexico. The first MC-130J rolled out in March 2011.

The aircraft—the first C-130 type built specifically for special operations—is a streamlined turboprop tanker designed to fly low-level, clandestine aerial refueling missions as well as infiltration, rescue, and resupply operations.

Guernsey, Wyo.; Fort Bliss, Tex.; JB McGuire-Dix-Lakehurst, N.J.; and JB San Antonio, Tex., as a future home of the consolidated schoolhouse.

After the detailed review is complete, Air Force leaders will select one or more of the installations as preferred alternatives sometime in mid-2012.

The realignment is part of USAF's broader goal of consolidating regional training centers to fewer locations. The service's aim is to conduct security forces training more efficiently while enhancing airmen's adaptation to emerging combat trends and enemy tactics. ■

Winner's Woe

Less than a week after selecting Sierra Nevada's A-29 Super Tucano as the winner of the Light Air Support competition, the Air Force issued a temporary stop-work order on the aircraft.

USAF is procuring the aircraft to provide Afghanistan with an advanced trainer and light close air support platform. Sierra Nevada teamed with Brazil's Embraer to build the aircraft in Jacksonville, Fla. Initially delivery was scheduled for April 2014, but Hawker Beechcraft filed a federal suit against the Air Force Dec. 30, the same day the contract was announced, citing a lack of justification for the company's exclusion.

Hawker filed suit after the Government Accountability Office dismissed an earlier protest.

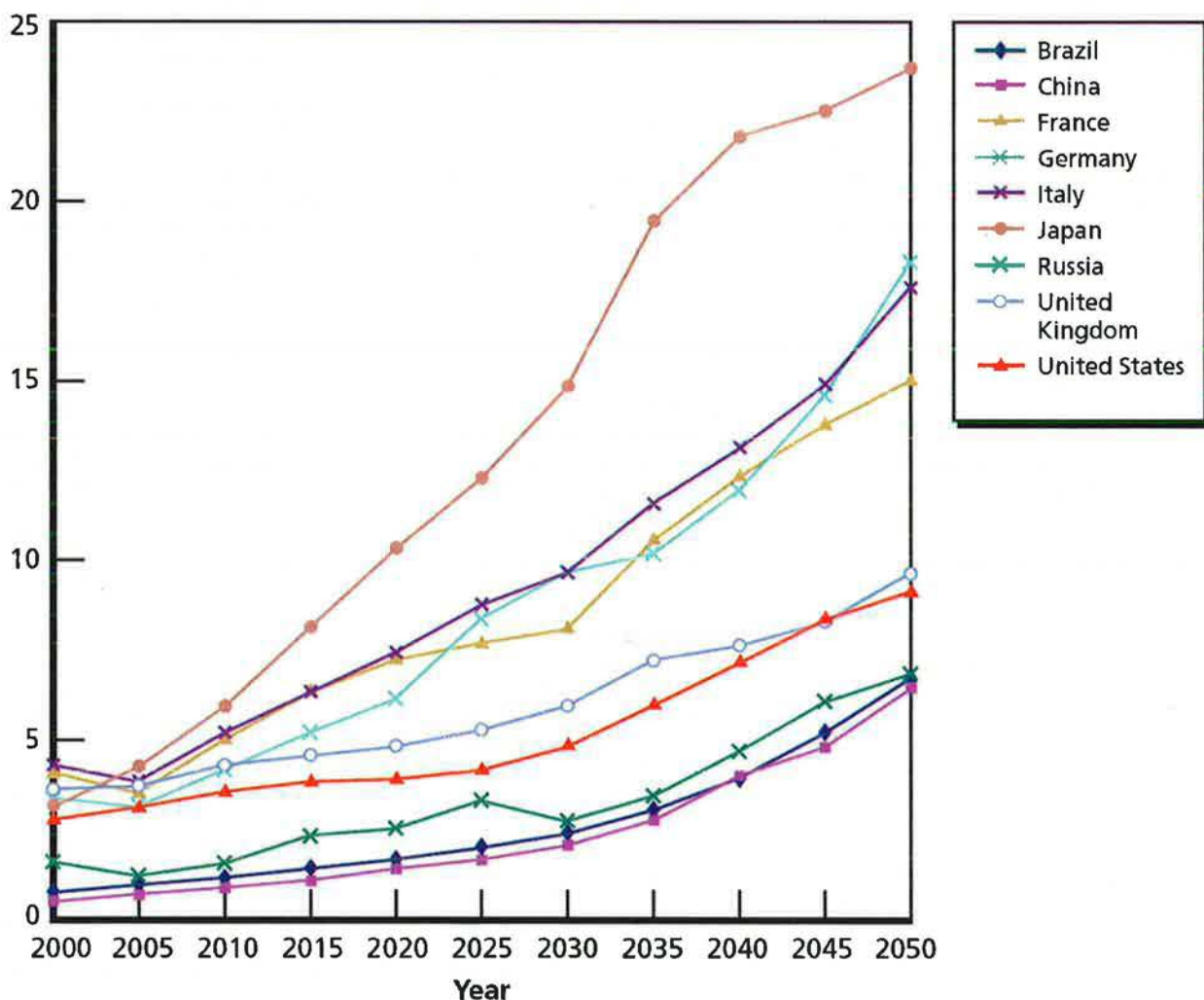
Air Force officials are "confident in the merits of its contract award decision and anticipates that the litigation will be quickly resolved," said USAF spokesman Lt. Col. Wesley Miller. "The competition and source selection evaluation were fair, open, and transparent."

Defense, Demography, and Destiny

Working-age citizens—those between 20 and 60—are the primary sources of a nation's wealth and military strength. In addition, many older than 60 still contribute. However, the so-called "old-old," those over 85, tend to consume rather than generate economic and technological gains. According to a new RAND Corp. study, a high ratio of old-old to the general

population can be a drag on defense. As shown in the chart, Japan, Germany, Italy, and France are headed toward 10 percent old-old in their populations. China, of the major nations, is the one with the lowest proportion of old-old citizens, while the UK, US, Russia, and Brazil are expected to stay below 10 percent through 2050.

Number of "Old-Old" Persons Per 100 Working-Age Adults



Source: "Global Demographic Change and Its Implications for Military Power," by Martin C. Libicki, Howard J. Shatz, Julie E. Taylor. RAND Corp., Santa Monica, Calif., 2011. Reprinted with permission.



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Rolls-Royce

By Robert S. Dudley

Boots in the Closet

"With the end of US military commitments in Iraq and the drawdown that is already under way in Afghanistan, the Army and Marine Corps will no longer need to be sized to support the kind of large-scale, long-term stability operations that have dominated military priorities and force generation over the past decade."—**Secretary of Defense Leon E. Panetta, News conference, Jan. 5.**

Cue the Violins

"Here we go again. The Obama Administration will reduce its long-service, professional land force to pay for something called 'AirSea Battle,' a strategy that seeks to buy more ships and planes in order to confront China with technology rather than people. This strategy shows a degree of ahistoricism that exceeds that of any post-World War II Administration. ... We will enter the next war again tragically short of the precious resource that we have neglected for six Administrations: our soldiers and marines."—**Retired US Army Maj. Gen. Robert H. Scales, former US Army War College commandant, Washington Post, Jan. 5.**

Demanding Customer

"The F-35 will be a major piece of our force structure, but getting there will be on a somewhat lower ramp than we had envisioned. ... We're certainly committed, [but] that's not to suggest we're not going to be a demanding customer. In the budgetary environment that we're in, we absolutely must be a demanding customer."—**Gen. Norton A. Schwartz, USAF Chief of Staff, Jane's Defence Weekly Magazine interview, Dec. 21.**

The Bomber Imperative

"The ability to operate from long distances will be fundamental to our future strategy in the Pacific. You have to have a long-range bomber. In terms of Air Force priorities, I cannot think of a larger one."—**Andrew Hoehn, RAND Corp. Wall Street Journal, Jan. 4.**

Iran's Latest Suicide Note

"We warn this ship [USS *John C. Stennis*], which is considered a threat to us, not to come back [into the Ara-

bian Gulf], and we do not repeat our words twice."—**Gen. Ataollah Salehi, Iranian armed forces commander, Washington Post, Jan. 4.**

The Iran IQ Test

"The 'American warship' that Tehran is now threatening, the USS *John C. Stennis*, is a Nimitz-class carrier whose air wing alone is more capable than the entire Iranian Air Force. If the mullahs are serious about carrying out their threats, they're dumber than we thought."—**Wall Street Journal editorial, Jan. 4.**

Maybe He'll Just Stay There

"Former President Jimmy Carter reportedly sent a personal condolence letter to the son of Kim Jong Il, the late North Korean leader who presided over one of the most repressive dictatorships in the world. The state-run Korean Central News Agency claimed that the former US President sent 'a message of condolences' to Kim Jong Un. ... The news agency said Carter wished the next leader of North Korea 'every success as he assumes his new responsibility of leadership, looking forward to another visit to [North Korea] in the future.'"—**FoxNews.com dispatch, Dec. 22, uncontested by Carter.**

The Hair Stands on End

"A 27-year-old running a repressive regime with nuclear weapons: It's kind of hard to say you don't have some concerns."—**Unnamed US official, on the ascension of 27-year-old Kim Jong Un to command of North Korea, Wall Street Journal, Dec. 20.**

The Score—Thus Far

"[President George W.] Bush's unambiguous objective in dealing with Kim [Jong Il] was zero nuclear weapons. Kim's objective was to build a nuclear arsenal without provoking an attack that threatened his regime. When Bush left office in 2009, the score in this big game was: George W. Bush, 0; Kim Jong Il, 8."—**Former Pentagon official and current Harvard professor Graham T. Allison, Boston Globe, Dec. 20.**

Biden's Surrealpolitik

"Look, the Taliban per se is not our

enemy. ... There is not a single statement that the President has ever made in any of our policy assertions that the Taliban is our enemy because it threatens US interests."—**Vice President Joseph Biden Jr. in White House interview, Newsweek, Dec. 19.**

That's a Rigorous Standard

"I feel like I either should have gotten them [four of his squad mates] out of there alive or died trying, and if I didn't die trying, that means I didn't try hard enough."—**Former USMC Sgt. Dakota Meyer, Medal of Honor recipient, interview with San Antonio Express-News, Dec. 16.**

Anwar Will Be a Little Late

"I specifically invite the youth to either fight in the West or join their brothers in the fronts of jihad: Afghanistan, Iraq, and Somalia. I invite them to join us in our new front, Yemen, the base from which the great jihad of the Arabian Peninsula will begin, the base from which the greatest army of Islam will march forth."—**Posthumous video message from Anwar al Awlaki, US-born al Qaeda militant killed by a drone strike in September, Posted on various websites, Dec. 20.**

Huh?

"Our motto is, 'America's Navy: A Global Force for Good.' And what better way to demonstrate that [motto] than to reach into these countries, where we don't have a lot of presence, with military bands? It's soft power projection, if you will."—**US Navy Lt. Cmdr. Dwaine Whitham, head of the service's music program, CQ Weekly, Dec. 22.**

Putin's Nightmare

"Mr. Putin can no longer take his supremacy for granted. It is not yet a revolutionary situation. ... But Russians, having sleepwalked away from communism, are awakening to the idea that if they want democracy and social justice, they need to engage in active struggle. Quiescent 20 years ago during Soviet communism's final days, they may at last be about to stand up for their rights."—**Robert Service, Russia expert at Oxford University and Stanford's Hoover Institution, New York Times, Dec. 24.**

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MISSILE SYSTEMS

Time To Get Started

By John A. Tirpak, Executive Editor



An artist's concept of the future bomber. Pentagon officials say the time to get started on a next generation bomber is now.

The Air Force needs a new bomber. To meet the target date, it needs to begin the process now.

movement recorded and tracked to ensure long-term health. Based on this scrutiny, as well as ongoing structural fatigue tests and computer modeling, the Air Force believes the B-52s and B-1s will be safe to operate through 2040 and the B-2s through 2058.

However, as potential adversaries acquire better defenses, the existing bombers' ability to get close enough to targets to be effective will continue to deteriorate. Already, against today's toughest air defenses, the B-52 and B-1 are largely relegated to a standoff role; only the B-2 is expected to get through.

In the years to come, the B-2's ability to penetrate will also decline. This will be true even though USAF will upgrade all three bombers with new systems and weapons.

Increasingly at Risk

Of all the myths circulating about USAF's plans for long-range strike, the biggest one "is that the nation doesn't need a new bomber," according to Lt. Gen. Christopher D. Miller, deputy chief of staff for strategic plans and programs.

The current fleet has been upgraded over the years with new weapons and

electronic warfare systems, but it is "increasingly at risk to modernizing air defenses," he said. "We need to start now to replace the aging B-52 and B-1 bomber inventories."

The new aircraft is needed in the mid-2020s, Miller said, a goal both he and industry officials believe is feasible provided the program begins in 2012. Industry officials said if the desired airplane is based on extant technology, work can get under way fairly quickly, but further delay would mean a day-for-day postponement of operational service.

As recently as last July, however, consensus on a new bomber within the top ranks of the Pentagon seemed elusive. Marine Corps Gen. James E. Cartwright, then vice chairman of the Joint Chiefs of Staff, told defense reporters last summer he continued to play devil's advocate on the need for a bomber, or at least why there should be any provision for making it a manned aircraft. Other nuclear systems, such as ICBMs and submarine launched ballistic missiles, Cartwright said, don't need a human crew to provide nuclear surety, and he also worried a new bomber would be unaffordable.

The Air Force's existing bomber fleet should remain capable and credible through the middle of this century, but it could not survive further delay in reinforcing it with a new-technology bomber and other improvements to the "family" of long-range strike assets, service and industry officials said.

The B-52, B-1, and B-2—now about 50, 26, and 18 years old respectively—receive meticulous care, their every



B-1s on the line at Ellsworth AFB, S.D. B-1s carry the largest payload of weapons, but would be relegated to standoff missions in many high threat environments.

USAF photo by A1C Anthony Sanchelli

An artist's concept of the Long-Range Strike-Bomber. Air Force Secretary Michael Donley says procuring the LRS-B is one of USAF's top three acquisition priorities.



Cartwright did not address the value of having a nuclear-armed system that could be recalled or retargeted enroute, something not possible with ICBMs and SLBMs. "I think you have to have a bomber," Cartwright admitted, adding, however, that he feels bombers are too slow to react to some targets.

Despite the Air Force's certitude about the new airplane, Miller acknowledged in December there still was no operational requirements document (ORD) specifying its characteristics and capabilities, despite the bomber getting the go-ahead well over a year ago.

Shay D. Assad, the Pentagon's director of defense pricing, said last July the bomber ORD would probably come together by the end of 2011, but Miller said in December such details are in "the classified realm." Assad had said until the ORD "settles down," the notional unit cost of \$550 million

for the new bomber will be, at best, a "rough estimate."

The new aircraft program is called the LRS-B, for Long-Range Strike-Bomber. Air Force Secretary Michael B. Donley in recent months has touted the aircraft as the service's third-highest acquisition priority—after the KC-46 tanker and the F-35 fighter. It is among the special few programs the Air Force will fight to protect from budget cuts, Donley said, because a core function of the service is "to hold at risk" targets anywhere on the globe.

Enablers

The LRS-B's funding will be unclassified, but almost everything else about it is secret, Miller said. He confirmed details previously revealed about the aircraft: The Air Force wants to buy 80 to 100 platforms; it will be capable of manned or unmanned operations; ini-

tial versions won't be nuclear-capable but later versions will be; and it will be developed largely from existing, mature technologies, especially in the area of signature and propulsion.

More broadly, Miller said, the LRS "family of systems" will include elements performing intelligence-surveillance-reconnaissance, communications, and electronic warfare. To keep the cost of the bomber down, these systems may or may not be present on the aircraft itself, but could be added as offboard building blocks depending on the severity of the threat in the target area.

While it's been suggested these so-called "enablers" would ride into battle on separate, undisclosed platforms—perhaps stealthy remotely piloted aircraft—Miller declined to confirm this concept. "It doesn't have to be an airplane," he said of the enablers,



Artist's concept by Erik Simonsen



DARPA artist's concept

A DARPA artist's concept of the future strategic strike aircraft. Part of the package will be a new standoff missile that will eventually be carried by the B-52, B-1, and B-2 bombers.

indicating USAF may be thinking of modular payloads, decoys, missiles, satellites, or pods on other aircraft.

Despite its very low observability on radar, for example, the B-2 has been backed up in almost all its combat missions by jamming support from other aircraft—often Navy EA-6B Prowlers or, as in the recent Libyan campaign, by EA-18 Growlers.

USAF's thinking about LRS, he said, is, "we're moving away from the idea that any single platform ... has to be able to do all aspects" of any given mission. "Every platform will be designed with its place in that family of systems in mind," he said, and while the Air Force has a concept for what the family is today, the elements "may change ... based on how the threat evolves."

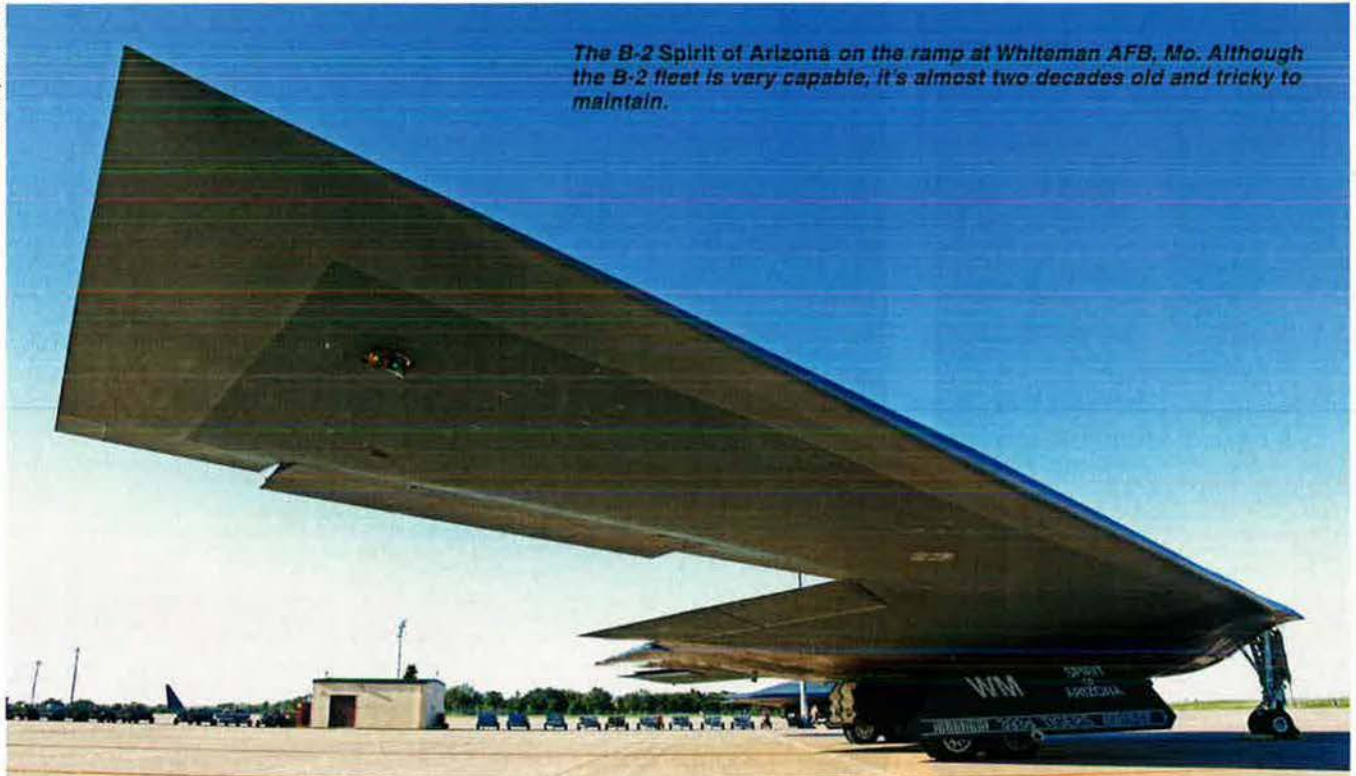
One of the principal criticisms of the new bomber program is cost. In the case of the B-2 and F-22 fighter, an industrial capability was created to produce many aircraft rapidly, only to have them built at a trickle when procurement funding was reduced. Unit costs subsequently soared.

"The Air Force learned a lot from the B-2," Miller noted. "I don't think we want to make those mistakes again." He wouldn't say whether it's been decided if the new bomber will be built at a slow but steady rate, but the service is "aware" of the dangers of expecting big annual production numbers and will work to ensure "we don't have that same thing happen to us in the future."

Miller declined to give much detail on the mid-2020s target for having the new bomber, but noted that the decision to declare an aircraft operational is made by the operational commander



Lt. Gen. Christopher Miller (r) listens to Col. Jose Rivera (l) discuss equipment issues at Robins AFB, Ga. Miller says the new bomber will fit into a family of systems.



The B-2 Spirit of Arizona on the ramp at Whiteman AFB, Mo. Although the B-2 fleet is very capable, it's almost two decades old and tricky to maintain.

at the time. He also pointed out that developmental weapons are sometimes rushed into service long before they are technically declared operational.

Miller said the family of systems will have to include a new cruise missile. The B-52's status as a nuclear-capable platform depends on a shrinking inventory of AGM-86 Air Launched Cruise Missiles (ALCMs), built in the 1980s, which will age out of the inventory in the 2020s.

The new cruise missile will be chiefly a replacement for the ALCM, capable of doing things the stealthy but conventional AGM-158 Joint Air-to-Surface Standoff Missile (JASSM) cannot do. US Strategic Command "is looking for something to do a variety of things they need done," Miller said. "The long-range standoff that they need is probably more than what a JASSM can do."

The missile is particularly important not only because without it the B-52

will lose its nuclear capability when the ALCM retires, but also because, when faced with high-threat environments, all three current bombers will eventually fall back to a role of launching standoff missiles. As they age, they will increasingly need to stay well outside the reach of enemy defensive systems.

Several studies have touted hypersonic cruise missiles as a promising way to keep the current fleet of bombers in the strategic mix, since a hypersonic



Crew chiefs SrA. Nathan Jacobson (l) and A1C Tyler Lyght monitor a B-52 at Minot AFB, N.D. The Air Force expects to operate the venerable bomber through 2040.

weapon would give a standoff platform nearly the same immediacy of effect as a penetrating bomber.

Miller said he didn't know if the missile would be constrained by the same "off-the-shelf" technology mentality slated for the new bomber's development as a way to reduce risk.

"Like all these competitions, there's a trade-off to be made among reducing technical risk, getting to an affordable per-round cost, getting the capability you need on the timeline [required]," Miller observed. However, the fiscal constraints on the Air Force for the foreseeable future compel the service to be hard-nosed about distinguishing between what is truly needed and what is desirable.

"That doesn't mean we don't invest in things that are difficult or expensive," Miller said. But "if we are going to stretch for the last half-percent of capability, this is a tough time to do that."

The issue of funding is the single most important factor affecting the bomber at this point. Paul K. Meyer, vice president and general manager of Northrop Grumman's advanced programs and technology division, said it is fair to say that even without an ORD, industry has enough information to start working on a bomber, and the "mid-2020s" is feasible based on the resources invested so far.

"The question is, are those resources still going to remain?" Meyer asked.

Before the Air Force focused on the new bomber, it was partnered with the Navy on the Joint Unmanned Combat Aircraft System program, or J-UCAS. That program lives on today as a Navy-only program and Northrop Grumman is now test flying the X-47.

Meyer said the X-47—which has the classic flying-wing lines of a stealth aircraft—is not likely to be a prototype for the new bomber.

"Airplanes don't scale well," he said, noting that the LRS-B will be a much larger airplane than the X-47, though not as large as the B-2, also built by Northrop. The X-47 is optimized for carrier operations "and not for a long runway." Still, "it obviously has the right design features for signature," and while the shape of a Northrop-proposed LRS-B would be different, "the technology is scalable to a different design."

Meyer also said the X-47 is being designed with a degree of autonomy that could be applied on an unmanned version of the LRS-B at "a risk level that could be considered." Air Force and industry sources have said the



Northrop Grumman illustration

An artist's concept of a strategic bomber. Northrop Grumman officials believe that there is enough information available to begin work on the new bomber.

service is "risk-averse" in the design of the LRS-B and wants to incorporate only those technologies already well understood, to avoid delays or costly program disruptions.

Speaking about the major aerospace companies, Meyer said, "We've all been working these problems for several decades, so one would think the answer is there." He added, "A high driver is affordability."

Going One Deep

Meyer could not say what direction the Air Force has given contractors about how the LRS-B program will be structured, but he believes the service is anxious to get the benefits of competition. That's not to say it won't consider teams, Meyer said, and Northrop would be willing to team if it gives the company a better chance "to be selected."

Several years ago, Boeing and Lockheed Martin formed a team to pursue a previous incarnation of the LRS-B, then known as the Next Generation Bomber. The companies are reluctant to discuss the arrangement now; various officials from both companies have said it effectively ended when the NGB was canceled.

However, the teaming arrangement is still on the books, Boeing Military Aircraft President Christopher M. Chadwick said at last summer's Paris Air Show. The two companies will look at the ORD when it is released, and then explore "what our teaming options are." The agreement "did not have a time constraint" on it, but "it can be dissolved; all options are on the table," he said.

Meyer said the new cruise missile is more of a mystery than the bomber. The missile doesn't get mentioned when Air

Force leaders talk about developmental priorities, "at least when they mention the top five."

Another urgent matter for the new bomber program is the issue of the industrial base. Without something to work on, industry would be hard-pressed to keep design talent on the payroll.

Three years ago, "across industry, we gave [the Pentagon] ... a minimum level of investment that's required by industry to sustain robust design teams," Meyer said. At the time, "things weren't looking too good, and they aren't looking any better now." When asked by the Pentagon for a number, industry said it would take "about \$100 million a year" per company to "sustain and maintain more than 'one deep' in a variety of technical talent skill areas that are necessary for any advanced design," he said. Those skill areas are in "aerodynamics, low observables, avionics, electronics, design, and the logistics support that goes along with that."

Meyer said such a level of funding is needed because, "whether it's weaponization or battle management control, it takes about that much to work with your other industry partners, fully understand the maturity of the technology, do some preliminary integration and tests," so that a concept "can then be validated in [wind] tunnels and other kinds of test activities."

Does the steady advance in anti-access, area-denial capabilities around the world mean the Air Force must have the new bomber ready for service by a specific deadline?

"I think that decision has been given to us," Miller replied.

"Now is the time to get started." ■

The Last Raptor

By Marc V. Schanz, Senior Editor

There will be no more of the world's first fifth generation fighter.

The last F-22, Tail No. 4195, on the line at Lockheed Martin's Marietta, Ga., plant. As the last Raptor took shape, the assembly line went dark. The program utilized up to 95,000 workers at a time, including suppliers and vendors.

Lockheed Martin photo by Damien A. Guarneri

On Tuesday, Dec. 13, 2011, in a ceremony attended by scores of employees, officials, and a marching band, the 187th—and final—F-22 Raptor built for the Air Force rolled off Lockheed Martin's Marietta, Ga., assembly line. This brought the long production saga of the Air Force's premier air supremacy fighter—the world's only operational fifth generation fighter—to a close.

"This is just the end of production," Lockheed F-22 Program General Manager Jeff Babione said in a late December 2011 interview. He said the ceremony was a tribute to all the men and women from Team Raptor who took the aircraft from the drawing board to reality and helped run the line.

The first F-22 had rolled out to the flight line in 1997. Now, 15 years later, each Raptor reflects the workforce that helped deliver the "world's greatest fighter," Babione said.

Tail No. 4195, bearing the fin flash for JB Elmendorf-Richardson, Alaska, will be delivered to the 525th Fighter Squadron, of the base's 3rd Wing. After its rollout from the factory in December, Lockheed towed the fighter to the Marietta plant's "fuel barn" where it entered fuel systems purging and servicing. Later, a Lockheed Martin pilot will perform flight line engine runs, said Babione.

According to Air Combat Command, the aircraft will undergo a series of standard acceptance flights, followed by final finish applications and radar cross section testing before delivery. Lt. Col. Paul Moga, the F-22's first demo pilot and current commander of the 525th FS, will fly the aircraft to Alaska once the final checkout is complete.

In 1991, Lockheed Corp., General Dynamics, and Boeing won the contract



The last Raptor rolls out the bay doors and onto the flight line at Lockheed's production facility. After a series of company and government flight tests, the F-22 will be delivered to the 525th Fighter Squadron at JB Elmendorf-Richardson, Alaska.

to begin development of the successor to the Air Force's F-15 fleet. Work began in 1994. At its peak in 2005, around 5,600 Lockheed Martin employees worked on the Raptor at locations across the country. The fleet was once anticipated to be as large as 750 aircraft, but was steadily reduced over the years.

The End of the Line

Since the beginning of construction for tail No. 4195, all the major assemblies have shut down and gone dark as the last Raptor took shape, Babione said. Under contract with USAF, the company identified in excess of 30,000 tools related to the line it would like to preserve, and Lockheed is in the process of disassembling the tools, wrapping them in protective material—identified with RFID (radio frequency identification) tags—and placing them inside connex storage containers for shipment to the Sierra Army Depot in California. They will be stored at the site until needed by the government.

The program has utilized up to 95,000 workers at any one time, if you count all

the vendors and suppliers involved in the aircraft's production, Babione noted. Most of the primary workers set up shop at the major assembly areas, with as many as 900 in Washington State, around 800 in Texas, and about 900 in Georgia working on the program at its peak, he added. Many of these workers have had to find jobs elsewhere now that the line has stopped. Some have moved over to the F-16 and F-35 efforts in Fort Worth, Tex. Many in Marietta have transitioned to C-5 and C-130 work.

Because the F-22 was the first fifth generation fighter, "we pioneered some skills that were never done before, and that has been good for the assemblers to go work [on the] F-35," Babione said. The Joint Strike Fighter features similar stealth coatings and technology aspects and requires skilled workers to fabricate and install these systems, he added.

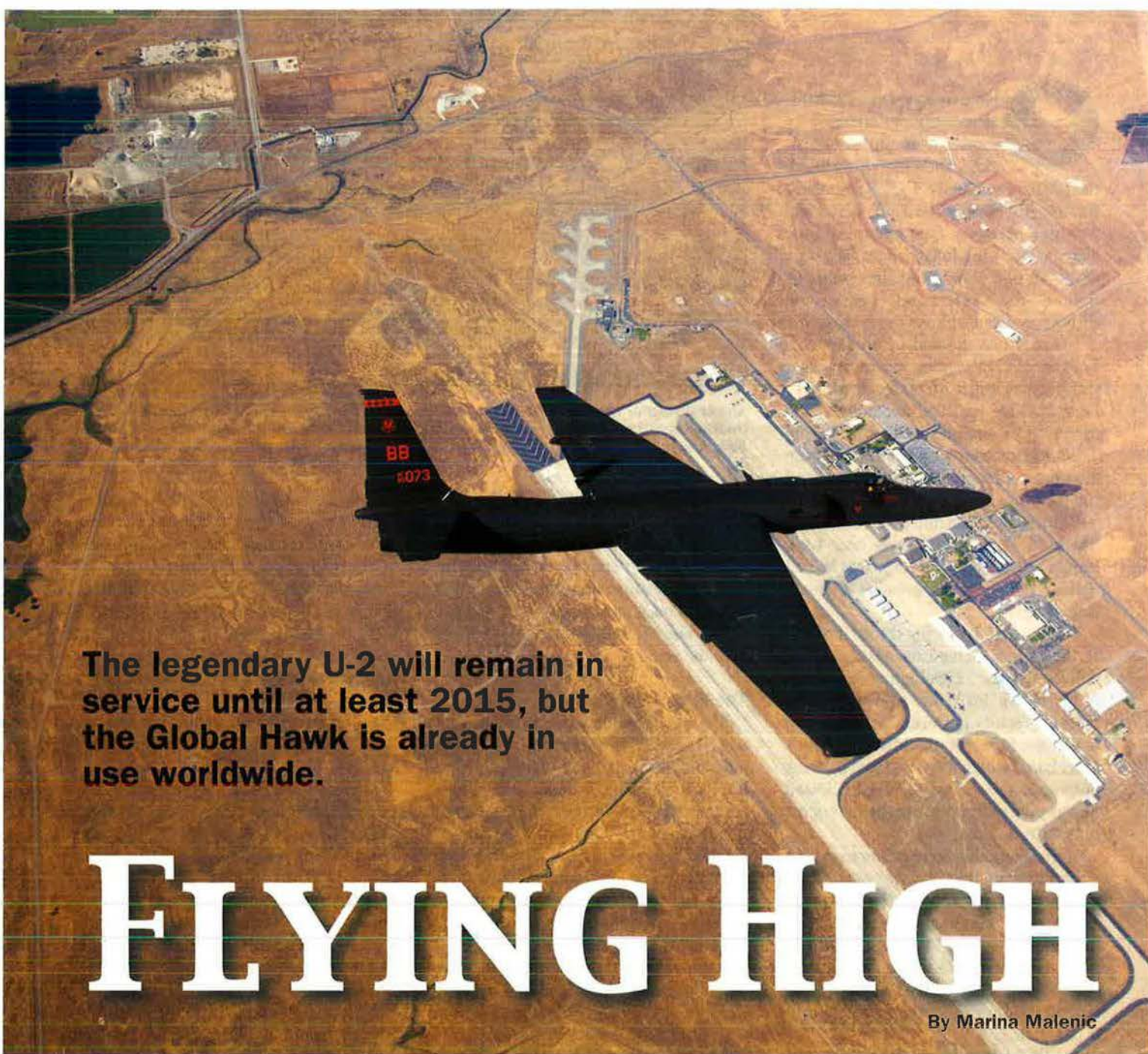
The end of the assembly line marks the beginning of a new chapter for the Raptor, program officials said. The fleet will receive a series of upgrades and modifications in years ahead. "This is only the beginning," said Col. Sean Frisbee, the F-22 system program manager at Wright-Patterson AFB, Ohio. "The next phase will [add] greater capability to an already incredible aircraft."

The last Raptor is a far different aircraft than the first one delivered in 1997. The first half-dozen aircraft were "hand built," with the sole purpose of proving and expanding the flight envelope of the F-22, with minimal avionics capability for testing and a shorter service life by design, an ACC spokesperson said.

The Air Force expects to take delivery of the last aircraft in May before it heads to Alaska to serve as a front-line air dominance and attack fighter. ■



Lockheed Martin photos



The legendary U-2 will remain in service until at least 2015, but the Global Hawk is already in use worldwide.

FLYING HIGH

By Marina Malenic

THE U-2 Dragon Lady first flew in 1955 and was tasked with some of the nation's most sensitive intelligence-gathering missions almost from Day 1. A series of successful flights directly over the Soviet Union ended when Francis Gary Powers' U-2 was shot down 52 years ago. U-2 surveillance flights spotted Soviet nuclear missiles in Cuba half a century back. And the aircraft is still a one-of-a-kind asset, regularly called on to fly near—or over—sensitive targets from the Pacific Rim to the Middle East and South Asia.

It is because of this enduring value that the Air Force's latest high-altitude intelligence-surveillance-reconnaissance

strategy keeps the venerable U-2 flying until at least 2015. USAF is also evaluating whether a mix of U-2s and unmanned RQ-4 Global Hawk aircraft should keep flying for years afterward.

"Both platforms have their advantages, and extending the [U-2 retirement date] to 2015 gives us an opportunity to evaluate the Block 30 version of the Global Hawk in terms of capability, sensor availability, and cost of operations until then," Gen. Norton A. Schwartz, Air Force Chief of Staff, said in a December interview. Force mixture options would include, "at the extremes, all of one of them and none of the other"—or some combination of the two airframes.

"In general, the U-2 is still a highly valued platform," Schwartz added. "We'll

see it through to 2015 ... and then take a look at what the right mix should be."

The Chief's comments harkened to the Air Force's previous high-altitude ISR scheme, in which the RQ-4 was regarded as a complement to the U-2. Facing severe budget pressure, the service eventually decided to retire the U-2 once the Global Hawk was able to perform the same types of intelligence collection. But years later, as the Dragon Lady continues to add specialized new, developmental, and one-off capabilities, the Air Force is still pondering when to phase out the U-2 in favor of the Global Hawk. (In the Fiscal 2012 defense authorization bill, Congress asked USAF to maintain the U-2 beyond 2016.)



A U-2 flies over Beale AFB, Calif. For the 9th Reconnaissance Wing at Beale, many aspects of pilot training for the U-2 and Global Hawk have been merged.

Photo by Segar Pathak

Despite the aircraft's reputation as a Cold War airplane, the current inventory is thoroughly modern. The fleet has all-new digital glass cockpits, state-of-the-art sensors and communications links, and other upgrades. Studies carried out by Air Force Materiel Command and Lockheed Martin have indicated the airplane could remain flightworthy for at least another 15 years. Of USAF's 32 existing U-2s, most were built in the 1980s.

Not too long ago, USAF had planned to retire the entire U-2 fleet no later than 2012, with the new Global Hawk waiting in the wings to take its place. Just two years ago, the service devised a new plan that would have kept the U-2 in service until 2014. Now, attempting

to predict the U-2's final retirement date would seem to be little more than speculation.

Lockheed Martin performs programmed depot maintenance on the U-2 at a company facility in Palmdale, Calif., as the Air Force does not have an organic capability to conduct the work. For the past three years, the Air Force has put three to four U-2s through PDM per year—a decrease from five to seven aircraft in previous years. The decrease was made in preparation for retirement, and Lockheed Martin officials have previously warned ramping back up would be costly.

However, the Air Force signed a contract with Lockheed Martin in October 2011 to ramp up the U-2's PDM rate to five aircraft for Fiscal 2012. Overall, an individual U-2 is expected to go through PDM around once every six years.

Long Lead Phaseout?

Lt. Gen. Larry D. James, USAF's deputy chief of staff for ISR, said, "The U-2s are flying at a very high optempo,

and we have to make sure that they're in good shape to do everything they're being asked to do today." The high operational tempo is a result of the insatiable hunger for ISR on the battlefield, and that is the primary justification for the ramp-up in PDM arranged for this year.

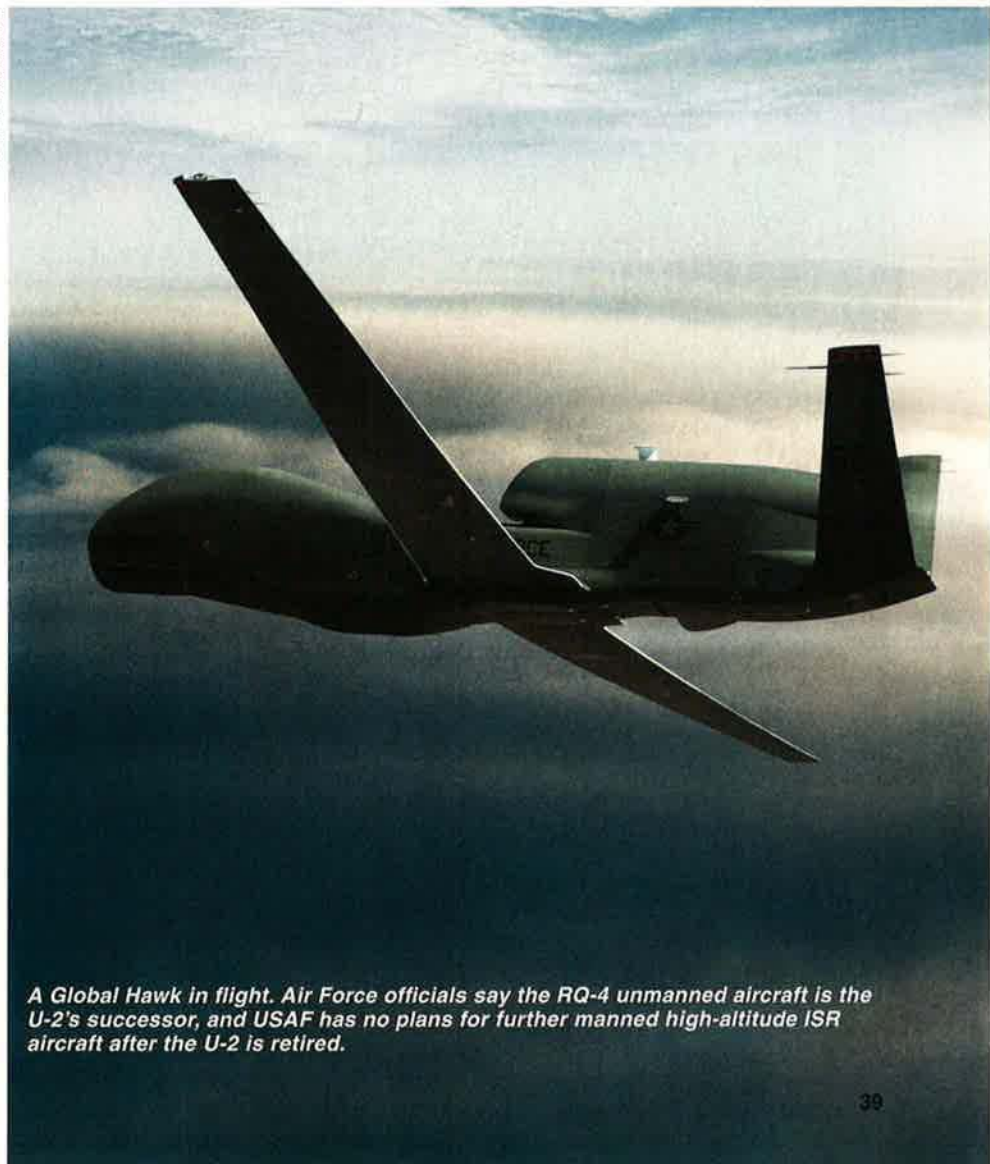
James said even though the U-2s are slated for retirement, "they have to be able to complete their missions."

Asked whether Lockheed Martin officials have proposed fleet upgrades to the Air Force, a company spokeswoman said Lockheed's representatives "go to the Air Force at times with a great opportunity." She declined to comment on what kinds of improvements were suggested.

According to senior service officials, the aircraft have recently received a new suite of defensive electronic upgrades and a cockpit modification that improves pressurization while airborne.

"This is not sensor capability or endurance [aid], but it lessens the physiological effects on the pilot," said Schwartz, noting that "improving the pressurization

Northrop Grumman photo



A Global Hawk in flight. Air Force officials say the RQ-4 unmanned aircraft is the U-2's successor, and USAF has no plans for further manned high-altitude ISR aircraft after the U-2 is retired.



A U-2 is seen in a gray camouflage pattern in 1975. This U-2 tested equipment to locate enemy SAMs.

will minimize the likelihood of high-altitude flight effects.”

He added, “In addition to what the Intelligence Community values about the aircraft, we have to be concerned with the human capital.”

An Air Combat Command spokeswoman said that a fleet upgrade to the U-2’s said Year Electro-Optical Recon-

naissance Sensors (SYERS) to the 2A configuration was nearly complete as of December 2011. The Air Force is awaiting delivery of one final SYERS-2A package. This upgrade adds extra multispectral imaging capability to the system, according to Michael Don, Goodrich’s director for strategic surveillance programs. Multispectral sensors

capture images at specific frequencies across the electromagnetic spectrum; this can be used to detect changes not visible to the human eye. The images can be used for targeting and threat analysis.

According to Don, SYERS-2A collects imagery in seven wavelength bands simultaneously. This imagery can be transmitted to a ground system and viewed in real time by analysts, who combine the separate spectral bands in different combinations in order to highlight the characteristics of various objects.

In addition to SYERS, the U-2 carries a 30-inch optical bar camera and a 24-inch IRIS camera, offering high resolution and panoramic imaging sensors, as well as the Advanced Synthetic Aperture Radar System (ASARS-2) that provides an all-weather radar imaging capability.

Unmanned Successor

Still, Air Force ISR officials insist the RQ-4 Global Hawk’s rise to completely replace the U-2 is inevitable. “Global Hawk is doing well and responding effectively to various scenarios,” said James, the ISR chief. Despite the ever-shifting switch-over date, the RQ-4 remains the U-2’s successor, and USAF has no plans



A Global Hawk races down the runway at a base in Southwest Asia. This photo was taken from a chase car as an RQ-4 pilot directed the aircraft during takeoff.

A U-2 passes two AWACS aircraft on a ramp in Southwest Asia. The Dragon Lady's retirement has been repeatedly extended because of its unique capabilities and Global Hawk growing pains.



USAF photo by MSgt. Scott T. Sturkol

for further manned high-altitude ISR aircraft after the U-2.

The RQ-4 has not been on the sidelines. Last year, for example, the Global Hawk flew in support of humanitarian missions following the Japanese earthquake and tsunami and performed targeting missions over Libya during Operation Odyssey Dawn. The Air Force used the RQ-4 to track moving targets for the first time in combat over Libya, according to Bill Walker, Northrop Grumman's RQ-4 business development manager. Walker said the Global Hawk achieved this capability by employing the moving target indicator (MTI) mode of its synthetic aperture radar. Having tracked moving targets, the aircraft was then able to employ its electro-optical/infrared sensor to "take an electro-optical image of the target and verify the identity," Walker added.

The vehicle in question was a Block 30 Global Hawk stationed at NAS Sigonella, Sicily.

Despite heavy use of Global Hawks over Afghanistan, the SAR's MTI mode has not been employed there to date, Walker said last September. In Afghanistan, the threats tend to be "more static," he said.

Last August, USAF declared the Block 30 Global Hawk had reached initial operational capability. Specifically, the Air Force now has sufficient

Block 30 assets and infrastructure in place to support one continuous 30-day orbit. At the end of 2011, there were nine platforms deployed at forward operating locations.

But while the Global Hawk has achieved operational successes, its development program remains difficult. On June 14, 2011, the Pentagon's acquisition chief implemented a management shake-up of the Global Hawk effort following program cost growth that breached a legislative cap early in the year. Ashton B. Carter, then undersecretary of defense for acquisition, technology, and logistics, put forth a plan aimed at increasing transparency. It restructured Global Hawk into four "subprograms": Global Hawk Baseline, which includes the Block 10 and 20 aircraft; the Block 30 aircraft; the Block 40 aircraft; and the ground segment, communications equipment, and training systems.

Tumultuous Acquisition Program

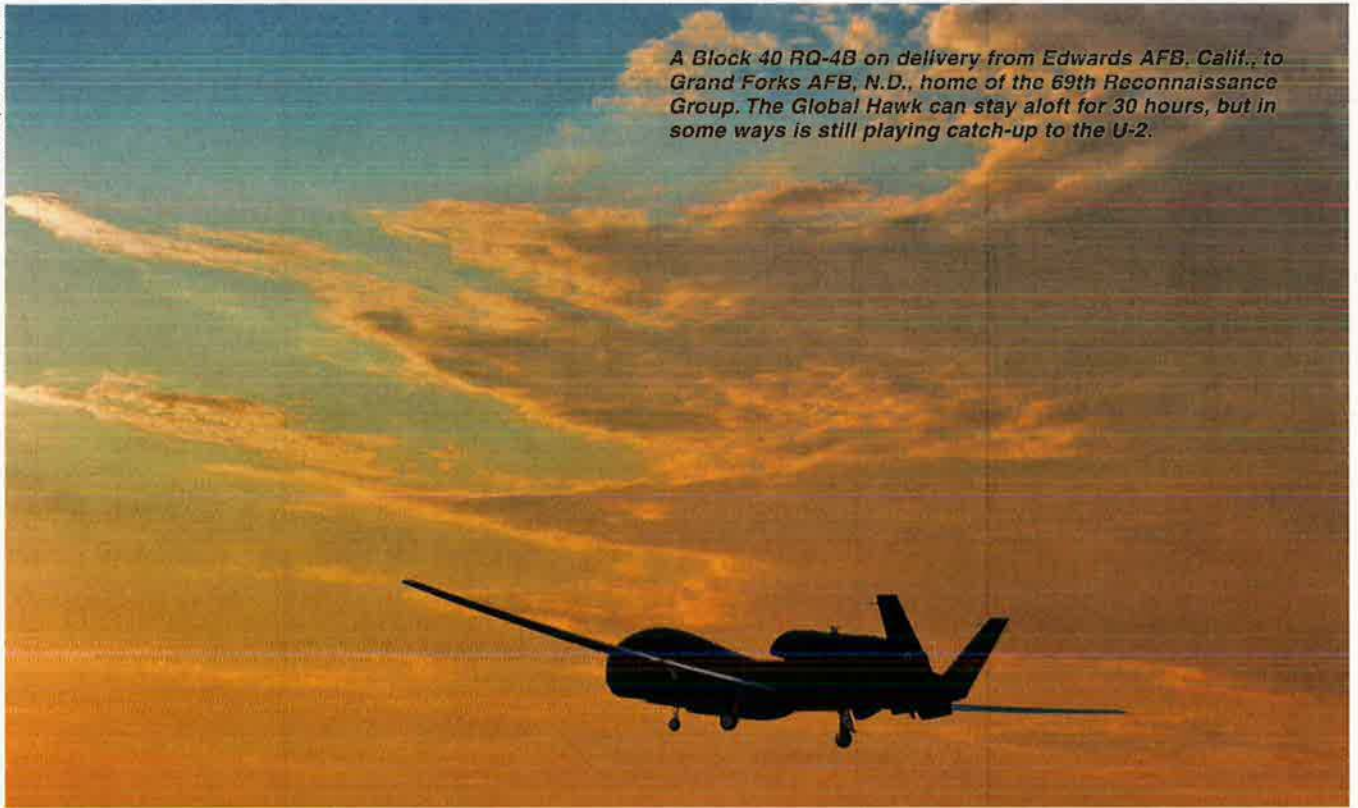
In April, the Air Force had notified Congress that the average unit cost of the RQ-4 had risen by more than 25 percent, triggering a Nunn-McCurdy breach. The statute requires the Department of Defense to certify the program as essential to national security in order to avoid termination. This marked the second time the program had breached the cost-growth cap.

Carter certified the program was indeed essential to national security and that there were no adequate substitutes available at a lower cost. He concluded a restructure was needed to better monitor costs. He also stated his intention to reduce the planned Block 30 fleet from 42 to 31 aircraft.

The Air Force said the primary driver of the year's reported cost increase was the Fiscal 2012 budget decision to decrease overall procurement from 77 to 66 aircraft. However, according to Pentagon analysis cited by Carter in a letter to Congress, "the primary root cause of the unit cost breach ... is due to having ... unfunded requirements in the baseline and the deferral of development activities." Other factors included "additional requirements for spares, support equipment and changes in the mix of aircraft purchased" and an unrealistic schedule "based upon the continued underestimation of the differences between RQ-4A and RQ-4B" and their payloads.

Despite the tumult in the acquisition program, USAF leaders said they were finally satisfied Global Hawk was meeting affordability guidelines—a little more than a year after officials first criticized both government and industry program managers for allowing costs to burgeon.

Northrop Grumman officials have said their "biggest focus" for the RQ-4



A Block 40 RQ-4B on delivery from Edwards AFB, Calif., to Grand Forks AFB, N.D., home of the 69th Reconnaissance Group. The Global Hawk can stay aloft for 30 hours, but in some ways is still playing catch-up to the U-2.

program is now affordability. The company has more than 100 cost-saving initiatives in place, according to George Guerra, vice president for the company's High-Altitude Long-Endurance Systems business.

Guerra noted that the company is co-hosting several "affordability" conferences with USAF and the US Navy, whose Broad Area Maritime Surveillance (BAMS) program is leveraging many lessons from Global Hawk. "We are looking at some of the initiatives in the sustainment period that might translate to fewer spares and less repairs."

According to Edward Walby, director of business development for Northrop's Global Hawk program, creating best practices in usage procedures can often cut down on wear and tear of the system. "Similar to [knowing], in your home, whether you should turn the television on first and then your satellite system, there are certain procedures that can prevent problems," he explained.

Guerra pointed out that Beale AFB, Calif., received its first two Block 30M RQ-4s late last year. This configuration carries the Airborne Signals Intelligence Payload sensor, which detects, identifies, and locates radar and other types of electronic communication signals.

"Today, imagery is collected based on request," he explained. "With signals

equipment, we can pull out targets that may not be known. This adds a whole new dimension to ISR collection."

The U-2 and the RQ-4, designed for the same mission, have many similarities. They both fly at very high altitudes and carry multiple sophisticated sensors. But each also has capabilities lacking in the other.

For example, the U-2 can stay airborne for 12 hours at a time at altitudes of around 70,000 feet. The U-2's great limitation is the endurance of the pilot. During the Cold War, typical missions lasted approximately nine hours and were carefully scripted. More recently, though, missions have grown longer, with more than 11 hours becoming fairly commonplace due to the need for more "dynamic taskings," the term for additional target taskings given to the pilot midflight.

Finding the Right Mix

The Global Hawk, conversely, can provide persistent, "staring" overwatch. It can cruise at about 60,000 feet and remain airborne for up to 30 hours. However, the RQ-4's optical field of view is quite a bit narrower than the U-2's.

Northrop Grumman is also on contract with Defense Advanced Research

Projects Agency for an experimental effort to conduct autonomous aerial refueling with RQ-4s. Company officials say such a program could further extend Global Hawk's endurance.

Air Force officials note the RQ-4 will never be everything the U-2 is, and vice versa. But at the 9th Reconnaissance Wing at Beale, many aspects of pilot training for the RQ-4 and U-2 have been merged. Students attend core classes together before continuing to platform-specific coursework. The Air Force has realized some savings from the collaboration, officials say, and the Navy is also partnering on training and sustainment efforts in order to cut down on overhead.

James emphasized that "there will always be a need for both" manned and unmanned ISR aircraft. "We just need to find the right mix for the future."

According to Schwartz, "The advantage of the U-2 is that it has very good sensor capabilities, among other things, while the advantage of the Global Hawk is that it has endurance."

Both platforms bring "something unique to the high-altitude ISR mission," Schwartz said. "The question is how do we manage the cost of that capability, and what is the best mix of manned and remotely piloted?" ■

Marina Malenic is the US aviation reporter for Jane's. Her most recent article for Air Force Magazine was "Missile Warning for the Future," in the October 2010 issue.

Dugan's "Heavy Equipment Operators"

Gen. Michael J. Dugan had been USAF Chief of Staff for 79 days when, on Sept. 17, 1990, he was dismissed. Defense Secretary Dick Cheney had found fault with some of Dugan's public remarks about the possible course of war with Iraq. Dugan mostly withdrew from Air Force affairs, but years later, he gave a much-quoted speech, warning about the danger to the Air Force of a growing "heavy equipment operator" mentality, in which airmen identified mostly with hardware rather than with concepts of operations and national service. The speech only served to underscore anew how much the Air Force lost when Dugan was fired.

I've long believed that airpower, space power, and now aerospace power are more about thinking and about ideas than they are about technology or hardware or systems or platforms or programs. Aerospace power is a state of mind. ...

Over the years when I would meet people, particularly in a civilian setting, one of the early questions that I'd get [was], "And what do you do?"

If I happened to meet an officer with experience in the United States Army, invariably the answer would get down to, "I served my country in the Army," and sometimes, "and I've commanded a battalion," or a "company in combat."

And if I happened to run into a naval officer and asked the same questions, I'd get a similar answer, and it would get down to "served my country," sometimes at sea, sometimes ashore.

If I happened to ask an individual who'd been a Marine, ... I got a much more extensive answer, but it always included the idea about service to country and probably service to the corps.

If I happened to ask a member of the United States Air Force, particularly an individual whom we call an operator, the reply I got turned early to hardware: "I'm a C-141 copilot." ... "I'm an F-16C Block 42B, X, Q officer," "I'm a launch control officer."

Now the point of this story is many people in leadership—and in senior leadership tracks for the aerospace forces of this nation—think of themselves—thought of themselves in my time—in relationship to their equipment. They thought of themselves, in many cases, as heavy equipment operators, and it just irritated the hell out of them when I told them that.

They had an equipment orientation, rather than a national or a service or an institutional orientation. Now they were very, very good at what they did—competent, professional, reliable, courageous. And I continue to be thrilled to be in the company of valiant men and women of the United States Air Force, heavy equipment operators or others, who regularly accept the risks and rigors of service life. And global engagement operations will be well-managed and well-effected by these men and women.

They are very good at what they do, very good at the here and now, at exploiting the capability inherent in the tools and equipment at their disposal.

Their linkages to the larger whole, to the longer term, however, were frequently invisible, and sometimes they were invisible to heavy equipment operators.

Even heavy equipment operators benefit from the vision and the coherence and the integration provided by a skilled architect, and one of the failures of my brief administration and

"Forgotten ... But Not Gone"

Gen. Michael J. Dugan, USAF (Ret.)
Address to Air Warfare Symposium
Orlando, Fla.
Feb. 5, 1999

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

one of the opportunities I never got to work on—but meant to—was an effort to shape and reshape the way air and space men and women view themselves, and then, of course, to grow a few more skilled architects.

This is a cultural issue. It affects the whole institution, and over a long period of time it will diminish the capacity of the institution to think about and to prepare for the longer term future.

In some regards the Air Force did address this situation. It had a plan and a program and a place to do longer range and deeper thinking about air and space power. In some regards the Air Force functionalized its responsibility for forward thinking. It organized around the inclinations of heavy equipment operators. Of course, the organization may have contributed, however, to the larger problem. ...

One of the significant changes during the 1990s has been the apparent decline in the Air Force institutional structure for thinking about the future of air and space power, for thinking about vital aerospace contributions to the nation as a whole.

Our ability 10 years ago, by the way, was not perfect, but it was visible and it was vigorous. In my view, the impact of this change is apparent, but that's another whole speech, and I'm not going to cover it here today. ...

I think that aerospace power is more about thinking and ideas than about technology or hardware or systems or platforms. I do believe the golden age of airpower and space power has not yet arrived, and the potential for the future is virtually unlimited. I believe that the heavy equipment operator syndrome can and must be converted into a spirit of service. ■

The days of antiquated equipment, questionable training, and outdated concepts are over.

A Revolution for China's Air Force

By Richard Halloran

When Secretary of Defense Robert M. Gates was in Beijing in January 2011, the Chinese Air Force unveiled its new J-20 stealth fighter with a drumroll of publicity about its initial test flight that the SECDEF and his delegation could not miss.

The immediate question: Was this just coincidence, or was it flaunting by increasingly belligerent Chinese military leaders? "I asked President Hu [Jintao] about it directly and he said that the test had absolutely nothing to do with my visit and had been a preplanned test," Gates said. "I take President Hu at his word that the test had nothing to do with my visit."

Whatever the facts, the appearance of the J-20 was visible evidence China is building an air force Chinese military leaders have indicated is intended to be commensurate with their nation's emerging status as a world power—and the equal of any other air force on the globe.

A leading Chinese airpower strategist, Lt. Gen. Liu Yazhou, has written that the world's major air forces have progressed from ancillary to decisive players. Thus, he says, the People's Liberation Army Air Force (PLAAF)

must build its strategic capabilities to enter the top tier of airpower nations.

The most recent white paper published by China's Ministry of National Defense (MND), although written in obscure language, holds pertinent clues to the PLAAF's mission. Boiled down, the white paper said the PLAAF must be capable of both offensive and defensive operations as it focuses on air strikes, air and missile defense, and the strategic projection of power.

The PLAAF, the white paper said, trains in electromagnetic environments and for air defense, with defense of the capital as the center and defense of coastal and border areas as the key. It has deployed airborne early warning and control aircraft, third-generation combat aircraft, and other advanced weaponry.

RAND Corp. has produced a broad assessment of the PLAAF for the US Air Force, titled *Shaking the Heavens and Splitting the Earth*. The report reads: "China's air force is in the midst of a transformation. A decade ago, it was an antiquated service equipped almost exclusively with weapons based on 1950s-ern Soviet designs."

Those weapons, RAND noted, were "operated by personnel with questionable training according to outdated em-

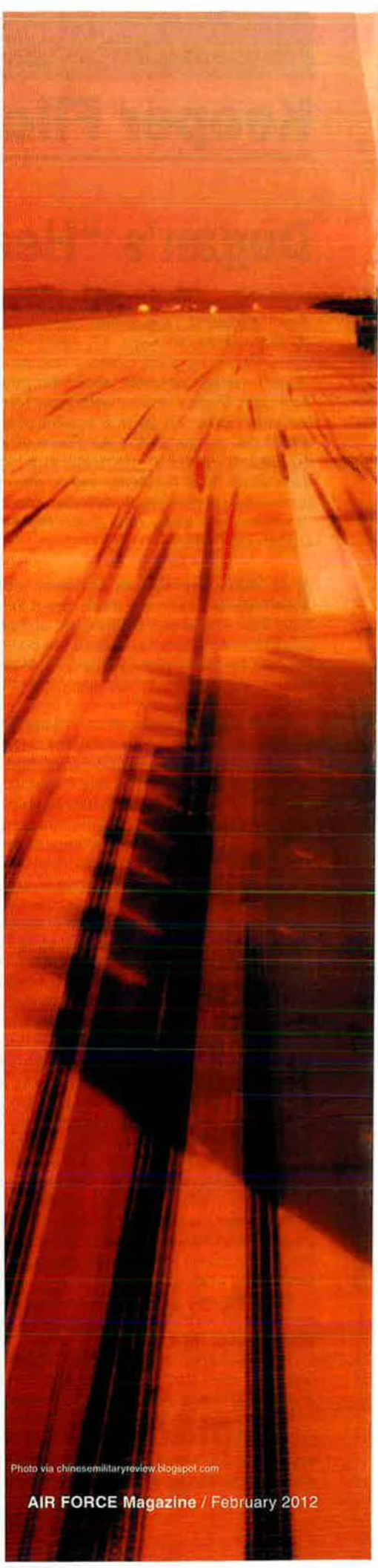
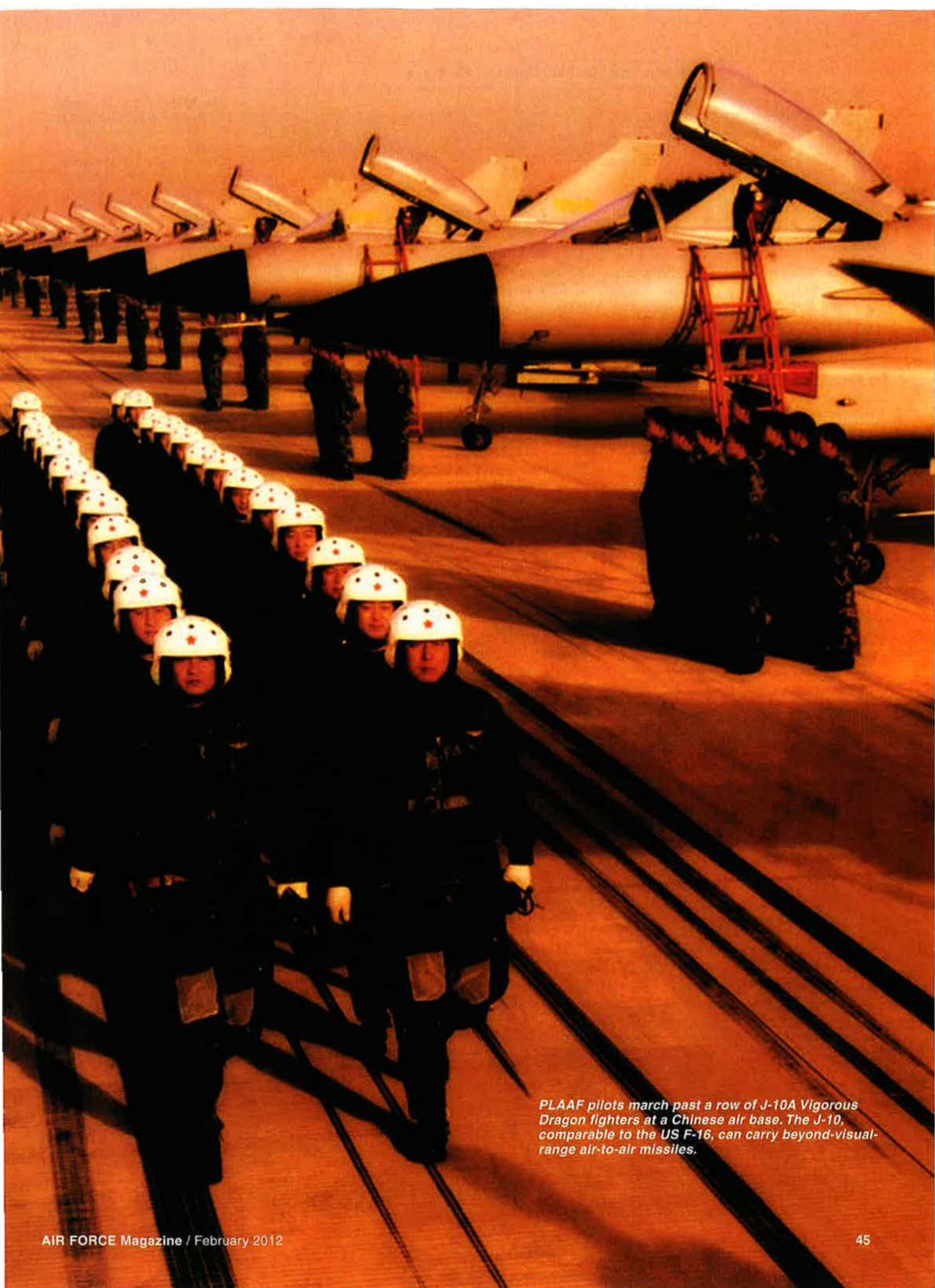


Photo via chinesemilitaryreview.blogspot.com



PLAAF pilots march past a row of J-10A Vigorous Dragon fighters at a Chinese air base. The J-10, comparable to the US F-16, can carry beyond-visual-range air-to-air missiles.

Taiwan Strait Military Balance, Air Force		
China		
Aircraft	Total	Within Range of Taiwan
Fighter	1,680	330
Bomber/Attack	620	160
Transport	450	40

Should China attack Taiwan, the PLAAF would be tasked to gain air superiority to support an amphibious landing force. It has hundreds of aircraft in place to do so, and even more that could be moved into position.

ployment concepts. Today, the [PLAAF] appears to be on its way to becoming a modern, highly capable air force for the 21st century.”

Similarly, the National Air & Space Intelligence Center at Wright-Patterson AFB, Ohio, recently published a wide-ranging analysis of the PLAAF. “The People’s Liberation Army Air Force is an organization undergoing a series of major transitions and significant changes,” the center noted. “Like the rest of the Chinese armed forces, change in the PLAAF is happening across a wide front, and in myriad endeavors: in operational matters, in institutional affairs, and in the acquisition of new capabilities.

“Today, the PLAAF is more operationally capable than at any time in its past, and it is enjoying the fruits of years of focused and sustained reform and modernization,” the assessment continued, before cautioning that the PLAAF is coping with the “inevitable dislocations and uncertainties attendant to institutional change on a grand scale.” China’s Air Force thus “remains challenged in many areas.”

Chinese military planners refer to two island chains, shown here.



All of this—and much more—seems to dilute the validity of the charge by US politicians and military leaders that China lacks “transparency” in its military expansion. China’s Defense Ministry maintains a website in English, as does the *Liberation Army Daily*, which is published by the People’s Liberation Army. The PLA comprises all of China’s armed forces.

Shocked and Awed

There has also been a steady flow—in English—of research papers, monographs, and books by Americans, many based on Chinese sources, from universities, think tanks, and government agencies. Enter “PLAAF” into a computer search engine and 449,000 hits come up. They may be of varying utility, but there is clearly no shortage of information about China’s Air Force available even in the public domain.

Major changes are likely in the PLAAF this year, with shifts in China’s political and military leadership scheduled. If some or all of these changes occur, the already rising influence of the PLAAF will most likely climb higher. This will affect priorities, budgets, procurement

of weapons, and assignment of senior leaders—but it is not likely to break the traditional dominance of China’s military forces by the Army.

In the PLAAF itself, the present commander, Gen. Xu Qiliang, may become a vice chairman of the Central Military Commission (CMC). The CMC, headed by President Hu, controls the PLA. In turn, speculation holds that Gen. Ma Xiaotian, deputy chief of the general staff for intelligence and foreign affairs, will become commander of the PLAAF and a member of the CMC. Liu, the strategist now assigned as political commissar of the National Defense University, is in line to be promoted to general and to be political commissar of the CMC.

The 12 members of the CMC include two civilians, President Hu and a vice chairman, Xi Jinping. Two vice chairmen and five other members are Army generals. The junior members are the commander of the Second Artillery—a separate service controlling nuclear and conventional missiles—the commander of the People’s Liberation Army Navy, and the commander of the PLAAF. This lineup, in turn, reflects the past 90 years—when China relied



China rolled out its new fighter, the J-20, during a diplomatic visit from then-Defense Secretary Robert Gates.

Photo via chinemilitaryreview.blogspot.com

on ground forces to fight Nationalists (Kuomintang), Japan, the US in the Korean War, India in border conflicts, and Vietnam. The mission of the PLAAF was to support the PLA's ground forces.

The PLAAF, founded in 1949 after Mao Zedong's communists had defeated the nationalist forces of Chiang Kai-shek, was in turmoil at the beginning. Mao's Soviet allies sent trainers and airplanes to China but they had hardly started training when North Korea attacked South Korea and China jumped into the Korean War.

The PLAAF was no match for USAF and the US Navy, which owned the skies over Korea. After the war, where Chinese pilots got their last combat experience, the PLAAF built a training base that provided pilots with about 120 hours a year of flying time. That was standard for the Warsaw Pact, but about half the hours provided for USAF pilots.

The PLAAF was set back, however, by the Sino-Soviet split in the 1960s after Mao and Soviet Premier Nikita Khrushchev disagreed over prospects for peaceful coexistence with the West, as well as over issues within the Communist bloc. The Soviets withdrew their aviation advisors and military aid. Then, in 1966, Mao's Cultural Revolution tore China apart. The PLAAF, like almost every other institution in China, was crippled by radical ideologues. Training was reduced to 12 months from 28 months, flying hours plummeted to 24 hours a year, and training manuals were destroyed—being labeled as capitalistic.

Mao died in 1976 and was succeeded by Deng Xiaoping, who set China on its present course of economic development and military buildup, with economics taking priority. When the economy eventually surged, funds were allocated to military expansion.

In 1991, PLAAF aviators were shocked and awed by US airpower during Desert Storm in Iraq. Liu belittled Iraq's line of defense in the desert, which proved helpless against US airpower. He likened it to the Great Wall of China, a source of national pride but unable to stop invasions from the north. Consequently, the PLAAF shed lingering Russian influence and learned from USAF.

PLAAF leaders aspired to free their service from supporting ground forces to become a strategic force. Liu, the main advocate of strategic airpower, was seen as a disciple of Giulio Douhet,



Photo via chinesemilitaryreview.blogspot.com

China's Y-8W/KJ-200 Balance Beam airborne early warning and control aircraft has a dual-sided active electronically scanned array radar mounted on top of a Y-8F-600 transport aircraft.

the Italian pioneer in airpower doctrine and strategy.

Today, Chinese thinking has evolved into three core missions for the PLAAF.

The first core mission is to defend China's airspace—particularly Beijing, headquarters of the Communist Party and the seat of government. Of China's seven military regions, that around Beijing takes priority. Air bases are concentrated around the city.

The Shenyang Military District, in northeastern China, bordering Russia, the Sea of Japan, and North Korea, is a close second priority. It features a layered defense of airpower, conventional missiles, anti-aircraft artillery, and early warning systems, also intended to help protect Beijing.

Core Missions

The second mission is preparation for an assault on Taiwan, the self-governing island the Nationalists fled to in 1949 and over which Beijing claims sovereignty. This task is assigned to the Nanjing Military District across the Taiwan Strait in the province of Fujian.

Beijing has never relinquished the threat to use military force against Taiwan, especially if the government in Taipei declared independence and asked other nations to recognize it as the legitimate government of a sovereign Taiwan. In the event of a war with Taiwan, the PLAAF would be tasked to gain air superiority over the island and strait and cover an amphibious landing force. The PLAAF might also mount an airborne invasion into Taiwan, as the PLA's paratroopers are part of the PLAAF, not the Army.

The PLAAF's third, and newest, core mission is to acquire the capability to project power into the South China Sea and the Pacific Ocean to what the Chinese call the second island chain. This island chain runs through Andersen Air Force Base on Guam to Japan, where USAF has bases at Kadena, Yokota, and Misawa.

In equipment, the PLAAF has gone from reliance on the Soviet Union to production of Russian aircraft on license—and reverse engineering—to domestic production. After the Soviet Union broke up in 1991, the impoverished Kremlin sold top-line aircraft to China, including the Su-27 fighter.

For the next 15 years, Russia was China's biggest arms supplier, providing \$20 billion to \$30 billion of fighters, destroyers, submarines, tanks, and missiles, according to the *Wall Street Journal*. RAND reported that the PLAAF operates more than 300 modern fighters now, with more in production. These include Su-27s and Su-30s plus the domestically developed J-10, comparable to the US F-16. Many PLAAF fighters carry beyond-visual-range air-to-air missiles and precision guided munitions.

The H-6 medium bomber can also be armed with first generation air launched cruise missiles. China is experimenting with airborne warning and control system aircraft, and PLAAF aircraft fly at low levels, over water, in bad weather, and at night—sometimes all at once. Meanwhile, the PLAAF has purchased Russian missiles of the S-300 series and surface-to-air missiles (SA-10s and SA-20s) and produced a home-built missile of comparable capability,



In 2006-07, China commissioned four KongJing-2000 aircraft. The AWACS aircraft are based on the airframe of the Russian-made A-50/II-76MD.

the HQ-9. RAND estimated that within a decade, the PLAAF's capabilities "could begin to approach those of the US Air Force."

Parallel to the PLAAF's development has been that of the Second Artillery, which reports directly to the CMC. The Second Artillery is "the core force of China for strategic deterrence," the MND proclaims on its website. "It is mainly responsible for deterring other countries from using nuclear weapons against China and for conducting nuclear counterattacks and precision strikes with conventional missiles."

The Second Artillery, reportedly named by the late Premier Zhou Enlai to differentiate it from the PLA Army's artillery, was set up as a nuclear force but later was tasked with "medium- and long-range precision strikes against key strategic and operational targets of the enemy," the MND states. Almost from the beginning, the Second Artillery and the PLAAF have competed not only for control of nuclear weapons but also for coordinating operations. It is still not clear who is responsible for meshing air and missile operations.

China has adopted a declared nuclear policy of "no first use;" that is, China will use nuclear weapons only after another nation has attacked it with a nuclear weapon. Chinese strategists said neither Mao nor Deng considered nuclear arms useful on the battlefield. Today's strategists in China are said to believe there is always the risk nuclear arms could be employed but, practically, conventional weapons have become so precise they have become the primary choice for strategic attack.

Although the PLAAF is charged with planning an assault on Taiwan and with projecting power well beyond China's borders, its primary mission is still to defend China's air space.

RAND researchers have identified six fundamental trends in PLAAF doctrine that American officers call the anti-access, area-denial strategy.

Trending

First, the importance of "key-point defense" is waning while that of "large-area defense" is growing. Given the PLAAF's previous focus on defending cities, industry, and military bases, this is perhaps the biggest change in Chinese thinking. The forward edge of the battle must be pushed toward the enemy, and intercepts must occur earlier.

Second, fixed defenses are giving way to "mobile air defense." The ability to "shoot and scoot" can improve chances of survival when PLAAF pilots are up against more and better reconnaissance and attack aircraft. Mobility can plug holes in an air defense and allow forces to mass and gain "local superiorities"—favorable conditions for Chinese forces to destroy their enemies.

Third, protective air defense is giving way to "offensive air defense" driven by more effective offensive operations. This calls for reliance on "integrated attack and defense" in which the offense mounts more attacks on enemy airfields. One source told RAND researchers commanders should "actively organize counterattack operations of various scales to distract and attrit the enemy, disrupt his plans, destroy his offensive posture, gradually move the enemy into a reactive mode, and, ultimately, seize the operational initiative."

Fourth is a trend toward "information air defense." Information has

become a core component of strength, and information superiority must be incorporated into the entire course of an air defense campaign.

Fifth is a trend toward the unification of air and space defense, requiring integrated command and control and the understanding that whoever controls space, controls the planet.

Sixth is the trend toward joint air defense, which RAND researchers said is part of a larger trend in PLA thinking toward joint operations, something many US officers have long argued causes the PLA great difficulty.

Beyond these points, the PLAAF has put new emphasis on recruiting and training pilots. The MND announced last fall that the PLAAF had joined with Tsinghua University, a prestigious technical institute, to set up a program intended to draw the best and the brightest into the air service. The first group of pilot cadets was required to meet the academic standards of civilian applicants and the physical standards of the PLAAF. Those accepted will spend three years as undergraduates at Tsinghua, and then transfer to the Aviation University of the Air Force for their final year of college. This effort would be analogous to the USAF joining with MIT or Cal Tech to educate young officers—and potentially, someday, Air Force generals.

Meantime, the Aviation University welcomed new pilot cadets into the "blue sky phalanx." Xu Qiliang, the PLAAF commander, and Gen. Deng Changyou, the PLAAF's political commissar, flew from Beijing to Jilin Province, to attend the ceremony in September 2011. Singled out for a welcome was Wang Xu, the first pilot cadet recruited from Tsinghua University to Aviation University. He has been selected to attend Aviation University for further studies.

In flight training, today's PLAAF reportedly gives pilots 200 hours a year in the air, a striking increase from the fewer than 24 hours a year during the depths of the Cultural Revolution. In this respect, the PLAAF is approaching the standard set by USAF. China's days of fielding obsolete air forces with poor training and outdated doctrine have clearly come to an end. ■

Richard Halloran, formerly a New York Times foreign correspondent in Asia and military correspondent in Washington, D.C., is a freelance writer based in Honolulu. His most recent article for Air Force Magazine, "Return to Vietnam," appeared in the January issue.



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Converging strategic goals prompted France in 2009 to end 43 years of self-imposed exile from NATO's military command structure, restoring political influence in the Alliance France believed it had lost. Only two years after that decision, France took a lead role in NATO's Libya air campaign, expanding on its significant contributions to NATO operations in Afghanistan.

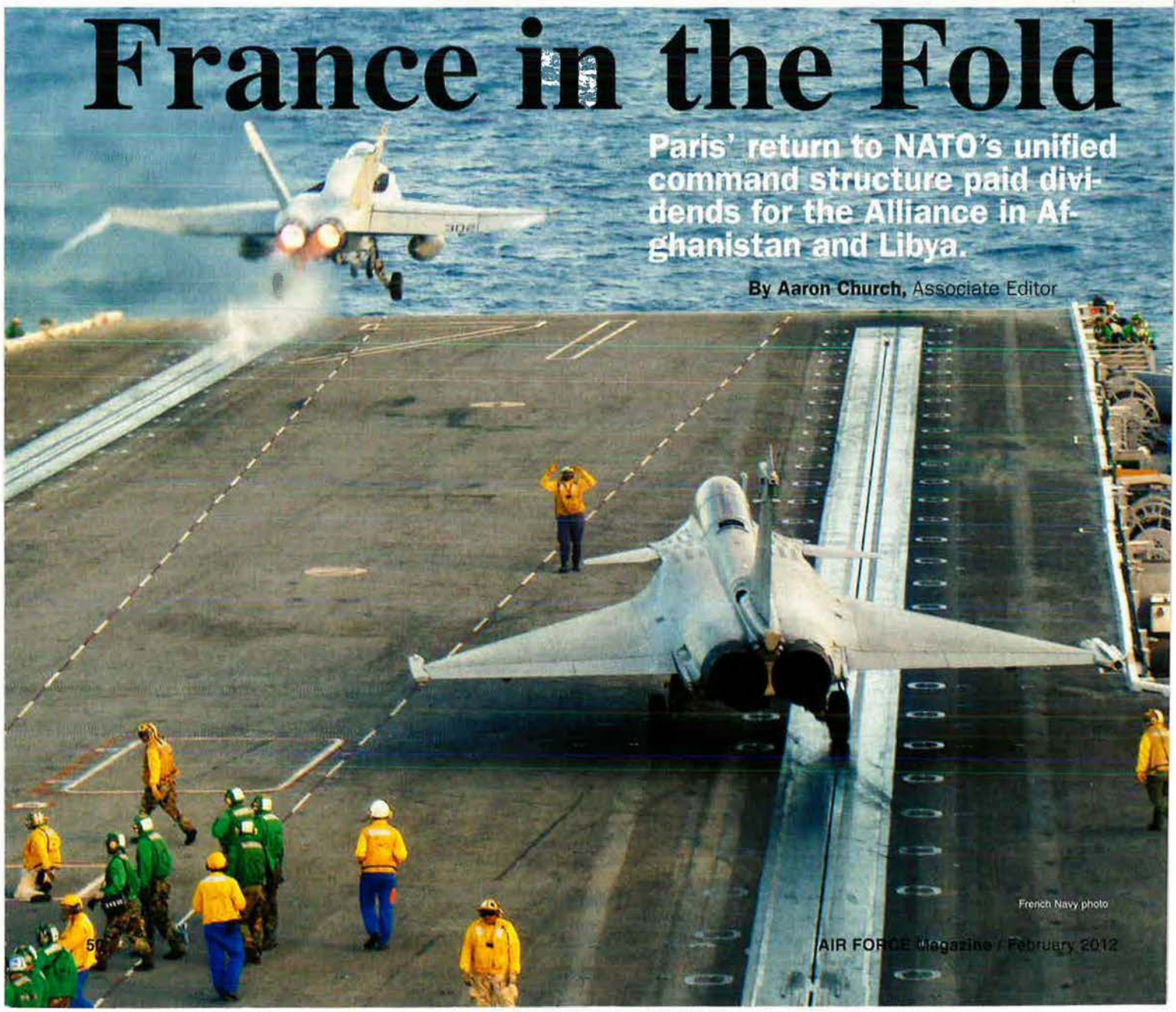
"We send our soldiers on the terrain but we don't participate in the committee where their objectives are decided," French President Nicolas Sarkozy said in 2009, explaining the state of France's relationship to NATO. "Our strategy cannot remain stuck in the past when the conditions of our security have changed radically," he said. The time had come, he asserted, "to end this situation," declaring France's full reintegration a month before NATO's 60th anniversary.



France in the Fold

Paris' return to NATO's unified command structure paid dividends for the Alliance in Afghanistan and Libya.

By Aaron Church, Associate Editor



French Navy photo

AIR FORCE Magazine / February 2012



French Air Force photo

Left: In 2008, a US Navy F/A-18 (l) and a French Rafale participate in a joint exercise, the first time the French air arm was integrated with an American carrier air group for several days of operations. **Above:** A French Rafale (l) and Mirage 2000 over Afghanistan.

President Obama welcomed France's decision to allow its military to once again operate with allies under a single, unified chain of command. Praising the move in March 2009, he said, "France is a founding member of NATO and has been a strong contributor to NATO missions throughout the Alliance's history. France's full participation in the NATO military command structure will further contribute to a stronger Alliance and a stronger Europe."

"The NATO Alliance has been the cornerstone of trans-Atlantic security for the past 60 years. ... It is through close cooperation with allies and partners that we can overcome our most difficult challenges," Obama said.

France wasted little time reasserting its influence in NATO command structures. "For the first time since 1949, NATO was put at the service of a coalition led by two determined European countries, France and Great Britain," Sarkozy said five months into allied operations over Libya.

Spurred by France and Britain, the United Nations authorized military force to shield Libyan civilians against attack by military forces loyal to Libyan dictator Muammar Qaddafi. Within two days, on March 19, France (under Operation Harmattan) took a lead role alongside Britain and the US. Even before NATO assumed the entire mis-

sion's leadership, France and Britain, working in conjunction with US forces under Operation Odyssey Dawn, were orchestrating naval operations and air strikes in Libya. NATO assumed overall command of the mission 12 days later.

Though absent from the command structure, France had never left the Alliance outright. The nation was one of the largest contributors of combat troops to NATO operations in Afghanistan and Kosovo—although they were until 2009 held separate from the overall allied chain of command. Today, roughly 3,800 French forces are deployed under NATO in Southwest Asia—the majority in combat and direct support roles.

Unraveling

From NATO's founding as a counter to Soviet expansionism in 1949, France played a key role in the Alliance, hosting, among other things, NATO's highest headquarters.

However, because of the prominence of the US and Britain—which shared a special relationship—in NATO, France came to believe its sovereignty was being threatened by the very Alliance it helped to create.

Wary of losing sway, then-President Charles de Gaulle sought to match the dominating influence of the US and Britain by proposing a new command structure with the US, UK, and France exercising co-equal leadership within the Alliance. When the US and Britain rejected this scheme, de Gaulle began distancing France from the Alliance.

At about the same time, France had begun asserting some strategic autonomy by developing its own, independent nuclear deterrent forces. This path culminated in

a test of the first French nuclear weapon in 1960.

For France, the last straw came with the US abandonment of the nuclear doctrine of mutually assured destruction in favor of staged, conventional escalation. An American "graduated response" would mean fighting the Soviet Union and Warsaw Pact troops conventionally on European soil, resorting to nuclear weapons in Europe if the Soviets couldn't be stopped any other way. De Gaulle strenuously objected to this approach, preferring to threaten immediate nuclear response to invasion rather than risk a ground war at France's doorstep.

In 1966, de Gaulle shocked US and allied leaders by severing French forces from multinational command and walking out of allied defense and nuclear planning. France remained in the Alliance but on her own political terms.

With France now absent from NATO military command functions, de Gaulle demanded the immediate departure of allied forces from French soil. NATO's military headquarters outside Paris relocated to Mons, Belgium—where it remains today. The US was also forced to vacate nuclear forces from air bases throughout France.

The French ambassador to the US at the time, Charles Lucet, framed the French stance: "We want to remain your friend and your ally within the Atlantic Alliance." Though de Gaulle resisted being pulled into a conflict between titans against France's will, Lucet acknowledged that NATO remained "indispensable for the balance and for the peace of the world." Lucet expressed France's contention, however, that the Soviet military threat to Europe was greatly diminished. "If the threat were



AP photo by Thibault Camus

French President Nicolas Sarkozy (l) met with NATO Secretary-General Anders Rasmussen (r) in September. France was instrumental in getting NATO forces involved in the Libyan conflict.



SAVING LIVES IS

From one generation....



26 November 1991

Dear Martin-Baker

I would like to thank you for manufacturing the ejection seat that saved my life on 26 February 1991.

I am a pilot for the United States Army and was deployed to Operation Desert Storm on the night of my ejection. The aircraft I was flying was an OV-10 MOHAWK (twin turbo-prop surveillance airplane). During the last few hours of the war I was sent deep into Iraq on a surveillance mission. Upon returning to my airfield I encountered unforecasted adverse weather conditions. Dense smoke from the burning Kuwaiti oil fields and the accompanying fog completely engulfed the entire region. I was already quite low on fuel when I tried several times to land the airplane, but could not find the runway. Then things went from bad to worse.

Another OV-10, who was also low on fuel, crash landed on the runway. The runway was promptly closed and then I had nowhere to go.

I had about two minutes of fuel left when I chose to depart the airfield and head out over the desert to eject. I climbed to about 2,000 feet above ground level, slowed to about 110 knots, and attempted to jettison the escape hatch. It would not jettison, but I was always told that the ejection seat would be able to penetrate the hatch with no difficulty. I then told my Technical Observer to eject and he did. I then put my life in your hands. I remember distinctly thinking that this could be the last few seconds of my life if the seat failed to function. I thought of my wife, my 6-year old son and my 2 year old son and how I might never see them again. I then grabbed the lower firing handle and pulled.

I can not explain the great sense of relief I had when the parachute opened and I began my slow descent to the ground. All the way down I kept thinking "it worked". I knew then that I would live to see my family again.

I am still flying the OV-10 and am completely confident that if I were in a position again where I had to eject, I would not hesitate to put my life in your hands. Thank you for not only the Martin-Baker ejection seat, but also for the high quality that goes into them.

Alitta Brando
OWE Alitta Brando United States Army

PERFORM
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From: John Ciminero
Sent: 30 June
Subject: Bravo and Thank you!!!

Dear Sir,
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The purpose of this email is to properly thank you and the fine people who designed and built the Martin-Baker ejection seat, a marvel of escape engineering.

I don't believe that I ever did thank anyone from Martin-Baker at that time. So please accept my thanks and heartfelt gratitude at this time.

I am now 70 years old, and I believe I owe a great debt of gratitude to the fine Martin-Baker people who gave me the chance to live this long.

Bravo Martin-Baker!!!

Thank you!!!

JOHN CIMINERO
Major (USAF) Retired



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Engineering For Life



A Rafale carrying GBU-12s and a Damos targeting pod during Operation Harmattan—the French designation for the NATO military intervention in Libya.

to be revived,” he said, “you know which side we would be on.”

Two months before allied operations drew to a close in Libya, Sarkozy stated unequivocally that France’s lead role there vindicated his decision to rejoin NATO’s unified command.

At the political level, France pushed NATO to take a much deeper look at Libyan involvement than it otherwise may have done. While US assets were key to the speed of success, the strategic objectives in Libya were much more in line with France’s goals.

“What’s happening in northern Africa is very closely tied to French national interests and probably a bit further away from American national interests,” said French Air Force Col. Eric Mongnot, head of France’s delegation to NATO Allied Command Transformation, in Norfolk, Va.

“We knew that this had an impact on European soil, security, and stability. ... We had a political goal, we had the military means to do it, and we launched the operation,” he said.

“We were politically more influential; ... that’s the main thing that we’ve gained going back into the structure,” he added.

For France and the US, the defining purpose of the Alliance remains collective defense from external attack. Article 5 of the North Atlantic Treaty guarantees that any armed attack against a member is considered an attack on the Alliance as a whole.

“If an Article 5 [event] were to emerge, then there’s no question—all our forces

would be engaged into that if needed,” said Mongnot.

Following the terrorist attacks of Sept. 11, 2001, NATO invoked Article 5 for the first time in history. “In a spirit of solidarity and responsibility,” then-President of France Jacques Chirac threw his country’s full support behind the US-led invasion of Afghanistan.

Three months later, 5,000 French troops deployed to Southwest Asia, second only to Britain among allied contributors. Early on, naval aircraft from the carrier *Charles de Gaulle* were flying 10 percent of allied air cover and reconnaissance.

“For Afghanistan, we were one of the first countries to provide fighters,” noted French Lt. Col. Jean-Patrick Borja, former airlift pilot and current exercise assessment chief at NATO Allied Command Transformation. French personnel helped open the Manas Transit Center in Kyrgyzstan in December 2001. “We were there with the Americans,” supplying fighters, KC-135 tankers, and airlift support less than six months after the attacks, Borja said. “I think this is quite significant because after that, ... everybody followed up, but France was the first.”

Even before rejoining NATO’s planning and chain of command, “we still showed that we were a very reliable ally to the US,” Borja said.

During Operation Anaconda in March 2002, French fighter aircraft, flying from the carrier *de Gaulle* and land based at Manas, carried out the first

non-US air strikes against targets in Afghanistan.

Early quibbles over the proximity of air strikes to civil zones aside, France, unlike many allies, placed no restrictive caveats on its military contribution.

“We just had the NATO rules, and that’s it—the same as the Americans,” said French Lt. Col. Vincent Fournier, a former Mirage pilot, now a capability and requirements officer at NATO ACT.

Initially outside NATO planning, French forces wrestled with equipment incompatibility—notably targeting pods—which hindered coordination with allied combat controllers. With some improvisation, “we did overcome that ... and it worked in the end,” said Fournier.

Bitter political disagreement over the invasion of Iraq in 2003 poisoned public discourse between France and the US, but had little effect on French commitment in Afghanistan. “Like the US, the spirit is, ‘If we go to war, then we go to war,’” said Borja. “I don’t think you’ll find that spirit in many countries, ... even in Europe.”

Reconverging Interests

France’s relationship with allies throughout the Cold War and beyond has been defined by Paris’ staunch assertion of national sovereignty and independence. This has earned France a reputation as difficult to work with.

Primarily, though, the decision to rejoin NATO command acknowledged converging interests with the organization in the

wake of the Cold War. NATO operations in Kosovo and Afghanistan highlighted the strategic merge.

"The first thing that we very often hear is that France has rejoined NATO, and that's a mistake, ... but very often we hear that even among our NATO allies," Mongnot said. "We never left the NATO exercises, we have never left NATO operations—we have always been among the first contributors, always in the first five."

Reintegration was largely driven by the same reason France originally split with NATO's command: desire for equal voice in strategy.

"As far as we're concerned, ... we keep our sovereignty. The French military assets are still under national command and that hasn't changed," explained Mongnot. "The main thing is that we didn't want" to have military orders imposed when "we hadn't taken part in the deliberation. Now we are fully back in."

The move was also an unequivocal message of commitment to NATO as the foundational defense structure in Europe. The French leadership was eager to vindicate the nation's allegiance to the Alliance after long being criticized as promoting humanitarian and security operations led by the European Union separate from and at the expense of NATO defense posture.

"We clearly know that for the defense of Europe, the first toolbox is NATO. We're not expecting the European Union to [defend] against a high-intensity attack," stressed Mongnot. "Being back in NATO

demonstrates that we are fully committed to making NATO an operational and efficient military tool," he added.

France is NATO's fourth largest financial contributor and one of only four European members to spend the baseline two percent of GDP on defense. Like the US, France feels the burden of meeting its military obligations.

"France, just like any other nation, is facing a financial crisis," explained Mongnot. Sharing the burden along with the US is good; "however, we are only one nation," he added, echoing the words of former Defense Secretary Robert M. Gates. Gates, in a parting shot delivered at his last NATO meeting, warned that if the defense spending of most European allies continues to free-fall, "future US political leaders ... may not consider the return on America's investment in NATO worth the cost."

While neither France nor the US can compel allies that are unwilling or unable to contribute, "as far as France is concerned, NATO should be and should remain ... the most efficient and capable military organization in the world," stated Mongnot.

He explained that some within the Alliance are pushing NATO to adopt a so-called "comprehensive approach" encompassing humanitarian and reconstruction-type missions. "If it's done at the expense of military equipment, military training, or military capability," this approach "reduces the credibility



French Air Force photo

French Air Force Commandant (Maj.) Yann Malard was an exchange pilot posted with USAF in Kandahar, Afghanistan.

and conventional deterrence of NATO," stressed Mongnot. "It is good to have a high level of ambition, high expectations, but sometimes you have to be realistic."

While NATO remains an "important pillar" of the US-French strategic relationship, he noted that "it is not the only one." The US and French militaries "have a bilateral relationship that is a lot stronger than the one we have through NATO," said Mongnot. NATO is an essential fixture of trans-Atlantic security, but "it's just one of the different ways we have to talk to each other." ■



French Navy photo

A Rafale is catapulted off the deck of the carrier Charles de Gaulle during Operation Harmattan.

A Russian Tu-95MS Bear bomber takes on fuel from an Il-78M Midas tanker. The iconic turboprop aircraft dominates Russia's strategic bomber force. Inset: Russian Prime Minister Vladimir Putin visits the nuclear-powered submarine Alexander Nevsky. Russia has seabed and territory claims in the Arctic and has increased its submarine patrols in the icy waters.



OUT OF HIBERN

After two decades of military decline and costly regional wars, Russia is again investing in—and exercising—its strategic forces.

By Marc V. Schanz, Senior Editor



IN the wee hours of Aug. 17, 2007, 14 of Russia's strategic bombers and a number of support aircraft lumbered into the sky from bases across that country. The synchronized launches were the start of long-range patrols well beyond Russia's borders.

The otherwise uneventful missions were noteworthy because they marked the resumption of regular strategic training flights, which Russia had mounted only sporadically in the post-Cold War era.

"We have decided to restore flights by Russian strategic aviation on a permanent basis," Russia's then-President Vladimir Putin announced, adding that the mission marked the beginning of conducting such patrols "on a regular basis." In a remark to reporters that was undoubtedly meant for US consumption, he said, "We hope our partners will treat this with understanding."

ITAR/Tass photo by Artyom Korotayev



ATION

Facing demographic and economic challenges, Russia is slowly rebuilding and refurbishing its strategic forces—occasionally using them to assert its interests.

Russia's conventional power has proved less than decisive in operations ranging from the bloody and costly Chechnya conflicts of the 1990s to the Georgian conflict of 2008. After the Georgia campaign, some retired Russian military officials openly criticized the operation, saying troubles with command and control and lack of appropriate equipment compounded

Photo by Yevgeniy Kazennov



Yuri Dolgorukiy during sea trials. The submarine will be capable of launching Russia's Bulava ballistic missile, still in development.

Photo by Alexey Victorovich Schekinov

other persistent problems to deny Russia clear success.

"If they were honest, they would prefer to have conventional military capability—but they don't," noted Russian military analyst Charles L. Thornton. As recent exercises have demonstrated repeatedly, Russia's military clout depends on its strategic forces—and this perception within Russia is driving a renewal of the country's strategic arms.

Much like the US, Russia plans to revamp its strategic weapons in the wake of the April 2010 signing of the New START agreement. New START limits each country to 1,550 deployed strategic warheads and 800 delivery systems, including both deployed and nondeployed. According to estimates by the Congressional Research Service, after New START reductions, Russia will field about 400 deployed delivery vehicles and 1,335 deployed warheads (counting each bomber as one warhead).

The new nuclear force structure will be more modern, though. New systems being deployed include the SS-27 intercontinental ballistic missile multiple warhead variant, the RS-24, which will replace three older missile systems. Russia is also moving ahead on testing and development of the Bulava SS-N-32 sea launched ballistic missile for its submarine fleet and the new Borey-class SSBN, to replace two older systems: the SS-N-18 and Delta III.

Russia's strategic bomber force, meanwhile, continues to be dominated by the iconic turboprop Tu-95 Bear—a mainstay of these now-regular patrols in both the European and Pacific theaters.

Since the August 2007 announcement, Russian bombers have flown long-range sorties far from the peripheries of both its European and Pacific territory—from Scandinavia and the

North Atlantic to the Arctic and even the waters near Guam.

Russia and China both are expanding the amount of area they cover in surveillance and exercise tracks outside their national airspace, but that's not particularly alarming to Pacific Air Forces chief Gen. Gary L. North.

"That's why they call it international airspace," he quipped to reporters at the Air Force Association's Air & Space Conference this past September.

"The Russians are out quite a bit, extending their long range capabilities," he said. "It gives them an opportunity to do long-range training. Clearly, their maintenance is doing much better, their training is doing much better, so they are out there quite a bit," North observed.

Reinvigorating the Triad

The Russian bomber fleet has increased its participation in both Russian and multilateral exercises in the last few years as well, sometimes pairing the Bear with its more modern, swing-wing jet aircraft counterpart, the Tupolev Tu-160 Blackjack.

Despite their age, the bombers still pack a credible deterrent capability. In October 2008, the exercise Stability-2008 saw Bears firing live, air launched cruise missiles for the first time since 1984. The Kh-55 cruise missile, called the AS-15 Kent by NATO, is key to the bomber's longevity and place in Russia's strategic forces, just as the US B-52 fleet is dependent on standoff cruise missiles for nuclear operations.

With a range of about 2,000 miles, the Kent will keep the Bear fleet strategically relevant for years. Each Tu-95 can fly patterns from standoff distances and hold prospective targets at risk with at least six cruise missiles.

One indisputable purpose of Russia's strategic exercises and nuclear

revitalization is domestic political gain. The moves increase Russian perceptions of national strength.

Russia is carefully trying to rebuild the prestige many officials in government and the military believe the nation has lost since the end of the Cold War.

"A lot of the analyses on Russian activities [assume] Russia is a single entity," said Thornton, the Washington, D.C., area director of an intelligence consulting firm, Operational Surveyors Inc., and a fellow at the Center for International and Security Studies at the University of Maryland. "There are a lot of different actors inside that country; they all have different perspectives. There are both external national security reasons [for their actions] and internal domestic political reasons for it."

Thornton, who first worked with the Russians in the 1990s under the Cooperative Threat Reduction Program, has since built extensive contacts among military officials there. The renewal of the flying program, he said, is part of Russia's attempt to reinvigorate its strategic triad.

The Strategic Rocket Forces—the branch of the Russian military responsible for the country's ICBMs—has always been the prime emphasis of the country's strategic planning and doctrine, with submarines second in the pecking order.

The resumption of the bomber patrols dovetails with Russia's planned strategic modernization. For many years, there were no regular bomber training flights, and now the military feels the bomber fleet must be brought back up to standards.

"The bomber link has always been the weakest," Thornton asserted.

The Russian bombers will receive substantial modernization funds, if Russian defense plans are any indication. Russia has 77 Blackjack and Bear

strategic bombers combined and plans upgrades to the targeting and navigation systems of both aircraft at a rate of two or three per year, concluding in 2015.

By the end of the New START process, Russia's bomber force will consist of 13 upgraded Blackjacks and 63 upgraded Bears; one Blackjack, though more modern than the Bear, will be retired before then.

Reportedly, Russia plans to replace all of its strategic bombers with a new stealth aircraft in the 2025 to 2030 timeframe—roughly the same window in which the US Air Force wants to field its next long-range strategic bomber.

The Tupolev Design Bureau began development of the new bomber via a contract with the Defense Ministry in 2009, and the airplane would likely be deployed after New START expires.

In 2010, Putin, who had since become Prime Minister, said Russia must “think and get down to work on a next generation, long-range aviation complex—our new strategic missile carrier” and that top Russian aerospace industrial priorities should be to design engines, new materials, and electronics for such a project.

No Strategic Purpose

Along with the intensified bomber flights, Russia is increasing its submarine patrols in the Arctic, where the country has asserted seabed and boundary territorial claims. This has been prompted by warming of the Arctic Ocean, resulting in reduced pack ice and greater access to oil and natural gas exploration and commercial navigation.

Photo by Yevgeniy Kazennov



A Tu-160 Blackjack bomber taxis at Engels Air Base in Russia. The modern swing-wing bomber is sometimes paired with the Bear during Russian and multilateral training exercises.

Routes over the Arctic are a frequent path for Russian bombers on their long-range aviation patrols and represent the most direct route to the North Atlantic, Thornton noted.

Bomber flights have grown in length and range, even penetrating Western Europe's sovereign airspace.

In August, two Royal Netherlands Air Force F-16s intercepted a pair of Russian Bear bombers flying just outside of Dutch airspace without identifying themselves; on the same mission, they had first been intercepted by Danish fighters. British fighters took over escort once the Bears left Dutch airspace.

The implications of these Russian activities and investments are being somewhat downplayed in Europe, especially among NATO allies. Flights into European territory are noticed,

but frankly have little to no impact, said US Permanent Representative to NATO Ivo H. Daalder in December.

“If there is a desire by Russia to try to do this [in order] to intimidate people, it's not working. ... In fact, [it] gives air defense capabilities good training to get up in the skies and fly,” he said.

“It's not seen as a change in the Russian direction,” Daalder said of the NATO allies' opinion of the operations. “It has no strategic [purpose behind it.] ... They are trying to modernize their strategic capability; we have good insight into it through the START agreement,” Daalder said. NATO understands what's happening, and most members don't feel the need to take issue with the activities so far.

Still, Russia has demonstrated its willingness to use these assets amid territorial and diplomatic disputes.

In early September, two Bear bombers flew around the Japanese mainland on a long-range patrol, and while they did not enter Japanese airspace, the flight drew a harsh response from the Japanese Foreign Ministry, which called on Russia to refrain from “provocative” military action. Some Japanese viewed the exercise as an attempt to pressure the new Japanese government.

The flight was provocative in the context of a long simmering dispute. Russia has since World War II held the two southernmost islands in the Kuril Island chain that stretches between Hokkaido and the Kamchatka peninsula, but those islands are also claimed by Japan. The dispute flared in 2010 when President Dmitry Medvedev became the first Russian President to visit the archipelago, followed by other

A Tu-22M3 Backfire drops its weapons load over a training range in Russia. The supersonic long-range bomber has been in service since 1983.



Photo by Yevgeniy Kazennov



Photo via Yevgeniy Kazennov

USAF Raptors fly just off the wing of a Tu-95MS Bear. Photos of this November 2007 intercept near Alaska usually show it from the F-22's perspective. This is what it looked like to the Russians.

senior officials promising to expand the Russian military presence there.

The flight aroused “suspicion among the Japanese people about its intentions,” Japanese Foreign Minister Koichiro Gemba said in a press conference following the patrol. Russian officials stressed Tokyo had been warned in advance of the flights and said they are standard practice of the armed forces of any state.

With such a large geographic area to secure, Russia has a range of disputes and concerns that have remained fairly consistent since the end of the Cold War, from US and NATO missile defense systems in Europe to surveillance of their submarine deployments, expansion of NATO in Eastern Europe, and US support for Georgia, Thornton noted.

Disagreements over the missile shield have become increasingly contentious, however. In November, Medvedev announced Russia would put early warning radar stations on alert and deploy strategic missiles to counter the US missile defense system in Europe if Russia’s concerns about the system aren’t addressed. Talks continued through December.

At the same time, there are signs of cooperation. Russia has entered into organizations such as the G8, which gives it much-desired prestige and international credibility. The G8, which Russia joined in 1997, also contains Canada, France, Germany, Italy, Japan, the UK, and the US—a group of eight industrialized, democratic economies.

Militarily, Russia has played a role in US efforts in Afghanistan by opening the Northern Distribution Network

for supply purposes, and it cooperates with multilateral efforts such as anti-piracy actions in the Gulf of Aden. The cruiser *Admiral Panteleev*, on rotation with other Russian vessels, patrols the gulf, as part of an international coalition to escort merchant shipping.

“My belief is that we can and will find many zones of practical cooperation with Russia,” said Adm. James G. Stavridis, NATO’s supreme allied commander Europe and head of US European Command. NATO and the US share many common security challenges and should develop “practical cooperation” in areas such as counter-piracy, arms control, Arctic policy, military training, and other areas, he said.

Maintaining Vigilance

Adm. James A. Winnefeld Jr., then-US Northern Command and NORAD commander, told Congress last March his forces monitor Russian long-range aviation flights and routinely fly intercepts with Canadian and US fighters.

“Despite recent improvements in US-Russian relations that reflect a dramatically reduced likelihood of conflict, we maintain our vigilance regarding the high-end threat,” he said in written testimony to the House Armed Services Committee.

Still, greater emphasis is put on terrorist use of civil aircraft, he noted, and cooperation with Russian forces has improved on that front.

In August 2010, NORAD and Russia worked together for the first time in a three-day, live-fly exercise designed to ensure clear communications during a crisis. Dubbed Vigilant Eagle, the

exercise simulated an international air terrorism scenario over the Pacific, requiring both Russia and NORAD to launch fighters to investigate a hijacked airliner and coordinate monitoring and hand-off. Vigilant Eagle was an “overwhelming success” and helped create an environment for further cooperative efforts, Winnefeld said.

US Pacific Command also works with the Russian military, particularly in the Eastern Military District, which oversees air and naval forces in the eastern portion of Russia. With partners in US European Command, PACOM maintains discussions with the Russian Colonels Working Group. The group met with Russian officials in Moscow in November to go over an annual plan, arranging certain bilateral and multilateral events and exercises and visits with the United States.

The commander of Russia’s Eastern Military District, Adm. Konstantin Sidenko, visited PACOM headquarters in October to participate in the 14th annual Chiefs of Defense Conference, hosted by PACOM’s Adm. Robert F. Willard. The conference brought together senior military leaders from 26 Asia-Pacific countries to discuss mutual security challenges, improve relationships, and build on cooperative efforts.

Plans and statements aside, Thornton said when it comes to the Russian military, it is important to watch how closely actions match up with words.

What Russia says, what the parliament budgets for, and what actually happens can be “very different,” he observed. Russia has built lofty policy documents in the past that included plans for missile regiments, new bombers, and other assets. “Then, if you go back a year later, and look at what they did,” the plans often evaporated.

Russia is a difficult country to understand strategically, he added, but if you consider Russia as a business, then its actions begin to make more sense.

“Russian wealth and power is largely derived from its natural resources, and so it requires some minimal military capability to protect its national borders and national security,” Thornton said. Strategic nuclear forces—bombers, missiles, and submarines—give it that capability and also impart continued international prestige.

Judging from the country’s recent emphasis on these forces, it seems the decision-makers in Moscow would agree. ■

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A new hangar will bring presidential and R&D aircraft in with the rest of the museum's collection.

Big Plans for the Air Force Museum

By Peter Grier



An aerial view of the National Museum of the United States Air Force in Dayton, Ohio. The dashed outline shows where the new building will be.

USAF photo

SAM 26000 is one of the most historic aircraft ever flown by the US Air Force. A military version of a Boeing 707-320B, it entered service right off the assembly line on Oct. 10, 1962. Painted a striking blue and white, with a large American flag on the tail, this Special Air Mission airplane (tail No. 26000) was known as Air Force One when the President of the United States was aboard.

John F. Kennedy flew on SAM 26000 to Dallas on Nov. 22, 1963. In the chaotic hours following his assassination, Lyndon B. Johnson took the presidential oath of

That soon is likely to change. A major capital construction program at the Air Force museum aims to expand the facility's current one million square feet of space with a new building that will allow hundreds of thousands of visitors a year to see SAM 26000, Franklin D. Roosevelt's Douglas C-54 *Sacred Cow*, and other presidential airplanes.

The building will also contain a Space Gallery big enough to allow the world's largest and oldest military aviation museum to display a full Titan IV booster.

"All of this will be indoors, out of the rain and snow, and the public will get a much better picture of the Air Force story

and careers in science, technology, and math. We want to teach their parents about this," Hudson said.

The National Museum of the US Air Force began life in 1923 as a display of World War I aircraft and equipment in the corner of a hangar at the Army's McCook Field, near downtown Dayton.

Even at that early date the area was steeped in the history of flight. Dayton had long served as home base for the Wright brothers, who developed their 1903 flyer there and used nearby Huffman Prairie for test runs through 1910. The Wrights' first successful flight was at Kitty Hawk, N.C., but it was at the

Aircraft from aviation's early days include a Cacquot Type R observation balloon and a Curtiss JN-4D (foreground).



office in the aircraft's cabin. An iconic photo of the event shows a grim LBJ raising his right hand while Jackie Kennedy stands next to him in the crowded space, her face a mask of shock. SAM 26000 flew JFK's body back to Washington. In later years it carried National Security Advisor Henry A. Kissinger to Paris for secret meetings with North Vietnamese leaders, and President Nixon to China on his famous 1972 visit.

Today the aircraft resides at the National Museum of the US Air Force in Dayton, Ohio. While a popular exhibit, it is difficult to reach.

Space limitations relegate it and other presidential aircraft to an old hangar a mile from the main museum, in a controlled-access portion of Wright-Patterson AFB, Ohio. Only one out of every 10 visitors manages to see the display.

in these particular mission areas," said the museum's director, retired Air Force Lt. Gen. John L. Hudson.

Wide Appeal

Today only about one-third of museum visitors have military experience. As time goes by, the percentage of Americans who have served in the armed forces gets smaller and smaller, and it is important to show them a full and updated picture of what the Air Force is about, said Hudson.

The new building—funded by private donations—should also help the museum in its mission of educational outreach. There is a lot of science, technology, and math behind the Titan IV, the space shuttle, and other displays intended for the museum expansion.

"We'd like to motivate American youth towards the Air Force, or civilian service,

prairie where they developed an airplane fully controllable by a pilot, able to turn, land, and take off at will. Later they established and ran a training school for pilots at the site. Among their students was then-Lt. Henry H. "Hap" Arnold, who rose to command the US Army Air Forces in World War II.

By the mid-1920s the Army owned Huffman Prairie and 5,000 surrounding acres, and the area was named Wright Field. In 1927 the nation's nascent military aeronautical museum moved there from McCook Field, taking up 8,100 square feet in a laboratory building. In 1935 the Works Progress Administration built a separate museum building to house the 3,000 items of the growing collection, but in 1941 the museum was commandeered for wartime needs, and the collection went into storage.



World War II Gallery aircraft include this Curtiss C-46D.

The Air Force Museum did not reopen until 1947. At that point it emphasized aircraft technical developments and was open by appointment only. In 1955, the Air Force finally threw the doors open to the general public. That year some 42,000 visitors trooped through its exhibits, housed in an old engine-overhaul facility at Patterson Field, next to Wright Field. As the museum's popularity grew, it became increasingly

apparent it needed a new home. The engine-overhaul building had posts every 16 feet in one direction, making it difficult to display aircraft. The building was also not air-conditioned and did not offer adequate fire protection.

Enter the Air Force Museum Foundation, a nonprofit formed in 1960. This group raised the \$6 million needed for a new building designed specifically to display aircraft. The long, open facility

with its half-curve roof can hold nearly 100 airplanes.

It opened in 1971 on a 400-acre site back at Wright Field and today holds the museum's collection of artifacts from the early years of flight—everything from a 1909 Wright Military Flyer, to an extensive collection of World War I biplanes, and an observation balloon—and a large display telling the story of World War II military aviation.



Also in the World War II Gallery are displayed (from left): a Stearman PT-13D, Vultee BT-13B, and Laister-Kauffman TG-4A.



The museum highlights engines and armament as well as airplanes in the Cold War Gallery.

Among the many notable aircraft from 1939 to 1945 is *Bockscar*, the B-29 Superfortress that dropped the “Fat Man” atomic bomb on Nagasaki, Japan.

A second building opened in 1988, running parallel to the first one and similar in appearance. Its \$10.8 million cost was shared by the federal government and the museum foundation.

Currently, it tells the story of the Korean and Vietnam Wars. The Korean section includes, among other things, a

MiG-15 delivered to the West by a North Korean defector in 1953. The Southeast Asia Gallery contains such iconic aircraft as an F-4 Phantom II and a UH-1 “Huey” helicopter as well as displays dealing with 1972’s Linebacker II and other key air campaigns of the conflict.

The third phase of the museum’s growth occurred in 2003 with the opening of the \$22 million Eugene W. Kettering Cold War Gallery. This provided the space for curators to rearrange their

entire collection in chronological order and show such large aircraft as a B-2 (the only stealth bomber on permanent public display) and the huge B-36J, the last piston-powered strategic bomber produced in the US.

Today the National Museum of the US Air Force is among the most popular public attractions in the Midwest. In 2011 about 1.2 million visitors walked through its doors, just short of the museum’s all-time attendance record of 1.34 million,

One of only two B-2 test articles built is on display at the museum. The airframe is marked to resemble Spirit of Ohio.



USAF photo



President Kennedy's Air Force One (SAM 26000) arrives at the museum, where it is currently displayed in a hangar about a mile from the main complex. Right: Lyndon Johnson, with Jackie Kennedy at right, takes the oath of office on SAM 26000 the day Kennedy was assassinated.

set in 2003 when it celebrated the 100th anniversary of powered heavier-than-air flight. "We're within a day's drive of better than 60 percent of the American population," Hudson noted.

Arranging Easy Access

With some 360 aircraft and thousands of other aviation-related items on display, the facility is already the largest such military museum anywhere.

But aviation continues to develop, and curators continue to amass items reflecting that development. The museum's master plan has long called for a fourth building alongside the existing three.

Today the institution's leaders and the Air Force Museum Foundation are moving to make that new building a reality. The museum is an Air Force facility, and government money pays for normal operations and maintenance. The foundation will pay for the fourth building, constructed by the Army Corps of Engineers.

So far the foundation has raised about \$37 million of the estimated \$47 million building cost. "We are planning on getting this started as soon as we can," Hudson said. "We would like to begin construction in 2013 and finish in 2014."

One big reason the museum needs a fourth building is to configure its entire collection for easy public access. Right now, two entire galleries—those housing the presidential aircraft and research and development—are located apart



USAF photo

from the main museum complex, in the secure zone. Visitors must take a shuttle bus to and from this area, and the bus only runs four times a day.

Yet the Presidential Gallery contains some of the museum's gems, such as *Independence*, a Douglas VC-118 that carried President Harry Truman on his historic flight to Wake Island in 1950 to discuss the situation in Korea with Gen. Douglas MacArthur.

Plans call for all the presidential aircraft to move into the museum expansion space. More visitors will be able to enter the aircraft, walk down their aisles, and envision the historic scenes that have occurred in their cabins. "This is a very popular set of exhibits," Hudson said.

Another reason is the need to further document the Air Force's evolving role in space.

A silo-shaped annex of the museum's Cold War Gallery currently houses a limited missile and space exhibit. It includes an array of Air Force ICBMs and a temporary display of space objects, including the Apollo 15 capsule.

The museum's expansion would allow it to display many more space items in a new gallery—among them, a Titan IV rocket in storage. "That was a launch vehicle that did a lot of important work for the Air Force. We would like to put one on display, but we can't do it now because we just don't have the room," Hudson said.

The Air Force museum was not successful in its recent attempt to obtain a retiring space shuttle. However, NASA is sending it one of two full-scale simulators used for training astronauts in Houston. Museum officials plan to use the simulator as the centerpiece of a large shuttle related exhibit. It will include a payload bay that visitors can walk inside of, and perhaps interactive displays shaped like shuttle wings. Among other things it will tell the story of what the Air Force did for the shuttle program in terms of providing astronauts and launch and recovery infrastructure.

"We'll really be able to tell the more technical side of the shuttle. We're going to take what NASA is going to give us and make a great display," Hudson said.

Eye on the Future

Adding museum space will also allow curators to better tell the story of Air Force airlift. A new Global Reach Gallery will allow the museum to bring together workhorse aircraft now scattered in other buildings or outside in the air park adjacent to the main complex. Among the stars of this new gallery, to be relocated from the Southeast Asia Gallery, will be the "Hanoi Taxi."

The Lockheed C-141 Starlifter was a cargo transport for three decades, but it carried its most important load on Feb. 12, 1973, when it lifted the first American prisoners released by the North Vietnamese out of Gia Lam Airport in Hanoi. In total it made two runs to Hanoi, and four from the Philippines to the US, to repatriate more than 70 POWs.

Airplanes the museum anticipates showing alongside the "Hanoi Taxi" include a massive C-5 Galaxy and a KC-135 tanker. As in the presidential



JS/JF Photos



USAF photo

exhibit, the Global Reach Gallery will feature walkways to allow public access into interior spaces. "People love getting inside the airplanes," Hudson said. "When you get inside you can see how they were designed, how big they were, see the engineering that goes into the cargo bay, and so forth. That will all be new with that fourth building."

Looking into the future, the museum's master plan contemplates even further developments. For instance, officials would like to have enough space to move the Research and Development Gallery into the main complex and expand its displays. But this is just on the drawing board. For now museum leaders are focused on making the current expansion a reality.



Displayed near the Boeing RB-47H (I) is a Lockheed U-2A.

The museum is busy with new acquisitions, as well. It is restoring *Memphis Belle*, one of the most storied B-17s ever produced. *Belle* was the first US heavy bomber to complete 25 missions over Europe and return to the United States. In June 1943 its crew flew the airplane on a three-month morale-boosting barnstorming tour of the US. It has been the subject of both a 1944 documentary and a 1990 feature film depicting its exploits.

Thanks to the National Reconnaissance Office, the museum has also received on loan a series of “Keyhole” spy satellites,

KH-7, KH-8, and KH-9, declassified in September 2011. The museum planned to put them on display in January.

“It is a remarkable feat of mechanical engineering the way they put these thousands and thousands of feet of film inside that thing,” said NRO Director Bruce A. Carlson last September when he announced the satellites were being declassified. “Running a camera that’s 60 feet long, you’d think what if it jams, what if something goes wrong? ... Well, it didn’t happen very often, and they took more pictures on the first flight, the first successful flight

of that system, than they did in all the U-2 flights that have ever taken place.”

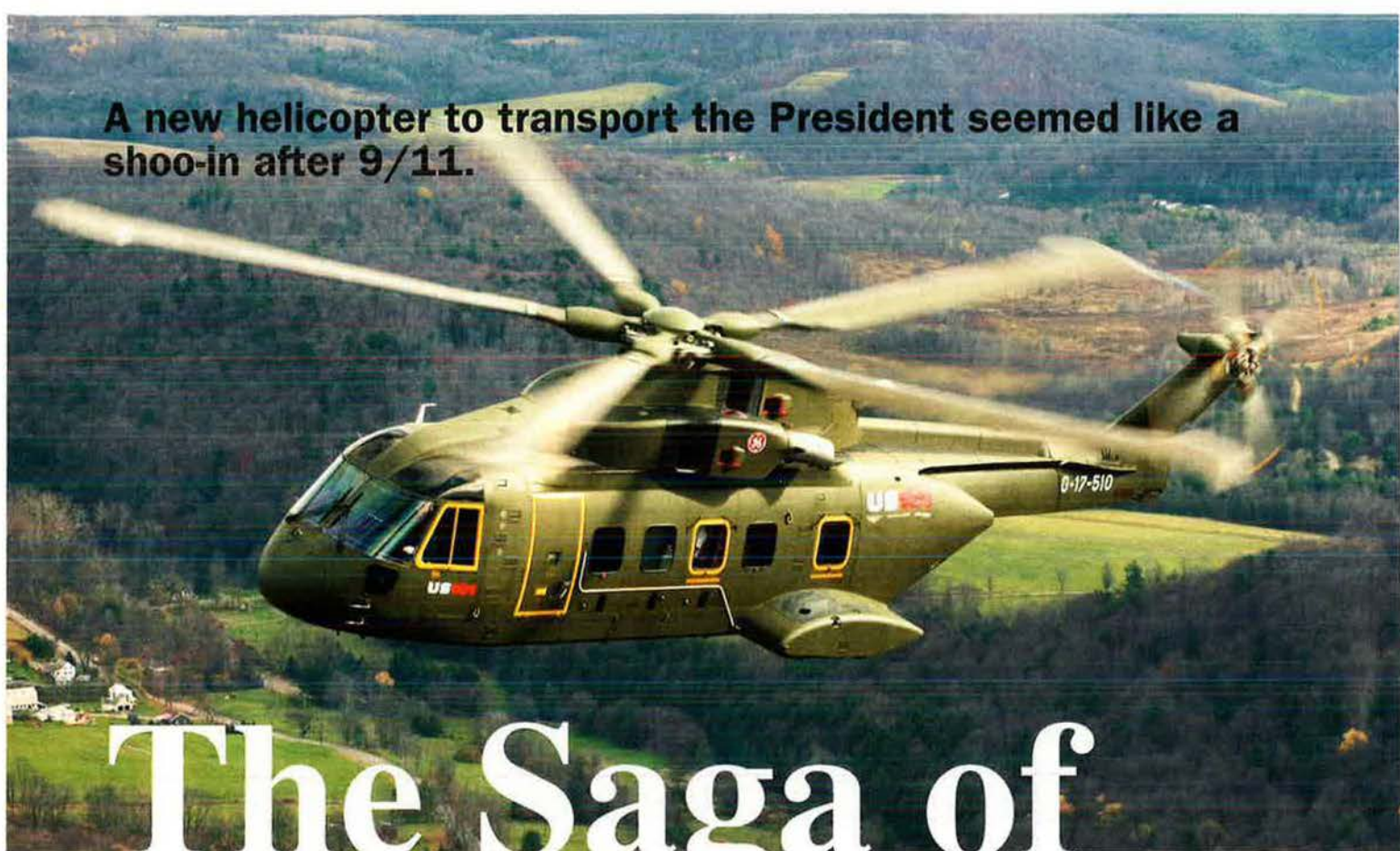
The Air Force “and airmen helped make these satellites function correctly and operated them while they were on orbit,” noted Hudson. “To have those three here and put them on display is really terrific.” ■

Peter Grier, a Washington, D.C., editor for the Christian Science Monitor, is a longtime defense correspondent and a contributor to Air Force Magazine. His most recent article, “The B-52 Gunners,” appeared in January.

The new building will allow additional large aircraft to move indoors. Seen here are a B-1B (foreground) and a Northrop AT-38B in aggressor markings.



A new helicopter to transport the President seemed like a shoo-in after 9/11.



The Saga of Marine One

By Otto Kreisher

One would think that a helicopter project intended to provide safe, effective, and secure transport for the President of the United States and other top-level US officials would be a sure thing. One would be wrong.

Successfully completing any new military helicopter program has proved difficult in recent years, and not even the new Marine One presidential helicopter planned in the aftermath of the 9/11 terror attacks has managed to emerge from its tumultuous acquisition process.

After 10 years and at least \$3.3 billion spent trying to produce the new VH-71 presidential support helicopter, the Navy has painfully shown this to be the case. Instead of a new fleet of VH-71s, the Navy and the nation have ended up with nothing but sizable termination expenses and a costly life extension requirement for existing VIP choppers.

Now the Navy's new effort to procure a more reasonably priced presidential



Top: An AgustaWestland-built US101 medium lift helicopter. Lockheed Martin offered it as the presidential helicopter replacement. Here: The first VH-71 takes flight. President Obama said the snakebit VH-71 program was a good example of the procurement process gone awry.

helicopter is being held up as the Pentagon prepares for smaller defense budgets projected over the next decade.

Meanwhile, President Barack Obama, Vice President Joe Biden, and other senior government leaders will continue to fly in aged helicopters that officials determined were not adequate for the post-9/11 security environment.

Still, cancellation of the presidential support helicopter surprised many analysts.

The program was widely supported when it was initiated in the late 1990s and gained increased urgency after 9/11. But it became controversial when the contract went to a foreign producer and was later bogged down in complaints of runaway requirements, program delays, and soaring costs.

When Defense Secretary Robert M. Gates gutted several high-profile military acquisition programs in April 2009, critics said each of the 23 proposed presidential helicopters would have cost more than the converted 747 jumbo jets that serve as Air Force One.



USAF photo by TSgt. Suzanne M. Day
President George Bush and Laura Bush wave as they board the presidential helicopter in 2009. When the Navy wanted to cancel the VH-71 program, Bush overruled it.

Even then, the decision to terminate the program was the subject of heated debates between members of Congress, the White House, and the Pentagon. "The Administration's proposed termination of the VH-71 program is one of the highest-profile program cancellations or reductions in the proposed FY2010 DOD budget and has emerged as a significant item of discussion in the debate on FY2010 defense funding," wrote Ronald O'Rourke, Congressional Research Service naval programs analyst, in a June 9, 2009, report.

An Eisenhower-Era Practice

Presidents have used helicopters for relatively short movements by air since 1957 when President Dwight D. Eisenhower used a helo to reach a vacation spot.

After that, the mission of rotary wing support for the President was given to the Marine Corps and assigned to Marine Experimental Helicopter Squadron One, based at Marine Corps Base Quantico, Va. HMX-1 was already a decade old, created in 1947 as a heli-

copter developmental unit to support the Marines' drive to perfect vertical assault in an effort to protect their cherished amphibious assault capabilities in the emerging era of nuclear weapons.

As with Air Force One, when the President is on board his Marine transport, the helicopter has the call sign Marine One.

From the beginning, Marine One has been a Sikorsky product. The current presidential support fleet consists of 11 VH-3D Sea Knights and eight VH-60N White Hawks, both made by Sikorsky.

The VH-3s, derived from the Navy's SH-3 anti-submarine helicopters, began operations with HMX-1 in 1975, and the VH-60s, a modification of the widely used Black Hawk, were added in 1989.

A replacement program for the existing inventory first began in March 1998, when HMX-1 submitted a Fleet Operational Needs document for new presidential helicopters, which was approved in September 1999. The program, initially designated VXX, was managed by the Naval Air Systems Command (NAVAIR) at Patuxent River, Md. NAV-AIR develops, tests, and provides aircraft for marines and sailors.

NAVAIR estimated a new Marine One initial operational capability in the first quarter of Fiscal 2009. After the 9/11 attacks, however, the plan was accelerated. CRS said the White House in November 2002 urged the IOC in-service date be pushed up to 2007, "in light of security issues raised by the terrorist attacks of Sept. 11, 2001."

The competition for the development and production contract was pursued aggressively by two industry teams that saw the relatively small but prestigious program as an avenue to wider sales of their products.

Sikorsky's offering was based on its S-92, which had yet to find a buyer.

Lockheed Martin led a rival team, offering the US101 based on the somewhat larger AW101 made by the Anglo-Italian helicopter manufacturer AgustaWestland. Various models of the AW101 were in service with several NATO nations.

Both teams hoped that winning the presidential fleet contract would give their aircraft an edge in the competition for the Air Force's CSAR-X combat search and rescue program and other military helicopter projects.

On Jan. 28, 2005, the Navy awarded the contract to the Lockheed Martin-led team. The US101 team received a \$1.7 billion cost plus award fee contract for the system development and



Lockheed Martin photos



President Obama approaches Marine One in 2010. The current Marine One fleet is made up of Sikorsky VH-3 and VH-60N rotary wing aircraft.

demonstration phase. The proposed aircraft was given the designation VH-71 and called Kestrel, after a species of falcons.

The decision was denounced by many members of Congress and others who were outraged that the President would be flying in what they considered to be a foreign helicopter. Under the winning bid, the major components of the VH-71s would be produced in AgustaWestland plants in England and Italy, with final assembly at Bell Helicopter in Texas.

The engines would be provided by General Electric, of Lynn, Mass., which also makes the power plants for the VH-3Ds and VH-60Ns.

According to the Navy, the Lockheed Martin team was chosen in part because it "was deemed more likely to be able to meet the program's operational requirements on time and at a lower cost," CRS said.

There also were reports at the time that the US101 design was preferred because it had three jet engines, theoretically offering greater security than the S-92's two.

The VH-71 program then went through several modifications over the years, with varying numbers of aircraft to be produced.

CRS said the goal was to provide 23 new presidential helicopters to replace the 19 existing ones, but the total number to be built ran up to 36 with as many as 28 scheduled to become operational for at least some time.

Because of the stated urgency in providing the President a more capable

and secure helicopter, the program was divided into two increments.

Increment 1 helicopters were intended to meet some of the operational requirements and would enter service first, beginning in 2009, as short-term replacements for some of the existing presidential helos. Increment 2 helicopters were to meet all the requirements and would replace the remaining legacy choppers and then the Increment 1 birds.

The Increment 2 helicopters were to begin reaching HMX-1 late in Fiscal 2011, with the full VH-71 fleet expected in service in 2015.

After several revisions, the contract called for the Lockheed team to produce nine Increment 1 helicopters, designated VH-71A, and 27 Increment 2s, or VH-71Bs. That would have included three test aircraft in each increment paid for by the Navy and one test article in each increment funded by the contractors. Five VH-71As were expected to become operational, replacing legacy aircraft. At one point, the Navy considered retrofitting four of the 71As to Increment 2 standards and acquiring only 19 of the more capable aircraft. That plan was scrapped in favor of buying 23 VH-71Bs and retiring the five initial aircraft.

The Poster Child

Marine One aircraft requirements also evolved as the Navy and White House proposed escalating needs for range, capacity, communications, self-protection, and creature comforts for the occupants. In terminating the program,

Gates joked that the VH-71 was supposed to be capable of providing the President a three-course meal while fleeing a nuclear attack.

Requirements creep and engineering problems led to the usual schedule delays and cost overruns.

In 2005, the cost of developing and procuring the full VH-71 fleet was estimated at \$6.5 billion. By December 2008, the total cost was projected at \$13 billion, or more than \$500 million per helicopter. IOC for the VH-71As had slipped to mid-2012 and operational capability for the full VH-71B fleet had lurched to 2021, six years behind the original schedule.

The huge jump in cost put the program into a Nunn-McCurdy breach, requiring the Pentagon to notify Congress and to reconsider the project as early as 2007. The Navy reportedly recommended terminating the program, but the White House, occupied by President George W. Bush, overruled it. By early 2009, with Obama in the White House and the economic recession putting strains on the federal budget, support for the Kestrel had faded.

The President met with lawmakers on Feb. 23, 2009. At this summit, Arizona Sen. John McCain, the top Republican on the Senate Armed Services Committee, cited the problems with a number of Pentagon procurement programs, including the VH-71.

Obama said he had "talked to Gates about a thorough review of the helicopter situation" and called the program "an example of the procurement process gone amuck," according to transcripts of the meeting.

"The helicopter I have now seems perfectly adequate to me," the President said. "Of course, I've never had a helicopter before, maybe I've been deprived and I didn't know it," he added, drawing laughter.

Obama also told McCain that "Secretary Gates shares our concern and he recognizes that simply adding more and more does not necessarily mean better and better, or safer and more secure."

When he unveiled the Fiscal 2010 defense budget on April 6, 2009, Gates called for cancellation of the VH-71 program. The SECDEF noted the program's cost had doubled, it was six years late, and it "runs the risk of not delivering the requested capability."

"We will promptly develop options for an FY11 follow-on program," Gates added.

That May 15, then-DOD acquisition executive Ashton B. Carter directed that the VH-71 be canceled, and the Navy immediately issued a stop-work order for the program.

Lockheed officials attributed the cost overruns and program delays to the government's insistence on extensive modifications to the original proposal. A March 2009 report by the Governmental Accountability Office said post-9/11 security concerns led to an "aggressive acquisition strategy," confusion on specifications, and concurrent design, testing, and production.

However, the termination drew protests in Congress, and not just from members whose constituents would have benefited from continuing production. By that time, the Navy had spent about \$3.3 billion, and nine aircraft had already been built. The VH-71A test aircraft and all five production models had rolled out of the factory.

CRS analyst O'Rourke estimated that shutting down VH-71 production, upgrading the existing fleet, and implementing a successor program would cost somewhere in the range of \$14 billion to \$21 billion. And starting over meant a new presidential helicopter fleet would not be available until 2024—meaning some of the legacy helicopters serving as Marine One would be 50 years old. Some members of Congress recommended the Navy continue with a modified VH-71 program to gain some return on the \$3.3 billion invested and to give the President better aircraft sooner.

In July 2009, the House Appropriations Committee approved \$485 million to make the five production VH-71As operational.

But Gates, in a congressional hearing, called the program "a poster child for an acquisition process gone seriously wrong" and suggested that no single helicopter design could meet the requirements of routine presidential trips and for secure escape during a major threat.

The Navy then completed the termination of the VH-71 program and directed all the remaining funds be used for upgrades and service life extensions of the existing helicopters, according to the Navy's 2009 contract termination notification. That work is continuing. The Fiscal 2012 President's budget requested \$58 million to carry on "structural enhancement" and avionics updates for the VH-3Ds and VH-60Ns.



USN photo by Photographer's Mate 2nd Class Robert J. Stratchko

Marine One, carrying President Bush, takes off from the deck of USS Iwo Jima after a visit to the Hurricane Katrina-ravaged Gulf Coast region. Two USAF helicopter programs did not survive defense budget belt-tightening.

"Continued investments in the in-service fleet will ensure continued safe and reliable executive transportation until the replacement aircraft is fielded," Navy officials said in a Nov. 2 congressional hearing. The budget also included a request for \$180.1 million in research funds for the new presidential helicopters program, again to be called VXX.

Let's Try This Again

Despite the costly failure of the VH-71, the new program is attracting a lot of contractor interest. Lockheed has said it would team with Sikorsky in offering the S-92. Boeing has acquired the US rights to the AW101 and has said it will offer that aircraft as a VXX competitor. But the VXX effort has been put on hold while Carter, now deputy defense secretary, reviews it and other procurement programs in light of defense funding cuts that could reach \$1 trillion over 10 years if sequestration is implemented beginning in January 2013.

Meanwhile, the Navy is negotiating with Lockheed over termination costs for VH-71. In 2009 they were estimated at \$555 million.

Part of that termination penalty will be covered by the sale of the nine VH-71A airframes to Canada for use as spare parts in its CH-149 search and

rescue helicopters. (The CH-149s are also based on the AW101). That sale was announced by Canadian Defense Minister Peter G. MacKay and will reportedly return \$164 million—about five percent—of the Navy's \$3.3 billion investment.

In recent years, the Air Force and the Army have learned similar hard lessons in their own efforts to develop and field new helicopters. Each service has had two major rotary wing efforts canceled or stalled over the same time period as the failed Marine One acquisition.

In 2009, Gates terminated the Air Force's second attempt to buy a new combat search and rescue helicopter in the CSAR-X program. He also canceled the Common Vertical Lift Support Program, intended to replace the aging UH-1 helicopters used at the Minuteman ICBM bases and for VIP support.

Meanwhile, the Army's high-tech RAH-66 Comanche armed reconnaissance helicopter program was canceled in 2004 after 22 years and \$6.9 billion spent developing it. The replacement program also was killed in 2008, forcing the Army to continue updating its OH-58 Kiowa Warriors.

So the President won't be the only one flying in old helicopters well into the next decade. ■

Otto Kreisher is a Washington, D.C.-based military affairs reporter and longtime contributor to Air Force Magazine. His most recent article, "Move That Gas," appeared in the September 2010 issue.

**Seven years in
Hanoi's prisons
did not dim
Robbie Risner's
fighting spirit.**



Nine Feet Tall

By John T. Correll

The picture on the *Time* magazine cover for April 23, 1965, was Air Force Lt. Col. Robinson Risner. The cover story, "The Fighting American," featured 10 US military members in Vietnam, with fighter pilot Risner—a rising star in the Air Force—foremost among them.

"At the time it was a great honor," Risner said. "But later, in prison, I would have much cause to regret that *Time* had ever heard of me."

On Sept. 16, Risner was shot down over North Vietnam and captured. The additional bad news was that the North

Vietnamese had seen *Time* magazine and knew who he was. "Some good soul from the United States had sent them the copy," he said, "and they thought I was much more important than I ever was."

The magazine article told them not only that Risner was an F-105 squadron commander who had led 18 missions against North Vietnam, but also that he was a Korean War ace, having shot down eight MiGs. It also disclosed details about his family. His captors knew they had an important officer and were determined to break him. "The Vietnamese regarded Robbie as their No. 1 one prized prisoner," said Col. Gordon Larson, a fellow POW. "Robbie was by far the most abused POW there because of who they thought he was." All of the POWs were tortured and ill-treated, but Risner got an extra portion.

Risner was a leader among the airmen held by the North Vietnamese, first as senior-ranking officer and then as vice commander of the 4th Allied POW Wing formed in Hoa Lo Prison, the infamous "Hanoi Hilton." According to Larson, Risner was "the most influential and effective POW there."

In 1971, after the POWs moved into large open-bay cells in Hanoi, Risner and several of his colleagues organized a church service, a forbidden activity. The North Vietnamese, obsessed with maintaining control, interrupted the service and dragged Risner and the other leaders away for discipline. George E. "Bud" Day jumped on his bed and began to sing "The Star-Spangled Banner." All

46 POWs present joined in to express their support.

"I felt like I was nine feet tall and could go bear hunting with a switch," Risner said later. The moment and his words are recalled by a statue of Risner unveiled at the Air Force Academy in 2001, the gift of Risner's friend, H. Ross Perot, who had a history of honoring the POWs. The statue, atop a five-foot pedestal, is exactly nine feet high. Some 40 of Risner's fellow POWs were on hand for the event. The principal speaker was Bud Day, who said, "We knew he was in fact nine feet tall. This is a life-size statue."

Few American airmen have ever stood taller in the estimation of their colleagues. Risner, now 86 and living in retirement in the Shenandoah Valley in Virginia, is best known for his courage and leadership as a POW and for his book, *The Passing of the Night: My Seven Years as a Prisoner of the North Vietnamese*.

But that is just part of his story.

Korean Ace

He was born James Robinson Risner in Mammoth Spring, Ark., on Jan. 16, 1925, but the country doctor who delivered him failed to write down his first name on the birth certificate. He soon became "Robbie" to himself and all others except his mother, who always called him "Jamey."

He grew up in Tulsa, Okla., and joined the Air Corps as soon as he could, in 1943. He earned his wings and a commission in the Aviation Cadets in May

Left: Robinson Risner with an F-86 during the Korean War. Risner would be credited with eight MiG kills during that war. Here: The F-105 Risner was flying when he was shot down over North Vietnam. He ejected and became a prisoner of war.



USAF photo



The April 23, 1965, cover of Time magazine featuring Risner.

1944. He applied for combat duty, but was sent instead to Panama, where he flew P-38 and P-39 fighters. He left active duty in 1946, becoming an P-51 (later F-51) pilot with the Oklahoma Air National Guard.

His ANG unit was called up for the Korean War, but was not going to Korea, so Risner applied for and was accepted for photo reconnaissance, in which he had some training. He shipped to Korea, where he flew 10 reconnaissance missions before talking his way into a transfer to the F-86, the Air Force's best fighter at the time. He managed to work around the fact he had broken his arm in an off-duty accident before leaving the States—persuading a doctor to replace the cast with a leather cover, and he flew that way.

Flying with the 336th Fighter-Interceptor Squadron out of Kimpo, South Korea, he shot down five MiGs and became an ace within a few months. "Korea was probably the high point of my whole career as far as real gratification is concerned," he said later. In all, he flew 108 combat missions in Korea and was credited with destroying eight MiG-15s.

He was also known for another feat of airmanship in Korea. On Sept. 15, 1952, Risner's wingman, 2nd Lt. Joe Logan, was hit by ground fire near the MiG airfield at Antung, China, on the Yalu River. It appeared he would have to bail out over enemy territory. "Joe's aircraft got hit in the belly and began losing fuel," Risner said. "When he

was down to five minutes remaining, I told him to shut down and I would try to push him to Cho Do island, where we had a rescue operation."

Risner carefully placed the upper lip of his air intake in the tailpipe of Logan's F-86. "It stayed sort of locked there as long as we both maintained stable flight, but the turbulence created by Joe's aircraft made stable flight for me very difficult," Risner said. Leaking fuel and hydraulic fluid made it even more difficult.

"If either of us bobbed the least bit, I'd be tossed out of contact," Risner said. The two aircraft lost contact eight times on the way to Cho Do, 60 miles to the south. They made it all the way, "but the nose of my plane was all boogered up," Risner said.

Near the base, Logan bailed out and landed in the water. Tragically, he became entangled in his parachute lines and drowned before the rescuers could reach him. Risner was awarded the Silver Star for the mission.

Following Lindbergh

Risner was promoted to major before he left Korea and was augmented into the regular Air Force in 1953. He kept on flying F-86s, first at Clovis AFB, N.M., and then at Hahn AB, West Germany, where he was the squadron commander. He returned to the States at George AFB, Calif., where he commanded the squadron evaluating the high-altitude air-to-air capabilities of the new F-100, the follow-on fighter to the F-86.

In 1957, he was chosen for the "Spirit of St. Louis II" mission, commemorating the 30th anniversary of Charles Lindbergh's nonstop flight across the Atlantic. In preparation, Risner learned to refuel in flight during practice missions over the California desert.

The aircraft for the commemoration was an F-100F, a two-seat trainer. The lanky Lindbergh, who was 6 foot, 3 inches, declined an invitation to squeeze into the rear cockpit for the long flight. En route from Palmdale, Calif., to his jumping-off point at McGuire AFB, N.J., Risner set a new unof-

Risner waves to the crowd on his return to the States after his release from the notorious Hanoi Hilton in 1973. Risner was imprisoned for seven years.

ficial coast-to-coast speed record of three hours and 38 minutes.

For the transatlantic flight May 21, Risner flew alone. Roosevelt Field on Long Island, where Lindbergh's flight originated, was closed, so Risner was timed instead from the moment he passed the control tower at Floyd Bennett Field in Brooklyn. He refueled in the air twice, and six hours and 37 minutes later—compared to 33 hours, 30 minutes for Lindbergh—rolled to a stop at Le Bourget Field in Paris at the same spot Lindbergh did in 1927. Risner's F-100F is now on static display at the Air Force Academy prep school in Colorado.

After a year at Air War College and a tour on the staff at US Pacific Command, Risner went to Kadena AB, Okinawa, in 1964 as commander of the 67th Tactical Fighter Squadron. A new war was under way in Asia, and Risner was about to become part of it.

Shot Down Twice

The war in Vietnam had not yet broken out in full fury. Although air commandos were flying clandestine combat missions in South Vietnam, US fighters did not deploy to Southeast Asia in strength until after the Tonkin



Gulf incidents in 1964. In January 1965, Risner led a contingent of seven F-105s from Kadena on a temporary assignment to Da Nang Air Base in South Vietnam.

Risner promptly received a medal and a reprimand for the same mission. As directed, his flight knocked down a bridge at Ban Ken in Laos. Seeing another bridge downstream, Risner dropped it as well. The returning flight was met at Da Nang by Lt. Gen. Joseph H. Moore, Air Force commander in South Vietnam. "We all lined up and he went down and gave us an Air Medal because this was a successful strike," Risner said. "He got to me and said, 'By God, Robbie, what did you hit that other bridge for?' ... He told me not to do that again."

In February, the 67th TFS deployed on temporary duty to Korat Air Base in Thailand. From there, Risner led the first Rolling Thunder air strike against North Vietnam March 2, 1965.

On March 16, he was shot down for the first time. Hit by ground fire while attacking a radar site in North Vietnam, he made it to the Tonkin Gulf, where he ejected and was picked up.

On April 3 and 4, Risner led two strikes against the 540-foot railroad bridge at Thanh Hoa, 70 miles south of Hanoi. Called the "Dragon's Jaw," it was rated the toughest target in North Vietnam. The strikes did not succeed, not because of lack of effort or courage by the aicrews but because the weapons were not good enough. The bridge withstood 871 attacks before smart laser guided bombs finally did the job in 1972.

The target was defended by lethal ground fire and by the first MiG interceptors the Air Force encountered in Vietnam. Risner's own aircraft was hit hard, but he pressed on despite smoke and fumes in the cockpit. For heroism in leading the mission, Risner was brought to Washington, D.C., and awarded the Air Force Cross, the first ever given to a living recipient. At the ceremony, Gen. J. P. McConnell, Air Force Chief of Staff, growled, "Now goddammit, Robbie, don't go back out there and get your tail shot off."

In August, the 67th again deployed from Kadena to Korat for temporary duty and Risner flew a mission a day over North Vietnam, often against tough defenses. "During one week, I was hit four missions out of five," he said. He was awarded the Silver Star for several of these early September missions.



Risner (center) accepts congratulations following the unveiling of the nine-foot-tall statue at the Air Force Academy that honors him and other prisoners of war.

His luck ran out on Sept. 16, when he was shot down a second time. That morning, he was leading a strike against a SAM site near Thanh Hoa. Flying low, he crossed a small hill and was suddenly hit hard by ground fire. He engaged his afterburner for a surge of power and raced toward the ocean, trailing smoke and fire. His engine quit before he got there, and he bailed out. He was captured by local militia, taken to Hanoi, and delivered to the Hanoi Hilton.

He didn't expect to be there for long because "I had been told that Secretary of Defense Robert McNamara had passed the word down: 'Do not make any long-range plans and do not start any new buildings. The war will be over by June 1966.'"

Risner would remain a captive for seven years, four months, and 27 days.

POW Leader

After his capture, Risner was promoted to full colonel with a date of rank of Nov. 8, 1965, but it would be some time before he knew that. Even in his previous grade, though, he was the senior-ranking officer among the POWs and, on their behalf, complained about

the squalid conditions in which they were held. He also established committees and assigned tasks, such as keeping the POW list current.

The Vietnamese did not want any military organization among the prisoners, and they aggressively suppressed attempts to communicate. Risner's activity was one more reason for putting him in his place. When he refused to make the kind of incriminatory statements they demanded, he was kept on bread and water from Oct. 1 through Dec. 15. His legs were seldom out of shackles, and he was in solitary confinement except for periods of torture. In one such session, his shoulder was dislocated.

At last, Risner signed an apology for violating North Vietnamese airspace and bombing North Vietnam. His subsequent direction to other POWs recognized the limits of resistance. "Resist until you are tortured," he said, "but do not take torture to the point where you lose your capability to think and do not take torture to the point where you lose the permanent use of your limbs." Risner was eventually awarded his second Air Force Cross for courage under torture and

establishing an honorable standard that could be followed by others.

Later, others succeeded Risner as senior-ranking officer. The practice for establishing military command among the POWs was to go by rank at the time of shootdown because it was almost impossible to verify promotions and dates of rank after capture. This eventually became a problem.

"New guys were coming in shot down as commanders who had been lieutenants in squadrons with old guys who had been shot down as lieutenant commanders; thus the old guys were now working for their previous wingmen," said Cmdr. James B. Stockdale, the ranking Navy officer.

In 1971, the senior POW, Col. John P. Flynn, made an exception to the shootdown rank policy. He recognized Risner's promotion to colonel and his 1965 date of rank, and named him vice commander of the 4th Allied POW Wing, with Stockdale as his deputy for operations.

The name of the wing referred to the fourth war of the century and recognized that Thai and Vietnamese were also held prisoner.

Before and After Ho

"Of all the indignities we were forced to undergo, I guess I resented meeting the foreign delegations more than any other," Risner said. "There was something so basically inhuman about appearing before the delegations and being asked how your food was and having to say it was excellent when it was not. Or to questions of your treatment, to lie in front of the cameras and say it was great, when they had literally tortured the stuffings out of you to make you appear."

There were command performances for reporters as well. In 1967, Risner was required to meet with Mary McCarthy, a liberal American writer openly sympathetic with the Viet Cong. "Do not say anything—regardless of what she asks you—do not say anything to disgrace or slander our country," the Vietnamese warned. "If you do, you will suffer for the rest of the time you are here," as if that was different from the regular routine.

McCarthy found Risner unlikeable, "a gaunt, squirrel-faced older man" who "had not changed his cultural spots." She did not notice the scars or other evidence of torture. She spoke enthusiastically of Sen. Eugene McCarthy's chances of winning the

Democratic nomination and presidential election and expressed hope for an early end to the war. "We'd better knock on wood," she said, and knocked three times on the table. Afterward, Risner was in interrogation for hours as the Vietnamese tried to discover what secret signal had been passed with the knocking.

Treatment of POWs changed for the better in the fall of 1969. Part of the reason was public recognition at long last in the United States of the plight of the POWs and the Vietnamese reaction to the unfavorable publicity. Another factor was the death of North Vietnamese strongman Ho Chi Minh.

In 1970, US commandos raided the prison camp at Son Tay. No prisoners were there, having been moved recently, but the operation unnerved the North Vietnamese. They pulled all of the POWs back into the Hanoi Hilton and sent hundreds of civilian Vietnamese convicts elsewhere to make room for them.

The POWs were held in seven large open-bay areas in a section of the prison they called "Camp Unity." The fellowship was wonderful, especially for those like Risner, whose total time in solitary confinement during his captivity added up to more than three years. It was at Camp Unity where the church service and the "nine feet tall" episode occurred.

"I never lost hope, and never did I despair of coming back alive," said Risner, who credits his religious faith with getting him through the ordeal.

Back in the Saddle

In 1973, the POWs were released by order of shootdown. Risner was No. 27 in the first group freed on Feb. 12. En route from Hanoi to Clark Air Base in the Philippines on the first leg of the journey home, an Air Force doctor told the group they would be on a bland diet for a few days until their stomachs adjusted. Risner told the doctor they had been subsisting on "a lot of pig fat and grease." The doctor said, "If you can digest that, you can eat anything" and changed the menu. That evening at Clark, Risner had steak and three pieces of cake.

Risner was in good physical shape, having exercised for hours a day during captivity. He reported that he was

ready for duty "after three good meals and a good night's rest." The Air Force wanted him to rest and take a special assistant job, but Risner balked.

He persuaded the Air Force to send him instead to qualify for operational flying in the F-4E. "Knowing that I had been in prison and been out of the cockpit for a long time, they didn't expect too much of me," he said. "I didn't have quite the finesse that I had some eight or nine years earlier" but "I had not lost my ability to take off, land, and fly an airplane in formation and to position the airplane where I wanted it," and "the instructors realized right away that I was coming back into my own."

He went to Cannon AFB, N.M., as commander of the 832nd Air Division, was promoted to brigadier general, and reassigned as vice commander of the Air Force Fighter Weapons Center at Nellis AFB, Nev., in 1975, where he was also commander of the Red Flag combat training program. He retired in August 1976.

For several years, Risner was executive director of Texans' War on Drugs and in 1985, President Reagan appointed him an alternate US representative to the 40th session of the United Nations General Assembly. He was constantly on the speaking circuit.

Risner—whose only staff assignment in his long career was the US Pacific Command tour in the 1960s—never lost his fighter pilot perspective. "Risner's last flight in a fighter plane occurred in 1990; he was 65 years old," said military historian John Darrell Sherwood. "A friend sent an F-16 to fly him to a formal dinner at Nellis. Not one to be a mere passenger, Risner convinced the pilot to let him fly the aircraft both ways. After the journey, Risner fondly reflected, 'The F-16 was a tremendous aircraft, but my personal favorite to this day is the F-86.'"

He was chosen six times as a participant in Air University's "Gathering of Eagles" program, where noted airmen talk about their experiences. At a gathering in the 1990s, he met a former Russian MiG-15 ace who had been in Korea about the same time as Risner and wondered if they had ever faced each other in combat.

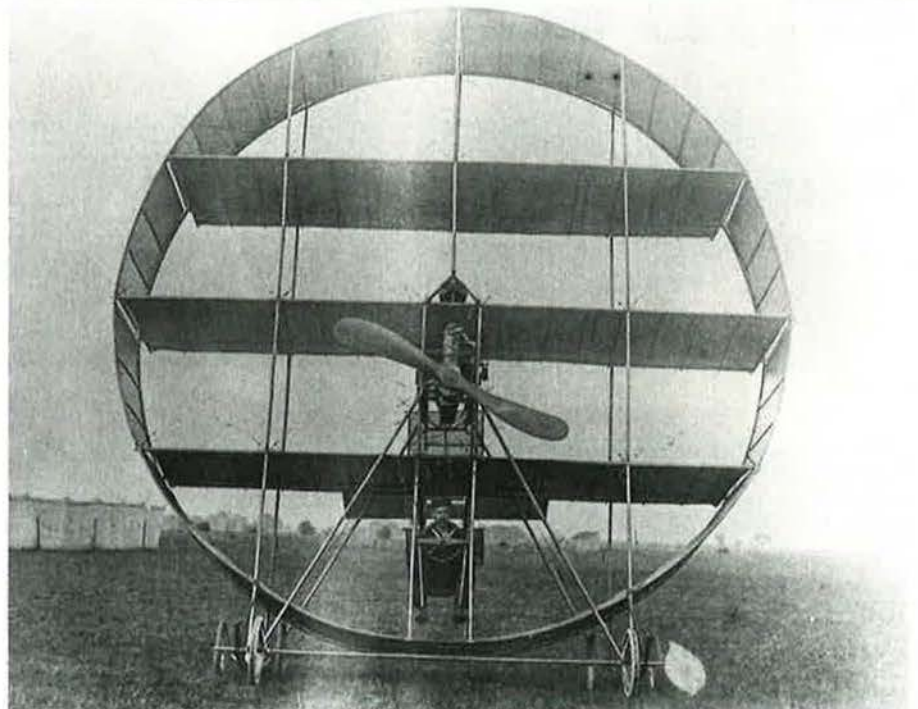
"No way," Risner said. "You wouldn't be here." ■

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

Lords of the Rings



The Wright brothers' epochal 1903 Kitty Hawk flight produced a burst of aviation fever in Europe. One who succumbed was Marquis d'Ecquevilly of France, a former Navy engineer who built one of the true oddities of early aviation. He is shown above, in a field in France in 1908, aboard a peculiar "multiplane." A four-wheel base supported two oval hoops, into which were fitted five pairs of half wings and one full wing. A seventh rested on top. Its 10-hp engine turned a propeller at 500 rpm. The pilot would hold on to wooden rings but had no flight controls, rudder, or brakes. The 17-foot tall, 308-pound aircraft never really flew. The same disappointing fate awaited the Geary Circular Triplane (right), a clear lineal descendant of d'Ecquevilly's multiwing design. It was photographed on Long Island, N.Y., in August 1911.



An aerial photograph of Whiteman Air Force Base in Missouri. The base is a large complex of various buildings, parking lots, and runways. In the foreground, the nose and cockpit area of a B-2 Spirit stealth bomber are visible, flying over the base. The bomber is dark in color and has a distinctive shape. The background shows a mix of industrial and residential areas, with some green spaces and roads.

Spirits of Stealth

The B-2 bombers operate worldwide from their home at Whiteman AFB, Mo.

Photography by Ted Carlson

One of only 20 B-2 Spirit stealth bombers, Spirit of Kitty Hawk, cruises over the flight line at Whiteman AFB, Mo. Whiteman is home to the 509th Bomb Wing, the only B-2 wing in the Air Force. The base, situated in an ocean of farmland, received the first combat-ready B-2—Spirit of Missouri—in December 1993, on the 90th anniversary of the Wright brothers' first flight.



From a flight line about 70 miles from Kansas City, Mo., USAF's B-2 bombers have flown record-setting missions to Serbia, Afghanistan, and elsewhere. The B-2's mission has evolved from Cold War nuclear strike to providing global conventional firepower from the heartland of the US, employing stealth and surprise. The nation's sole penetrating bomber, the B-2 was first tested in combat in 1999, when the type destroyed 33 percent of all Serbian targets in the first eight weeks of Operation Allied Force. The stealth bomber played a central role in Operation Enduring Freedom, Operation Iraqi Freedom, and recently in Libya, where it took part in the opening phase of Operation Odyssey Dawn. 111 Spirit of Kitty Hawk flies over Missouri. 121 Maintainers (l-r) A1C Sean Hegstead, SSgt. Chad Burke, and TSgt. Christopher Therrian work on the 393rd



Bomb Squadron's Spirit of Pennsylvania. Full of sensitive electronics, avionics, and stealth materials, the B-2 fleet is a maintenance-intensive platform. 131 L-r: SSgt. Brock Schuld, SSgt. Athena Keller, and SSgt. Antonio Washington work on a weapons loading trainer at Whiteman. Washington is adjusting a GBU-31 Joint Direct Attack Munition. 141 Spirit of Indiana banks away over Missouri at sunset.





1



4



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11 Spirit of Indiana overflies the countryside. The B-2 can carry a wide range of conventional and nuclear weapons in its two bomb bays, with a capacity of 40,000 pounds of munitions internally. *12* Among the arrows in the B-2's quiver: the AGM-158 Joint Air-to-Surface Standoff Missile, a stealthy cruise missile. *13* Weapons airmen, such as SrA. Jacques Walden, shown here in the weapons loading trainer, must master the loading, unloading, and handling of ordnance ranging from gravity bombs to cruise missiles. *14* The B-2 can also employ the AGM-154 Joint Standoff Weapon, shown here. The stealthy glide bomb can carry a unitary warhead or submunitions.

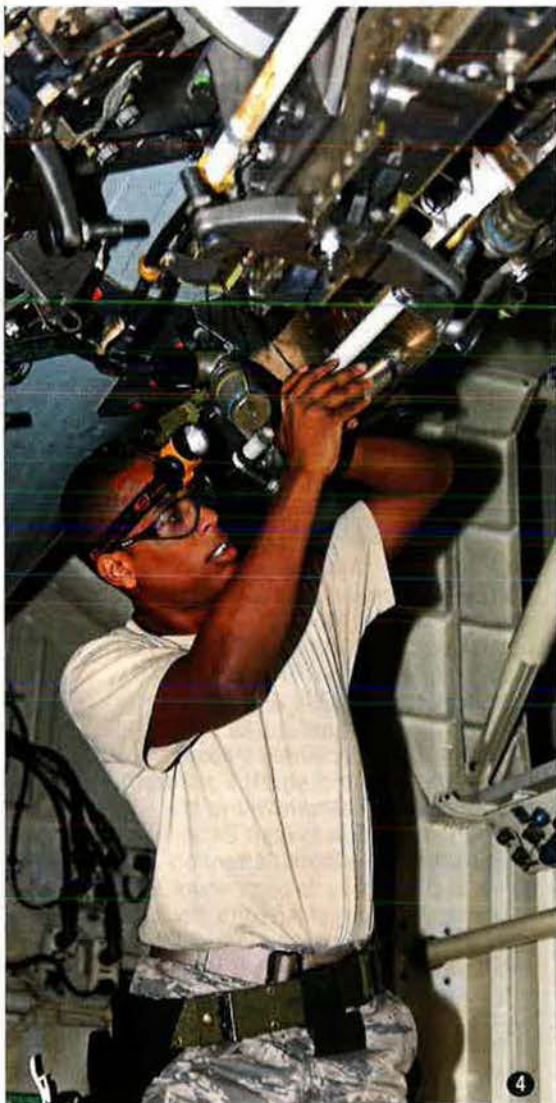
Formerly a Cold War ICBM base, Whiteman began a massive conversion to host the B-2 mission starting in 1988. USAF plans to keep the B-2 flying into the 2050s. **I11** Spirit of Indiana passes Whiteman. The B-2's size, flying wing shape, and internal weapons carriage enhance its range to reach any target on Earth with one aerial refueling. **I2I** Spirit of Indiana. **I3I** A1C Clayton Walton of the 509th Aircraft Maintenance Squadron prepares Spirit of Arizona for a sortie. **I4I** A1C Keena Johnson of Whiteman's 509th Security Forces Squadron secures the ramp near a B-2. The B-2's dual conventional and nuclear strike mission—as well as its super-sensitive stealth coatings and technologies—demands maintenance and security meeting rigorous Air Force Global Strike Command standards. When it became clear the B-2 fleet would be small—but bear huge responsibilities—the Air Force began naming the bombers after states, much as the Navy names capital ships.





11 Pilots Capt. Matthew Burrows (l) and 394th Combat Training Squadron boss Lt. Col. Ron Bodine (right), leave Spirit of Arizona parked on the Whiteman flight line. The 394th CTS was activated in 1996 at Whiteman as the training squadron for all B-2 aircrews. *12* SrA. Ashley Hussein, 509th Operations Support Squadron, cleans aircrew helmets in the life support shop. Due to their extra-long-duration missions, attention to life support gear is paramount to success. *13* Spirit of Arizona taxis past another B-2 parked in one of the hangars on the ramp at Whiteman. After the 2008 crash of a B-2 on Guam, only 20 airframes remain in the fleet. *14* Spirit of Kitty Hawk, of the 13th Bomb Squadron, taxis on the ramp.

111 Bodline (l) and Burrows go over paperwork before a mission on Spirit of Indiana. 121 Spirit of Indiana opens its weapons bay doors during a sortie. Bomb bays are opened and closed rapidly in real combat, to minimize the nonstealthy exposure of the weapon bays. 131 Spirit of Indiana shows off the many special coatings, seals, gap fillers, and other treatments that make the B-2 so hard to detect. The aircraft also employs electromagnetic techniques to hide from radar. One Northrop Grumman engineer quipped that while previous aircraft were designed by aeronautical engineers, "the B-2 was designed by electrical engineers." 141 Walden works on the weapons loading trainer at Whiteman. The bomber's already-impressive portfolio of weapons expanded last year, with completion of testing on the Massive Ordnance Penetrator (MOP) a 30,000-pound conventional bomb designed to reach hardened, deeply buried targets. The MOP was declared ready for operational use with the B-2 in November 2011.





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2




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1|1 The B-2's sinister, bird-like shape inspired one of several unofficial nicknames: "The Beak." 12|1 SrA. John M. Hodge with Spirit of Kitty Hawk in the background. 13|1 Spirit of Kitty Hawk climbs out. The B-2's shape presents some flying challenges; it must be coaxed to land when it encounters ground effect, and its bow wave tends to push away a tanker during refueling. Pilots have mastered techniques to overcome these quirks. 14|1 SrA. Jannel Kennedy (l) and A1C Brian Serafin work the Whiteman tower. The B-2 is not Whiteman's only resident. Companion T-38 jet trainers, Air Force Reserve Command A-10s, and Army National Guard AH-64 Apache attack helicopters also operate in Whiteman's busy airspace. B-2s, however, will rule the base for 40 years to come. ■



No Quarter: This painting by Ivan Berryman depicts Lt. William Robinson attacking Zeppelin SL-11. It was the first airship brought down over Britain.

For almost two years, British airmen were unable to stop the German airships as they bombed England with impunity.

WAR BERRYMAN '07

The Scourge of the Zeppelins

Even before World War I began in August 1914, the British were alarmed by the huge dirigibles built for the German armed forces by Ferdinand von Zeppelin. These massive airships had plenty of room to carry bombs and were easily capable of crossing the English Channel from bases in Europe.

The British were accustomed to fighting their wars abroad. It had been more than 200 years since England was last successfully invaded by a foreign enemy, but the British isles were newly vulnerable to

what prewar headlines called "The Airship Menace" and "The Peril of the Air." The anxiety was fed by a futuristic H. G. Wells novel, *The War in the Air*, in which giant airships destroyed New York.

Other nations had dirigibles—as steerable airships were called—but nothing to compare with the Zeppelins: cigar-shaped, barn-sized, and much advanced from the pouchy balloon-and-basket rigs that preceded them. What made them unique was their rigid structure, a skeleton of lightweight aluminum rings and girders with gas bags of hydrogen inside. The

outer covering was of tough fabric, treated with dope for tightness and waterproofing.

Crew and weapons rode in gondolas slung on the keel underneath. Engines for forward propulsion were mounted to the hull by struts and wires. To rise, the Zeppelin released some of its water ballast; to descend, it released some of the hydrogen.

The Germans were enormously proud of their Zeppelins, which had been in passenger service before the war. Some of the big airships were made by other firms, such as Schutte-Lanz, which used



Painting by Ivan Bismyanc, courtesy of Chapman Paper Arts

likely to prevail, but airships had the advantage in size, load, altitude, and range.

German expectations and British concerns were premature. Although it was not generally known, the Germans had lost six of their Zeppelins since summer and had only three in service in late August. Sent on low-level reconnaissance in broad daylight over the front lines, they were promptly shot down by the big field guns in the first weeks of the war. However, more were coming off the production line, and for almost two years, German airships would bomb Great Britain with impunity.

Kaiser Wilhelm II was hesitant in employing the Zeppelins against English cities. He may have thought about the personal safety of his relatives in the royal family—both he and King George V were grandsons of Queen Victoria—but the main consideration was world opinion, especially in the United States, which was thus far neutral. In January 1915, the Kaiser approved attacks on Britain but excluded London as a target. The authority was expanded somewhat in May, and unrestricted bombing to include London was authorized in July.

The first Zeppelin attack on Britain came Jan. 19. Two airships of the prewar class—518 feet long, each carrying 21 bombs and a crew of 16—were blown off course and dropped their bombs in Norfolk on the eastern coast, killing four people. Compared to the staggering toll of the land war in France, the Zeppelin attacks were a drop in the bucket, but they caused great alarm and consternation.

The Army's Royal Flying Corps preferred to concentrate on the Western Front, and home defense was left to the Royal Naval Air Service. This arrangement continued until February 1916, when Army participation was ordered. Afterward, Navy responsibility ended when the Zeppelins crossed the coastline, where the Army's responsibility began.

The Germans had their own interservice shuffle. At the beginning of the war, the Army had most of the airships and conducted the first attacks on London. Primacy soon shifted to the Naval Airship Division, led by Cmdr. Peter Strasser whose ability, commitment, and strength of personality soon pushed the Army to the side.

"Through 1915 and 1916, the Zeppelin raids became a regular feature of life in towns along Britain's eastern coast and in London," the *Daily Mail* said in a historical retrospective. "The airships would loom out of the night sky, some as big as battleships, a terrifying sight. Houses were blasted, people left dead and injured. On the ground, there was no civil defense and

little warning. No sirens wailed. Instead, boy scouts blew bugles and policemen on bicycles blew whistles and whirled rattles. In the absence of public shelters, people were told to go indoors and hide under a table or in the cellar. For some, however, the threat from the air was so new and fascinating that their curiosity got the better of them, and they went out into the streets to watch."

Between January 1915 and January 1916, the Zeppelins struck Britain 21 times.

The Danger of Fire

At first, British airplanes had no good weapons to fight the Zeppelins. Ordinary bullets penetrated the gas cells, but depending on the location of the hole and the ambient air pressure, the puncture might not have much effect. The first Zeppelin destroyed in an aerial engagement was brought down by bombs, not bullets.

On June 6, 1915, Zeppelin LZ-37 was returning to its base in occupied Belgium when intercepted near Ostende by Lt. R.A.J. Warnerford, flying a Morane-Saulnier monoplane. He first tried shooting at it with his carbine, then took up pursuit, gradually climbing until he was above the airship. He dropped six bombs on its top and watched it erupt in flames. Warnerford was awarded the Victoria Cross for this action.

The real danger to the Zeppelins was fire. Inside the airship were 18 gas bags filled with more than a million cubic feet of highly combustible hydrogen. If the hydrogen ignited, the entire airship would be engulfed in moments. The most likely sources of fire were aboard the airship itself. Crews were forbidden to carry matches and wore special shoes to avoid sparks. The sailmaker braced himself between gas cells like a mountain climber, his glue pot kept nearby to seal any leaks.

A shaft between gas cells rose 50 feet up to the gunner's platform on the top of the airship. The gunner, minimally screened from the frigid airstream, could not shoot without orders. A burst from the machine gun would be disastrous if the airship was discharging hydrogen.

The only alternative to the hydrogen as a lifting medium was helium, which was not flammable. However, helium was newly discovered and the total supply was not enough to fill a single airship. Nearly all of the helium reserves were on the Great Plains of the United States, which was not inclined to sell strategic goods to the Germans.

The British sought a means of attacking the Zeppelins in the air. A large projectile, the Rankin Dart, dropped from above to

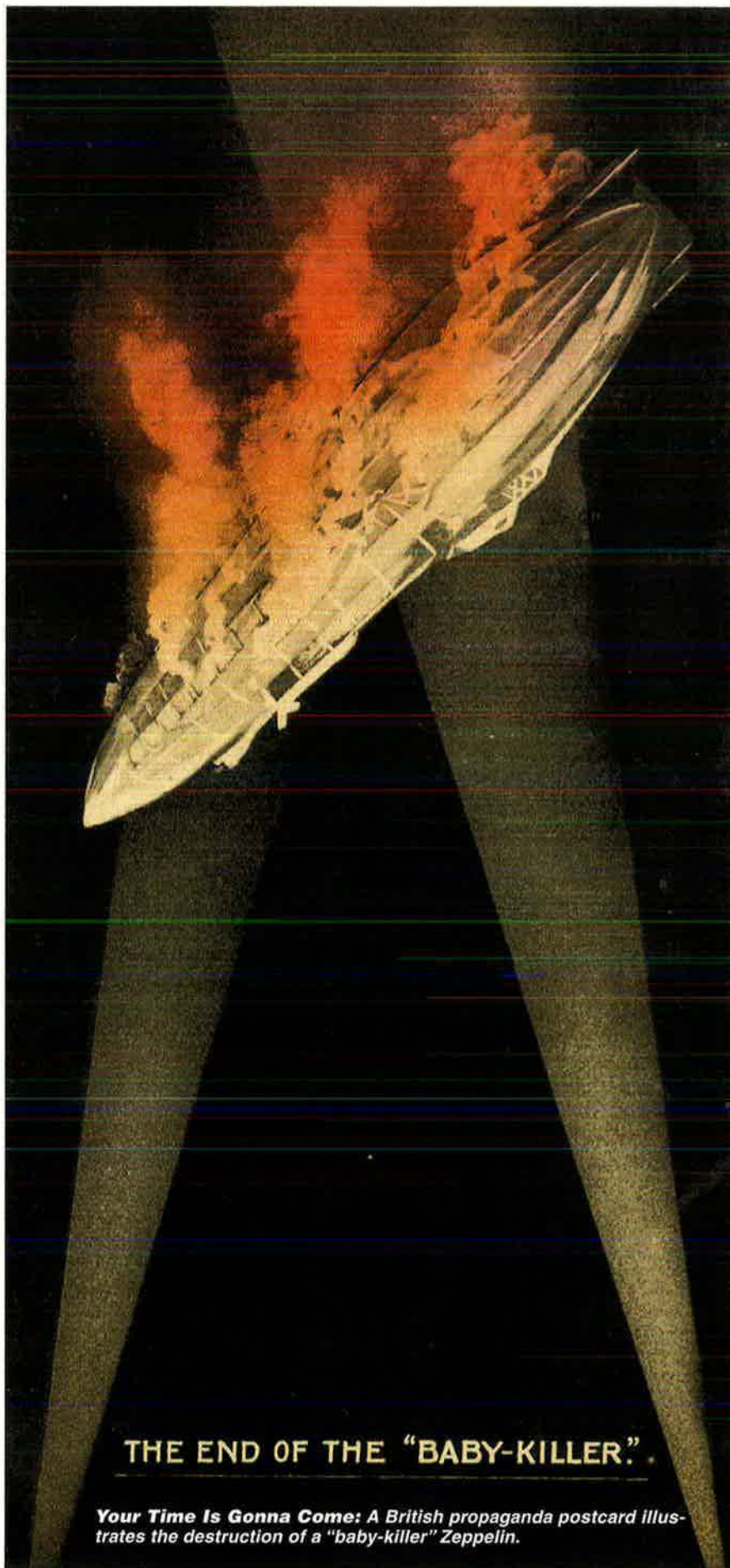
By John T. Correll

laminated plywood rather than aluminum for the framework, but in common usage, all of them were Zeppelins.

When the war began, the popular expectation was expressed in a German children's song:

*Zeppelin, fly,
Help us in the war,
Fly to England,
England shall be destroyed by fire,
Zeppelin fly!*

Powered flight was still new in 1914, and the course of military aviation was not yet determined. The airplane seemed



Your Time Is Gonna Come: A British propaganda postcard illustrates the destruction of a "baby-killer" Zeppelin.

pierce the gas bag before igniting, did not work well. Among other things, it was difficult to fly high enough to employ it effectively. More successful were variants of .303-caliber explosive and incendiary bullets, named for their inventors: Pomeroy, Brock, and Buckingham. The lethal combination, which would not be available until late 1916, was to intersperse explosive and incendiary bullets in the ammunition drum to tear open the fabric and set the hydrogen afire.

The mainstay of the British air defenses was the plucky Bleriot BE2c. Slow and steady, it was no match for the nimble German fighters on the Western Front but it was excellent against the Zeppelins. The interceptor version of the BE2c was a single seater, with a Lewis gun mounted to fire upward through a notch in the biplane's top wing.

Even with explosive bullets, the Zeppelins were not that easy to shoot down. It usually took repeated passes and more than one drum of ammunition, but once the fire caught, the results were spectacular.

Targeting London

The Zeppelin raids followed a standard mission profile. The airships took off in late morning, reached the British coast at dusk, conducted their attacks during the night, and were well on their way home before dawn. They seldom raided during the long days of summer.

The German airships also bombed Paris, but London was an easier target although it was twice the distance. The Zeppelins had to fly over land to Paris, which attracted the attention of the defenses. The route to London was mostly over water. The Zeppelins attacked Belgium, France, Poland, Rumania, and Russia, but England got the worst of it and London was the favorite target.

The most successful attack on London of the entire war was Sept. 8, 1915, conducted by a single Zeppelin, L-13, commanded by Lt. Cmdr. Heinrich Mathy, regarded as the best captain in the Naval Airship Division. Two other Zeppelins flying with him turned back short of the target but Mathy reached central London, where his raid killed 22, injured 87, and accounted for a sixth of the total air raid damage to Britain during the war.

New R-type airships, known in Britain as "Super Zeppelins," reached the front in May 1916. They had six engines, were 650 feet long, and had an operational ceiling of 11,000 to 13,000 feet, higher than most British fighters could go. They carried 10 machine guns and five tons of bombs.



Dazed and Confused: A policeman and two young women stand beside the wreckage of London homes destroyed by bombs dropped from a Zeppelin in 1915.

The airships seldom used their full range but in April 1916 Zeppelin L-14 bombed Edinburgh and the nearby port of Leith in Scotland, destroying a whiskey warehouse and some other buildings. Scotland was bombed again in May.

The free run of the Zeppelins was almost over. During the summer of 1916, the British added more airplanes to the defense and completed testing of the explosive bullets. Airship commander Mathy had one more night of glory, Aug. 25, when his L-31 Super Zeppelin bombed London and inflicted considerable damage.

The turning point was Sept. 2-3, when the Zeppelins mounted their largest raid of the war, 12 airships from the Navy and four from the Army. The task force was scattered by storms over the North Sea, but SL-11, a new Army airship on its first mission, pressed on to London.

Lt. William Leefer Robinson, flying a BE2c, intercepted SL-11 over the northern suburbs. Failing to bring down the airship on his first two passes, Robinson took a position 500 feet below and just behind and concentrated an entire drum of ammunition, alternating Pomeroy and Brock bullets, on a selected spot on the hull.

The conflagration lit up the night sky and cheering crowds in London watched SL-11 fall 30 miles away, in the village of Cuffley. It was the first German airship brought down over Britain. Robinson was an instant hero, awarded the Victoria Cross by King George.

The entire 16-member crew of SL-11 died, compared to four people killed on the raid, and the total damage done was less than a fourth of what Germany had paid for the airship. More important, confidence of the high command was shaken. The German Army Airship Service did not attack England again and was disbanded the following year, its assets transferred to the Navy and Strasser.

Further misfortune followed. Three Navy Super Zeppelins were shot down Sept. 23. The much-admired Mathy was again bombing London in L-31 on Oct. 1 when a BE2c flown by Lt. Wulstan Tempest caught up with him and set the airship ablaze. Rather than be burned alive, Mathy and several of the crew jumped to their deaths. More losses followed in November and December and

only the personal persuasive power of the indefatigable Strasser kept the Zeppelin operation going.

The Bomber Blitz

In February 1917, the Germans fielded the S Class of Zeppelins, called "Height Climbers" by the British because their operational ceiling was 16,500 feet and they could go as high as 21,000 feet, beyond reach of defending guns and airplanes.

The altitude was gained at a price. Oxygen deficiency hampered both crews and engines. Sustained flight above 16,000 feet caused severe pains, vomiting, and exhaustion. Airframes and oil lines became brittle in the cold, and compasses went awry. High winds and cloud cover made navigation difficult.

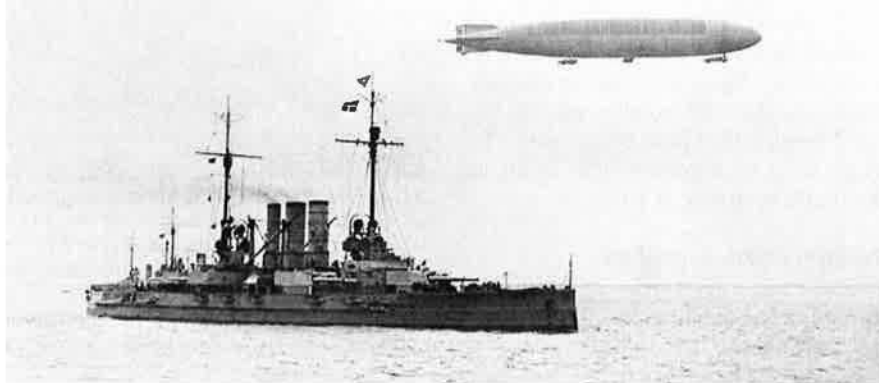
The high command had lost faith in the Zeppelins, though, and transition to bomber aircraft had already begun. The first of the new Gotha IVs arrived at their bases in Belgium in March, and the "England Squadron" assumed the leading role in the air war against Britain.

Fourteen Gothas struck central London in a daylight raid June 13 with devastating effect, killing 162 and injuring 426. Among the dead were 46 children whose kindergarten was bombed. A month later, the royal family changed its name from Saxe-Coburg-Gotha to Windsor.

In September, the Germans introduced the R-type bomber, a huge four-engine aircraft almost twice the size of the Gotha and carrying a variety of bombs, some of them larger than 2,000 pounds. The British met them with high-performance Sopwith Camel and Bristol fighters and forced the Germans to resort to night attacks.

Meanwhile, Strasser kept pressing. A strike against London in October 1917 was known as "the Silent Raid" because the Zeppelins flew so high they were unseen and unheard. Five of the airships that began that mission did not return

Bring It On Home: The German Zeppelin L-31 flies over Ostfriesland during the war. This Zeppelin, piloted by Lt. Cmdr. Heinrich Mathy, would be shot down near London in 1916.



home. The French defenses brought down two, one was lost at sea, and two crash-landed. The airships made only three raids in Britain in 1918, none of them against London.

Zeppelins "ultimately failed in the strategic assault as aircraft and anti-aircraft defenses drove them so high that they became vulnerable to gale force winds that would blow returning dirigibles all over the European continent and occasionally further," said historian John H. Morrow. "The airplane became the primary aerial vehicle of the war."

Strasser was promoted to admiral second class, but he did not survive the war. On Aug. 5, 1918, five airships set out to bomb England, led personally by Strasser aboard L-70, a modified Height Climber 693 feet long and powered by seven engines. It was the fastest airship yet, with a top speed of 81 mph. Three British DeHavillands spotted the big Zeppelin over the North Sea and attacked head on with explosive bullets. L-70 erupted in flames and the wreckage went down in the water.

The remaining Zeppelins were confiscated by the victorious Allies at the Armistice in November 1918, although the crews managed to destroy some of them rather than give them up. Of the 115 Zeppelins built and employed by the German forces, 53 were destroyed and another 24 were damaged beyond operational use. There were 51 Zeppelin raids on Britain, killing 557 and injuring 1,358. Twenty-six of the raids targeted London. The cost of the Zeppelins was about five times that of the damage they inflicted.

Neither the Zeppelins nor the bombers succeeded in crushing British morale, but they tied down resources that might otherwise have been used at the fighting front. Their most important effect was to convince Britain of the significance of airpower. The British Air Ministry was formed in January 1918, and in April, the Royal Air Force became the world's first independent air arm.

The British were imprinted with the seeming invincibility of the bomber. In 1932, British Prime Minister Stanley Baldwin predicted that, in the next war, there would be no defense against air attack and that "the bomber will always get through." That proposition would be tested when the Germans came again, in the Battle of Britain in 1940.

Twilight of the Zeppelins

There was a resurgence of interest in dirigibles for exploration and carrying passengers in the 1920s, and the Zeppelin company at Friedrichshafen, which had



Nobody's Fault But Mine: German Cmdr. Peter Strasser was an indefatigable proponent of the huge airships.

reverted to civilian enterprises, was in the thick of it.

The majestic Graf Zeppelin entered international passenger service in 1928. Larger than any dirigible built before, it was 10 stories high and more than two city blocks long. The passenger gondola was outfitted with carpeting and draperies and the dining room could seat 16 for dinner. A midnight supper of lamb

chops and caviar was served. The Graf made 590 flights before its retirement in 1937.

The Zeppelin Company was virtually taken over by the Nazi regime in Germany by the time the greatest Zeppelin of them all, the Hindenburg, entered service in March 1936. The Hindenburg was 803 feet long and carried 50 passengers.

Like the Graf and the wartime Zeppelins, it used hydrogen rather than helium. Helium would have removed the risk of fire, but it was heavier, had less lifting capacity, and was far more expensive. Even if the United States had not refused to sell helium to the Germans, the cost would probably have been prohibitive. The Hindenburg required seven million cubic feet of gas.

The Hindenburg came to a dramatic ending. As it was landing at Lakehurst, N.J., May 6, 1937, a spark of unknown origin ignited one of the hydrogen cells and within seconds, the entire airship—including the swastikas on its vertical fins—was in flames. Some of the passengers managed to escape when it crashed to the ground, but before the gathered crowd and the newsreel cameras, the Hindenburg burned to a charred framework of girders.

There were a few more airship initiatives after that, but for all practical purposes, the age of the Zeppelins was over. ■



Gallows Pole: The Hindenburg goes up in flames at Lakehurst, N.J., in May 1937. A spark of unknown origin set the airship alight within seconds, as onlookers watched in horror. Though World War I was long over, the tragedy illustrated the risks inherent in hydrogen-filled airships.

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

Thank you!

The Air Force Association would like to acknowledge and thank the companies listed below for their support in 2011. These companies enable AFA to continue its mission to educate the public about aerospace power, support USAF's Total Force family, and promote aerospace education.

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Dozens of B-29 wing structures fill the vast Boeing plant in Wichita, Kan.

Boeing and the Air Force struggled to build B-29s and train their crews in time for the planned offensive against Japan.

THE B-29'S BATTLE OF KANSAS

By Walter J. Boyne

FEW American battles during World War II had as many top level people “helping” as did the Battle of Kansas in the winter of 1944. There, on wind- and snow-whipped plains, civil and US Army Air Forces teams struggled in deplorable weather to build and modify

Boeing B-29s, while crews trained to take the airplane into combat.

Their eventual success is a tribute to motivation, skill, and hard work under appalling conditions.

This battle was of visceral interest to world leaders in the US, UK, and China—not to mention Japan.

President Roosevelt was concerned that China, hard-pressed by the Japanese since 1937, might drop out of

the war. At the Cairo Conference in November 1943, he pledged his word to Generalissimo Chiang Kai-shek that B-29s based in China would bomb Japan by the spring of 1944.

In England, Prime Minister Winston Churchill worried that the enormous diversion of resources to the B-29 would affect the war in Europe. His fears were real, for at \$3 billion, the B-29 was the war's most expensive



B-29 wings are mounted in the factory. The Superfortress was a complex, sophisticated aircraft that required a huge, well-trained workforce.

program. It was also the most vital, for only the Superfortress could deliver the atom bombs created by the war's second most costly program, the \$2 billion Manhattan Project.

Weight Vs. Cost

The B-29 was needed to keep China in the war until Japan was brought to its knees.

Unfortunately, the hoped-for B-29 flood was dammed up by myriad technical problems and the Herculean effort needed to build plants and modification centers while simultaneously training the crews.

The most challenging element—developing correct doctrine and tactics—came hard, much later, at a great cost in airplanes, lives, and careers.

The B-29 was an immensely complex aircraft, the most sophisticated, advanced bomber of World War II. Each of its major features might have taken five years to test under ordinary circumstances. Without question, the most demanding of all was development of its Wright R-3350 engine. Everything had to be rushed into being concurrently to fulfill Roosevelt's promise.

The Boeing Airplane Co. had kept up with new technology and routinely met its customer needs before and during World War II. Unfortunately, the Curtiss-Wright Corp., which began operations as Wright Aeronautical in 1919, bumbled toward senility during

the same period. Buffeted by the Great Depression, Curtiss-Wright's management avoided risk and placed a greater focus on the bottom line than it did on customer requirements.

The significant differences in the way each company conducted its business accounts for both the great successes and the many failures of the B-29.

When challenged by the Army Air Corps on Feb. 5, 1940, to build a "Hemisphere Defense Weapon" Boe-

ing pulled out all the stops to respond with its Model 345. This ultimately became the B-29, incorporating a very streamlined fuselage, a revolutionary high aspect ratio wing with huge Fowler flaps, and a tricycle landing gear. Other refinements included cabin pressurization, a sophisticated central fire-control system, and a flight engineer's station to ease the pilots' load.

More concerned with weight than cost, Boeing created the ultimate World War II bomber. The Air Corps ordered more than 1,500 of them before the first one flew.

Only one engine was considered suitable for this new aircraft: the 2,200 hp Wright R-3350.

The Wright was a big 18-cylinder, twin-row radial that ran for the first time in 1937. Despite the power plant's promise, Curtiss-Wright put the design on the back burner, electing to spend resources on mass production of its bread-and-butter engines, the R-1820 and R-2600.

The R-3350 was thus denied the extensive test and development programs necessary to discover and cure its many problems. These included inadequate cooling, insufficient lubrication to upper cylinders, failure-prone reduction-gear design, poor carburetion, and an inefficient mixture distribution. All of these conditions resulted in excessive heat and sometimes fire, which fed upon the engine's extensive use of magnesium.

The R-3350 got its real "test and development" in combat, where engine



Electrical mechanics-in-training work on the miles of wiring in a B-29's wing spar. Because of new and revolutionary materials and features incorporated, the workers faced a steep learning curve.



A fully assembled B-29. By mid-April 1944, 150 Superfortresses were finally combat ready.

problems brought down more B-29s than the Japanese.

FDR's pledge to Chiang Kai-shek presented Gen. Henry H. "Hap" Arnold, USAAF commander, with a seemingly unsolvable problem.

By the time of the Cairo Conference, fewer than 100 B-29s had been produced, and of these only about 15 percent were flyable. They were grounded by everything from engine fires to equipment failures to change orders. Fewer than 70 pilots were checked out in the aircraft, and there were few trained aircrews.

Arnold believed Operation Matterhorn—the strategic bombing of Japan from India and China—would require at least 175 B-29s, with trained crews, appropriate maintenance and logistics, airfields located within range of Japan, and full support from theater commanders.

Boeing had a strong presence in Wichita, Kan., having acquired the Stearman Aircraft Corp. in 1934. There it produced almost 10,000 of its famous biplane trainers by 1945. Many were built in what was retrospectively known as Plant I after Plant II was built to produce B-29s. Although it took 18 months to complete after its June 1941 ground breaking, Plant II was in partial operation by June 1942.

Building a new plant was formidable, but staffing it with sufficient adequately trained workers was far more difficult.

Many of the employees from the local population had never before actually touched an airplane, much less one as demanding as the B-29. A mammoth recruiting, training, and

job placement task eventually created a skilled workforce able to reduce the man-hours required to manufacture a B-29 from more than 150,000 to 20,000.

Less obvious, but equally challenging, were the problems faced by the thousands of subcontractors that also had to expand and train their workforces across the country.

Arnold's Rage

Companies that used to supply simple reels of wire and conventional plug-in connections now had to manufacture the complex wiring bundles required by the B-29. Cannon plug connections, sophisticated enough themselves, needed upgrading to withstand the challenges of mating a pressurized compartment to a nonpressurized area. Similar problems were found in most of the other components.

Configuration control was not the science it is today. The revolutionary new airplane required thousands of changes over time, from new sets of wires to new types of Plexiglas. In the rush to complete the aircraft, changes were made on the spot on the production lines as the deficiencies were discovered.

But applying the corrections on future aircraft made at other plants was difficult. B-29s were produced by Boeing at Renton, Wash., and in Wichita; by Bell in Marietta, Ga.; and by Martin in Omaha, Neb.

Col. Leonard Harman proposed forming a B-29 Special Project Office to coordinate everything from production through flight training. His idea was approved and his boss, Brig. Gen.

Kenneth B. Wolfe, took charge of the program. It became standard practice to fly newly manufactured B-29s directly to a modification center where the aircraft could be brought up to full combat readiness.

These modification centers were vastly overtaxed, with such limited hangar space that repairs took place in the open, without regard to the weather.

In early 1944, Arnold was already suffering from the heart problems that ultimately took his life. Despite this, he was determined to see FDR's promise of bombers in China fulfilled and visited Wichita on Jan. 11, 1944.

Arnold walked down the assembly line and selected the 175th fuselage to bear his name, stating he wanted it delivered before March 1, 1944.

All of the personnel involved in producing the B-29 worked hard to achieve Arnold's demand. Unfortunately their efforts were hampered by the innate complexity of the aircraft, continuing engine problems, and the slow delivery of key parts. The workers were facing a very steep learning curve. None of this mattered to Arnold when during a March 9, 1944, return to Kansas he found no B-29s available for combat operations.

Furious, Arnold plunged into the problem, assigning Brig. Gen. Bennett E. Meyers as special project coordinator. The B-29 was to have priority over all USAAF programs. Meyers selected Col. Clarence S. Irvine as his deputy.

With Arnold's rage as their clout, Meyers and Irvine imposed order on the chaotic program. Boeing sent 600 workers, and USAAF units were tapped for their top maintenance personnel. Anyone subcontracting parts for USAAF received directions to apply all their efforts to the B-29 program.

Most of the workforce had been battling the long Kansas winter for months, working outside with temperatures hovering between two below zero to 20 degrees Fahrenheit. Even as spring approached in March, the weather continued to hamper the work effort with large snowfalls. Often the cold was so severe workers could work no longer than 20 minutes at a stretch before going to warm up at one of the small gasoline heaters studding the flight line.

Arnold's key deputies applied pressure on everyone to produce more and quickly. As they did, they began to regularize vast numbers of changes. These ranged from physically strengthening

the internal structures of the aircraft with steel plates and new skin panels to resoldering thousands of electrical connections and replacing entire rudders.

One perplexing problem was the variation in empty weight from one B-29 to another. Eventually it was found that allowable commercial tolerances in equipment and raw materials created a "lap error" sometimes as large as several hundred pounds.

On the flight line, the R-3350-23 engines continued to overheat on takeoff. It was found that reducing the size of the cowl flaps slightly allowed more airflow without increasing drag. All of the aircraft were destined to receive a later model R-3350-3A engine which had some—but not all—of the cooling problems solved.

Flying techniques were also improved. One important new method was to delay the climb after takeoff. Maintaining level flight just after liftoff allowed a few more knots of airspeed, reducing the incidences of overheating and engine fires.

The shortage of B-29s reduced the scope of Arnold's original plans for Operation Matterhorn. Ultimately, the US decided to build five bases in India to support the effort, plus four advanced bases in China to put the southern part of Japan in range.

Among Japan's blazing victories in the spring of 1942 was the conquest of Burma and severance of the famous Burma Road, the only land route from India to China.

As a result, the bases in China had to be supplied by air. With insufficient conventional transports available, the B-29s themselves were used to carry fuel from India over the "Hump" of the Himalayas to forward bases. It was a dangerous task for the Superfortress, still untried and in short supply.

In a management master stroke, Arnold reserved command of the newly created Twentieth Air Force for himself. It became a small-scale prototype of the future United States Air Force. Brig. Gen. Haywood S. Hansell Jr. became his chief of staff and, effectively, the commander. Under him, Wolfe had charge of XX Bomber Command.

The new command was established with two combat wings, each of four groups. The implacable transport problems soon reduced this to a single wing of four groups. It was the start of the slow transformation of FDR's pledge from a war-winning China-based strategy to a show of force.

Arnold had selected the right leaders to carry out his forced-draft plan and by April 15, 1944, 150 aircraft were combat ready.

Low-level Firebombing

Roosevelt realized his exact promise had not been fulfilled, but it was close enough. By May 8, 130 B-29s had made the 11,500-mile journey from the United States to India and China, arriving in immediate need of maintenance and repair.

The B-29s, ready or not, were about to go to war.

Unfortunately, the logistics and maintenance concepts of Operation Matterhorn had fatal flaws. There were not enough transports available to carry the fuel and bomb loads, so the valuable new B-29s took their place. Writing after the war, Gen. Curtis E. LeMay noted it was necessary to make seven trips in a B-29 to stockpile fuel for a combat mission from its forward base. On the eighth mission, the B-29 flew over the Hump carrying bombs.

Brig. Gen. LaVerne G. Saunders led the first raid from China on June 5, 1944, with 98 B-29s attacking Bangkok, Thailand. The mission was a fiasco, with less than two dozen bombs hitting the target railroad yard. Fourteen Superforts aborted en route, 42 diverted to alternate airfields, and five crashed on landing.

Things would improve, but only moderately.

Ten days later, 68 B-29s took off for the first attack on the Japanese homeland since the Doolittle raid. Only a few aircraft found their target, the steel mills of Yawata, located in southern Kyushu. Losses included a crash on takeoff, one shot down by flak, and six others in accidents.

Reconnaissance photos showed only one bomb landed near—but not on—the target.

Arnold replaced Wolfe with Saunders temporarily, assigning LeMay to take command Aug. 30. LeMay introduced new training standards, but was unable to do achieve significantly better results. However, he did experiment with the firebombing techniques he would use later against Japan.

LeMay soon realized that the difficulties Wolfe had encountered made

operations from China too difficult to sustain. The combination of inexperience, continued problems with the R-3350 engines, and adherence to the concept of precision bombing rendered the magnificent efforts of the previous two years moot. Japan was still at the limits of the B-29's range, and its targets were of a far different nature than those in Germany. The weather, particularly the jet streams, made operations over the enemy homeland from the attackers' range unprofitable.

Even the Japanese concluded the B-29s were a net loss to the Americans, costing great sums of money without being able to deliver significant damage.

Despite the enormous effort, the Japanese assessment was correct. China-based B-29s dropped about 11,000 tons of bombs on Japan but without the necessary accuracy.

Other battles, far more costly in time, materiel, and casualties than the Battle of Kansas, changed things. The capture of the Marianas put Japan within reasonable range for the B-29s, and limitless supplies could be provided by ship. There XXI Bomber Command under Hansell began operations against Japan with far more optimism. Hansell persisted in the doctrine of high-altitude precision bombing despite inadequate results.

In January 1945, Arnold relieved Hansell, appointing LeMay in his place.

High-altitude precision bombing techniques continued for a short while, until LeMay introduced a series of low-level firebomb attacks lethal to Japan.

It was quite a turnaround. Initial operations from China indicated that the B-29 was a potential failure, but under LeMay's leadership, the B-29 came to symbolize airpower. It offered, at an ever-decreasing cost in aircraft and personnel, the option of victory over Japan.

Ultimately, two nuclear weapons provided that victory, one that might have been long delayed without Hap Arnold's furious management of the B-29 development program.

Sadly, as the result of a final "Battle of Kansas" the magnificent contributions of Boeing's Wichita plant will end in 2013, an unexpected victim of defense budget cuts. ■

Walter J. Boyne, former director of the National Air and Space Museum in Washington, D.C., is a retired Air Force colonel. He has written more than 600 articles about aviation topics and 40 books, the most recent of which is How the Helicopter Changed Modern Warfare. His most recent article for Air Force Magazine, "Milton's Climb," appeared in October 2011.

By Frances McKenney, Assistant Managing Editor

Honors In Los Angeles

The 40th annual Air Force Ball in Los Angeles—sponsored by the **Gen. B. A. Schriever Los Angeles Chapter**—honored Lt. Gen. Larry D. James for his leadership as head of 14th Air Force.

He received the General Thomas D. White Space Award, named for USAF's fourth Chief of Staff (1957 to 1961) and presented for outstanding contributions to the nation's progress in space.

Now USAF's deputy chief of staff for intelligence, surveillance, and reconnaissance, James had commanded 14th Air Force (Air Forces Strategic), USAF's operational space component to US Strategic Command, from December 2008 until January 2011.

Master of ceremonies Pat Coulter told the Air Force Ball audience that James had shown "steadfast leadership, operational prowess, and strategic vision" through challenges that included 25 space launches with a 100 percent mission success rate.

Also on Stage in Los Angeles

The Air Force deputy undersecretary for space programs, Richard W. McKinney, received a Schriever Fellowship at the ball.

McKinney is the Air Force's "focal point for space matters," Coulter explained in his remarks. McKinney develops policy and integrates Air Force space activities with those of the NRO, NASA, and other agencies and nations.

In another ball highlight, San Francisco Giants relief pitcher Brian Wilson—his tuxedo contrasting with a huge Mohawk and trademark bushy black beard—presented \$15,000 each to the first recipients of a scholarship named for his late father, an Air Force veteran.

The Michael Wilson Scholarships went to AFROTC cadets Kaleb Simpson from the University of Delaware and Alexander Shuler from the University of Washington. AFA and Brian Wilson established the award just after the Giants won baseball's 2010 World Series.

The Schriever Chapter uses funds raised by this Air Force Ball to support local AFROTC units and USAF personnel and to enroll classrooms in the Visions of Exploration Program.

The Visions program has partnered AFA chapters with *USA Today* news-



At the Air Force Ball in Los Angeles, AFA Board Chairman Sandy Schlitt (far left) presents the Gen. Thomas D. White Space Award to Lt. Gen. Larry James. Joining them are Lt. Gen. Ellen Pawlikowski, Space and Missile Systems Center commander and the ball's military host, and Stephen Quilici, Schriever Chapter president.

More photos at <http://www.airforce-magazine.com>, in "AFA National Report"

paper for more than two decades. It encourages students to take an interest in science, technology, engineering, and math (STEM) topics by providing classrooms with print or digital versions of the publication. Teachers receive lesson plans and suggestions for activities tied to news events.

The Schriever Chapter sponsors 84 Visions of Exploration classrooms.

Pearl Harbor: 70th Anniversary

The Long Island Chapter hosted New York's annual "Dropping of the Roses" ceremony on Dec. 7, marking the 70th anniversary of the attack on Pearl Harbor.

At the ceremony at the American Airpower Museum in Farmingdale, N.Y., Chapter Treasurer William G. Stratemeier Jr. formally introduced five Pearl Harbor survivors: Richard Abeles, 90 years old, who was a radio operator on USS *Dale*; Gerard Barbosa, 88, a gunner's mate on USS *Raleigh*; Bernard Berner, 91, a former Army technical sergeant at Schofield Barracks; Seymour Blutt, 93, who served at Hickam Field; and 92-year-old Michael Montelione, another Schofield Barracks soldier.

Guest speaker Libby H. O'Connell, chief historian for the History Channel, delivered a presentation on Long Island activities during World War II.

According to newspaper coverage of the ceremony, O'Connell said German U-boats off Long Island fired on vessels traveling to New York Harbor. The wreckage and bodies washed up on the south shore. Soon construction began on lookout towers. In Freeport, a bank building was designated as an air raid observation post. Mitchel Field became a key military center, and roadways became commuter routes for defense industry workers.

At the ceremony's end, a vintage airplane took off for the Statue of Liberty with 70 American Beauty roses—plus a white one to remember 9/11—aboard.

The pilots dropped the roses in the waters around the monument at 12:55 p.m., the exact moment on the East Coast when the Pearl Harbor attack began.

An article on the LongIsland.com website described the history and extensive preparation for this ceremony, organized by Chapter President Fred Di Fabio.

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CyberPatriots Fund-raise for Airmen

In a kind of man-bites-dog role reversal, a group of kids in Maryland—with help from the **Thomas W. Anthony Chapter**—raised funds to benefit adults.

AFJROTC cadets from the CyberPatriot team for Gwynn Park High School in Brandywine, Md., bagged groceries at the Joint Base Andrews commissary to fund-raise for both their team and the base's Combined Federal Campaign.

Anthony Chapter members James Warren and Col. David W. Koontz, the CyberPatriot team's mentor and advisor, respectively, and John Thomas pitched in. Koontz, commander of the 11th Security Forces Group at Andrews, and Thomas collected donations, handled the cash box, and handed out AFA brochures.

The kids raised \$943.

Cadet Matthew Simmons, a CyberPatriot team member and chairman of the Anthony Chapter's Cadets Council, presented \$471 to Col. Kenneth R. Rizer at a Maryland State AFA meeting in November. As 11th Wing commander, Rizer accepted it for the Joint Base Andrews Community Fund.

Captive in the Korean War

A Korean War POW received special recognition at the Virginia State AFA meeting and banquet, hosted in Colo-

nial Heights, Va., by the **Leigh Wade Chapter** in November. Local area resident James M. Franklin Sr. represented all veterans at this Nov. 12 gathering.

As an Army private first class, Franklin had been captured in April 1951. He was released at Panmunjon on April 24, 1953, in a group of 40 ill and injured POWs, according to a newspaper account from that time. His repatriation took place as part of Operation Little Switch, between April 20 and May 3, 1953, when United Nations Command returned more than 6,000 Chinese and North Korean prisoners. The communists in turn repatriated 684 UN troops. (The main Operation Big Switch prisoner exchange happened after the armistice.)

At the AFA banquet, Virginia Delegate Kirk Cox presented Franklin with an AFA Certificate of Appreciation and a letter from US Sen. Mark Warner (D-Va.).

Ken Allen, a senior China analyst with a public safety and national security company, served as guest speaker for the AFA state meeting's banquet. The retired Air Force intelligence officer had been a Chinese and Russian linguist during his 21-year military career.

Remembering an Ace

In a tradition going back to the mid-1970s, AFJROTC cadets from Westland

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High School in Galloway, Ohio, joined **Capt. Eddie Rickenbacker Memorial Chapter** representatives in observing the birthday of the chapter's namesake.

Some 50 students, as well as Chapter President Richard H. Coots Jr., Treasurer Christopher M. Gibson, and Richard Hoerle, attended a service last fall at Rickenbacker's gravesite in Columbus, hometown of the World War I ace.

Rickenbacker earned 26 aerial victories and the Medal of Honor in that war. He died in 1973, and a few years later, a chapter member, the late Westland High AFJROTC instructor Melvin H. Gerhold, organized what became an annual memorial service. It was a way to teach cadets some Air Force history.

This year, Gerhold's old AFJROTC unit—whose aerospace science instructor today, SMSgt. Clement L. Francis Jr., is a chapter member—turned the event into a school field trip to involve more students.

After the memorial service, including a color guard and a reading about Rickenbacker's life, the students toured the nearby Motts Military Museum and had lunch, provided by the chapter.

Let's Make it Official

The **Chuck Yeager Chapter** in West Virginia signed up its first new Community Partner in more than a decade.

Herman N. Nicely II said he'd been buying Hondas from the local dealer, Lester Raines, for 36 years. Raines had also regularly donated funds to support drill competitions and the chapter's Mountaineer Cadet Officer Leadership School for AFJROTC cadets.

Nicely described Raines as an "unofficial Community Partner."

Recently, Nicely decided to take a direct approach with the local businessman. "How about becoming a Community Partner?" he asked. "OK," Raines replied.

Chapter VP John M. Lucarelli has been the chapter's sole CP until now.

More Chapter News

■ Adelbert W. Carpenter of the **Donald W. Steele Sr. Memorial Chapter (Va.)** recently taught a class of middle-schoolers about his days as an SR-71 pilot. His presentation at Sacred Heart Academy in Winchester, Va., came about as part of the **Northern Shenandoah Valley Chapter's** efforts to enrich STEM education in their area. "Buz" Carpenter is no stranger to Sacred Heart students; he has been their docent during field trips to the Smithsonian's Udvar-Hazy Center in Dulles, Va. After Carpenter's most recent lecture to the Sacred Heart youngsters, Thomas G. Shepherd, who had arranged for the teaching stint, presented a \$1,000 do-

nation to the school, from the chapter, in Carpenter's honor.

■ In late November the **Donald W. Steele Sr. Memorial Chapter** of Virginia held its 16th annual Salute to AQ, recognition for USAF's acquisition community. Lt. Gen. Janet C. Wolfenbarger, military deputy in the Office of the Assistant Secretary of the Air Force for Acquisition, spoke to the evening gathering and helped Chapter President F. Gavin MacAloon present AQ Hero Awards to: Samuel Brown, Steve Burke, Courtney Fonner, Sharon Foust, Allan Haenisch, Julie Hogan, Deborah Ann Johnson, Col. Nedim Kirimca, Julia Preisinger, Alonzo Rease, Jeanette Snyder, Samuel Torrey, Maj. Dan Walter, and Kevin Zawicki.

■ In Charlottesville, Va., in December, AFA members hosted their 13th annual holiday season dinner. Among the more than 50 guests was Thomas Shepherd, from the **Northern Shenandoah Valley Chapter (Va.)**. As State VP North, he presented an AFA Medal of Merit to James Kevin Lavin.

Charles X. Suraci Jr., 1934-2011

Charles X. Suraci Jr., president of the Thomas W. Anthony Chapter (Md.) beginning in 1995, died Nov. 23 at age 77. He had resided in Kensington, Md. Mr. Suraci was born in Washington, D.C., in 1934 and served in the Air Force from 1953 to 1957. He then joined the Civil Air Patrol, where he was a colonel. ■



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Reunions

13th Bomb Sq Assn. May 16-20 in New Orleans. **Contact:** G. E. Dorwart, 1849 Ramsgate Ct., Fort Collins, CO 80524 (970-416-1691) (gedorwart@comcast.net).

63rd Troop Carrier Wg. May 2-5 in Dayton, OH. **Contact:** Shirley Holmquist, 2021 Shelter Pt., Anderson, SC 29626 (864-226-6869) (keshi@charter.net).

601st-615th Aircraft Control & Warning Sq, Germany. April 23-27 in Nashville, TN. **Contact:** Francis Gosselin (352-588-9295) (fgosselin@tampabay.rr.com).

3389th Pilot Tng Sq. April 19-21 in San Antonio, including IPs and foreign students. **Contact:** Charles Davies Jr., 4435 Monaco, San Antonio, TX 78218 (210-653-1475) (cpmfd@sbcglobal.net).

E-mail unit reunion notices four months ahead of the event to reunions@afa.org, or mail notices to "Unit Reunions," *Air Force Magazine*, 1501 Lee Highway, Arlington, VA 22209-1198. Please designate the unit holding the reunion, time, location, and a contact for more information. We reserve the right to condense notices.

KC-135 Stratotanker



The KC-135 Stratotanker was USAF's first jet-powered tanker. In the beginning it was used to refuel Strategic Air Command's bombers. The Air Force, however, made heavy use of it in the Vietnam War, Desert Storm, and all other modern wars. It was key to extending the range of not only bombers but also fighters and other aircraft. Ever since its operational debut in 1957, the vaunted tanker has continuously expanded its role.

The KC-135 was derived from Boeing's famed 367-80 prototype. SAC acquired the tanker to refuel its powerful fleet of B-47s and B-52s. It is an all-metal, low-wing aircraft with four jet engines suspended in pods. The KC-135 has benefited from constant improvements in engines and equipment over its more than 50 years of operations. Its speed and altitude capability made in-flight refueling vastly more productive.

Special probe and drogue refueling techniques were adopted to permit refueling of US Navy and Marine Corps aircraft.

During the Vietnam War, US fighter and bomber operations hinged upon the KC-135s. While officially confined to operating outside of North Vietnam, KC-135s often entered hostile airspace to save fighters short on fuel. More recently, it proved similarly valuable over Iraq and Afghanistan. The tanker has served in every US war for a half-century. Many variants of the aircraft were derived to carry out ISR and command and control missions. The basic tanker version was also vitally important as a transport aircraft and for humanitarian missions.

—Walter J. Boyne

This aircraft: KC-135E Stratotanker—#59-1456—as it looked in July 1997 when assigned to the 141st Air Refueling Squadron, New Jersey Air National Guard, McGuire AFB, N.J. It wears tiger markings for its appearance at the 1997 Royal International Air Tattoo held at RAF Fairford, Britain.



A KC-135R Stratotanker aircraft with a pair of F-15E Strike Eagle fighter aircraft (foreground) and two F-16Cs.

In Brief

Designed, built by Boeing ★ first flight Aug. 31, 1956 ★ number built 803 ★ crew of four (pilot, copilot, navigator, boom operator) ★ no armament. **Specific to KC-135E:** four Pratt & Whitney TF-33-PW-102 turbofan engines ★ max load 83,000 lb of cargo, 37 passengers ★ max speed 610 mph ★ cruise speed 550 mph ★ max range 11,200 mi ★ weight (loaded) 322,500 lb ★ span 130 ft 10 in ★ length 136 ft 3 in ★ height 38 ft 4 in.

Famous Fliers

Notables: Many, including Curtis LeMay, William Begert, Roger Brady, Jack Catton, John Chain, Russell Dougherty, Raymond Johns, Walter Kross, Arthur Lichte, Charles Robertson Jr. **Record setters:** Many, including Burl Davenport, William Eubank Jr., Charles Gibbs. **Test pilots:** Charles Gandy, Tex Johnston, Dix Loesch, Frank Wright.

Interesting Facts

Made possible the "Chrome Dome" strategy by refueling B-52s on combat orbit ★ flew first Vietnam combat missions in June 1964 ★ mounted first "Young Tiger" mission on Jan. 25, 1965 ★ rang up 813,878 refuelings in Vietnam War ★ survived war with no combat losses ★ flown by Capt. Sandra Scott, first female pilot in SAC ★ refueled first fighters sent to Saudi Arabia at start of Desert Shield in 1990 ★ used by air forces of Chile, France, Singapore, Turkey.



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