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AIR FORCE MAGAZINE

BOMBS AWAY

USAF is dropping bombs as fast as it gets them. PG.28

44-Hour Bomber Mission PG.33

Rescue off Hawaii PG.38

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January 2017, Vol. 100, No. 1

AIR FORCE MAGAZINE

FEATURES

About the cover: SSgt. Kevin Merkel (left) teaches 379th Air Expeditionary Wing Vice Commander Col. Samuel White how to assemble a bomb. See "Empty Racks," p. 28. USAF photo by Janelle Patiño.

AIR FORCE MAGAZINE

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By Adam J. Hebert, Editor in Chief

Pivoting in the Philippines

Washington, D.C., Nov., 17, 2016

The US delivered a C-130T Hercules transport aircraft to the Philippines in October, the second such C-130 transferred last year. US Ambassador Philip Goldberg said the deliveries symbolize the strong partnership between the two nations.

"Stalwart countries like the US … will always [support] our aspiration to build a vibrant, peaceful, and progressive Philippine nation," said Lt. Gen. Edgar R. Fallorina, Philippine Air Force commanding general, at the airplane's formal acceptance ceremony.

About a week later, Philippine President Rodrigo Duterte launched into a televised tirade because the US canceled a sale of 26,000 rifles.

"Look at these monkeys. The 26,000 firearms we wanted to buy, they don't want to sell," Duterte said Nov. 2. "Son of a bitch. We have many homemade guns here. These American fools."

These two events, nine days apart, seem incongruous but are actually typical of US-Philippine relations over the past six months.

Duterte took office in June 2016 as a controversial firebrand populist who relishes inflammatory comments. He has vulgarly insulted President Obama, flamboyantly asked China for military support, and foolishly called for an end to US-Philippine cooperation.

But Duterte speaks off the cuff. His comments frequently surprise his own government, and officials have repeatedly tried to clarify what the president really meant to say. Most of his directives toward the United States have not been implemented, and officials in both nations are clearly in the dark about what is policy and what is bluster.

Duterte says the US treats the Philippines like a colony. He is especially thin-skinned about a brutal anti-drug campaign that has left thousands of alleged drug dealers and users dead without trials. "Don't treat us like a doormat because you'll be sorry for it," Duterte said. "You don't go around reprimanding a head of state."

The two nations share a long history, dating to 1898 when the US acquired the Philippines from Spain. The archipelago became America's first colony. The Philippines were famously captured by Japan in World War II and reclaimed by the US later in the war. The nation obtained its freedom and independence in 1946, and the countries have maintained an up-and-down but close relationship ever since.

The two nations signed a mutual defense treaty in 1951, with each nation pledging to come to the other's assistance if under attack.

The US maintained large military bases in the Philippines, including the Subic Bay naval station and Clark Air Base, until the early 1990s when the Americans were kicked out during an earlier wave of Philippine nationalism.

The two nations signed a new, 10-year Enhanced Defense Cooperation Agreement in 2014, pledging exactly what its name implies—including US access to five Philippine bases. The countries conduct 28 bilateral military training exercises every year.

Philippine Air Force photo

The C-130 delivered to the Philippines in October.

USAF works well with the Philippine military. Will it be allowed to continue?

"I think it's just going through these bumps on the road," said Philippine Defense Secretary Delfin Lorenzana of the current tensions. "Relationships sometimes go to this stage, … but over time it will be patched up."

US officials are cautiously optimistic. "The tremendous popularity of the US-Philippine alliance, and the very significant benefits that accrue to the Philippines through that alliance … make it improbable that any leader of the Philippines would, in a systematic and sustained way, distance themselves from the United States," said Daniel R. Russel, assistant secretary of state for East Asian and Pacific affairs. Duterte "will find [the US] is a steadfast and reliable partner."

The Air Force has spent decades cultivating relationships throughout the region. Nations such as Japan, South Korea, Thailand, Indonesia, Singapore, and Australia work closely and regularly with the Air Force. These nations—including the Philippines—partner to secure peace, prosperity, and common interest.

The US and the Philippines conducted several combined exercises just this fall, and operational relations are solid.

Filipinos had "never worked with their air force for an exercise like this," said USAF Lt. Col. Courtney Finkbeiner, casualty evacuation mission commander, of a September mass-casualty training event.

"I hope the US will continue to give support [for] exercises like this," added Philippine Army Capt. Melvin Hiponia.

Duterte may choose to walk away from more than a century of shared history with the United States. But the US is the Philippines' third largest trading partner, in general the US is admired and well-respected by Filipinos, and the mutual defense treaty is clearly to the Philippines' advantage. Losing access to the Philippines would be a loss and an inconvenience for the Air Force, but there is plenty of work to do elsewhere and many other partners to work with.

Hopefully it will not come to that. ✪

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Dummy Targets

I have known about the QF-4 program for a long while now and of all it takes to bring an aircraft back online after being in storage ["Air Force World: QF-16 Reaches IOC," November/December, p. 18]. I do understand that the program is necessary for ongoing pilot training; but I cannot understand the use of the retired QF-4s as ground targets. That, to me, is a total waste of a beautiful airframe. There are plenty of museums around the country that would love to have an F-4 for display purposes. Also I am sure that there are museums that would love to have one of the QF-4s to replace their airframes that have been damaged over time by abuse and weather.

It is just a terrible shame that USAF is just going to let the existing F-4s become ground targets for gunnery or bombing practice when they can use dummies for that. I guess that the dummies are too busy making the decisions on how to destroy beautiful museum/display airframes that will forever be gone once they are destroyed. All we have to do is to look at what has happened throughout the years to past airframes such as the B-29, B-47, B-58, and dozens of others that have been destroyed instead of properly displayed for the public to view, walk around, touch, and imagine what it was like to live in and be part of that era. I remember B-29s and B-47s flying out of MacDill AFB, Tampa. What a beautiful sight to see.

Paul Pratt
Sarasota, Fla.

Something Smells Fishy

Your article ["Target: Ramenskoye," September, p. 102] evoked pleasant memories of my own contribution to better understanding the Soviet air force.

In the pre-Earth-satellite days of the 1950s, I was assigned to the CIA's Tehran station, working in its Soviet Operations section. The station had established an effective liaison relationship with several of the shah's air force pilots. In spring 1958, the Iranians reached an agreement with Moscow to allow their supply aircraft, a modified DC-3, to fly directly from Tehran to Moscow, this to support the Iranian military attaché group at its Moscow embassy.

The DC-3 was obliged to put down at Tbilisi, the capital of the Georgian Soviet Republic, for refueling. Following the second of these flights, we received word that the pilots had observed something the CIA should know about. On the aircraft's approach to the city's military airfield, the pilots could see, on the tarmac below, what appeared to them to be two Soviet delta wing jet fighter aircraft, not seen before.

We, of course, informed CIA headquarters of this sighting and word came back, immediately, that the Iranian pilots had seen the products of the Mikoyan-Gurevich Aircraft Factory No. 31, known to be sited alongside the same airport.

Then followed a hurry-up effort to send to the station a handheld aerial camera. And it fell to me to teach the two pilots how to use it. It was also my job to design and fabricate a concealment device, in the rear-most portion of the DC-3's cargo space. The aircraft would be on the ground, in Moscow, overnight and we were concerned that it might be searched, the exposed film confiscated, and our pilots [might be] in deep trouble.

Those concerns proved unfounded. The camera's film, developed in the station's photo lab, showed what were later identified as the first-ever pictures of the Soviets' first supersonic fighter, two prototypes of the MiG-21. It entered service in the Soviet air force in 1959, just a few months after our collection bonanza.

Sometime later, the aircraft was given the NATO designation Fishbed. Eventually, the Soviets sold many production models to their socialist allies and it became the fighter aircraft of choice for those countries.

This story was published in 2013 as part of my autobiography, after having been thoroughly vetted, prepublication, by the CIA.

John Sager
Mercer Island, Wash.

Whose Heroics?

The statement in ["Namesakes: Carswell," October, p. 76] that a solo B-24 sank a Japanese cruiser in the South China Sea Oct. 15, 1944, needs rechecking. Forty Japanese cruisers were sunk in WWII; in no instance is there any relationship to the South China Sea on Oct. 15, 1944.

Could the ship sunk have been a destroyer? A. J. Watts, in *Japanese Warships of World War II* (published in the US by Doubleday & Co. in 1967) lists 146 Japanese destroyers,destroyer escorts, and fleet torpedo boats sunk in WWII, with dates of sinking. By date, the only possibility from the list is the fleet torpedo boat *Hato,* which according to Watts, was sunk Oct. 16, 1944.

Hato and its sister ships were 289 feet long and 840 tons, with speed up to 30.5 knots. They were armed with three 4.7-inch guns, one 7.7 mm anti-aircraft gun, and three 21-inch torpedoes. The closest US Navy counterpart was the DE (destroyer escort). The Japanese fleet torpedo boats were quite different from US PT (Patrol Torpedo) boats, which were 70-80 foot, 35-48 ton motor boats.

According to the Internet website Long Lancers of Allyn D. Nevitt, *Hato* had escorted a convoy into Hong Kong Oct. 8, 1944; Nevitt's next entry is: "15-16 October: Departed Hong Kong. Sunk: by aircraft of TF 38, 130 miles ESE of Hong Kong (21-45N, 116-30E)." TF 38 was a US Navy Task Force; the aircraft would have been single-engine Navy aircraft carrier planes.

It would be valuable for historical accuracy if your historians could check primary data (USAAF, USN, Imperial Japanese Navy) and determine what actually happened.

Saran Jonas
New York City

■ *The information on Capt. Horace Carswell's Oct. 15, 1944, mission was from his Distinguished Service Cross citation synopsis, available at http://valor.militarytimes.com.—THE EDITORS*

I enjoyed the recent *Air Force Magazine* October "Namesakes" article about Horace Meek Hickam.

I would like to point out one error, however. For "college" you listed University of Indiana. I'm sure that the native Hoosier Lieutenant Colonel Hickam would be the first to point out that the proper name of the university is Indiana University.

Lt. Col. Robert L. Karpinski,
USAFR (Ret.)
Bloomington, Ind.

Thanks for the very well written history of Hickam, the cavalry convert, in your "Namesakes" series. It was extremely educational and I do enjoy learning about the namesakes of our bases around the world. One point I might [make] is: Your series and historical significance are the very reason we should abandon the term "joint base," or JB. Using the term JB and hyphenating two (or more) base names detracts from the colorful history and the respect for those for whom those bases were named. I would urge all to write their congressmen/women to get this absurdity removed. It should be Hickam AFB, Langley AFB, etc., not JB Pearl Harbor-Hickam or JB Langley-Eustis. Although they may be jointly managed, they are still geographically separated and should reflect our proud heritage. The only place I wish to see JB is on

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

Educate the public on the critical need for unmatched aerospace power and a technically superior workforce to ensure US national security.

Advocate for aerospace power and STEM education.

Support the Total Air Force family and promote aerospace education.

the tails of F-105Gs stationed at Korat RTAFB during the Vietnam War.

Many thanks for a great magazine!

Col. Frank Alfter,
USAF (Ret.)
Beavercreek, Ohio

A Mighty Wind

The article concerning the wind damage to B-36s at Carswell AFB mentioned that there have been other such incidents, but mostly to small aircraft ["The Carswell B-36 Disaster," October, p. 62]. One of these occurred, also in Texas, in the late spring or summer of 1958, but to what would be called large aircraft.

The 4th Strategic Support Squadron (SAC) was based at Dyess AFB, flying C-124C Globemasters. One stormy night one or more big thunderstorms floated over the base and generated high winds that severely damaged the control surfaces of every plane in that squadron, except one that was away on a mission. Apparently, there was a strong wind shift of 180 degrees within a few minutes. This caused the control surfaces on the "Shakeys" to overcome their hydraulic buffering systems that kept them semirigid when parked. This resulted in a few weeks of repair work, 24/7, by both squadron personnel and workers from Kelly AFB. The unit had to go off the war plan, and only the weather office's recorded, unpredictable wind speeds and headings saved the squadron CO his job.

Henceforth after that affair, every time strong winds were forecast, usually at night, lieutenant copilots (like myself) hustled out to the planes, cranked up the inboards, and taxied into the forecast winds. Mechanical control locks were devised and used also, which kept the moveable surfaces totally rigid. Whether or not this incident involved a microburst is unknown, but it certainly did show what winds can do to big aircraft.

Lt. Col. William L. Farrar,
USAF (Ret.)
Kansas City, Mo.

I was there!

In August 1952 I was recalled to Active Duty to be upgraded from a B-29 flight engineer to flight engineer on B-36s.

I lived in the Capehart housing (off base) that backed up to the east overrun of Carswell AFB. A group of officers were having a conversation when we noticed a storm approaching from the south and heavy rain ensuing. I closed the garage door and went into my quarters. Shortly, the wind and rain subsided and many of us resumed our conversations. It was strange, after the wind and rain that had been so intense, to find the weather so calm! Shortly, the weather became as intense as it had been previously.

As we were on alert daily, we got a call from our team to return to the base immediately. Not knowing what had taken place on the base, I was surprised when I checked in to the flight line that a tail of a B-36 was overhead. It didn't take long before we were told of the devastation that had taken place. We were paired and assigned to specific areas of the flight line to patrol. It was strange, standing on the flight line and hearing parts of aircraft metal scraping as they were blown along the ramp.

The next morning we could see all of the damage that was done the night before. One B-36 was literally picked up and turned 180 degrees and placed between two buildings on the ramp. It was not damaged, as far as I could tell, but there was no way to remove it from where it was except to cut the tail off! Another picture that I saw was of a hangar door with a sliver of wood penetrating through the metal door. A transit P-51 was wrapped around the base of the control tower.

Our crew was scheduled to receive the next B-36 from the factory. It went to another crew.

Microburst, I know nothing about, but at the time of the devastation, I could say the "eye" of a tornado passed over our area.

I went on to become a first flight engineer in the 42nd Bomb Wing at Loring AFB (was Limestone), Maine, for three-and-a-half years.

Maj. Brooks W. Lovelace Jr.,
USAF (Ret.)
Hahira, Ga.

You Oughta Know

In the October issue Mr. Correll references the world record for horizontal flight as 85,135 feet set by an SR-71 in 1965 ["Air and Space and Aerospace," p. 56]. This record was set in July 1976 by Capt. [Robert C.] Helt and Maj. [Larry A.] Elliott. The previous record was held by the YF-12A. I was the RSO (reconnaissance systems officer) on the record SR-71 flight.

Col. Larry A. Elliott,
USAF (Ret.)
Woodbridge, Va.

What About the Guard?

In the September issue of *Air Force Magazine* I noted Lt. Gen. L. Scott Rice, director of the Air National Guard, is a member of the Air Staff ["Photochart of Air Force Leadership," September, p. 72]. Also on p. 77, I noted that the Air Force Reserve is listed as a major command. What happened to the Air National Guard as a major command? As a former commander of the 157th Air Refueling Wing at Pease Air Force Base, retiring in 1986, I would hate to think the Air National Guard, with its state affiliation, had been absorbed by the Air Force. If so, a huge mistake!

Col. Robert C. Lilljedahl,
USAF (Ret.)

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By Jennifer Hlad

Airpower in the Battle for Mosul; Big week targeting ISIS; Raqqa as the next step ....

DISRUPTING ISIS IN MOSUL

Though many news reports have focused on fighting on the ground in Mosul, airpower is an integral part of the ongoing battle to reclaim the Iraqi city from ISIS.

Air forces have been a continuous presence since before the fighting began in earnest, and the air coalition employed 1,352 weapons in Mosul from the campaign's start on Oct. 17 to Nov. 1, defense officials said.

USAF has provided ISR assets including U-2s, MQ-1 Reapers, and MQ-9 Global Hawks; KC-10 and KC-135 tankers; F-22, F-15, and F-16 fighters; and AWACS and JSTARS. In addition, nearly all of the munitions being used against ISIS are US precision guided weapons.

USAF photo by SrA. Miles Wilson

An airman loads a JDAM onto a weapons rack in October, during the offensive to recapture Mosul.

"The coalition team was instrumental in shaping the battlefield ahead of the operation to liberate Mosul," Lt. Gen. Jeffrey L. Harrigian, commander of US Air Forces Central Command, told *Air Force Magazine.*

"Taking out [ISIS] command and control, defensive positions, [vehicle-borne improvised explosive device] factories, and weapon caches has helped soften up the enemy, but this will be a tough fight. Airpower will continue to be there for the Iraqi forces, day and night, supporting them as they push forward with their plan."

In a Nov. 3 teleconference with Pentagon reporters from Baghdad, Col. John L. Dorrian, the spokesman for Operation Inherent Resolve, said the coalition air strikes "severely disrupted" ISIS' command and control, allowing Iraqi Security Forces and others on the ground to move forward.

Those critical air strikes began "months before Mosul," Dorrian said, with operations targeting the terror network's cash and oil distribution sites.

Since the battle began in mid-October, Dorrian said, "we dropped more than 3,000 munitions on [ISIS] targets," removing "hundreds of fighters" and "scores of vehicle-borne improvised explosive devices" from the battlefield.

"There's no question that it's very impactful and it makes a big difference," Dorrian added.

LARGE AND COMPLEX

Army Lt. Gen. Stephen J. Townsend, commander of Combined Joint Task Force-Operation Inherent Resolve, told reporters in late October that the Mosul offensive "is a large and extraordinarily complex" operation—planned and executed by Iraqi forces, but supported by a "relentless campaign of strikes" from aerial bombs, artillery and mortar shells, High-Mobility Artillery Rocket System (HIMARS), and Hellfire missiles.

Brett McGurk, the special presidential envoy for the global coalition to counter ISIS, posted on Twitter that in the first week of the fight for Mosul, the coalition launched more air strikes than during any other seven-day period of the war against the Islamic State.

Iraqi Prime Minister Haider al-Abadi posted on Nov. 5 that "the operation to liberate Mosul is on plan and on schedule."

However, the coalition to defeat ISIS is not the only force using air assets. ISIS has been using drones extensively, Townsend told reporters.

"It's not episodic or sporadic. It's relatively constant and creative," he said. "We've seen them use them mostly for reconnaissance and surveillance, … we have detected them using them for fire direction on the past," and they have used them to drop "small explosive devices."

Townsend said the US government is "working really hard" to find solutions, including electronic attack and "kinetic kills with small-arms fire," but as of yet has not found the best solution to what he called a "pretty thorny problem."

NOWHERE TO RUN

As Iraqi forces continued to advance into Mosul, the operation to liberate Raqqa began Nov. 6 in Syria. Defense Secretary Ashton B. Carter called Raqqa "the next step in our coalition campaign plan.

"As in Mosul, the fight will not be easy and there is hard work ahead, but it is necessary to end the fiction of ISIS' caliphate and disrupt the group's ability to carry out terror attacks against the United States, our allies, and our partners," he said in a written statement.

Townsend had told reporters that the plan was to apply pressure to Mosul and Raqqa at roughly the same time, "so that the enemy doesn't have a convenient place to go." ✪

Jennifer Hlad is a freelance journalist based in the Middle East and a former *Air Force Magazine* senior editor.

By John A. Tirpak, Editorial Director

Pay to play; Get 'em while you can; Black Diamond in the rough; 50-year trainer ....

HARD BARGAINING

The high stakes of doing business with the Pentagon on big-ticket programs came into sharp relief this fall with two significant developments. They signaled that industry buy-in on new projects has clearly become a competitive requirement, and that the Defense Department is so focused on cost that it may simply set contracting terms unilaterally to get the price it wants.

First, in late October, the Government Accountability Office released its report of why it ruled against Boeing's protest of the Air Force's late 2015 award of the B-21 bomber contract to Northrop Grumman. The report was heavily redacted because of the program's secrecy, but sifting through the legalese, it's clear that Northrop won the work by outbidding Boeing on price, even when the GAO found both companies were quite possibly bidding less than the work is worth. It also seems clear that both companies felt they had to underbid in order to win. The GAO rejected Boeing's claims that the risks of Northrop's approach and the cost realism of its bid weren't properly weighted by the Air Force.

Second, in early November, the Pentagon took the extraordinary step of halting negotiations with Lockheed Martin on production Lot 9 of the F-35 fighter and summarily set a price that hadn't been mutually agreed upon. The talks had dragged on for some 14 months, and with no resolution in sight, the Pentagon simply "came up with a price we thought was fair and reasonable" to keep the program moving, an F-35 program office spokesman said. Lockheed was "disappointed" with the government's action, a company spokesman reported, and while he insisted there's no question it will deliver F-35s under the contract, "we will evaluate our options and path forward." The company can seek recourse through the Armed Services Board of Contract Appeals, but had not decided in early November whether to do so.

The system program office had been trying to negotiate Lots 9 and 10 for the airframe at the same time. In mid-November, Lot 10 negotiations continued, and the SPO spokesman said the government hoped for a deal by the end of calendar 2016. Deals with Pratt & Whitney for Lots 9 and 10 of the F-35's engines had already been concluded and weren't part of November's unilateral contract action.

The spokesman said the government and Lockheed were not far apart on price, but the disagreements were "fundamental." Industry sources said the sticking points were award fees and company profit. The SPO had given Lockheed nearly $1 billion over the summer because the company had publicly complained that, without the Lot 9 contract in hand, it was paying for long-lead materials and work out of its own pocket. The money was to tide the company over until the deal was struck.

Coincidentally, these two developments came within a week of Pentagon acquisition chief Frank Kendall calling the press in to review long-term progress in getting acquisition costs under control through three iterations of his Better Buying Power initiatives. Summing up internal efforts at acquisition reform, Kendall noted that DOD has the fewest programs late or over budget in 30 years. He said the initiatives he and Defense Secretary Ashton B. Carter launched to get acquisition under control "were successful," although he acknowledged "we have work to do" on many of the hundreds of programs under Pentagon management, some of them continuing to defy budgets and calendars.

Kendall has previously keyed the success of BBP to competition whenever it makes sense, along with acknowledging the defense contractor's right to earn an appropriate profit, but by tying that profit more directly to incentives and performance rather than the calendar. He has also encouraged industry buy-in—companies spending their own money to develop new technologies—as a way to gain a competitive advantage and reduce risk on programs.

What Kendall pointed out, though, is that while fewer programs have problems, "there are also fewer programs." These realities have caused the big contractors to view any new major project coming up for competition to be a "must-win."

WINNER TAKE ALL

The F-35 started this trend. The 2001 winner-take-all contract with Lockheed Martin effectively locked out any competitor from designing an all-new fighter for the US military for 20 years or more, giving the company a strategic competitive advantage over anyone else when the next new fighter program gets underway.

The Air Force's KC-X aerial tanker replacement strategy—after fits and starts throughout the 2000s—eventually was won by Boeing, which admits it bid aggressively on the fixed-price project, knowing another tanker program might not come along until the 2030s. Boeing officials have said they were willing to lose money on the tanker's development effort in order to gain volume for the company's 767 line of cargo jets and to be competitive in many upcoming international tanker contests. Hard experience has taught industry that an American military product not in American military service is a tough sell overseas.

Though the company is already $1.2 billion in the red on the KC-46A, recent remarks from Air Force Air Mobility Command's chief, Gen. Carlton D. Everhart II, suggest Boeing's tanker underbid may have been a good bet. Everhart said he thinks the planned second phase of the three-phase modernization of the tanker fleet—the so-called KC-Y—might simply be negotiated with Boeing and not competed. A future KC-Z, he said, will likely be something

different from the airliner-type tankers the Air Force has flown for 60 years—potentially more advanced concepts able to escort fighters and bombers into heavily defended enemy airspace.

Like the F-35 and KC-46 in the fighter and tanker categories, the B-21—the third of USAF's crown jewel acquisition programs, and one that service leaders have said they will protect at the expense of other modernization efforts—is probably the only bomber program the Air Force will pursue for the next 30 to 50 years. Given changing technologies, especially in unmanned systems, it may even be the last classical bomber program ever.

In Northrop Grumman's case, losing the bomber might have signaled its exit from the combat aircraft business, much like what happened when McDonnell Douglas Corp. was eliminated from the Joint Strike Fighter competition in the 1990s. McDonnell merged with Boeing in 1997.

In the GAO's autopsy of the B-21 contract, it concluded that the award was based on whoever could offer "the lowest-price technically acceptable best-value approach" with "no credit for exceeding the requirements." While there was a formula whereby a higher bid could win if it offered certain extra value up to about 103 percent of what the Air Force said it was willing to pay, ultimately that didn't affect the outcome. The GAO said Northrop's bid was "substantially" lower than the Boeing-Lockheed team's, reflecting "Northrop's corporate investment decisions" to bear more development cost, along with somewhat better labor rates.

The GAO quoted the source selection authority—whose identity is always withheld—as saying both competitors were "aggressive" in their pricing. So much so, in fact, that both teams initially came in with bids considered unrealistically low and well short of an Air Force independent cost estimate.

"Both offerors submitted cost proposals that I believe reflect aggressive attempts to achieve the lowest evaluated price in this competition," the GAO quoted the selector as saying. "Neither offeror substantiated that it could accomplish all necessary EMD (engineering and manufacturing development) efforts at its proposed cost for EMD."

In Boeing's case, though the GAO report did not identify it as such, the company believed its "Black Diamond" manufacturing processes, privately touted by Boeing as "revolutionary," justified its low bid. The Air Force's independent cost estimate used historical experience on other major programs for cost comparison and did not accept Boeing's claims that Black Diamond represented a watershed ability to reduce cost. The GAO said the Air Force did nothing wrong in using prior experience as its reality check on costs and had made clear it would do so in choosing a winner.

The initial technical offerings, pared down by the companies to be lowest cost and to reflect Kendall's insistence on low risk, were also judged too bare-bones to suit the Air Force. After the service discussed the offerings with the two teams up to a dozen times, the GAO said, technically acceptable proposals were offered by each. The service wanted "mature, integration-ready" technologies.

The GAO said the Air Force did judge some risk in Northrop's proposal related to schedule, but the service has structured the contract such that Northrop earns its fees only to the degree that the project moves according to schedule. Lt. Gen. Arnold W. Bunch Jr., military deputy to USAF's acquisition chief, said in a press conference last year that the more Northrop is late, the less its fee will be, and the fee can go down "to zero."

FOLLOWING PRECEDENT

In quarterly earnings calls with business reporters, executives with all the major aircraft companies have said in recent months they regard upcoming competitions—the T-X trainer and the JSTARS recapitalization among them—as must-win contracts. Given that the B-21 was won based chiefly on cost, with no credit given for additional performance or capability, companies will probably tailor their entries to exactly the performance the Air Force specified, shooting for the lowest price rather than the best all-around value.

Boeing Phantom Works chief Darryl W. Davis, presenting the company's new entrant in the T-X competition in September, said the design strictly addresses USAF's specified performance requirements. He would not discuss performance above threshold requirements, but he suggested the design simply left room for wiring and plumbing to accommodate other missions that may come up in the future and will be competed separately. These may include a USAF companion trainer for small fleets like the B-2 bomber and F-22 fighter, or a lead-in fighter. The service has said explicitly, however, that it's looking for an advanced trainer first and won't give credit for applicability to other missions.

Given that the Air Force is replacing the T-38—in service for more than 55 years—the likelihood of another trainer program coming along in the next 30 years is small. And given that the worldwide market for a modern trainer could be in the thousands of airplanes, the bids on T-X could be pretty low as well.

HISTORY IN THE DETAILS

The GAO's synopsis of its ruling in the Boeing bomber protest provided some facts about the program long guessed at but never officially confirmed.

According to the report, the bomber program got going in 2004, and Boeing, Lockheed Martin, and Northrop Grumman were all brought in to offer their concepts and vision for what the Air Force's new long-range strike aircraft would be. By 2007, it officially became the Next Generation Bomber program, and by then Lockheed Martin had teamed with Boeing to compete against Northrop Grumman.

In 2010, then-Defense Secretary Robert M. Gates canceled the program, saying it had grown too expensive. The GAO said all three companies, however, got contracts to continue working on bomber technologies—specifically those geared toward "risk reduction and cost savings efforts."

Kendall's low-risk mantra was applied, and the Air Force approach to the aircraft shifted to one of modularity—an open systems architecture that could allow upgrades to be added regularly and inexpensively. Unlike previous programs, the Air Force would own the technical data package, so the upgrades could be competed, and the prime contractor would not necessarily have an inside track to future work on the jet.

Language in the GAO report about concepts "demonstrated" suggests flying prototypes or subscale aircraft were flown. Both Boeing and Northrop had to carry their designs through a USAF preliminary design review that both passed. ✪

By Megan Scully

Sparring Partners?

One of the most interesting dynamics in American politics in the coming years will almost certainly be the relationship between President-elect Donald J. Trump and Senate Armed Services Chairman John McCain, who are certain to spar on high-profile defense and national security issues.

The incoming Commander in Chief has no military experience and has painted his defense and foreign policies mostly in broad strokes, sharply criticizing everyone from the country's general officers to an Obama administration official's handling of hotspots around the globe. At the time of the election, Trump had done this without providing a clear blueprint for his path forward.

McCain, a storied veteran and still the most influential hawk in the Republican Party, would, under normal circumstances, serve as a key advisor to an incoming administration of his own party, capitalizing on Trump's inexperience in this area to influence decision-making on his own priorities, ranging from US involvement in the intractable Syrian war to the level of defense spending.

Indeed, that kind of role would be a welcome relief for the Arizona Republican, who lost to President Barack Obama in 2008 and has spent the last eight years battling the administration on its policies overseas.

But the circumstances are anything but normal. McCain withdrew his support for Trump in the last weeks of the campaign, setting up what will likely be a tense relationship between the two men as the next Congress and the next administration get underway.

McCain, who won re-election in November and has a reputation for reaching across the aisle, stands in stark contrast to the President-elect. He is in a position to steer his fellow hawks through what could be a tumultuous relationship with a president of their own party. Indeed, McCain may have found more agreement with Hillary Clinton, the Democratic presidential nominee and a fellow hawk who once served on the Senate Armed Services Committee.

The President-elect and the Senate Armed Services Committee chairman differ on what to do about the US detention facility at Guantanamo but may find agreement on other issues.

USN photo by PH1 Shane T. McCoy

Among the topics the two could battle over are Trump's interest in Russia and the country's President, Vladimir Putin. McCain has long been suspicious of Russia's increasing aggression in the region, particularly Moscow's illegal annexation of Crimea and its involvement in Syria.

Meanwhile, Trump's stated stances on the military's controversial detention facility at Guantanamo Bay, Cuba—his desire to "fill it up" with new prisoners and his openness to trying US citizens there—will probably be met with some opposition from McCain, who has long supported Guantanamo's closure, if there is a viable alternative to house the terrorist suspects still there. McCain will also undoubtedly battle Trump on any move to allow torture as an interrogation technique, a policy the former prisoner of war has opposed dating back to the George W. Bush administration.

But the two men may find agreement on at least one matter: defense spending. Trump has said he would call on Congress to eliminate caps on the Pentagon's budget, a move that will be welcomed by many Republicans, who maintain control of the House and Senate going into the 115th Congress.

Democrats, led by Obama, for years have resisted lifting the defense caps without providing similar relief for domestic spending. The limits on the Pentagon's budget have served as a forcing function for patchwork compromises over the years, which have increased both defense and nondefense spending above the caps in the 2011 Budget Control Act.

But with Republicans in control of the White House and both chambers of Congress, it will be easier for GOP lawmakers to boost defense dollars without any resulting increase in domestic spending. That could make it an easier sell for fiscal conservatives, who have balked at proposed spending increases in the past.

That could pave the way for billions more for weapons systems like the F-35, and allow the military to preserve equipment like the A-10 Warthog, which the Air Force has sought to retire as a cost-saving measure. But it is unclear what Trump's specific defense spending priorities would be and how that would mesh with those of McCain and other defense hawks on Capitol Hill.

Debate on the Fiscal 2019 Pentagon spending proposal (which has already been drafted by the outgoing administration) early next year will likely be the first indicator of where a Trump administration is headed, in that regard. ✪

Megan Scully is a reporter for *CQ Roll Call.*

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USAF and Japan Air Self-Defense Force HH-60 Pave Hawks fly in formation during Keen Sword 17, near Okinawa, Japan. Keen Sword is the largest joint bilateral field training exercise between the US military and the JSDF.

USAF photo by SrA. Stephen G. Eigel

By Wilson Brissett, Senior Editor

■ Norway Proposes Block Buy of 12 F-35s

Norway's department of defense has submitted a request to the Norwegian parliament to participate in a proposed block buy of 12 new F-35As, according to F-35 joint program office spokesman Joe DellaVedova. The new purchases would be made in 2018-20 and would bring Norway's total number of F-35s purchased up to 40. Norway has said that it plans to purchase 52 F-35s overall.

"Due to vast economies of scale, all countries will achieve significant reductions on the price of their jets," said DellaVedova. The block buy would eventually be joined by the US and other nations. It is expected to procure a total of 450 aircraft and produce an overall savings of close to $2 billion. The cost of an F-35 purchased within the block buy will be $80 million to $85 million by 2019, DellaVedova said, in contrast to the $112 million paid in 2014.

Norway received its first F-35 in September 2015, and Royal Norwegian Air Force pilots have trained on F-35s in a global training squadron under the 56th Fighter Wing at Luke AFB, Ariz., since then.

Lockheed Martin photo by Liz Kaszynski

■ Raymond Now Head of Space Command

Gen. John W. "Jay" Raymond assumed command of Air Force Space Command from Gen. John E. Hyten on Oct. 25 during a ceremony at Peterson AFB, Colo. Air Force Chief of Staff Gen. David L. Goldfein called Raymond "the obvious choice" for the job because of his "experience, cyber expertise, and proven leadership." In accepting his new position, Raymond said, "There's no other organization in the world that does what you do."

Goldfein praised Hyten for his two years of leadership at AFSPC, especially in standing up the successful Joint Interagency Combined Space Operations Center (JICSPOC). "All I want to do is say 'thank you,'" Hyten said. In reflection on his time at AFSPC, he noted, "In cyber we delivered effects around the world that were only theories" a few years ago.

Hyten became the commander of US Strategic Command on Nov. 4.

USAF photo by Craig Denton

■ Three GBSD Proposals Submitted

Boeing, Lockheed Martin, and Northrop Grumman responded to the Air Force's request for proposal for the next generation Ground-Based Strategic Deterrent (GBSD) system ahead of the Oct. 12 deadline.

The Air Force released the RFP in early August, and the service plans to award up to two cost-plus-fixed-fee contracts in summer 2017, with eventual deployment in the late 2020s. The expected value of the program is about $62.3 billion.

USAF photo by Elmer F. Franz

■ North Korean Missile Launch Fails Again

US Strategic Command on Oct. 19 detected another failed North Korean missile launch, a provocation Defense Secretary Ashton B. Carter said was an attempt to destabilize the Korean Peninsula. STRATCOM said it detected the Musudan intermediate-range ballistic missile test at about 5 p.m. Central Daylight Time near the northwestern city of Kusong, and NORAD said it "did not pose a threat to North America."

Carter, in a joint briefing Oct. 20 with South Korean Defense Minister Han Min-koo, said "even in failing," the test violated several UN Security Council resolutions, and it "only strengthens our resolve to work together with our Republic of Korea allies to maintain stability on the peninsula."

North Korea has repeatedly tested the Musudan system, at one time failing five times in a row, showing the "limits" of its ability, said Han. However, "we have assessed the stability of Kim Jong Un's regime and North Korea's nuclear and missile capabilities as continually advancing. ... We have agreed to strengthen our stalwart combined defense posture so that we may respond to any North Korean provocation," Han said. It was the second time in a week a Musudan test by the regime failed.

North Korean Central News Agency photo

■ Air Force Exceeds Recruiting, Retention Goals

The number of Active Duty airmen currently in service has exceeded the Air Force's goal for Fiscal 2017, thanks to an increased effort in recruitment and retention. There are about 317,800 airmen in uniform, up from 309,000 a year ago—that's 800 more than USAF's stated goal of 317,000, said Lt. Gen. Gina M. Grosso, the service's deputy chief of staff for manpower, personnel, and services, at an AFA-sponsored, Air Force event Oct. 12 in Arlington, Va.

USAF photo

Air Force Secretary Deborah Lee James has placed a high focus on building the ranks, which she said dropped too low because of budget constraints. James told reporters earlier in 2016 she was considering enacting a little-known law that enabled her to bolster the service's end strength by up to two percent—or as many as 6,340 airmen—above congressional mandates.

■ Too Close for Comfort

A Russian fighter jet and US aircraft unwittingly passed within a half-mile of each other over Syria on Oct. 17, Col. John L. Dorrian, spokesman for Combined Joint Task Force-Operation Inherent Resolve, said. The Russian jet passed in front of the "larger framed" US aircraft. It was close enough to for the American crew to feel the jet wash. "So that's closer than we'd like," Dorrian said.

He said there was immediate contact between the two aircraft and then follow-up on the deconfliction channel, which remains in daily use. The Pentagon does not believe there was "nefarious intent" on the part of the Russian pilot, Dorrian said.

Russian Federation Ministry of Defense photo

■ Air Force Sets Transgender Policy

The Air Force outlined its policies for airmen undergoing gender transition while in service and said the new policy is necessary for accession of transgender persons by July 1, 2017. "A transgender airman [who is currently serving] must receive a diagnosis … that gender transition is medically necessary," states the memo, dated Oct. 6.

Airmen must make use of "lodging, bathroom, and shower facilities" in accordance with their Military Personnel Data System (MilPDS) gender marker both before and after transition. The memo forbids "a commander to deny medically necessary treatment to a transgender airman" and declares, "No otherwise qualified airman may be involuntarily separated, discharged, or denied reenlistment or continuation of service solely on the basis of their gender identity."

Forthcoming accession policy is required by the memo to establish an 18-month period of gender stability before recruits who have undergone gender transition may be accepted into service.

USAF photo by TSgt. Jonathan Fowler

■ Enlisted Airmen Begin RPA Pilot Training

The first group of enlisted potential RQ-4 Global Hawk pilots began training to fly remotely piloted aircraft at Memorial Airport in Pueblo, Colo., on Oct. 12, marking the first time since the 1940s that the Air Force has trained enlisted members as pilots, according to Air Education and Training Command spokesman Randy Martin. (See "By the Numbers," p. 20.)

USAF photo by Randy Martin

Secretary of the Air Force Deborah Lee James visited the four trainees at the Air Force's Initial Flight Training School in Pueblo on Oct. 17. "The integration of enlisted RPA pilots into RQ-4 Global Hawk operations is part of a broader effort to meet the continual RPA demands of combatant commanders in the field, ensuring they are provided with intelligence, surveillance, and reconnaissance capabilities in their areas of responsibilities worldwide," she said.

The beginning of enlisted RPA training coincides with a broader increase in RPA pilot production in Fiscal 2016, from 192 to 384, at a cost of $1.2 million, according to Martin.

■ Clark Takes Command of 3rd Air Force

Lt. Gen. Richard M. Clark took command of 3rd Air Force at Ramstein AB, Germany, on Oct. 21. Clark, who previously commanded 8th Air Force (Air Forces Strategic) at Barksdale AFB, La., and recently received his third star, replaced Lt. Gen. Timothy M. Ray, according to a US Air Forces in Europe press release.

USAFE chief Gen. Tod D. Wolters presided over the change of command. "A year from now … when we have a ceremony like this and talk about the accomplishments of Lieutenant General Clark, the promise is this: He will be the finest [numbered air force] commander this United States Air Force has ever seen," said Wolters, according to the release.

USAF photo by TSgt. Roidan Carlson

In his new position, Clark leads the 603rd Air and Space Operations Center, nine wings, and one expeditionary wing, as well as nearly 35,000 personnel.

Ray, who held the position since July 2015, now serves as deputy commander for US European Command.

■ Grounded F-35s Returning to Flight

The Air Force's F-35As grounded by an insulation problem in September began to return to flight in October. On Sept. 16, the service announced it had grounded 15 aircraft—including 10 operational jets at Hill AFB, Utah; two training jets at Luke AFB, Ariz.; and one test plane at Nellis AFB, Nev.—and would need to repair 42 aircraft still on the production line because improperly installed avionics cooling lines deteriorated and left debris in the fuel lines and tank.

Two of Hill's affected jets flew again on Oct. 24 after undergoing the repair process that requires cutting through the aircraft skin and stripping the faulty coating from the coolant lines, according to a 75th Air Base Wing news release. Three more were expected to be repaired by Nov. 4.

After the grounding, Hill was left with only five operational F-35s, and some pilots were sent to Luke, Nellis, and Eglin AFB, Fla., to maintain proficiency. Hill maintainers expected all 10 of the base's affected F-35s to be in service by the end of the year, according to the release. The 42 in-production aircraft were also expected to be ready to go by then.

US Central Command Operations: Freedom's Sentinel and Inherent Resolve

Casualties

By Nov. 16, a total of 32 Americans had died in Operation Freedom's Sentinel, and 30 Americans had died in Operation Inherent Resolve.

This includes 59 troops and three Department of Defense civilians. Of these deaths, 24 were killed in action with the enemy while 36 died in noncombat incidents.

There have been 132 troops wounded in action during OFS and 20 troops in OIR.

Air Strike Reportedly Hits Friendly Forces in Iraq

A coalition air strike near the Qayyarah airfield in Iraq allegedly killed at least 20 Sunni tribal fighters who were reportedly mistaken for ISIS militants. After midnight on Oct. 5, coalition strikes hit a position that was reportedly firing on Iraqi forces, said Canadian Armed Forces Brig. Gen. D. J. Anderson during an Oct. 5 briefing. He is the director of partner force development and the ministerial liaison team for Combined Joint Task Force-Operation Inherent Resolve.

The coalition has heard reports that friendly forces were hit and is beginning an investigation, he said. The commander of the Tribal Mobilization in Nineveh province told the BBC that his group had repelled an attack by ISIS when it was hit by fire from an aircraft. US aircraft were reportedly flying support for friendly forces during the battle.

Al Qaeda Leader Killed in Syria

The Pentagon said the death of a senior al Qaeda leader in Syria on Oct. 3 provided a "significant disruption" to the group. Abu al-Farai al-Masri, an Egyptian national also known as Ahmad Salamah Mabruk, was killed in a strike near Idlib, Syria.

His death will serve as "a blow to their ability to conduct external attacks," Pentagon Press Secretary Peter Cook said. Al-Masri was a long-standing al Qaeda member who previously had ties to Osama bin Laden, the Pentagon said in a statement.

Defeating ISIS With "Constant Pressure"

"Constant pressure on the Islamic State" is the key to defeating ISIS in Iraq and Syria, Army Gen. Joseph L. Votel, commander of US Central Command, said in comments delivered at the Center for American Progress in Washington, D.C., Oct. 19. By attacking oil infrastructure and information systems, as well as military positions, US forces seek to "present [ISIS] with as many obstacles as we can."

Calling ISIS an "adaptive enemy," Votel also insisted that, even as the US military has focused on the effort to retake Mosul, it is "extraordinarily important to apply pressure in many areas in Iraq and Syria" to prevent ISIS fighters from simply abandoning one stronghold and reconstituting in new locations.

Ultimately, Votel said, the defeat of ISIS will require a political solution. In Mosul, he said CENTCOM has "synched our military planning with humanitarian planning and political planning" to put a postconflict "framework in place" that includes a "high-level commission" made up of key regional stakeholders.

Losing Ground in Afghanistan

The security situation in Afghanistan is eroding, according to a quarterly report to Congress from the US Special Inspector General for Afghanistan Reconstruction (SIGAR). Only 63.4 percent of the country's districts remain under the control of the Afghan government, down from 65.6 percent in May. The report, released Oct. 30, says 33 of Afghanistan's 407 districts were under insurgent control or influence, and another 116 were "contested" as of Aug. 28. Afghan National Army and police numbers are only at about 87 percent of authorized levels and the security forces "suffer from high levels of attrition," states the document.

SIGAR reports that "the United States lacks visibility into most Afghan units' actual levels of training and effectiveness." One result of this lack of transparency is the overuse of Afghan special forces for missions that could be completed by conventional troops. US military advisors are working mainly with these elite units and have "little or no direct contact" with Afghan units below headquarters level. So while Afghan special forces have achieved a high level of success, ANA units "have questionable abilities to sustain and maintain units and materiel" in support of the government's strategy of "hold" in districts the government is unwilling to give up, "fight" in districts where the government wants to resist insurgent advances, and "disrupt" in districts held by insurgents.

USAF photo


USAF photo by A1C William Blankenship

■ Bob Hoover, 1922-2016

Robert A. "Bob" Hoover, described by AFA founder Gen. James H. "Jimmy" Doolittle as the "greatest stick-and-rudder pilot who ever lived," died Oct. 25 at age 94. Hoover was a World War II pilot in the Army Air Forces, who went on to be an Air Force test pilot and a storied performer at air shows, famous for his elaborate dead-stick, or power-off, maneuvers.

Hoover started flying in 1937, mastering the Piper Cub in his teens, working at a grocery store to pay for lessons and fuel. He joined the Tennessee National Guard and became a "flying sergeant" in World War II, eventually assigned to fly British Spitfires operated by the 52nd Fighter Group, stationed in Sicily. Shot down in 1944, he was captured and sent to Stalag Luft 1 in Germany. Late in the war, Hoover escaped, stealing a Focke-Wulf 190 from a poorly guarded airfield and making it as far as the Netherlands before he ran out of fuel and crash-landed. With the help of locals, he made it back to Allied lines.

After the war, Hoover became a test pilot and was one of three chosen for the X-1 supersonic program. During Chuck Yeager's Oct. 14, 1947, faster-than-sound flight, Hoover flew chase in a P-80 jet. (He re-enacted the chase flight for the 50th anniversary in 1997, flying chase as a backseater in an F-16 while Yeager flew supersonic in a two-seat F-15).

Hoover left the Air Force in 1948 to work as a private test pilot, first for the Allison Engine Co., and then for North American Aviation. During the Korean War, he went to the front lines to teach Air Force pilots how to dive-bomb with the North American F-86. While doing this work, he participated in actual combat bombing missions, but was not allowed to engage in air-to-air combat. He later did test work on the FJ-1 Fury and F-100 Super Sabre. During his years as a test pilot, Hoover set a number of altitude and time-to-climb records.

He became famous in the flying community for his ability to recover aircraft that had suffered midair calamities.

Hoover left North American to work as an air show pilot, flying P-51 Mustangs and later an Aero Commander Shrike. Hoover would conclude an air show by cutting his engines, then executing rolls, landing, and coasting to a show-center parking spot purely on momentum. He continued working the air show circuit into the 1990s and wrote an autobiography, *Forever Flying.*

During his career, Hoover accumulated a vast array of awards, some of them later named in his honor. He received AFA's Lifetime Achievement Award in 2015.

■ Moving Forward With 3DELRR

The Air Force has amended the current solicitation for the Three-Dimensional Expeditionary Long-Range Radar (3DELRR) to include options for full-rate production, according to a USAF news release.

The service originally awarded an engineering and manufacturing development (EMD) contract to Raytheon in 2014 for the next generation radar that will track aircraft, missiles, and remotely piloted aircraft. However, rival competitors Lockheed Martin and Northrop Grumman protested the award and the Air Force eventually changed its mind based on advice from the Government Accountability Office.

Raytheon then appealed that decision, but a US federal claims court in 2015 rejected the claim, allowing the Air Force to reopen the contract. USAF now expects to award the contract in the second quarter of this fiscal year. It will include EMD, low-rate initial production, interim contractor support, and full-rate production, according to the release. Competition for the 3DELRR contract is "limited to the incumbent prime contractors—Lockheed Martin, Northrop Grumman, and Raytheon—for the pre-EMD period of the ... technology development phase, states the release.


Lockheed Martin photo

By the Numbers

TWO

Number of enlisted airmen who have piloted flights since the termination of the Cadet Aviation Program in 1961. Two unidentified master sergeants completed solo training flights at Initial Flight Training in Pueblo, Colo., on Nov. 3. They will fly RQ-4 Global Hawks.


USAF photo by SSgt. Cory Payne

By Robert S. Dudney

Here He is, Whoever He Is

"If you would have asked me if I was going to be a pilot when I was an airman first class, I would have told you, 'No.' I would never have thought that possible."**—Air Force MSgt. "Alex" (last name withheld), one of USAF's first two RPA enlisted pilots, American Forces News Service, Nov. 4.**

Down For the Count

"This war [in Iraq] became so politicized, so PC. ... Under George [President George W. Bush], all we could do was straight right hooks and a couple of uppercuts. When Obama took over, we could only do straight lefts, and [first] we had to say, 'We're going to punch you."**—William Hansen, National Guardsman who served two tours in Iraq, *New York Times,* Nov. 2.**

Wages of Low Readiness

"If we were called upon to do a no-fly zone, ... we know how to do this. We know how to put this together, how to plan it, how to execute it. It would be enormously complex, but what I'm trying to convey is, if asked to do so, we would step up to the plate, we would do it with our joint warfighting partners, and we would do it as part of the coalition. ... Now, if we get called upon to do it, make no mistake, we will go and we will do the job, but at ... lower readiness. Our worry there is that it will take longer to get the job done, we may lose more lives, more people may be hurt or killed, we may lose more assets, more aircraft, and the like. That's the impact of not having sufficiently high levels of readiness."**—Secretary of the Air Force Deborah Lee James, on a possible "no-fly" zone over Syria, remarks at Center for a New American Security, Oct. 24.**

Saladin AB, Perhaps?

"Turkey's Incirlik Air Base has supported America's most vital strategic needs for more than a half-century. ... Now, as its host country becomes less stable and less friendly to the United States, the best way to ensure continued access to this large and well-located base is to prepare to do without it. ... It's time to find an alternative to Incirlik. The best solution would be to build a new airfield in Iraq—specifically, in territory controlled by the Kurdistan Regional Government."**—Retired USAF Gen. Charles F. Wald, op-ed in DefenseOne.com, Oct. 24.**

Built to Last

"It is a testament to the [Northrop] engineering team that here we are in 2016 and the B-2 is still able to do its job just as well today as it did in the 80s. While we look forward to modernization, nobody should come away with the thought that the B-2 isn't ready to deal with the threats that are out there today. It is really an awesome bombing platform and it is just a marvel of technology."**—USAF Maj. Kent Mickelson, director of operations for 394th Combat Training Squadron, interview with Scout Warrior, Oct. 29.**

Not Bad

"They dropped 30 bombs—20 laser guided bombs and 10 JDAMs (Joint Direct Attack Munitions). All of them were effective."**—USAF Maj. Gen. Jeffrey L. Harrigian, former director of F-35 Integration Office, on a test of F-35 attack capabilities, quoted in *The National Interest,* Oct. 18.**

What China Does

"Chinese intelligence has repeatedly infiltrated US national security entities and extracted information with serious consequences for US national security, including information on the plans and operations of US military forces and the designs of US weapons and weapons systems. This information could erode US military superiority by aiding China's military modernization and giving China insight into the operation of US platforms and the operational approaches of US forces to potential contingencies in the region."—**Draft 2016 report of the Pentagon's US-China Economic and Security Review Commission, quoted in *Washington Free Beacon,* Oct. 27.**

No Killer Robots; No Skynet

"What we want to do [with development of 'autonomous' weapons] is just make sure that we would be able to win as quickly as we have been able to do in the past. There's so much fear out there about 'killer robots' and 'Skynet.' That's not the way we envision it at all. ... There will always be a man in the loop."—**Deputy Secretary of Defense Robert O. Work, *New York Times,* Oct. 2**

Killer Robots; Skynet

"What's very dangerous is the idea ... of autonomous vehicles that are simply given guidance to, 'Here's a geographic area; kill anything that moves in that area.' In my view, it is a violation of the laws of war. Whenever you take the human out of the loop, you have the possibility of that kind of outcome."**—Retired US Adm. James G. Stavridis, former NATO Supreme Allied Commander, Europe, interview with McClatchy News, Oct. 28.**

Time Marches On

"I saw many former [Air National Guard] F-16 units go kicking and screaming into the [MQ-1] Predator mission and now, ... you can't go to one of these places [without former F-16 operators] telling you, 'We regret resisting this."**—USAF Gen. Joseph L. Lengyel, Chief of National Guard Bureau, quoted in Military.com, Nov. 15.**

Kendall's Disturbed Sleep

"We need capability and, to get capability in the hands of the warfighters, we have to go to the next step. We will do the demo, we'll be very happy with the results, we won't have the money to go on. That's what I'm concerned about. ... All the things we're doing are creating options. ... It's going to be difficult to get enough money to (produce) even a minor subset of those things. That takes money that we don't have, and that's what keeps me awake at night."**—Frank Kendall, Pentagon's top acquisition official, quoted in Breaking Defense, Oct. 31.**

The Lost Cause

"I think the notion of getting the North Koreans to denuclearize is probably a lost cause. They are not going to do that. That [possession of nukes] is their ticket to survival."**—Retired USAF Gen. James R. Clapper Jr., outgoing Director of National Intelligence, speech at Council on Foreign Relations, Oct. 25.**

CLOSER THAN EVER

By Amy McCullough, News Editor

JAPAN is stepping up its security posture, prompted by recent provocative moves by North Korea and China. The heightened threat is pushing the US and Japan even closer together militarily and spurring Japan to try to smooth over long-simmering tensions with South Korea.

On Sept. 9, North Korea conducted its second nuclear test of 2016—its fifth overall—claiming to have successfully detonated a warhead small enough to be mounted on an ICBM. The test came just days after Pyongyang launched three Nodong medium-range ballistic missiles into the Sea of Japan. Just a few weeks before, as Japan announced its new cabinet, North Korea launched two more ballistic missiles toward the Sea of Japan. The first one exploded almost immediately after launch, but the second landed in the exclusive economic zone, about 200 miles from Japanese soil.

SIGNIFICANT STEPS

The launches were part of what President Barack Obama called an "unprecedented campaign of ballistic missile launches" in 2016. After the fifth nuclear test, Obama vowed to work with regional allies and partners to "vigorously implement" existing UN Security Council resolutions "and to take additional significant steps, including new sanctions, to demonstrate to North Korea that there are consequences to its unlawful and dangerous actions."

Obama also spoke with South Korean President Park Geun-Hye and Japanese Prime Minister Shinzo Abe to reiterate the "unshakable US commitment to … defend our allies in the region."

Brig. Gen. Michael P. Winkler, vice commander of 5th Air Force at Yokota AB, Japan, told *Air Force Magazine* he doesn't think "there has been a stronger point in the alliance" between the US and Japan. "We work very, very closely with them. The nature of the threats in the region are driving us closer together."

The US and Japan build closer military ties as the Far East gets more dangerous.

Japan Air Self-Defense Force maintenance airmen prepare Mitsubishi F-2 fighters for a mission during Cope North at Andersen AFB, Guam. The annual exercise concentrates on interoperablity and coordination between USAF and JASDF airmen.

DOD photo by SSgt. Jacob N. Bailey

Thousands of North Korean missiles are pointed at Japan, and Pyongyang's ambitious missile program is "a source of a lot of heartburn," noted one US Forces Japan official. The fact that many of those missiles are capable of reaching Japanese islands is very much on "the minds of the Japanese," said Winkler.

"Fifteen years ago, we used to think of Japan as a sanctuary, but the reality of today is that we live under an anti-access, area-denial umbrella" that has "fundamentally changed the way we think about conflict in the Pacific," said Winkler. Though North Korea is the closest and most immediate threat, many countries in the theater have ballistic and cruise missiles capable of attacking US bases in Japan and in the surrounding region.

The US and South Korea agreed to deploy a Terminal High Altitude Area Defense missile system on the Korean Peninsula in July, and Winkler said he is "very excited" to have it in theater. Though its projected placement in South Korea won't "do a lot to defend the nation of Japan," the information gathered from its sensors can be shared with "all the US forces in theater, and some of that data may be able to be shared with allies."

In July 2014, the Japanese government sent shock waves through the region and stirred a domestic controversy by lifting a constitutional ban on its troops fighting abroad—a provision that had been in place since 1945. The change broadened the country's military options in times of crisis, allowed Japan to more easily participate in military exercises with other countries, and enabled its forces to participate in UN peacekeeping operations. Abe called the change a "defensive measure," but he also emphasized that Japan was unlikely to use force to defend foreign forces.

Soon after, in April 2015, the first major revision to US/Japanese defense cooperation guidelines since 1997 was unveiled. Secretary of State John F. Kerry said the new guidelines would help deter

USAF, JASDF, and Royal Australian Air Force aircraft fly in formation off Guam during Cope North 15 in February 2015.

USAF photo by TSgt. Jason Robertson

threats and contribute to regional peace and stability, but applying those guidelines is still in the early stages.

Col. Kenneth E. Moss, commander of the 374th Airlift Wing at Yokota, said the US is seeing the start of "a really good relationship" with Japan. Moss has been stationed in Japan four times since 1993 and has watched the relationship evolve. He said 20 years ago, US and Japanese forces rarely exercised and trained together, but now are doing so constantly.

"The Japanese have always accepted us in and were always willing to partner. The recent changes in the threat and stability of the region have opened up the Japanese eyes and minds to additional training and opportunities that exist because they partner with us," said Moss.

The new guidelines have enabled the Japanese to participate in more joint planning sessions with US forces, said Brig. Gen. Barry R. Cornish, commander of the 18th Wing at Kadena AB, Japan.

"We've opened the door a little more in understanding each other and our ability to integrate and operate together," said Cornish.

One key change has been in command and control. The Japan Air Self-Defense Force continues to invest in its network capabilities allowing the US and Japanese forces to share data links. Cornish said this has been a "great enhancer [to] situational awareness that will become central to how we are able to interoperate" in the future.

The Japanese also are keenly aware of the increase in natural disasters in the Pacific region in recent years. Roughly 80 percent of the world's natural disasters take place in US Pacific Command's area of responsibility, covering roughly 52 percent of the globe, and Japan is looking to the US to help it respond to these crises.

RADICAL CHANGE

After the devastating 9.0 magnitude earthquake and subsequent tsunami hit Japan in 2011, the government realized it needed to be better prepared to work with the US military assigned in their country.

Moss said Operation Tomodachi, the earthquake relief effort, "radically changed" the way the Japanese view US forces. "We're seen as a true partner and as someone that's here to help," he said.

The JASDF has made significant strides in its own humanitarian assistance/disaster relief capabilities since then, having studied US Guard and Reserve natural disaster response efforts. In 2015 when flooding struck a prefecture north of Yokota, the Japanese civil government reached out to its own military for support.

"We said, 'We're here to help,' and the Japanese military said, 'I think we have this one,'" said Moss. "They demonstrated a disaster relief capability for the first time for the Japanese people and it really gave them a sense that, 'We can do this. It's great the US military is there, but it's also great that our military can provide a response.'"

Still, humanitarian assistance-disaster relief operations and partnership building remain major parts of the US mission in Japan as well as the rest of the Pacific.

The bulk of the Air Force's presence in Japan is on Okinawa, where the US military has long had a complicated relationship with Japanese civilians and local political leaders. These sometimes-tense relationships make disaster relief capabilities and partnership building all the more important. "To me, that's

Col. Kenneth Moss, commander of the 374th Airlift Wing at Yokota AB, Japan, flies over the Kanto Plain, Japan, during a training mission. The wing is transitioning to the C-130J and the final J-model is slated for delivery in February 2018.

why we're here," said Col. William C. Freeman, commander of Kadena's 353rd Special Operations Group, US Special Operations Command's only air component in the Pacific.

USAF has "that enduring presence out here. That helps with building up those critical relationships," he added. "If we had a rotational force they couldn't establish that bond that we have and wouldn't really know the people throughout the Pacific region and what they need."

When Typhoon Halola struck Wake Island in July 2015, Pacific Air Forces called on the 353rd SOG to rapidly assess the damage. More than 100 people had evacuated and PACAF wasn't sure if it was safe to land C-130s or C-17s on the runway.

The SOG sent two MC-130H aircraft and a special tactics team to conduct a "boots on the ground technical assessment." The team planned the mission in the back of the aircraft on the five-hour flight to Andersen AFB, Guam, where they integrated with the 36th Contingency Response Group. A B-52 operating out of Guam flew over with an intelligence, surveillance, and reconnaissance pod and took pictures.

The next morning, the MC-130Hs took off on the three-hour flight to Wake Island. They were refueled in the air by a KC-135 operating out of Guam, and airdropped "a five-person special tactics team along with a couple of dirt bikes" to assess the field, clear the debris, and give the green light. Less than an hour later, a C-17 landed on the runway.

"It's a great vignette on … how we can integrate with our sister services and the rest of the Air Force," said Freeman. "We can't do this alone. … From notification to opening the field was 36 hours," and that includes nine hours of flying time.

Kadena is known as the "keystone of the Pacific" because it is just an hour's flying time from both South Korea and Taiwan; three hours to the Philippines and the contested Spratly Islands in the South China Sea; and five hours to Singapore and Indonesia. Kadena, Yokota, and Misawa AB, Japan, often serve as staging locations for humanitarian assistance-disaster relief operations.

In 2015, the 909th Air Refueling Squadron at Kadena—USAF's only Active Duty tanker squadron in the Pacific—flew a total of 7,500 hours, including 469 combat hours for operations Inherent Resolve and Enduring

DOD photo by Mass Comm. Spc. 1st Class Matthew Bradley

SrA. Christian Coleman cleans up debris in Noda, Japan, in 2011 during Operation Tomodachi, the humanitarian assistance-disaster relief effort undertaken after a devastating 9.0 earthquake.

USAF photo by Yasuo Osakabe

Freedom, setting a 25-year high, said Lt. Col. Jonathan Burdick, unit commander. In that year, the squadron offloaded 3.2 million pounds of fuel, supported 47 strikes, refueled 247 coalition receivers, and conducted 86 aeromedical evacuation support missions, saving 64 patients.

"We have 15 tankers and we're typically always maxed out," said Burdick, who noted that the overall demand for tankers in theater "far exceeds capacity."

In addition to its refueling and aeromedical evacuation roles, Kadena's KC-135s are being used as transport aircraft. After North Korea conducted a nuclear test in January 2016, for example, the 909th was called in to "transport materials back to the US very, very rapidly so senior leaders could make the decisions they needed to make," Burdick said. He wouldn't elaborate on the nature of the materials sent, but said that within 12 hours his airmen launched two missions from Kadena to JB McGuire-Dix-Lakehurst, N.J.

"Initially it was a very, very tactical-level capability that was put in place where we could have grand strategic effect. That's a key reason why we have tankers at Kadena and I think we'll always have tankers paired with all the other combat assets here." The tankers "shrink the world" and put many places within reach, he said.

HOIST CAPABILITY

The 374th Airlift Wing at Yokota has 14 C-130Hs, and several C-12Js and UH-1Ns, all of which Moss said "have been great enablers at partnering with the JASDF and some of our other regional nations." The wing's Hueys allow airmen to get in and out of tight spaces, an important capability in the congested Tokyo metropolitan area. Pilots also fly with night vision goggles, which the JASDF does not do, allowing recovery efforts to continue after sunset, Moss said.

The Air Force recently added a hoist capability to the helicopters, allowing them to take on some aeromedical evacuation roles as well, easing demand for the base's C-130s and Kadena-based tankers. In addition, the service added a medevac function to the C-12, normally used for VIP transport.

The new capability not only has "opened some doors with JASDF partners," said Moss, but has saved the Air Force a lot of money.

It costs about $9,230 per hour to fly the C-130H and just over $11,000 per hour to fly the KC-135. The much smaller C-12J, by comparison, costs $2,289 per flight hour to operate.

"Based on the number of flight hours we have devoted to aeromedical evacuation missions, we have saved the Air Force an estimated $1 million compared to the C-130H and KC-135 since the start of the calendar year," said Capt. Anthony J. Pergola, a C-12 pilot with the 459th Airlift Squadron at Yokota.

The 374th AW is PACAF's only forward deployed airlift wing and its reach is extensive. During a typical week, one or two of the wing's C-130s are in depot maintenance, three are reserved for training, and the rest are participating in tactical airlift missions throughout the theater.

Many other countries in the Pacific fly C-130s, including Indonesia, Japan, Malaysia, the Philippines, and Vietnam. The 374th serves as the regional "subject matter experts for the employment of that airplane," said Moss.

"We have a lot of outreach with many of the countries," he said. "Right now, … we're in the initial stages of building a relationship with them, understanding what their capabilities are, and letting them build trust with us and assist them," he added. "We've done deployments to Indonesia and Malaysia, and

A Japan Ground Self-Defense Force UH-1 Iroquois and a USAF C-130H fly over Yokota Air Base. Both the US and Japan fly a version of the UH-1 in the Pacific region.

USAF photo by Yasuo Osakabe

USAF photo by Yasuo Osakabe

SrA. Donovan Boone marshals a JASDF RF-4E during the 2016 Japanese-American Friendship Festival at Yokota.

we're looking ... to expand our presence elsewhere."

The wing is upgrading its own capabilities and is about to transition to the C-130J Super Hercules. The first model was slated to arrive in November 2016. Eventually, the 374th AW will fly a mixed fleet, including eight new J models and six older aircraft with the final J model slated for delivery in February 2018.

Pilots say the new aircraft is in some ways more like a C-17 than the legacy C-130s. It's newer and therefore much more reliable. The C-130J is about 10 percent to 15 percent faster than the H models and is more fuel efficient. It can carry 128 troops instead of 92 and eight pallets instead of six. Another benefit is that the wing's H models are on a five-year programmed depot maintenance cycle, but the new J models will be on a 10-year cycle, making more aircraft available for operations and training.

"The J can take off a little heavier. It has more volume and weight," said Maj. Brian Miller, director of Yokota's C-130J transition program. "Before, it would take us four C-130s to move cargo to Korea. Now we can do it in three and it's not like they reduced our footprint. It's still a one-to-one swap. We're just getting a more capable plane."

The challenge will be in maintaining the high operational tempo during the transition. The wing is no longer bringing in new H model pilots and J model pilots have to go back to the United States for training. Also, the wing is not getting aircraft as quickly as before, making it harder to train maintainers on the aircraft. Unlike the pilots, who will train at Little Rock AFB, Ark., the vast majority of C-130J maintainer training will be conducted at Yokota, so the early aircraft will have to be split between operational use and training.

"We are intentionally delaying the H leaving to allow for some capacity to remain at Yokota for the H flying mission while the J stands up," said Miller.

The 353rd SOG, which began transitioning to the MC-130J in December 2014, already has six of its planned 10 J models. However, the group will keep four of the MC-130H models around until Air Force Special Operations Command completes development and testing of the airplane's all-weather terrain avoidance radar, said Freeman.

Former AFSOC commander Lt. Gen. Bradley A. Heithold said the command had scrapped plans to use the original AN/APN-241 radar and is moving forward instead with the Silent Knight Terrain Following/Terrain Avoidance radar currently deployed on MH-60 and MH-47 special operations helicopters. The new radar is expected to be installed on AFSOC CV-22 Ospreys, too.

The SOG was expected to begin sending its four remaining Talon IIs back to the US for modifications in October 2016, including upgrades to its radios, avionics, and defensive system. Freeman said it will take a couple years for all four H models to be upgraded, and noted that "it's going to be a while before we're full-up on J models." The exact timeline hasn't been determined, he said.

The group also is in the process of standing up its CV-22 detachment at Yokota. The first three of 10 CV-22s is slated to arrive in the second half of 2017 and the rest will be delivered by 2021. The beddown "will provide increased capability for US special operations forces to respond quickly to crises and contingencies in Japan and across the Asia-Pacific region, including humanitarian crises and natural disasters," according to the 2015 Pentagon release announcing the beddown. It will "increase interoperability, enhance operational cooperation, and promote stronger defense relations with the Japan Self-Defense Forces."

The CV-22s and Yokota's C-130Js will be able to share a composite repair facility now under construction, saving some money in the military construction budget.

As part of the Defense Department's push to put its most capable assets in the Pacific region, 10 Marine Corps F-35Bs will be deployed to that service's air station at Iwakuni, Japan, in 2017. The base now hosts F/A-18 fighters, which will eventually be replaced by F-35Bs. The deployment is to familiarize pilots and ground crew members with the fifth generation fighter.

Japan also is procuring the F-35A strike fighter and is buying V-22s for its own forces.

Lockheed Martin rolled out the first Japanese F-35A during a September ceremony at the company's Fort Worth, Texas, facility. Company CEO Marillyn A. Hewson said three more Japanese F-35As would be made in Texas followed by 38 more to be made at the Mitsubishi final assembly and checkout facility in Nagoya, Japan.

During a joint press conference with Japanese Defense Minister Gen Nakatani in April 2015, Defense Secretary Ashton B. Carter said the "close bonds of friendship" in the US-Japan alliance are being strengthened by "our investments in technological breakthroughs, deploying our finest capabilities to the Asia-Pacific, and realigning our posture in the region."

The relationship with Japan, he said, remains "the bedrock of our key role in the security of the Asia-Pacific." ✪

The Air Force is expending its precision weapons almost as quickly as it receives them.

EMPTY RACKS

By John A. Tirpak, Editorial Director

A year after the Air Force first admitted it was running perilously low on precision guided munitions, the service is still struggling to get production ramped up. It must boost inventories to meet the immediate needs of commanders fighting ISIS and have enough weapons available to fight a peer adversary, if called on to do so.

The shortage is so acute that, for the moment, at least some US allies that want to buy American PGMs, including some coalition partners in the fight against ISIS,

are being turned away. Rebuilding the supplies will take time, money, and the cooperation of Congress—three things also in short supply.

The service won't give specifics when it comes to how many bombs it has on hand or how short of weapons it really is. This strategic information could benefit an enemy looking to attack US interests in a region where there aren't enough weapons to mount a sustained response. But one USAF field commander told *Air Force Magazine,* "It's true; there are some empty igloos," the term used to describe weapons storage bunkers at forward and Stateside combat bases. "We have been borrowing heavily" from stocks to sustain the air campaign in Syria and Iraq, he said.

Asked for a formal comment, the service said through a spokesman, "The Air Force has moved munitions from other COCOMs [combatant commander areas of responsibility] as well as from CONUS [the continental US] depots to support the war in the Middle East." He said, "Our munitions inventory levels are lower in all locations since the war started."

USAF photo by TSgt. Robert Cloys

SSgt. Chris White loads a GBU-54 laser JDAM at Bagram Airfield, Afghanistan. Stocks of JDAMs and other precision munitions have been heavily drawn down for operations in Iraq, Syria, and Afghanistan. USAF is trying to boost production, but this requires the orchestration of money, contracts, and suppliers.

BDA IN 48 HOURS

A telling comment about how just-in-time the supply has become was offered in September by Jeffrey Meywes, who runs production at Boeing's St. Charles, Mo., facility, where Joint Direct Attack Munition tail kits—the brains that make an otherwise dumb bomb smart—are built.

Meywes, showing reporters around the facility, casually noted that after a truckload of tail kits and Small Diameter Bombs leaves the facility, "we often get Bomb Damage Assessment within 48 hours." Meaning that, within 48 hours, the weapons are trucked to the airport, flown nine time zones to the Middle East, unloaded, assembled, taken to the flight line, mounted on a combat jet, programmed, flown to the target area, and released, after which the pilot returns and debriefs the mission, and USAF forwards to the company an assessment of how well the bomb worked.

They work very well, by the way. JDAMs routinely deliver better than 95 percent reliability and an even better percentage in accuracy. This is what puts them among the preferred munitions in the fight against ISIS. The rules of engagement for Operation Inherent Resolve set commanders and pilots a goal of no civilian casualties or collateral damage—unintended destruction. This is why PGMs are the default choice. Not only are the weapons accurate, but using them is nearly foolproof: They can be loaded with precise target coordinates before the mission and reprogrammed in-flight by the pilot to respond to targets of opportunity.

Lt. Gen. Arnold W. Bunch Jr., top uniformed deputy to Air Force acquisition chief Darlene Costello, said precision is essential because "any strike you make today could have strategic implications." Hitting a hospital by mistake, or destroying a civilian neighborhood when the aimpoint was an enemy command post, for example, can turn international opinion against the US.

"And those are all things that the combatant commander and the CFACC [combined force air component commander] … weigh as they employ and decide what kind of weapons they want to drop," Bunch said in an interview.

One former OIR air leader said, until recently, there were no American tanks, artillery, or attack helicopters in the fight, so any time ground forces had to go through an obstacle, "the only tool was a bomb delivered by a plane." That reality caused PGMs to be expended at an unpredicted and unsustainable rate.

A decision to deploy more artillery and Army Apache helicopters to the anti-ISIS fight was announced by Defense Secretary Ashton B. Carter in April 2016, and it was not until June that they began to play a significant role in operations. That will take some pressure off the PGM pipeline, but "we also have to figure a way to decrease the appetite" for PGMs, the former OIR air commander said.

The alarm was quietly sounded last year by former Chief of Staff Gen. Mark A. Welsh III, who said to some reporters that USAF was expending munitions "faster than we can replenish them." A service spokesperson later elaborated that because much of the replenishment money comes from the overseas contingency operations funding rather than base budget, different rules apply to those monies, creating "large delays, up to four years, in recovering the munitions inventory expended in combat." One spokeswoman said the shortage affected not only PGMs but gravity bombs and air-to-air and standoff weapons, too.

Bunch said PGM production is being ramped up, but until field commanders reach a greater comfort level with available stocks, foreign military sales of JDAMs to certain countries is being withheld.

"I won't go into details, [but] we have had some countries approach us [about JDAMs and] we've said no." But that "no" is more of a "not right now," he said. "We need to work with what we have."

Bunch acknowledged that most of the US partners in the coalition conducting the air campaign against ISIS use American

An F-16 of the Arizona Air National Guard Air Reserve Test Center fires a Hydra rocket fitted with an Advanced Precision Kill Weapon System II seeker in July 2016. USAF is pursuing new precision munitions like the APKWS.

ANG courtesy photo

PGMs, but "we need to wait" in supplying some of them. "We are working with all our partners … who are dropping these type [of] weapons to ensure that we're meeting the immediate need. And [looking] into the future as well."

How did the Air Force get into this munitions hole? The deficit really started to take hold in 2011 when the Air Force, already fighting in Afghanistan and Iraq, was tasked to undertake an air campaign in Libya. It did so, but Congress never got around to providing funding for the Libya operation, and while it approved replacements for weapons used in Afghanistan and Iraq, it didn't specifically fund a restock for those used in Libya. Moreover, during the Libyan campaign, many NATO partners and other coalition allies quickly exhausted their supplies of American-made precision weapons and had to borrow PGMs from the US.

Replacement funding was slow, and at the NATO Warsaw summit in July, alliance commanders said the restock is still plodding along, five years later, despite a clearly growing threat from Russia.

VORACIOUS DEMAND

Pentagon acquisition, technology, and logistics chief Frank Kendall, talking with reporters in October about progress in speeding up the acquisition system, said the Defense Department has "the balancing act in every budget of trying to fund within the constraints that we have." Responding to a question from *Air Force Magazine,* he said it's "probably fair to say that traditionally and historically, munitions have tended to be a billpayer in that process. We're addressing that as we go through building this [Fiscal 2018] budget, to see if we can

USAF photo by TSgt. Jeff Andrejcik

Airmen attach JDAM tail kits to bomb bodies. Last June, the Air Force's Life Cycle Management Center nearly doubled—to $3.2 billion—Boeing's 2014 contract to make JDAM kits.

make some corrective action there." He said some effort was made to bump up munitions production "going back two or three years" but added, "I don't think we foresaw the usage rates that we're seeing right now."

An Air Force spokesman said the Air Force and Navy buy JDAMs "cooperatively," but the two services don't share inventories. When other countries run short of bombs and USAF lends them some, it prefers to receive "replacement-in-kind" with new JDAMs bought by those countries. Such lending is done when it is "required to meet the schedule and is in the best interest of the United States," he said.

Then there is the voracious demand for PGMs in the war against ISIS. The combined air and space operations center at US Air Forces Central Command, in its August summary of activity, said the coalition had, in 2016, released between 2,052 and 3,160 weapons a month against ISIS targets in Iraq and Syria, for a total of 19,623 weapon releases. At that rate, it would have exceeded, by November, the whole-year 2015 total of 28,696 weapons released. The peak weapons-release months were November and December of 2015 and June of 2016. Those months averaged more than 100 weapons drops every day.

Elizabeth R. Kluba, Boeing Military Aircraft's vice president of weapons and missile systems, told reporters in September that the company is working with the Air Force to increase JDAM and Small Diameter Bomb production. As recently as July, production was at about 110 to 120 tail kits per day, but is now ramping up to 150 per day, with the addition of a second shift at the St. Charles plant. The Air Force wants Boeing to make 36,500 guidance kits per year by the end of 2017.

A company spokeswoman said that during the period 2015-2017, JDAM production will have trebled. The 300,000th JDAM tailkit will be produced sometime in early 2017.

Not all the weapons being expended are JDAMs, of course—the list of preferred munitions also includes the

Top: SSgt. Stefano Cothran loads JDAMs on a B-52 at Barksdale AFB, La. Middle: SSgt. Randy Broome loads Small Diameter Bombs on an F-15E at RAF Lakenheath, UK, in 2006. Bottom: An airman loads pallets of bomb bodies onto a C-17 headed for al Udeid AB, Qatar.

DOD photos

An ISIS command and control building in Raqqa, Syria, before and after being hit by 1,000-pound JDAMs dropped by F-22s on their first combat mission. Rules of engagement demand extreme precision in the anti-ISIS fight.

Small Diameter Bomb and the Hellfire missile, the latter being the typical armament of MQ-9 Reaper remotely piloted aircraft. But in addition to feeding the war, precision munitions are expended in training, to supply certain partners, in other-area operations—notably Afghanistan and Libya—and to refill empty igloos.

In August, the Air Force said it was looking into whether more sources of comparable weapons could be found. Air Force Secretary Deborah Lee James told reporters at a Pentagon briefing that month the service is exploring options whether to simply expand production with Boeing and Lockheed Martin (principal maker of Hellfire) or look for alternative sources.

It's not as easy as simply handing the schematics off to another company to build—possibly competitively—more JDAMs and SDBs, Bunch said.

"When we did our acquisition" of the JDAM, for example, "we did not buy the technical data packages" that would allow the Air Force to set up another production source, he said; Boeing alone can make the JDAM. Bunch said the Air Force has not asked Boeing to consider licensing production of JDAM to another company, either domestically or overseas.

THERE OUGHTA BE A LAW

The JDAM was developed in the early 1990s. At that time, with post-Cold War defense budgets declining, the urgency of having multiple sources for critical items was considered unnecessary and inefficient for the expected levels of production. Many laws or acquisition regulations on the books for decades mandating multiple sources of items such as radars, jet engines, etc., were either waived or allowed to lapse.

Initially thought to be a silver-bullet weapon, it was scarcely imagined that something like JDAM would become a bread-and-butter munition used in huge numbers. Bunch said he's aware of no mandate to have a competitive or redundant source for weapons like JDAM.

The Air Force is trying to adapt more weapons to the precision category. One is the Advanced Precision Kill Weapon System—a seeker that attaches to the front of a Hydra rocket. Extremely lightweight, the combined weapon will provide high precision with extremely low chance for collateral damage. Bunch said the Air Force is "working with [contractors and the other services] to get almost triple production of those. We're putting that on the F-16 and some other aircraft."

Moreover, building more bombs is not something that can be done like turning on a faucet. In Boeing's case, it makes the bomb guidance kit, but not the explosive part of the weapon that the tail kit attaches to. The Army actually provides the bomb bodies to the Air Force, which usually assembles the full weapon right on the flight line. So, Bunch explained, expanding weapon production is a group effort that must orchestrate the activities of prime contractors, subcontractors, often other services, and of course, money from Congress.

That last one is a sticking point. Because Congress did not approve the Fiscal 2017 defense budget but instead allowed merely a continuing resolution, which leaves the Air Force's various acquisition programs at their 2016 authorized levels. This in turn limits the service from increasing production of anything, including munitions.

The Air Force is still in the early stages of buying a new munition, the Small Diameter Bomb II, but Bunch said there's been no move to facilitize for massive production.

"We haven't made that leap, yet," he said. His first priority is getting the program to "Required Assets Available"—having enough units available for it to be fielded on its threshold system, the F-15E Strike Eagle.

Bunch would not address, as one general put it, "constraining the appetite" of field commanders for PGMs. "As the acquirer, it is a very far stretch to tell the requirer what he or she needs," Bunch said. "Our job is to provide" the munitions demanded.

"I know there has been dialogue about what weaponry needs to be used on certain targets and all that—are there other options and alternatives that are out there," Bunch said, but those are decisions to be made by the commanders in the field. "My job is to work with our requirers and industry partners to address that requirement as quickly as I can."

"The lead time on production on a lot of these munitions is on the order of two years," Kendall said. "That's really not fast enough, so we are increasing production rates in some areas. Because we do expect that the need for some of these munitions is going to continue for some time."

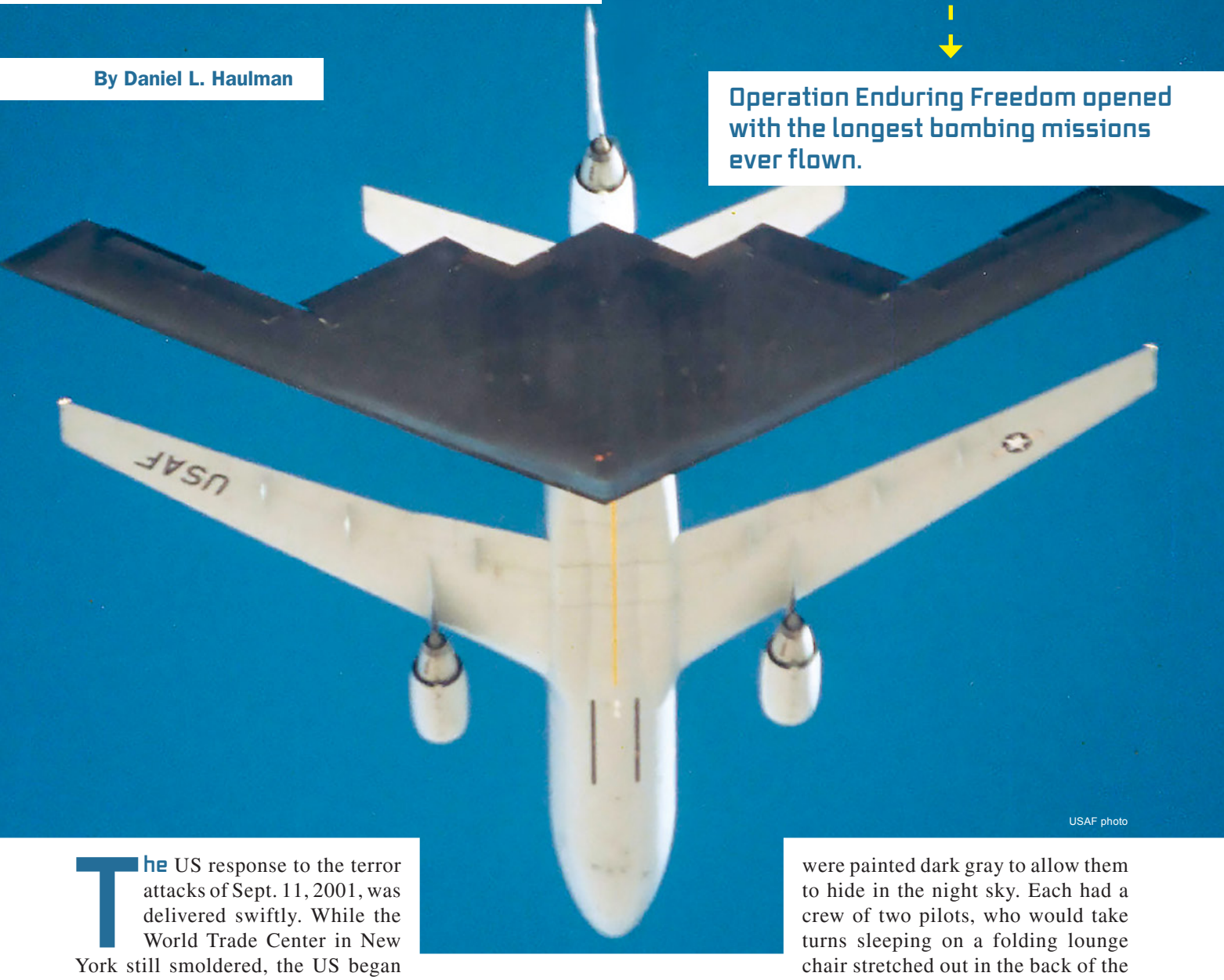
Bunch is optimistic that a path to healthy inventories has been developed and that USAF will get there in the not-too-distant future.

"We're making progress," Bunch said. "I'm very, very pleased. Since I got into the position, we have renegotiated our contract and we have upped our capacity [and] throughput." JDAM and SDB I production have been accelerated, "we've increased Hellfire, we've brought in APKWS. … We're attacking this on all fronts, and we're going in the right direction." ✪

44 Hours

By Daniel L. Haulman

Operation Enduring Freedom opened with the longest bombing missions ever flown.



USAF photo

The US response to the terror attacks of Sept. 11, 2001, was delivered swiftly. While the World Trade Center in New York still smoldered, the US began Operation Enduring Freedom—the campaign to take from al Qaeda its bases in Taliban-controlled Afghanistan and put the terror group permanently on the run.

The campaign began with strikes from B-2 bombers of the 509th Bomb Wing, flying directly from their home base at Whiteman AFB, Mo. These missions, some lasting in excess of 70 hours, were the longest combat bombing missions in history.

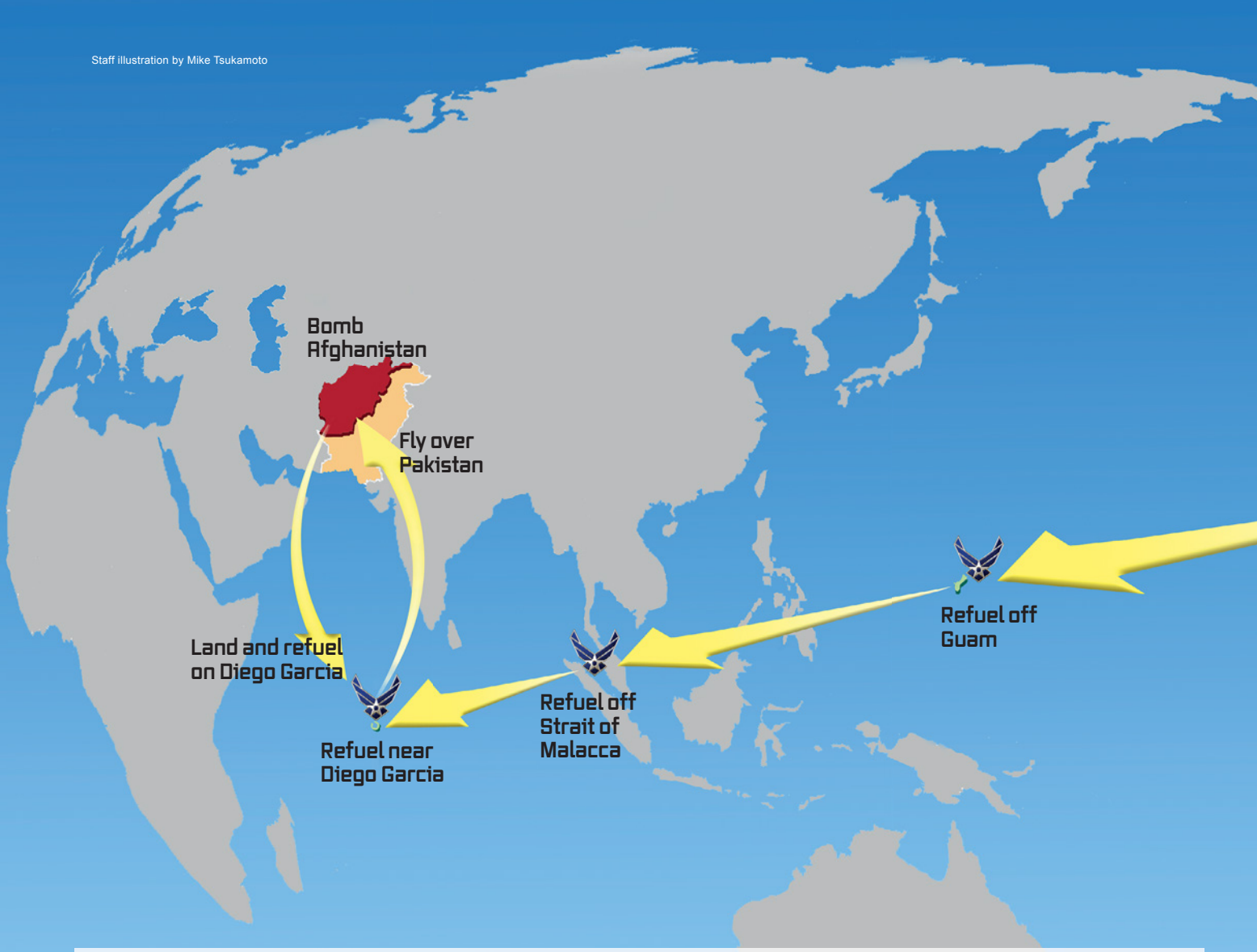
The last of the small fleet of 21 bombers had recently been delivered, and the bat-wing aircraft had only seen action in one previous conflict, 1999's Operation Allied Force in Yugoslavia. Then, as in Afghanistan, they operated from Whiteman, capitalizing on their 6,000-mile unrefueled range.

The weapon of choice for the B-2s was the extremely precise, satellite guided Joint Direct Attack Munition, or JDAM. Each B-2 could carry up to 40,000 pounds, or 20 tons, of bombs in its twin weapon bays. The bombs could be dropped from very high altitudes.

The B-2s, designed to be hard to find with radar and other sensing devices, were painted dark gray to allow them to hide in the night sky. Each had a crew of two pilots, who would take turns sleeping on a folding lounge chair stretched out in the back of the cockpit, next to the jet's toilet.

At an AFA Mitchell Institute for Aerospace Studies event on Capitol Hill this past October commemorating the 15th anniversary of the start of OEF—and specifically the B-2 strikes that paved the way for the campaign—retired Lt. Gen. David A. Deptula said the stealth bombers were chosen to spearhead the war because of the threat.

A B-2 is refueled by a KC-10. B-2s from Whiteman AFB, Mo., opened the OEF bombing campaign in Afghanistan in 2001.



Though the Afghan air defense system was "not the world's best," in the aftermath of 9/11, its radars, surface-to-air missiles, and fighters still posed a potentially lethal threat to coalition aircraft. They had to be taken out.

The B-2s offered long range, a large payload, and stealth, allowing them to accomplish the surprise destruction of anything the Taliban could put up to challenge coalition airpower.

Deptula, who now heads the Mitchell Institute, said that when the 9/11 attacks occurred, he was directing the Air Force's piece of the Quadrennial Defense Review, but he was quickly reassigned to run US Air Forces Central Command's Combined Air Operations Center. It fell to him to recommend to CENTCOM air chief Gen. Charles F. Wald and CENTCOM commander Army Gen. Tommy R. Franks how to start the war.

"It took us less than 30 days" to plan and launch a "fully fledged air campaign" against the Taliban and al Qaeda, Deptula said, and the B-2s were "ideally suited" to conduct the initial strikes.

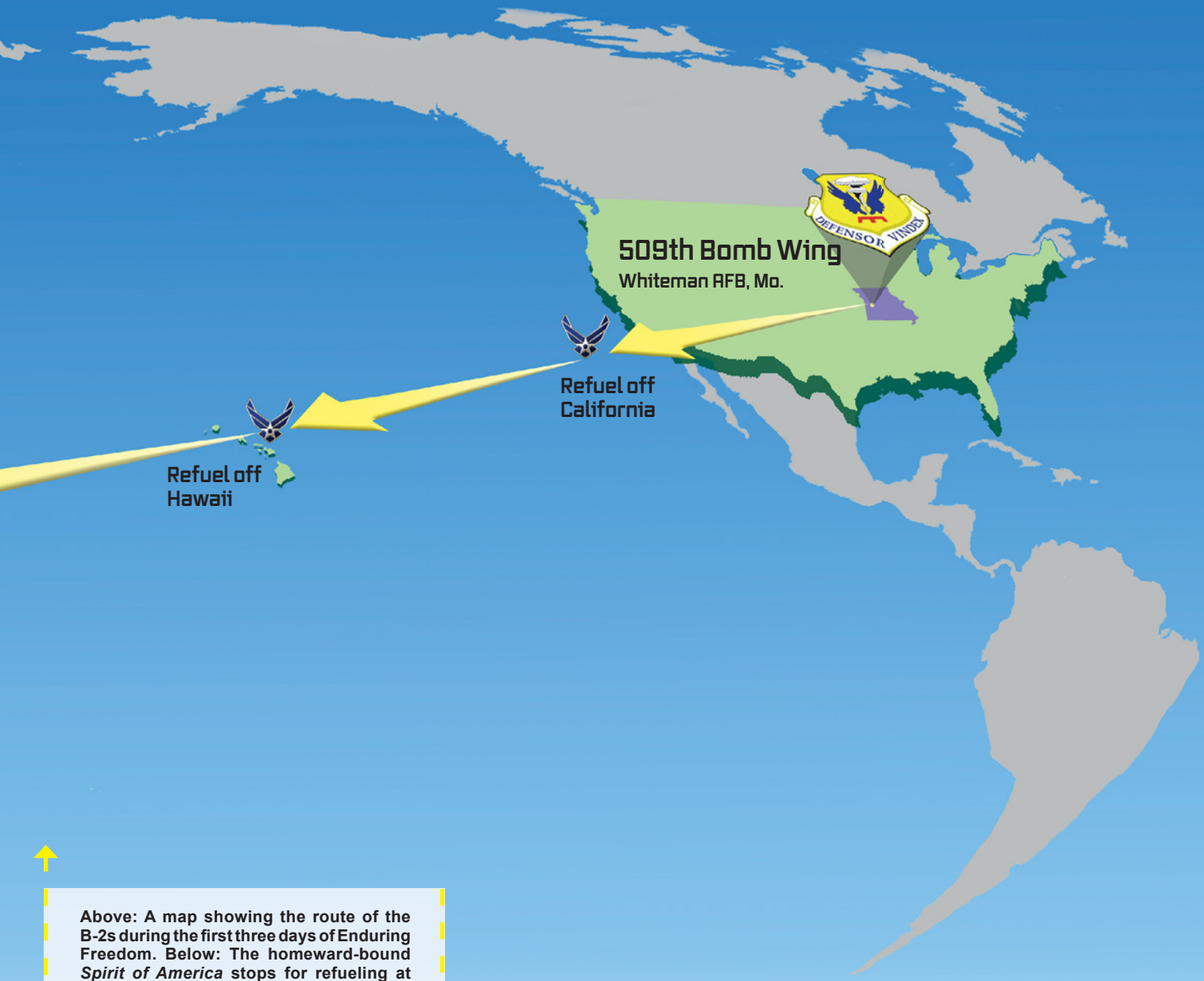
REFUELING

The B-2s at Whiteman belonged to the 509th's operations group and its 325th and 393rd bomb squadrons. Brig. Gen. Anthony F. Przybyslawski commanded the wing. At the time, strategic bomber organizations were assigned to Air Combat Command; they have since been reorganized under Air Force Global Strike Command.

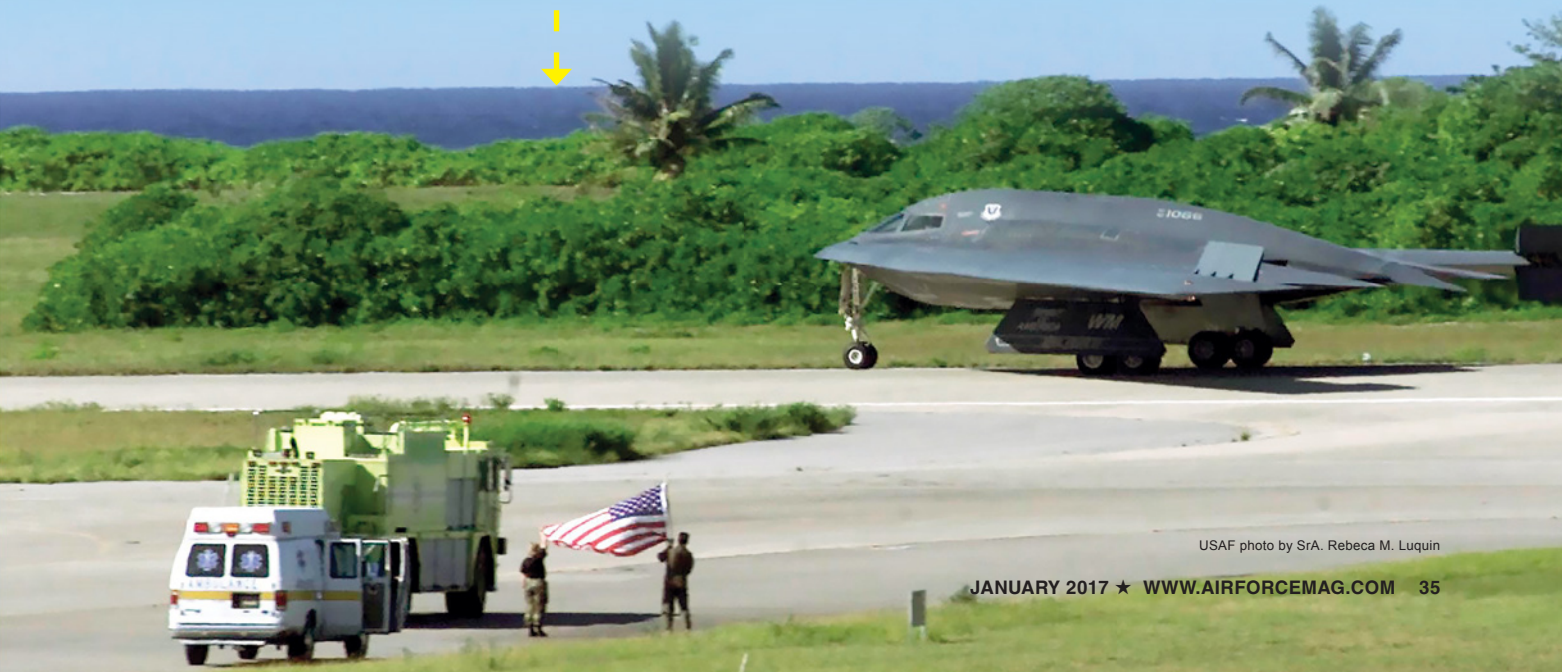
The B-2s would have to be refueled in the air several times in order to reach their targets on the other side of the world, so they depended on KC-135 and KC-10 tankers from organizations that included the 60th and 349th air mobility wings at Travis AFB, Calif., and the 319th Air Refueling Wing from Grand Forks AFB, N.D. The air refueling operations were coordinated through the 618th Air Operations Center, assigned to 18th Air Force.

The shortest air route between Whiteman and Afghanistan would have been over the North Pole and across Russia, but such missions would have been impossible in 2001. Despite the end of the Cold War, Russia wasn't likely to approve of armed US strategic bombers overflying its heartland, even if the targets were in Afghanistan.

Moreover, if the US had notified Russia of its mission, the word may have made its way to Taliban leaders, destroying the element of surprise and putting the mission at risk. Flying eastward across the Atlantic and then across Eurasia was the second shortest in terms of distance, but the



Above: A map showing the route of the B-2s during the first three days of Enduring Freedom. Below: The homeward-bound *Spirit of America* stops for refueling at Diego Garcia during the longest bombing raid in history—over 44 hours of flight time. All six B-2s that participated flew missions of more than 40 hours.



USAF photo by SrA. Rebeca M. Luquin

USAF photo by SrA. Orly N. Tyrell via National Archives

Airmen process through a mobility line on Sept. 21, 2001, at Barksdale AFB, La., before setting out for Operation Enduring Freedom.

USAF photo

An airman uses Combat Track II, a system used to reprogram JDAMs when target priorities change.

need to inform the countries being overflown would similarly risk the loss of surprise.

For operational security, President George W. Bush authorized the B-2s to fly west, across the Pacific. No one expected that.

Six B-2 bombers started the war, their missions spread out across the first three nights of the operation.

From Oct. 7 to 9, two B-2s took off from Whiteman every night. They generally flew the same route, refueling first over the coast of California before starting across the Pacific.

The second refueling occurred near Hawaii in the central Pacific.

Over Guam, the bombers had their third refueling.

The fourth took place near the Strait of Malacca in extreme Southeast Asia, while the fifth and final inbound refueling took place near the British island of Diego Garcia, in the Indian Ocean. After that, the bombers struck their targets in Afghanistan.

The only foreign country the bombers had to cross on the way to Afghanistan, taking the Pacific route, was Pakistan. After the air strikes, and with another refueling over the Indian Ocean, the B-2s landed on Diego Garcia.

Now-retired Brig. Gen. Jonathan D. George, who was the 509th's operations group commander, said wing pilots had long since anticipated that the B-2s would be asked to fly globe-girdling missions without any en route stops. Speaking at the Mitchell event in October, he said they had been practicing missions of increasing lengths in the simulator, some in excess of 50 hours, so the call to attack Afghanistan was neither unexpected nor did it require any new thinking about long-endurance missions.

While the B-2s may not have needed any bases between Whiteman and their targets, the tankers did. For the record-breaking flights, such bases were available in the continental US, in Hawaii, in Guam, and at Diego Garcia. The tankers based at Diego Garcia also refueled the B-1s and B-52 flying subsequent missions between that island and Afghanistan.

SPIRIT OF AMERICA

The missions on those three nights targeted Taliban and al Qaeda radar installations, airfields, air control facilities, enemy aircraft, and enemy training camps. The precise JDAMs—still relatively new in the inventory—had an accuracy within 10 feet.

The third of the six missions, on the second night, proved to be the longest bombing sortie in history. Maj. Melvin G. Deaile and Capt. Brian Neal crewed the B-2 named *Spirit of America.* Ahead of them were more than 30 hours of flying time just to get into the target area.

As now-retired Col. Tony Cihak, one of the B-2 pilots who flew during those three nights of missions said at the Mitchell event, "We took off for the second night's missions before the war was on, … before the first night had even happened."

Like the two B-2s that flew the previous night, they took the Pacific route. Deaile and Neal took turns sleeping, but were both at the controls at crucial points along the flight, such as their connections with the tankers. As they approached Afghan airspace, the sun was going down, and to fight sleepiness—the crossing of the Pacific alone had taken 24 hours—they had been given "go pills" by the flight surgeon to remain awake.

During the long transit, targets had changed, and nearly three-fourths of the aimpoints for new targets had to be fed into the computers and bombs.

Neal, now a colonel and commander of the 482nd Fighter Wing at Homestead ARB, Fla., told the Mitchell audience the most surprising thing about the B-2 missions in OEF was "their dynamic nature." He expected more set-piece bomb runs, but it was typical in those three nights to strike or restrike targets that had not been planned back at Whiteman. Reprogramming the JDAMs, using a system called Combat Track II, required thousands of keystrokes. It's considered clumsy by today's standards,

DOD photo by R. D. Ward

L-r: Missouri Sen. Christopher Bond, Secretary of Defense Donald Rumsfeld, Missouri Rep. Ike Skelton, and Brig. Gen. Anthony Przybyslawski at Whiteman AFB, Mo.

but it was so new then that it had only been available to B-2 crews for a few months, Neal said.

After penetrating Afghan airspace, Deaile and Neal dropped 12 of their 16 JDAMs, spending about two hours over the country. Some of the targets required multiple passes, so the B-2 could create a 3-D image of that attack area with its synthetic aperture radar, to make a more precise drop.

They then headed out, connecting with a tanker and set a course—they thought—to land at Diego Garcia.

However, the CAOC called and asked if they were willing to go back in over enemy territory and use their remaining bombs. The crew agreed and spent another 90 minutes over Afghanistan, releasing four more weapons, before making for Diego Garcia.

After another aerial refueling, Deaile and Neal had to orbit the island as a B-52 was ahead of them. They finally touched down after being aloft 44 hours and 20 minutes.

Their mission was done, but *Spirit of America* was not. With 18 B-1s and B-52s already based at Diego Garcia, there simply wasn't enough room for B-2s or their maintenance crews to operate from the island. When the jet landed, its engines were kept running while the aircraft was serviced. It was refueled, new oil was poured into the engines, the toilet was emptied, and fresh food was put aboard, as was a different two-man crew, flown ahead for just this purpose. The new pilots got onboard, and just 45 minutes after the bomber landed, it took off and flew back across the Indian and Pacific oceans, across the western US, all the way back to Whiteman. When *Spirit of America* finally landed, it had been operating more than 70 hours without an engine shutdown.

During those three days, all six B-2s flew comparable missions lasting about 70 hours. The mission that Deaile and Neal flew happened to be the longest before landing. None of the aircraft experienced engine problems or had to abort or divert.

KNOCK DOWN THE DOOR

The B-2 strikes, coupled with Tomahawk missile attacks launched by Navy vessels in the Indian Ocean, destroyed key Taliban and terrorist air defense facilities at the very start of Operation Enduring Freedom. These missions cleared the way for more vulnerable bombers, such as the B-1s and B-52s operating from Diego Garcia, joined by Air Force fighters based in other parts of the Middle East, and Navy attack jets flying from carriers in the Indian Ocean. Some of the fighter missions lasted upward of 18 hours.

Deptula said the "knock down the door" missions flown by the B-2s on the first three nights of OEF illustrate the need for the new B-21 bomber. Like the B-2, it is about "providing options to the President," said Brig. Gen. Jim Dawkins Jr., a B-2 pilot at the time who is now on the Joint Staff. Should the US need to launch attacks on any target on Earth, no matter how comprehensively defended, in a short period of time, while operating directly from US soil, the B-2s—and someday the B-21s—will be available to do the job, he said at the Mitchell event.

The strategic bombing missions allowed the US and its coalition partners in OEF to have complete control of the skies over Afghanistan. Not long after the operation began, those skies were safe enough for American transports to begin delivery of huge amounts of aid and supplies to parts of northern Afghanistan, where the indigenous Northern Alliance could begin to assert its own control over the country, toward evicting both the Taliban and the al Qaeda terrorists they harbored. The longest bombing missions in history were some of the most successful, demonstrating the swift global reach of American aircraft and aircrews—an object lesson for current and future adversaries. ✪

Daniel L. Haulman is a historian at the Air Force Historical Research Agency. He is the author of several books, including *Killing Yamamoto: The American Raid That Avenged Pearl Harbor.* His most recent article for *Air Force Magazine,* "Watershed Air War," appeared in April 2015. John A. Tirpak contributed additional reporting to this article.

USAF photo by 2nd Lt. Jaclyn Pienkowski

FILLING THE SEAM

ON July 15, 2016, a multiservice, multinational exercise suddenly and unexpectedly turned into a real-world rescue mission when a small civilian aircraft went down off the coast of Kona, Hawaii.

Capt. John Rulien and CMSgt. Jason Arnott were up before dawn, preparing to lead a day of high-altitude, low-opening paratroop training at the Pohakuloa Training Area on the island of Hawaii with the 353rd Special Operations Group. The 353rd had traveled from Kadena AB, Japan, to the RIMPAC (Rim of the Pacific) exercise—the world's largest sea-based warfare exercise.

Their pilots, Maj. Rob Bingham and Maj. Richard Bloom, weren't even off the ground to pick up the Navy SEALs they were scheduled to train with that day when Rulien and Arnott saw on the news ticker that a civil aircraft had gone missing.

"There was a downed aircraft off the Big Island of Hawaii," Rulien said, referring to the southernmost island in the chain. "The only thing we really knew was that about 25 miles offshore there were two personnel from a general aviation aircraft in the water," Arnott recalled.

Once Rulien inquired about the crash, "they gave me a coordinate, and the rest is history. [The] chief and I made the decision to cancel that day's training" and redirect the group to join the search and rescue.

Bingham and Bloom had their MC-130J Commando II, call sign Legit 17, in the air less than 10 minutes after receiving the command from Rulien, and they arrived at the initial search area within 30 minutes.

They were joined on the scene by a New Zealand air force P-3 Orion, a US Coast Guard MH-65, a US Coast Guard cutter, and a US Navy MH-60 flying from USS *Chung-Hoon.*

Now all they had to do was find the downed aircraft and hopefully rescue the two civilians.

PRACTICE MAKES PERFECT

The team that assembled for the search offers a clear picture of the advantages of joint force exercises like RIMPAC. Every two years, RIMPAC—first held in 1971—has brought together air and sea forces from around the world to gain crucial experience in interoperability—in 2016, 26 nations were represented. Practicing missions enables effective joint operations in the real world, and the 353rd SOG took on this search and rescue in coordination with two other branches of the US forces and a foreign partner.

The cooperation was hardly nominal. The New Zealand P-3 had assumed airborne command and control when Legit 17 first arrived on the scene, Bingham said. "Those Kiwis really had their stuff together and were true professionals."

All the parties were fully aware of the challenge in front of them in a maritime search and rescue operation. "I've looked for guys six miles off the shore of South Carolina. One man is very difficult to find in the ocean," Arnott said. "When you've got a limited asset, you start with where you believe the aircraft went down, and you expand that search area, and you look for anything—aircraft wreckage, anything—that indicates there was a person in the water."

The 353rd team admittedly didn't have the best tools for the job.

"The MC-130J is an Air Force Special Operations Command aircraft, and search and rescue is not one of the normal mission sets performed by its crews," Bingham noted. But flexibility is the key to airpower, and "we happened to be in the right spot at the right time to lend a hand to folks in need."

Though the aircraft and crew were operating outside their core strengths, Legit 17 did have several advantages.

For one, the aircraft is equipped with electro-optical/infrared sensors that can

Left: This MC-130J, performing a training mission during RIMPAC 2016, call sign Legit 17, aided in the search for downed civil fliers off the Big Island of Hawaii in July. Below: Coast Guard crews deliver the survivors, David McMahon and Sydnie Uemoto, to emergency medical personnel in Kona, Hawaii, following their rescue.

By Wilson Brissett, Senior Editor

Kadena airmen sprang into action when a small aircraft went down during the RIMPAC exercise.

scan the ocean for warm objects, like people. In addition, "we had more people on the crew," Bingham said, "because of the high-altitude airdrop training we were originally planning to conduct with the Navy SEAL team. Having the extra people on the aircraft ended up being a good thing, since it made more eyes available for scanning outside." Once Legit 17 arrived, "we effectively doubled the possible search area right off the bat."

Conditions made the search difficult. "Flying around at 500 feet or even as low as 300 feet, it was difficult to spot something the size of a person in the water, due to the sea state," Bingham said. "There were lots of white caps."

The key capability that Legit 17 brought to the mission was communication. "The MC-130J Commando II was uniquely suited to help facilitate communications between all maritime and air assets," Bloom said. "We took over airborne [command and control]," Bingham added, "providing radio communication and information relay to all players while actively engaged in search operations." With its range of capabilities—ultrahigh frequency radio, very high frequency (VHF) radio, high frequency radio, maritime VHF, and satellite communications—only Legit 17 could communicate with all of the assets involved.

The pilots and their crew were in the air for four hours searching for the missing persons. "What if that was one of our loved ones in the water?" Bingham asked. "I'd want people to keep looking for them. And we did."

In the end, the big break came from outside the rescue group. The search area was significantly narrowed when a local tour helicopter pilot spotted

US Coast Guard photo by Lt. Cmdr. Kevin Cooper

USN photo by Mass Comm. Spc. 2nd Class Jeff Troutman

USCG photo

McMahon (white shirt) and Uemoto (blue shirt) meet with some of the New Zealand airmen who aided in the search for them during RIMPAC. Right: US Coast Guard cutter *Galveston Island* also assisted in the search and rescue operation, as did a New Zealand air force P-3 Orion, a Coast Guard MH-65, and a Navy MH-60. The joint rescue operation made clear the value of training exercises such as RIMPAC.

debris in the water about 10 miles north of the Kona airport and a mile offshore, Bingham said.

Once the pilot reported what he saw, the Coast Guard sent a helicopter to retrieve the two missing persons, a save that took place a considerable distance from where the plane was reported to have gone down.

As it turned out, the crash survivors had been moving targets. "From the time they had ditched their aircraft, they started swimming towards the shore," Arnott said.

The survivors had no raft and were relying only on flotation devices from their aircraft.

"I don't think anyone on the crew was expecting the survivors to be found so close to land," Bingham said.

Though the team called away from RIMPAC didn't make the save, the operation was a success, not only because the downed aviators were recovered.

The events of July 15 offer insight into special operations teams' contributions. According to Rulien, a special operations group "finds seams or gaps where we can enable conventional forces" to be more effective.

Planning and vision are required to identify the seams, and specialized tactics are often necessary to operate effectively in the gaps.

A MORALLY RIGHT DECISION

There is also the leadership needed to make tough calls about the mission. Though the decision to help was in retrospect easy for Rulien and Arnott to make at the time, it was one that pushed them and their group outside of their typical duties.

While troops and assets involved all performed well, the story highlights a different side of special operations. "This is by no means an individual story," Rulien asserted. "When you get to search and rescue there's hardly a single heroic act. It's the overall, general teamwork—where everyone comes together, finding seams to do better, and taking initiative—that results in a save."

The rescue mission benefitted from the structure of the exercise. The day before the rescue, the teams had been training with a fictitious earthquake scenario, honing their ability to collaborate in the face of calamity. Rulien said, "We went out there to demonstrate the full spectrum of what the special tactics and special operations group here in Kadena has to offer, so the fact that we were prepared to go train to all those contingencies made it that much easier to react to the real-world scenario."

Just as important was operational flexibility. The decision to postpone the scheduled training and join the search and rescue was a quick judgment call, one the airmen felt could not wait for vetting up the chain of command. Arnott said it was "the morally right decision" and not a hard one for him.

"One of the things [special operations is] good at is trying to find the easy solution to a complex problem," he said. In this case, the easy solution required cutting through red tape.

"I caught some hell for that," Rulien said, about "not calling for permission." But he also said the 353rd was able to complete all its scheduled training by the end of the day, and the repercussions were not serious. Once higher-ups "got the story from us," Arnott added, "they said, 'You made the right call.'"

While Rulien, Arnott, Bingham, Bloom, and their teammates did not find the survivors, they did find the seam. They were willing to take a risk, put aside their assigned duties for the day, and provide urgent assistance. As Bloom said, "Captain Rulien took the initiative to send help when lives were on the line." ✪

Give us your tired, your poor. Your huddled airframes yearning to breathe free. The wretched refuse out your hangar door.

MONSTER

USAF photo by TSgt. Samuel King Jr.

GARAGE

By Brian W. Everstine, Pentagon Editor

KIRTLAND AFB in central New Mexico boasts an impressive array of special operations aircraft, 67 in all, ranging from MC-130J Commando IIs to HH-60G Pave Hawk helicopters to the unique CV-22 Osprey tilt-rotors.

Surprising, then, that alongside these high-tech secret mission marvels, operators and support personnel alike agree that the base's most used, most innovative training tool is a World War II-era hangar on the base's west side. The airmen affectionately call it the "Monster Garage."

Retired technicians known as "Hammerheads," along with 58th Special Operations Wing personnel, have filled the hangar with unwanted and discarded military derelicts and refurbished them into training platforms used by thousands of airmen. These recycled hulks have saved USAF upward of $57 million.

The 58th SOW, besides its clandestine activities, trains more than 14,000 students a year to support eight systems, including the CV-22, HH-60G, MC-130, and UH-1N helicopter. Some 24 crew positions get trained through more than 120 courses, both at Kirtland and other training sites. The wing's offsite activities include survival, evasion, resistance, and escape courses at Fairchild AFB, Wash., and Eielson AFB, Alaska.

It would be prohibitively expensive to train all those airmen on operational aircraft, and the aircraft would be tied up for coursework instead of flying. That inspired the Monster Garage idea.

BROKEN AND UNWANTED

Hangar 482 was built in World War II to house B-24 Liberators. The massive building is now filled with aircraft mockups and partial aircraft the Air Force and other services had planned to discard. Most of the airframes were headed to the "Boneyard" at Davis-Monthan AFB, Ariz. One is an old Marine Corps Huey helicopter that was condemned to be used for target practice.

"We take broken, unwanted things, and turn them into useful, cost-effective, and functional training aids," said Lt. Col. Kenneth McAdams, then commander of the 58th Training Squadron, in a 2013 news release describing the garage.

Of the equipment in the garage, 85 percent came at no cost to the wing or was purchased for $1, said Anthony Tapia, a technician in the facility. The crew scours the Boneyard, Defense Logistics Agency Disposition Services yards—even big-box stores—for low-cost equipment that can be used in training.

Among the denizens of the garage are full-scale C-130 fuselages and the "WarWagon"—a standard trailer that looks like it was used as a concession stand or to carry lawn equipment, now outfitted with a 7.62 mm minigun that the squadron uses to train gunners for Pave Hawks. A UH-1N Huey, set up on scaffolding, has a Walmart Christmas tree hanging from its tail to represent downwash and the dangerous area around a tail rotor that can affect hoist systems.

"It's low cost—and much faster than we could it get it done anywhere else," said Lt. Col. Kevin Lee, the operations officer for the 58th TRS.

An MC-130 Combat Talon takes off on its final flight before decommissioning, as another, nicknamed "Wild Thing," waits on the ramp at Boise Air Terminal, Idaho, in 2010. The Monster Garage hangar at Kirtland AFB, N.M., now uses Wild Thing's fuselage for loadmaster training.

Loadmasters SSgt. Dean Scalise (left) and MSgt. Edmund Bozeman train at the Monster Garage with contact instructor Ron Leonard (center).

Perhaps the most storied of the Monster Garage training systems is the full-size MC-130H Combat Talon II fuselage it uses for loadmaster instruction. Until 2012, the garage used an ancient C-130A fuselage for this purpose. The equipment was 50 years out of date and no longer really representative of the modern Hercules.

It was "similar to using a 1960s Corvette to teach a mechanic how to fix a 2013 Corvette," said Col. Dagvin R. M. Anderson, then the 58th Special Operations Wing commander, in a news release about the garage's new trainer.

The garage had heard about an MC-130E Combat Talon I airframe that Air Force Special Operations Command retired on Sept. 18, 2012, at Duke Field, Fla. After a few well-placed phone calls, the Monster Garage crew diverted the plane's final flight from a trip to the Boneyard to Kirtland instead, where the fuselage was converted to a Combat Talon II.

The Monster Garage crew got to work, getting rid of all the fuel and other hazardous materials. They cut off the wings and clipped the propellers. They removed and replaced 81 cubic feet of wiring and modified the cargo bay for loadmaster training.

The cost of all this was about $265,000 and about three years of work—a bargain compared to a contractor's estimate of $15 million to build a new trainer.

Left: A UH-1N Huey is squeezed into the cargo bay of an MC-130H for its trip to Kirtland, where it is now used for training at the Monster Garage. Above: The inside of the Monster Garage shows just a few of the aircraft repurposed for training. Right: At the Garage's WarWagon, Gen. Edward Rice (left), then head of Air Education and Training Command, receives instructions on the GAU-2 minigun from TSgt. Josemaria Gonzales (center) as CMSAF James Cody listens.

The updated trainer allows almost all loadmaster training to be done on the ground instead of on an operational aircraft that would cost $14,000 per student. During a recent *Air Force Magazine* visit, airmen demonstrated a simulated drop of a special operations team and their Humvee from the mock Talon.

In 2014, the Monster Garage team was recognized with an Air Force Productivity Excellence Award from Air Education and Training Command for the Talon build. The team hopes that the Talon modification can be replicated soon for an MC-130J.

A MYTHICAL BEAST

The crew's decision to save the Talon I from the Boneyard didn't just provide a cheap way to train airmen, it saved some Air Force history. The aircraft, tail No. 64-0567, is better known as "Wild Thing."

During 47 years of service, it recorded more than 21,000 service hours, taking fire in Vietnam and participating in Operation Eagle Claw (the failed "Desert One" Iranian hostage rescue mission in 1980), Urgent Fury in Granada in 1983, and Enduring Freedom in 2003. Wild Thing got around.

Its most famous mission, however, came in 1990. During Operation Just Cause, Wild Thing flew Panamanian dictator Manuel Noriega from Panama to Miami. The very seat the dictator sat in is still in the fuselage.

In much the same way, the Monster Garage crew decided to get creative to help train airmen on the UH-1N. In 2013, the crew found a Huey that had seen long service training marines at Marine Corps Base Camp Pendleton, Calif. It was old, in disrepair, and faced the likely undignified fate of being used for target practice.

The team flew on an MC-130 to Pendleton to retrieve the aircraft. To get it back, they removed the main rotor and tail so it could be squeezed into the aircraft. A scant three

Photo by Todd Berenger

inches of clearance separated the top of the chopper from the ceiling of the cargo bay inside the Hercules.

"It was the first time we know of [since the Vietnam War] that a Huey was put on a C-130," said Maj. Rob Faith, assistant operations officer for the Trainer Development Flight, in a 2015 news release.

Marines had used the helicopter for years to train every UH-1 crew chief and had taken to calling it "The Novem-

USAF photo by TSgt. Samuel King Jr.

Saved from the Boneyard, "Wild Thing"—stenciled nickname shown here—served for 47 years and now trains Air Force loadmasters at the garage.

ber." It cost about $3,000 to get the Huey ready for training airmen, not including cost of transportation or man-hours of labor. In its new life, it's used to train every UH-1N student in the Air Force, including mission pilots, instructor pilots, special mission aviators, and special mission aviator instructors. On average, each student gets six instruction hours—about 100 students per year. Previously, training costs were about $12,000 per student on a real helicopter. Monster Garage team members say it saves about $1 million per year.

The Monster Garage crew isn't just using the equipment from yesterday; it's also looking at new, high-tech ways to teach its airmen.

CV-22 Osprey training involves a Cabin Operational Flight Trainer featuring an "augmented reality" system that looks like night vision goggles affixed to headgear. Sensors on the airman's body and cameras track movement. Blue screen technology, similar to that used in TV weather reports, surrounds the aircraft, and computer graphics create a realistic surrounding environment.

The system is able to simulate an airman working on an Osprey in darkness, or in a sandstorm, and is used for scenarios such as loading and unloading and working on the aircraft's systems while on the ground.

An instructor can watch the student in a normal, fully lit environment while the student is working in simulated darkness.

Airmen become so familiar with the Osprey's systems in the simulator that they are experts before moving on to an actual aircraft.

"If you think of training as 'crawl, walk, then run,' this is crawling and walking," Faith said. "Running is the training in the actual aircraft."

While this dedicated system has been shown to be effective, the Monster Garage team is looking for newer, more realistic ways to train. They are now doing a proof-of-concept of a commercial, off-the-shelf HTC Vive virtual reality system to simulate working on the aircraft. The system includes a headset and two handheld controllers—similar to those used in home gaming consoles—that are used as "virtual wrenches" and other equipment to work on a simulated Osprey.

Like everything in the garage, the virtual system isn't a perfect replica of flying on a real aircraft, but it's close enough.

"You know it's fake, but it looks real," Lee said. "It's real enough for realistic training." ✪

CAP JOINS THE TOTAL FORCE

By Jim Mathews

WHEN the Air National Guard's 174th Fighter Wing traded its F-16s for MQ-9 Reapers in 2009, training with the remotely piloted aircraft (RPAs) quickly became a major logistical headache.

To comply with FAA rules about where and when unmanned aircraft can fly, crews and maintainers had to take the RPAs apart and truck them from their home at Hancock Field, near Syracuse, N.Y., to Wheeler-Sack Army Airfield at Fort Drum, N.Y. There they assembled the aircraft, flew their training missions, then dismantled the RPAs and trucked everything back down Interstate 81 to their home base. This procedure was costly and limited training on RPAs at a time when the Air Force was short of funds.

This past summer, the Civil Air Patrol, the Air Force auxiliary, stepped in to help.

Volunteers in CAP-owned aircraft began flying RPA chase missions from Hancock, home of what is now the 174th Attack Wing (ATKW). Under a deal with the FAA—which requires RPAs to remain in visual sight while operating in domestic US airspace—CAP pilots escort the MQ-9s as they fly to one of the nearby military operating areas.

It has quickly become a full-time mission for CAP, requiring weeklong deployments for the volunteer pilots and aircrews that rotate into the role, supporting as many as 30 hours per week of flying. The mission will continue, and even grow, until a new surveillance radar comes online in late 2017 that will minimize the need for the chase sorties.

Col. Michael R. Smith, 174th ATKW commander, said this approach will save taxpayers $1 million while boosting training by about 50 percent.

The RPA chase mission is a case study in how CAP is moving into a more prominent partnership role as part of the Total Force.

CAP was created in December 1941 and has been the Air Force's auxiliary since May 1948, but awareness of its capabilities had been minimal until August 2015, when USAF updated its doctrine to include CAP's volunteers in its definition of the Total Force. Service leaders are now directed to consider all Total Force elements, including Civil Air Patrol, "when determining the most effective and efficient ways to complete the mission."

The doctrine change "is raising the visibility within the Air Force itself about what the Civil Air Patrol is," said CAP Maj. Gen. Joseph R. Vazquez, the organization's national commander. "It has put us on the map as an Air Force asset. It's sort of been building up to this" in the year since the change was publicized, a "recognition that we do have the capability to do a lot more. That universe of potential customers out there within the Air Force has expanded."

The 1948 law establishing the Civil Air Patrol as the auxiliary of the then-new Air Force set out what's become its familiar three-pronged mission: aerospace education—both for its members and the general public—a cadet program to foster leadership in American youth, and emergency services, encompassing everything from search and rescue to disaster relief.

In existence for 75 years, and USAF's auxiliary for 68, CAP is a partner in major missions.

Photo by Lon Carlson, L-3 Communications

In recent years, the emergency services mission has expanded into counterdrug surveillance, fighter interceptor training, critical infrastructure surveillance, and noncombat support missions. Those include using CAP manned aircraft to emulate MQ-1 and MQ-9 RPAs during Green Flag exercises. Today, CAP members fly nearly 100,000 hours per year performing missions under the direction of Air Force, state, and local agencies. In Fiscal 2015, CAP aircrews flew 79,003 hours on Air Force-authorized missions alone, 47 percent more than a decade earlier.

"As a strategic partner, these unpaid professionals have boldly served our nation, saving the Air Force almost 40 times the cost of using military assets for each hour served," Air Force Secretary Deborah Lee James said in announcing the 2015 Total Force definition change.

Vazquez described another recent example of involving CAP in Active Duty operations. A wing commander at JB Langley-Eustis, Va., needed low-and-slow targets so F-22 Raptor pilots could practice intercepts. CAP supplied aircraft and crews, at considerable savings. Vazquez commented, "There is this auxiliary out there that they can go and use to meet their needs, rather than having to bid on some government contractor to go out and do the same thing." (See "Capital Defenders," December 2012, p. 28.)

Civil Air Patrol operates border-to-border and coast-to-coast within the continental US, plus Alaska, Hawaii, Puerto Rico, and the US Virgin Islands. Congress appropriates funds for acquisition and operation and maintenance. Years of steady procurement have produced a fleet of some 550 aircraft dispersed around the country. The Fiscal 2015 buy included 21 Cessna 172S aircraft, and Fiscal 2016 saw the purchase of 17 Cessna 182Ts and two Cessna 206s.

With 35 Cessna 206s, 194 Cessna 172s, and 343 Cessna 182s, CAP operates the most Cessna aircraft in the world. A large number are outfitted with a flat-panel glass cockpit, full autopilot, full suite of specialized search gear, satellite phone, and VHF-FM tactical radios. Sixteen Gippsland GA-8 eight-passenger transports round out the fleet, along with 49 gliders used for orientation flights and cadet training.

A Civil Air Patrol Cessna T206H, modified by L-3 Communications—which installed a sensor similar to those found on Predator RPAs—supports a Green Flag mission.

Army Col. Jayson A. Altieri, who chairs CAP's 11-member board of governors, said the need for CAP will only grow, due to years of increasing demands on the Air Force, even as defense budgets have declined.

Created by Congress in 2000 to oversee CAP, the board comprises members appointed by the Secretary of the Air Force and members appointed by CAP. They, in turn, stay engaged with USAF leadership and explore how CAP might be used in new or expanded roles. These range from operations, supporting cyber education, and preparedness to taking full advantage of CAP's cadet program.

TRIBLADE

Among the initiatives growing from the Total Force redesignation are several utilizing communication as a strategic asset. CAP can provide secure, mission-critical tactical command and control communications between aircraft, ground teams, and command posts performing search and rescue and disaster recovery operations. In recent years CAP has invested in a survivable, infrastructure-independent, and nationwide long-distance messaging system using high frequency (HF) radio.

In 2014, CAP created the National Traffic Net, known as Triblade, with around-the-clock availability and next generation Automatic Link Establishment. It will soon be able to pass data through the HF network with online and offline encryption. Early in 2016, CAP reported that an average of 100 to 110 stations a day check in on one of its 15 regular weekly national HF nets. Air Forces Northern is considering leveraging this capability as a command and control resource, a crucial capability for passing messages over long distances in case satellite-based digital systems fail or are compromised.

Apart from this, CAP has a national objective of exploring possible new missions, including nonflying missions that play to its strengths and expand funding opportunities. The 2016-20 CAP Strategic Plan states, "We are performing missions today that were 'what if' questions just a few years ago" and charges all CAP members with looking for ways to establish "enduring partnerships with local and national authorities" that open the door "to missions not yet envisioned."

Collecting imagery to respond to disasters and recover from them is a role of increasing importance. CAP aircrews supplied more than 150,000 geo-tagged images of the devastated New Jersey coast to the Federal Emergency Management Agency after Hurricane Sandy in 2012. Emergency managers have started to see the value of gathering imagery in developing response plans.

All the service branches and the Department of Homeland Security are doing more dedicated planning for domestic US disasters and contingencies, looking for opportunities to partner with local, state, and other response agencies.

Paul D. Gloyd II is a retired Air Force officer who commanded the CAP-USAF organization with day-to-day administrative responsibility for CAP and is now a CAP headquarters civilian employee. He said the organization's new status as a fully recognized part of the Total Force has given it a seat at the table as these plans take shape.

"It's well-publicized that our military has faced, in recent years, unprecedented budget and manning cuts," said Gloyd. "What we're beginning to see is CAP's increased presence in Air Force strategic-level planning activities. For example, noncombat activities historically conducted with organic Air Force personnel and assets are now being shifted to CAP when prudent to do so."

The cooperation is becoming broader and deeper and now extends beyond just picking up mission sorties.

"People often think of a mission as an activity accomplished in an aircraft or perhaps searching for a lost soul on the ground," said Gloyd. "However, missions span the scale of opportunities and sometimes the mission is to shape the future." For example, CAP's aerospace education efforts to inspire youth in science, technology, engineering, and mathematics "is earning national acclaim." The Air Force STEM Outreach Coordination Office provided funds "to continue our outreach to tens of thousands of school-age children. This funding is expected to continue, as will CAP's growing catalog of STEM subjects, the newest of which focuses on cyber."

Another pressing issue is how to address USAF's pilot shortage. CAP leaders recently participated in Air Force discus-

CAP photo

CAP photo

CAP photo by 2nd Lt. Robert Kehr

Top: A CAP flight monitors an MQ-9 Reaper. CAP has been chasing Reapers in the Class C airspace around Hancock Field, N.Y., to ensure safety of flight for the RPA. Left: CAP Lt. Col. John Henderson (r) briefs CAP Maj. Jim Schmidt (l) and CAP Maj. Jeff Koubek before an aerial photo mission. Right: A CAP aircraft orbits a JLENS aerostat, a vehicle designed to provide a battlefield commander with early warning of airborne threats.

sions to address and develop options to reverse the trend, Gloyd said.

"By most accounts, being incorporated into strategic planning processes is somewhat of a first for CAP and very much welcomed by us and the Air Force," he said.

One message that emerged from these conversations with Lt. Gen. Darryl L. Roberson, commander of Air Education and Training Command, and other senior leaders is that USAF wants to do a better job of enticing its own AFROTC cadets to become Air Force pilots, Vazquez said.

"That means getting them up in the air as often as they can, which means funding [CAP's] cadet-orientation flight program," he explained. The pilot shortage has made these efforts a priority, and CAP is ready to execute quickly. "The airplanes are in place, the program is in place; all they have to do is turn the dollars on. They don't have to create a program from scratch or go get contractors. It's very inexpensive for us to do that versus a contractor."

As of Aug. 9, 2016, CAP pilots had conducted 126.3 hours of orientation flying in Fiscal 2016 for AFROTC cadets, a 213 percent gain over Fiscal 2015. Nevertheless, more is needed to make a dent in the pilot shortage.

About 9,600 pilots are on the CAP rolls, but only 2,800 are active pilots, and the number of fully qualified mission pilots hovers around 1,700. That's enough to support existing missions, but more are always needed. All are unpaid volunteers who give up nights, weekends, holidays, or vacations to train in their specialties. Some 70 percent of CAP's annual mission hours are devoted to mission support, with another 35 percent spent on training.

Like the Air Force, commercial airlines, and even general and sport aviation, CAP could use more pilots.

That's one of the challenges that has come along with the Total Force designation. People and processes are being adjusted to meet growing demand for support, and recruiting and retention become more important as the number of missions increase.

"We're a very mature program. We've been around a long time," said Vazquez, "and we've let our regulations grow to the point where sometimes we can turn people off trying to come in the front door."

CAP is in the midst of a nose-to-tail revamp of every regulation, instruction, and pamphlet. This scrutiny is aimed at stripping down requirements and administrative burdens to a minimum while aligning more closely with the Air Force. It's more than a paper chase: Exit surveys of members who leave CAP show that a prominent factor in their decision is the perception that they're not needed. This is fueled in part by procedures that make it difficult to recruit members in particular specialties—whether pilots, communicators, system operators, or administrators.

"We've got to figure out a way to give credit for people who have those experiences and bring them straight into the program, where they can start contributing without too much overhead," Vazquez said. "The big thing is making it easy for professional pilots, or professionals of any stripe, to come into Civil Air Patrol" without roadblocks being put in their way "inadvertently." ✪

Jim Mathews volunteers as a CAP major commanding a Virginia squadron and serving as rated aircrew. He became CEO of a national transportation nonprofit organization after 26 years as a reporter, editor, and executive at Aviation Week. *This is his first article for* Air Force Magazine.

RETENTION QUESTIONS

By Megan Scully

USAF photo by SrA. Tyler Woodward

IT'S NOT JUST ABOUT PAY.

The military will never compete dollar-for-dollar on salaries with the private sector, and in many ways, comparing military to civilian work is an apples-to-oranges comparison. The perks that go along with military service, though—from training and educational opportunities to, more recently, paid maternity leave—do help the military overcome what might otherwise look like a no-win pay imbalance.

The goal is to offer a balanced compensation package, where salary and benefits make financial sense. If the Air Force can strike that balance, it stands a good chance of recruiting and retaining quality and skilled airmen.

The Air Force has regularly met its recruiting goals, a trend that is expected to continue through 2017. News on the retention front, especially in regard to enlisted personnel, has also been good.

One area of present concern centers on retaining midcareer officers—particularly in the aviation and remotely piloted aircraft communities. The biggest challenge is convincing those airmen with six to 16 years of experience to stay with the Air Force.

An F-22 pilot prepares for takeoff in Southwest Asia on Oct. 21. Retention is good in some specialties—for pilots, not so much.

USAF photo by Yasuo Osakabe

For the Air Force, perhaps the biggest and most effective financial incentive for retaining pilots is aviation bonuses. Bonuses have been capped for pilots of manned aircraft at $25,000 since 1999, however, and Brig. Gen. Brian T. Kelly, the Air Force's director of military force management policy, notes the value of those dollars has declined over time. Not surprisingly, so has the "take rate" for that bonus.

The Air Force's target take rate is 65 percent, but it missed that mark by 10 percentage points in Fiscal 2015, according to service statistics. The number for the first 10 months of Fiscal 2016 was only 42.9 percent. Every weapons system saw a drop. The take rate for bomber pilots, for instance, dropped from 57.1 percent in 2015 to 38.5 percent, while fighter pilots similarly declined from 47.8 percent to 34.4 percent.

The Air Force has been pushing Congress to provide some relief and allow officials to increase the amount of the bonus and position the service to better compete against commercial airlines, which can offer more lucrative salaries and more consistent schedules.

During a Pentagon press conference in August, Air Force Secretary Deborah Lee James appealed to Congress to raise the cap on those bonuses, stressing that an anticipated hiring surge within the airlines will only exacerbate the service's pilot retention problem.

"We need this authority now specifically because we need to address a number of shortfalls, the most important of which at the moment is the 700 fighter pilot shortfall that we are facing by the end of this year," James told reporters. That deficit, she added, will grow to 1,000 pilots in just a few years.

Air Force Chief of Staff Gen. David L. Goldfein views these bonuses as a way to boost the quality of life for airmen, particularly those whose specialties are most in demand.

BONUS INCREASE

"If we can remove some financial burdens and provide some incentive, our studies have shown that the force will respond," Goldfein said. "But we do need to change the levels that we're authorized to pay because we haven't changed those in years. ... We've got to make sure that we remain competitive."

The Air Force is less constrained for remotely piloted aircraft operators. The bonus for RPA pilots is increasing from $25,000 to $35,000. All RPA pilots coming to the end of their Active Duty service commitment are eligible for the larger bonus, should they re-up with the Air Force, James said.

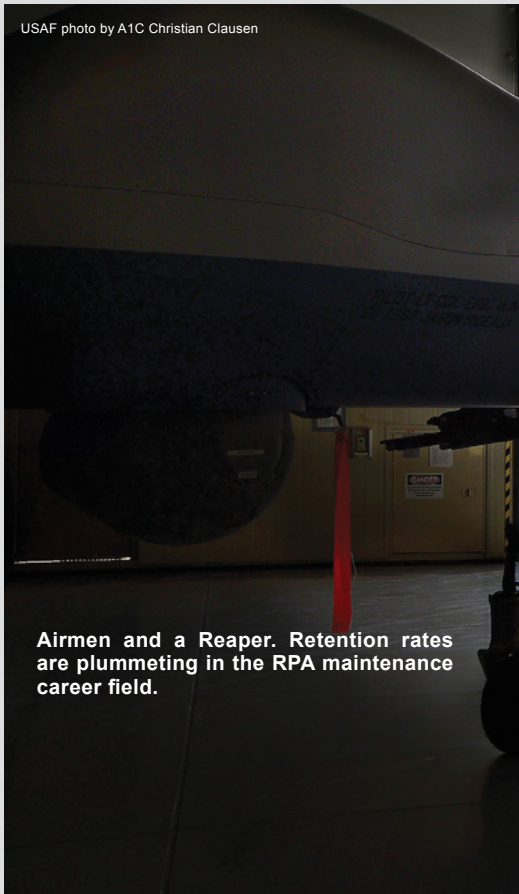
Meanwhile, the service has begun offering selected reenlistment bonuses to a wider range of career grades and fields, including special operations and cyber. More than 4,000 airmen have taken advantage of those bonuses, which can run as high as $90,000, depending on the specialty.

While the bonuses cost money up front, they protect the Air Force's investment in its force, which can often be difficult to quantify in dollars. The Air Force can always produce more pilots or cyber operators, but it can't easily replace or replicate their years of experience.

"You're really exchanging that experience for new people," Kelly said.

While compensation—particularly sizeable bonuses—is a big part of the story, it's just the tip of the iceberg for the service's recruiting and retention efforts. Benefits, many of which are unique to the military, remain a significant factor for new airmen and for those considering staying in the service.

Indeed, Col. Matthew L. Hughbanks, chief of the plans and resources division



USAF photo by A1C Christian Clausen

Airmen and a Reaper. Retention rates are plummeting in the RPA maintenance career field.

Far left: Maj. Dominique Haig flies over the Kanto Plain, Japan, where the US demonstrated airdrop capabilities. Left: USAF Chief of Staff Gen. David Goldfein speaks to airmen about pilot retention at Osan AB, South Korea, in October.

at the Air Force Recruiting Service, said potential recruits rarely even ask about salary. It's not that they don't care about the size of their paycheck, but most have already done at least a cursory Internet search and have some idea what to expect. What they do have questions about are other aspects of the package, especially education benefits. This is particularly true for airmen who expect to use their time in the service as a stepping stone, a time to gain skills, certification, and education that will help them when they return to the private sector.

At any given time, about a third of airmen are taking advantage of tuition assistance, making it a "key pillar" in Air Force readiness and critical programs for recruiting and retention, Goldfein said in a written response to questions from the Senate Armed Services Committee before his confirmation hearing in 2016. Enlisted airmen rank GI Bill and tuition assistance programs as among the top five reasons to stay in the Air Force, according to the Air Force's 2015 retention survey.

For those airmen considering extending their service commitment, many have a family to think about, Kelly said. That means benefits such as health care and retirement often play a bigger role than they do in recruitment. But the military's goal, particularly with the military's Tricare health care system, is to make the benefit as cost-effective as possible.

The Pentagon's cost-saving efforts to raise prescription co-pays and make other changes to Tricare have typically been met with stiff resistance on Capitol Hill, particularly within the House, where hawkish lawmakers want to preserve the benefit, largely as is. Air Force and other military officials however, have advocated for changes amid fears that health care costs are rising too rapidly.

"We must continue to remain cognizant of rising personnel costs and ensure efficiency, as well as look to new ideas and keep them manageable in order to provide for force structure and modernization that are also critical in defense of our nation," Goldfein told the Senate Armed Services Committee in his written response, adding that the Air Force continues to make difficult, but fiscally responsible, decisions in personnel.

Compensation changes come with decades of after-effects as they affect which airmen are gained, lost, retained, or sent looking for private-sector work. Annual pay changes also bring a lasting effect to military personnel costs. Military pay became a "third rail" in US politics in the years following the Sept. 11, 2001, terrorist attacks, when the White House requested annual pay hikes in excess of the rate of inflation.

Not to be outdone, lawmakers would often heap another half-percent on top of that, without any significant pushback from their colleagues or the

administration, or any concerns about long-term consequences.

No one wanted to be seen as cutting troop pay or even simply holding it flat in wartime when many remembered the recruiting and retention challenges the military faced in the past when a so-called "pay gap" existed between military and civilian pay.

That all changed in 2011—and so did the size of the military pay raise, which dropped suddenly to a much more modest 1.4 percent. It has mostly hovered around that point since then.

The largesse in the decade following 2001 brought military salaries much more in line with the private sector—a comparison particularly important within the Air Force, which regularly competes with commercial airlines and technology firms for skilled personnel. However, it also set up a growth curve in pay that the Pentagon, grappling with stringent budget caps since 2012, simply can't sustain.

It might not have to.

Those involved in recruiting and retaining airmen say smaller raises haven't really affected their efforts. Rather, it's the entire package of benefits—from tangible things like quality health care, to the intangible, such as desire to serve—that matters most in building and maintaining the force.

Each half-percent uniformed pay raise costs the military about $330 million, but that doesn't produce a big difference in most paychecks. A service member at a grade of E-4, for instance, would receive only $11 additional each month, Rep. Susan A. Davis (Calif.), the top Democrat on the House Armed Services military personnel subcommittee, estimated this spring. While bigger raises seemed like a no-brainer when the budget was growing steadily, Davis and others argue there may be better ways for USAF and the other services to spend today's limited defense dollars.

GOODWILL GOES A LONG WAY

"We closed that gap down pretty good throughout the 2000s, especially after 9/11," said Kelly.

Not all benefits come with a big price tag. Some, like the military's new maternity leave offering and efforts to station married personnel together, cost little and go a long way toward building goodwill with service members.

"We're not trying to be futuristic, we're not trying to be progressive," Defense Secretary Ashton B. Carter said in 2016 in announcing new, more family friendly policies for military personnel. "We're trying to make sure that we continue to attract and retain the very best."

The Air Force has yet to measure how these new policies will affect recruiting and retention, but officials are optimistic that they will appeal to airmen, particularly women who would otherwise make a choice between family and service.

All these noncompensation measures are particularly important to recruiting and retention as an improving national economy makes it easier for prospective airmen to find jobs in the private sector.

"When the economy was down, it wasn't uncommon for people with law degrees, master's, and Ph.D.s wanting to go to [Officer Training School]," Hughbanks said. "Now, it's the normal thrash of kids late in college or just coming out of college."

The Air Force nonetheless continues to meet its targets in terms of quality and numbers, said Kelly, who pointed to the 31,500 enlisted recruits and 4,500 new officers in the ranks.

"I think the most important thing—and this is going to sound easier than it is—is giving somebody a quality experience," Kelly said. That includes job satisfaction, allowing members to learn and maintain skills aligned with their personal preferences, and having an overall positive experience within the Air Force.

Pay, bonuses, and other benefits certainly matter in recruiting and reten-

USAF photo by TSgt. Christopher Carwile

USAF photo by A1C Christian Clausen

Capt. Stephen Del Bagno, an F-35 pilot, prepares for a flight at Alliance Arpt., Fort Worth, Texas. Pilot retention is partly a marketing problem, said Col. Matthew Hughbanks, chief of plans and resources at the Air Force Recruiting Service.

USAF photo by SSgt. Peter Thompson

tion, but aren't enough. If the Air Force doesn't get the quality of service right, if the airmen don't enjoy their service and aren't proud of their work, nothing else really matters.

It's not an exact science. The military "counts a little bit on the goodness of people's desire to serve," Kelly said.

While the policies that promote quality of life help with recruiting and retention, Hughbanks asserted that the Air Force needs a bigger marketing budget to get out its message.

Fewer potential recruits have parents or extended families who have served in the military than just a generation ago, and some can't even name all of the services. That's a problem for recruiters, particularly those in regions where the Air Force doesn't have a strong local presence.

"They think the Air Force logo is a Lockheed Martin logo," observed Hughbanks, who bemoaned the service's shortage of marketing dollars compared to the Army and Navy. The Air Force simply doesn't have the money for widespread outreach, such as commercials during major sporting events, he added.

Hughbanks would like to see the Air Force roughly double its marketing dollars, to about $85 million annually. That would allow it to work on a long-term plan that includes advertising and other tactics aimed at attracting new personnel.

"Without the marketing and additional manning, it'll be a very, very difficult road," Hughbanks warned.

After more than a decade of heavy deployments, the Air Force—and, really, the entire military—also must overcome the impression that all personnel go from recruiting station to the war zone. Hollywood's depiction of the military leads many recruits and parents alike to worry about the dangers of a life in the military. Many, Hughbanks said, ask whether they are going straight to the desert.

Far left: Airmen look over a U-2 during training in Southwest Asia. USAF is meeting most enlisted recruiting goals. Left: Airmen fly an RPA training mission at Creech AFB, Nev. USAF is having difficulty retaining RPA officers.

The Air Force is also working on removing other barriers to service, many of which are policies left over from the 1970s. Those include everything from prohibitive medical conditions to how many tattoos an airman can have. Another issue the service is struggling with is marijuana use, particularly as some states legalize recreational use.

Meanwhile, the service wants to mobilize retired airmen to get its message out to diverse communities, many of which don't have regular contact with the Air Force. They also want minorities to be able to see themselves in the force.

"For me, as a new Chief, it's about a balance between quality of service and quality of life," Goldfein said. "I'm confident we'll be successful."

In the end, it comes down to Kelly's ledger. If the Air Force can provide a high quality of service—a total package of compensation and intangible benefits—USAF will continue to be able to recruit and retain quality airmen. If the Air Force is not able to do this, high-quality people will go elsewhere. ✪

Megan Scully is a reporter for *CQ Roll Call*.

B-1, BETTER THAN EVER

The B-1B is officially designated as a bomber. But during its three-decade operational life, it has demonstrated expanding multimission versatility and supersonic speed and agile handling that defy that characterization and its massive size.

Officially named the Lancer, the B-1 is affectionately called the "Bone" by its four-person crews, who proudly call themselves "Bone Drivers." It could as well be called the Phoenix, for the mythical bird that rose ever more powerful from the ashes of its own destruction. Conceived in the 1970s as a replacement for the B-52s in the strategic nuclear bomber force, the program was canceled in 1977 by then-President Jimmy Carter after four B-1A prototypes were built. But the program was resurrected in 1981 by President Ronald Reagan as part of a major defense buildup.

The new B-1B model was substantially changed to add payload capacity and to reduce its radar cross section in

The Lancer's legacy is still being written.

Photography by Sagar N. Pathak
Text by Otto Kreisher, Senior Correspondent

Crew chiefs at Dyess AFB, Texas, prepare to launch a B-1B.

recognition of the growing threat from radar guided surface-to-air missiles. Part of the structural changes for lower RCS reduced the B-1B's maximum airspeed from its predecessor's Mach 2.2 to a still impressive Mach 1.2.

Powered by four General Electric F101-GE-102 turbofan engines with afterburner, producing more than 30,000 pounds of thrust each, the B-1B has set more than 50 world records for speed, payload, range, and time to climb in its class. Its exceptional in-flight performance is aided by its ability to swing its massive wings back close to the fuselage for reduced drag in flight, but spread them to their full 137-foot length for slower takeoff and landing speed.

Under the Reagan buildup, 100 B-1Bs were produced by Rockwell International, now part of Boeing. It achieved initial operational capability Oct. 1, 1986, at Dyess AFB,

/1/ Bones on the ramp. /2/ The Sniper Advanced Targeting Pod-Sensor Enhancement carried by the B-1s has enabled crews to detect and identify weapons and added to surveillance capabilities. The pod adds forward-looking infrared, dual-mode laser, HDTV, laser spot tracker, laser marker, video data link, and a digital data recorder to the B-1B's capabilities. /3/ A maintainer examines one of four F101-GE-102 turbofan engines on a B-1 at Dyess.

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Texas. But due to a difficult early operational experience, the Bone did not see combat until the limited strikes against Iraq in Operation Desert Fox in 1998.

The B-1Bs made a formal transition from part of the nuclear-armed strategic deterrence force to a fully conventional warrior in 1998. In 2001, it survived another threat to its existence—evading Defense Secretary Donald H. Rumsfeld's attempt to retire a large part of the force—thanks to congressional support.

In its next combat opportunity, during Operation Allied Force in 1999, the NATO-led mission against Serbia for its aggression in Kosovo, the B-1B demonstrated what has become its distinguishing characteristic—the ability to deliver massive amounts of ordnance in a limited number of combat sorties. The Bones unloaded more than 20 percent of the coalition's total tonnage in Allied Force while flying only two percent of the combat missions.

In its next combat assignments, in Operation Enduring Freedom in 2001, the B-1B's massive weapons payload—up

/1/ The B-1B's variable-geometry wings increase maneuverability and speed. /2/ The 7th Bomb Wing (commander's airplane with the orange tail flash) comprises the 9th Bomb Squadron (black stripe with white bat tail flash) and the 28th BS (blue-and-white-checkered tail flash). /3/ Crew chief SSgt. Erron Farrow runs through a final check before launching a Lancer on a mission. /4/ Capt. Richard Hansen leads a pair of B-1s in formation. /5/ Lt. Col. Jeff Strommer inspects his headset before a flight.

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to 75,000 pounds—and its ability to loiter for hours over the battlefield and to put bombs on target with great precision, made the Bone a favorite of air component commanders and threatened ground forces. B-1B precision strikes with Joint Direct Attack Munitions (JDAMs), under the direction of combat air controllers on the ground, enabled the small number of US special operations troops and Afghan resistance fighters to quickly drive the Taliban extremists out of their strongholds in the opening phase of OEF. In the first six months of that fight, eight B-1s dropped 40 percent of the coalition air forces' total bomb deliveries.

In Operation Iraqi Freedom in 2003, B-1Bs delivered 43 percent of the JDAMs used, while flying less than one percent of the combat missions. In the later stages of OEF, when large numbers of US ground troops frequently were engaged in intense battles with aggressive Taliban fighters, the Bones showed considerable skill in an unexpected role for a heavy bomber—providing close air support to threatened soldiers and marines. Again, the ability of the B-1s to linger over the battlefield for hours and to deliver a variety of precision guided munitions, sometimes at

/1/ Maintainers at Dyess work on one of a B-1B's four GE F101-GE-102 turbofan engines. /2/ Capt. Krystle Duckett, an offensive systems operator, in her spot behind the cockpit of a Bone. /3/ A B-1B undergoes heavy maintenance in a dock at Dyess. /4/ Aircrews go through hanging harness training to prepare them to overcome obstacles they might encounter after ejection and to learn how to manually lower themselves.

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danger-close distances, won them the devotion of hundreds of grunts.

Their ability to perform demanding ground-support missions, never envisioned when the first B-1Bs rolled out of the factory in 1984, was the result of a series of improvements to the Bones' avionics and mission systems. The addition of targeting pods with day-night sensors also allowed the B-1s to take on another role in support of ground troops: providing overwatch and valuable intelligence on hostile forces. But after more than a decade of nearly continuous operations as the backbone of the coalition air forces in Iraq, Syria, and Afghanistan, the Bones have been pulled back to the States for an extensive upgrade to its combat systems and avionics, called the Integrated Battle Station (IBS).

During that multiyear technology modernization, the entire inventory of 62 B-1s also will receive structural work intended to keep them operational and cutting edge through 2040. ✪

/1/ A Bone over Texas. /2/ A B-1B rests on the ramp while another takes off in the background. There are 33 B-1Bs at Dyess and 27 at Ellsworth AFB, S.D., and two test frames at Edwards AFB, Calif. /3/ Hansen and Capt. Brian Rahl (right) fly the most updated version of the B-1B. The cockpit features an upgraded Integrated Battle Station, including Fully Integrated Data Link, Vertical Situation Display, and Central Integrated Test System. All increase situational awareness. /4/ Crew chiefs wait for the aircrew to arrive so they can launch the bomber on a night mission.

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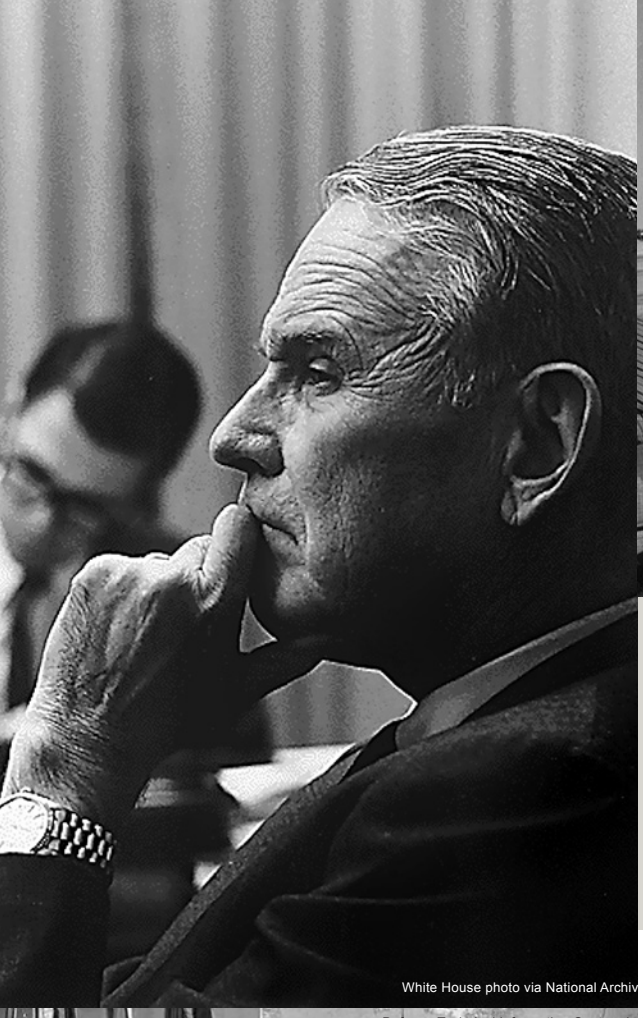


White House photo via National Archiv

National Park Service photo by Abbie Rowe

Defense Technical Information Center photo

Maxwell Taylor's Trumpet

By John T. Correll

JFK, impressed with Taylor's strident arguments, recalled him from retirement, launching the era of "Flexible Response."

The US Army was already upset about its losses from deep personnel and budget cuts when Gen. Maxwell D. Taylor arrived as the new Chief of Staff in June 1955. Army strength was down by almost a third since the Korean War and the Army share of the budget was dropping steadily.

These reductions were the result of the "New Look" defense program, introduced in 1953 by President Dwight D. Eisenhower, and the "Massive Retaliation" strategy that went with it.

New Look was focused on the threat of Soviet military power, putting greater reliance on strategic airpower and nuclear weapons and less emphasis on the kind of wars the Army fought.

US planning was based on the standard of general war; the limited conflict in Korea was regarded as an aberration. If for some reason another small or limited war had to be fought, the US armed forces, organized and equipped for general war, would handle it as a "lesser included contingency."

New Look—so called because Eisenhower had ordered a "new fresh survey of our military capabilities"—was driven by the belief that adequate security was possible at lower cost, especially if general purpose forces overseas were thinned out.

Another factor was the recognition that NATO could not match the conventional forces of the Soviet Union, which had 175 divisions—30 of them in Europe—and 6,000 aircraft based forward. So in 1952, the US and its allies had adopted a strategy centered on a nuclear response to attack.

As a side effect of New Look, the Army's strength dropped by almost half a million men by 1955. The Army, which had been first among the services in its share of the defense budget, fell to last. The diminished role of ground forces predicted further cuts to come.

Clockwise from upper left: Gen. Maxwell Taylor, as advisor to President Lyndon Johnson, at the White House in January 1968. / L-r: Taylor, then Chairman of the Joint Chiefs of Staff, Secretary of Defense Robert McNamara, and President John Kennedy at the White House in 1963. Taylor and McNamara were briefing Kennedy on a recent trip to South Vietnam. / L-r: Gen. Thomas White, USAF Chief of Staff; Taylor, then Army Chief of Staff; Gen. Nathan Twining, Chairman of the JCS; Adm. Arleigh Burke, Chief of Naval Operations; and Gen. Randall Pate, USMC Commandant, at the Pentagon in 1957.

The effort to resurrect the limited war mission began during the tour of Gen. Matthew B. Ridgway, Army Chief of Staff from 1953 to 1955, but the bulk of the task was up to his successor, Taylor, who has been called "the last of the World War II heroic generals" and was well-known for parachute jumping into Normandy on D-Day as commander of the 101st Airborne.

When he came to Washington, he brought with him a draft paper he had been working on, promoting a concept he called "Flexible Response." It was no surprise that it called for greater attention to limited war and more resources for the US Army.

VOICE OF DISSENT

Before his selection to be Army Chief of Staff, Taylor was interviewed by Eisenhower, who told him that he expected "loyalty in spirit as well as in letter" from the service Chiefs. By Taylor's own account, he had "no difficulty" in assuring Eisenhower of "my readiness to carry out civilian orders even when contrary to my own views."

That, however, did not fit with Taylor's agenda to roll back the Army reductions. During his tour as Army Chief, Taylor consistently engaged in "undercutting as subtly as he could the Eisenhower policies of massive retaliation, with testimony on the Hill, with subtle leaks to the right journalists," said David Halberstram in *The Best and the Brightest.*

It was difficult to substantiate any administration bias against the Army. The policy was Eisenhower's and he was a retired five-star Army general. He had been Army Chief of Staff and Supreme Allied Commander, Europe.

In public, Taylor focused much of his ire on Adm. Arthur W. Radford, Chairman of the Joint Chiefs of Staff, described by Taylor as "an able and ruthless partisan" who "led a major effort to cut the conventional forces and particularly the Army."

In March 1956, the Secretary of Defense and the service Chiefs met at Ramey Air Force Base in Puerto Rico to talk about strategic requirements. Taylor presented his Flexible Response paper but the other Chiefs were not impressed, regarding it as essentially a partisan pitch for the Army.

Taylor pushed his arguments in speeches, articles, and interviews. "The avoidance of deliberate general atomic war should not be too difficult," he said, since it would be of mutual interest to the superpowers "to keep the hostilities localized."

"We are probably justified in assuming that neither side would voluntarily start a general atomic war," he said. The Soviet Union would probably favor "other forms of aggression" and "in the long run, these less catastrophic forms of warfare may prove more dangerous than the direct threat of atomic attack."

On the other hand, "a failure to have forces appropriate to situations short of general war can have serious consequences," he said. "If we allow a limited aggression to go unchallenged, we will risk the loss piecemeal of our position around the world."

Taylor is sometimes depicted as opposed to nuclear weapons, but that was hardly the case. In 1956, unable to secure his objectives with his basic Flexible Response proposal, Taylor reorganized the Army around the "Pentomic Division," designed to fight either a nuclear or conventional war. Each Army division would consist of five self-contained battle groups with capabilities that included low-yield tactical nuclear weapons.

US Army photo by 1st. Lt. Cecil W. Stoughton

Department of Energy photo

Top: US soldiers surround a Davy Crockett, a weapon capable of firing small-yield atomic warheads on the battlefield in support of the Army's front line Pentomic Divisions. Above: The mushroom cloud from "Little Feller I," the last atmospheric nuclear test in the US. Taylor and US Attorney General Robert Kennedy—great friends—witnessed it.

The Army already had artillery that fired atomic rounds and during Taylor's tenure added the 155 mm Davy Crockett, a tactical nuclear recoilless gun mounted on a tripod and having a range of only a few miles.

To Taylor's chagrin, Eisenhower was open to the idea of the Pentomic Division but saw it as an opportunity to make further reductions in personnel, which was not what Taylor had in mind. The Army followed the Pentomic model for a few years, then scrapped it and went back to a more traditional division structure.

Contrary to popular belief, Taylor did not resign from the Army in protest. He completed his full tour as Chief, retired in July 1959, and repackaged Flexible Response as a book.

THE UNCERTAIN TRUMPET

Publication in 1960 of *The Uncertain Trumpet* was timed, according to the Taylor-friendly *New York Times,* "to coincide with the opening of Congress on Jan. 6 in hope that it might tip off a great debate on national security in the final year of the Eisenhower administration." In addition to Taylor's usual points on Flexible Response, the book launched a free-wheeling attack on the Air Force and the Joint Chiefs of Staff:

■ "In its principal aspects, the New Look was little more than the old airpower dogma set forth in Madison Avenue trappings and now formally buttressed upon Massive Retaliation as the central strategic concept."

■ "The Air Force sees our principal danger in the growing strategic air and missile forces of the Soviet Union."

■ "The Air Force is not equipped to discharge its responsibilities to the Army in ground combat."

■ "Manned aircraft are disappearing and with them the kind of sustained air operations which justified the creation of the Air Force as a separate arm of the service."

■ "I would dissolve the JCS as it now exists and replace it by a single Defense Chief of Staff" who would be the senior military officer of the United States. Additional advice would be available from a "Supreme Military Council," consisting of three retired or soon-to-retire officers "not carried on the rolls of any service."

The Army should be restored to the strength it had at the close of the Korean War, he asserted.

Despite the image fostered by Taylor's admirers, the book was not particularly analytical or intellectual. "Stylistically, *The Uncertain Trumpet* left much to be desired, being jargonistic and repetitive and resembling a series of Army briefing papers," said Brig. Gen. Douglas Kinnard, a senior Army historian who once served on Taylor's staff.

"Limited war" and "flexible response" as described in Taylor's book had nothing to do with counterinsurgency or guerrilla warfare. "He seemed to be talking about guerilla wars, though it would turn out that he was the most conventional of men in terms of the new kind of warfare," Halberstram said. "What he was really talking about was apparently limited use of highly mobile conventional forces in very limited wars."

What *The Uncertain Trumpet* did have, beyond any question, was explosive political punch. Nobody realized that better than Sen. John F. Kennedy (D-Mass.), who was running for President and welcomed the scathing criticism of Eisenhower's military program.

"To the Kennedy people," Halberstram said, Taylor "was a good general, different from the Eisenhower generals." Kennedy, already enthusiastic about counterinsurgency and "brushfire war" strategies, adapted Taylor's Flexible Response theme for his own purposes.

White House photo via National Archives

Maxwell Taylor and Lyndon Johnson at the White House in March 1965. Johnson never entirely trusted Taylor, and they never developed the kind of close relationship experienced by Taylor and the Kennedys.

KENNEDY'S GENERAL

In his first job after retirement, Taylor was president of the Lincoln Center for the Performing Arts, but in October 1960, *The New York Times* predicted that he would be offered "a high post in the federal government" if Kennedy won the election.

In April 1961, Kennedy asked Taylor to lead a study into what had gone wrong in the Bay of Pigs fiasco, a failed military operation in Cuba run by the CIA with detailed operational decisions made by the White House. Nevertheless, Kennedy blamed the Joint Chiefs of Staff for not providing him better advice. Taylor's report gave Kennedy the answer he wanted: The Joint Chiefs had not adequately reviewed the plan.

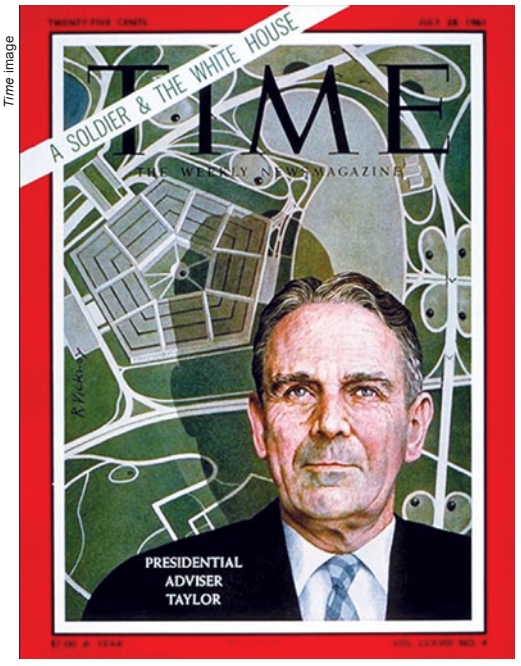
In July, Kennedy recalled Taylor to active duty in a newly created position, carefully designated as "military representative to the president." In this role, Taylor "effectively supplanted the Chairman of the Joint Chiefs" as principal military advisor to the President, said defense analyst Thomas E. Ricks. At the time, Army Gen. Lyman L. Lemnitzer was less than a year into his tour as Chairman.

It was a symbiotic relationship. Taylor lent military credibility to the Kennedys. They welcomed him as an insider and made Flexible Response the centerpiece of strategy. Taylor was especially close to the President's brother, Attorney General Robert F. Kennedy, who named one of his children after Taylor.

Implementation of Flexible Response took several forms. The nuclear war plan was revised to include options other than massive retaliation. The conventional forces were rebuilt. The Army was projected to grow from 11 combat-ready divisions to 16, and the number of Air Force tactical fighter wings was increased as well. The Army share of the budget began to rise. By 1966, it would surpass that of the Navy and pull even with the Air Force.

However, Kennedy went well beyond Taylor's prescription for Flexible Response with his emphasis on counterguerrilla warfare and a conversion to counterinsurgency swept through the armed forces. The administration was already leaning toward more active involvement in Vietnam.

In October 1961, Kennedy sent Taylor, accompanied by Walt Whitman Rostow of the White House staff, on a fact-finding mission to Vietnam. Taylor recommended sending a contingent of US ground troops, about 8,000, for limited use to reassure and shore up the position of South Vietnamese President Ngo Dinh Diem. "The risks of backing into a major Asian war by



Time image

Taylor on the cover of *Time* magazine, July 28, 1961.

way of SVN are present but are not impressive," Taylor said.

Taylor's report helped Kennedy decide to do what he wanted to do anyway. He declined to send combat forces but ordered a big increase in advisors and support personnel. The total rose from 900 at the time of the Taylor-Rostow mission to more than 11,000 by the end of the year. The drift to deep involvement in Vietnam was underway.

MARCHING IN STEP

In July 1962, Kennedy nominated Taylor to be Chairman of the Joint Chiefs of Staff. At his confirmation hearings, senators—no doubt recalling his firebrand activities of the 1950s—asked whether he planned to make sweeping changes.

"I assured them that none of these apprehensions was justified, that I was returning to the Pentagon in no crusading spirit, and I hoped, uninfluenced by any bias derived from my past experience." Taylor was sworn in as Chairman by his friend Bobby Kennedy on Oct. 1.

"With his own man as Chairman of the JCS, Kennedy would no longer need a 'military representative'," said Army Lt. Gen. H.R. McMaster in his highly regarded 1997 book, *Dereliction of Duty.* "When Taylor moved across the Potomac to the Pentagon, the President abolished the White House position."

Taylor's days as a disruptive activist were over. "I have come to understand the importance of an intimate, easy relationship, born of friendship and mutual regard, between the President and the Chiefs," he said. "It is particularly important in the case of the Chairman, who works more closely with the President and the Secretary of Defense than do the service Chiefs. The Chairman should be a true believer in the foreign policy and military strategy of the administration which he serves or, at least feel that he and his colleagues are assured an attentive hearing on those matters for which the Joint Chiefs have a responsibility."

Unlike the service Chiefs, Taylor had what was described as a "warm relationship" with Robert S. McNamara, the heavy-handed Secretary of Defense. *The New York Times* noted that Taylor managed to "adjust his concepts to complete endorsement of the McNamara [strategic] theory."

As recalled in John M. Taylor's biography of his father, Taylor said—probably with a certain satisfaction—that "under Kennedy, the Air Force had replaced the Army in the position of a 'permanent minority' on the JCS."

In the presidency of Lyndon B. Johnson following the Kennedy assassination in 1963, Taylor "demonstrated the same loyalty to Johnson that he had shown Kennedy," McMaster said. The service Chiefs had little access to the White House.

"Taylor deliberately misrepresented the Joint Chiefs' opinion and helped McNamara forge a consensus behind a strategic concept that permitted deepening American involvement in the war without consideration of its long-term costs and consequences," McMaster wrote.

Even so, Taylor never gained LBJ's complete trust, largely because of his closeness to the Kennedys, of whom Johnson was always suspicious. "Every now and then he'd say, 'How is that Kennedy boy named after you?' I wasn't sure he was joking," Taylor said.

Taylor's reputation in journalistic circles continued to glow. "He runs counter to the prevailing image of professional soldiers as inarticulate men of narrow interests," *New York Times* defense writer Jack Raymond said in 1964.

THE VIEW FROM SAIGON

When Taylor's tour as Chairman ended in 1964, Johnson named him ambassador to South Vietnam. Taylor arrived in Saigon in July with a powerful-sounding charter in a letter of instructions that he had drafted himself.

However, Gen. William C. Westmoreland—who had once served on Taylor's staff in the Pentagon—had arrived a month

US Army photo

Taylor (l) and Gen. William Westmoreland (c) answer questions from the press in South Vietnam. Westmoreland was for introducing ground troops into the war; Taylor was not.

earlier at Military Assistance Command Vietnam. As would become increasingly obvious over the next year, it was Westmoreland rather than Taylor who was Johnson's general.

The burning issue was introduction of US ground troops into combat in South Vietnam. Westmoreland was for it; Taylor was not. Ironically, Taylor, who had spent much of the past decade disparaging airpower, thought that an air campaign against North Vietnam was the better strategy.

Taylor expressed that advice until April 1965 when Johnson and McNamara decided that the air campaign was not working and that the war would be won or lost in the south. The rapid buildup of US ground forces began. After that, Kinnard said, Taylor was "a background figure in Vietnam" as Westmoreland came to the fore.

By June, though, "Taylor was back on the team" and "now supporting the program advanced by Westmoreland and the Joint Chiefs," Kinnard said. Always flexible in the long run, "Taylor later modified his position, saying that perhaps the United States had waited too long to commit American ground forces."

Taylor finished his tour as ambassador in July. He returned to Washington as a special consultant to Johnson, occupying the same office he had used in the Kennedy years in the Executive Office Building next door to the White House. His first assignment was a speaking tour to promote support for the administration's war policy.

He continued to serve into 1969 as chairman of the President's Foreign Intelligence Advisory Board but his public career was essentially over when the Johnson administration ended.

ECHOES FROM *THE TRUMPET*

In *Swords and Plowshares,* published in 1972, Taylor implored the nation not to forsake forces for limited warfare because of the experience in Vietnam. "The fact is, without the limited war option and the forces that go with it, we have little of substance with which to defend ourselves," he said.

In his later years, Taylor was a regular contributor to *The Washington Post* oped page, often sounding much like the Maxwell Taylor of old.

"By giving top priority to strategic weapons and thereby to preparations to forestall the least probable of our military threats, it will lead us to expend much of our resources on the wrong things or in the wrong order of priority," he wrote in 1980. "It will confirm us in the neglect of our conventional forces."

US Army photo

Maxwell Taylor's son Thomas (c) arrived in Vietnam as a US Army captain on the same day his father (r), then the US ambassador to Vietnam, left the country. Westmoreland is in the background.

He was implacably opposed to the Air Force's MX missile with basing modes that sought to survive a Soviet first strike. "A surprise attack on our silo ICBMs could be very damaging but its probability is very low," Taylor said in 1981. "I can conceive of no national purpose or vital interest that might induce the cautious old men in the Kremlin to run the risks inherent in such an action."

When Taylor died in 1987, Sen. Edward M. Kennedy (D-Mass.) said, "America has lost one of the greatest soldier-statesman in its history."

In a broader perspective, Taylor has not fared that well in the critical analysis of history.

The harshest judgment is by Ricks in *The Generals* in 2012. "Maxwell Taylor arguably was the most destructive general in American history," Ricks said. "As Army Chief of Staff in the 1950s, he steered the US military toward engaging in 'brushfire wars.' As White House military advisor during the early 1960s, he encouraged President John Kennedy to deepen American involvement in Vietnam. As Chairman of the Joint Chiefs, he poisoned relations between the military and civilian leadership."

"It is not overstating the case to say that the Army's doomed voyage to Vietnam grew in part out of its search for a mission in the mid-1950s," Ricks added.

H. R. McMaster's conclusions are almost as caustic. "Taylor exacerbated service differences to help McNamara and Johnson keep the Chiefs divided and, thus, marginal to the policy process," he said. "Taylor recommended men for appointment to the JCS who were less likely than their predecessors to challenge the direction of the administration's military policy, even when they knew that policy was fundamentally flawed."

From the middle 1960s on, Maxwell Taylor was never quite as large as his early legend. He did not expand significantly on his military concepts nor—given the positions of power that he held—did he have that much influence on policy or operations.

His big achievement was the formulation of Flexible Response. It has been interpreted in a variety of ways, some of them considerably different from what he had in mind. However, in various guises it became a fundamental doctrine of both the United States and NATO and is one of the lasting military concepts of the 20th century.

Even his worst critics will give him some credit for that. ✪

John T. Correll was editor in chief of *Air Force Magazine* for 18 years and is now a contributor. His most recent article, "Pearl Harbor Rides Again," appeared in the November/December issue.

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OUR GERMAN SCIENTISTS

By Rebecca Grant

Wernher von Braun in 1969 at the Kennedy Space Center, Fla., with a Saturn V that he helped the US develop. At the end of World War II in Europe, he led several German scientists in surrendering to American—rather than Soviet—troops.

Marshall Flight Center/NASA photo

IN May 1945, days before World War II ended in Europe, Private Fred Schneikert from Sheboygan, Wis., on sentry duty on the German-Austrian border, was approached by a young German man on a bicycle. He told Schneikert that his brother had been the V-2's inventor and now wanted to surrender.

Schneikert thought the man was nuts and told him so, but took Magnus von Braun into custody and said the Americans would investigate.

By the next morning, Schneikert's anti-tank company was holding several engineers from the rocket base at Peenemünde who had fled to the border area near Austria.

Their leader, Wernher von Braun, had indeed masterminded the V-2 and now wanted to be captured by Americans, not Soviet Russians.

In what today might be called the "preoffset," Americans raced around Europe at the end of the war gathering the scientific treasures of Nazi Germany's war effort. From Me 262 jet fighter assembly rigs to ballistic missile data from Peenemünde to the scientists themselves, the vast haul jump-started US Air Force technology dominance for the postwar era.

As the war wound down, Army Air Forces commander Gen. Henry H. "Hap" Arnold already had his eye on German technology.

Arnold had established Air Technical Intelligence teams to monitor enemy technology throughout the war. His advisor, Theodore von Kármán, collected a brain trust of scientists itching to exploit German advances once the war ended. In late 1944, teams

USAF photos

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German Federal Archives photo

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at Wright Field, Ohio, started composing "blacklists" of their most-wanted German aircraft.

Arnold "realized that the United States and its Allies by no means led the world in military aeronautical development," wrote his biographer, Dik A. Daso in *Air & Space Power Journal*. The US had made up for a lag in prewar designs with rapid innovation in engines and aircraft, and American factories simply out-produced the Axis. Although the US led in a few crucial fields—such as encryption and radar—in other areas it was behind, even at the height of the war. An American jet fighter wasn't fielded until just after the war ended in the Pacific.

Most egregiously, none of the victorious allies could match the reich's rocketeers, who had terrorized London and the Low Countries with the V-2. The rocket's velocity and penetration made it highly destructive against fixed targets.

Gen. Dwight D. Eisenhower, Supreme Allied Commander, concluded that if the Germans had perfected the V-2 six months earlier, they might have targeted the invasion staging areas in Portsmouth and Southampton. Operation Overlord "might have been written off," Eisenhower wrote in his 1948 war memoir.

From Washington, the Joint Chiefs of Staff gave Eisenhower orders to "preserve from destruction and take under your control records, plans, books, documents, papers, files, and scientific, industrial, and other information and data belonging to or controlled by ... German ... organizations engaged in military research."

Gen. Carl A. "Tooey" Spaatz, European air commander, ordered all those "not engaged in critical operational duties" to help seek out the "technical and scientific intelligence" that could

/1/ The rush to corral German technical and scientific knowledge after the war brought scientists such as Alexander Lippisch to the US. He had designed the rocket-powered Me 163 in Germany. This one is shown at the National Museum of the US Air Force in 2015. /2/ Lippisch was experienced in delta wing design, used by Convair in US fighter aircraft like the F-102, here on alert during the Vietnam War. /3/ Lippisch, left, and glider pilot Günter Groenhoff with a Lippisch Storch V, circa late 1920s/early 1930s.

be "of material assistance in prosecution of the war against Japan."

The first name for the overall program of technology exploitation was Operation Overcast, and the AAF part of the effort was Operation Lusty, a bastardization of the initials for Luftwaffe Scientific Technology.

Operation Lusty began April 22, 1945, when the wartime technical intelligence teams merged with the new Exploitation Division. The initiative would enjoy firm high-level support from the assistant secretary for air, Robert A. Lovett, as well as Arnold, Spaatz, and others, such as Curtis E. LeMay, who would serve one postwar year heading research and development.

MOST WANTED

With Spaatz's order, AAF teams moved forward, fanning out just behind armies advancing on the broad front, to locate blacklist aircraft. Some drove jeeps, while others flew into half-deserted German airfields in cargo aircraft. They lived with little support, camping in Luftwaffe barracks. Deep in Bavaria, some of them fished for trout or shot game for their meals.

Col. Harold E. Watson headed up the section of Operation Lusty charged with rounding up Luftwaffe airplanes. Watson divided his men into two sections, one for collecting propeller aircraft and one for jet aircraft. Both teams took on the name "Watson's Whizzers."

The most wanted aircraft in Operation Lusty was the swept-wing Messerschmitt Me 262 Schwalbe (Swallow) jet fighter. Pilots reported it achieved phenomenal speeds in combat. In a Military Channel interview, Bob Strobell, a P-47 pilot requisitioned for Operation Lusty, said that, near the end of the war, "we didn't have any jet fighters. We needed what they had, back in the US as quickly as possible."

Strobell took charge of the Me 262s at the Lechfeld air base. Nearly 30 Schwalbes in various states of repair were scattered around the field. Strobell recruited pilots and crew chiefs and ultimately relied on German personnel to get the jets flying and ready to be ferried to Cherbourg, France. To his surprise, the Germans cooperated. "They were apparently pretty proud of the airplane that they had and wanted us to like it," Strobell recalled.

The sleek Me 262s were fully operational and impressively easy to maintain. "I know for a fact you can change a jet engine on a Messerschmitt Me 262 in 30 minutes," said Strobell. Other innovations included leading edge slats to improve performance at lower speeds.

Through trial and error, Strobell's team figured out how to fly the Me 262s and ferried them to Cherbourg for embarkation on an aircraft carrier headed back to the States.

Operation Lusty ultimately exploited 9,132 separate installations. Most were known in advance, while others were a stroke of luck. In mid-April 1945, the US 1st Infantry happened on a facility near Braunschweig that turned out to be the Hermann Göring aeronautical lab, boasting the most sophisticated wind tunnels yet built. A budding forest cloistered the facility and stork nests dotted the roofs of the buildings.

The Germans called it simply Völkenrode. "The Allies had never heard of it before," wrote journalist Annie Jacobsen in her book *Operation Paperclip: The Secret Intelligence Program That Brought Nazi Scientists to America.* "It was an incredible find."

The take from Operation Lusty went to Dayton, Ohio. Wright Field became the central hub for crated planes and boxes of documents arriving by train from New York. More than 16,200 separate items came in. One early task for the newly arrived Germans was sorting through the documents to compile a technical library.

Arnold ordered the Army Air Forces to keep at least one of every type of airplane flown by the enemy during the war. The overflow of parts and planes went first to Indiana and then to Davis-Monthan Field in Arizona. Ultimately, several Operation Lusty aircraft ended up in permanent museum collections of the Air Force and the Smithsonian.

Much more complex was the issue of what to do with the people behind the technology. Originally, the victorious airmen thought mainly of retrieving airplanes and documents. However, the site visits of Operation Lusty relied on German help. It soon became evident that recruiting the Messerschmitt test pilots, Luftwaffe mechanics, and aeronautical engineers from German academia and industry would greatly enhance exploitation of the captured technology.

"What was really needed to redress the United States' scientific backwardness were the men who had designed and built the jets, missiles, and wind tunnels," wrote retired Col. Wolfgang W. E. Samuel in *American Raiders: The Race To Capture the Luftwaffe's Secrets.*

At the end of the war in Europe, Allied teams raced to capture and exploit the best brains of the Third Reich.

The masterminds behind this chapter in airpower development were Maj. Gen. Hugh J. Knerr and Brig. Gen. George C. McDonald. Knerr had been a pioneering pilot of the B-10 bomber as well as a disciple of Billy Mitchell. Retired before World War II, he returned to Active Duty and by 1944 was deputy commanding general of US Strategic Air Forces in Europe. In that post, he'd urged his boss, Spaatz, to secure German technical sites. Knerr took over the Air Technical Service Command in the spring of 1945, giving him broad authority over all aspects of Operation Lusty.

McDonald was another adventurous pilot who'd set a world seaplane speed record in 1924 and now served as director of intelligence for the US Strategic Air Forces in Europe. McDonald later became chief of intelligence for the Air Staff. Together Knerr and McDonald spearheaded efforts to set up the structure for bringing the Luftwaffe's spoils to the US, converting an airplane and document hunt into a sensitive recruiting operation.

USAF photo

The phenomenally fast, easy to maintain Me 262 was No. 1 on the list of German aircraft Americans sought. One US team rounded up propeller aircraft, another rounded up jets.

In occupied Germany, the man they put in charge was Col. Donald L. Putt, a pilot with degrees in electrical and aeronautical engineering who'd just finished a top-secret assignment to modify a B-29 to carry the atomic bomb. Now Putt was entrusted with creating an Air Force wishlist of scientists to bring to America, based on reports from the teams and contacts made in Europe.

Putt's first list comprised just five names: Ernest Schmidt, an engine developer; Adolf Busemann, an expert on compressability and supersonics who was the Völkenrode's scientific director; Theodor W. Zobel, an aerodynamicist who photographed airflow around wings and turbine blades; Otto Lutz, an engineering officer, and Wolfgang Noggerath, who developed rocket fuels and nitrous-oxide injection.

"In many fields," Putt reported, "the Germans were ahead of us … from two to 15 years." As summarized by Samuel, it was Knerr who made the case. He petitioned Spaatz to "make full use of the established German technical facilities and personnel before they were destroyed or disorganized."

So great was the value of this technology that the plan for fast temporary exploitation evolved into a wholesale relocation of the German scientific and industrial establishment. Knerr realized early on that these men would do their best work under good conditions, with their dependents by their side. "Pride and face-saving have no place in national insurance," summed up Knerr in a letter to Spaatz. Besides, they didn't want these scientists ending up with the Russians—or with the British or even the US Navy, for that matter.

As the list grew, Putt placed the Germans in hotels. The paperwork for their Army contracts was laborious and gave rise to the new name for the effort: Operation Paperclip, so chosen because of the number of paper clips needed to hold together the copious scientist dossiers. Among other things, the US required certification that the incoming experts weren't Nazis. Most weren't, but postwar scholarship suggests the Office of Strategic Services in some cases whitewashed the records of a few that were.

Not everyone welcomed the Germans. Press reports stirred mixed reactions. Albert Einstein wrote to President Harry S. Truman in 1946, objecting to the project. In 1947 the Federation of American Scientists termed their presence "an affront" to those who'd fought the war.

The challenge for Knerr, Watson, Putt, and others at Wright Field was to integrate the Germans with the government research establishment and private industry. Capitalizing on their unique knowledge demanded clever management that would link the Germans with projects to which they could make a real contribution.

Rudolph Hermann, for example, had assisted von Braun's team in building a supersonic wind tunnel—a vital ingredient in missile fin design and for later jet aircraft. Hermann worked first at Dayton, then in academia, and finally for NASA.

CONFIRMATION: IT WORKS

Unlike the cloistered von Braun team, the aeronautical experts needed to be integrated with USAF labs and aerospace industry. They brought fresh perspectives, technical problem-solving, and confidence with modern designs. The best of them advanced current projects and influenced younger generations of American engineers over careers lasting into the 1970s and beyond.

They naturally met some resistance. The German scientists were still enemy aliens to the State Department—and to some at Wright Field.

"I detected a certain reluctance by the labs to use the scientists," said Lloyd Wenzel, a P-38 pilot with 70 combat missions who'd been raised in a German-speaking community in Texas. Wenzel, a captain, was one of many dragooned into the mysterious Operation Paperclip under the sweeping orders from Spaatz.

Wenzel recalled in Samuel's book how attitudes changed when a wind tunnel at Wright Field was malfunctioning. Rudolph Gothert, a wind tunnel expert, examined it and soon had it working perfectly. "That really put us over the hump," said Wenzel.

Another quick benefit was confirmation that swept wings worked. Research on swept wings was a top secret project at Langley Field, Va. According to Samuel, a conversation between von Kármán and Busemann about swept-wing test data convinced Boeing Chief Aerodynamicist George S. Schairer the concept was sound.

At the top of the list of influential engineers was Hans J. P. von Ohain. In 1939, a Heinkel 178 took flight, powered by von Ohain's first-ever jet engine. He stayed in government employ until he retired in 1975 as chief scientist of the Aero Propulsion Laboratory and Wright-Patterson AFB. Along the way, von Ohain mentored a young Paul Bevilaqua, who went on to invent the Rolls-Royce lift fan that helps loft the short takeoff and vertical landing variant of today's F-35 fighter.

Some, like von Ohain, remained government employees while many

others gravitated toward academia. In other cases, industry was a better match. Werner von der Nuell was an expert on superchargers. Engine work was contracted out so von der Nuell was one of the first to move to an industry post in California.

By the spring of 1946, Wright Field began to allow contacts between industry and the German scientists. Curtiss-Wright was the first company to hold formal meetings with the ex-German scientists.

As a teenage boy, Alexander M. Lippisch saw Orville Wright fly at Tempelhof Field in Berlin. In 1931, Lippisch helped design the first delta wing aircraft and grew fascinated with tailless aircraft. At Messerschmitt, he was part of the design team for the rocket-powered Me 163 Komet, assisting with its first flight in 1941. Lippisch's proof of concept work on delta wings contributed to concepts for the Convair F-92, and later (and more successfully), to the F-102 Delta Dagger, the F-106 Delta Dart, and the B-58 Hustler.

Lippisch himself worked for Collins Radio in Iowa. His delta wing work was a classic example of how Operation Paperclip scientists speeded up US aeronautical efforts. The melding of ideas accelerated innovations in American companies and research labs.

"All of this, when analyzed and plugged into our US program, moved our research and development ahead rapidly by four-and-a-half to five years," concluded Operation Lusty's Watson in 1981.

No innovations were more dramatic in the Cold War than the transition from V-2 rockets to ICBMs and Saturn V boosters for the Apollo moon rocket program.

The Allies first combed the V-2 plant at Nordhausen. "I was told to remove as much material as I could, without making it obvious we had looted the place," Maj. James P. Hamill of US Army intelligence said, according to a NASA history book by Henry C. Dethloff. Some 300 boxcar-loads of material were shipped from Europe to Aberdeen Proving Ground, Md. The initial haul from Germany included 138 different types of missile designs.

Hamill also packed up 100 V-2 missiles for shipment to the United States.

Hardware and blueprints were "only a small part of what needed to be brought home," wrote Samuel. "What was much more important was to tap the minds of the innovative scientists who had come up with these ideas in the first place." The German scientists "were the real prizes of war."

The Allies knew who they were looking for. In March 1945, Britain's MI6 obtained a copy of the so-called Osenberg List of Germany's top scientists. Maj. Robert B. Staver of the US Army's Ordnance Corps scanned it and compiled his own roster of the most desired names in German science. Wernher von Braun was at the very top of the list.

But von Braun was on the move. His V-2 sites were slated to fall within the Soviet zone of occupation, and he knew it. Von Braun thus commandeered several vehicles to carry part of his team south from their Baltic Sea coastal research site into the depths of Bavaria, where they met advancing US troops.

Von Braun had good reason to run. In March 1944, the Gestapo had jailed him for two weeks. He'd provoked the SS by talking about how he'd rather be building space rockets. He was also leaving behind the slave labor conditions at the munitions factory Mittelwerk. He called it a "showplace of indescribable suffering," according to author Marsha Freeman.

TO THE MOON

After von Braun's brother, Magnus, talked to Schneikert, the Army private handed matters over to Lt. Charles Stewart of the 44th who gave the Germans passes through the American lines.

Von Braun was soon debriefed. "When the art of rockets is developed further," he told interrogators in 1945, "it will be possible to go to other planets, first of all to the moon." Von Braun also foresaw the "harnessing of atomic energy together with the development of rockets, the consequence of which cannot yet be fully predicted."

Late that summer, Washington approved dossiers of 127 Germans for contract work in the US. By year's end, 300 individuals were being processed.

The rocketeers had been speculating about a move to America for months.

Walter Wiesman had been hoping for such a chance. "My wife and I made a decision even in '44, at least early '45, if we ever had a chance to get to America, that would be it," he recalled in a Smithsonian oral history project.

Little wonder. "Europe was a heap of ashes," recalled Samuel, who had lived in Berlin as a child and later wrote his definitive history of Operation Lusty.

Yet some felt trepidation, too. In a 1995 lecture, Ernst Stuhlinger wondered, "Could we hope that Americans would accept us as coworkers and take us at our face value, in spite of all the war propaganda that had painted a very different picture of the Germans?"

Fears of being dragged to the US—then being sent back to Germany—worried many on the list. A crucial turning point came when it was decided to guarantee long-term employment to those who settled in the US.

The initial group of six led by Wernher von Braun himself sailed to America in September 1945. They were held first at Fort Strong near Boston, then transferred to Aberdeen Proving Ground, where they processed the contents of those 300 boxcars. Von Braun's group then moved to Fort Bliss, Texas, and White Sands, N.M. In 1950 the group ultimately consolidated in Huntsville, Ala.

Von Braun went on to lead work on ballistic missiles and spaceflight rockets, eventually transferring to NASA.

And the captured V-2 rocket parts? Project Bumper began at the White Sands Missile Range in 1946, where the Army launched 64 V-2s after assembling the parts. Not to be outdone, the Navy launched one from the carrier USS *Midway.*

By 1953, 544 German scientists and engineers were at work in America due to Operation Paperclip. Ultimately, 516 became US citizens, as did 1,063 of their family members.

By the early 1960s, USAF was fully stocked with jet fighters, bombers, and transports and was fielding its first ICBMs.

In the 1960s, von Braun hosted a special guest for a rocket launch test in Huntsville. Hailing from Wisconsin, it was Fred Schneikert. ✪

Rebecca Grant is president of IRIS Independent Research. Her most recent article for *Air Force Magazine,* "A Rolling Bomb at Bagram," appeared in the September 2016 issue.

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WINGMAN

Molly Mae Potter

Boots to Ball Gowns

Staff photography by Mike Tsukamoto

1

Ms. Veteran America

Boots to ball gowns.

Courtesy photo via Molly Mae Potter

3

Courtesy photo via Molly Mae Potter

2

1. Austin Chapter's Molly Mae Potter reacts to being named Ms. Veteran America. The competition took place in Washington, D.C., in October, with 25 finalists selected from some 120 veterans and Total Force contestants of all ages and all services. **2.** Now an Individual Ready Reservist, Potter was a flight test engineer on deployment to Afghanistan in 2010 when she was wounded in an enemy attack. Three years later, she sought treatment for PTSD and had to work hard to gain approval for a service dog to remain alongside her while she was on duty. Potter has since become an advocate for airmen veterans. **3.** In 2015 she and service dog Bella took part in AFA's Congressional Fly-In, calling in on Capitol Hill offices. Here, they pose

Staff photography by Mike Tsukamoto

Hard Work That Needs To Be Done

I first heard about Ms. Veteran America about a year ago and immediately knew I had to be a part of it. The competition benefits the 501(c)3 nonprofit organization Final Salute, Inc., whose mission is to provide housing for homeless female veterans and their kids.

As contestants, we fund-raised for Final Salute and worked a social media campaign to raise awareness about the issues female veterans face. Over the course of last year, I raised close to $17,500.

Candidates were also judged on their military knowledge, eloquence, understanding of current events relating to female veterans, and talent. The top 25 were announced last spring after a series of interviews, a talent review, and a look at advocacy efforts.

Competing in Ms. Veteran America was transformational for me. For the first time since leaving the military, I felt I had found my calling: fighting for my sisters in arms. It's hard work that needs to be done. It's what gives me energy every day.

—Molly Mae E. Potter

Staff photography by Mike Tsukamoto

just before meeting Rep. Tammy Duckworth (D-Ill.) **4.** The contestants in this fifth edition of the Ms. Veteran America competition look glamorous, but some also showed physical strength during a push-up contest in front of the audience, with a drill sergeant barking at them. **5.** Potter combines combat boots with a cocktail dress at the competition. Today, she is an engineer at Dell, Inc., in Texas. **6.** For the talent portion, Potter showcased her photography skills. In 2014, she took a vacation to Antarctica aboard a Russian research vessel. During that 10-day trip, she photographed wildlife like these penguins. In 2016, she went to the Arctic and photographed this polar bear. Aside from her talent, Potter clinched the title when she was asked: What's the first thing you would ask our new Commander in Chief? Potter's answer: "What are you going to do to ensure that our military leaders successfully transition into the civilian world?" ✪

Read more about Molly Mae Potter in "Chapter News," p. 81.

CHAPTER NEWS

By June L. Kim, Associate Editor

Updates on AFA's activities, outreach, awards, and advocacy.

CHARLESTON CHAPTER

Charleston Chapter President Linda J. Sturgeon represented AFA at a Key Spouse Appreciation event at the home of retired CMSAF James A. Roy and Paula, his wife, in Summerville, S.C., last fall.

The crowd of more than 100 included key spouses, commanders, chiefs, and first sergeants from JB Charleston, S.C., according to Sturgeon.

The event featured a handful of keynote speakers from various veterans and military spouse organizations, she said. Chief Roy thanked guests for attending and supporting key spouses in many programs.

Wing commanders Col. Jimmy R. Canlas, 437th Airlift Wing, Col. Robert K. Lyman of the 628th Air Base Wing—who are both AFA Life Members—and Col. Gregory S. Gilmour, 315th Airlift Wing, spoke to the crowd "about the importance of each key spouse and how they all have pitched in for deployments, and taking care of the Air Force family," said Sturgeon.

Photo by Mary Oluwalowo

Cadets gather at the University of North Dakota in Grand Forks for an Arnold Air Society/Silver Wings conference in November. James Simons, chapter VP for leadership development of Gen. David C. Jones Chapter (N.D.), talked about the AFA mission and encouraged cadets to support it. The students came from Illinois, Iowa, Minnesota, Missouri, South Dakota, and Wisconsin. Victor Johnson Jr., president of the Billy Mitchell Chapter in Wisconsin and Daniel Murphy, president of the Gen. E. W. Rawlings Chapter in Minnesota also attended.

Photo via Howard H. Leach Jr.

New Jersey State President William Fosina and Shooting Star Chapter member Martin Fleisher were at a recent chapter meeting where Fleisher spoke of his World War II service as a mechanic, crew chief, and pilot of the B-26 Marauder, said Chapter Treasurer Howard Leach Jr. Behind them is a mural by artist William Sturm. It includes a painting of Fleisher and his patch from Ninth Air Force. In front of them is a painting of a B-26.

SPIRIT OF ST. LOUIS CHAPTER

The Spirit of St. Louis Chapter helped sponsor the annual Salute to Veterans hosted by the Missouri Athletic Club in St. Louis in November.

Gen. Darren W. McDew, head of US Transportation Command at Scott AFB, Ill., was keynote speaker. A Scott Memorial Chapter member, McDew spoke to a crowd of some 300 people and thanked veterans for their service, according to Spirit of St. Louis Chapter VP Robert D. Schure.

Through his contacts, Schure was able to get the USAF Band of Mid-America from Scott to perform at the event.

Got chapter news? Send the details to jkim@afa.org. Please include high-quality, visually interesting photos and the photographer's name.

AFA Emerging Leader

Photo by Natalie Cass

Molly Mae E. Potter

Home State: North Carolina

Chapter: Austin Chapter

Joined AFA: 2006

AFA Offices: Texas State VP, Government & Industry Relations

Military Service: 2007-13 (Active Duty). Now an Individual Ready Reservist

Occupation: Engineer at Dell, Inc.

Education: B.S., engineering & physics, Embry-Riddle Aeronautical University; M.S., materials science & engineering, University of Florida

How did you first hear of AFA?
In 2004, during my freshman year of college at Embry-Riddle Aeronutical University, I joined Silver Wings and have been a member of AFA ever since.

What do you enjoy most about your AFA membership?
AFA has been the backbone of my career in my professional development. The mentoring and development opportunities I've received and gained from AFA are unparalleled with any other professional organization.

What do you think AFA needs to improve most to increase exposure and draw in more members?
The Air Force and our nation are changing—so are our airmen and the defense community. AFA as a whole needs to be more cohesive and technologically savvy in order to keep up with social media and a fast-paced communications environment. If we can't adapt and get our message out as fast as the Internet and media are changing, we will quickly be irrelevant to potential future members.

How do we bring more awareness about AFA and what it does for airmen and their families?
By being active and involved in your community and supporting causes that are important to you. When people see you active in your community, ... they also see that you are a member of AFA, [and] it opens up the organization to be recognized through activism. It places a face and actions to its membership base and the mission of AFA. Just ... being a member of AFA helps bring awareness to the organization as a whole and the support it can provide to our airmen and their families.

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US Army photo by SSgt. Christopher Calvert

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ROBERT GRAY

The Pilot of *Whiskey Pete*

He was a bomber pilot who spent only two-and-a-half years in the Air Corps. He died before his 24th birthday. The US Air Force base that bore his name no longer exists.

Yet no one who knows his story has forgotten Capt. Robert Manning Gray, revered member of the famed Doolittle Raiders. Gray joined up with then-Lt. Col. Jimmy Doolittle in April 1942 to strike Japan a blow in the darkest days of World War II. He left an indelible mark.

Gray was born May 24, 1919, in Killeen, Texas. At Tarleton College, he earned a private pilot's license while serving in the Reserve Officer's Training Corps.

Gray left college in June 1940 to enter the US Air Corps' Aviation Cadet Program, and within a year, he earned his wings and was commissioned a second lieutenant. He was soon flying B-25 bombers.

In February 1942, then-First Lieutenant Gray was selected to take part in the planned raid on Japan.

On April 18, 1942, the Doolittle Raiders and their 16 B-25s were aboard USS *Hornet* off Japan. Gray's B-25—he named it *Whiskey Pete,* after a horse—was third off the carrier. No. 3 approached Tokyo at low level, popped up, and dropped three 500-pound bombs.

The first struck a steel plant. The second made a direct hit on a gas works. The third hit a chemical plant, setting it on fire. For good measure, Gray shot up a barracks on the way out.

As planned, Gray turned toward China. He searched for a friendly airfield, but the B-25 ran out of fuel and the crew bailed out over China. Gray, the last to jump, did so at 6,200 feet and landed on a mountain peak.

Gray evaded capture and linked up with several *Whiskey Pete* crew members. Cpl. Leland Dale Faktor, No. 3's engineer-gunner, was killed in the jump, but the others made it to safety in Chunking.

Following the raid, Gray was promoted to captain. He was awarded the Distinguished Flying Cross, whose citation noted that Gray "volunteered for this mission knowing full well that the chances of survival were extremely remote."

Gray stayed in the China-Burma-India Theater, based in India. He was killed on Oct. 18, 1942, when his B-25 bomber crashed during a combat mission over Assam, near Burma. His remains were returned to the US and were buried in Killeen.

Hollywood in 1944 turned out "Thirty Seconds Over Tokyo," the first film about the raid. Gray was portrayed by Robert Mitchum.

To honor Gray, USAF in 1948 gave his name to a new flying facility near Killeen, Robert Gray Air Force Base. It was built to handle heavy bombers and was used to support Killeen Base, a nearby nuclear weapons storage site.

Robert Gray Air Force Base existed for some 15 years. In June 1963, USAF relinquished control to the Army, which promptly renamed it Robert Gray Army Airfield. The name persists today.

ROBERT MANNING GRAY

Born: May 24, 1919, Killeen, Texas
Died: Oct. 18, 1942 (KIA), Assam, India
Colleges: Tarleton College, Texas A&M
Occupation: US military officer
Service: US Air Corps, US Army Air Forces
Era: World War II
Years Active: 1940-42
Combat: Pacific Theater, China-Burma-India Theater
Final Grade: Captain
Honors: Distinguished Flying Cross; Chinese Medal of Honor
Famous Friend: Jimmy Doolittle

ROBERT GRAY AIR FORCE BASE

State: Texas
Nearest City: Killeen
Area: 18.75 sq mi / 12,000 acres
USAF Status: Closed
Opened: (by Air Force) 1947
Prior Names: Killeen Army Airfield, Camp Hood Army Airfield
Named as Air Force Base: Robert Gray AFB (February 1948)
Closed: (by USAF) June 1963
Reopened: (by Army) 1963
Renamed: Robert Gray Army Airfield (1963)
Adjacent To: Fort Hood, Texas
Home Of: 1st Cavalry Division, 1st Air Combat Brigade
USAF Presence: None

1. Crew of No. 3 (l-r): 2nd Lt. Charles Ozuk (navigator), 1st Lt. Robert Gray (pilot), Sgt. Aden Jones (bombardier), 2nd Lt. Jacob Manch (copilot), and Cpl. Leland Faktor (engineer-gunner). **2.** Gray as an ROTC member. **3.** Army Gray Eagle RPAs in a maintenance hangar at the airfield. **4.** Soldiers load a helicopter onto an Air Force C-17 at Robert Gray Army Airfield.

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