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June 2016, Vol. 99, No. 6

Journal of the Air Force Association

AIR FORCE MAGAZINE

FEATURES

About the cover: An ANG crew chief from Burlington Arpt., Vt., performs a preflight check. See "The Readiness Conundrum," p. 20. USAF photo by SrA. Thomas Spangler.

Journal of the Air Force Association
AIR FORCE MAGAZINE

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By Adam J. Hebert, Editor in Chief

Too Many Bases, Not Enough Air Force

THE Defense Department's Infrastructure Capacity report to Congress, released in April, got right to the point. The Pentagon "must stop wasting money on unnecessary infrastructure," the introduction read, so DOD can "devote these savings to readiness, modernization, and other more pressing national security requirements."

The first comprehensive assessment of its sort in 12 years determined DOD is currently supporting at least 22 percent more infrastructure than needed for its missions. The Air Force has it even worse, the study determined, as USAF is presently carrying at least 32 percent excess infrastructure.

In other words, nearly one-third of the Air Force's facilities are unnecessary, given the service's planned missions and force structure. This is not a good thing, as it requires USAF to spread an already-strained force among too many bases, creating inefficiency and wasting billions of dollars over time.

Unfortunately, the Pentagon is nearly powerless to do anything about this unless it receives explicit permission from Congress to conduct a base-closing process commonly known as BRAC.

USAF is spread among nearly a third more bases than it needs.

You might think that most lawmakers would be in favor of DOD closing facilities the military does not need, to free up money for the training, equipment, and modernization the armed forces do need.

You would be wrong.

Lawmakers are loathe to close bases. Wasting money on unneeded infrastructure is a national-level problem, but politics is local. Lawmakers with bases in or near their districts represent constituents who benefit from the jobs and spending those bases bring. Closing a military base is tumultuous in the short term, to be sure, and could cost a lawmaker votes.

But parochialism comes with a real cost. "Extra capacity is a big problem for us because it is wasteful spending, period," said Deputy Defense Secretary Robert O. Work in 2014. "It is the worst type of bloat."

"When I worked for the Air Force, our walking around, rough order estimate was it took 800 to 900 airmen to open a base," Jamie M. Morin, director of DOD's Cost Assessment and Program Evaluation office, added in March. This was "before you had any operational folks there."

The last realignment and closure round took place in 2005. That year's BRAC commission suggested a new round be conducted every eight to 12 years, as military missions are constantly evolving. The very soonest a new BRAC round will be conducted—assuming Congress approves one this year—is 2019, 14 years since the last go-round.

"If history serves as any guide, it will take several years of studies, analysis, and pleading before Congress acquiesces to this latest BRAC request," we noted on this page more than four years ago (See: "Editorial: Bringing Closure," March 2012, p. 4). Although Congress as a whole seems to be ever-so-slowly coming to an acceptance that a BRAC round is necessary, approval is still a long shot this year. In fact, lawmakers have rejected a DOD closure proposal in each of the last five years.

The Pentagon basing estimate compares 2019 load levels to 1989, thereby assuming DOD had its infrastructure correctly sized near the end of the Cold War. This may or may not be accurate, as previous BRAC rounds were held in 1988, 1991, 1993, 1995, and 2005.

The department estimates that these actions, combined with the 2015 European Infrastructure Consolidation, now save the nation $14.1 billion 2016 dollars every year. Kathleen I. Ferguson, the Air Force's former installations chief, calls BRAC "the gift that keeps on giving," because once a surplus facility is shut down the department never has to pay for it again.

Inefficient basing exacerbates the Air Force's difficulties of having too few airmen operating too few aircraft that are too old. The service is forced to spread them like peanut butter to cover all the bases, instead of placing them in more efficient units. Congressman Adam Smith (D-Wash.), ranking member of the House Armed Services Committee and one of the more prominent supporters of a new BRAC process, describes the current arrangement as "death of a thousand cuts."

Congressman Mac Thornberry (R-Texas), HASC chairman, holds the opposite opinion. He said of DOD's report, "In envisioning a military far smaller than anyone thinks is wise, it fails to comply with the law [requesting the study] as badly as it fails to justify a BRAC round."

But in reality, the study was performed using the 2019 force structure plans Congress approved last year, and the numbers were subsequently coordinated with the Joint Chiefs. BRAC rounds typically only close about five percent of DOD's infrastructure, and an independent commission will evaluate Pentagon recommendations before giving Congress the opportunity to approve or reject the entire package. Under a BRAC, bases offering the least military value can be targeted for closure, with the savings pumped back into starving personnel, readiness, and modernization accounts.

With 22 percent surplus capacity, short of major war with Russia or China forcing a massive increase in the size of the US armed forces, there is no realistic scenario in which BRAC will leave an inadequate network of bases. In that extraordinarily unlikely scenario, the nation would open new bases, as it has done many times in many places.

BRAC is overdue. USAF, quite remarkably, closed no Air Force bases in the 2005 round and had too much infrastructure even then. Since 2005, the Air Force has shrunk by another 500 aircraft and 42,000 airmen.

The Air Force is too old and too small. It needs more airmen to operate additional, newer equipment. But it needs a smaller footprint for a more economical and powerful force. It is time for Congress to approve a 2019 BRAC round. ✪

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McCain Wants it All

I have a comment on Adam J Hebert's April editorial "An Air Force at War on the Home Front" *[p.4]*. While the A-10 aircraft are stationed at a base in Arizona, McCain's home state, they are not stationed at Luke AFB, but rather at Davis-Monthan AFB in Tucson. Luke AFB, near Phoenix, is home to F-35A aircraft and will eventually have 144 F-35 aircraft. So, Senator McCain wants a win-win outcome, both A-10 and F-35 infrastructure to remain in Arizona.

Kirk R. Warburton
Kirkland, Wash.

Bull's Eye

Kudos in a big way to Sam McGowan for his in-depth article about the C-130 and the Commando Vault missions in the April 2016 edition of your fine magazine *["Herculean Ordnance," p.58]*.

I was a loadmaster assigned first to the 29th TAS and then the 774th TAS at Clark AB from January 1970 until August of 1971. I was one of several loads who became qualified to drop BLU-82 bombs during our rotations to Cam Ranh Bay. I still have the nose cone from my first bomb drop.

Mr. McGowan's story is absolutely spot on from my own recollections. Thank you for bringing up that small part of what loadmasters, many of us just 19 and 20 years old at the time, did back then. Keep up the good work.

Bill Carroll,
USAFR (Ret.)
Chicopee, Mass.

Don't Be So Sure

"We're not going to turn the employment of weapons over to a machine. ... It ain't going to happen." With all due respect to the Mitchell Institute Dean, Lt. Gen. (Ret.) [David] Deptula, these comments strike me as somewhat nearsighted *["Rise of the Machines," April, p. 28]*.

First of all, we already have certain classes of autonomous capability—missile defense systems in automatic mode are a good example today. More importantly, most *Air Force Magazine* readers will recognize one inconvenient truth: Those who say something will never happen are more often wrong and those who believe something is possible are more often proven right. In the case of lethal autonomous machines (LAMs) one can easily imagine myriad scenarios where this capability will not only be advantageous, but necessary—as Mathewson implied. For example, consider the idea of attack zones and how planners might invert their thinking about using LAMs. The LAM (my new term) would require "inside the box thinking"—meaning: No killing outside the box, raise hell inside the box! The future of LAMs is upon us and the sooner we stop worrying about it and begin learning how to exploit it, the more likely we are to win the next complex fight. Our adversaries understand this!

Col. W. Michael Guillot,
USAF (Ret.)
Montgomery, Ala.

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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.

By Megan Scully

The Cost of a Bigger Budget

Despite stringent caps on federal spending, some House hawks are prepared to boost defense spending, even if it means underfunding the military's operations overseas to pay for pet projects that didn't make the final 2017 President's budget.

The House Armed Services Committee, the first of the four congressional defense panels to consider their annual bills, set the tone for the year in late April when members agreed to a Fiscal Year 2017 defense authorization bill that would eliminate $18 billion from the overseas contingency operations account and replace that with money to pay for fighters, ships, and personnel the military did not request.

The move to use OCO as an overflow valve amounts to an end run around the spending limits established in a bipartisan budget deal hatched late last year that gave the Pentagon moderate relief from even more stringent caps set in 2011.

The HASC's $610 billion bill technically abides by the caps and adheres to the letter of the law. However, it only funds operations overseas for the first seven months of the fiscal year, forcing the next President to request a supplemental spending request, not subject to the caps but nonetheless boosting federal spending, early in his or her first term.

While most of the items added by the armed services panel were pulled directly from the services' budgetary wish lists (the so-called "unfunded requirements lists"), the sheer volume of the add-ons could be disruptive to Pentagon planners. Indeed, most of the plus-ups come with hefty life cycle price tags that could upend military plans moving forward, forcing the Pentagon to pay to maintain force structure it can ill afford in an era of capped spending.

HASC Chairman Rep. Mac Thornberry (R-Texas) has defended his strategy as a necessary way to fund programs that are vital to military readiness. The additional base-budget funding, he has said, gets the military to the minimum spending levels it requires for next year.

"I think we are in a far more serious readiness crisis than I had understood and, I think, most people understand," Thornberry told reporters in April, adding that it is "absolutely wrong" to ask the military to go on missions without funding to adequately prepare and support them.

Most Democrats on the panel supported the widely popular bill that sets Pentagon policy in addition to prescribing spending levels. But many did so with deep reservations.

"At some point, we are going to have to live within our means, the means we've decided to provide," armed services ranking member Rep. Adam Smith (D- Wash.) said just before he voted in favor of the bill.

The spending added by the committee includes $3 billion for 25 additional fighter jets, including $691 million for Air Force F-35s. Other plus-ups in the House bill include $415 million for C-40As, $272 million for C-130Js, and $219 million for upgrades to the A-10 Warthog close air support aircraft, which service officials have agreed to keep flying through 2017 after efforts to retire the airplanes failed on Capitol Hill.

The panel has also boosted Active Duty military end strength by 27,000 and increased the reserve component by another 25,000 above the Administration's request, at a cost of $2.1 billion next year.

At press time, House appropriators had followed the HASC's path, with some differences in figures.

In the Senate, meanwhile, Armed Services Committee Chairman John McCain (R-Ariz.) said he does not favor this approach, lining up a potential battle with his House counterparts when they meet later this year to resolve differences in the two chambers' versions of the authorization bill.

If Thornberry's strategy prevails, it could set the defense authorization bill on another collision course with the White House—this time, at the very end of an Administration with a President who has nothing to lose and a lame-duck Congress that will likely be eager to complete its legislative work for the year.

Last year, President Obama vetoed the authorization measure because it increased war spending to pay for base-budget items, forcing lawmakers to revise the bill before sending it back through both chambers and to the White House for approval.

Thornberry, however, appears unfazed that this year's bill could also be struck with the veto pen, stressing that the Administration has threatened to kill the must-pass piece of legislation every year for a multitude of reasons.

"If it's not that, it's something else," he said.

Megan Scully is a reporter for CQ Roll Call.

Defense officials testify before the HASC on the Fiscal 2017 defense authorization request.

USAF photo by SMSgt. Adrian Cadiz

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By John A. Tirpak, Editorial Director

The next Chief; A full plate; Second in charge; Base makes waste ....

WASHINGTON, D.C., MAY 9

AND NOW, THE GOLDFEIN YEARS

Assuming a smooth confirmation process, Gen. David L. Goldfein will succeed Gen. Mark A. Welsh III as Air Force Chief of Staff around July 1. Goldfein has only been a four-star general since August 2015, when he became vice chief of staff.

An Air Force Academy graduate and career fighter pilot, Goldfein comes to the job with impressive credentials. From the summer of 2013 to August 2015, he served as director of the Joint Staff, one of the most important three-star jobs in the military and a traditional stepping-stone to four-star rank and either a Joint Chiefs or combatant commander post. Prior to that, he commanded US Air Forces Central Command, and before that he was the operations chief for Air Combat Command.

Goldfein has commanded fighter units at multiple levels and was executive officer to Gen. Michael E. Ryan, former Chief of Staff, when Ryan was commander of US Air Forces in Europe.

He goes by the call sign "Fingers" and describes himself as the last pilot to train to fly the F-117 Nighthawk stealth attack fighter. As commander of the 49th Fighter Wing at Holloman AFB, N.M., he presided over the type's 2008 retirement.

Goldfein flew 40 combat missions in the F-16 during Operation Desert Storm in 1991.

As commander of the 555th "Triple Nickel" F-16 squadron at Aviano AB, Italy, in May 1999, he was one of two Air Force pilots shot down during Operation Allied Force, brought down by a Serbian surface-to-air missile. Even though he ejected and parachuted safely to the ground, he was quickly located by Serb ground forces and narrowly escaped capture with the help of an MH-60G Pave Hawk rescue helicopter crew. He annually sends the rescue unit a bottle of Scotch in appreciation and keeps in touch with members of the crew that saved him.

His list of airplanes flown includes the MQ-9 Reaper remotely piloted aircraft and the MC-12W, a converted business turboprop used in Afghanistan and Iraq for intelligence, surveillance, and reconnaissance work. Goldfein also flew combat missions in Afghanistan.

In 2001, he wrote the book *Sharing Success, Owning Failure: Preparing to Command in the 21st Century,* a leadership primer for new squadron leaders.

The last vice to become Chief was Gen. T. Michael Moseley.

Pentagon sources said Goldfein was not the service's initial choice for the top job, which for a time was expected to go to Air Force Space Command chief Gen. John E. Hyten. The choice of Hyten would have highlighted the growing importance of space and a change from the unbroken tradition of pilots—and almost exclusively fighter pilots over the past 35 years—in the Chief's position. However, Defense Secretary Ashton B. Carter is said to have wanted a combat pilot with Middle East experience at the helm of the Air Force during the ongoing air campaign against ISIS.

AN INTIMIDATING AGENDA

At a late April press conference, Carter praised Goldfein as "a tested warrior" and "one of the most proven strategic thinkers across our joint force," singling out his "deep knowledge of a region where the US Air Force is now carrying out the vast majority of air strikes" against ISIS. Carter said that Goldfein, while air boss at US Central Command, "advanced the integrated ... missile defense" of the Persian Gulf region and "developed the Gulf Command Air Operation Center, working closely with nations who are today our critical partners" in the anti-ISIS campaign.

Carter said Goldfein proved to be a "consensus builder" during his time on the Joint Staff.

"We go back quite a ways," Carter said. "I've seen how Dave's strategic approach and his management skill have helped the Air Force maintain investments in near-term readiness while making sure that we continue also the Air Force's vital modernization efforts."

Air Force Secretary Deborah Lee James said that as vice chief, Goldfein played a "major role in developing our Air Force budget" and in "developing the Air Force's input and contribution to the Third Offset strategy, and also has worked tirelessly to increase our capabilities in all three of our warfighting domains" of air, space, and cyber.

Goldfein will inherit substantial challenges from Welsh. The Air Force has struggled to balance its "fight tonight" readiness with the need to modernize large blocks of its fleet all at once. The replacement of aircraft in practically every mission area—from fighters, bombers, and tankers to surveillance, command and control, and trainers—has been too long postponed, and the Air Force's legs of the nuclear triad are overdue for recapitalization. Collectively, the situation has become known as USAF's "bow wave" of modernization.

During Goldfein's tenure, the Air Force may have to set new acquisition priorities and reset its ambitious timeline for re-equippage.

Meanwhile, USAF cut its ranks of airmen too deeply in recent years, trying to free up money for readiness and hardware, and must now grow its uniformed force again without much new money to do so.

As all of that unfolds, the specter of sequestration haunts Air Force plans, and the service suffers from a thorny relationship with Capitol Hill. Its poorly explained plans to retire the A-10 and U-2, as well as other controversial approaches to living within its means, along with dustups over the C-27 and the Air National Guard, have left Congress skeptical of USAF's

motives and methods. Goldfein will have to rebuild USAF's credibility with lawmakers while winning the resources to accomplish the massive modernization required.

At the same time, the Air Force is carrying the bulk of the anti-ISIS air campaign—and achieving success against stated objectives—but seems not to be getting either the credit or commensurate resources that go with that level of effort.

Goldfein will be joining a rare all-new crew on the Joint Chiefs of Staff, with all the service Chiefs, Chairman, and vice chairman having changed out in a single year's time.

RIGHT-HAND MAN?

Lt. Gen. Stephen W. "Seve" Wilson, deputy chief of US Strategic Command, is the likely nominee to receive a fourth star and take over as vice chief of staff from Goldfein.

Wilson has been a bomber pilot and commander at multiple levels during his 35-year career. He led 8th Air Force and then Air Force Global Strike Command before taking the No. 2 job at STRATCOM.

Pentagon officials said his knowledge of the nuclear mission was a big factor in Wilson becoming the top candidate for the vice job, given the major nuclear modernization effort now getting underway.

New nuclear systems needing to move through development and testing and into the field include the Ground-Based Strategic Deterrent ICBM, the new B-21 bomber, an upgrade of the B61 bomb, and the new Long-Range Standoff missile, or LRSO (which will succeed the 1980s-vintage Air Launched Cruise Missile). Wilson, who has more than 4,500 flying hours—some 680 of them in combat—has been a vocal advocate of re-engining the B-52 bomber fleet.

Wilson commanded the 379th Air Expeditionary Wing at Al Udeid AB, Qatar, from July 2009 to July 2010, supporting the last stages of Operation Iraqi Freedom. While he'd been considered a candidate to succeed Adm. Cecil D. Haney as commander of STRATCOM, it's now believed Air Force Space Command boss Gen. John E. Hyten is the top contender for the unified command position.

As vice chief, Wilson would represent the Air Force on a number of joint service committees, notably the Joint Requirements Oversight Council.

BASE MAKES WASTE

A fresh Pentagon report confirms what DOD leaders have been saying for years: The services have far too many bases and not enough people and gear to spread around to them all.

In the report, the Department of Defense urged Congress to end its strident refusal, in each of the last five budget cycles, to allow a new round of base realignment and closure (known in Washington, D.C., as BRAC).

The April "infrastructure capacity analysis," sent to the leaders of the committees overseeing defense, was topped by a letter from Deputy Defense Secretary Robert O. Work, who said the military overall has 22 percent excess capacity distributed as follows: Army 33 percent, Air Force 32 percent, Defense Logistics Agency 12 percent, and Navy seven percent. The analysis, Work explained, "compared base loading from 1989 to base loading in 2019 using 32 metrics" of infrastructure.

The last time the Air Force comprehensively measured its own base capacity, it estimated it was 20 to 25 percent heavy on installations and pleaded with Congress to let it slim down so the operating cost savings could be put toward badly needed airmen and modernization.

As DOD leaders have "repeatedly testified," Work wrote in the cover letter, "spending resources on excess infrastructure does not make sense," especially when so many defense combat needs are going unmet.

The report was a partial response to Congress' directive in the Fiscal 2016 National Defense Authorization Act, approved last November, to conduct a full-out analysis of future basing needs against "probable threats." Work said the full analysis is coming, but that the results so far show "significant excess capacity exists to warrant" a BRAC as soon as possible. The partial report was rushed to Capitol Hill early so Congress could consider allowing a BRAC in its Fiscal 2017 defense authorization deliberations.

The Pentagon said it's saving about $14 billion a year as a result of previous base closings and could save billions more in short order if another BRAC is approved. (See "Editorial: Too Many Bases, Not Enough Air Force," p. 4.)

Moreover, in his cover letter, Work said, "Under current fiscal constraints, local communities will experience economic impacts regardless of a congressional decision regarding BRAC authorization. This has the harmful and unintended consequence of forcing the military departments to consider cuts at all installations, without regard to military value." The better alternative, he said, is to close or realign facilities "with the lowest military value."

In recent years, Congress has complained that the up-front expense of closing bases, moving their assets, and doing industrial cleanup afterward has cost more than the country could bear during wartime. Moreover, members charge that the speed and amount of payback has been less than the Pentagon estimated.

Reacting to the April report, Rep. Mac Thornberry (R-Texas), chairman of the House Armed Services Committee, complained that it wasn't what Congress asked for. Congress, he said, directed the Pentagon to assess base capacity needed in the future, and not against what it was in 1989 (although that was the comparison year for previous BRACs). The approach taken assumes a military "far smaller than anyone thinks is wise," Thornberry said through a spokesperson. If the military is required to grow to meet future threats, there won't be enough bases to handle the increase, he said. However, the Pentagon report said growth that would strain even a reduced base structure was unlikely, given fiscal limits on defense spending even in wartime, and the estimates of excess capacity are already "conservative."

In submitting its Fiscal 2017 budget to Congress in February, defense leaders said it's so urgent to close bases and stop wasting resources that they may have to do it without a BRAC, and that would be even more painful.

"In the absence" of a BRAC authorization, the budget documents say, "the department will explore any and all authorities that Congress has provided to eliminate wasteful infrastructure." It didn't elaborate on what those measures might be, but Air Force Secretary Deborah Lee James has said there are emergency actions available to the services to mothball bases or put them in caretaker status. ✪

05.12.2016

An Air Force F-15C (foreground) flies with an Indian air force Su-30MKI during a Red Flag-Alaska mission out of Eielson Air Force Base. More than 1,400 personnel and 75 aircraft participated in this latest iteration of RF-A, one of USAF's premier combat training exercises. This May's exercise included a rare visit to Red Flag by Indian airmen and equipment.

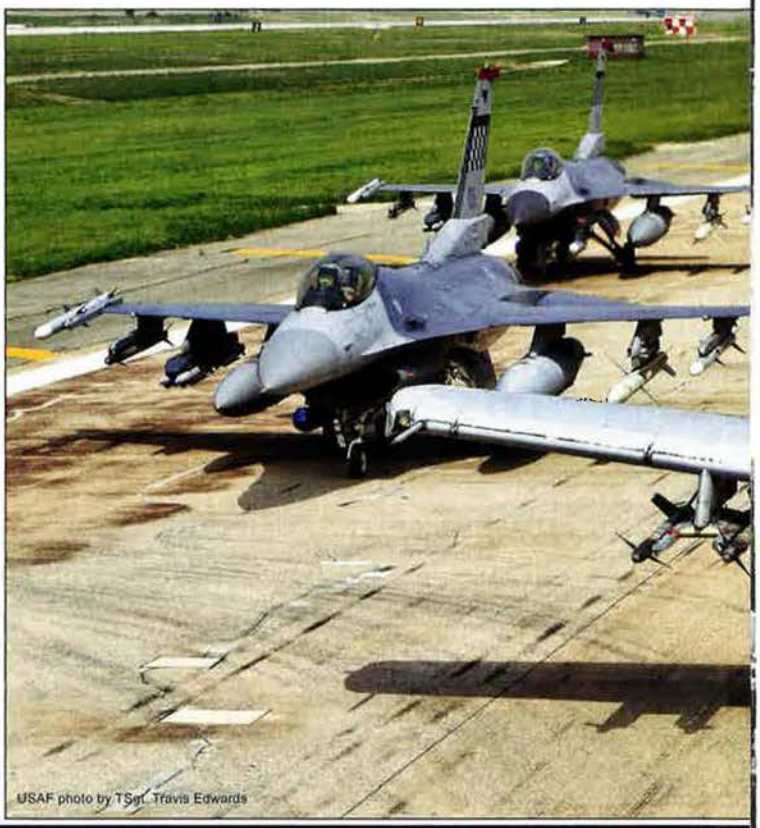
Photo by Jim Haseltine

The Private F-35 Fix Is In Beyond 2020

It'll cost the Air Force "tens of millions" per year out of hide to hire contractors to do F-35 maintenance through at least 2020, because the service doesn't have enough people to do the work, Air Force Materiel Command chief Gen. Ellen M. Pawlikowski said April 28.

Congress restored some money to keep A-10s in service after rejecting USAF's plan to retire the jet and transition A-10 maintainers to the F-35. That took care of the flying hour shortfall but "would not have included money to do contract maintenance ... so we've had to carve that out of all the other O&M [operation and maintenance] accounts," Pawlikowski said

The situation won't be fixed quickly, either, because even though USAF is looking to grow by several thousand airmen, it can't simply put new people to work on the F-35. The jet is too complex for newbies, and it takes "seven to nine years" to grow a maintainer to a high experience level, she said. Using contractors will "give ourselves time to build the organic workforce" needed.



USAF photo by TSgt. Travis Edwards

Night Vision: ***A C-130 conducts a night flight over Yokota AB, Japan, as part of annual Jump Week training in May. The 36th Airlift Squadron provided support all week long for US marines from III Marine Expeditionary Force, who were maintaining parachuting proficiency. The aircrews, in turn, trained in flight tactics, timed-package drops, and drop zone coordination.***

USAF photo by Yasuo Osakabe

By **Brian W. Everstine,** Pentagon Editor

Warthogs and Vipers Take an Elephant Walk: ***A-10s and F-16s line up on the runway at Osan AB, South Korea, for "an Elephant Walk"—a demonstration of USAF's ability to generate combat airpower quickly and in huge numbers. The Warthogs came from Osan's 25th Fighter Squadron. The F-16s came from Osan's 36th Fighter Squadron and the 179th Fighter Squadron deployed from Duluth Arpt., Minn. They were all participating in Exercise Beverly Herd 16-01.***

Adjusting Missileer Career Trajectory

The Air Force is restructuring the missileer career path in an attempt to retain officers longer. Air Force Global Strike Commander Gen. Robin Rand, in concert with the service's Strategic Deterrence and Nuclear Integration Directorate, directed a review of the nuclear and missile operations (13N) career field with the goal of creating a self-sustaining force that places a premium on experience and expertise at the wing level, according to an April 7 news release.

In the past, instructors, evaluators, and flight commanders were all officers still in their first four years of service.

The restructuring will attempt to balance accessions with retention and will adjust grade structures across the field, redistributing the O-4 and O-5 billets.

Upgraded AWACS Goes to the Pacific

The Air Force's upgraded E-3G Sentry made its Pacific debut in March. The 552nd Air Control Wing at Tinker AFB, Okla., deployed the Airborne Warning and Control System Block 40/45 aircraft to Pacific Air Forces, flying the first E-3G sortie over the Korean peninsula on March 18, according an April 15 Tinker press release.

The aircraft was stationed at Kadena AB, Japan, from March 12 to 22 and flew missions alongside the Japanese Self-Defense Forces. The AWACS helped control other aircraft in aerial interdiction, counterair, and suppression of enemy air defenses training missions, 964th Airborne Air Control Squadron Detachment Commander Maj. Jonathan Ritsema said in a news release.

The updated AWACS made its combat debut in November. The aircraft's $2.7 billion program includes modern communications, enhanced computer processing, and improved threat tracking.

Night Vision Goggles Case Caused Fatal C-130 Crash

A misplaced night vision goggles case led to the C-130J crash that killed 14 at Jalalabad Arpt., Afghanistan, in October 2015, Air Mobility Command investigators found.

After landing at Jalalabad, the crew conducted engine-running on-load/offload operations. To assist with offloading, the Super Hercules' pilot placed the hard-shell case in front of the yoke to hold the horizontal stabilizer elevators in a raised position, but did not remove it before the nighttime takeoff, according to an April 15 news release announcing the finding.

The aircraft entered an excessive upward pitch just after takeoff, and the copilot misidentified a trim malfunction as the cause, resulting in improper recovery techniques. The aircraft crashed just off the runway 28 seconds after liftoff and struck a perimeter guard tower, killing all personnel aboard and three Afghan Special Reaction Force members on the ground.

USAF photo by SrA. Nigel Sandridge

Ready? *A 56th Rescue Squadron HH-60G crew from RAF Lakenheath, UK, carries out a preflight check during Exercise Joint Warrior at RAF Lossiemouth, Scotland, in April. One of Europe's largest NATO exercises, Joint Warrior involved 14 nations, more than 60 aircraft, 30 ships and submarines, and some 6,500 personnel. Joint Warrior provides NATO forces with threat-reaction training. It takes place twice a year—the second iteration comes in October—and lasts for three weeks.*

The crew consisted of the pilot, copilot, and two loadmasters assigned to the 39th Airlift Squadron at Dyess AFB, Texas. Two fly-away security team members assigned to the 66th Security Forces Squadron at Hanscom AFB, Mass., and five civilian contractor passengers were also onboard.

More Than Just a Terrorist Group

The biggest change in Operation Inherent Resolve, from an air perspective, is that ISIS is no longer just looked at as a terrorist group, Air Force Chief of Staff Gen. Mark A. Welsh III said May 4.

Speaking at a discussion with all the service Chiefs at the Council on Foreign Relations in New York, Welsh said the original strategy in Iraq and Syria allowed ISIS to "have a vote" and "kind of direct activity" for the first six to eight months. Then, he said, the US realized ISIS looked like "something much more than a terrorist group," because they had "training infrastructure, recruiting infrastructure, financial infrastructure, governance infrastructure," and "what looked like fielded military forces," in addition to the terrorism component.

"From an Air Force perspective, you can attack all those different pieces simultaneously," he said, and the air coalition has done so.

By the Numbers

1,982

Total air strikes from the US-led coalition targeting ISIS in March, about 300 more than this time last year. As of April 1, aircraft have conducted 6,730 strikes against ISIS in Iraq and Syria. Tanker sorties have stayed steady as well, with 194 million pounds of fuel offloaded through 3,129 sorties. Intelligence, surveillance, and reconnaissance aircraft flew 2,117 sorties so far this year, according to statistics from US Air Forces Central Command.

Carter To Reconsider OIR Campaign Medal Criteria

DOD needs to reconsider the criteria for the new Operation Inherent Resolve medal to include those supporting the mission from outside Iraq and Syria, Defense Secretary Ashton B. Carter said during a trip to Al Dahfra AB, United Arab Emirates—one of the bases most involved in the mission.

Al Dahfra is a large USAF installation with thousands of troops deployed for OIR, though many are not qualified for the medal based on existing criteria, which states they must have served inside Iraq, Syria, or within contiguous airspace or waters, extending out 12 nautical miles (13.8 miles).

The War on Terrorism

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

Casualties

As of May 18, a total of 22 Americans had died in Operation Freedom's Sentinel in Afghanistan, and 20 Americans had died in Operation Inherent Resolve in Iraq and Syria.

This includes 38 troops and four Department of Defense civilians. Of these deaths, 15 were killed in action with the enemy while 27 died in noncombat incidents.

There have been 103 troops wounded in action during OFS and 14 troops in OIR.

OIR Goes Multidomain

The US has begun to use "our exquisite cyber capabilities" in the fight against ISIS, the campaign's deputy commander for operations and intelligence told reporters April 26.

Air Force Maj. Gen. Peter E. Gersten said cyber operations "are cloaked in the highest of secrecy." They are "highly coordinated [and] it has been very effective, and Daesh will be definitely in the crosshairs as we bring that capability to bear against them." Gersten, who has been in theater about a year, said that when he first arrived it was estimated that there were roughly 1,500 to 2,000 foreign fighters streaming into Iraq and Syria each month. That number is now thought to have dwindled to around 200 per month—plus there has been an increase in desertion rates among ISIS fighters.

"In every single way, their capability to wage war is broken," he said of the terror group.

Service Members Disciplined for Kunduz Strike

Sixteen service members, including a general officer involved in the October 2015 air strike on a Doctors Without Borders hospital in Kunduz, Afghanistan, have been punished for their conduct. Forty-two civilians were killed in the attack.

A US Central Command investigation released April 29 found that "certain personnel"—none of them identified—did not comply with the law of armed conflict and rules of engagement, but none of the failures constitutes a war crime. Five of the service members were sent home to the United States, including an officer who was removed from command.

US Special Operations Command boss, Army Gen. Joseph L. Votel, directed boards to evaluate the flight certification of three aircrew members, according to a CENTCOM press release.

"The personnel involved did not know that they were striking a medical facility. The intended target was an insurgent-controlled site which was approximately 400 meters [a quarter-mile] away from the MSF Trauma Center," stated the CENTCOM release, referring to the Médecins Sans Frontières site.

"The investigation found that an AC-130U Gunship aircrew, in support of a US Special Forces element that was supporting a partnered Afghan ground force, misidentified and struck the MSF Trauma Center. The investigation determined that all members of both the ground force and the AC-130U aircrew were unaware the aircrew was firing on a medical facility throughout the engagement," the statement continued.

"This tragic incident was caused by a combination of human errors, compounded by process and equipment failures. Fatigue and high operational tempo also contributed to the incident."

Army Gen. John F. Campbell, then commander of US Forces Afghanistan, ordered additional training on rules of engagement and tactical guidance, directed a review of the targeting process, and issued an updated tactical directive and targeting standard operating procedure, among other measures.

Votel extended his condolences to the victims and said the US is "fully committed to learning from this tragedy." Meinie Nocolai, the president of Doctors Without Borders Belgium, said an "independent and impartial investigation by the International Humanitarian Fact Finding Commission" was still necessary.

Under this criteria, pilots who fly missions into Iraqi or Syrian airspace qualify for the medal, but maintainers and other airmen who worked on the aircraft or supported the mission outside of the countries will not. "You guys are fighting the war, too, as far as I'm concerned," said Carter on April 16 when asked about the medal by a major serving on the base. "I definitely really need to give some thought to that."

Carter then visited Iraq and awarded the first five Inherent Resolve Campaign medals to one airman, one marine, one sailor, and two soldiers.

USAF Patrols South China Sea From the Philippines

Five A-10 attack jets, three HH-60G rescue helicopters, one MC-130H, and about 200 airmen would stick around for an extended deployment in the Philippines following the annual Balikatan exercise to help patrol the South China Sea, Defense Secretary Ashton B. Carter said.

The airmen and USAF aircraft would remain in the country for the rest of April to fly joint training and conduct flight operations in the South China Sea and establish "the foundation" for joint air patrols, said Carter during a joint news conference with his Filipino counterpart in Manila on April 14.

Carter also announced that a "command and control node made up of American personnel" would remain behind and continue exercising with the Filipinos. In addition to the A-10 rotation, the Air Force will deploy newer fighters to the island nation in the near future, though officials did not immediately say what variant.

Fighting Drug Smugglers With Bombers

The Air Force is going to coordinate training flights in the Caribbean and Latin America to assist with drug enforcement efforts, sending aircraft such as B-1s and B-52s on flights that could help deter trafficking.

Courtesy photo from SpaceX

A Liftoff in Time Lapse: ***USAF's 45th Space Wing supported this SpaceX Falcon 9 liftoff from Launch Complex 40 at Cape Canaveral AFS, Fla., on May 6. The two-stage rocket carried the communications satellite JCSAT-14, designed to provide TV programming and broadband services. Three weeks previous, SpaceX was awarded its first national security space-launch contract, to boost a future GPS satellite into orbit.***

Air Force Secretary Deborah Lee James said a B-1 was flying a training sortie in the Caribbean in March, when its sensors picked up a boat in the waters below it. The crew, working with other aircraft and the Joint Interagency Task Force-South, were able to identify it as a "go fast" drug running boat. The Lancer then flew low over the boat, scaring the crew, which then threw about 500 kilograms of cocaine into the water, she said.

The Air Force needs to look at "additional ways to replicate" this flight using other training sorties that are being flown anyway, said James.

Lt. Gen. Mark C. Nowland, commander of 12th Air Force and Air Forces Southern, said missions could include aircraft such as the E-8C Joint Surveillance Target Attack Radar System, Navy P-8s, and B-1 and B-52 bombers. The aircraft could use sensors to find ships, and then relay that information to Coast Guard ships with the legal authority to interdict. Currently, these flights happen sparingly, but James said she wants to "redouble" efforts to conduct more.

More RPA Changes

The Air Force has approved two more changes to the remotely piloted aircraft community: redesignating Predator units as attack wings and allowing RPA pilots to log combat hours even though they are not physically in a combat zone, the service announced April 11.

The changes are a part of the continuing Culture and Process Improvement Program that aims to improve the service's RPA community and welfare of the airmen in related career fields. "The airmen who perform this essential mission do a phenomenal job, but we learned from the RPA pilots, sensor operators, and their leaders that these airmen are under significant stress from an unrelenting pace of operations," Air Force Secretary Deborah Lee James said in a news release announcing the changes.

Previously Air Force MQ-1B Predator squadrons were designated as reconnaissance, while MQ-9 Reaper squadrons were attack. Now squadrons with either aircraft will be attack squadrons, part of the service's anticipated shift to an all-MQ-9 fleet. Air Force Chief of Staff Gen. Mark A. Welsh III also approved the change to let pilots log combat time while flying an RPA in hostile airspace, even though the aircrew is not physically in a combat zone.

SpaceX Wins GPS III Contract

SpaceX will launch the second GPS III satellite in May 2018. The Air Force on April 27 awarded the first competitively sourced National Security Space launch services contract to SpaceX; the firm-fixed price contract is valued at $82.7 million.

The contract award "achieves a balance between mission success, meeting operational needs, lowering launch costs," and reintroducing competition into NSS missions, said Space and Missile Systems Center Commander Lt. Gen. Samuel A. Greaves in a written release.

Under the terms of the contract, SpaceX will be responsible for launch vehicle production, mission integration, launch operations, and spaceflight certification for the GPS III satellite. The Pentagon inspector general in March launched an investigation into United Launch Alliance, after ULA failed to bid for the GPS III contract and a ULA employee said the company wanted to avoid a "cost shoot-out." That employee later resigned. ✪

Editor's Note

In September 2015, the Air Force Association's *Wingman Magazine* published an article about John Weston, an Air Force veteran and AFA member who had recently retired from the State Department's Diplomatic Security division.

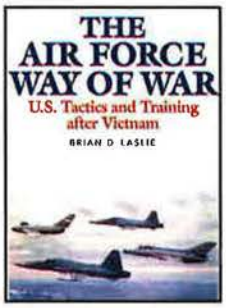
Major portions of this article, which was submitted by Fred Lash and appeared under his byline, were essentially identical to a 2008 article about John Weston that had previously been published in an internal State Department newsletter, "DS Update Online." Lash and the author of the 2008 article, Marcy Mason, both previously worked in State Department public affairs. The September 2015 *Wingman Magazine* article misled our readers and took Mason's work without attribution.

The Air Force Association and *Air Force Magazine* take accuracy, fairness, and intellectual honesty very seriously. For contributing to this act of plagiarism, we would like to apologize to our readers and to Marcy Mason, and we have removed the article in question from our website.—*The Editors*

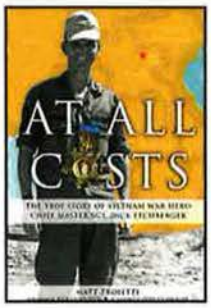
Books Special: CSAF Reading List 2016

Compiled by Chequita Wood, Media Research Editor

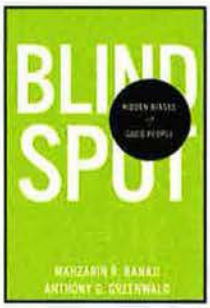
Air Force Chief of Staff Gen. Mark A. Welsh III released his 2016 reading list in May. Twelve books form the centerpiece of the list, which also includes a film, photographs, journals, web publications, and TED Talks. Welsh said, "This year's list is curated to increase our understanding of past heroes as well as our current challenges while keeping an eye towards a future you make brighter by your service." One of the two journals he recommends is *Air Force Magazine.* Weblink: http://static.dma.mil/usaf/csafreadinglist/01_books.html.



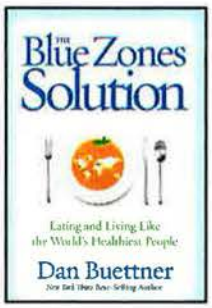
The Air Force Way of War: US Tactics and Training after Vietnam. Brian D. Laslie. Order from: Hopkins Fulfillment Service, Baltimore (800-537-5487). 260 pages. $50.00.



At All Costs: The True Story of Vietnam War Hero CMSgt. Dick Etchberger. Matt Proietti. Order from: Etchberger Foundation, Kay Press, 4908 Bennington Dr., Schwenksville, PA 19473. 160 pages. $32.94.

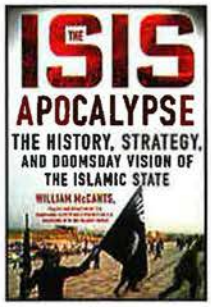


Blind Spot: Hidden Biases of Good People. Mahzarin R. Banaji and Anthony G. Greenwald. Penguin Random House, New York (800-733-3000). 272 pages. $27.00.

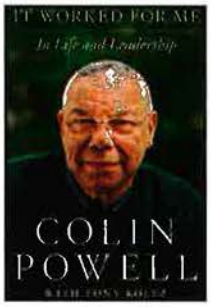


The Blue Zones Solution: Eating and Living Like the World's Healthiest People. Dan Buettner. National Geographic, Margate, FL (800-437-5521). 320 pages. $26.00.

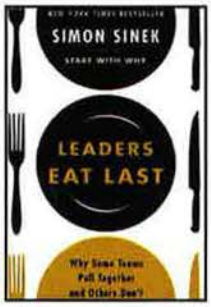
Hit the Target: Eight Men Who Led the Eighth Air Force to Victory Over the Luftwaffe. Bill Yenne. Penguin Random House, New York (800-733-3000). 384 pages. $26.95.



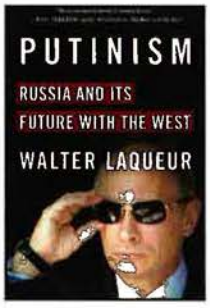
The ISIS Apocalypse: The History, Strategy, and Doomsday Vision of the Islamic State. William McCants. St. Martin's Press, New York. (888-330-8477) 256 pages. $26.99.



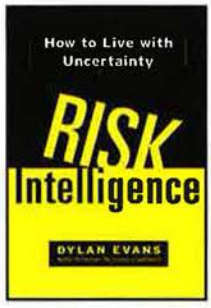
It Worked for Me: In Life and Leadership. Colin Powell, with Tony Koltz. HarperCollins, New York (212-207-7000). 304 Pages. $27.99.



Leaders Eat Last: Why Some Teams Pull Together and Others Don't. Simon Sinek. Penguin Random House, New York (800-733-3000). 256 pages. $27.95.

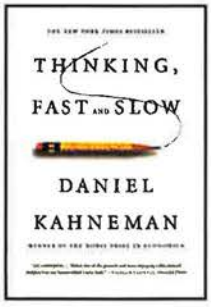


Putinism: Russia and Its Future with the West. Walter Laqueur. Thomas Dunne Books, New York (888-330-8477). 288 pages. $27.99.

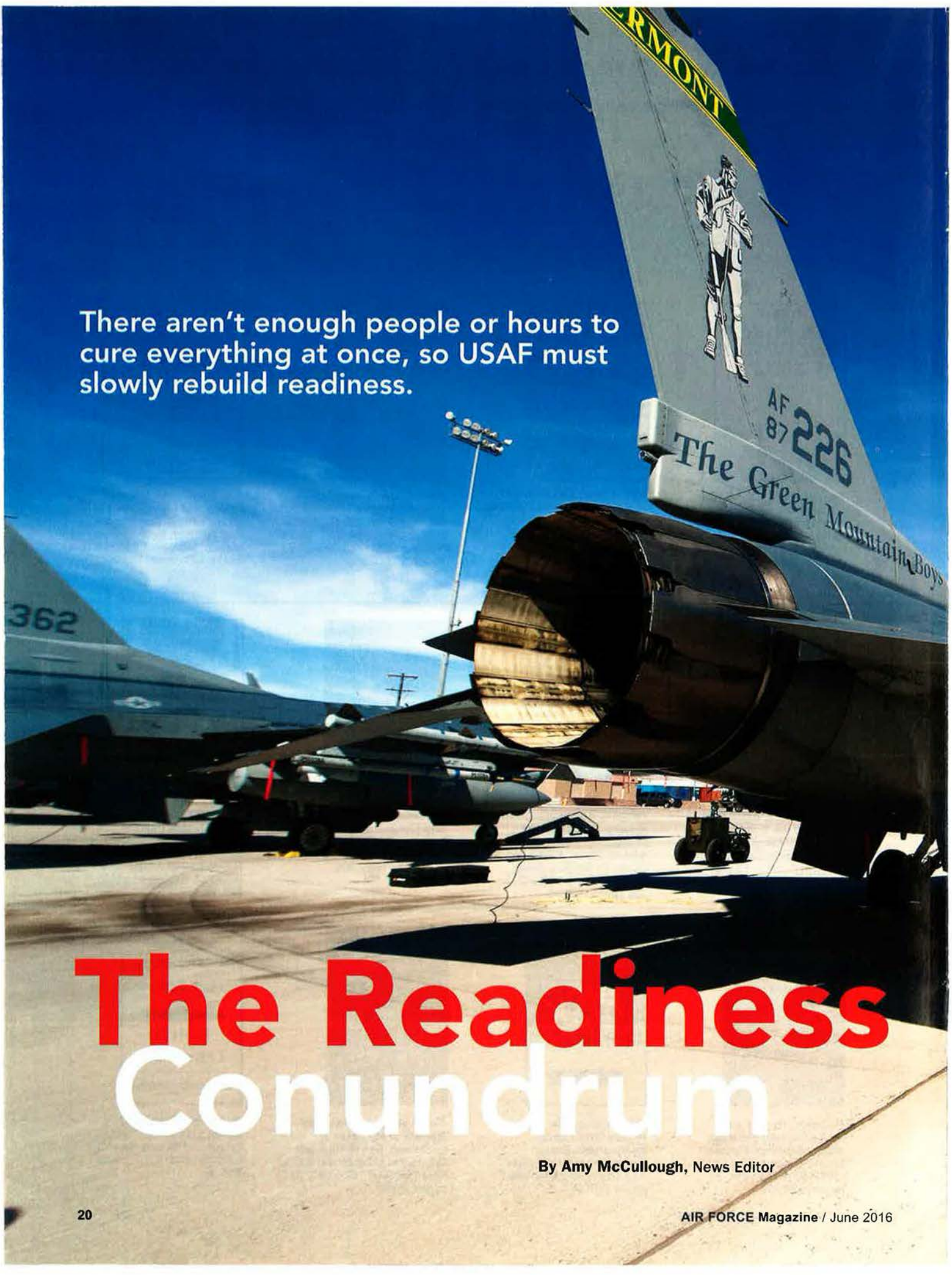


Risk Intelligence: How to Live With Uncertainty. Dylan Evans. Simon and Schuster, New York (800-223-2336). 288 pages. $16.00.

Skunk Works: A Personal Memoir of My Years at Lockheed. Ben R. Rich and Leo Janos. Little, Brown & Co., New York (800-759-0190). 370 pages. $8.98.



Thinking, Fast and Slow. Daniel Kahneman. Farrar, Straus and Giroux, New York (888-330-8477). 512 pages. $16.00.



There aren't enough people or hours to cure everything at once, so USAF must slowly rebuild readiness.

The Readiness Conundrum

By Amy McCullough, News Editor

It could be more than a decade before Air Force readiness levels are back to where they need to be for the service to truly be "ready" for the full range of missions the nation may ask it to perform.

The Fiscal 2017 budget request places a heavy emphasis on rebuilding the force by increasing Active Duty end strength from 311,000 to 317,000 and funding much-needed training improvements. However, the heavy operational tempo, coupled with the fact that today's Air Force is the "smallest, oldest, and least ready" it has ever been, continues to take its toll on the service, Gen. David L. Goldfein, USAF vice chief of staff, told members of Congress in March.

For example, in 1991, 33 of the Air Force's 134 combat-coded Total Force fighter squadrons deployed in support of Operation Desert Storm. At the time, there were 946,000 airmen in the service, the average aircraft was 17 years old, and 80 percent of the fighter force was ready for full-spectrum conflict.

The 80 percent goal still exists today—and is one the service is falling far short of meeting.

By comparison, the Air Force now has just 55 Active Duty, Guard, and Reserve fighter squadrons. Its Total Force is 30 percent smaller than it was during Desert Storm. The average age of its aircraft is now 27 years old, and less than 50 percent of the combat Air Force is ready for full-spectrum operations, said Goldfein.

"In order to maintain an effective fighting force, our budget submission ... tries to balance capacity, capability, and readiness appropriately," Air Force Secretary Deborah Lee James told members of the House Armed Services Committee on March 16. She added, "In terms of readiness, this budget funds flying hours to their maximum executable level, [invests] in weapon system sustainment, and ensures combat exercises like Red and Green Flag remain strong."

The Air Force's plan should stop the readiness decline, but mission preparedness is still expected to plateau over the next three to four years. It won't "be back on a positive trajectory" until Fiscal 2019 at the earliest, said Maj. Gen. Scott A. Vander Hamm, assistant deputy chief of staff for operations on the Air Staff.

IMPORTANCE OF READINESS

Full-spectrum readiness is defined differently for each platform and mission set in the Air Force, and the time it takes to regain readiness varies just as widely. More complex missions, such as multirole fighters, will take longer to recover once readiness is lost.

SSgt. Nicholas Smith, an F-16 crew chief, performs a preflight check before a training mission during Red Flag 15-1 at Nellis AFB, Nev. Exercises such as Red Flag keep USAF ready for upcoming contingencies.

USAF photo by SrA. Thomas Spangler

For example, if an F-16 is tapped to deploy to the US Central Command area of responsibility to conduct close air support operations, its other mission areas, such as air-to-air combat, likely will atrophy. Vander Hamm compared it to a bodybuilder who only exercises one muscle. This results in an exceptionally strong right bicep, but "it will take time for that person to get in total fitness later on down the road," he said.

That's why exercises like Red Flag, giving airmen the chance to execute multidomain, full-spectrum operations, remain so important.

Fighter pilots will go into that and "they will see [maybe for the first time an] airborne interceptor and aggressor come at them. They will get a full complement of surface-to-air missile threats. They will be in a package of offensive and defensive counterair interdiction sorties, ISR, integrated space and cyber. There will be communication issues, and they'll have to fight their way into integrated air defense system," said Vander Hamm.

USAF photo by TSgt. Robert Cloys

Capt. Jay Doerfler, an F-16 pilot, performs preflight checks on his aircraft at Bagram Airfield, Afghanistan, before a mission.

PILLARS OF READINESS

People and platforms are the foundation of a fully ready force, but there also are five "pillars of readiness" the service must consider, including critical skills availability, weapon system sustainment, training, the flying hour program, and the deployment-to-dwell cycle.

After years of cutting end strength, the service went too far. James said USAF must now "upsize our force" to address critical and overly stressed career fields, such as intelligence, surveillance, and reconnaissance, battlefield airmen, cyber, and maintenance.

Although the budget funds an additional 6,000 Active Duty airmen, James said mission demands require even more growth in Fiscal 2017. Speaking at AFA's Air Warfare Symposium in February, James said she has the power through existing law to increase the congressionally approved end strength by up to two percent.

"So, in order to meet that demand, I plan to take a judicious approach to incrementally increase our Total Force beyond the current level, provided ... that we can get the right talent," James later told members of Congress.

Lt. Gen. John B. Cooper, the Air Force's deputy chief of staff for logistics, engineering, and force protection, told House legislators in February that the service is 4,000 maintenance airmen short across the service, and the deficit continues to grow because the Air Force is bringing in two F-35s a month, each requiring 20 maintainers.

"We have the force structure that we're not able to divest, and we're growing F-35s," he said, referencing legacy aircraft that are being maintained for the fight against ISIS and possible European and Pacific contingencies.

To fill the ranks of F-35 maintainers, the Air Force announced in February plans to draw 1,100 airmen from the A-10, F-16, and C-130 fleets. The positions will be backfilled by contractor personnel, but that's just a short-term solution to ensure the Air Force can still meet the F-35A strike fighter's initial operational capability date, said Cooper.

"This is one of many deliberate measures we are taking to help manage this shortage of experienced aircraft maintainers until we can grow and develop our new accessions," he later said in a press release.

It takes five to seven years to recruit new airmen, push them through the training pipeline, and get them trained to a seven-level, where they are not only

USAF photo by TSgt. Nathan Lipscomb

A B-52 lands at Al Udeid AB, Qatar, as part of Operation Inherent Resolve, the fight to eliminate ISIS and its threats to the region.

able to complete tasks on their own, but can also sign off tasks as being done properly, said Vander Hamm.

The risks the Air Force has taken across its entire maintenance portfolio directly relate to a gap in the service's flying hour program.

The Fiscal 2017 budget request, updated to reflect the two-year bipartisan budget agreement, funds 1,165,203 flight hours, down nearly 50,000 from the Fiscal 2016 enacted flight hours, according to budget documents. The Air Force is only able to fund 92 percent of the minimum flight hours aircrews need to fly each year to successfully accomplish the mission set, said Vander Hamm.

"We're only executing the flying hours to what we have the capacity to execute," he added. "So even if we wanted to put money in flying hours to execute to 100 percent, I don't have the maintainers to generate the combat sorties to build the program to get me to 100 percent of our flying hour program."

The gap that is left is additional risk the Air Force is forced to take across its combat and mobility air forces.

Of all the pillars, operational tempo could make the biggest impact in the shortest amount of time, said Vander Hamm. But that's not necessarily a good thing.

Just a few years ago, the service expected to be out of both Iraq and Afghanistan. Not only did that not happen, but the Air Force is now regularly flying in Syria, and "Yemen is heating up," too, he noted.

Russia continues to behave aggressively and violently in Eastern Europe and the Middle East.

In response to a myriad of other threats, the Air Force has increased its posture in both the Pacific and Southeast Asia to counter rising tensions in the East and South China seas and to deter an increasingly bellicose North Korea that continues to threaten nuclear war.

Red Flag and comparable exercises can keep USAF ready for these contingencies, but the amount of time available is again a factor. "If it got more intense, then instead of plateauing and climbing out, then we could see a dip in readiness," Vander Hamm cautioned.

Although the high operational tempo has made it more challenging for units to attend a flag exercise, they are still going. In fact, the Air Force has more flag exercises planned this year than it has previously.

Vander Hamm said this creates a "lack of white space in a unit's schedule," because even when airmen are home they sometimes have to leave their families so they can train to regain the competencies lost while deployed downrange.

Red Flag continues to get more complex to accommodate the changing security environment, but the Air Force is still lacking capacity when it comes to adversary air.

"As we continue to grow out the F-35 and increase the fifth gen requirement, that's going to cause an even greater demand signal for more adversary air," said Vander Hamm.

Just as it did with the maintenance shortfall, the Air Force is looking at contract adversary air to fill that gap.

The US Weapons School at Nellis AFB, Nev., signed a contract with Draken International in 2015 to provide some of its "Red Air" capability after the school inactivated its own F-15 aggressor squadron. Vander Hamm said right now such contracts are a "small slice" of USAF adversary air and it's not yet clear if that will grow in the future.

"We'll see how that goes and then we'll adjust fire down the road," he said.

Draken International A-4s ready for a training mission with the Joint Strike Fighter Operational Test Team. Draken was contracted to provide support to the JSFOTT during the operational test of F-35s for the Royal Netherlands Air Force.

USAF photo by Rebecca Amber

USAF photo by Naoto Anazawa

A1C Ian Wilkerson checks the radio systems of an HH-60G Pave Hawk during a pre-flight inspection at Kadena AB, Japan.

However, USAF won't be able to fully meet the requirement for adversary air without the addition of virtual and constructive training.

"Our capacity now does not meet the demand. As we look at the capacity at the end of the [Future Year Defense Program], it still doesn't meet the demand," he said. "So, a lot of work is going on right now because much of the high-end fight in the fifth generation fighters is going to be done and can be done in that virtual and constructive environment."

But virtual training is not limited to the flying community. It is used by nearly every discipline in the service.

Currently, the Air Force is looking to expand virtual and constructive training for its cyber force so airmen can train offline where adversaries cannot see what they are doing. Air Mobility Command is taking advantage of emerging technology so aircrews can use high-fidelity simulators to accomplish more rigorous mission sets, said Col. Nathan A. Allerheiligen, the assistant director of operations for Headquarters Air Mobility Command.

"There will always be live training, but as we move to the future, I think we will see a shift in that balance," Vander Hamm said.

Red Flag has been so successful for the combat air force, AMC wants to mimic it for mobility forces.

The command will conduct its first large-full, full-spectrum, Red Flag-type exercise in July 2017. Dubbed Mobility Guardian, the exercise will include participation from other areas of the service, as well as joint and coalition partners, said Allerheiligen.

Although Red Flag is held multiple times a year at Nellis, Mobility Guardian will be held every two years. The hub will be JB Lewis-McChord, Wash., although it will utilize training ranges throughout the northwest.

Planners are still developing specific scenarios, but Allerheiligen said training tasks will include operating out of austere air bases, handling cargo from unimproved airfields, joint forcible entry, and humanitarian relief operations.

"We have relooked at what does the mobility air force need in order to be ready for those big, large operations that require a large portion of our force to be engaged for an extended period of time," he said.

BALANCING ACT

Although the bipartisan budget agreement provided the Defense Department the stability and predictability it has been seeking, the Air Force is still short about $3.4 billion from its original Fiscal 2017 budget request. The shortfall makes it difficult to find the right balance between readiness and modernization.

The Air Force's budget strives to protect funding for its top three acquisition programs: the KC-46 tanker, the B-21 Long-Range Strike Bomber, and the F-35A strike fighter. It provides funds to modernize nuclear command and control, replace outdated Minuteman III ICBM equipment, build the Ground Based Strategic Deterrent program, and continue developing a new nuclear air-launched cruise missile. The budget delays retiring the A-10 Warthog, which is being used heavily in anti-ISIS operations, and the EC-130 electronic combat aircraft.

However, the Air Force had to delay procurement of five F-35A strike fighters and three C-130Js, and it is slowing modernization of fourth generation aircraft. Air Force leaders said additional funding

TSgt. Christopher Fitzgerald examines the runway at Bagram Airfield as rubber from the tires of jets taking off and landing is removed from the surface with foam and biodegradable solvents.

USAF photo by Capt. Susan Harrington

SrA. Peter Espinoza, a crew chief from Osan AB, South Korea, runs through a checklist on an A-10C after a mission over international waters at Clark AB, Philippines.

would have ensured the service could invest in those capabilities now to avoid having them compete for critical nuclear and space requirements in the future.

"These are not things we'd love to do, certainly," DOD Comptroller Michael J. McCord said during the budget rollout in February, but the Pentagon chose to cut some modernization to protect readiness and human capital.

The Air Force had to make other difficult choices as well, including once again delaying investment in aging infrastructure, such as airfields and taxiways. In their prepared statement to the Senate Appropriations Committee's defense panel in February, James and Chief of Staff Gen. Mark A. Welsh III said USAF has repeatedly delayed such upgrades since sequestration was implemented in Fiscal 2013.

"Every year we delay these repairs, operations are affected and the eventual cost of improvements grows substantially," according to James' and Welsh's statement.

Fiscal 2013 was a brutal year for the Air Force. Because of the draconian nature of the Budget Control Act, 31 of the service's 55 fighter squadrons were forced to stop flying and the ripple effect was felt across the enterprise, said Goldfein.

Air Combat Command boss Gen. Herbert J. "Hawk" Carlisle said even though budget agreements have temporarily halted the sequester and provided additional funds to the service, the command is so busy it has not had time do all the continuation training it needs to get back what it lost. The Air Force is still digging out from sequestration.

A return to sequester-level funding in Fiscal 2018 would be devastating to the service, certainly leading to even more lost readiness—or worse.

"If we return to sequestration and we once again have to park jets and take some of those very dire effects that we did the last time around, there's just no question in my mind this means that we will enter possibly a future conflict less prepared," said James in her House Armed Service Committee testimony. "History teaches us that the consequences of insufficient preparation are prolonged conflict and increased loss of life."

Air Force leaders have repeatedly cautioned that the technological gap between the US and its adversaries is quickly closing and, in the 2016 posture statement, said a deteriorating military strength could serve as an "invitation for conflict" for "unstable powers" seeking to capitalize on "our eroding competitive advantage.

The Air Force has enjoyed "uninterrupted" air superiority since the early 1990s, but that's not likely to be the case for much longer. Other countries have closely watched US capabilities and are increasing their own defense funding.

Sophisticated air defense systems are much more common. Advanced military capabilities such as nuclear weapons, cruise and ballistic missiles, and precision guided weapons, are much more affordable today than they were during Desert Storm—and they continue to proliferate.

The readiness gap has been closing for the last couple years, and the Air Force is setting the conditions to close it further, but there is still much ground to be made up.

"Air forces [that] don't modernize eventually fail, and when the Air Force fails, the joint team fails," said Goldfein. ✪

USAF photo by TSgt. Nicholas Rau

MOBILITY RESET

By Brian W. Everstine, Pentagon Editor

COMBAT operations may have recently decreased for Air Mobility Command, but the Middle East fight still has plenty of thirsty combat aircraft that require fuel, parts, weapons, and personnel movements. In addition to the ongoing anti-ISIS operations, AMC has a new focus on readiness and training at home stations. These competing demands are being flown on the backs of an already stressed airlift fleet.

The drawdown in Iraq and Afghanistan was supposed to mean a reset of air operations back home, focusing on proficiency and rest as the Air Force began to mature its airlift fleet and modernize its air refueling capabilities. The shift in operating requirements is bringing forward new challenges the service must address.

"The current pace of today's operations requires the full effort of our nonmobilized air refueling and airlift fleet," Air Force Gen. Darren W. McDew, commander of US Transportation Command, told lawmakers during a March hearing. "Should the need arise to respond elsewhere in the world, the mobility resources required could exceed existing capacity."

During the height of Operations Enduring Freedom and Iraqi Freedom the Air Force launched an airlifter every 90 seconds. By 2015 that pace had fallen to one takeoff every 2.8 minutes, but training needs at home are increasing. This will likely require a dramatic overhaul of the command's key exercises.

"We've done 14 years of war tremendously well," Gen. Carlton D. Everhart II, commander of Air Mobility Command, said at AFA's Air Warfare Symposium in February in Orlando, Fla. "But as we go out and expand out, we need to look at other skill sets. I need to be able to respond globally at any moment's notice."

For decades, air mobility crews competed every other year at the command's crown jewel exercise—the Air Mobility Rodeo. Crews would fly into JB Lewis-McChord, Wash., to compete in all facets of the mobility mission and vie for trophies. The competition was

C-17s, KC-10s, and C-5s from the 60th Air Mobility Wing at Travis AFB, Calif. Twenty-two mobility aircraft launched in 36 minutes.

expensive and crews became busy with real-world operations, so AMC canceled the event in 2013 and went back to the drawing board.

Next year, the command will introduce a brand-new training event—designed to be the Red Flag for mobility crews—called Mobility Guardian. The event is scheduled for July 2017.

Mobility Guardian will be an international, scenario-driven event to test mobility airmen at the highest level of full-spectrum training, Everhart said. Tankers, strategic airlifters, tactical airlifters—even aeromedical evacuation crews—will come together to "train as we fight," he said. International partners are invited, and the plan is to "exercise every one of our core functions," Everhart said.

Air Mobility Command crews have always supported other aircraft in exercises, air dropping soldiers or refueling combat aircraft. While that will still be a large part of what AMC does, Mobility Guardian will be an opportunity for the command to finally be the focal point, Everhart said.

Joint training will be needed in the future, as continued operations in the Middle East have shown.

STRESSED NEAR BENDING

The biggest stress on Air Mobility Command's fleet has been on its legacy KC-135 and KC-10 tankers. The aircraft put up record numbers in 2015, responding to international refueling needs as part of the coalition war against ISIS in the Middle East, along with training missions abroad and supporting air bridges for aircraft globally.

"Our KC-135 and KC-10 refueling fleet is stressed at a point that's near bending," McDew told a House Armed Services subcommittee in March, "and I'm concerned [about] our ability to flex that force to another region of the world if we need to."

In 2015, the air refueling fleet passed 1.3 billion pounds of fuel in refueling operations, Everhart said. KC-135s deployed to al Udeid AB, Qatar, set a flying-hour record by exceeding 100,000 hours

USAF photo by Ken Wright

AMC HOPES TO TAKE ADVANTAGE OF A RARE DIP IN OPTEMPO TO REBUILD READINESS.

refueling both US and coalition aircraft in the area, including daily operations supporting a Saudi-led effort targeting Houthi extremists in Yemen.

AMC's tankers provide fuel to "every flying unit in the area of responsibility, which is Syria, Yemen, Iraq, and Afghanistan, and [we] supported 12 coalition nations," said Lt. Col. James Murray, 340th Expeditionary Air Refueling Squadron operations director, in a press release. "Imagine 12 airplanes flying 24 hours a day. It's incredible."

Al Udeid-based KC-135s offloaded 700 million pounds of fuel—more than half the 2015 output of the entire refueling fleet. As of March 1, air refueling tankers have offloaded 132 million pounds of fuel, keeping pace this year.

USAF photo by SSgt. Vernon Young Jr.

Above: Capt. Trenton Palmer (l) and Capt. Andrea Delosreyes, KC-135 pilots, go over a preflight checklist with boom operator A1C Kevin Haggith and other aircrew before a refueling mission over Iraq in 2014. Below: Airmen sprint to their aircraft during Air Mobility Rodeo 2011 at JB Lewis-McChord, Wash.

CHANGING AIRLIFT NEEDS

For years, the Air Force overpopulated the C-17 pilot career field to keep crews available to fly operational missions, but for the first time in almost two decades, the pilot manning is about 100 percent, said Lt. Col. Jaron H. Roux, commander of the 62nd Operations Support Squadron at McChord. Although there is no longer a manning buffer, planners at McChord are working to balance the need for continuation training so pilots can maintain proficiency, while still allowing enough time for office work and professional military education.

"It's just a different world we are living in," Roux said. "But the need for airlift has not stopped. So, it's an adjustment for sure."

McChord hosts the largest number of the Air Force's newest strategic airlifters—C-17 Globemaster IIIs. McChord-based C-17s, able to launch within 16 hours and carry cargo across the globe, are a part of every contingency operation that requires quick response strategic airlift.

However, McChord's ramp of C-17s is getting smaller, while their responsibility is staying the same, Roux said. In May, the base will close the 10th Airlift Squadron and the number of C-17s at the base will eventually fall from 48 to 36. The move comes after McChord's partner C-17 base, JB Charleston, S.C., inactivated a C-17 squadron.

"It's not as many sorties, but the strain is on our aircrew—they feel that," Roux told *Air Force Magazine* in an interview.

As large-scale Army deployments to Iraq and Afghanistan have mostly ended, soldiers at their home bases want to train more, especially with airdrop training, and 18th Air Force is committed to fulfilling that need.

To do that, McChord needs to find the time and money to train pilots and loadmasters so they are proficient to fly airdrops for the Army. Then the base must send those airmen to Fort Bragg, N.C., for flights with the 82nd Airborne, Roux said. "That's the conundrum we find ourselves in, to find pilots and loadmasters able to go provide the training the Army needs."

Within the past year, that requirement has increased almost threefold—McChord-based C-17s are now dropping about 10,000 parachutes each month, Roux said.

Air Mobility Command recently instituted a new method to track Active Duty force readiness called "health of the wings," including regular open

USAF photo by TSgt. Elizabeth Concepcion

USAF photo by Capt. Raymond Geoffrey

forums with wing commanders. The forums give them an opportunity to bring up readiness issues that may not come up with standard data reporting, said Col. Nathan A. Allerheiligen, AMC's assistant director of operations. As of early April, AMC had gone through the first cycle and was beginning the second.

The challenges facing a wing could vary based on mission sets and resources. Some places have issues with facilities, while others have equipment or manpower resources problems, said Allerheiligen. So far there doesn't really seem to be a specific trend across the command, he said.

For example, one unit that was going through a manpower conversion was concerned it did not have the proper skills in place for its emerging mission. "This venue allowed us to make sure we got them the manpower they needed [for] their mission. It opens up the conversation on an informal basis," said Allerheiligen.

KEEPING THE FLEET MODERN

Air Mobility Command is in the early stages of developing one of the Air Force's highest-profile acquisition programs, the KC-46A Pegasus. The new tanker will eventually replace the oldest and most problematic batch of Eisenhower-era KC-135s with 179 aircraft expected to fill the fleet. However, there is worry the tanker may not deliver on time.

The Defense Contract Management Agency on March 25 said it expects Boeing will miss its August 2017 deadline to deliver 18 KC-46As by seven to 14 months, a delay that could have a ripple effect through current operations by keeping KC-135s flying longer.

"That airplane is 50-plus years old, the KC-135," McDew said. "It was old when I flew it, three decades ago. ... That recapitalization effort must stay on track, and at the rate they're doing it, we're going to have to fly the current fleet of KC-135s 30 more years, so that's a potential problem."

The KC-46 may capture most of the headlines, but AMC also needs to balance other acquisition and modernization programs with operations.

The service is relaunching a two-phase modernization program for its legacy C-130H fleet. The first phase, dubbed AMP 1, will make sure the aircraft are compliant with Federal Aviation Administration requirements and enable the C-130 to fly stateside beyond 2020. The second phase of the program will provide flat-panel glass cockpit displays, like those in the C-130J, and will begin shortly after AMP 1 is done.

The command is working with both the Air National Guard and Air Force Reserve Command to create a schedule for AMP installation that will not impact one unit more than others, Allerheiligen said.

"AMP one and two don't change the structural integrity of the aircraft, but they do bring updated avionics that will make the platform more reliable from a sustainment standpoint. ... It will extend the viability of the aircraft in terms of utility of the warfighter," he said.

USAF photo by SSgt. Russ Jackson

Top: C-130Hs drop heavy equipment payloads over South Korea during exercise Max Thunder in 2014. Right: A C-17 drops heavy container delivery systems to ground forces during the simulated Rainier War in Washington state.

USAF photo by TSgt. Kristine Dreyer

A KC-135 connects to an MC-130P during an air refueling mission over the East China Sea. Stratotankers have been in the fleet for more than 50 years.

The command, which uses the most fuel in the Defense Department, must keep a close eye on fuel efficiency and consumption, said Everhart. A recent study found that Air Force fuel prices quadrupled between 2004 and 2012.

In light of this fact, the first C-130H to receive an engine upgrade kit took to the skies in February, and the command is "going to get these airplanes up to speed. We're looking at all aspects. ... Fuel efficiency is big to me," said Everhart.

Everhart said AMC is considering re-engining older C-17s. Pratt & Whitney delivered the last F117 engine for the C-17 in January, about two months after Boeing officially ended the C-17 production line in Long Beach, Calif.

The C-5M could be a model for the C-17, with new engines letting the massive Super Galaxy take off in 6,000 feet and fly nonstop from the East Coast to Turkey on an airframe that first flew in 1970. That's about half the runway required for the C-5A. "We're doing it all the time ... and that's based off the engine and the fuel efficiency we get," Everhart said.

The Air Force and Boeing are searching for a way to reduce the C-17's drag, which would in turn reduce fuel costs. The Air Force Research Laboratory completed the first phase of the C-17 drag reduction program in March, when testers studied the effects of placing vortex control technology finlets on the aft part of the fuselage. The testing also will determine whether the modifications impact the C-17's current capabilities.

"Our end goal is to reduce fuel consumption while maintaining military utility," said project manager Steve Salas of the 418th Flight Test Squadron at Edwards AFB, Calif., in a press release. "This program has the potential for significant savings in C-17 fuel costs, helping the Air Force stretch its budget even further while maintaining force readiness."

WAR, TRAINING, AND VIPS

AMC's missions include a not-insignificant amount of high-profile transport—VIP operations that take place regardless of what other demands the command is facing. In addition to supporting US Central Command, McChord-based C-17s also assist presidential and other VIP travel; respond to humanitarian crises, such as a hurricane, tsunami, or the Ebola response in Africa; and handle the large increase in domestic tasking for Army training, Roux said.

For example, the VC-25 flying the President requires a flight of C-17s, from bases such as McChord, to enable the travel.

The Presidential Airlift Group at JB Andrews, Md., in charge of Air Force One operations, launched 200 missions to 75 countries in 2015 alone, at a 98.4 departure reliability rate, according to the 89th Airlift Wing. This includes Pope Francis' visit to the US last September. Its responsibilities this year have encompassed the March-April Nuclear Summit in Washington, D.C., of several world leaders; repatriation of American prisoners abroad; and the historic March 20 trip to Cuba, the first time a US President visited the country in almost 90 years. ✪

THE Air Force is getting ready to launch a sweeping analysis of how it conducts electronic warfare, hoping to develop a more integrated and innovative approach to this critical aspect of modern combat around 2018.

That analysis can't come soon enough. Experts charge that the multitude of elements in USAF's electronic warfare portfolio haven't been knitted together in a coherent way; the service is tripping over definitions, can't find a workable distinction between electronic and cyber war, and has taken an ad hoc approach to electronic battle.

The service also lacks an electronic warfare "czar" with visibility into all aspects of its EW efforts—a focal point that experts think is urgently needed.

Retired Gen. Larry D. Welch, USAF Chief of Staff from 1986 to 1990, offered a blunt appraisal of the Air Force's EW enterprise at AFA's Air Warfare Symposium in Orlando, Fla., in February.

"One of the problems with electronic warfare is, we don't know who owns it," Welch said in a panel discussion on future capabilities.

"We don't know where it fits," he said. "It's not cyber, so what is it?"

The Air Force long regarded cyber as endemic to all its missions, and for that reason long postponed recognizing it as a domain separate from air and space and worthy of its own enterprise. After long debate, 24th Air Force, the service's own cyber command, was created in 2010.

"Some people advocate ... [that EW] should be considered a separate domain. I don't know that that's the answer," Welch said. "But I do know that the Air Force has been particularly remiss in not doing a lot with electronic warfare compared to ... our two principal, probable adversaries," a clear reference to China and Russia.

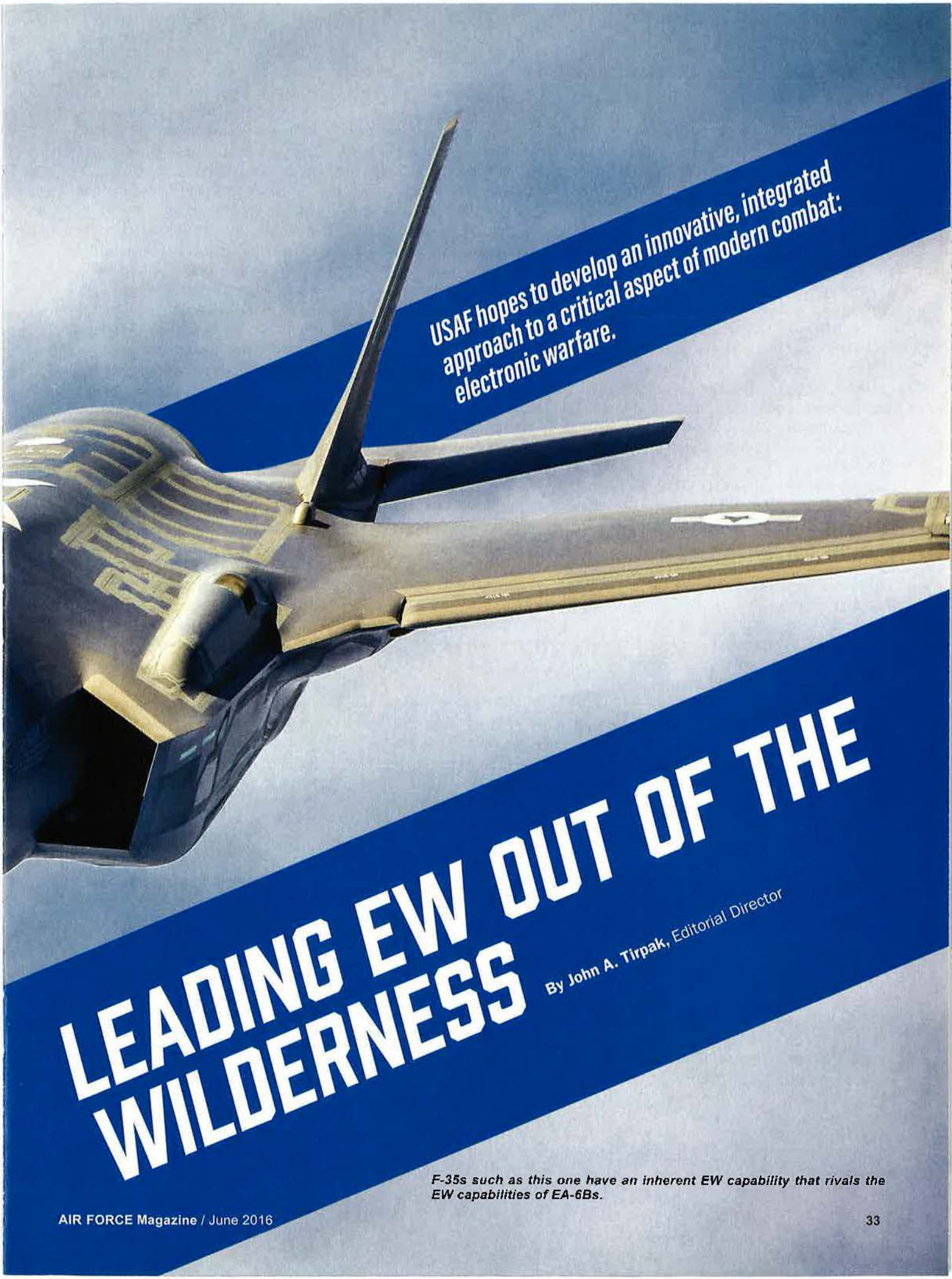
"Quite frankly," Welch said, USAF has not done nearly as much EW planning "as the Navy has done. So it just needs to have a home somewhere in the Air Force where it ... gets the attention it needs."

Reacting to those comments, Gen. Mark A. Welsh III, the current Chief, said electronic warfare has "changed shape over time. And if you ask people in any of the services what that means, you'd get a number of different answers." The Air Force needs to define "clearly what electronic warfare is today and in the future, and then what capabilities are we missing." Some of these may be met by elements "already built into systems that are moving forward," he said.

He continued, "This is one of the areas that we identified a year ago as something for a potential [Enterprise] Capability Collaboration Team in the Air Force"—a cross-domain analysis—as EW "affects a whole bunch of different mission areas ... in different ways." But Welsh also said that "using a single broad term to refer to all of it actually confuses things more than it helps. ... We're trying to clearly define the mission area, the requirements within it, and who should have the lead for each of those things."

The Air Force's self-set 12 core functions range from nuclear operations to global attack to mobility and special operations, but don't include EW, though EW is considered a key factor in each.

USAF photo by MSgt. John R. Nimmo Sr.



USAF hopes to develop an innovative, integrated approach to a critical aspect of modern combat: electronic warfare.

LEADING EW OUT OF THE WILDERNESS

By John A. Tirpak, Editorial Director

F-35s such as this one have an inherent EW capability that rivals the EW capabilities of EA-6Bs.

Lt. Gen. James M. "Mike" Holmes, USAF's top strategic planner, told *Air Force Magazine* that an EW deep dive is coming soon, but couldn't get underway until the recent Air Superiority 2030 study was completed. Once the overarching construct was figured out, Holmes said, the pieces—EW being a big one—can be fleshed out in specific detail.

"We are working on it," Holmes said of an EW roadmap. He said there's "a strong feeling that EW will be on the next list" of topics addressed by a Strategic Portfolio Review and an Enterprise Capability Collaboration Team, which will look at ways to address new operational problems in approaches that cut across domains and commands.

"We know that we have to take a soup-to-nuts look at EW across our enterprise," Holmes said.

Asked when it would start, Holmes said Welsh directed that "before we pick the next areas we're going to look at, he wants me to bring in industry and academia and some other people and look at opportunities and think through what our next one should be." Holmes added, "Right now, EW is at the top of the list ... we haven't made a final decision." If another topic takes priority, "we're not going to wait, we'll continue to do some work" on it.

The Air Force's EW portfolio has a lot of parts. Its flagship platform is the EC-130H Compass Call, a Hercules transport brimming with racks of electronics gear and bulging with pods and blisters that can detect, locate, and jam transmissions and radars. (The EC-130J Commando Solo, though it has a nearly identical nomenclature, has a completely different mission, as a flying broadcast studio for psychological operations.)

Beyond the EC-130H, the Air Force's fourth generation fighters carry self-protection radar warning and jamming pods, electronic countermeasures pods, and onboard EW systems. The Miniature Air Launched Decoy (MALD) missile and its MALD-J jamming variant would be fired in volleys during an air campaign to mask the true location of striking jets. The Air Superiority 2030 plan also suggested that cheap stand-in jamming drones might be built in large numbers to fool enemy air defenses.

STEALTH VS. EW?

The RC-135 electronic spyplane can also be used to characterize, locate, and jam transmissions.

The F-22 and F-35 fighters, as well as a small number of F-15s, possess active electronically scanned array (AESA) radars. These can perform not only search-and-track functions for air combat, but communication, jamming, and deception, too. The F-35 and F-22 also have conformal antennas in their skins which can serve EW functions, but the Air Force won't discuss them.

The F-22, F-35, and B-2 all employ stealth, which relies on aircraft shaping, radar frequency-hopping, some active systems, and a number of tactics and techniques to attenuate their radar signature.

Some have argued that the Air Force put too much reliance on stealth and, in so doing, failed to adequately invest in electronic warfare. Retired Lt. Gen. Robert J. "Bob" Elder Jr., former commander of 8th Air Force, said in an interview that "some people have told me we don't need electronic warfare anymore because we have stealth. Well, stealth *is* electronic warfare. What they meant was, they thought we didn't need active electronic attack."

Until the late 1990s, the Air Force employed large numbers of EW aircraft. The EB-66 Destroyer was a Vietnam-era electronic countermeasures jet that escorted strike aircraft. Also during Vietnam, the F-105G Wild Weasel provoked enemy radars into revealing their positions, which they then attacked with Shrike and Standard Anti-Radiation Missiles. During the 1991 Gulf War, USAF employed F-4Gs in the Wild Weasel role, using the more advanced High-speed Anti-Radiation Missile (HARM) to destroy enemy emitters. The EF-111 Raven, the Air Force's version of a "stand-in" or escort jammer, was also a prominent player in the Gulf War, blanketing the sky with electrons that made the enemy's radar screens light up with thousands of false targets that hid striking USAF jets.

These aircraft collectively performed the suppression of enemy air defenses, or SEAD mission. It is often counted as the kinetic form of electronic warfare.

When the Air Force downsized in the 1990s, the F-4Gs were retired, passing their mission on to F-16Cs equipped with targeting systems for the HARM. The EF-111 retired without a direct successor in hand. The Navy, whose four-seat EA-6B Prowler escort jets carried the same electronics, picked up the jamming

An EA-18G Growler launches from the deck of USS George Washington. Some USAF crew members fly with Growler units as exchange officers.

USN photo by Mass Comm. Spc. 3rd Class Bryan Mai

USAF photo by TSgt. Nicholas Rau

SSgt. Gabriel Felix runs through a check of the computer system on an EC-130H at Bagram Airfield, Afghanistan, in February. Compass Call aircraft go through baseline upgrades every 18 to 48 months.

escort mission for both services, and until recently, Air Force electronic warfare officers flew on the Prowlers to improve service integration. Though the Marine Corps still has some Prowlers, the Navy has moved on to the EA-18G Growler, an EW variant of the two-seat F/A-18F Super Hornet. Under an agreement between the services last September, a few Air Force crews will continue to fly with Growler units as exchange officers.

The downsizing over the years, coupled with the growth of stealth, saw USAF neck down to the Compass Call as its main EW platform.

Col. George M. Reynolds, commander of the 55th Wing, which counts the EC-130H and RC-135 fleets in its portfolio, explained that the EC-130 offers several main capabilities. Those are "countercommunications, counterradar, counterdata, and counternavigation," he said in an interview.

"We do a full range of military operations, from supporting small teams on the ground all the way up to the high-end conflicts," he explained. The EC-130 can perform standoff communications or radar jamming of enemy air or surface craft. It can listen for enemy communications, warn troops on the ground that an enemy is nearby, or disrupt the enemy's attack at selective moments by jamming, Reynolds said. The aircraft has a lot of power for emissions, due to its four engines, he noted.

BIG SAFARI

The 55th's aircraft are operating in a constantly shifting electronic environment, as communications evolve from land lines to cellular and satellite modes, and radios morph into software programs on other devices. Many nations that never built land lines are skipping directly to modern wireless systems, Reynolds said, and these are expanding "in an exponential manner." This drives constant fleet updates.

"The capabilities on the aircraft actually get updated very rapidly. ... In the case of the EC-130, we go through baseline upgrades ... every 18 to 48 months," Reynolds said. The older aircraft are now largely up to speed with digital avionics, doing away with the old "round dial" cockpit displays, he said. Those upgrades have provided "significant" new capabilities.

In between the major refits, there are "Quick Reaction Capabilities," which are interim installs of new mission gear. It's all done under an Air Force program/office called Big Safari, which does quick acquisition and maintenance of aircraft in key missions.

"One of our combatant commanders may want us to look at a communication system that we had never seen used by a military," Reynolds explained. "And that could be a terrorist organization, a country ... that's using something they bought from [another] country we never anticipated." Big Safari has to "provide that capability on the aircraft because nobody five years ago had thought about that capability being used."

Likewise, the specialists that use the equipment need constant, on-the-fly training. If they suggested it, though, they have a pretty good sense of how it's supposed to work.

The pace of programmed depot maintenance is also faster for the 55th Wing

USAF photo

Unarmed EB-66 EW aircraft escorted strike aircraft during the Vietnam War, detecting and jamming enemy air defense radars.

An EC-130H Compass Call on the flight line at Bagram. The EC-130 is the Air Force's flagship EW aircraft, brimming with electronic equipment, pods, and blisters to detect, locate, and jam enemy communications and radar.

airplanes than for most others. After a total stripdown of the aircraft to inspect, repair, and reinforce anything necessary, "it's really not even the same airplane" anymore, Reynolds said.

In the case of the EC-130s, the key life-limiting item was the center wingbox, which holds the wings and central fuselage together. Those have been replaced, and that mod "extends the life of the platform by decades," he said.

Reynolds said that to meet demand for machines and crews alike, the wing rethought all its upgrade schedules and training programs to increase aircraft availability, with the same number of aircraft. Such is the demand that sometimes aircraft are hot-turned, where one crew gets off and another gets on.

To get even further value out of the aircraft, Reynolds said that participation in a Red Flag or similar exercise is an opportunity to experiment with new tactics, techniques, and procedures and "support test and evaluation while we're there." The wing is increasing its participation in Virtual Flag and simulations, and doing more "reachback" by making use of stateside analysts and operators as backup for deployed people and assets.

All of which made it puzzling that the Air Force proposed retiring seven of the 15 EC-130 Compass Call aircraft in its Fiscal 2016 budget request. The decision to retire those airplanes "was one not made lightly," the Air Force told Congress at the time, "but was driven by financial constraints and the needs of the Air Force to modernize in other areas."

The reason was certainly not lack of need. Reynolds said that, since 9/11, the EC-130 has been "continuously deployed to the Middle East" among 13 locations worldwide.

Operating tempo has been unrelentingly high during those years. "We've been doing this for so long, that's kind of become the standard," he said. For some specialties associated with the mission, such as linguists, the optempo has been even higher, as it has been for maintainers, who are in short supply.

Congress declined USAF's request to reduce the EC-130 fleet.

Service sources said the Air Force was willing to absorb some loss of EC-130s because its new F-35s have an inherent EW capability that will match or exceed what the EC-130s offer. Lockheed Martin, maker of the F-35, frequently points out that the Marine Corps plans to use a standard F-35, without any external jamming pods, as its EA-6B replacement.

THE BLACK WORLD

The Navy, however, has focused on the EA-18G Growler as its principal EW platform. In mid-April, it awarded Raytheon a $1 billion contract to complete development of the Next Generation Jammer pod, which will replace the ALQ-99 pods that were largely a legacy of the Prowler.

Elder said a lot of EW projects "are in the black world" which means that US advances in EW may not be obvious. He said USAF's air operations centers do a good job of coordinating the disparate EW efforts and are moving toward achieving even better synergies between them.

"Where they are now is just in the basics, but they're getting better and better," he said, speculating that this may be one of the reasons "why the Air Force hasn't seen a need to go for a [new] dedicated" EW platform.

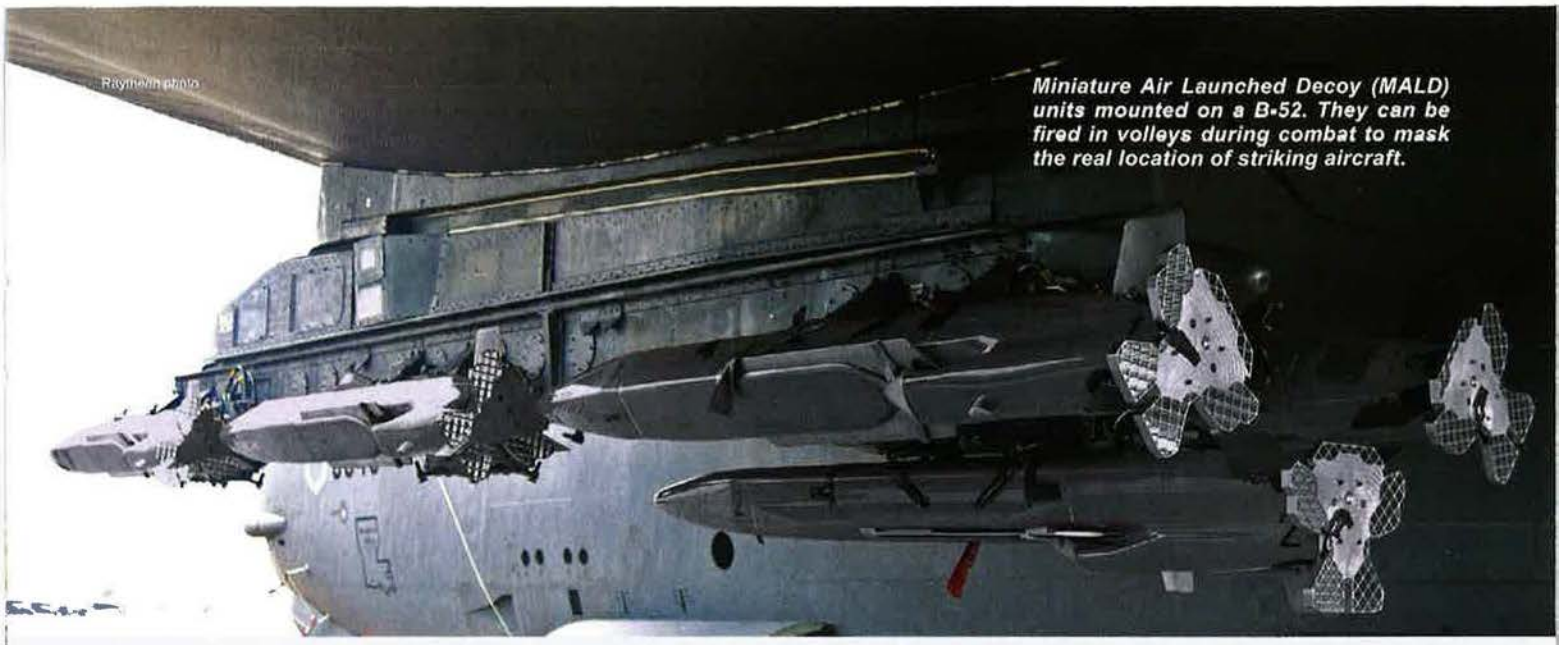
The Air Force asked industry last fall to pitch ideas for militarizing business jets to take on electronics-heavy missions the service didn't identify. Industry experts speculated that such aircraft might be intended for EW.

Elder suggested that the US hurts its own efforts by distinguishing signals intelligence missions from electronic warfare, largely because of laws affecting how the military can conduct reconnaissance. "That distinction complicates our approach," he said.

The Defense Science Board, in a report released late last year, offered what it called a "sobering" assessment of electronic warfare capabilities across the military services. Though the US "relies on information superiority," this is "jeopardized by serious deficiencies" in EW. The DSB urged the Pentagon to spend more on EW, devote more manpower and other resources to it, shift "more to offense," and create "governance" for the EW enterprise appropriate to 21st century warfare.

The DSB estimated it would cost "$2.3 billion per year for at least five years" to implement its recommendations regarding electronic warfare.

Deputy Defense Secretary Robert O. Work, responding to the DSB, launched the EW Executive Committee, which he touted as a cross-service look at integrating electronic warfare—not just at the tactical or operational level, but across entire theaters. The so-called "ExCom"



Raytheon photo

Miniature Air Launched Decoy (MALD) units mounted on a B-52. They can be fired in volleys during combat to mask the real location of striking aircraft.

is co-chaired by Pentagon acquisition chief Frank Kendall and Joint Chiefs vice chairman Air Force Gen. Paul J. Selva.

Work explained that EW—like space, cyber, and nuclear weapons—is a "cross-cutting" area where "we don't have a kind of 'head'" and consequently "got in trouble." There was no way for Work to know "whether, as a Department of Defense, as a joint force, [if] we have enough electronic warfare effectors in our joint battle networks."

The ExCom has given him more insight into the EW portfolio, he said, but "we have a lot of work to do in both cyber and EW. Our adversaries have really ... poured a lot of money into it because they know the power of our battle networks" and want to counter them.

Work said he created a "Cyber Investment Board" as a result of analysis done on that domain, "and ... my intent" is to do something similar with EW. More should be done in both areas, he said, but "what we give up to get it is always the question."

In a paper called "Winning the Airwaves," published last fall by the Center for Strategic and Budgetary Assessments, authors Bryan Clark and Mark A. Gunzinger suggested the Pentagon consolidate the terminology for electronic warfare, electronic attack, cyber, and electronic support under the blanket domain name "electromagnetic spectrum." The Defense Department, they said, should also take advantage of new technologies that will "dramatically change" EMS to leapfrog the nation's adversaries in this domain.

Much as smartphones and the internet are changing "how the world shares, shops, learns, and works," new sensors and networking technologies will give some militaries "significant new advantages over competitors that fail to keep pace," the authors warned, charging that "'failed to keep pace' is an appropriate description" of the Pentagon's investments in EMS for a generation.

COUNTERDETECTION

This "pause," Clark and Gunzinger charged, gave Russia, China, and other rivals a chance to target "vulnerabilities" in US communications and sensor networks. The "once significant" American military advantage in the EMS domain "is eroding and may in fact no longer exist," they wrote.

To fix the situation, the authors recommended the US obtain a "leap ahead" in EMS capability. This could come through "low-power countermeasures" to defeat enemy sensors and low probability of intercept/low probability of detection sensors and communications to reduce the likelihood that US forces will be "counterdetected."

The authors pushed a shift toward passive or "multistatic" methods: using "ambient electromagnetic energy"—such as comms traffic, TV and radio emissions, and even sunlight—to spot enemy forces without emitting and using new emissions controls and "low-power countermeasures" to stay quiet in enemy airspace.

Such a transition demands ever-more sophisticated (and hack-resistant) networking of systems; the ability to agilely "maneuver" in the EMS with regard to power, frequency, space, and time; investing in "multifunctional" systems like AESAs that can perform a variety of all-in-one tasks; investing in smaller, cheaper systems that can be widely deployed among US forces; and investing in systems that can rapidly and automatically "characterize the EMS," finding "previously unknown emitters" and exploiting opportunities.

Asked who is the quarterback for the EW enterprise in combat, Elder said, "There are a number of different programs looking ... now" to designate just such a player—and they're secret—but "there's a need to be able to coordinate these things" such that whenever the leader "drops out, someone else can pop in and take over."

David Hime, president of the Association of Old Crows, an EW organization, said though the terms "convergence" and "integration" have become common themes in debates over EW strategy, "it seems we still keep having this debate. ... Some people argue" that EW, Sigint, electronic attack, and cyber "are the same thing," but what should guide the discussion from now on is, "the effect you're trying to have in the battlespace."

Hime and Elder agree that a central office for EW acquisition would create a useful, clear focal point.

There should be "a clear go-to person that has [a] broader portfolio than just the requirements," bringing in training and operations as well, Elder said.

Whether that EW overseer should be at the deputy chief of staff level—much as the Air Force created a deputy chief of staff for ISR in 2006—might be an "interesting discussion," he said. ✪

The Next AIR FORCE

The current presidential transport has served well, but it is time for a replacement.

A photo illustration of a proposed Boeing 747-8 replacement for Air Force One.

Staff Illustration by Mike Tsukamoto. Original photos by Boeing and by USN Photographer's Mate 2nd Class Daniel J. McLain

AIR Force One, the blue and white "flying White House" that has carried Presidents around the world and served as a symbol of American power and technology since the current version debuted in 1990, is due for replacement. The Air Force is working to provide that new airplane by 2024—possibly in time for the President after the one elected in 2016 to fly in it.

The new airplane has already been chosen. It will be a Boeing 747-8—an updated version of the iconic 747 design—and the Air Force wants to buy

ONE

By Will Skowronski, Senior Editor

three of them: two to carry the President and his entourage, and one as a spare. A longer version of the 747-200B that today's Air Force One is based on, the 747-8 will be familiar-looking but with an extension of the upper-deck "hump" that makes a 747 so distinctive.

Air Force One will carry state-of-the-art defensive and communications systems to protect the Commander in Chief and ensure the ability to stay in close contact with every element of government and the military—especially nuclear forces—and foreign heads of state.

The Air Force requested $351 million in Fiscal 2017 for what it calls the Presidential Aircraft Recapitalization program, or PAR, and expects to spend about $2.8 billion on the program through the next five years. The Fiscal 2017 budget request and the Pentagon's acquisition strategy call for two aircraft to be bought. Whether USAF will actually get to buy two or three aircraft is one of many decisions to be made this summer.

Boeing was picked in early 2015 to supply the airframe and serve as its systems integrator because there was no other realistic choice. The Air Force determined the mission requires a widebody four-engine aircraft able to fit and power all the needed communications and security systems, and only two platforms met those requirements: the US-built Boeing 747-8 and French-made Airbus A380. For security and integration purposes (and national prestige), a domestic supplier was deemed essential, and Boeing was selected to do the work sole-source.

"The presidential aircraft is one of the most visible symbols of the United States of America," Secretary of the Air

White House photo by Cecil W. Stoughton

Vice President Lyndon Johnson, flanked by first lady Jacqueline Kennedy (r) and his wife, Lady Bird Johnson (l), takes the presidential oath of office aboard Air Force One in November 1963 shortly after President John Kennedy's assassination in Dallas.

Force Deborah Lee James said in announcing the selection, and "the Boeing 747-8 is the only aircraft manufactured in the United States [which], when fully missionized, meets the necessary capabilities established to execute the presidential support mission."

FASTEST IN THE WORLD

Even though Boeing will get the contract for the aircraft and integration, the massive effort to missionize the aircraft will be as competitive as possible, both to obtain good dollar value and to ensure the Air Force gets the best technical solution available.

According to Boeing, the 747-8, which first flew earlier this decade, is the fastest commercial jet in the world, with a .855 Mach cruising speed. It can take off with 154,000 more pounds of cargo than the 747-200. With a nearly 225-foot wingspan and 250-foot length, the new 747 will have more room to accommodate the additional people and gear that now accompany the President when he travels.

The existing presidential transports—technically, any Air Force aircraft bearing the President carries the call sign Air Force One—are known by the nomenclature VC-25A and are powered by four General Electric CF6-80C2B1 engines, each generating 56,700 pounds of thrust. This allows the jet to maneuver far more aggressively than a commercial 747, and to elude threats such as air-to-air or surface-to-air missiles. It's not yet clear which engines will power the new 747-8s, but the commercial model comes with four General Electric GEnx-2B engines. According to GE, that power plant has a takeoff thrust of 66,500 pounds each.

The existing presidential fleet is equipped with self-defense systems, including protection against electromagnetic pulse, and reportedly has state-of-the-art navigation, electronic, and communications equipment.

The Air Force bought the current aircraft in 1987. VC-25A tail No. 28000 first flew as Air Force One in September 1990, just after Saddam Hussein invaded Kuwait. At that time, the Internet was a novelty, and the first iPhone was still a decade away.

For amenities, the aircraft would rival any presidential suite. The three-level, 4,000-square-foot floor space on each aircraft can fit up to 102 people with 26 crew members. The President's living area is equipped with a dressing room and shower, a medical suite that could be used for surgery, an executive office, a conference room that doubles as a dining room, and two galleys that can provide 100 meals at a time. Outfitted for aerial refueling, the aircraft can stay in the air indefinitely at need.

That capability was tested on 9/11, when President George W. Bush, visiting Florida, decided it was unwise to return

Air Force One, carrying President Richard Nixon and first lady Pat, lands in China on Feb. 21, 1972.

National Archives photo

Dixie Clipper, Flying White House, and Sacred Cow

Franklin D. Roosevelt was the first sitting President to fly. A Boeing 314 Clipper flying boat, the *Dixie Clipper,* took him across the Atlantic to Gambia and a C-54 took him the rest of the way to the Casablanca conference during World War II. Soon after, the Army Air Forces commissioned the first aircraft to be built specifically for the US head of state.

That airplane, a Douglas VC-54C Skymaster, was officially named *The Flying White House.* However, it soon acquired the nickname "Sacred Cow" because of its unique status and accommodations: a conference room with a bulletproof window, a private lavatory, a fold-down bed, and electric refrigerator. The aircraft carried Roosevelt to the Yalta Conference in February 1945.

President Harry S. Truman flew in the Sacred Cow for the first 27 months of his Administration. On board the airplane, in July 1947, he signed the National Security Act of 1947, making the Air Force an independent service. That same month, a modified Douglas DC-6—designated the VC-118—was delivered and named *The Independence* after Truman's hometown.

Various propeller-driven aircraft continued to be used as the presidential transport until August 1959, when VC-137A, a Boeing Stratoliner, became the first presidential jet aircraft, when it carried President Dwight D. Eisenhower. It was during his Administration that the practice began of calling the President's aircraft Air Force One.

The first jet aircraft built specifically for a president was the VC-137C, a highly modified Boeing 707-320B, first flown for President John F. Kennedy. With tail No. 62-6000 and call sign SAM 26000, it was also the first presidential airplane with the distinctive blue and white color scheme.

A new VC-137C, serial No. 72-7000 (SAM 27000), became the primary presidential jet in 1972, but in its lifetime SAM 26000 flew eight Presidents—Kennedy through Bill Clinton—in nearly 36 years of service. The transports gained notoriety as they became associated with historic events, such as when Lyndon B. Johnson was sworn into office aboard SAM 26000 after Kennedy's assassination, before returning from Dallas with Kennedy's body.

Sacred Cow and SAM 26000 are on display in the National Museum of the US Air Force's new hangar at Wright-Patterson AFB, Ohio. *The Independence* is scheduled to be as well. The Ronald Reagan Presidential Foundation and Library is home to SAM 27000.

Top: The first aircraft built for a US President, "Sacred Cow," at the National Museum of the US Air Force in Dayton, Ohio. Above: President Truman flew in* The Independence *from 1947 to 1953.

to Washington given that the extent of the terrorist attacks on the US was still unknown. Air Force One had to serve as Bush's command center for determining the nature of the attack and directing the immediate response. The jet remained airborne for hours, eventually landing at Barksdale AFB, La., and Offut AFB, Neb., before returning the President to the nation's capital.

Though the current presidential transports have been updated routinely through their lives, parts are becoming hard to get, as commercial operators have almost entirely retired their versions of the 747-200. Moreover, the aircraft, which have logged millions of miles of travel, are structurally feeling their age. Designed to serve for 30 years, the aircraft will be at least four years past their intended retirement date when they are finally withdrawn from service—assuming there are no further delays in the program.

CLEARLY A NEED

In announcing the selection of Boeing as supplier of the aircraft and the integrator of its systems, James said, "Parts obsolescence, diminishing manufacturing sources, and increased down times for maintenance" will challenge the Air Force's ability to provide the President with safe and reliable transportation "until a new aircraft is fielded."

In January 2009, the Air Force announced it was researching replacements after a study found that building a new fleet would cost less than updating the old one. Former Defense Secretary Robert M. Gates told lawmakers in March 2010, "There clearly is a need for a new presidential aircraft."

White House photo by Pete Souza

President Barack Obama (l) meets with staff in 2009 aboard Air Force One en route to Ankara, Turkey.

In a budget document, the Air Force said the VC-25A fleet also faces "capability gaps," but did not provide specifics.

While USAF has been tight-lipped about what improvements the PAR will feature, some of the reported modifications to the 747-8 include installing an electrical power upgrade with dual auxiliary power units, a mission communications system, military avionics, autonomous enplaning, deplaning, baggage loading capabilities, and a modern self-defense system.

Boeing did not immediately receive a contract for the PAR project. At the time, Col. Amy McCain, the PAR program manager, said a contract would only be awarded if negotiations found a fair price.

Cost problems caused a similar project to fail spectacularly. Between 2005 and 2008, the estimated cost of developing a fleet of new VH-71 presidential support helicopters (the so-called "Marine One" aircraft) doubled, from $6.5 billion to $13 billion. Power requirements, exquisite onboard communications needs, and other requirements expansion led President Obama to call the program "an example of the procurement process gone amuck."

The Navy terminated the project in 2009 after an investment of 10 years and $3.3 billion.

AVOIDING THE NAVY'S WOES

To avoid the same result, USAF is starting small. Congress allotted $82.4 million for the PAR program in Fiscal 2016, and in January, the service awarded Boeing $25.8 million to begin work. Under the cost-plus-fixed-fee contract, Boeing is studying how to keep costs down with design trade-offs and risk reduction going into the engineering and manufacturing development phase. A second risk-reduction contract is expected this summer, according to a USAF spokeswoman.

"We are focused on ensuring this program is affordable," McCain said in a statement announcing the deal. "This contract gets us started on determining how to modify a 747-8 to become the next Air Force One and finding opportunities for cost reduction through detailed requirements choices, competition of subsystems, and in the sustainment of the aircraft after it has been fielded."

In February, the PAR program released a request for proposal for the basic airframe. An RFP for preliminary design activities was posted in May.

The program goes before the Defense Acquisition Board this summer for its Milestone B review. That review determines if the appropriate risk reduction has taken place and if technology is ready to proceed to engineering and manufacturing development. If development is approved, the program will buy the aircraft, and design work will begin shortly thereafter, in early Fiscal 2017.

A preliminary design review is scheduled for mid-2018, and the design phase is projected to end with a critical design review in the fourth quarter of Fiscal 2019.

The Air Force expects the aircraft to reach initial operational capability in 2024 and have a 30-year lifespan.✪

Air Force One at Maxwell AFB, Ala., in 2015. The replacement presidential aircraft is slated to come on line in 2024 and fly for 30 years.

USAF photo by Donna L. Burnett

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The Washington, D.C., area hosts many memorials to the armed services, wars, and those who served. Here are a few of our favorites.

Remembering Those Who Served

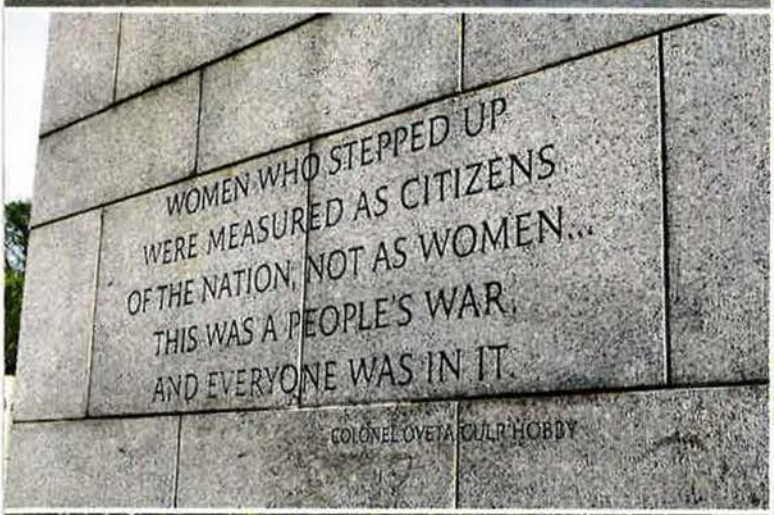
Photography by Heather Lewis and Kristina Parrill. Text by Brian W. Everstine

The Nation's Capital is home to numerous military memorials, open to all who want to visit to remember the men and women who served in specific wars, or those who were a part of individual services. The memorials range from the old, dating back more than 100 years, to one that opened two years ago. They are large and easy to find, or tucked away in wooded areas off the public paths. The number of visitors to memorials has increased in recent years, with the Vietnam Veterans Memorial setting a record of 5.6 million visitors in 2015, according to the National Park Service. The city's tributes to veterans are increasing, with the design for a new National World War I Memorial selected earlier this year.

National World War II Memorial

1750 Independence Ave, SW
Washington, DC

The World War II Memorial sits in the shadow of the Washington Monument, with a large plaza and fountain built to honor more than 16 million who served in the war. Fifty-six triumphal columns circle the plaza, each representing a US state, territory, or district. The columns are arranged in two semicircles, to commemorate the Pacific and Atlantic theaters of war. A Freedom Wall sits on the west end and contains 4,048 golden stars, each representing 100 Americans who died in service. The memorial has two hidden inscriptions of "Kilroy Was Here," graffiti American troops used during the war to signify that they had passed through. The memorial opened to the public on April 29, 2004. The Honor Flight Network regularly flies in veterans to visit memorials in Washington, with a special priority on bringing World War II's service members to the memorial. In 2015 alone, the network flew in 20,886 veterans, according to Honor Flight. Next to the Freedom Wall, a quote from President Harry S. Truman explains the need for the memorial: "Our debt to the heroic men and valiant women in the service of our country can never be repaid. They have earned our undying gratitude. America will never forget their sacrifices."



Vietnam Veterans Memorial + Vietnam Women's Memorial

5 Henry Bacon Dr, NW
Washington, DC

One of Washington's most famous memorials sneaks up on visitors. The Vietnam Veterans Memorial largely consists of two 246-foot-nine-inch walls sunken into the ground on the National Mall. The two walls are tapered, from eight inches to 10 feet and list the names of 58,307 service members who were wounded in the Vietnam War between 1956 and 1975 and died of those wounds. Work for the memorial began in 1979 with the creation of the Vietnam Veterans Memorial Fund. It raised $8.4 million in solely private donations to construct the memorial. Yale University student Maya Lin submitted the winning design during a national contest two years later, and the memorial opened in November 1984. The memorial area encompasses the Three Servicemen statue, designed by Frederick Hart, and the Vietnam Women's Memorial, designed by Glenna Goodacre, depicting three uniformed women aiding a wounded soldier.

Korean War Veterans Memorial

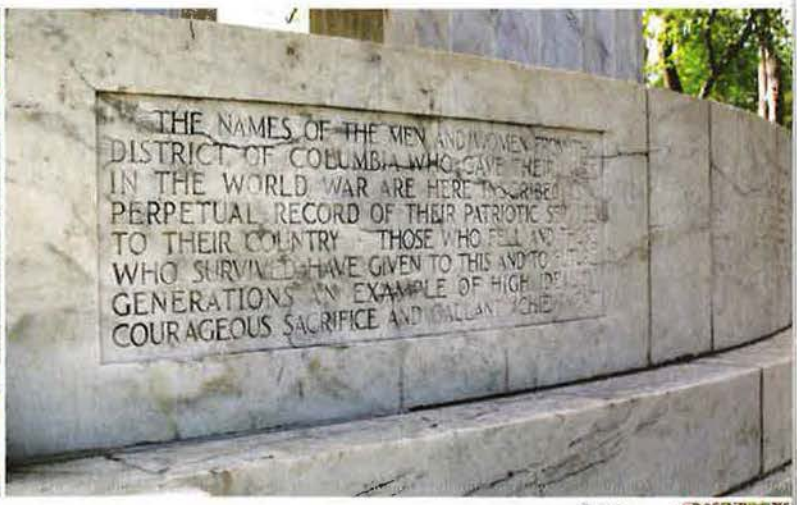
10 Daniel French Dr, SW
Washington, DC

A team of 19 service members, clad in ponchos and trudging through juniper bushes, make up the centerpiece of the Korean War memorial on the National Mall. The seven-foot-tall statues represent all services—with one Air Force air-ground controller—and the ethnicities of the 5.8 million Americans who served in the war. The 19 troops are on patrol, each looking in a different direction so no matter where visitors are, they likely come under the gaze of one of the statues. The memorial was dedicated on July 27, 1995. A 164-foot mural wall highlights more than 2,400 etchings based on photographs of service members and their equipment. The Air Force panels show airmen along with pictures of fighters, bombers, and transport aircraft. The wall's granite creates a reflection, so the 19 statues appear to be 38, representing the 38th Parallel and the 38 months of the war. During the war, 36,574 Americans died, including 8,200 missing in action or lost at sea. More than 100,000 were wounded.

District of Columbia War Memorial

1900 Independence Ave, SW
Washington, DC

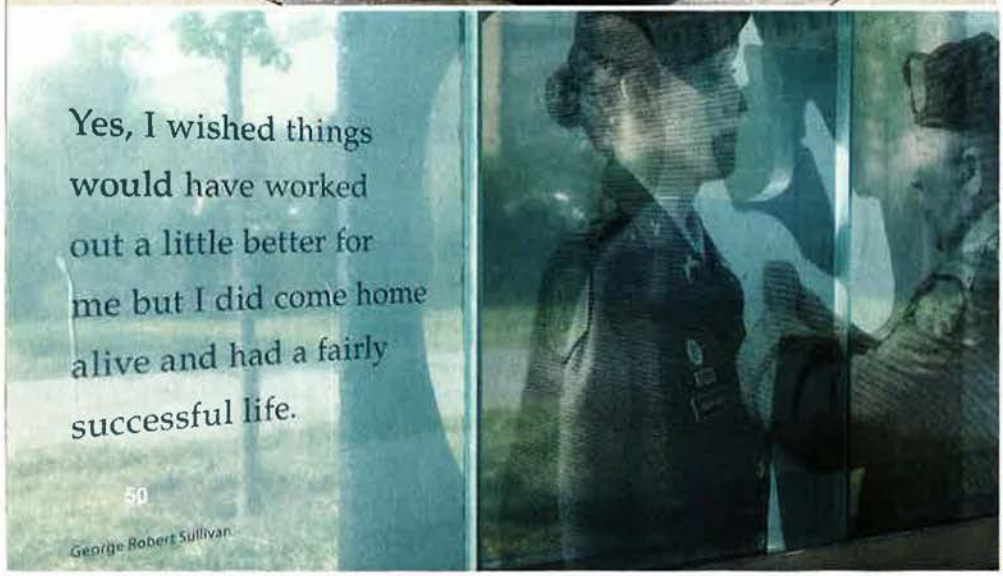
One of the least visited memorials on the National Mall sits nearly hiddden by trees, tucked alongside Independence Avenue. The District of Columbia War Memorial was dedicated on Armistice Day, Nov. 11, 1931, to honor the 499 men and women from Washington, D.C., who died in World War I. Planning for the memorial began in 1919, with congressional approval in 1924. The architect, Frederick Brooke, designed the 47-foot-high memorial to be a band-stand, with each concert to be a tribute. The memorial is large enough to fit the US Marine Corps band, and famed conductor John Philip Sousa attended its dedication. A federal stimulus package provided $3.6 million in 2010 to renovate the memorial. This involved restoring the Vermont marble and installing new lighting systems.



American Veterans Disabled For Life Memorial

150 Washington Ave, SW
Washington, DC

Washington's newest military memorial sits just south of the National Mall, among government office buildings near the Capitol. The American Veterans Disabled for Life Memorial opened on Oct. 5, 2014, and is the only national memorial built to honor those disabled during military service. Granite and glass are centered around a star-shaped fountain, with a ceremonial flame burning in the middle, next to a reflecting pool. The Wall of Gratitude of concrete and granite is inscribed with quotations honoring disabled veterans. Three large glass walls, built of 49 panels, feature the words of veterans themselves. President Barack Obama said at the memorial's opening ceremony, "With this memorial we commemorate, for the first time, the two battles our disabled veterans have fought—the battle over there and the battle here at home—your battle to recover."



Pentagon Memorial

1 N Rotary Rd
Arlington, VA

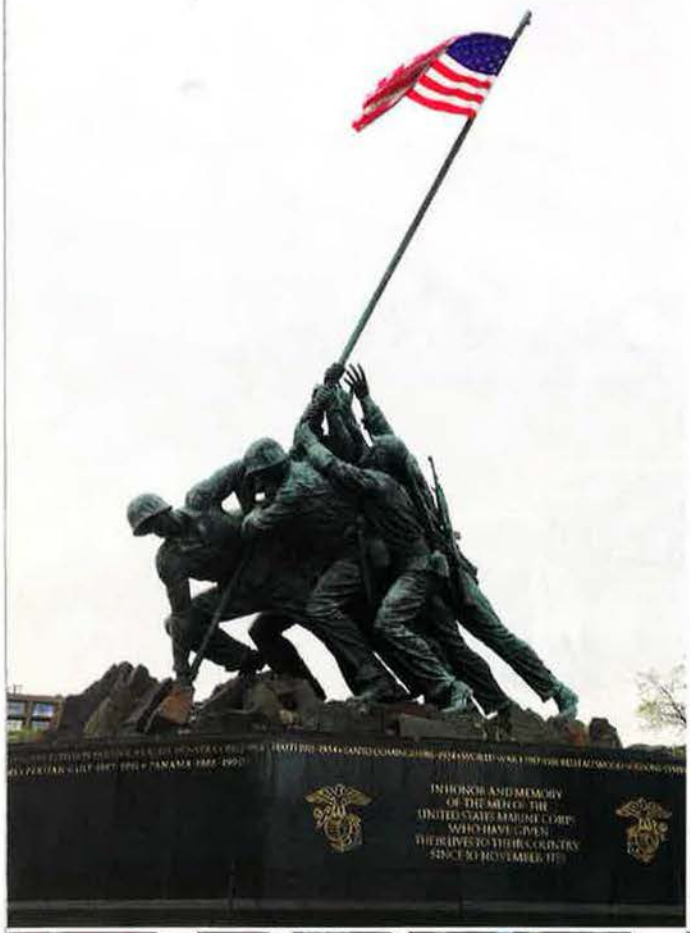
The National 9/11 Pentagon Memorial opened as the first of three major memorials to commemorate those killed in the Sept. 11, 2001, terrorist attacks. American Airlines Flight 77 crashed into the west side of the Pentagon, killing 184 civilian employees, military personnel, passengers, and flight crew. On Sept. 11, 2008, the memorial was dedicated to them. Located at the site of the crash, the memorial has 184 cantilevered benches, each with a lighted pool of water, and the name of a victim. The benches distinguish those killed inside the Pentagon, through positioning 125 of them in a way to see the person's name and the Pentagon in the same view. The 59 benches commemorating those on the airplane are positioned to see the victim's name and the direction of Fight 77's approach.

The Age Wall ranges from three inches—the youngest victim in the crash was three years old—to 71 inches—the oldest was 71. The rebuilt section of the Pentagon, adjacent to the memorial, incorporates a charred, partially blackened slab of limestone taken from the building's original wall that was hit by the hijacked airliner.

US Marine Corps War Memorial

US Marine Memorial Cir
Arlington, VA

Across the river from Washington, on a hill near Arlington National Cemetery, a most famous statue commemorates the Marines. The US Marine Corps War Memorial, opened in 1954, is dedicated to those who gave their lives in defense of the US since the service was founded in 1775. The memorial is based on Associated Press photographer Joe Rosenthal's image of five Marines and a Navy corpsman from Company E, 2nd Battalion, raising the American flag on Mount Suribachi, Iwo Jima, on Feb. 23, 1945. Following a fierce fight against the Japanese, US troops climbed to the top of the mountain to place a small flag. Later that day, when the mountain was cleared of enemy soldiers, five marines and a sailor returned to raise a larger flag. That's when Rosenthal took the picture. Sculptor Felix de Weldon, at the time on duty with the Navy, created a scale model of the scene. The model was eventually cast in bronze over a three-year period in New York and trucked to Washington. The 32-foot-tall figures are raising a 60-foot flagpole. A flag flies at full mast 24 hours a day, 365 days a year, under presidential proclamation.



United States Navy Memorial

701 Pennsylvania Ave, NW
Washington, DC

Legendary Navy Adm. Arleigh Burke in 1977 decided it was time to do something about creating a Navy memorial in Washington, D.C.—an idea that dated to 1791, when architect Pierre L'Enfant designed the city. L'Enfant imagined a memorial to "celebrate the first rise of a Navy," and Burke built on that idea, with progress beginning in the 1970s and congressional approval coming in 1980. The memorial was dedicated on Oct. 13, 1987, on the 212th birthday of the Navy. The plaza on Pennsylvania Avenue features a 100-foot "Granite Sea" map of the world, along with pools, waterfalls, and masts carrying signal flags. The Lone Sailor statue, made of bronze and incorporating artifacts from eight Navy ships, adds poignacy to the memorial. Unlike most of the others in Washington, the Navy memorial is in the middle of the city and sits right outside the entrance to a Metro station.

Where Is the Air Force Memorial?

1 Air Force Memorial Dr
Arlington, VA

The United States Air Force Memorial is in Arlington, Va., just west of the Pentagon and south of Arlington National Cemetery, on a promontory overlooking Washington, DC. It was dedicated on Oct. 14, 2006, to honor all the men and women who have served in the Air Force and its predecessor organizations. *Air Force Magazine* will commemorate the memorial's 10th anniversary with extensive coverage in the October issue.

AIR FORCE MEMORIAL

THE AIR FORCE'S BUDGET BLACK HOLE

By Jennifer Hlad, Senior Editor

Perched at the top of the Air Force's breakdown of its $166.9 billion budget request for Fiscal 2017 is a $34.2 billion black hole: a "non-blue" budget, which is frequently mentioned but rarely explained.

The funds in the non-blue budget support accounts that are classified—mainly the Defense Health Program, special operations, and the National Intelligence Program, according to a 2013 RAND report—and while they fall under the Air Force's topline, the service does not benefit from this money and has no authority over it.

In a February speech outlining the Fiscal 2017 budget request, Air Force Deputy Assistant Secretary for Budget Maj. Gen. James F. Martin Jr. described the non-blue budget as "a portion of the Air Force budget that is not directly under our control, but managed by other departments or agencies."

Col. Elizabeth Eidal, director of Air Force budget programs, said the service separates the budget submission into "blue" and "non-blue" to delineate between what the Air Force plans, programs, and executes from the portion that just passes through. "The Air Force serves as an administrative conduit for the non-blue funds, but is not responsible for its management," she said.

It may seem strange that the Air Force budget is the temporary depository for billions of dollars that do not go to the Air Force. But perhaps even stranger is the fact that no other service has a similar albatross weighing down its budget—or, at a minimum, weighing down perceptions about its budget.

"This is something that is really unique to the Air Force in terms of the magnitude of the pass-through here. I'm not aware of anything even close to this in the other services," Todd Harrison, director of defense budget analysis at the Center for Strategic and International Studies, told *Air Force Magazine*. "Really, it's one of these boring, inside-Washington budget things that needs to be fixed, but no one else cares or even knows about it."

Clearly, budget officials inside the Pentagon do know about the non-blue budget, and take that into consideration when giving out fiscal guidance, Harrison said. But "where it really matters is more in the public communication of the budget," he said—a statement echoed by Air Force budget officials.

"The Air Force has to continually remind everyone year after year, both members of Congress and the general public, that there is this pass-through money in their budget, because it makes their budget look larger in total than it actually is," Harrison said.

Those reminders become more difficult if the total amount needed for the non-blue budget increases, making it seem like the Air Force itself is asking for more money, even if the blue portion of the budget stays the same, officials said.

Adding to the challenge is the fact that most or all of the programs and activities funded by the non-blue budget are classified, so no one can talk about them in media briefings or public congressional testimony.

"They can't even reassure people in an unclassified setting that it's not going

to something that does belong in the Air Force's budget. All they can say is it's classified non-blue. It's needlessly making the budget communication process more difficult for the Air Force than it should be. And the Army, and Navy, and Marine Corps are more than happy to gloss over this when they talk about shares of budget and just include all of this pass-through money as being part of the Air Force's budget, even though it's not," Harrison said.

Eidal said Congress appropriates the funding to align with how the Pentagon has requested it. Each level of the government—including the Office of Management and Budget, the Secretary of Defense's office, the Air Force, and the responsible agencies—understand the Air Force's "administrative role in these programs," she said, but they rely on the management agencies to provide further details on the requirements and plans for the non-blue funding.

Despite the challenge, Air Force officials make sure to separate the non-blue budget from the blue budget in annual budget release materials. It's also usually mentioned, at least in passing, in congressional hearings on the budget.

In testimony to the Senate Armed Services Committee in April 2014, Air Force Secretary Deborah Lee James noted that since 1962, the service's non-blue total obligation authority had risen to more than 20 percent of the Air Force's TOA. That squeeze, along with other budget pressures, created a constrained environment with "no room for error," she said.

That year, the requested amount of non-blue funds was $28.5 billion, or 20.7 percent of the requested $137.9 billion total Fiscal 2015 Air Force budget, according to USAF briefing materials. In Fiscal 2012, the non-blue portion of the budget was just 18.6 percent of the total budget request.

The $34.2 billion non-blue included in the Fiscal 2017 request is 20.5 percent of the $166.9 billion total requested Air Force budget.

The inclusion of non-blue funds in the Air Force budget means that in recent years, the Air Force has been getting less than a quarter of all defense dollars, contrary to the oft-repeated notion that each of the services gets roughly a third of the defense budget.

Harrison said this assumed rule of thirds is just plain false. "It's never been true," he said. "Even if you count the pass-through money as part of the Air Force's budget, it's still not true."

The main reason it's incorrect, he said, is that 20 percent of the defense budget goes to defensewide activities, instead of any single service. And, he said, "Even looking at the part of the budget that does go to the services, it's not equal. It's never been equal—especially when you take into account the pass-through money for the Air Force."

USAF ALONE SEES BILLIONS OF DOLLARS "PASS THROUGH" ITS ACCOUNTS EVERY YEAR, OUTSIDE OF SERVICE CONTROL.

Based on DOD's Fiscal 2017 total base budget of $523.9 billion in constant 2017 dollars, the percentages are: Army 23.5 percent, Navy 29.7 percent, and Air Force 28.8 percent, including non-blue funding. USAF blue-only is 23 percent.

This hasn't always been the case. Budgets can fluctuate widely depending on national defense strategy at the time. Harrison pointed out that the Air Force got about 49 percent of the defense budget in the mid-50s, when the country was looking to rely more on the nuclear deterrent and was building two legs of the nuclear triad within the service.

Likewise, the Army got a much larger share of the budget during the wars in Korea, Vietnam, Iraq, and Afghanistan, Harrison said, because ground forces played a very significant role in those conflicts.

How non-blue funds got stuck in the Air Force's budget in the first place is less clear, but Harrison called it a "historical artifact."

"There are programs that go all the way back to the beginning of the space age that started out being affiliated with the Air Force, but have since grown and morphed and spread, and for whatever reason, the appropriators keep tucking that money into the Air Force's budget every year," he said.

The easiest and quickest way to fix the Air Force's non-blue problem would be for the appropriators to create a new appropriation account in the defensewide budget and put the money there, Harrison said. Alternately, the Office of Management and Budget could propose the change in the next budget submission. But they'd still need appropriators to go along with the idea.

"You ask the Air Force, and they say, 'Well, we can't change the appropriation categories; we've got to get permission from OMB or Congress has to do it.' I talk to people in OMB and they're like, 'Well, we don't want to do it because that would upset the balance of power among the appropriators, because it would change who's doing the oversight.' And you talk to the appropriators, and they're like, 'Why would we change it if the Administration's not asking us to change it?' " Harrison explained.

He said the Air Force is stuck in a kind of loop where "no one has an incentive to be the first mover to change it, but it makes no sense that this money, on paper, shows up as being part of the Air Force's budget." ✪

The First Offset

By Peter Grier

Adversaries have been watching the US military carefully for decades and have seen the military advantages provided by stealthy aircraft, precision guided munitions, and space-based reconnaissance and navigation capabilities. Now America's potential and actual enemies want some of that for themselves—and they are developing technologies and strategies to duplicate or counter the US advantages.

That is why the Department of Defense is moving to a "third offset" approach to leap ahead in defense technologies. Officials are emphasizing robotics, artificial intelligence, miniaturization, and other new areas in an attempt to maintain the US status as the most advanced military on the planet, bar none.

This is called a third offset because it is modeled on two previous offset leaps. The first was the move to a nuclear-based New Look deterrence strategy in the wake of the Korean War. The second was the development of stealth, PGMs, and other current technologies in the 1970s and 1980s as a means of countering the Warsaw Pact's numerically superior conventional forces in the late stages of the Cold War.

A closer look at the third offset's ancestors provides important lessons about how to proceed in the modern era. The first offset, in particular, offers parallels to the position of today.

The first US offset strategy—to counter the numerical strength of military adversaries with technical innovation—began to take shape in the middle of the Pacific Ocean in early December 1952.

President-elect Dwight D. Eisenhower was returning from Korea, a trip he'd promised to make during the campaign. The bitter Korean War was locked in a stalemate and Eisenhower worried it was draining off US resources and affecting national morale. Clearly America could not afford many such regional conflicts.

Ike had brought several top incoming Administration officials with him to look at the Korean problem firsthand. More joined the party in Guam for the sail home aboard the heavy cruiser USS *Helena*. Eisenhower's idea was that three days at sea would be a good time for them all to get to know each other before the demands of office began occupying their time.

The setting was not propitious. *Helena* was the flagship of the Pacific Fleet but still a warship, not a passenger liner. Their conference room was "antiseptically spare and cold," speechwriter Emmet J. Hughes wrote later in his memoirs.

Nor did Eisenhower immediately warm to all his new advisors. Secretary of State-designate John Foster Dulles tended to drone on in a legalistic manner, causing a bored Ike to stare fixedly at an upper corner of the room.

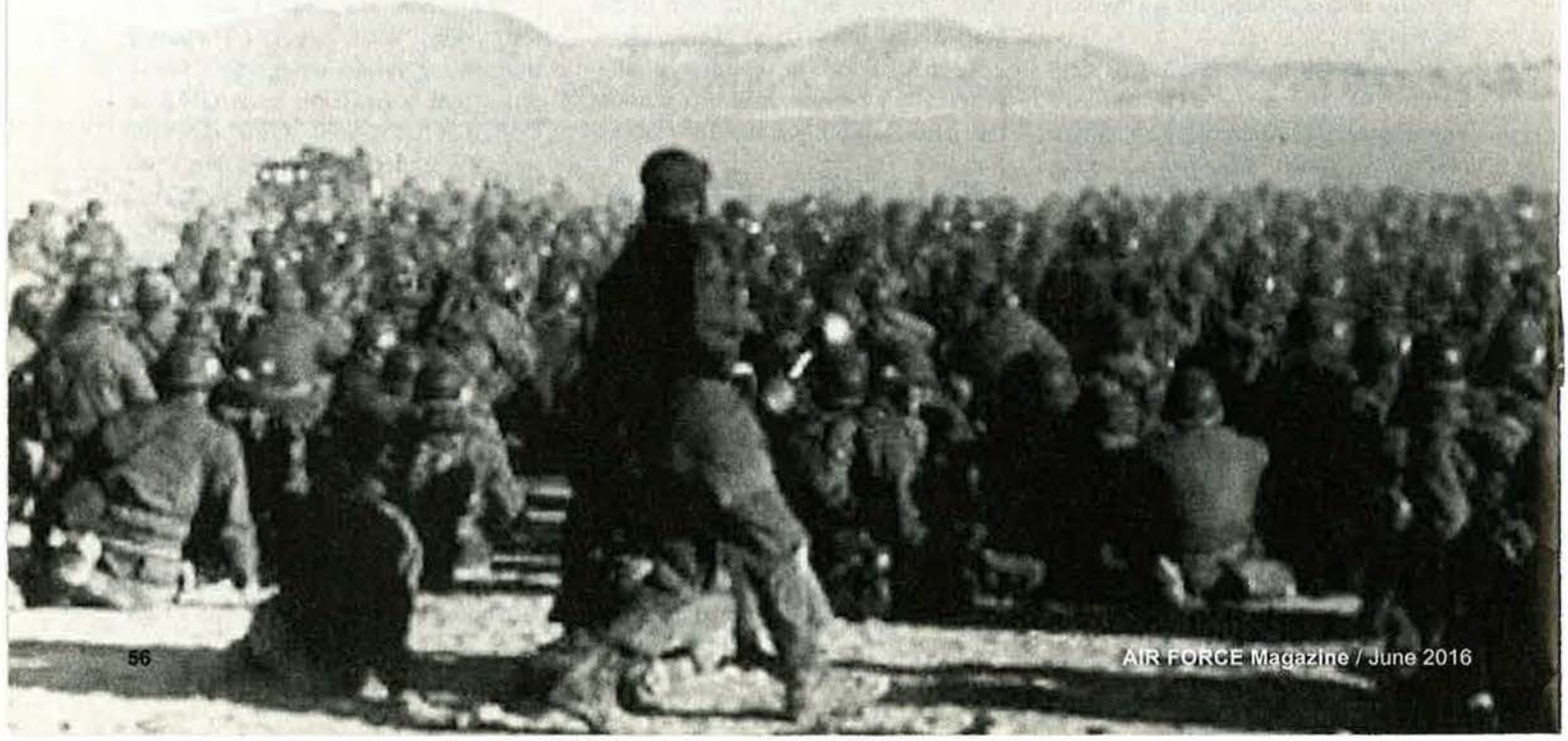
But the meetings proved significant. They talked about the war and much else—"everything you can think of that might in any way involve the things we were embarking upon," Treasury Secretary George M. Humphrey said later.

Two presentations in particular shaped a wide-ranging discussion of possible changes in the nation's grand strategy for the Cold War. Adm. Arthur W. Radford, chief of the Pacific Fleet, said it was costly and inefficient to try to contain the Soviet Union with a ring of scattered American forces. And Dulles pushed for greater reliance on America's growing nuclear stockpile as a means to deter Soviet-backed expansionism.

Neither point was new to Eisenhower. But he began thinking more deeply about how the problem of the first might be solved by the solution of the second, given the context of what he'd recently seen on the Korean front lines.

"It was here that the ideas came together, that Eisenhower's concerns blended in with Dulles' solution. ... The 'New Look' in national defense policy was born," writes journalist and historian Fred Kaplan in his book on the development of nuclear policy, *The Wizards of Armageddon.*

The basic problem, as Eisenhower and some of his top aides saw it, was that the geopolitical situation they were inheriting from outgoing President Harry Truman was structured in a way that favored the Soviet Union.



In the 1950s, the US faced overwhelming Soviet land forces. Eisenhower turned to nuclear weapons to offset the communist advantage.

They had little doubt that the Kremlin's hand was behind the Korean War. They believed Moscow was happy to see the US and its Free World allies throw men and treasure into a peripheral conflict in East Asia. What if the USSR's strategy was to provoke more such wars at a time and place of its own choosing?

That would play to the Soviet's already-overwhelming lead in conventional forces. On the European central front the USSR could muster around 175 divisions, according to contemporary CIA estimates. Moscow had another 125 reserve divisions it could deploy within a month.

The US did not need to match this number unit-for-unit due to America's higher quality weapons and troops. But at the time it fielded an Active Duty total of 29 Army and Marine Corps ground divisions, with another seven or so in reserve. The disparity in forces was so large that a buildup, by itself, did not seem a viable solution.

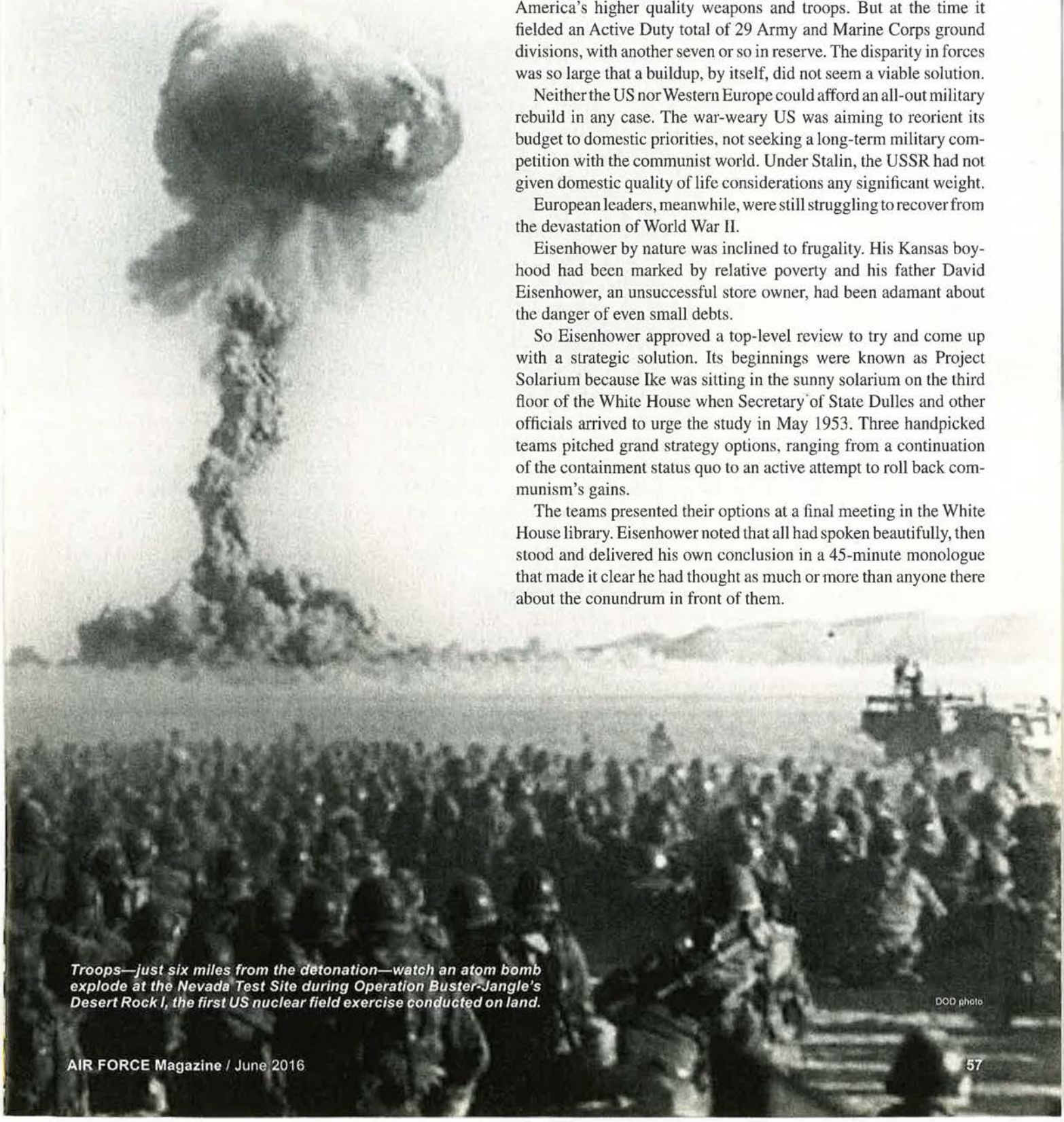
Neither the US nor Western Europe could afford an all-out military rebuild in any case. The war-weary US was aiming to reorient its budget to domestic priorities, not seeking a long-term military competition with the communist world. Under Stalin, the USSR had not given domestic quality of life considerations any significant weight.

European leaders, meanwhile, were still struggling to recover from the devastation of World War II.

Eisenhower by nature was inclined to frugality. His Kansas boyhood had been marked by relative poverty and his father David Eisenhower, an unsuccessful store owner, had been adamant about the danger of even small debts.

So Eisenhower approved a top-level review to try and come up with a strategic solution. Its beginnings were known as Project Solarium because Ike was sitting in the sunny solarium on the third floor of the White House when Secretary of State Dulles and other officials arrived to urge the study in May 1953. Three handpicked teams pitched grand strategy options, ranging from a continuation of the containment status quo to an active attempt to roll back communism's gains.

The teams presented their options at a final meeting in the White House library. Eisenhower noted that all had spoken beautifully, then stood and delivered his own conclusion in a 45-minute monologue that made it clear he had thought as much or more than anyone there about the conundrum in front of them.



Troops—just six miles from the detonation—watch an atom bomb explode at the Nevada Test Site during Operation Buster-Jangle's Desert Rock I, the first US nuclear field exercise conducted on land.

DOD photo

"He showed his intellectual ascendency over every man in the room," said diplomat George F. Kennan, a study participant who had thought Ike nothing but a dull war hero.

In the end Eisenhower chose the containment option—but with a twist. The US would counter the Soviet Union's threat to expand its influence outward with the threat of a response with nuclear weapons. It was a strategy of asymmetry: Future Koreas might be met, not with a conventional defense in the region in question, but with an atomic strike at a time and place of Washington's choosing.

The economy of this approach was one thing that recommended it to Eisenhower, according to Gen. Andrew J. Goodpaster, an Army officer who participated in the study and later served as Supreme Allied Commander, Europe. It allowed him to proceed with reductions in military budgets.

But it was not all about the money. It was at least as much about technology's march.

"I think it came from the conviction on Eisenhower's part that we were in the nuclear age and that the nuclear component of war had really already, even then, become a dominant component," Goodpaster said in a 1975 oral history on file at the Eisenhower Library. "The Pentagon and its major component elements were far from having made the adjustment to that kind of concept."

MAXIMUM DETERRENT

The Eisenhower Administration dubbed its revamped strategy the New Look, borrowing the phrase from Christian Dior's sleek New Look fashions of the era. It was outlined officially in NSC 162/2, issued in October 1953. Dulles explained it in a famous speech in January of 1954 at the wood-paneled establishment redoubt of the Council on Foreign Relations. To counter the "mighty landpower" of communist foes, the US would rely on the "massive retaliatory power" of its burgeoning nuclear stockpile, said the Secretary of State.

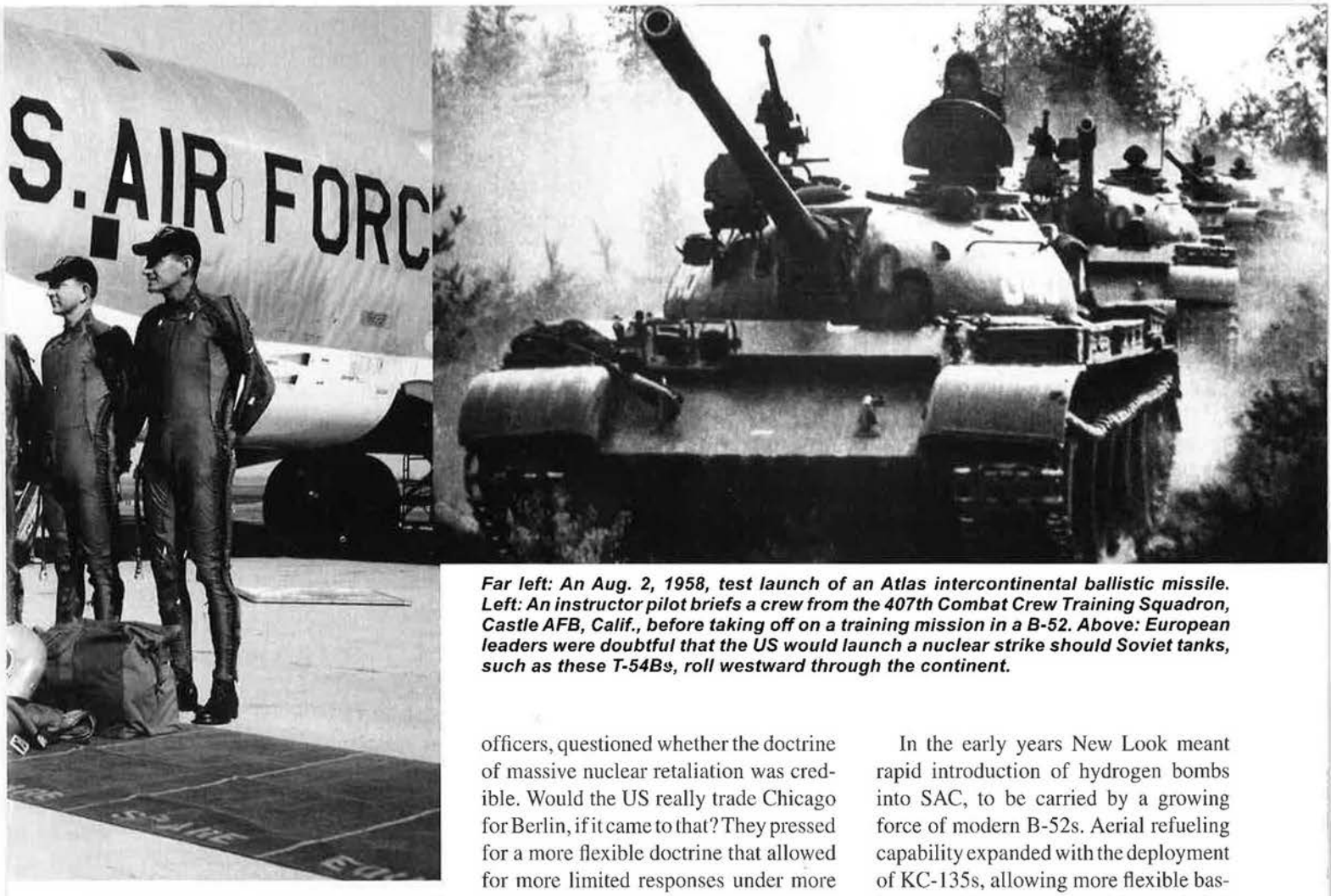
"We want for ourselves, and the other free nations, a maximum deterrent at a bearable cost," said Dulles.

This swerve made use of a pre-existing US military advantage. At the end of 1952 the US had 841 atomic warheads available, while the Soviets had an estimated 120. Moreover, the US stockpile was increasing twice as fast, with the nation's atomic infrastructure producing several hundred new weapons annually. And the US had already successfully tested a thermonuclear device. This new H-bomb was so powerful it dwarfed existing atomic bombs in destructive potential and seemed destined to change the very nature of nuclear deterrence.

US nuclear delivery capability also far surpassed that of the USSR. The US Air Force was already fielding long-range jet-powered bombers, as the eight-engine B-47 Stratojet began entering service in 1951. The B-52 Stratofortress was under development with delivery of operational aircraft to begin in 1955.

In contrast Soviet bombers were still stuck in the prop age. The USSR had no air bases anywhere close to its superpower opponent, while the US could count on European and Asian allies to provide bases ringing the Soviet perimeter.

In budgetary terms the New Look was good for the Air Force. Its projected size grew from a total of 95 wings under the last Truman budget to 137 total wings under



Far left: An Aug. 2, 1958, test launch of an Atlas intercontinental ballistic missile. Left: An instructor pilot briefs a crew from the 407th Combat Crew Training Squadron, Castle AFB, Calif., before taking off on a training mission in a B-52. Above: European leaders were doubtful that the US would launch a nuclear strike should Soviet tanks, such as these T-54Bs, roll westward through the continent.

initial Eisenhower estimates, with 92 of those assigned to Strategic Air Command.

From 1954 through 1957 the Air Force received about 47 percent of total Department of Defense appropriations, while the Navy received 29 percent and the Army 22 percent, according to figures compiled by the Center for Strategic and Budgetary Assessments. During the same period the Army's end strength shrank by some 40 percent.

Meanwhile, the New Look was successful in overall budgetary terms. US spending on the function of national defense for the era peaked in 1953, as Eisenhower took office, according to historical budget tables. It then dropped in stages, bottoming out at $42.5 billion in Fiscal 1956.

The 1953 defense budget accounted for almost 14 percent of US GDP. By 1956 this measure had dropped to 9.7 percent. Thus the economic weight of the military budget grew lighter by a third during Eisenhower's first term.

But within a relatively short period of time the original formulation of New Look was under political and technological pressure. Critics, including top Army officers, questioned whether the doctrine of massive nuclear retaliation was credible. Would the US really trade Chicago for Berlin, if it came to that? They pressed for a more flexible doctrine that allowed for more limited responses under more limited circumstances.

"GAP" SCARE

The Soviets were not standing still in terms of developing their own nuclear forces. The USSR tested a thermonuclear device in 1953. Preliminary versions of a jet-propelled bomber, dubbed the M-4 Bison, appeared a year later.

"Within a few years, the Soviet Union used the fruits of advanced military technology to increase greatly its striking power and put the Eisenhower policy in doubt," wrote Air Force historian George F. Lemmer in a formerly secret 1967 study, "The Air Force and Strategic Deterrence: 1951-1960."

When they made the original decision to implement the New Look policy Eisenhower and other top officials knew full well that the USSR would develop its own strategic nuclear capabilities. They trusted that the pace of US technological progress would remain robust, providing a continually upgraded deterrent edge. In most respects that proved true. The USSR did not stand still militarily, but USAF's nuclear forces advanced at least as rapidly as the opposition.

In the early years New Look meant rapid introduction of hydrogen bombs into SAC, to be carried by a growing force of modern B-52s. Aerial refueling capability expanded with the deployment of KC-135s, allowing more flexible basing. The Air Force pressed forward with development of liquid-fueled Atlas and Titan ICBMs.

Early warning radars were integrated into a continentwide defensive network. Eventually solid-fueled Minuteman ICBMs followed on the heels of the liquid-fueled nuclear missiles. The land-based parts of the US strategic nuclear deterrent began to roughly resemble those of today.

As the 1960s neared, the US strategic nuclear force was still far more capable than its Soviet equivalent. US warheads outnumbered those of the USSR by 10 to one. Some of Moscow's weaponry was illusory: The M-4 Bison jet bomber, which first appeared in a 1954 May Day parade in Moscow, gulped so much fuel it was an impractical strategic asset. Only a few were deployed.

For a long-range bomber, the Soviets relied on the Tu-95 Bear, a turboprop aircraft of the same vintage as the B-52 that, like the BUFF, remains in service today.

But that did not stop "gap" scares from roiling US politics of the period. Following the shock of the 1957 launch of a Soviet ICBM, and then the Sputnik satellite shortly thereafter, Democrats seized on

a perceived "missile gap" as a means to criticize the Eisenhower Administration's security policies.

"It is not very reassuring to be told that next year we will put a 'better' satellite in the air," said Senate Majority Leader Lyndon B. Johnson. "Perhaps it will even have chrome trim and automatic windshield wipers."

Eisenhower knew there was no basis for much of this gap panic. He just could not say so in public, since his knowledge was based on photography from secret U-2 spyplane flights over Soviet territory.

In any case, Ike's most acute problems in regard to New Look came from inside the government. Other services—particularly the Army—had never accepted the premise of massive retaliation and continued to argue against it. By the middle of the 1950s Secretary of State Dulles began to agree with them. He had heard European allies question over and over again whether the US would really jump into general nuclear war if Soviet tanks rolled westward.

In the end, Gen. Maxwell D. Taylor, Army Chief of Staff, emerged as the main internal critic of the New Look. A World War II paratrooper and model soldier-scholar, Taylor was articulate and unafraid to debate his Commander in Chief.

Eisenhower's policies had slashed the Army and siphoned off much of its budget, but Taylor's opposition was based on more than parochial concerns. He genuinely believed that threatening a general atomic response to virtually any Soviet move was a clumsy meat-ax approach. In Taylor's view, the US might face many different kinds of crises in the years ahead, and leaders needed many different kinds of forces, including large ground forces, to mix-and-match flexible responses.

GOING FLEXIBLE

In the Administration's inner councils Eisenhower gradually gave up ground to his critics, writes journalist and author Evan Thomas in his history of the period, *Ike's Bluff.* He accepted changes in doctrine if not expanded budgets.

"Indeed, the official NSC documents in 1955 and 1956—confidential documents, for internal use, not public consumption—indicated that the policy of the United States was flexible response, or something close to it," Thomas writes.

USAF photo

A B-47B makes a rocket-assisted takeoff on April 15, 1954. US bombers and missiles helped keep the Soviet Union at bay for decades.

But Eisenhower was still the Commander in Chief. In a crisis, it would be him—not Taylor—deciding the appropriate response. Ike never gave up his belief that any serious confrontation with Moscow would inevitably escalate into greater and greater violence. In his experience, that was the nature of war. He thought threatening a nuclear response was the best way to keep those crises from occurring.

Was the first offset successful? From the standpoint of today's Pentagon officials, it was.

"It's kind of crazy when you look back and you say, 'Wow, you know, we were planning to drop so many nuclear bombs everywhere. It was a different time. But it did provide a credible deterrence, without question," said Deputy Secretary of Defense Robert O. Work in a 2015 speech on offset strategies. "And it enabled Eisenhower to actually reduce spending from the levels that were originally projected."

The US may never again have a disruptive technological advantage as profound as that provided by nuclear weapons in the wake of World War II. But there are still lessons applicable to today's offset strategy that can be drawn from Eisenhower's experience, according to Robert C. Martinage, a former acting undersecretary of the Navy who is now an analyst at the Center for Strategic and Budgetary Assessments.

One lesson is a need for a balanced strategy capable of handling a full range of military threats. While that may seem counter to the expressed intent of the Ike-era massive retaliation policy, experience bears it out.

"Nuclear weapons provided a cost-effective 'backstop' for outnumbered conventional forces—not a wholesale replacement for them," writes Martinage in a CSBA report, "Toward a New Offset Strategy."

Other lessons applicable in 2016 include the value of threatening asymmetric punishment and the importance of alliances for burden-sharing and complicating adversary's planning.

Finally, airpower is key.

"A global air warfare capability can provide valuable strategic freedom of maneuver, complicate an adversary's defensive planning, and reduce basing vulnerability," Martinage writes.

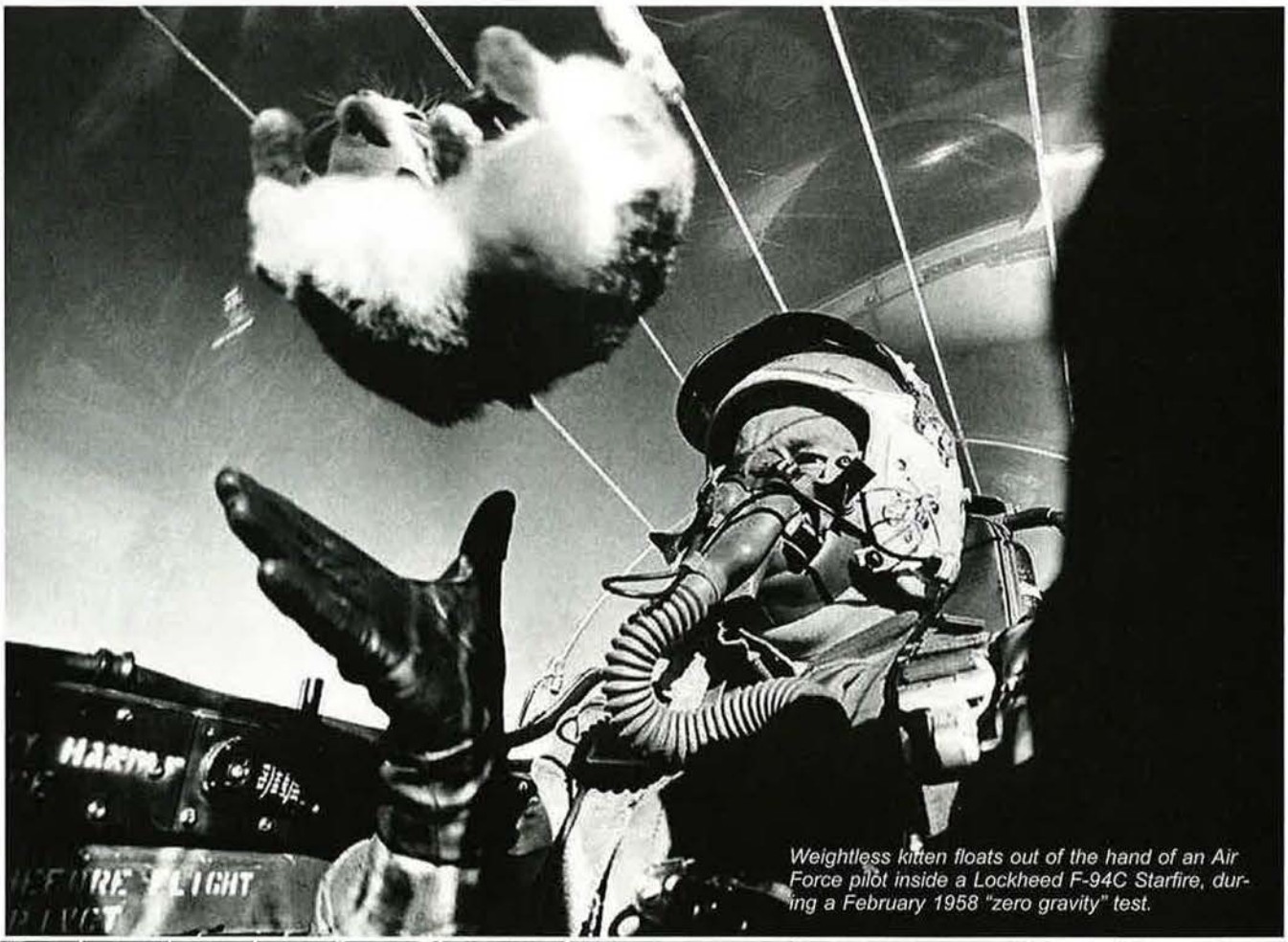
The US has been the world's military technology leader for at least six decades, and as the nation strives to move the technological goalposts forward once again, the Air Force will be front and center in the Third Offset. ✪

Peter Grier, a Washington, D.C., editor for the Christian Science Monitor, *is a longtime contributor to* Air Force Magazine. *His most recent article, "Package Q," appeared in the January issue.*

flashback@afa.org

Where's Up, Pussycat?

Photo by Sam Falk/New York Times



Weightless kitten floats out of the hand of an Air Force pilot inside a Lockheed F-94C Starfire, during a February 1958 "zero gravity" test.

A kitty orients itself.

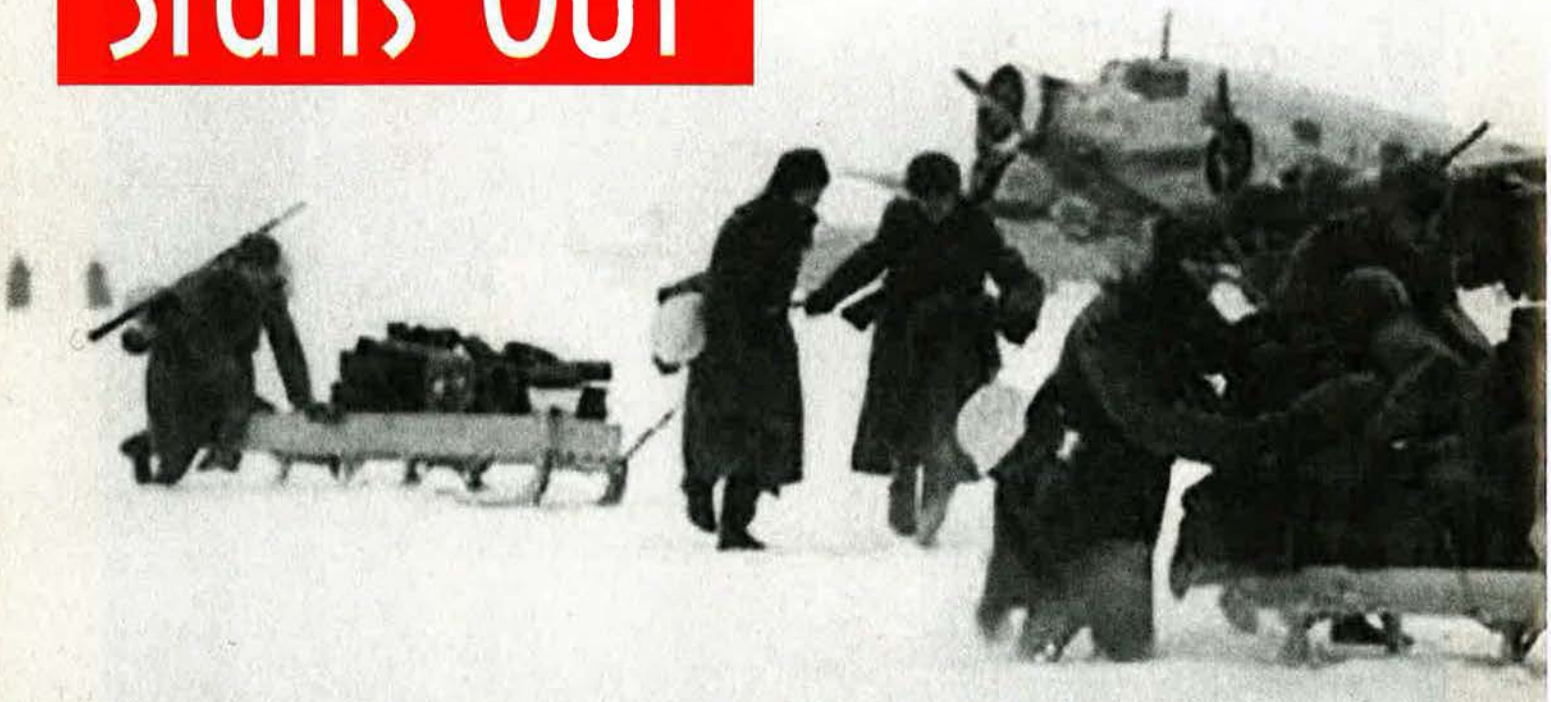
How humans did it. Mercury astronauts in 1959 test aboard the C-131 "Vomit Comet."

NASA photo

In the early Space Age, weightlessness caused a more or less general freak-out. Medical experts worried about the consequences of "zero gravity" and what it would do to a living, breathing human being—his digestive system, vision, balance, and so forth. In February 1958, NASA and the Air Force tested a kitten in a fighter used to simulate weightlessness. The experts wondered about the cat's famous ability to quickly orient, when dropped, and land on its feet. Released at 25,000 feet, the feline experienced at most 40 seconds of weightlessness. The cat's reaction was described as "bewilderment." The first Project Mercury astronauts went through something similar in a special C-131 aircraft used to fly a "zero-g" trajectory. Fondly known as "the Vomit Comet"—for obvious reasons—it helped the early space voyagers adjust to the weirdness of weightlessness.

Operation Barbarossa Stalls Out

By John T. Correll



German Federal Archives photo

Hitler's biggest military mistake was invading the Soviet Union. He had expected it to be an easy victory in six or eight weeks.

In the spring of 1941, the nonaggression pact between Germany and the Soviet Union was 18 months old and wearing thin. The warning signs were abundant. The Germans made little effort to conceal their massive buildup of forces or their daily reconnaissance flights across the border.

At least two intelligence reports, one from a German army deserter and the other from a secret agent, accurately forecast the exact day and hour for the coming German invasion of Russia. The Soviet Embassy in Berlin obtained a copy of a German-Russian phrase book for soldiers with such useful lines as, "Hands up or I shoot!"

Soviet dictator Joseph Stalin dismissed the warnings. He did not believe his nominal ally, Adolf Hitler, would risk opening a second front in the east while Germany was still engaged against Britain in the

German soldiers unload a Junker Ju 52 transport, lugging the supplies on sleds through the snow. Anticipating a quick victory, the Germans were not prepared for the brutality of a Russian winter.

west. To avoid provoking Hitler, Stalin gave orders not to fire on the reconnaissance overflights. The border guards were not reinforced, nor were they put on alert.

Thus the Russians were taken by surprise when the Germans launched their invasion before dawn on June 22, 1941. Three German army groups, preceded by Luftwaffe bombers and fighters, surged with ease through the sluggish Soviet defenses. Within a month, they had pushed 450 miles into Russian territory.

Hitler believed the offensive, which he named Operation Barbarossa, would lead to victory over the Soviet Union within a few months. Military observers in the United States and Britain likewise predicted a Russian defeat.

In actuality, Hitler had just made the biggest of his numerous military mistakes.

HITLER LOOKS EAST

Hitler's plans to conquer Russia were of long standing and well known. In *Mein Kampf* in 1925, he laid claim to "the "soil and territory" of "Russia and her border states" as "living space" for Germans after the regular occupants were evicted. He repeated his intentions periodically.

The nonaggression pact of August 1939 was a temporary arrangement of expediency for both sides. It let Hitler concentrate on subjugating western Europe without worrying about the eastern front. Stalin gained time to rebuild the Soviet armed forces, badly depleted by his own political purges of the Red Army in 1937.

A secret protocol to the pact divided up eastern Europe into German and Russian spheres of influence. Hitler and Stalin each took a share of Poland. The Soviet Union annexed the Baltic states.

Foiled by German failure in the Battle of Britain in 1940, Hitler resumed his determination to invade and exploit eastern Europe and Russia. The plan was called Operation Barbarossa—"Red Beard"—the nickname of Germanic Emperor Frederick I who hammered the Slavs in the 12th century.

Hitler disagreed with his generals, who proposed to take Moscow as soon as possible. In addition to its political value, Moscow was the hub of Russian transportation and communications lines. Hitler thought it more important to secure the agricultural and industrial areas of the Balkans and the Baltic. Hitler's opinion prevailed, of course.

Fuhrer Directive 21 on Dec. 18, 1940, called for three army groups to push toward Leningrad, Moscow, and Kiev—but Moscow was a secondary objective. When the army group in the center reached

German Federal Archives photo by Arthur Grimm

German Federal Archives photo by Johnnes Hahle

Clockwise from left: A single-seat Il-2 Sturmovik assault aircraft at an airfield in Russia in 1941-42; German soldiers on Panzer tanks at the beginning of the Eastern campaign in June 1941; a German soldier examines a dead Russian tank soldier in front of a burning Russian BT-7 light tank during the early days of Operation Barbarossa.

Smolensk, its panzers would split off north and south to join the assault on Ukraine and Leningrad.

There would be plenty of time to worry about Moscow after victory on the northern and southern flanks. The planners assumed a campaign of six to eight weeks, four months at most. Winter clothing was ordered for less than a third of the invasion force.

Barbarossa was timed to begin on the shortest night of the year, to allow the invasion force as much daylight as possible. In the early phase of the operation, the Luftwaffe was to neutralize the Russian air force and support the German ground forces. The directive specified that the Soviet arms industry would not be attacked until the main operation was completed.

LINES ON THE MAP

The division of spoils in 1939 had a significant side effect: The buffer zone that had previously separated Russia and Germany was eliminated. Now they faced each other directly over a new border that ran for more than 1,000 miles from the Baltic to the Black Sea and that bisected Poland.

Once the invasion force entered the Soviet Union, the front would spread out rapidly like an expanding fan. However, the Germans did not want all of Russia. They intended to stop well before reaching the Urals, along a new line that would extend some 2,000 miles from Archangel to Astrakhan. They regarded the expanse of Asia beyond there as a wasteland.

Neither side was yet settled into fortifications on the new border, but throughout the first half of 1941, the Germans steadily moved troops, tanks, and artillery forward into Poland and East Prussia.

In a single month between April and June, the Luftwaffe violated Soviet airspace 180 times to fly reconnaissance missions over the Russian defenses. Stalin raised no objection.

Stalin wanted to delay an armed confrontation with Hitler as long as he could, but eternally suspicious, he also imagined the British were feeding him misleading information in order to draw Russia into the war.

By late June, the Germans had assembled about three million troops, accounting for about 80 percent of their

army, in position to strike. The Russians had about the same number of forces in the four military districts facing the German front, but this rough numerical parity was offset by the German advantage in quality.

The German *Schwerpunkt,* or strategic "heavy point," was in the center, where Col. Gen. Heinz Guderian and his Panzer Group 2 stood on the banks of the Bug River east of Warsaw, waiting to lead the attack. They were only 700 miles from Moscow.

THE LAST BLITZKRIEG

Operation Barbarossa was based on faith in blitzkrieg and contempt for the Russians. The Germans had introduced blitzkrieg, or "lightning war," in their victories in western Europe, using the shock effect of coordinated panzers, motorized infantry, and aircraft—especially Ju 87 Stuka dive bombers—to blow away the opposing forces in their path.

In the Barbarossa invasion, the Germans would employ blitzkrieg for one last time in World War II, counting on their combat experience and superior technology to prevail over the sheer Russian numbers.

The greatest military resource of the Soviet Union was its huge population, which provided almost limitless manpower for the Red Army. In 1941, the Soviet forces had 5.5 million men under arms with a reserve of 14 million available for mobilization.

The Red Army had 23,000 tanks. The Soviet *Voyenno-Vozdushnye Sily,* or VVS, was the world's largest air force. It had about 20,000 airplanes, but the vast majority of them were obsolete, many of them old biplanes.

The Soviet forces were raw and disorganized. In 1939-40, they had been severely battered in an unsuccessful attempt to overwhelm little Finland, even though the Russians committed three times as many soldiers and 30 times as many airplanes as the Finns did.

When Operation Barbarossa began, the Russians had about half of their active ground forces stationed in the west, facing the Germans. The rest were in Siberia and the Far East. Of the 70 VVS air divisions, 48 were on the Western Front, many of them based near the border, within easy reach for a strike by the Luftwaffe.

The Germans had the sturdy Panzer III tank, the superb Bf 109 fighter, the Ju 87 Stuka, the Bf 110, Ju 88, and He 111 medium bombers, and excellent leaders at all levels. They had no long-range bombers, but the main deficiency was that their logistics infrastructure could not cope with the distances and conditions the Germans would encounter in Russia.

INVASION

Barbarossa opened at precisely 3:15 a.m. on June 22 with an artillery bombardment by 6,000 guns. Concurrently, the first wave of German troops surged across the border. Thirty Luftwaffe bombers with crews specially trained for night operations struck at 10 selected Soviet airfields.

At sunrise, at 4:10 a.m., the Luftwaffe launched in strength. Five hundred high-level bombers, 270 dive bombers, and 480 fighters, swept in ahead of the ground forces. Among their targets were 66 Russian airfields, where they found the airplanes parked out in the open, close together in neat rows.

The attack took the Soviets by surprise and there was no coordinated resistance. Stalin did not believe reports of the attack and was slow to react. It was 7:15 a.m. before he gave the first order to resist, stipulating even then that Soviet ground troops were not to cross the border without specific authorization. He did not declare a general counteroffensive until 9:15 p.m., fully 18 hours after the invasion began.

On the central front, the panzers crossed the Bug River before the Russians could detonate the demolition charges on the bridges. The Germans broke through everywhere, pushing the Russian divisions aside, capturing thousands of soldiers, and disrupting telephone and telegraph lines.

German Federal Archives photo by Albert Cusian

German soldiers push a car stuck in the mud in October 1941. Snowfall followed by rain made progress on the dirt roads slow for the Germans. In November, heavy snows began, and temperatures plummeted to 52 degrees below zero. Most German troops did not have winter gear.

Stalin did not clear the Soviet fighters to take off until the bombardment was four hours old. The VVS fought fiercely in scattered instances. Nineteen times that day, Russian pilots rammed their aging aircraft into German bombers. Nevertheless, by nightfall 1,800 Soviet aircraft had been destroyed, more than half of them on the ground.

Within a few days, the Luftwaffe had established undisputed air supremacy and before the end of the month, had destroyed 4,614 Russian aircraft. What had been the world's largest air force was no longer a factor in the ongoing battle.

On June 24, Hitler arrived at his forward command post near Rastenburg in East Prussia to direct the invasion.

All four of the Soviet armies facing the German center were encircled and defeated. In two months, the Red Army lost 700,000 soldiers killed or wounded and almost a million taken prisoner. The

Clockwise from above: A German soldier surrenders to a Russian soldier in November 1941; German soldiers dig out a Panzer tank stuck deep in the snow in December 1941; Yak-1 aircraft, such as this one, were stripped of their wheels and outfitted with skis to better take off and land in the harsh Russian winter.

Germans had advanced 500 miles and controlled the western part of the Soviet Union.

DIVERSION

By the middle of July, the Germans were 200 miles from Moscow with only a weak blocking force in front of them. Hitler's generals beseeched him to press on, but he would not hear of it.

Instead, he reinforced the earlier plan, requiring the panzer groups to break off the advance toward Moscow and join the assault on Leningrad in the north and the conquest of the Ukraine and Crimea to the south. "My generals know nothing about the economic aspects of war," Hitler said.

Hitler did permit the bombing of Moscow, but the Luftwaffe did not fly many missions and most of them consisted of fewer than 10 aircraft each. The effect was negligible.

The diversion to the flanks was enormously successful in the short term. In September, the Germans laid siege to Leningrad and captured Kiev, where the Russians sustained losses of 616,000 killed or captured. Entire Soviet field armies ceased to exist.

However, Operation Barbarossa had begun to take its toll on the Germans. Their strategy since 1939 had focused on short, intensive campaigns. Logistics was a blind spot. The Germans were poorly prepared to sustain or replenish their forces in extended engagements. They manufactured fewer airplanes in 1941 than they did in 1940, and they had not replaced all of their losses from the Battle of Britain.

The Russian scorched earth policy left nothing behind for the Germans to use. The supply lines were longer now, and more dependent on primitive roads. The Luftwaffe often flew from dirt airstrips while the VVS had the use of better fields around Moscow.

On Oct. 2, Hitler ordered resumption of the offensive on Moscow in Operation Typhoon, a separately designated operation within Barbarossa. The advancing Germans inflicted punishing defeats on the Soviet forces between them and Moscow but the diversion to the flanks had consumed two months.

The Germans had allotted four months for Operation Barbarossa. The timeline was running behind and winter was coming on. Through October, the Wehrmacht had suffered 686,000 casualties, the Luftwaffe readiness rate had plummeted, and the panzer divisions were at 35 percent of required strength.

RUSSIA REBOUNDS

Stalin and the Russians were not as clumsy or as dull-witted as they may have seemed earlier. To the utter surprise of the Germans and the rest of the world, they managed an astounding recovery in a very short time.

By some estimates, the Red Army lost almost five million men during Operation Barbarossa. By any count, the peacetime force was virtually eradicated in the first three months, but Stalin rebuilt it in record time through redeployments and mobilization.

The most immediate source of fresh troops was the Russian army in the Far East, on guard against the Japanese. Fortunately for Stalin, a Soviet-Japanese neutrality pact signed in 1941 still held. The Japanese, focused on their expansion in the Pacific, were not ready to come to the aid of their German allies.

Stalin brought half of the Soviet Far East forces to augment the defense of Moscow and formed new reserve armies by mobilization. In December, the Red Army was back to full strength. Russian soldiers, motivated by the attack on

their homeland, fought harder and the battles increasingly went in their favor.

Industrial recovery was even more amazing. Prior to the invasion, most of the Soviet arms plants were in eastern Russia and the Ukraine. Between July and November, 1,523 entire factories were stripped down, transported, and reassembled in the safety of the Urals, Siberia, and Central Asia. This incredible transfer required about 1.5 million rail cars.

Aircraft production dropped during the move, but within 90 days output had risen above the previous level. In the last half of 1941, the Russians produced vastly more fighter aircraft than the Germans did—5,173 to 1,619.

Development of new Russian weapon systems started well before the invasion. Notable among these was the Yak-1 fighter, introduced in February 1940. It was nearly equal in speed, maneuverability, and firepower to the Bf 109, but the VVS did not have many of them when the war started and most were lost in the first days of fighting. New production enabled the effective use of the Yak-1 in the battle for Moscow.

The Il-2 Sturmovik ground attack aircraft made its combat debut at the battle for Minsk in June 1941. The single-engine Il-2 was often called "the flying tank" because it was so heavily armored that it was almost impervious to light machine gun fire. It was adept at bombing the Germans from altitudes as low as 300 feet.

The Panzer III was outclassed by the Russian T-34 tank, introduced in October. It had sloping armor plates that deflected German shells and a 76 mm gun that blew big holes in the panzers. It also had wide tracks that rolled on top of the mud in which the panzers bogged down.

WINTER

As Napoleon learned in 1812, Russian winters are severe. It was to the sheer bad luck of the Germans that the winter of 1941-42 was the coldest of the century, and it came early.

The first snow fell on Oct. 6. It melted quickly but was followed by a stretch of heavy rainfall. The dirt roads turned to mud, slowing the advancement toward Moscow to a crawl. November brought colder weather, freezing the mud and allowing the German tanks and trucks to move again.

Later that month, the temperature fell to 52 degrees below zero. "Water froze in the boilers of railroad engines, oil froze in trucks, grease froze in guns, and the mechanized German army had to seek horses to hitch to its tanks," said historian Nicholas Bethell. "Wounded foot soldiers often died where they fell, not from their injuries but from shock and frostbite."

Then came the snow, obliterating landmarks, closing resupply routes, and hampering aircraft takeoffs and landings. Rubber aircraft tires turned brittle in the cold. The Russian airfields, built for winter conditions, remained open. The Yak fighters were painted white for camouflage and their wheels were replaced with skis. Some of the Russian rifle battalions were on skis as well. Wide-tread T-34 tanks rode on the crest of the snow.

The Luftwaffe gave thanks to Field Marshal Erhard Milch, who had overcome official refusals and insisted on warm clothing for his airmen. Belatedly, overcoats were ordered for the ground forces and shipped to rear echelon railheads in Russia. Few of them reached the fighting front before winter took hold.

The staggering German army got within 10 miles of Moscow, close enough to see the Kremlin with field glasses, but on the morning of Dec. 5, the Russians launched their counterattack.

Additional Red Army troops arrived from Siberia in trains pulled by insulated locomotives that held their steam in the cold. Air superiority now belonged to the VVS, which had more than twice as many airplanes on the Moscow front as the Luftwaffe did.

Recognizing the possibility that his entire force could be lost, Hitler on Dec. 8 issued Fuhrer Directive 39, declaring that German forces around Moscow were to "halt immediately all large-scale offensive operations and go on the defensive."

Operation Barbarossa was over, five months, two weeks, and two days after it began. In that time, the Russians had sustained four million casualties, the Germans one million. Tanks and aircraft were lost by the tens of thousands, and the devastation was enormous to 400,000 square miles of Soviet territory.

Hitler was not willing to give it up. The army was permitted to withdraw to fortified positions as rallying points, but the fight to dominate the Soviet Union would continue.

There were more battles to come in the Soviet Union, notably at Stalingrad, where Field Marshal Friedrich Paulus defied orders from Hitler and surrendered the German Sixth Army in January 1943 after it was cut off and surrounded.

The Germans never regained the hopes and expectations with which they had begun Operation Barbarossa. They fell back, steadily and grudgingly, pushed by the resurgent Red Army.

The remnants of the German armies on the Russian front made their last stand in April 1945 on the Oder River, a few miles east of Berlin. That battle, which they lost, was the prelude to the German surrender on May 7. ✪

John T. Correll was editor in chief of Air Force Magazine *for 18 years and is now a contributor. His most recent articles, "Turkey Shoot" and "1946: The Year After the War," appeared in the April issue.*

By Robert S. Dudney

Ripe For Bamboozlement

"All these newspapers used to have foreign bureaus. Now, they don't. They call us to explain to them what's happening in Moscow and Cairo. Most of the outlets are reporting on world events from Washington. The average reporter we talk to is 27 years old, and their only reporting experience consists of being around political campaigns. That's a sea change. They literally know nothing."***—National Security Advisor Ben Rhodes, on how the White House took advantage of gullible reporters to "sell" the Iranian nuclear deal, quoted in*** **New York Times Magazine,** ***May 8.***

Arc of History

"My career started here [Europe] in a Cold War trying to keep the peace. ... My career is now ending here trying to prevent a Cold War and continue to keep the peace."***—USAF Gen. Philip M. Breedlove, Supreme Allied Commander, Europe, at a ceremony marking his retirement after 39 years in uniform, May 3, Stuttgart, Germany.***

Unintended Consequences

"The investigation determined that all members of both the ground force and the AC-130 aircrew were unaware that the aircraft was firing on a medical facility. ... As I talked to each of these individuals that were involved, their intention was true. They were absolutely trying to do the right thing. They were trying to support our Afghan partners. There was no intention on any of their parts to take a short cut, or to violate any rules that were laid out for them. And they were attempting to do the right thing."***—Army Gen. Joseph L. Votel, US Central Command, results of a probe into 2015 strike on Doctors Without Borders clinic in Afghanistan, DOD press briefing, April 29.***

Touchy, Touchy

"They sit together, scheme, and say that Iran must not hold war games in the Persian Gulf. What a foolish remark! They [US forces] come here from the other side of the globe and stage war games. What are you doing here? Go back to the Bay of Pigs. Go and hold exercises there. What are you doing in the Persian Gulf? The Persian Gulf is our home."***—Ayatollah Ali Khamenei, Iran's supreme leader, remarks criticizing the US military presence in the Middle East, reported by AP, May 2.***

Don't Bet on It

"The stunning success of the Air Force in dominating its domain since the 1991 Gulf War has created two looming problems for the service leadership: The Air Force no longer has any substantive experience in how to fight and win in a highly contested environment, and its current airmen have never experienced serious losses of people and machines in air combat. The very profession of arms in air combat—'to fly, fight, and win' in Air Force parlance—may be at risk. The Air Force's immense success resulting from the courage, skill, and technological superiority of American airmen has now perversely made the service much less ready to fight the next big war."***—Retired Army Lt. Gen. David W. Barno and Nora Bensahel of American University, in "War on the Rocks," May 3. Barno was head of Combined Forces Command-Afghanistan 2003-05.***

Of Farmers and Strategists

"Attacking orthodoxy, convention, and unquestioned assumptions in pursuit of a competitive edge—that's a good thing. What's wrongheaded, though, is the premise of the modern defense debate. The presumption seems to be that, just as farmers must plow the fields and rotate crops every year to get better results, so military thinkers must turn over fundamental military concepts on a regular basis. The belief that intellectual advances will inevitably deliver a better understanding of complex phenomenon is a tenet of faith—and one of the biggest blind spots—in the modern world."***—James Jay Carafano, Heritage Foundation vice president for national security,*** **The National Interest,** ***May 4.***

Biggy Smalls

"In the olden days, we'd say, 'I need a stealth bomber to get through that [dense enemy air defenses].' Now we might say, I need a stealth bomber that's equipped with ... Gremlins [small drones] .... I need a stealth bomber that's going to get close, and then it's going to drop a whole bunch of smalls. Some are decoys, some are jammers, some are [ISR] looking for where the SAMs are. Some of them are kamikaze airplanes that are going to kamikaze into those SAMs, and they're cheap. You have maybe 100 or 1,000 surface-to-air missiles, but we're going to hit you with 10,000 smalls. ... That's why we want smalls. ... Suddenly, we're overwhelming their radars, and it's all cheap stuff."***—USAF Col. Travis Burdine, division chief, RPA operations, referring to DARPA's Gremlin Project, quoted in flightglobal.com, May 3.***

Fool's Errand

"The deployment of 250 additional US military forces to Syria is a welcome development but one that is long overdue and ultimately insufficient. Another reluctant step down the dangerous road of gradual escalation will not undo the damage in Syria. ... While the Assad regime, together with Russia, Iran, and their proxies, has slaughtered Syrians with impunity and changed the military facts on the ground, the Administration has been on a fool's errand, pleading with Vladimir Putin to negotiate a political solution to the very hostilities he perpetuates."***—Sen. John McCain (R-Ariz.), statement on President Obama's decision to send a handful of US troops to Syria, April 25.***

What Worries Gates

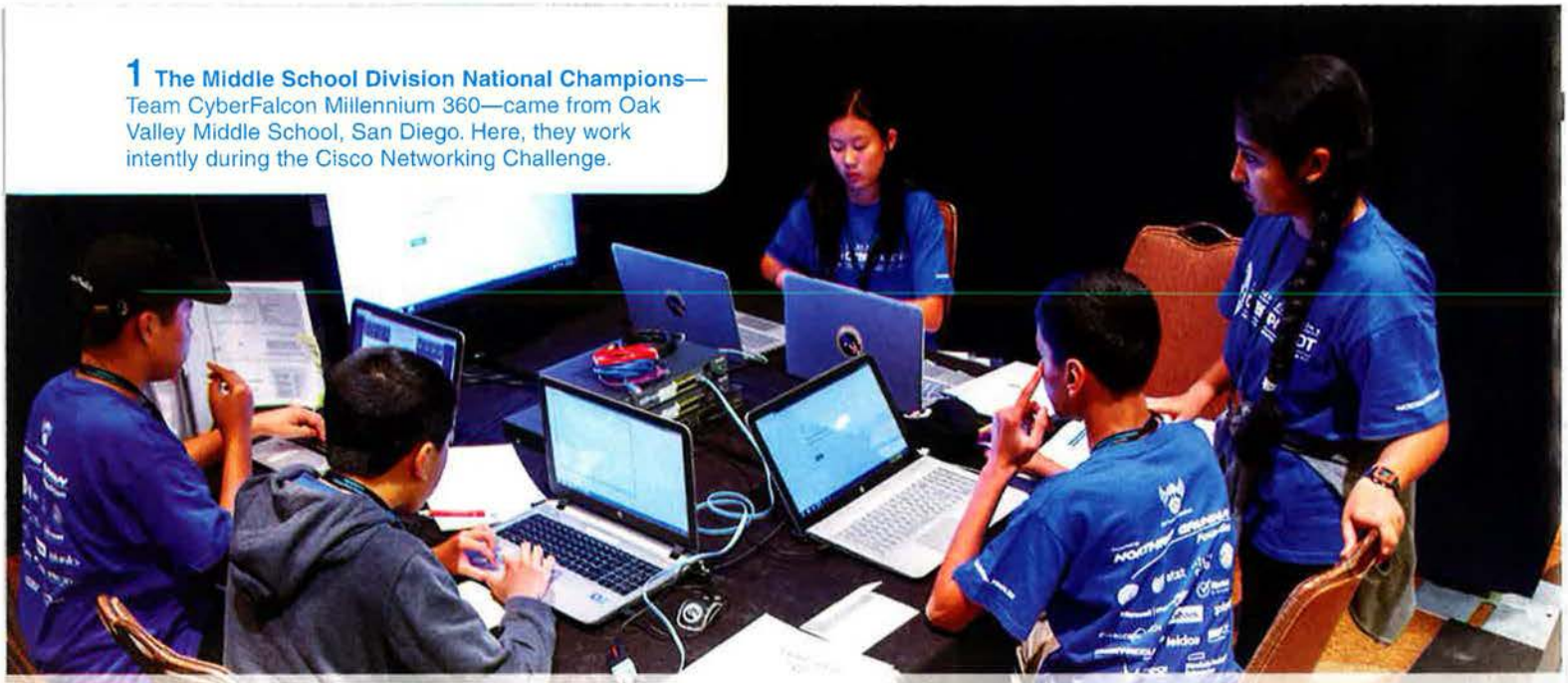
"One of the things that worries me ... is that he [Republican presidential candidate Donald Trump] doesn't appear to listen to people. He believes that he has all the answers, that he's the smartest man in the room. And I've worked with some ... very different presidents. Jimmy Carter and Ronald Reagan, George W. Bush, Barack Obama. One of the things they all had in common was a willingness to listen to people who ... had experience and then make their own independent judgment. Now, they've gone in different directions, but they never assumed they had all the answers, and that's one of the things that troubles me."***—Former Secretary of Defense Robert Gates, ABC News' "This Week" broadcast, May 1.***

Published by the Air Force Association

WINGMAN

CyberPatriot VIII

National Finals cap CyberPatriot's biggest year ever.



1 **The Middle School Division National Champions**—Team CyberFalcon Millennium 360—came from Oak Valley Middle School, San Diego. Here, they work intently during the Cisco Networking Challenge.

CyberPatriot VIII

Inside the National Finals

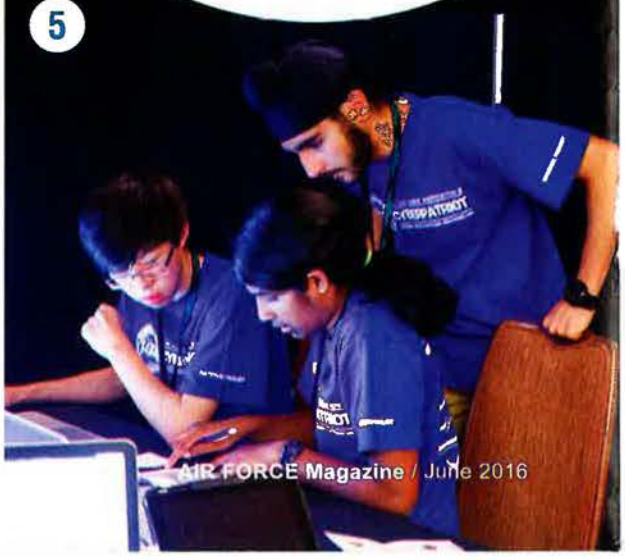
Photography by David Keith Text by Rebecca Dalton

2

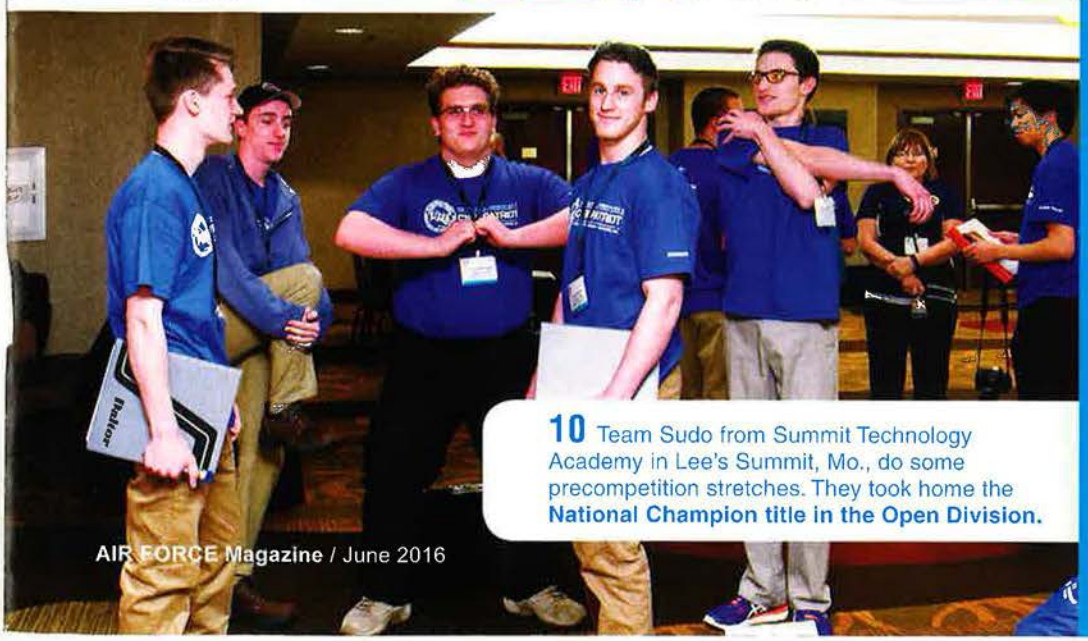
3

4 Centurion Battalion Netrunners from Winter Park, Fla., were the **All Service Division National Champions.**

5



A record **3,379** teams competed in CyberPatriot VIII, AFA's National Youth Cyber Defense Competition. Twenty-eight teams—**12** in the Open Division, **13** in the All Service Division, and **three** in the Middle School Division—made it to the National Finals Competition.



10 Team Sudo from Summit Technology Academy in Lee's Summit, Mo., do some precompetition stretches. They took home the **National Champion title in the Open Division.**

2 It's not all about competition. Highlands Ranch High School's team from Colorado relax at a dessert social and take in the skyline of Baltimore's Inner Harbor, site of this year's national finals.

3 CyberPatriot coaches and mentors, like Evan Dygert—shown here with Florida's Winter Springs High School Army JROTC cadets—prepared the students for the competition.

5 The Falcons of Poolesville High School, Md., won the Facebook Challenge and the Leidos Digital Forensics Event.

6 Kathy Warden of Northrop Grumman Information Systems congratulates Team Bruin.777 from Cherry Creek High School, Colorado. They won the AT&T Mobile Device Challenge. At far right is AFA Board Chairman Scott Van Cleef.

7 At the awards banquet, two Mountain Do It team members from Patrick Henry High School in San Diego exchange smiles as they head to the stage to accept the top award in the Cisco Networking Challenge All Service Division.

8 CyberPatriot National Commissioner Bernie Skoch shows the CP-VIII trophies to Lt. Gen. James McLaughlin, US Cyber Command deputy commander; Victoria McLaughlin; and Diane Miller, CyberPatriot program director at Northrop Grumman, the competition's presenting sponsor.

9 Stack Overflow, Sisler High School's team from Winnipeg, Manitoba, won the Cisco Networking Challenge Open Division.

More than 800 teams have already registered for the next school year's CyberPatriot IX.

Rebecca Dalton is CyberPatriot's sponsorship and outreach programs manager.

6 Ways To Build Membership

By McKinnon Pearse

Silver Wings started **10** chapters in a year. Here's how.

Over the past two years I was privileged to serve on the Silver Wings National Staff.

Silver Wings is an organization of college students who work side by side with Arnold Air Society cadets to provide professional development and leadership opportunities and to support the US military. All AAS cadets and Silver Wings students are AFA members.

During 2014-15, I served as the national development officer, responsible for starting new chapters and mentoring existing ones. In the course of the year, I activated 10 new chapters, expanding our organization to 50 chapters nationwide.

This year, I was the national sustainability officer and worked to ensure the stability and well-being of active chapters, reducing chapter loss and pursuing a goal of 100 percent growth.

Silver Wings is unique because it has such a broad membership base. This has its advantages—and disadvantages—when it comes to recruitment.

When building an organization, recruiting active and dedicated members is no easy task and encouraging them to stay engaged can often seem even more daunting. This is a theme I became very familiar with.

1. When pursuing prospective members, know the audience.

Certain aspects that are appealing to one chapter's demographic might not be to another. For instance, the students who started the Nighthawk Chapter at the University of Minnesota were interested in the community service aspect of Silver Wings.

Another example: Zachary Pokrant, a senior at the Russell Spicer Chapter of the University of Arizona, said his group got started because they decided "to do what we could to involve our non-ROTC friends in this great community of leadership, [service], and professional development." Their aim was to connect civilian students with their pre-existing Arnold Air Society squadron to promote civic awareness.

2. In recruiting new members, remember why you initially joined the organization.

I joined Silver Wings because I was attracted to its mission of promoting national defense through community service. I have always been passionate about encouraging my generation to be informed, patriotic.

3. Remember what made you stay.

I stayed because of the tremendous personal and professional development opportunities Silver Wings has presented. These ranged from workshops on how to prepare for a job interview to gaining experience in public speaking.

These are the kinds of activities that can retain members in the long run.

Photo by Christina Aycock

4. Keep members engaged.

Chapter leaders need innovative ways to capitalize on their regular meetings, with member retention in mind.

At the Rochester Institute of Technology in New York, the Col. Andrew J. Dougherty Chapter brought in a representative from Toastmasters International to provide public speaking workshops.

Organizing such presentations, group activities, and events pertaining to both the organization's mission and the interests of the members is a great way to map out the year.

A roster of upcoming events also gives you information to use in selling the organization's benefits to prospective members.

5. Be a mentor.

Call chapter leaders monthly to simply have a conversation about how chapter affairs are progressing.

Having an approachable presence is crucial to keeping chapter leaders committed because they, in turn, keep members committed to the organization.

6. Highlight the highlights.

For Silver Wings and Arnold Air Society, our joint annual National Conclave is an attractive benefit to potential members, because it unites college students with world leaders. ✪

McKinnon Pearse graduated in May from Auburn University in Alabama, where she was a member of Silver Wings' John "Boots" Stratford Chapter for four years. She is now a Silver Wings national administrative consultant.

Two-Way Street

On its website, Silver Wings reminds its members that AFA offers them:

- **a connection to the community**
- **career advice**
- **a seasoned perspective**

The website says AFA benefits, in turn, because the students contribute:

- **manpower**
- **fresh ideas**

CHAPTER NEWS

By June L. Kim, Associate Editor

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

GOLD COAST CHAPTER

More than a dozen people gathered recently to honor retired Lt. Col. Leo R. Gray, one of the famed Tuskegee Airmen, during an anniversary luncheon in Florida in March. Some members of AFA's Gold Coast Chapter and local members of the Tuskegee Airmen chapter were present at the function.

The Tuskegee Airmen were America's first black military pilots and airmen who served in the Army Air Forces during World War II. They formed the 332nd Fighter Group and the 477th Bomb Group.

When asked to share, Gray, who is also vice president of AFA's Gold Coast Chapter, reminisced about a day nearly 70 years ago when Fifteenth Air Force's 332nd Fighter Group, led by Col. Benjamin O. Davis Jr., flew 1,600 miles round trip to escort bombers to a Daimler-Benz factory in Berlin on March 24, 1945. The 332nd FG received a Distinguished Unit Citation for its achievement.

Gray flew a P-51 Mustang as a Red Tail pilot in Ramitelli, Italy. He received the Air Medal with an Oak Leaf Cluster, among other awards.

At the March luncheon, Gray lauded the March issue of *Air Force Magazine,* in which the Tuskegee Airmen were featured.

"Gray was pleased as were the current members of the [Miami Tuskegee Airmen] chapter ... with the photo essay of the Red Tails in the March issue," said Gold Coast Chapter President Virginia Montalvo. Gray was "engrossed in the photos" and "began to name the pilots he knew and events he remembered," she wrote in an email. "Of all the [magazine] issues I have used in recruiting efforts, this Tuskegee front cover issue has attracted the most attention to the existence of ... AFA, both with the Tuskegee members and other civilians," she said.

The luncheon, sponsored by VITAS Healthcare, a Miami-based health care company, was held at a cafe at the Fort Lauderdale Executive Airport.

Photo by Jill Beach

Gold Coast Chapter VP Leo Gray looks over *Air Force Magazine's* March photo feature on the Tuskegee Airmen. His photo appeared on p. 40.

CHUCK YEAGER CHAPTER

The Chuck Yeager Chapter held its 20th annual Air Force JROTC drill competition in Parkersburg, W.Va., in March, said Chapter President Herman N. Nicely. There were also teams from Ohio and Pennsylvania participating in the event at Parkersburg South High School.

First-place winners were from Knox County Career Center in Mount Vernon, Ohio; South Charleston High School, South Charleston, W.Va., placed second; and third-place went to students from Nitro High School in Nitro, W.Va.

In the West Virginia division, first place went to South Charleston; second place went to Nitro; and third place went to Woodrow Wilson High School in Beckley.

The chapter donated all the trophies to the winners, said Nicely.

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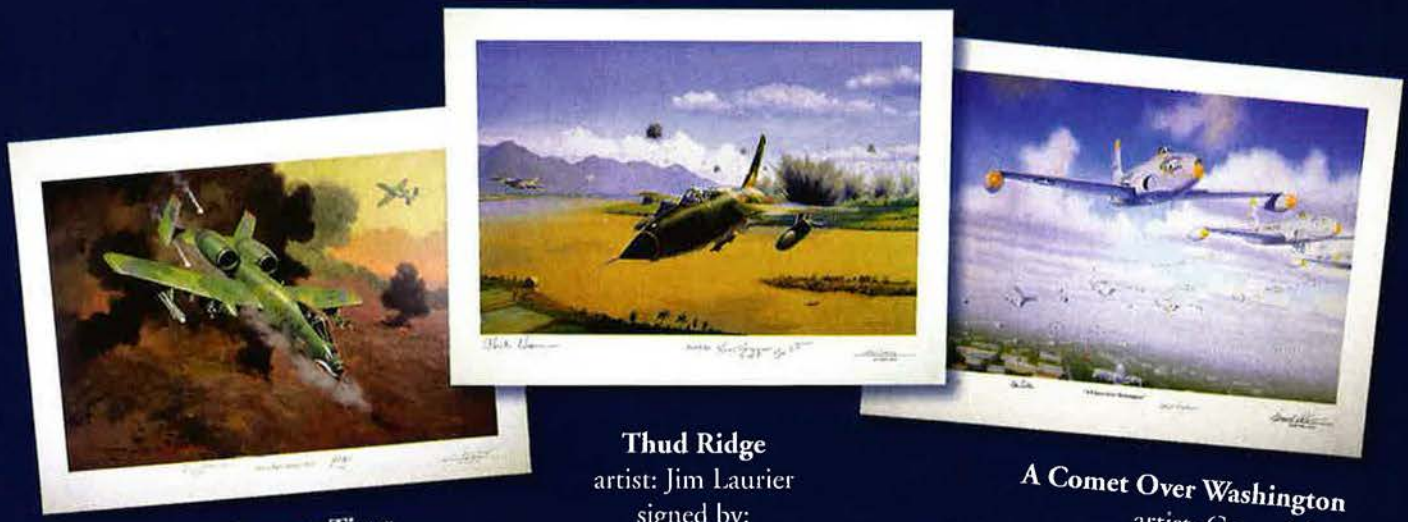

Once a Tiger, Always a Tiger
artist: Roy Grinnell
signed by: Capt John Marks, Capt Eric Salomonson

Thud Ridge
artist: Jim Laurier
signed by:
Gen Charles A. Horner,
Col Leo K. Thorsness,
Lt Col Gene Smith

A Comet Over Washington
artist: Gerry Asher
signed by: Gen Bruce K. Holloway, Brig Gen Robin Olds, Col Phillip Loofbourrow

Please go to www.AFA.org/monthly or scan the QR code with your phone

Photo via Daniel Woodward

Homer Hogues holds a Congressional Gold Medal awarded to Tuskegee Airmen in 2007, as he poses with Elinor Otto and Jerry Yellin at the Arnold Air Society-Silver Wings National Conclave in March. Otto represented "Rosie the Riveter" women who took on jobs once held by men who left to serve in World War II. Yellin was a World War II fighter pilot.

ARNOLD AIR SOCIETY/SILVER WINGS

More than a thousand Arnold Air Society and Silver Wings cadets gathered in Dallas for the annual National Conclave. The students—who are also AFA members—flew in from across the US and Puerto Rico, for the four-day conference to celebrate last year's achievements, said Daniel P. Woodward, executive director of AAS-SW and a member of AFA's C. Farinha Gold Rush Chapter in California. This year's event was "the best conclave they've seen," said Woodward.

Keynote speakers included Gwynne Shotwell, president and chief operating officer of SpaceX; Peter Bergen, CNN national security analyst and author; Lt. Gen. Lee K. Levy II, commander of Air Force Sustainment Center; Gen. Robin Rand, head of Air Force Global Strike Command; Elinor Otto, who was a Rosie the Riveter during World War II; Homer Hogues, a Tuskegee Airman; and Jerry Yellin, a World War II pilot who fought in the Pacific Theater.

During the conclave, AFA President Larry O. Spencer presented the AFA Exception Service Award to Tyler Johnson, Langley Chapter president and an AFA Emerging Leader, for 10 years of service to AAS-SW. AFA Board Chairman Scott P. Van Cleef, AFA Vice Chairman for Field Operations David A. Dietsch, and AFA Vice Chair for Aerospace Education Richard B. Bundy were also at the conclave.

AFA Emerging Leader

Tyler J. Worley

Home State: Calif.

Chapter: Prescott-Goldwater Chapter (Ariz.).

Joined AFA: 2009.

AFA Offices: Chapter President and Arizona State Secretary. Previously Chapter Vice President.

Military Service: N/A.

Occupation: In transition.

Education: B.S., Embry-Riddle Aeronautical University.

How did you first hear of AFA?

The first exposure I had to AFA was as an AFJROTC cadet. I had received the AFA cadet award my junior year and around the same time one of the instructors who was an AFA member began putting *Air Force Magazine* in our lounge.

What inspired you to join?

I initially joined just because I enjoyed reading the articles in *Air Force Magazine* but after a few years of working with the local AFA chapter through Silver Wings, I decided to start attending meetings in order to become more actively involved and was asked to become the chapter vice president once I learned more about what the organization does [and] how it operates.

What do you enjoy most about AFA membership?

The many opportunities it has provided for me to grow professionally and network with other Air Force advocates.

What do you think AFA needs to improve most to increase exposure and draw in more members?

AFA needs to overcome the disconnection it has with the younger generation, many of whom are looking for ways to be active in giving back to their communities but do not understand what AFA is and the programs it runs or how their membership is beneficial to them. I believe this will not only bring in a strong group of new members but help us retain those we get through Every Airman a Member and the Arnold Air Society-Silver Wings.

How will you keep building awareness about AFA?

In my opinion social media is the greatest tool AFA has to inform the communities our chapters are located in about the various AFA programs at the national level and the efforts of our membership at the local level. Over the past year, I have created and currently run all social media pages for my chapter, which has seen success in connecting with members and communities all around the area the chapter boundaries encompass.

AIR FORCE ASSOCIATION and AIR FORCE MEMORIAL FOUNDATION

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The Air Force Association's Annual Fund helps provide the financial support needed to carry out the Association's mission. Like most nonprofit organizations, the Air Force Association is not supported by membership dues alone. The organization relies upon generous contributions to support the programs, awards, scholarships, and initiatives that enable AFA to reach thousands of people every year. You are a significant part of our success!

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For more information contact Wesley Sherman at 703-247-5831 or WSherman@afa.org

GEN. E. W. RAWLINGS CHAPTER

The Gen. E. W. Rawlings Chapter honored Col. Anthony G. Polashek, commander of the 934th Airlift Wing at St. Paul ARS, Minn., with a unique gift during an awards ceremony in April. Polashek received a painting, done by Air Force historian Maj. Warren Neary, of the rescue of Navy SEAL Marcus Luttrell, said Lawrence Sagstetter, the chapter's aerospace education and communications VP.

Luttrell was the only survivor of a four-man team on a recon mission, setting the scene for 2013 movie "Lone Survivor." The painting depicts an HH-60 Pave Hawk from the 59th Expeditionary Rescue Squadron on the foothills of Afghan mountains, with other aircraft flying above.

The framed artwork was signed by Neary and all the members of Halo 42, the rescue crew members. ✪

Photo by TSgt. Lynette Olivares

AFA VP for Field Operations David Dietsch congratulates ANG SMSgt. Aaron Siek, named Senior NCO of the Year. Chapter VP Capt. Andrea Gehrman (right) presented the award.

Photo by TSgt. Lynette Olivares

Col. Anthony Polashek displays the artwork he received at a Gen. E. W. Rawlings Chapter awards dinner. Around him are other 934th Airlift Wing members and AFA VP for Field Operations David Dietsch (fourth from left).

Photo courtesy of Springdale Public School Communications

Arkansas' CyberPatriot VIII team winners from Springdale (Ark.) High School received awards, presented by former AFA Board Chairman Bob Largent (back row, red tie). Some 75 people attended the April ceremony for team Alpha Omega, shown here with their teachers and mentors—including Tim Skoch (back row, sixth from left), son of CyberPatriot National Commissioner Bernie Skoch.

Photo via Bob Schure

Maj. Chris Higgins, Air Force Reservist and local weatherman for Channel 2 News, receives an Appreciation Award from Spirit of St. Louis Chapter VP Bob Schure (left) and Chapter Secretary Flo Murphy. Higgins was guest speaker at the chapter's awards dinner.

Chapter News in Wingman

Send your chapter news to Wingman@afa.org. We prefer unposed photos of high resolution.

Reunions

reunions@afa.org

8th AF Combat Operations Center, Hadley, MA, including 814th Combat Defense Sq, 99th Security Police Sq, & 18th Communications Sq (1958-70). July 20-24, Residence Inn by Marriott, Chicopee, MA. **Contact:** Jack Havranek (203-661-6813) (gpd126@optonline.net).

86th Fighter-Bomber Group Assn. Oct. 19-23, Four Points by Sheraton in Destin-Fort Walton Beach, FL. **Contact:** Dallas Lowe (850-319-3047) (fighterbomberpilot@yahoo.com).

Air Force Postal & Courier Assn. Sept. 6-8, Atlantis Casino Resort & Spa in Reno, NV. **Contact:** Jim Faulkner (361-746-8460) (jlm1c21@aol.com).

B-66 Destroyer Assn. Aug. 28-Sept. 1 in Charleston, SC. **Contact:** Jim Milam, 9021 Ledge Stone Dr., McGregor, TX 76657 (254-845-1310) (jimmilam@aol.com).

F-15 Gathering of Eagles. July 29-31, Hope Hotel & Conference Center, Wright-Patterson AFB, OH. **Contact:** Donna Friedman (919-618-0621) (donnafriedman@nc.rr.com).

Misawa Project, Inc. June 22-June 25 in Mobile, AL. **Contact:** Lee Hansel (678-410-0925) (hansel1325@comcast.net).

Pilot Tng Class 66-H, Vance AFB, OK. Sept. 28-Oct. 2, Washington, DC. **Contact:** Skip Foster (flyerskip@cs.com).

Titan II Wings. Sept. 29-Oct. 1, Desert Diamond Casino Hotel in Tucson, AZ. **Contact:** Elaine Lasher, PO Box 17916, Tucson, AZ 85731 (520-886-7157) (redsnooty@comcast.net.

Having a Reunion?

Email reunion notices four months ahead of time to reunions@afa.org, or mail notices to "Reunions," Air Force Magazine, 1501 Lee Highway, Arlington, VA 22209-1198. We reserve the right to condense notices.

Artwork by Ugo Crisponi aviationgraphic.com

E-8 Joint STARS

This aircraft: USAF E-8C JSTARS—*#97-0100*—as it looked in 2004 when assigned to 461st Air Control Wing, Robins AFB, Ga.

Introduction of the E-8 in the 1990s gave the Air Force a powerful ISR aircraft able to locate, classify, track, and direct fire against moving ground targets. It was the airborne part of the Joint Surveillance Target Attack Radar System, a project that included Army elements. Grumman (now Northrop Grumman) integrated a huge ground-scanning radar and advanced communications into a modified Boeing 707-300 airframe. The result: real-time battle management for air and ground commanders.

JSTARS evolved from USAF and Army efforts to find better ways to attack Soviet armor. Their programs merged in 1982, with the Air Force as lead. Grumman modified used 707s to carry a 27-foot, canoe-shaped radome slung under the fuselage. It housed a 24-foot side-looking phased array radar. The antenna tilted to either side of the aircraft to conduct wide-area surveillance, fixed-target indication, moving target indication, and target classification. The E-8 could look out 125 miles and track up to 600 targets simultaneously, differentiating between tracked vehicles and trucks. Mission crew analyzed the radar information and transmitted it to ground stations or other aircraft.

The E-8 achieved initial operational capability in late 1997. However, it was by then already a combat veteran. Two prototypes had starred in the 1991 Gulf War, where they played a key role in the Battle of Khafji. The two also flew in Joint Endeavor, a 1995-96 NATO peacekeeping mission in Bosnia. Newly operational E-8s again went into action in Operation Allied Force, the 1999 NATO air war against Serbia. Although not publicized, the performance of the E-8s was an airpower triumph of the 2003 Iraq War. E-8s accumulated tens of thousands of combat hours over Afghanistan, Iraq, Libya, and other hot spots.

—Robert S. Dudney with Walter J. Boyne

Northrop Grumman photo

An E-8C JSTARS over Robins AFB, Ga.

In Brief

Designed, built by Grumman, now Northrop Grumman (mission systems) and Boeing (707-300 airframe) ★ first flight (w/radar) Dec. 22, 1988 ★ function, ground surveillance/airborne battle management ★ four Pratt & Whitney TF33 102C turbofan engines ★ AN/APY-7 synthetic aperture radar ★ number built 18 (two E-8As repurposed to E-8C configuration) ★ standard flight crew of four (pilot, copilot, navigator, flight engineer) ★ standard mission crew, 18 specialists ★ max speed 639 mph ★ cruise speed 449 to 587 mph ★ endurance: 11 hrs (unrefueled) ★ weight (max T/O) 336,000 lb ★ span 145 ft 9 in ★ length 152 ft 11 in ★ height 42 ft 6 in ★ ceiling 42,000 ft.

Famous Fliers

Desert Storm: Royce Grones, Mark Neese, George Muellner (Cmdr, 411th Joint Stars Sq.). **OEF/OIF:** Robert Elder Jr. (Cmdr 8th AF). **Notables:** Lori Robinson (Senior air battle manager, US Northern Command, first female combatant commander), Charles Brown Jr., David Fadok. **Test Pilots:** Royce Grones (Chief AF Test Force), Mark Neese.

Interesting Facts

Generates radar field-of-view covering 19,305 square miles ★ deployed twice for combat (Gulf War 1991, Balkans 1995-96) before even reaching IOC ★ capable of locating, classifying, tracking ground vehicles 125 miles distant ★ can track dismounted human targets ★ tested in 1980s on top-secret Tacit Blue experimental aircraft ★ has some limited capability to detect helicopters, rotating antennas, and slow-moving fixed-wing aircraft ★ called "JSTARS" at first, then officially "Joint STARS" ★ uses radar developed by Norden.

Illustration by Zaur Eyfanbekov

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