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Journal of the Air Force Association

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MAGAZINE

Continuous Bomber Presence





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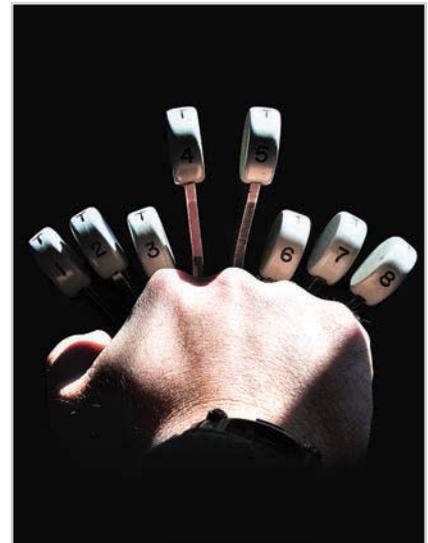
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MetLife



Major Powers, Back on Top

The United States military has spent the past 15 years concentrating on primarily low-intensity wars in Iraq and Afghanistan. Over the past year, much of the nation's attention has been focused on the threat from the ISIS international terror organization.

At the national level, threats from major powers such as Russia and China were frequently afterthoughts. ISIS is almost certainly not the greatest threat to the United States, however.

Yes, ISIS must be watched, guarded against, and attacked militarily as appropriate. But the organization does not and has not represented the No. 1 danger to the United States. More dangerous are major powers that behave aggressively, intimidate or attack their neighbors, violate international norms, and in one case has the ability to destroy the United States.

Thankfully, America's recent fixation on "today's wars" is coming to an end and some long-held assumptions are being discarded as policy-makers come to terms with the facts. Russia is not a peaceful democracy, China's prosperity is not leading to responsible international relations, violent Islamic fundamentalism has enduring appeal in Iran, and North Korea shores up its regime by creating conflict.

Russia in particular is back at the top of the threat list.

In late June, Air Force Secretary Deborah Lee James said at the Paris Air Show that Russia's recent actions are a "big part of why I'm here in Europe."

The "biggest threat on my mind is what's happening with Russia and the activities of Russia," she said, describing the situation in Ukraine as "extremely worrisome." Russia illegally seized Crimea and has subsequently waged a surreptitious war in an attempt to split the country to Russia's advantage.

The Pentagon subsequently released a new National Military Strategy July 2. It brought great-power conflict back to the front and center of US military planning.

Russia "has repeatedly demonstrated that it does not respect the sovereignty of its neighbors and it is willing to use force to achieve its goals," reads the new National Military Strategy. "Russia's military actions are undermining regional security directly and through proxy forces."

It went to war against neighboring Georgia, is believed to have orchestrated major cyber assaults against NATO member Estonia, and continues its conflict in Ukraine.

And it is not just Russia behaving badly.

Communist China has aggressively violated numerous international norms in recent years. It is North Korea's sole significant benefactor. It has thousands of missiles aimed at Taiwan. In 2013

Russia eclipses the threat from ISIS.

it unilaterally declared an air defense identification zone in international airspace, where it expects other nations to submit flight plans and follow Chinese instructions.

China also continues to seek international territory. "Its claims to nearly the entire South China Sea are inconsistent with international law," the strategy states. China continues "with aggressive land reclamation efforts" that will allow it to build air bases and shipyards in contested or international waters.

Iran creates its own set of problems. "It is pursuing nuclear and missile delivery technologies," the strategy reads, and "is a state sponsor of terrorism that has undermined stability in many nations." Iran exports terrorism to Iraq and Syria, seeks the destruction of Israel, and is believed to be seeking nuclear weapons.

And don't forget North Korea, where "pursuit of nuclear weapons and ballistic missile technologies ... directly threaten[s] its neighbors, especially the Republic of Korea and Japan. In time, they will threaten the US homeland," the strategy reads. "North Korea also has conducted cyber attacks, including causing major damage to a US corporation."

Despite these nations' enormous capability to harm the United States, many in Washington still view ISIS as the greater threat, either out of habit, because the media keeps it front and center, or because the US is currently engaged in a shooting war with the group.

The notion that Russia is actually a greater threat to the United States than

ISIS is still not universally accepted. It was therefore asserted at the confirmation hearings for the nation's top two military posts.

It is in this context that Marine Corps Gen. Joseph F. Dunford Jr., at his nomination hearing to become the next Chairman of the Joint Chiefs of Staff, made news when he called Russia the greatest threat to the United States. ISIS ranked fourth, also behind China and North Korea.

Dunford noted Russia is a nuclear power with the ability to destroy the US. It has attacked its neighbors, and "if you look at their behavior, it's nothing short of alarming," he said July 9.

Less than a week later, Air Force Gen. Paul J. Selva had his turn before the Senate Armed Services Committee, seeking confirmation as the next Joint Chiefs vice chairman.

Selva struck a similar note. Terrorist groups are "a threat we must deal with," he said, but they do not threaten the US homeland to the same degree as nation-states. "Russia possesses the conventional and nuclear capability to be an existential threat to this nation, should they choose to do so," he noted.

ISIS, on the other hand, "does not present a clear and present threat to our homeland and to the existence of our nation."

Selva's list of threats to the US was similar but not identical to Dunford's—and ran from Russia to China, Iran, and North Korea.

This seemed to surprise lawmakers on both sides of the aisle, who must not have been paying attention to the new National Military Strategy or during Dunford's hearing.

If a threat is defined simply as potential devastation multiplied by its likelihood, then it is hard to quibble with these rankings. Russia is not just a proven aggressor, it has the means to destroy its enemies.

Of course ISIS must be taken seriously and dealt with, but it is time for the US to refocus attention on the larger problem actors. Recent steps to bolster the US military presence and readiness in Eastern Europe and throughout the Pacific are steps in the right direction. ☛



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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.

Is Treason So Wrong?

In "Verbatim," *Air Force Magazine*, June 2015, Michael J. Morrell, former deputy director of CIA, was cited from his book, *The Great War of Our Time: The CIA's Fight Against Terrorism From al Qaeda to ISIS*, stating that leaks by Edward Snowden resulted in terrorists modifying their actions, drying up their communications sources, and changing their tactics and that Snowden's actions clearly played a role in the rise of ISIS [*"Get the Noose,"* p. 10].

Snowden's self-righteous action is now seen as a weakness in the security of America's intelligence system, because anyone in the system or any authorized user of intelligence could use the same whistle-blower excuse that Snowden used. America's allies, coalition forces, and potential lucrative human sources have doubts that America's intelligence procedures are secure and reliable. Having said that, I am concerned that a court of law in the US may not find Snowden guilty beyond any reasonable doubt, because it could be difficult to convince everyone in a jury that Snowden did wrong.

Lt. Col. Russel A. Noguchi,
USAF (Ret.)
Pearl City, Hawaii

Eglin Schools, Too

The June 2015 *Air Force Magazine* [*"Air Force World: Lightning's Day Out,"* p. 18] states that Luke AFB, Ariz., was "home to the F-35A schoolhouse." This seems to say this is the *only* schoolhouse and that's simply not true. The first one—and still going—is the one at Eglin's 33rd FW. Maybe it should have said one of two F-35 schoolhouses, or home to an F-35 schoolhouse.

Col. Al Haberbush,
USAF (Ret.)
Niceville Fla.

No Lake Wobegon

Regarding "Secret Solutions From the Desert" in the June 2015 issue [p. 28]:

Asking that every government acquisition be modeled after the Lockheed Martin Skunk Works is like mandat-

ing that every elementary and high school course be an advanced placement course. Unfortunately, the Skunk Works approach isn't for everyone, as admirable as it is. In addition to the monumental organizational issues to overcome, there are also the likely objections from those that would demand "appropriate" representation for all genders, ethnicities, and life styles. Our high school track coach told us that when we performed our running broad jumps, we should try to jump over the trees on the horizon. Of course, it was impossible, but if it helped us land just a bit further than we would have otherwise, it was still a useful objective.

Hank Caruso
California, Md.

The picture of the "A-12s—secret CIA spyplanes," June 2015, p. 30, is not of three CIA A-12s. The airplanes in the picture have a second crew compartment and the A-12 was a single-seat aircraft. My guess would be that it is a picture taken for a historical record of the initial production of the YF-12A fighter interceptors. During the construction of the A-12s, production was changed on the seventh, eighth, and ninth models to add a second crew position and several other modifications to make the change to the Air Force YF-12A. After the three variants, the assembly line went back to produce nine more of the single seat A-12 aircraft for a total of 15. Six of those 15 crashed. It is also possible

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that the three aircraft were SR-71s. We would need to know the date of the photograph to know for sure.

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

Lining Putin's Pockets?

The five Air Force advisors in your report deserve the Distinguished Flying Cross for their valor and professionalism under fire [*"Heroism From the Hip," June, p. 52*]. But your article raises a disturbing question. Why does our military purchase Russian helicopters for Afghanistan's National Army? What's wrong with US helicopters from Sikorsky and Bell? As your report noted, they're easier for most aircrews to operate than Russian Mi-17 choppers. The Air Force took heavy flak from Congress for using Russian RD-180 rocket engines to launch satellites. Why compound that error by giving Afghan forces helicopters made by a nation that tried to conquer them 35 years ago? We can't condemn Putin for his current aggression with one hand while lining his pockets with the other. That won't work in the Cold War 2.0.

Richard Reif
Flushing, N.Y.

Puff, Spooky, Shadow, Stinger, Spectre
I always enjoy reading Mr. Correll's

articles, which are insightful and fascinating. May I offer one slight correction to a minor error in the article entitled, "Gunships on the Trail" [*June, p. 64*]? The US Air Force did indeed fly AC-47s after December 1969. Three Spookys were provisionally reassigned from the 4th SOS to Udorn RTAB, Thailand, on 10 December 1969 and designated as Det. 1, 56th SOW, identified by the tailcode, OS.

I was an airframe repair technician, assigned to the 432nd FMS and performed maintenance on these aircraft (AC-47Ds, serial numbers 44-76625, 43-16133, and 43-49010) during their tenure at Udorn. The final sortie performed by this detachment took place on 29 May 1970 and all three aircraft were flown by Det. 1, 56th SOW, aircrews to Vientiane, Laos, where they were transferred to the Royal Laotian Air Force.

As a sidebar, it is interesting to note that the office facilities and vehicles at Udorn were transferred to the 18th SOS, on 4 June 1970, which operated three AC-119K Stingers designated as Flight D, detached from the 14th SOW at Nakhon Phanom RTAB, Thailand. This assignment was apparently rotational in nature, since I observed 11 different Stingers there by serial number, although there were never more than four on station at one time.

I also participated in maintenance on these aircraft, as well.

One Stinger was lost on 6 June 1970 (#52-5935), while a second successfully recovered at Udorn following massive battle damage on 8 May 1970, resulting in the loss of 15 feet of the right wing and the right aileron. The aircrew was subsequently awarded the Mackay Trophy for 1970 in recognition of the most meritorious flight for that year. Named "Super Sow" (with appropriate artwork), the aircraft was AC-119K, #52-5982.

Thanks for consistently publishing an outstanding magazine of unparalleled professionalism and journalistic competence.

Dave Hansen
Oak Creek, Wis.

I would like to thank you for the excellent article in the June 2015 magazine, "Gunships on the Trail." I spent three years in Ubon, Thailand, on the AC-130. In 1969-70, I was a crew chief on the AC-130A gunship. In 1971-72, I became an illuminator operator flying on the AC-130A models, logging numerous combat missions flying over the Ho Chi Minh Trail. In 1974-75, I went back to Thailand, and as an IO I flew on the AC-130A and AC-130E aircraft. What a great experience it was to be a part of this wonderful organization.



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This article brought back many fond memories of those years and all of the great individuals I worked with. I have been able to stay in touch with some of the guys I flew with.

SMSgt. Danny E. Krouse,
USAF (Ret.)
Hesperia, Calif.

I enjoyed the article "Gunships on the Trail" by John T. Correll. Having spent one year at NKP (1966-67) flying the AT-28D at night on the trail, I was disappointed when the -28 was not mentioned in third paragraph as one of the vintage aircraft attacking trucks on the trail. Our call sign was Zorro and our mission and call sign was picked up later by the A-1s.

[Retired Col. Ronald W. Terry], the father of the gunship, was inducted into the Air Commando Hall of Fame in 2013. Our Air Park/Museum at Hurlburt Field has each of the three gunships on display.

Lt. Col. Felix Sambogna,
USAF (Ret.)
Fort Walton Beach, Fla.

One slight correction/addition to your excellent article on the AC-47. The original test bed—call sign Puff 99—was assigned to the C-47 Section of the 1st Air Commando Squadron. Gradually, all C-47s assigned to the 1st ACS were modified to the AC-47 and all used the call sign Puff. The C-47s assigned to the 4th Air Commando Squadron were also modified in the field and used the call

sign Spooky. Eventually, the AC-47s, and crews, were transferred to the 4th ACS and the call sign Puff went into the history books. For those of us unreconstructed veterans of the 1st ACS, the AC-47 will always be Puff, the dragonship.

Col. Dick Sexton,
USAF (Ret.)
Colorado Springs, Colo.

Regarding the last USAF missions of the Spooky gunships: We flew out of Udorn RTAB well into May of 1970. Lieutenant Opdyck (aircraft commander) and I (navigator) were awarded Silver Stars for a mission on 13 May 1970. I visited the Lima site via Air America in July and was told by the Laotian general there that "without Spooky, we no exist."

Several crew members and I were transferred to Vientiane to train the Lao to take over the mission. When I left in September that mission was still in progress.

Ron Terry was right—the side-firing gunship concept was "right on."

Robert Manns
San Antonio

Great article. I think gunships in Vietnam, Iraq, and Afghanistan are just potent weapons.

I wonder if a UAV gunship could be designed. Let me throw out a possibility: Let's say that the goal was simply to have a .50-caliber machine gun in the sky hovering over some Army or Marine patrol for support. Why?

(1) A gunship circles its target and can put continuous fire on it vs. a conventional plane that just makes a pass.

(2) Our UAVs are generally designed for more time aloft while sacrificing speed and performance (no 9G turns).

The Predator and Reaper are our main UAVs. Neither is really suited to a side-firing gun, which easily fits in a C-130. However, I think our designers (say, aerospace engineer Burt Rutan) could come up with one. Rutan designs his plane with a box structure of two fuselage elements for structural strength, which is what you would need for a side-firing .50-caliber. It would sort of look like a P-38 without the pilot pod. The .50-caliber could be hung under the wing. If this destroyed too much of the lift efficiency, you could hang it between the two fuselage elements. Naturally you would have balance issues, but I think you could get around that with shifting fuel. Also, UAVs don't fly too fast (and wouldn't have to in order to keep up with a ground patrol). Even wing walkers didn't destroy the lift of the old biplanes.

You could fly the UAV .50-caliber at 10,000 feet to be out of the range of small arms. It would only descend to firing range in support of ground troops. It could be a cheap, persistence answer for close support. Obviously you still need planes for bombs and major ground support.

William Thayer
San Diego

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BRAC to the Drawing Table

Lawmakers are poised to again deny the Pentagon its request for a round of base closures and realignments to begin in 2017, but the Obama Administration is upping the ante this year by adding BRAC resistance to its lengthy list of grievances against the annual defense authorization bill.

In Administration statements issued this spring on the House and Senate versions of the sprawling Pentagon policy measure, the White House's Office of Management and Budget threatened that President Obama would veto the bill because of a number of objections, including the failure to authorize a BRAC.

"The Administration strongly urges Congress to provide the BRAC authorization as requested, which would allow DOD to right-size its infrastructure while providing important assistance to affected communities, freeing resources currently consumed by maintaining unneeded facilities," according to OMB's statement on the Senate's version of the defense bill.

The House passed its version of the bill in May, and the Senate followed suit in June. As of press time, the two chambers were negotiating differences in the bills, but both measures would block a BRAC.

The Administration hasn't followed through on threatened vetoes of previous defense bills, but ongoing budget battles could force the President's hand, tying lawmakers' aversion to BRAC into a much larger end-of-year debate.

While it seems unlikely that Congress will authorize the 2017 BRAC, base-closure supporters hope that the veto threat is at least a step in the right direction. Meanwhile, a small but influential group of lawmakers support another round of base closures, including the top Demo-

crats on the House and Senate Armed Services Committees, Rep. Adam Smith of Washington and Sen. Jack Reed of Rhode Island. Others, including House Armed Services Committee Chairman Mac Thornberry (R-Texas), have said they may not always oppose a BRAC. They just don't think now, as the military downsizes and faces dramatic budget reductions, is the right time to cut infrastructure.

As they have pled their case on Capitol Hill, the Air Force and Army have been particularly upfront about their need for another cost-saving BRAC, clamoring that they have, respectively, 30 percent and 18 percent more real estate than they are now using, according to the services' most recent analyses.

Within the Air Force, that doesn't mean the service can close 30 percent of its bases, says Kathleen I. Ferguson, the Air Force's principal deputy assistant secretary for installations, environment, and energy. But it does suggest that further analysis—presumably as part of a formal BRAC round—is warranted to determine how much excess capacity the service needs and how much it can shed.

In the last five BRAC rounds, the Air Force has closed 40 bases and saved \$2.9 billion annually, the service estimates. While the most recent BRAC a decade ago, conducted in the midst of two wars, focused on transformation, department officials have stressed that this next round would shutter installations, yielding significant savings in just a matter of years.

"Through a BRAC, we can save money to put toward other needs of the department and stop spending money where we don't really need to," Ferguson says.

If Congress doesn't authorize another BRAC, the Administration has warned that it will pursue other ways to cut unneeded infrastructure and "ensure that DOD's limited resources are available for the highest priorities of the warfighter and national security."

Communities are already bracing for another BRAC round, hiring lobbyists in Washington and putting pressure on their delegations. Some, Ferguson says, are confident in their fates, having easily survived the last round. Others are caught in limbo as they await a BRAC, with potential investors afraid to pursue new developments until they have a better idea of a base's future.

It is, many BRAC lobbyists, lawmakers, and base advocates acknowledged, not a matter of if, but when.

BRAC supporters stress that the process, which involves an exhaustive review of the Pentagon's closure recommendations by an independent commission, is the most detailed, organized, and fairest way to eliminate bases or move forces from one installation to the next.

Communities have an opportunity to appeal the department's decision to the commission and, occasionally, the commission agrees with base advocates. That was the case in the 2005 round with both Ellsworth AFB, S.D., and Cannon AFB, N.M.

And, even for bases that do shutter, there is an opportunity to rebuild and reuse the installation for civilian purposes.

"It's not a death knell," Ferguson says. "There have been tremendous success stories." ★

Megan Scully is a reporter for CQ Roll Call.



Kathleen Ferguson, USAF's principal deputy assistant secretary for installations, environment, and energy, says the Air Force has 30 percent more real estate than it needs.

USAF photo by SrA. Carlin Leslie

By Robert S. Dudley

Backfire Bombing

“Adhering to a zero civilian casualty goal [in air operations against ISIS] is backfiring in ways that those who directed it probably did not intend. It is yielding to the Islamic State an air defense capability they do not have to pay for, equip to attain, or man to employ. Our airmen are performing magnificently at the individual and unit level, doing the most they can while encumbered with incredibly onerous rules of engagement—well in excess to the laws of armed conflict.”—*Retired USAF Lt. Gen. David A. Deptula, quoted in Air Force Times, July 8.*

War, Take 1

“This will not be quick. This is a long-term campaign. ISIL ... is nimble. In ... urban areas, it is dug in among innocent civilian populations. ... Our coalition [has] now hit ISIL with more than 5,000 air strikes. We have taken out thousands of ... tanks, vehicles, bomb factories, and training camps. We have eliminated thousands of fighters, including senior ISIL commanders. ... We have seen, when we have an effective partner on the ground, ISIL can be pushed back. ... ISIL's recent losses in both Iraq and Syria prove that they can and will be defeated.”—*President Obama, statement at the Pentagon on the status of war with Islamic State fighters, July 6.*

War, Take 2

“President Obama's comments today reveal the disturbing degree of self-delusion that characterizes the Administration's campaign. None of the so-called progress that the President cited suggests that we are on a path to success, and when you are not winning in warfare, you are losing.”—*Sen. John McCain (R-Ariz.), Senate Armed Services Committee, statement issued July 6.*

Raptor Days?

“I would say the biggest threat on my mind is what's happening with Russia and the activities of Russia, and indeed that's a big part of why I'm here in Europe. ... It's extremely worrisome on what's going on in the Ukraine. We've seen the type of warfare—which someone dubbed [as] hybrid warfare—which is somewhat new. So I would put that at the top of my list. I could easily see the

day—though I couldn't tell you the day exactly—when the F-22, for example, rotates in [to European bases]. ... I don't see why that couldn't happen in the future.”—*Secretary of the Air Force Deborah Lee James, remarks at the Paris Air Show, June 15.*

Going, Going ...

“Aerospace power has always been and will always be fundamental to our ability to project power across transoceanic distances, to conduct theater entry operations, and to mount joint combined arms operations. ... The thing that bothers me the most is that in 2001, the United States Air Force had 88 tactical fighter squadrons [but] today, and primarily due to intense budget pressures, they have 54, moving to 49. ... We're [at] about the same place ... in ground forces [and] we're [at] about the same place ... in naval forces. But in aerospace capacity and capability, we have dropped significantly.”—*Deputy Secretary of Defense Robert O. Work, address to RAND Corp., June 22.*

Space Under Siege

“All of our global command and control and space capabilities are under increasing threat and, in an unclassified environment, I can't speak too deeply about this, but let me just say that it is very concerning. Our potential adversaries are pursuing a wide range of cyber and kinetic attack capabilities, and we are going to have to expend a lot of effort to maintain our C2 network and our space capabilities in any future fight.”—*Deputy Secretary of Defense Robert O. Work, address to RAND Corp., June 22.*

Phalanx, Longbow, Battleship

“Between 1990 and 2014, the United States went to war against regional or lesser powers that had no means to challenge US air superiority and therefore no means to threaten the American way of war. That attractive state of affairs possessed a superficial permanence similar to earlier dominant military concepts and technologies such as the Greek phalanx, longbow, and battleship. ... Today, it appears that the proliferation of long-range precision strike capabilities, accurate and reliable ballistic and cruise missiles especially, is bringing

an end to the American era of rear-area sanctuary. ... USAF is no newcomer to the problems of air base defense. ... [It] can meet and overcome them just as it did in earlier conflicts. ... We can, however, be sure [that] ... winning the battle of the airfields will require a level of institutional commitment to air base defense ... not seen since the height of the Cold War.”—*RAND analyst Alan J. Vick, in “Air Base Attacks and Defensive Counters,” released June 12.*

Et Tu, Jimmy?

“On the world stage, I think they [President Obama's successes] have been minimal. ... Just to be as objective about it as I can, I can't think of many nations in the world where we have a better relationship now than ... when he took over—you know, if you look at Russia, if you look at England, if you look at China, if you look at Egypt, and so forth. ... I would say that the United States' influence and prestige and respect in the world is probably lower now than it was six or seven years ago.”—*Former President Jimmy Carter, remarks at the Aspen Institute in Colorado, June 25.*

Paint It Black

“Almost exactly a century ago, crazy concepts like ‘flying machines,’ ‘undersea boats,’ and ‘land ironclads’ appeared in novels, while Andrew Carnegie dedicated his new Palace of Peace with a speech predicting that the end of war was ‘as certain to come, and come soon, as day follows night.’ Yet a real war emerged out of a crisis and the real airplane, submarine, and tank were fighting in it. Likewise today, the wars of the Middle East could be looked back upon as equivalent to the Boer Wars and other small wars of that period. There is a real arms race and real tensions. ... A conflict could start by an accident—two planes accidentally smashing together over an uninhabited island that no one should really care about—or through a deliberate choice in the 2020s to reorder the global system. The risks of World War III may seem like something in the distant past but, as the Rolling Stones sang in ‘Gimme Shelter,’ ‘It's just a shot away.’”—*Military futurist Peter W. Singer of New America Foundation, writing in Defense One, July 7.*

Long-Range Strike Bomber contract to be awarded; Boeing and Lockheed Martin's edge; Northrop Grumman's advantage

WASHINGTON, D.C., JULY 15

AND THE WINNER IS ...

Any day now, the Air Force will award the Long-Range Strike Bomber contract, worth well in excess of \$50 billion. Two industry teams—a Boeing-led partnership, including Lockheed Martin, and another led by Northrop Grumman—are competing for the work. The choice could well shape the military aviation landscape in the US for decades to come.

The teams are technically well-matched. Both have styled themselves as *the* bomber company. Boeing makes that claim based on its history with the B-17 and B-29 in World War II, the B-47 in the Korean War era, and the B-52 from the 1950s on, as well as its experience with the B-1, built by its “heritage” company, Rockwell International. Northrop Grumman built the B-2, the most recent American bomber, and the only one built with stealth technology as its driving design feature. Given that the B-52, B-1, and B-2 are all serving today, each with a robust program of upgrades in the pipeline, *both* teams can claim to be the “incumbent.”

Chief of Staff Gen. Mark A. Welsh III, who won't get a vote on the selection, said in April he had visited both design shops before proposals were submitted and was “impressed” and “confident” they were each on the right track. Both teams have long experience in building and maintaining stealthy military airplanes. Technical proposals are just one part of the LRS-B decision, however.

Price, of course, plays a huge role in the choice. Since program launch in 2010, USAF leaders insist that to keep the project on track and on budget, no changes have been made in LRS-B requirements. Air Force acquisition chief William A. LaPlante has said the requirements are understood well enough by industry that the production contract can be fixed-price. The Air Force insists it will only pay \$550 million a copy for the LRS-B, in 2010 dollars, and that the offerors should trade away nice-to-have but noncritical features to hit that mark.

Other factors include the government's confidence in the competitors—based on past performance in other projects—as well as each team's manufacturing capabilities, their financial ability to invest in the program and weather its inevitable ups and downs, and how many other big-ticket projects they have going, competing for management attention.

Will the health of the industrial base also play a role? When asked by *Air Force Magazine* how much the industrial base will figure into the LRS-B pick, Pentagon acquisition, technology, and logistics chief Frank Kendall insisted, “It'll be decided on the merits.” However, many industry experts have suggested the LRS-B win will drive consolidation, with the loser either exiting the business or buying other companies to remain competitive.

LaPlante has shrugged off these fears, however, insisting that the upcoming T-X trainer competition, another to recapitalize the E-8 JSTARS fleet, and a number of other, secret projects will provide ample opportunities for the team that goes home empty-handed from the new bomber competition.

So, who will win? Both entrants know the requirements, both have deep experience in building stealthy aircraft, and both are fully capable of offering an acceptable technical solution. Here, presented alphabetically, are the key other reasons why, given comparable technical and price proposals, each team theoretically offers an unbeatable proposal.

WHY BOEING WILL WIN

If you wanted to build a “dream team” to develop and produce the LRS-B, the Boeing/Lockheed Martin partnership would be it.

Boeing is one of the largest aircraft manufacturers in the world, with a global supply base and vast experience at controlling costs on large-scale projects. It is highly skilled at integrating programs with tens of thousands of moving parts and is a world innovator in materials and manufacturing sciences. It knows how to tap the world industrial base to find the best manufacturing skills and the best price. It also has a longstanding “bomber culture” stemming from its successes with the B-52 and B-1.

Lockheed Martin is almost synonymous with the terms “stealth” and “secret.” Its Skunk Works division is largely responsible for the specialized technologies that made the F-117 and F-22 work so well in combat. Boeing and Lockheed Martin (and General Dynamics) collaborated on the F-22, with Lockheed Martin building most of the jet, including its stealth edges, while Boeing built the wings and aft fuselage.

The two companies are the main suppliers of the Air Force's existing combat air forces, having also built (themselves and their heritage companies acquired in mergers) the F-15, F-16, B-52, and B-1. Boeing and Lockheed Martin are also the prime contractors and integrators on the KC-46 tanker and F-35 fighter; the two largest and most complex programs in the Air Force's acquisition plans, together accounting for some 1,942 future USAF aircraft. Industry officials say they think the LRS-B may



What aircraft will join this flight of USAF's veteran bombers? Stay tuned.

be able to use large amounts of software generated for the F-35's sensor integration and mission systems—thus saving substantial money through reuse.

The F-35 program, after a bumpy start, has—since its 2010 rebaselining—stuck to its budget, and Lockheed Martin expects that the fifth generation jet will retail at about the same price as fourth generation jets as early as 2018.

Lockheed Martin is also steeped in classified airplane skills, the Skunk Works having been involved in numerous known and undisclosed secret projects. The most recent of these is the RQ-170 Sentinel, about which USAF will say almost nothing, but which is credited with the stealth surveillance that brought about the 2011 killing of Osama bin Laden. Pentagon leaders have credited the “Skunk Works model”—of innovation, small teams, reuse of existing technology, and clearly defined goals—as the basis for Pentagon R&D efforts in the coming years. Boeing's own “Phantom Works” will also contribute cutting-edge technology to the LRS-B.

Lockheed Martin also builds the C-130, a stalwart of tactical airlift since the 1950s, routinely upgraded since, and is also upgrading the C-5 Galaxy with new engines and systems. In the field, these upgrades have drastically improved the C-5's performance. For the Navy, Boeing makes the F/A-18 Super Hornet strike fighter and EA-18G Growler electronic warfare jets, as well as the brand-new P-8A Poseidon patrol craft. The Hornet family is delivering on time and at budget.

Northrop Grumman, on the other hand, has only delivered a handful of all-up production airplanes—RQ-4 Global Hawks—in the last few years, focused mainly on building pieces of airplanes for other companies and performing electronics upgrades or conversions.

It's worth noting that Lockheed Martin defeated Northrop Grumman the last time they competed in a comparable program. Lockheed Martin's F-22 beat Northrop Grumman's F-23 in the Advanced Tactical Fighter program in 1991. Though the F-23 was deemed technically acceptable, Donald B. Rice, Secretary of the Air Force at the time, said he thought Lockheed Martin had a better plan for managing the program—specifically for dealing with developmental setbacks.

Besides bringing large programs to fruition, Boeing and Lockheed Martin are sitting on quite a lot of cash—five times the revenue of Northrop Grumman—enabling them to go shopping for other companies and giving them the flexibility to invest their own funds in the LRS-B. Pentagon leaders have said for several years that they expect companies to invest in the LRS-B and put their own hides on the line; Boeing and Lockheed Martin can do this far more easily than can Northrop Grumman, whose sales have been declining.

Given their broad experience in large-scale programs, the relevance of their recent experience and success in fighting down costs, Boeing and Lockheed Martin seem a good bet for the LRS-B win.

WHY NORTHROP GRUMMAN WILL WIN

Northrop Grumman clearly has the chops to build the bomber. The B-2 was no mean technical feat, launched at a time when some of its critical enabling capabilities were rated at a Technology Readiness Level of 4 or 5. (The Air Force is demanding a minimum TRL of 6 for LRS-B technologies).

When the B-2 program was truncated in the late 1990s at only 20 (later 21) airplanes, Congress made a provision to keep funding Northrop Grumman's knowledge of how to make the B-2 even better and preserve the ability to manufacture another large stealth bomber in the future. Consequently, there have been numerous updates to the B-2's stealth features, evolving away from the arduous tape-and-caulk methods to streamlined systems that work better and are easier to maintain. The B-2's mission systems are now entering what some call a “midlife update” involving new technology, and Northrop Grumman has

a detailed plan to keep the bomber capable and relevant until 2058—nearly two decades beyond its early service life predictions. Northrop Grumman is state-of-the-art when it comes to modern stealth bombers.

The Air Force suggests LRS-B may be “optionally manned” in the future. In the last two years, Northrop Grumman's X-47B stealth concept jet has taken off from and landed on an aircraft carrier fully autonomously and performed aerial refueling on its own, as well. Its Global Hawk intelligence, surveillance, and reconnaissance aircraft fly automatic routes every day, aided by humans only in the takeoff and landing phase, with mere monitoring in between. Though Global Hawk has come close to termination a couple of times due to cost, the Air Force admits Northrop Grumman has made great strides in getting costs under control.

Northrop Grumman also has solid, industry-leading skills in radar and electronic warfare, which the Air Force recently acknowledged will be a key part of the LRS-B's mission. In fact, if Boeing were to win the LRS-B, it might well have to buy these mission systems from Northrop Grumman. Much of the F-35's mission suite is built by Northrop Grumman—including the centerpiece radar—as well as the fighter's 360-degree-view Distributed Aperture System and communications-navigations gear. The company also builds a substantial part of the F-35 airframe as Lockheed Martin's industrial partner.

The Air Force has all but acknowledged that Northrop Grumman is the contractor behind a stealthy, long-range robotic ISR platform purportedly called the RQ-180, now in service, and there's strong evidence that Northrop Grumman built a proof-of-concept aircraft in preparation for USAF's last attempt at a B-2 successor, the Next Generation Bomber, terminated by then-Secretary of Defense Robert M. Gates in 2009. The company's acquisition of Scaled Composites, another aerospace company, boosted its already robust ability to rapidly prototype novel aircraft concepts, which apparently is being done: Northrop Grumman's balance sheet reveals considerable revenue from unnamed, classified government projects.

Though Boeing has downplayed the risk involved in building the KC-46 tanker, a seemingly novice error in the design of wiring harnesses has put the project at least eight months behind. That mistake also cut deeper into the company's profits on development, which it took on as a loss leader to be a player in what it sees as a decades-long tanker market. And, while Lockheed Martin has reduced costs and made good on the F-35 since its program “rebaselining” in 2010, the company clearly didn't anticipate the risks in development, which went \$12 billion over budget before the Pentagon started to apply corrective action. How the Pentagon grades “past performance” on these two crown jewel programs may well be the critical factor in deciding who gets to work on the LRS-B.

The three programs the Air Force considers “existential” to its ability to do its mission are the KC-46 tanker, the F-35 strike fighter, and the LRS-B, and it maintains that it will cut or shuffle any other acquisition projects to get them. Boeing already has the tanker program; Lockheed Martin has the F-35. Would the Air Force really put all its Fabergé eggs in their basket? Pentagon leaders say that as the number of new programs shrink, they want to preserve competition as much as possible, with as many credible offerors as possible. Based on that thinking, Northrop Grumman will get the LRS-B.

It's not just a matter of who needs the work. If budgetary push comes to shove, would Boeing and Lockheed Martin put their full backing behind the LRS-B, which is still in the concept stage, or behind the tanker and F-35, which are well into production? Lockheed Martin yanked its support for the F-22 when Defense Secretary Gates, who wanted to kill the Raptor, threatened the F-35 in retaliation. The air immediately rushed out of the campaign to keep the F-22 going in Washington, D.C.

All those factors taken in concert, Northrop Grumman has good reason to believe the empty space in its Palmdale, Calif., facility will soon fill up with LRS-B work. 

Air Force World

★ screenshot

07.15.2015

An Atlas V rocket boosts GPS IIF-10 into space from Cape Canaveral AFS, Fla. This year marks the 20th anniversary of the GPS system achieving full operational capability.



SpaceX Still in Play

SpaceX is still eligible to compete for national security space missions even though one of its Falcon 9 rockets exploded on June 28, Space and Missile Systems Center boss Lt. Gen. Samuel A. Greaves told Reuters.

"SpaceX remains certified and can compete for the upcoming GPS III launch service," Greaves told the wire service.

The rocket was on a commercial mission carrying supplies to the International Space Station when it experienced an "anomaly," SpaceX officials said. According to SpaceX Chief Executive Officer Elon Musk, a support strut failed in the Falcon 9 and most likely triggered the explosion. SpaceX is also looking at other factors that may have caused the mishap.

The GPS III launch will be the first time United Launch Alliance will face competition for NSS missions since the Lockheed Martin and Boeing consortium was formed in 2006.

SpaceX was certified in May after a two-year review.

Ghostrider Grounded

The Air Force's prototype AC-130J Ghostrider gunship was grounded pending investigation of an in-flight incident that occurred during a test sortie from Eglin AFB, Fla., earlier this year, according to Air Force Materiel Command.

United Launch Alliance photo



C-123 Crews Cleared for Compensation

The Department of Veterans Affairs extended compensation coverage to airmen suffering certain conditions linked to repeated contact with contaminated C-123 Provider aircraft used to spray Agent Orange chemicals during Operation Ranch Hand in Vietnam, officials announced.

“Opening up eligibility for this deserving group of Air Force veterans and reservists is the right thing to do,” VA Secretary Robert A. McDonald said in a June release.

The decision follows a 2015 report by the Institute of Medicine detailing the health consequences of exposure to dioxin-tainted aircraft, even years after their use in Vietnam, according to the release. “We thank the IOM for its thorough review that provided the supporting evidence needed to ensure we can now fully compensate any former crew member who develops an Agent Orange-related disability,” McDonald said.

The inquest found that as many as 2,100 Active Duty and Air Force Reserve Command aircrew, maintainers, and aeromedical personnel could have been exposed to harmful chemicals.

AFRES personnel who served on the aircraft at Lockbourne/Rickenbacker ANGB, Ohio; Westover AFB, Mass.; Pittsburgh Arpt., Pa.; or Active Duty airmen who served on C-123s at several bases between 1969 and 1986 are encouraged to submit compensation claims, according to the VA.

—Aaron M. U. Church

Go Fly a Kite: A1C Jonathan Palacios-Conde and SrA. John Brown cover the engine of a KC-135 tanker at Al Udeid, Qatar, during a windstorm that had gusts of almost 60 mph. Sensitive aircraft engines must be protected from sand and debris and extreme conditions such as the heat that is common at locations in the Middle East.

The aircraft “returned to base and safely landed without further incident or any injuries to the crew” after the April 21 mishap, the command told *Air Force Magazine* in a statement.

AFMC officials on June 15 elevated the accident from a Class C mishap after “structural analysis suggested damage greater than the \$2 million monetary threshold for a Class A incident,” reads the statement.

The AC-130J prototype suffered a similar mishap when it departed controlled flight during handling trials in February, exceeding its structural limits and resulting in the addition of two months to flight testing.

Air Force Special Operations Command plans to purchase and convert 37 airframes to the AC-130J configuration as part of its \$2.4 billion program to replace the legacy AC-130U and AC-130W fleets.

Radar Appeal Quashed

The US federal claims court rejected Raytheon’s appeal of a May decision permitting the Air Force to reopen review of the Three-Dimensional Expeditionary Long-Range Radar system contract originally awarded to the company.

“Raytheon has not demonstrated either a likelihood of success or a substantial case on the merits of its appeal,” federal judge Margaret M. Sweeney concluded in a decision released June 18.

Raytheon initially won the 3DELRR contract to provide airborne and missile threat tracking in 2014. After protests

by competitors Lockheed Martin and Northrop Grumman, the Air Force moved to “correct” its decision, based on advice from the Government Accountability Office.

The GAO found that the Air Force “erred in its technical evaluation of Raytheon’s proposal and ... conducted unequal and misleading discussions regarding the parties’ cost/price proposals,” according to a court summary of the case.

Raytheon argued the original award was sound and that the Air Force’s “corrective action was arbitrary, capricious, and unreasonable,” based on the GAO’s faulty evaluation. The court decision clears the way for the Air Force to reconsider competing bids.

KC-46 Blooms a Boom

A KC-46A Pegasus test airframe flew in the tanker configuration for the first time on a certification flight June 2, manufacturer Boeing announced. Provisioned 767-2C test airframe EMD-1 took off with both the KC-46’s planned flying boom and twin, wing-tip mounted refueling pods to check the configuration’s airworthiness, according to the company.

The first full-up KC-46 Pegasus tanker (EMD-2) is slated to fly for the first time later this summer, according to Boeing. The company is using four test aircraft—two provisioned 767-2C freighters and, later, two KC-46A tankers—to attain FAA and Air Force certification.

A provisioned airframe flew the program’s maiden flight from Paine Field in Everett, Wash., last December. The Air

Pull it Apart, Put it Together: SrA. Clint White, an F-16 maintainer with the 455th Expeditionary Aircraft Maintenance Squadron, takes apart a jet during a phase inspection July 7 at Bagram Airfield, Afghanistan. Inspectors had been at Bagram for more than two months, performing phase inspections on aircraft that have reached 400 flying hours.

Broken Treaties, Closing Skies

Russia is violating provisions of the Open Skies treaty by barring Air Force OC-135s from observing key strategic areas, according to the State Department’s 2015 arms control treaty compliance report, released on June 5.

“We have been unable to conduct overflights of either Russia or Ukraine near their shared international border” since the shoot-down of a civilian airliner in the area last year, arms control and international security undersecretary Rose E. Gottemoeller said in a June 10 speech.

Russia is also blocking access to parts of Kaliningrad (its strategic military enclave wedged between NATO allies Poland and Lithuania), Russian-occupied portions of Georgia, and the conflict zone in Chechnya.

“The United States continued to oppose any airspace restriction inhibiting an observing party’s right” under the treaty, and both the US and Poland formerly raised the issue with Russia, the document states.

“Russia has veered off course. We call on Russia to join us in improving security in Europe and to return to full implementation” of Open Skies, Gottemoeller said, addressing the Open Skies treaty review conference in Vienna.

The US cited Russia for violating the Intermediate Nuclear Forces treaty banning mid-range nuclear missiles, last year, and Russia has long been in breach of a conventional arms agreement.

—Aaron M. U. Church



USAF photo by SrA. Cierra Presentado

Force is planning to purchase 179 new tankers, with 18 airframes slated for delivery over the next two years.

Rude Awakening

The Air Force will activate the 34th Fighter Squadron at Hill AFB, Utah, as part of the base's transition from F-16 to F-35A operations, according to a base news release.

The unit, known as the "Rude Rams," stood down in summer 2010 as part of an Air Force-wide restructuring effort that saw Hill lose 24 of its F-16s, leaving a force of 48 fighters there. Now, with plans to establish the Air Force's first F-35A operational location at Hill with 72 combat-ready jets, the 34th FS is returning.

The squadron will be one of three Active Duty units, along with the 4th FS and 421st FS, within the 388th Fighter Wing that will fly F-35As with the support of members of Air Force Reserve Command's 419th FW.

Hill is scheduled to receive its first F-35A in September and have 15 jets on hand by August 2016 when the Air Force aims to commence F-35A operations.

Lakenheath's Everywhere Eagles

Eagles and Strike Eagles from RAF Lakenheath, UK, fanned out on training exercises in southern Europe while the base's runway was under repair in June.

Fifteen F-15Es and 300 airmen from the 492nd Fighter Squadron relocated to Aviano AB, Italy, for two weeks of dissimilar air combat training with resident F-16s. "Different aircraft allow both crews to accomplish training missions that typically wouldn't happen," 492nd FS Operations Director Maj. Timothy Dowling said in a release.

Meanwhile, a dozen F-15C/Ds and 250 pilots, maintainers, and support personnel from Lakenheath's 493rd FS took part in Exercise Anatolian Eagle at Konya AB, Turkey, officials announced.

"Anatolian Eagle is a great opportunity for our aircrews to hone their operational skills from a forward operating location," 493rd FS Commander Lt. Col. John Stratton said.

NATO aircraft from Germany, Spain, Turkey, United Kingdom, and Pakistan took part in the June exercise.

Iraqi F-16 Crashes in Arizona

An Iraqi Air Force F-16 assigned to the Arizona National Guard's 162nd Fighter Wing for foreign pilot training crashed during a night training sortie near Douglas, Ariz., on the state's southern border, *The Arizona Republic* reported. The sole pilot, Brig. Gen. Rasid Mohammed Sadiq Hasan, was killed.

The jet went down approximately five miles from the small Douglas Municipal Airport near the US-Mexican border at 8 p.m. local time, June 25, according to an ANG news release.

Emergency responders controlled a brush fire started by the crash, according to the *Republic*.

The aircraft was reportedly a Block 52 F-16D—the first delivered to Iraq.

Iraq ordered 36 F-16C/Ds. The cause of the incident is under investigation.

Bomber Bustle

Air Force Global Strike Command B-2 and B-52 bombers staged deterrent operations from RAF Fairford, UK, supporting NATO and US Strategic Command exercises in the region in June.

The B-2s conducted hot-pit refueling and crew changes, demonstrating rapid regeneration from a forward location on their brief stopover at Fairford on June 7. Three B-52s from Minot AFB, N.D., simultaneously operated from Fairford for exercises Baltops and Saber Strike, officials stated.

The 5th Bomb Wing B-52s were originally slated to fly nonstop sorties from the United States to take part in a scenario off the Swedish coast during Baltops. The bombers expanded

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The War on Terrorism

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

Casualties

As of July 17, three Americans had died in Operation Freedom's Sentinel in Afghanistan and seven Americans had died in Operation Inherent Resolve in Iraq and Syria.

The total includes nine troops and one Department of Defense civilian. Of these deaths, two were killed in action with the enemy while eight died in noncombat incidents.

There have been 33 troops wounded in action during OFS and one in OIR.

Troop Swell for Iraq

President Obama authorized up to 450 additional US military personnel to train, advise, and assist Iraq security forces at Taqaddum military base in Anbar province, the White House announced June 10.

"These new advisors will work to build [the] capacity of Iraqi forces, including local tribal fighters, to improve their ability to plan, lead, and conduct operations against [ISIS] in eastern Anbar under the command of the Prime Minister," according to the statement.

The training site will complement the four previously established sites in al-Asad, Besmaya, Erbil, and Taji, where some 9,000 Iraqi troops have already been trained and another 3,000 are currently in training.

"These additional troops will not serve in a combat role and will augment the 3,100 US troops who have already deployed to Iraq."

The Pentagon emphasized the "decision does not represent a change in mission," but will enable Iraqi forces "to better defend its citizens and retake its territory" from ISIS, according to a June 10 Defense Department statement.

The President asked military leaders to examine areas that have been successful and those that "may have been moving at a pace that's late-to-need or where certain units have not stood and fought," said Army Gen. Martin E. Dempsey, Chairman of the Joint Chiefs, referencing the recent fall of Ramadi, where many Iraqis left the city without a fight despite outnumbering ISIS forces.

JSTARS Does it Again

E-8C JSTARS, staging from Al Udeid AB, Qatar, recently surpassed 100,000 flying hours in direct support of US Central Command operations. "The tasking in the CENTCOM theater during the last 13 years is a clear indication of the value and capabilities that the E-8C brings to the manned command and control, battle management, intelligence, reconnaissance, and surveillance mission," said Col. Kevin D. Clotfelter, Georgia Air National Guard 116th Air Control Wing commander, in a June 2 news release.

Members of the ANG's 116th ACW and the Active Duty 461st ACW from Robins AFB, Ga., as well as the Army JSTARS 138th Military Intelligence Company, amassed the flying hours over six CENTCOM operations—Southern Watch, Enduring Freedom, Iraqi Freedom, New Dawn, Inherent Resolve, and Freedom's Sentinel—according to the news release.

JSTARS clocked 100,000 post-9/11 combat flying hours in all theaters last May.

Predators Down

An MQ-1 Predator remotely piloted aircraft crashed in southeastern Iraq on June 22 during a combat air patrol, announced Air Forces Central Command. The incident was "not due to enemy fire," according to AFCENT's press release.

Controllers lost "positive control" of the RPA during a sortie supporting anti-ISIS operations, and the aircraft hit the ground at approximately 8:30 a.m. local time, without injuring civilians or damaging property, AFCENT stated.

The Air Force also confirmed in June that an MQ-1 Predator lost over Syria in March was indeed shot down by Syrian forces.

The shutdown was the first reported RPA loss during Operation Inherent Resolve and possibly the first time Syrian air defenses have been activated against coalition aircraft since the operation began.

the mission to fly ground-support training over Estonia, Latvia, Lithuania, and Poland as part of the US Army in Europe-led Saber Strike exercise that ran through June 19.

"This deployment to RAF Fairford was specifically designed ... to ensure maximum opportunities to synchronize and integrate our bomber capabilities with [allied] military assets," explained Adm. Cecil D. Haney, STRATCOM commander.

Stressed, But not Broken

Lockheed Martin completed 25,000 simulated flight hours on an F-16C Block 50 aircraft as part of its full-scale durability test designed to stress the aircraft to identify potential fatigue issues, according to a June 11 company press release.

The F-16 fleet was designed to hold up under heavy stress for 8,000 equivalent flight hours, but the FSDT results will be used to "design and verify" a service life extension program that will extend the service life of up to 300 F-16C/D Block 40-50 aircraft to 12,000 EFH, until USAF's F-35 strike fighters come online.

"This testing milestone clearly demonstrates that F-16s with SLEP modification can be safely operated longer than

By the Numbers

\$808 Million

Boeing's cost overage on the KC-46A tanker program, as of mid-July, bringing the total cost of the fixed-price program near USAF estimates. Boeing must pay the cost overruns.

Senior Staff Changes

RETIREMENTS: Lt. Gen. Ronnie D. **Hawkins Jr.**, Lt. Gen. Bruce A. **Litchfield**.

NOMINATIONS: To be Lieutenant General: David J. **Buck**. **To be Brigadier General:** Christopher P. **Azzano**, Paul E. **Bauman**. **To be ANG Brigadier General:** Howard P. **Purcell**, Frank H. **Stokes**, Thomas K. **Wark**. **To be AFRC Major General:** Randall R. **Ball**.

CHANGES: Lt. Gen. (sel.) David J. **Buck**, from Vice Cmdr., AFSPC, Peterson AFB, Colo., to Cmdr., 14th AF (Air Forces Strat.), AFSPC, Vandenberg AFB, Calif. ... Maj. Gen. Mark C. **Dillon**, from DCS, United Nations Command & US Forces Korea, Yongsan Army Garrison, South Korea, to Vice Cmdr., PACAF, JB Pearl Harbor-Hickam, Hawaii ... Lt. Gen. Russell J. **Handy**, from Cmdr., Alaskan Command, PACOM, JB Elmendorf-Richardson, Alaska, to Cmdr., Alaskan Command, NORTHCOM, JB Elmendorf-Richardson, Alaska ... Brig. Gen. David S. **Nahom**, from Dir., Regional Affairs, Office of Dep. Undersecretary, Intl. Affairs, Office of Undersecretary of the AF, Pentagon, to Dep. Dir., P&P, ACC, JB Langley-Eustis, Va. ... Brig. Gen. Mary F. **O'Brien**, from Spec. Asst. to the DCS, Intel., Surveillance, & Recon, USAF, Pentagon, to Dir., Intel., CYBERCOM, Fort Meade, Md. ... Lt. Gen. John W. **Raymond**, from Cmdr., 14th AF (Air Forces Strat.), AFSPC, Vandenberg AFB, Calif., to DCS, Ops., USAF, Pentagon ... Brig. Gen. Lenny J. **Richoux**, from Dir., AF Colonel Mgmt. Office, DCS, Manpower, Personnel, & Svcs., USAF, Pentagon, to Dir., Svcs., DCS, Manpower, Personnel, & Svcs., USAF, Pentagon ... Maj. Gen. (sel.) James C. **Slife**, from Dep. Dir., Strategy, Plans, & Policy, CENTCOM, MacDill AFB, Fla., to DCS, United Nations Command and US Forces Korea, Yongsan Army Garrison, South Korea ... Brig. Gen. Jeffrey B. **Taliaferro**, from Dep. Dir., P&P, ACC, JB Langley-Eustis, Va., to Dir., Plans,

Prgms., & Rqmts., ACC, JB Langley-Eustis, Va. ... Brig. Gen. Billy D. **Thompson**, from Chief, AF Senate Liaison Office, Office of the LL, OSAF, Pentagon, to Dir., Regional Affairs, Office of Dep. Undersecretary of the AF, Intl. Affairs, Office of the Undersecretary of the AF, Pentagon ... Lt. Gen. Tod D. **Wolters**, from DCS, Ops., P&R, USAF, Pentagon, to Dir., Ops., Jt. Staff, Pentagon.

COMMAND CHIEF CHANGE: CMSgt., Patrick F. **McMahon**, from Command Chief, 14th AF, AFSPC, Vandenberg AFB, Calif., to Command Chief, AFSPC, Peterson AFB, Colo.

SENIOR EXECUTIVE SERVICE CHANGES: Winston A. **Beauchamp**, to Dep. Undersecretary of the AF (Space), Pentagon ... Steven A. **Contrell**, to Dir., Civil Aviation Intel. Analysis Center, DCS, Intel., Surveillance, & Recon, JB Anacostia-Bolling, D.C. ... Paul F. **Freisthler**, to Sr. Intel. Engineer/Scientist, Natl. Air & Space Intel. Center, Wright-Patterson AFB, Ohio ... Carolyn M. **Gleason**, to Assoc. Dep. Asst. Secy., Budget, Office of the Asst. SECAF, Financial Mgmt. & Comptroller, Pentagon ... Richard K. **Hartley**, to Principal Dep. Asst. SECAF, Instl., Env., & Energy, Pentagon ... Laura N. **Jankovich**, to Asst. Auditor General, Field Offices Directorate, Office of the Auditor General of the AF, Pentagon ... Richard **Linderman**, to Dep. Dir., Info. Sys. & Cybersecurity, DASD for Research, USD, Acq., Tech., & Log., Alexandria, Va. ... Michael F. **Logrande**, to Dep. Dir., AF Review Boards Agency, JB Andrews, Md. ... Rodney L. **Miller**, to Chief Scientist, AFGSC, Barksdale AFB, La. ... Judith B. **Oliva**, to Dir., Financial Mgmt., AF Sustainment Center, AFMC, Tinker AFB, Okla. ... Philip L. **Ritcheson**, to Dep. Dir., Intl. Affairs, Natl. Geospatial-Intel. Agency, Springfield, Va. ... Pamela C. **Schwenke**, to Assoc. Dep. Asst. Secy. (Prgms.), Office of the Asst. SECAF, Financial Mgmt. & Comptroller, Pentagon. ★

USAF photo by A1C Delano, Scott



Baby, You're a Firework: Festive fireworks light up the sky July 2 behind a C-130 Hercules at Yokota AB, Japan, during Celebrate America, an annual event that provides US military members and their families at the base an opportunity to enjoy games, food, and music in recognition of America's Independence Day. Events included a 5K run, a cake and pie contest, go-carts, a petting zoo, a water balloon toss, a scavenger hunt, a three-point basket ball shootout, and "goofy golf." The event is sponsored by the 374th Force Support Squadron.

Strategy on the Eroding Edge

The Defense Department's 2015 National Military Strategy calls for "greater agility, innovation, and integration," while also acknowledging that the United States' "comparative military advantage has begun to erode."

In the first such strategy released since 2011, Chairman of the Joint Chiefs of Staff Army Gen. Martin E. Dempsey wrote in the intro that "today's global security environment is the most unpredictable I have seen in 40 years of service."

The United States now faces "multiple, simultaneous security challenges from traditional state actors" and nonstate actors—"all taking advantage of rapid technological change," added Dempsey. "Future conflicts will come more rapidly, last longer, and take place on a much more technically challenging battlefield."

In addition, such conflicts will "have increasing implications to the US homeland," wrote Dempsey.

The strategy notes Russia's continued disrespect for the "sovereignty of its neighbors" and its willingness to "use force to achieve its goals." It acknowledges the "strategic challenges" Iran's nuclear ambitions pose to the international community and calls the country a "state-sponsor of terrorism that has undermined stability" in "Israel, Lebanon, Iraq, Syria, and Yemen."

North Korea's pursuit of nuclear weapons also threatens its neighbors, specifically Japan and the Republic of Korea.

While the US supports "China's rise," the report highlights the regional tensions created by its actions in the South China Sea.

—Amy McCullough

Russian Fighters Forward

The Russian air force is negotiating an agreement with Belarus to establish a forward fighter base there to counter increased NATO fighter rotations to neighboring Poland and the Baltic States, state-run TASS Russian News Agency reported.

Russia deployed six Su-27s just across the border from US F-15s and F-16s in Poland and Lithuania last March, and Russian air force chief Col. Gen. Viktor Bondarev earlier announced plans to permanently base Su-27s in central Belarus as early as 2016, according to the report.

Belarusian Defense Minister Lt. Gen. Andrei Ravkov said the timing and location are still under discussion, but the country is "ready to undertake all necessary measures" to host a Russian air force presence, according to TASS.

"Belarus cannot ignore changes in the military-political situation in the region that bear additional risks," Ravkov said.

Valor From the Flames

French Defense Minister Jean-Yves Le Drian presented USAF SSgt. Gregory Swarz the Legion d'Honneur medal, honoring Swarz for risking his life to save three French airmen during a deadly aircraft accident in Spain in January.

"He did not hesitate to throw himself in the flames to save his comrades," said Le Drian during the award presentation at the Paris Air Show on June 15.

Swarz dragged the airmen from the flames after a Greek F-16 crashed into several parked aircraft during a NATO training event at Los Llanos AB, Spain, on Jan. 26.

"It's human nature. There [are] people suffering, you've got to do as much as you can," said Swarz. "I saw some stuff that shouldn't really be talked about. Some pretty horrific things," he said.

Swarz is an aircraft electrical technician assigned to the 48th Fighter Wing at RAF Lakenheath, UK. He received the Airman's Medal earlier this year for his bravery. ★

anyone previously thought possible," said Rod McLean, vice president and general manager of the F-16/F-22 Integrated Fighter Group at Lockheed Martin.

Lightning Strikes Twice

The 62nd Fighter Squadron transitioned from the F-16 to the F-35A, becoming the second Lightning II pilot training squadron at Luke AFB, Ariz., in a ceremony there in June.

"As we open this new chapter in our squadron's history, we will focus our efforts on what we've been doing for three generations—training and delivering combat airpower," said the incoming 62nd FS commander, Lt. Col. Gregory Frana, during the June 5 transition ceremony.

Luke stood up the 61st FS as the first of six F-35 training squadrons in October 2013. The 62nd FS was slated to begin receiving F-35s in July and will eventually host US, Italian, and Norwegian conversion training.

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Hanging by a Helmet

LE BOURGET, FRANCE—The Air Force anticipates declaring initial operational capability on the F-35A between August and November 2016, Lockheed's F-35 executive vice president told reporters during the Paris Air Show.

The 3I software block for the first operational F-35A next year has the same capabilities as the Marine Corps' Block 2B, but with two differences: an upgraded processor and the "Gen 3" helmet, said F-35 General Manager and Executive Vice President Lorraine M. Martin.

"The Air Force has said it wants to go to IOC with the new helmet," she said. To make sure 3I is ready, Lockheed Martin will take 12 USAF aircraft and ensure they are configured correctly with USAF-specific modification, she said.

The company also has some "enhancements" it wants to make to the Autonomic Logistics Information System (ALIS) for the F-35A, per USAF request, to ensure data can be distributed across multiple bases.

The F-35A mods are less intensive than the USMC F-35B changes, since some of the Air Force's airframes came off the production line in Fort Worth, Texas, more recently, giving the company time to make most of the changes while the aircraft were still on the line.

The pilot and maintainer training rate must also spool up, Martin said, as the first aircraft delivery to Hill AFB, Utah, is anticipated by the end of this year.

—Marc V. Schanz

The Air Force wants to bolster its permanent presence on Guam in an effort to improve its continuous bomber presence mission. Bombers—mostly B-52s from Minot AFB, N.D., and Barksdale AFB, La.—have been rotating to Guam since 2004 as part of USAF’s strategic deterrence mission, serving as a visible reminder to allies, partners, and adversaries that the United States is committed to the region and ready to act on a moment’s notice if the need arises.

“Any time we send out bombers anywhere in the world people pay attention,” Air Force Global Strike Command boss Lt. Gen. Stephen W. “Seve” Wilson told reporters in January.

CBP provides “great training for our crews,” he continued. “I haven’t flown a 47-hour mission, I’ve only flown upper-20-hour missions. Those are hard, ... so the experiences we gain for those crews are all very beneficial. Not to mention

interoperability and the training with partners.”

Depending on how they are loaded, B-52s can fly about 8,000 miles without refueling, offering a persistent, long-range strike capability to the nation. However, being forward deployed to Guam significantly expands sortie time and limits stress on the crews and aircraft, said Lt. Col. Scott Maytan, commander of the 20th Expeditionary Bomb Squadron at Andersen.

From Maytan’s home station at Barksdale, it is a 16-hour sortie to Guam. But once at Andersen, the bombers are just four hours to northeast Asia, five hours to the South China Sea, and about seven hours to Hawaii.

“It’s surprising at home in the [continental United States] how much time we can spend just training with ourselves. We all get in our scheduling ruts. ... You get focused on your training proficiencies that you need to get done and all of a sud-

den you’re doing everything in-house,” said Maytan. “You come up to Guam and for the B-52 it’s exciting because it kind of forces us to do integration,” he said during an *Air Force Magazine* visit to Andersen this spring.

“Any football team has to be able to win on the road,” Maytan continued. “It’s a different airfield, different dimensions, different parking plans, different weather patterns. ... It’s good exposure for my crew.”

It takes a lot of manpower to bring six B-52s—the typical CBP rotation—to Guam, though, and to keep the aircraft operating once in theater. In April there were more than 320 personnel, deployed from Barksdale. Of those, nearly 250 were maintainers.

There are just three people permanently assigned to the expeditionary maintenance squadron at Andersen: a squadron commander, a superintendent, and a “port guy,” said Lt. Col. William



Bombers on Guam

By Amy McCullough, News Editor

The continuous bomber presence is a visible show of USAF’s commitment to Pacific security.

Bradley, deputy commander of the 36th Maintenance Group. Their job is primarily to take the rotating aircraft maintenance units under their wing, he said.

NO STONE UNTURNED

When AFGSC broadened its grassroots Force Improvement Program from the ICBM to the bomber community, one of the recommendations that came back was to increase permanent party personnel at Guam to smooth the constant rotations of airmen and iron, said Bradley.

As a result the command sent a three-person Tiger Team to Andersen the first week of November 2014. It was specifically tasked with determining what a detachment could and would look like if established, said Maj. Michelle Willison, the Tiger Team lead.

The team left virtually no stone unturned, taking notes and interviewing just about every airman associated with the mission. The general takeaway was

that “if we had a little more continuity, it would make us all a little better,” said Maytan.

Commanders and base leaders interviewed by the team acknowledged that “for many, many years Guam was a sleepy hollow,” but they also said “that’s no longer the case,” said Willison. In addition to smaller monthly exercises, Andersen hosts Cope North each year and Valiant Shield biennially—both exercises that continue to grow.

The two-week joint and multilateral Exercise Cope North 15 was the largest ever, involving some 2,340 participants, including B-52 crews. Along with US airmen, military personnel from Australia, Japan, New Zealand, the Philippines, and South Korea all took part. Singapore and Vietnam sent observers from their air forces. Pilots flew more than 1,450 missions and delivered nearly 100 weapons.

Valiant Shield 2014—a nine-day air, land, and sea exercise—brought together

more than 18,000 service members, 200 aircraft, and 19 ships, said Col. Reid M. Langdon, commander of the 36th Operations Group at Andersen.

“I watched a C-17, Global Hawk, P-3, P-8, and B-52 all take off within a week or two of each other,” Langdon told *Air Force Magazine*. “Two times a year, this place is just packed.”

However, the increased operational tempo can be taxing on Andersen maintainers, who are supporting CBP as well as all the other aircraft operating from the base. “They are just stretched so thin,” said Willison.

As of early June, the Air Force was still trying to figure out exactly how this new permanent presence would work. Wilson said AFGSC proposed a detachment of 30 to 34 Active Duty personnel who would deploy to Andersen for three years if accompanied by dependents, or two years if not. Lt. Col. Michael Pritchett, who has been tapped to lead the detachment,



B-52s deployed from Barksdale AFB, La., on the flight line at Andersen AFB, Guam, as part of the Air Force’s continuous bomber presence.

A B-52 assigned to Andersen approaches a KC-135, also based on Guam, for fuel over the Pacific.

said Det. 4 would comprise eight officers, including himself, and between 22 and 28 enlisted airmen.

Maintainers will make up “roughly half of the permanently assigned personnel,” said Wilson. Many will be “aircrew ground equipment” airmen, added Pritchett, who currently serves as the deputy chief of the combat operations division at the 608th Air Operations Center at Offutt AFB, Neb.

On the operations side, AFGSC is looking to “include mission planners, combat crew communications, a flight safety officer, a standardization and evaluation officer, and a [survival, evasion, resistance, and escape] specialist,” said Wilson.

Pritchett and the Det. 4 superintendent will deploy to Andersen in September, while the rest of the personnel are slated to begin rolling in between November and December, said officials. “Once all of the personnel are in place, we would declare full operational capability three to four months later,” said Wilson.

But finding the right people is not an easy job. For starters, both resourcing and implementation must cross major commands. Though AFGSC has the lead in the effort, the command is working closely with Pacific Air Forces. Maytan

said the crossover is “surmountable,” but it does complicate things.

“It’s not [just] a Global Strike problem. It’s not a PACAF problem,” he said. “They both have similar but different goals at the end of it, so all that needs to be worked through to make sure we do this smartly.”

As of mid-June, a memorandum of understanding between AFGSC and Pacific Air Forces was still awaiting PACAF Commander Gen. Lori J. Robinson’s signature, but officials said they expected the document to be signed “soon.”

“In our construct, the activities and work of the AFGSC detachment would be synchronized and done in close coordination with the 36th Wing at Andersen Air Force Base, with their primary focus being support ... for the continuous bomber presence mission,” said Wilson in June. “Administrative-type actions and funding would be accomplished through reachback to AFGSC through 8th Air Force.”

CRAFTING AGREEMENTS

Because Andersen is a joint base, Wilson said there also will need to be “a variety of agreements between Air Force and Navy entities” to support the detachment, though in June it was still too

early to know exactly what agreements were necessary.

Brig. Gen. Steven L. Basham, at the time director of strategy, plans, and programs at PACAF headquarters at JB Pearl Harbor-Hickam, Hawaii, said a permanent CBP on Guam makes sense because there’s a “continual need for individuals doing the same thing” at Andersen, no matter which bomber units go through.

The permanently assigned personnel will not only alleviate some of the stress on airmen at Andersen, but also at the bomb squadrons back in the continental United States. This is because fewer airmen will be required to deploy, “allowing more time between deployments” for some of the career fields, said Wilson.

The bomb wings at Minot and Barksdale take turns rotating to Guam every other year. Although that will not change, the deployment sizes will decrease once the detachment is activated. The exact

A B-52 lands at RAAF Darwin, Australia, in December 2014. There aren’t a lot of places in the Pacific region that can accommodate the massive bombers, so Australia is a particularly important partner for USAF’s deployed presence.



RAAF photo by ABIS Nicolas Gonzalez

numbers are still being worked out, but officials said they expect 14 fewer maintainers and about 11 fewer operators to deploy per CBP rotation once the detachment stands up.

“Additionally, the detachment would enable a force improvement quality-of-life initiative for our airmen, by opening an overseas assignment location, which is generally not available for B-52 maintainers,” added Wilson.

Maj. Andrew Marshall, a B-52 radar navigator and Air Force Reservist assigned to the 20th EBS, has deployed to Guam eight times, as both an enlisted airman and an officer. Since his first rotation in 2003, he has had a front row seat to the evolving mission.



Staff photo by Amy McCullough



USAF photo by SrA. Benjamin Wiseman

Above: With help from SrA. Sean Beres and SSGt. Albert Tolbert, SrA. Cedric Gaines packs the drag chute back into a B-52 after it lands at Andersen. Here: Airmen deployed to Guam from Minot AFB, N.D., prepare a training AGM-86C CALCM for loading onto a B-52. All expeditionary weapons troops must pass a load inspection within 10 days of arriving on the island. Some bombers are kept at a higher rate of readiness than when they are at a CONUS base.

“Obviously when you start something up you are just figuring things out. ... We’ve always been capable of performing the mission” from Guam, he said. “Coming out here [provides] more training opportunities. We’re a little closer to our allies. The assurance [and] deterrence—it’s more visible here.”

Maytan said the continuous bomber presence mission makes bomber crews a “sharper team.” With tensions boiling in the South China Sea and Russia flying its own bombers off the coast of Guam, the potential for miscalculations and

escalation is a real threat in the region. Andersen’s strategic location and the “messaging piece” of the CBP mission means deployed bombers have to be ready to go at a moment’s notice, so “at least some subset” of the deployed B-52 fleet is kept in a slightly different state of readiness on Guam than they are back home, he stated.

For example, the amount of fuel in a parked bomber might be different on Guam than at Barksdale and the aircraft might have different weapons racks loaded while deployed, said Maytan.

“Nothing amazing or super secret. We’re just two or three steps [closer] to being ready for an operational mission,” he explained. Those may be “steps we would keep off the list at home because it’s more focused on the local flying training.”

Guam is a small island surrounded by a massive body of water, so the training environment “is a little less forgiving. It raises our game and our discipline,” said Maytan.

A typical mission from Barksdale might include a four- or five-hour flight



Maintainers work on a B-2 bomber at Andersen in 2014. In that year, some 200 airmen deployed to the island to support three B-2s deployed there.

to a training range in Texas, followed by a short hop to Oklahoma where a bomber would refuel before heading back to Louisiana. The difference is at home there are plenty of bases where a B-52 can land if anything were to go wrong during the mission. That's not the case in the Pacific.

"If I want to fly four to five hours in the South China Sea, I'm going to fly four to five hours back. It's all water; there's not a lot of places to land," Maytan pointed out.

In November 2013, shortly after China declared an air defense identification zone over a large swath of the East China Sea, the United States sent two unarmed B-52s from Andersen through China's ADIZ. A Pentagon spokesman at the time described the sorties as "uneventful," saying they were part of previously scheduled training, but the mission sent a powerful message.

Air Force officials said the creation of the ADIZ did not alter CBP operations in any way. Bomber crews continue to file an international flight plan and fly through the area even today.

"It's public domain. There are clear-cut laws as far as what constitutes national air space. ... We're not violating any rules. We go out and do our thing just like we've always done it," said Marshall.

"We're here to assure our allies, that it's business as usual. ... You kind of want to be a role model [for America's

allies]. That's the way I look at it," Marshall said.

Training with allies and partners is a big part of the CBP, and Australia is playing a growing role in that mission.

In December 2014, a B-52 redeployed from Andersen to RAAF Darwin, Australia, for a joint training exercise with the Royal Australian Air Force. While there, the B-52 simulated strike mis-

sions over the nearby Delamere Training Range in Australia's Northern Territory and practiced intercepts with Australian F-18 fighters from neighboring RAAF Tindal, according to a PACAF release. It noted that the purpose of the event was "to highlight the intent for increased US Air Force training with the RAAF." The exercise marked the fourth time a US bomber landed at Darwin since 2012.

USAF photo by SrA. Benjamin Wiseman



This year, two B-52Hs flew from Andersen to Australia to participate in the Avalon Air Show. Officials declined to talk about future operations, but all said it's safe to assume that B-52s will continue to operate out of Australia.

"There are only so many places that are well-suited to land a B-52 because of our size and the dimensions," noted Maytan. Around the Pacific, Hawaii, Alaska, and Darwin, Australia, are among those locations.

Brig. Gen. Jeffrey McDaniels, director of air and cyberspace operations at PACAF headquarters, said bombers are often viewed as "one-dimensional," and though they "are very good at going to blow things up" in the Middle East and South Asia, in the Pacific region they haven't actually dropped a bomb, other than for training, since Vietnam.

ALLIED TRAINING

In the Pacific bombers are used mostly for deterrence, helping to maintain peace and stability in the region, he said. Through the CBP mission, the B-52s also are used for nation-to-nation engagements, one of PACAF's top priorities.

"We have five allies out here and lots of partners. Our goal would be to get along with everybody, they get along with us, and they get along with each other," said McDaniels. "We can use CBP for that on a peaceful positive approach that keeps us away from the bad things bombers have to do."

He said that in addition to the Avalon Air Show, B-52s attended an air show in Malaysia, and also in April, a B-52



Lt. Col. Scott Maytan, 20th Bomb Squadron commander, briefs aircrews before a mission from Barksdale AFB, La. It is a 16-hour flight from the squadron's home base to Andersen on Guam.

operating from Andersen flew around Japan, allowing the Japanese "to do intercepts on us for their proficiency" purposes.

Although B-52s are most often associated with the Air Force's continuous bomber presence mission, there have been limited B-1 and B-2 deployments to Andersen over the last 11 years. In 2013, then-Deputy Defense Secretary Ashton B. Carter said, "Our ability to strengthen the ongoing continuous bomber presence missions in the region will ... benefit from [a] reduced presence in Afghanistan," stating that "more B-1 [bombers] will become available" to augment the B-52s.

Three B-2s and some 200 airmen from the 509th Bomb Wing at Whiteman AFB, Mo., deployed to Andersen in 2014 as part of the CBP rotation. Prior to that, however, the last extended B-2 deployment to Guam took place in 2012.

Langdon said having multiple bomber variants operate out of Andersen sends a "different strategic deterrent message" and shows the US is "fully committed." Both he and Basham said they think the B-1 and/or B-2 could play a larger role in CBP one day, but that's not likely to happen anytime soon considering the current air campaign against ISIS terrorists in Iraq and Syria.

Wilson said AFGSC has no plans to integrate the B-1 into CBP even after the bombers transition from Air Combat Command to Global Strike this fall. Though he said, "there are synergies to be gained" by the move, there won't be any impact on the continuous bomber presence mission. There also are "no plans to include B-2s into the CBP rotation at Guam," though Wilson remarked that "B-2s do regularly support [US Pacific Command] exercises in the AOR."

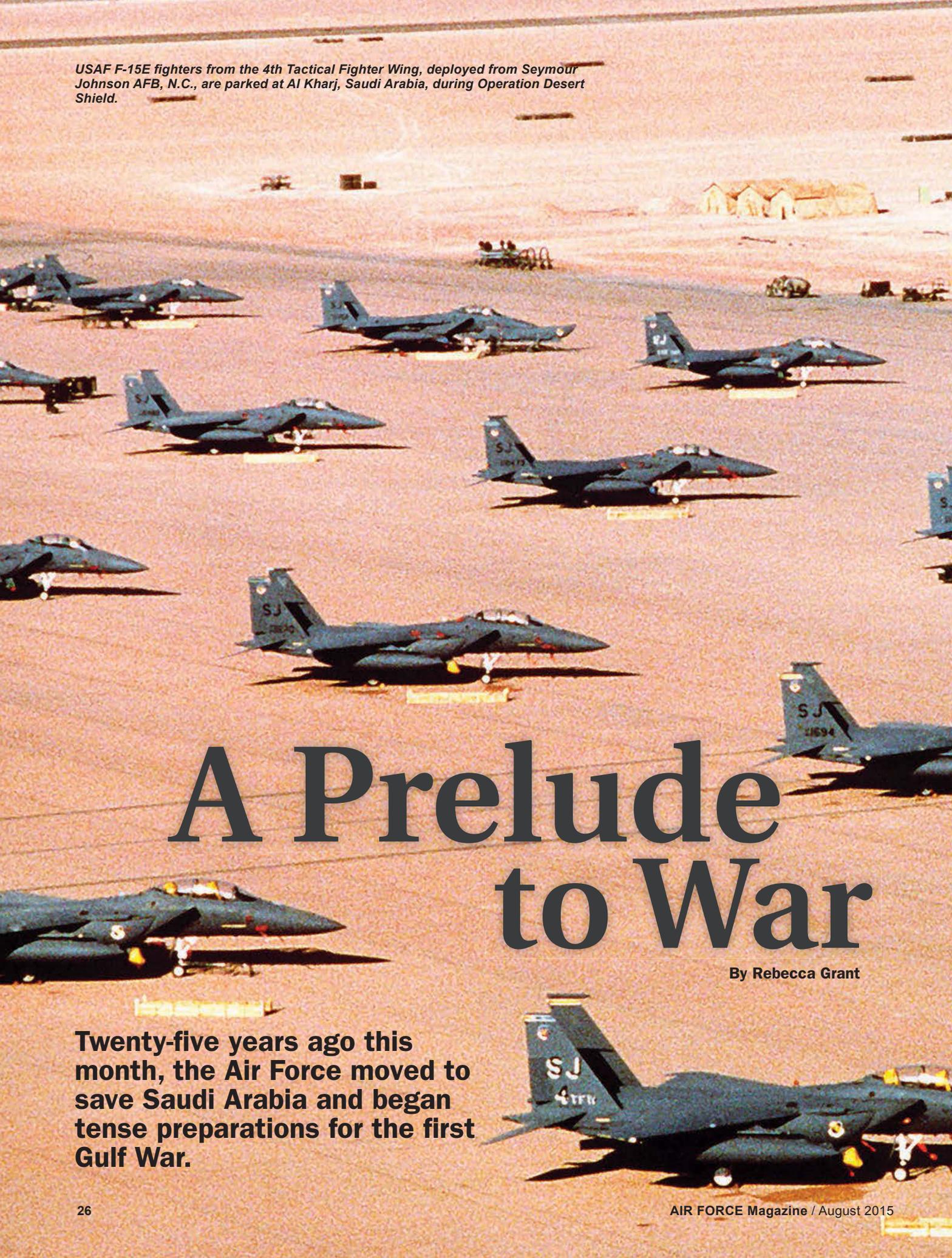
Marshall said that bomber diplomacy—a term often associated with CBP—has been a big part of the Air Force's mission since its inception, and that probably won't change anytime soon.

"Think about it. When you say, 'I can be anywhere in the world and I can hold anybody at bay, that I represent ... America, and we're here for our friends—we've done that since World War I and we'll continue to do that.'"



The bombers are carefully maintained at Andersen for maximum readiness. Here, the interior and exterior of a B-52 gets cleaned before it returns to flying operations.

USAF F-15E fighters from the 4th Tactical Fighter Wing, deployed from Seymour Johnson AFB, N.C., are parked at Al Kharj, Saudi Arabia, during Operation Desert Shield.



A Prelude to War

By Rebecca Grant

Twenty-five years ago this month, the Air Force moved to save Saudi Arabia and began tense preparations for the first Gulf War.



At 2 a.m. local time on Aug. 2, 1990, Lt. Gen. Ayad Futayih al-Rawi ordered the Hammurabi Armored Division and the Tawakalna Mechanized Division of Iraq's Republican Guard Forces Command to seize Kuwait. The first of 1,000 Soviet-built Iraqi tanks reached Kuwait City at 5 a.m. and occupied the city that evening.

"I knew the Iraqis could overrun the Saudi oil region in a week," said Gen. H. Norman Schwarzkopf Jr., United States Army, who was commander, United States Central Command at MacDill AFB, Fla.

The invasion, sparked by spats between the region's oil-producing nations and triggered by Iraq's near-bankruptcy, redefined US geopolitics and American airpower for a generation. But in the summer of 1990, what to do about the problem in the faraway desert was far from certain.

Brazen conquest of a sovereign, oil-rich nation was not the foundation for a new world order. "I had decided in my own mind in the first hours that the Iraqi aggression could not be tolerated," said President George H. W. Bush.

"This was clearly an airpower situation," thought Col. John A. Warden III.

"Schwarzkopf depended on airpower as the essential shield for the buildup of forces necessary to defend the Arabian peninsula," historians Thomas A. Keaney and Eliot A. Cohen wrote in their *Gulf War Air Power Survey* in 1993.

But airpower had to shake off its doctrinal supporting role for the United States to step up to the challenge of Iraq in this new world order.

From August through October, the work of a disparate group of airmen in key senior positions would convince Schwarzkopf and Bush that airpower could be the centerpiece of a joint campaign. Most were fighter pilots with Vietnam service. Their collective efforts—even when at cross-purposes—forged a new template for American warfare with airpower at the center.

NEW ROLES FOR AIRPOWER

In 1990, defense strategy did not feature airpower taking the lead. Warplans postured land forces to block an invasion with some assistance from airpower. The Navy had its Maritime Strategy while the Army had AirLand Battle. The Air Force tended to be parceled to the Army corps commander's scheme of maneuver—or dedicated to the nuclear Single Integrated Operational Plan.

"We'd been working on a set of ideas about how to better use airpower," recalled Warden, who headed the directorate of warfighting concepts under Maj. Gen. Robert M. Alexander, who was director of plans in the office of the deputy chief of staff for operations—a post known as XOX. Warden at the Pentagon had in his directorate small offices for doctrine, long-range plans, requirements, "Checkmate" for operational analysis, and the "Skunk Works" for strategy.

"Let's put a plan together," Warden told his staff on Monday, Aug. 6. "I don't know how we're going to sell it, but let's do it."

The appetite for airpower began with Schwarzkopf.

On Aug. 6, King Fahd of Saudi Arabia consented to host American forces.

Aircraft poured into an unfamiliar theater. Lt. Col. Kenneth M. “Mike” DeCuir deployed with his F-15E unit. “We started setting up our cots in a warehouse,” he later recalled. “I went to the security forces detachment and asked them the best way to prepare MREs [meals, ready to eat] because as aircrew we had never even seen MREs, much less knew how to eat the darn things!”

There was another surprise in store. “Just as we got it all together, we were bused to the Royal Omani Air Force officers mess for dinner,” continued DeCuir, now a retired major general.

CENTCOM war plans had long assumed that “in the first month of any deployment, US and Saudi air threat to extended Iraqi lines of communication was the deterrent,” writes Army historian Richard M. Swain in a 1997 book, *Lucky War*.

But in the then-recent Internal Look wargame, six Iraqi divisions advanced 124 miles into Saudi Arabia, inflicting 50 percent losses on the airborne corps holding Dhahran.

Iraqi tanks weren’t the only threat. Saddam had taken hostages. What if he started executing them? What if Iraqi forces stormed the US Embassy? Chemical weapons were another specter.

“It suddenly dawned on me that I had no military options, or very, very limited military options, to offer the President. ... I asked [Army Gen. Colin L. Powell, the Chairman of the Joint Chiefs

USA photo by SSGT. F. Lee Cockran



US military personnel arrive at Dhahran Airport aboard a C-5 Galaxy during Desert Shield.

of Staff] to allow me to work directly with the air staff to develop a package of options,” Schwarzkopf later said in a PBS “Frontline” program.

“He had no ground forces. There was no ground option,” recalled Warden.

The door was wide open for airpower. Developing America’s response followed two tracks: the immediate, executable options and the much wider campaign to eject Iraqi forces from Kuwait.

Both were on Schwarzkopf’s mind when he called Gen. John Michael Loh, Air Force vice chief of staff, on the morning of Aug. 8.

“I need a full-blown air campaign plan, not the limited, AirLand battle and defensive plan I am getting from

AFCENT,” Schwarzkopf told Loh. “Can you help me?”

“The center of gravity shifted from MacDill to Checkmate,” Loh said.

“I thought Schwarzkopf was dyed-in-the-wool green Army and didn’t know airpower,” Loh said later. “I was wrong.”

Still, Schwarzkopf was not an easy customer. “Burly, emotional, and brilliant, Schwarzkopf earned the handle ‘Stormin’ Norman’ early in his career primarily because of his outspoken personality and his volcanic outbursts,” said the official US Army history of Operation Desert Storm, *Certain Victory*.

“When he was edgy, it was normally with senior officers. He was great with the troops. ... Lieutenant colonels and above were fair game,” observed retired Lt. Gen. Buster C. Glosson in his 2003 book, *War With Iraq*. In 1990, Glosson was a brigadier general, in Bahrain as deputy commander, Joint Task Force Middle East, embarked on USS *LaSalle*.

“Schwarzkopf wants whatever we’ve got right now,” Loh reported to his boss, Air Force Chief of Staff Gen. Michael J. Dugan, a day later.

Warden and his boss Alexander briefed Schwarzkopf at his headquarters in Tampa, Fla., on Aug. 10. The concept packaged six days of air strikes against targets in Iraq and Kuwait, designed primarily to cut Saddam’s control by hitting air defenses, airfields, telecommunications, and suspected weapons of mass destruction sites.

Schwarzkopf told them it was exactly what he wanted. The briefing opened

USAF Capt. James Dygert checks a rotor blade on a UH-60A Black Hawk helicopter during Desert Shield.

USAF photo by CMSgt. Don Sutherland





USA photo

Schwarzkopf's mind to a further possibility, according to his "Frontline" interview. "I then realize, sitting in that room, that this strategic air campaign would have to be a precursor to any offensive campaign."

MAKE IT JOINT

Schwarzkopf was sold on the value of airpower but there was much more work to do. Back in Washington, Powell listened to Warden's briefing. The J-3, Army Lt. Gen. Thomas W. Kelly, questioned airpower's effectiveness. Powell half-sided with Kelly at first. "This is different," Loh interjected. "We've got precision and stealth."

Finally, Powell authorized Loh to continue the air campaign planning, but to make it more joint.

"By that afternoon we'd gained 100 or so more people, mostly from the Air Force and Marine Corps," Warden recalled.

The plan was "50 percent theoretical and 50 percent pragmatic," according to Loh. "We needed real targets and real missions" in the plan, he summed up.

The task fell now to Lt. Gen. Charles A. Horner, air component commander.

Schwarzkopf had left Horner in Riyadh to take charge as CENTCOM and work immediate air strike options. According to the book, *Every Man a Tiger*, the omnipresent question to Horner was, "What will we do if the Iraqis come across the border tonight?"

"A cutup as a youngster, he'd matured a bit but was still cheeky, something of a jester with friends," said Gen. Merrill A. McPeak, who took over as Chief of Staff in October 1990. "Scruffy, a little disheveled," McPeak added; Horner was not textbook military.

"When it came to the mission and the people entrusted to him for its accomplishment, he was engaged, deeply serious, the opposite of frivolous," said McPeak.

"Primary defense continued to rely on airpower and a thin line of United States and Saudi units along the Kuwait border," stated the Pentagon's official "Conduct of the Persian Gulf War" report.

"Initially the tasking was to support the troops of the 82nd Airborne who were the first to arrive and were pretty exposed up along the Kuwait-Saudi border," said DeCuir. "We expected a massive push of armor should the Iraqis come south, and the airborne guys were lightly armed and not prepared to repulse an armored invasion." The F-15Es were loaded with Rockeye munitions and waited.

In this tense environment, Horner saw the Air Staff briefings as just a start. In theater, the task was to build immediate options to shield Saudi Arabia from attack.

"John Warden and I looked at the problem of air campaign planning differently," Horner later wrote. "He viewed it as an almost Newtonian science, with the targeting list being an end unto itself, while for me, air warfare revolves around the ATO [air tasking order], logistics, joint service and allied agreements, and the million and one little things."

"In the interim we had a D-Day plan, a defensive campaign, in case the Iraqi army came," said Horner in his PBS "Frontline" interview.

"Have we got a bombing plan now," Schwarzkopf told Powell. "If you want to execute an air attack by itself, we're ready."

With fixed, strategic targets, "I was still disturbed by the issue of 'effects-

JSTARS' first operational mission was during the Gulf War in 1991. The new ISR aircraft would show its mettle tracking Iraqi forces as they moved toward Khafji to launch a surprise attack.

based' targeting," Glosson wrote in his book. "For leadership, communications, aircraft shelters, and general facilities, the concept of a few bombs to cause paralysis, not destruction, was OK. For other targets, this was very definitely not OK. NBC [nuclear, biological, chemical] sites, bridges, mobile assets—all these needed a hard kill, not an 'effect.'"

Another divide formed over how and when to hit Iraqi ground forces.

In the Aug. 11 briefing, Warden told Powell he had "no plans at all to attack the Iraqi army in Kuwait." He wanted the Iraqi army to give in to the pressure of attacks on strategic targets in Iraq and go home.

"I don't want it to go home," Warden recalled Powell saying. "I want a smoking tank on every kilometer marker from Kuwait to Baghdad." Warden, in contrast, "hoped we would never have to execute the attack on the Iraqi army."

There was no debate as far as Schwarzkopf was concerned. He was eager to use superior US airpower to full advantage, for it gave him something Saddam didn't have. "Obviously one of the very, very great strengths that we had was our ability with strategic airpower and tactical airpower," he later explained in "Frontline." He was mindful of Iraq's "tremendous advantage on us on the ground, numbers wise," and intended for airpower to help offset it.

"One of the main goals that Schwarzkopf always had, and I think Powell as well, was to get the Republican Guard," Horner attested in the same PBS program.



USN photo by JO3 Gerald Johnson

President George H. W. Bush speaks to military personnel during a Thanksgiving visit to Saudi Arabia during Desert Shield in 1990.

Turning the theoretical plan into an executable ATO depended on intelligence. Commanders struggled with intelligence and communications and the shortage of precision-capable aircraft in ways hard to credit 25 years later.

Intelligence support was “my No. 1 problem,” Glosson later stated.

Identifying and collecting data on targets for a massive air campaign demanded unprecedented support. Loh leaned on Air Force intelligence at the Pentagon to help the air campaign planners. Their initial reaction was “that’s not our duty; those in the field should do it,” he recalled. Then there was the problem of transmitting intelligence and targeting imagery to the theater.

“There were computers around but not many were interconnected,” Warden said. Planners packed crates of target folders containing high-resolution pictures onto Dugan’s airplane when he visited the theater in mid-September. Another time, a major was sent from the Air Staff to Riyadh on a commercial flight via Paris with a briefcase of more top-secret files.

A classified fax machine was put in at Checkmate and another in the “Black Hole” secret planning room in the basement of Royal Saudi Air Force headquarters.

L-r: Gen. Colin Powell, Chairman of the Joint Chiefs of Staff, Gen. Norman Schwarzkopf, commander of US Central Command, and Undersecretary of Defense for Policy Paul Wolfowitz listen to Secretary of Defense Richard Cheney answer questions from the media during a press conference in February 1991.

As to precision, it rested with the laser guided weapons targeting pods of the F-111 and F-15E, the Navy’s coveted A-6 carrier-based attack aircraft, and the F-117 stealth fighter.

Stealth was the other linchpin of the coming campaign. Leaders from around the Air Force and all the way up to Secretary of State James A. Baker III wanted to know if it would work.

Glosson dispatched F-117 pilot Maj. Robert D. Eskridge to fly a sortie from the base at Khamis Mushait, Saudi Arabia, shut down communications and slip into the F-117’s clean configuration as if for an attack, and skim parallel to the border for five or six minutes. The Iraqis never saw him.

All this was done in great secrecy. Outside, few grasped the value of stealth and how air superiority would allow them to layer interdiction and close

air support to take down the world’s fourth largest army in position. The F-15’s 33-to-zero air-to-air kill ratio, the ability of the F-111 to destroy an Iraqi tank with one plink from a guided bomb, and the test article JSTARS that tracked Iraqi forces on a sneak attack toward Khafji, Saudi Arabia: All this lay in the future.

Conventional wisdom doubted the US military and airpower in particular. A Brookings Institution scholar predicted between 1,049 to 4,136 deaths and more than 16,000 US casualties, while Army models of maneuver warfare estimated 9,000 casualties, USAF historian Richard P. Hallion later recorded.

“There was very little public support in the United States for the idea of going to war in the Persian Gulf. In fact, it was overwhelmingly opposed,” said Secretary of State Baker on “Frontline.”

Except for Schwarzkopf, America’s most senior military commanders were uneasy with airpower, too.

Loh served five weeks as acting Chief of Staff after Defense Secretary Richard B. Cheney fired Dugan during the runup to the war. He faced constant squabbling during meetings of the Joint Chiefs.

“Vuono wanted to start with a simultaneous ground campaign. Gray fought everyday for an amphibious landing,” said Loh, referring to Army Chief of Staff Gen. Carl E. Vuono and Marine Corps Commandant Gen. Alfred M. Gray Jr. Chief of Naval Operations Adm. Frank B. Kelso II wanted to divide the theater into “route packages” a la Vietnam, with a northwest package from carriers in the Red Sea to attack from the west and protect Israel, and a northeast package from carriers in the Persian Gulf attacking targets in Kuwait.

USN photo by Photographer’s Mate 2nd Class Susan Carl





USAF photo by A1C Heather Stanton

“He would leave the middle for the Air Force working with the Army,” said Loh.

WINNING THE WHITE HOUSE

Much rested on an effective plan, and the first group to convince was President Bush and his senior Cabinet officials. On Oct. 11, Glosson was scheduled to brief the air campaign plan to Bush.

Schwarzkopf told “Frontline” he wanted to brief the President himself. But “Colin felt that my arrival in Washington, D.C., could not be done in secret and that that would gin up a whole great deal of speculation within the Washington community as to why I was there.”

Schwarzkopf designated Glosson to brief the three-phased air campaign while Army Lt. Col. Joseph H. Purvis covered the ground phase. He warned Glosson and Purvis to stick to the brief he’d approved or he’d kick them out of theater and terminate their military careers.

“This meeting established airpower as the dominant force for Operation Desert Storm,” said Loh.

It almost didn’t happen that way. Glosson prebriefed the Joint Chiefs the day before the White House meeting. Powell took him aside afterward. “You’ve got to make sure when we go to the White House tomorrow we don’t oversell the air campaign,” Powell implored.

Glosson returned to Secretary of the Air Force Donald B. Rice’s office with Loh and McPeak and vented his frustration.

“Don’t change a chart,” Loh said

“I’m going to give the President a factual briefing and let the chips fall where they may,” Glosson decided.

“Give the President the briefing you and I discussed,” Schwarzkopf told Glosson by telephone from Riyadh.

“The air campaign was an offensive plan; it was what we were going to do whether they attacked or we attacked,” Glosson summed up.

When the briefing started, “I hadn’t gone far before I realized that he had an understanding of airpower execution that not very many people in politics have. I am sure his insight was based on his own experience as a naval aviator and as head of the CIA,” Glosson wrote of Bush.

Bush, Baker, and Cheney asked questions on topics ranging from TLAM accuracy to the role of Turkey. What will Saddam Hussein be able to do after Phase I, the President asked Glosson.

“He will not be able to effectively communicate with his people: He will lose C2 [command and control] to his forces, and he will have significant problems reinforcing Kuwait because of LOC [lines of communication] cuts. He will have to deal with disruption throughout the country,” answered Glosson.

Schwarzkopf said Powell told him that “the briefing on the air campaign had gone wonderfully, the briefing on the ground campaign had gone terribly.”

The negative reaction to the one-corps ground offensive served Schwarzkopf’s purpose, for he had another land campaign plan up his sleeve. “He had an alternative that started a flank, a little bit of a left hook. He needed more forces and then he would develop a much better land campaign, which is what happened,” said Horner.

By the end of October, all the arguments were settled. “Our air campaign became the vanguard of the overall joint

F-117s on the flight line at Holloman AFB, N.M., as another F-117 takes off in the distance. The value of stealth would be proved during the desert campaigns.

force campaign and stayed relatively intact,” said Loh.

“I have today directed the Secretary of Defense to increase the size of US forces committed to Desert Shield to ensure that the coalition has an adequate offensive military option should that be necessary to achieve our common goals,” the President announced later in October.

On Nov. 29, 1990, the United Nations authorized the use of force to free Kuwait. “When he got the UN vote through, ... I knew then we were going to go to war,” Horner said.

By January 1991, the coalition lined up to defend Saudi Arabia and to expel Iraq from Kuwait had grown to tremendous size. Approximately 540,000 ground troops from 31 countries were in place. More than 660,000 coalition soldiers were in the theater, and almost half-a-million of them were Americans. Some 1,800 combat aircraft and numerous support aircraft were deployed.

Across the border of Kuwait waited 43 Iraqi divisions. Most were not at full strength, but postwar estimates put the number of Iraqi troops at about 330,000, supported by 4,200 tanks, 2,800 armored vehicles, and 3,100 artillery pieces.

Seven hundred combat aircraft and a fully integrated air defense system was in place, ready to take out attacking coalition forces.

On Jan. 17, 1991, Operation Desert Shield came to an end and Desert Storm began. ✪

Rebecca Grant is president of IRIS Independent Research. Her most recent article for Air Force Magazine was “Airpower Against Ships” in June.



Fifth **GEN FLIGHT TEST**

By John A. Tirpak, Editorial Director

The F-22 and F-35 are put through the wringer at Edwards AFB, Calif.

An AIM-120C AMRAAM is launched from F-35 AF-6's internal weapons bay during a February 2015 sortie. F-35 testing has reached a near-maximum pace, but the strike fighter still has a long way to go before its flying qualities, mission systems, and weapons functionality are fully shaken out.



The pace of testing the three F-35 strike fighter variants is nearing its peak. The program is the priority flight-test program at Edwards AFB, Calif., and gets first dibs on its tankers, ranges, ground control, and bandwidth. Even so, the pressure is on from military services anxious to field the jets and from Congress to hurry up and prove the multiservice fighters ready for combat.

Testing the F-35, however, is unlike any previous program—even its stealthy, fifth generation F-22 stablemate—because of the program’s size, its international nature, the astonishing array of capabilities jammed into it, and the unprecedented amount of concurrency built into the project.

With only 60 percent of development completed, the Marine Corps expected to declare initial operational capability with the F-35B in July. With a modern fighter, that is unprecedented.

“There’s ... a lot of political pressure [and] visibility on it,” said Lt.

Col. Andrew Allen, commander of the F-35 Integrated Test Force, in a recent interview.

Will it be everything they want? That’s relative, Allen said.

“To have a service willing to declare IOC well before we’re done developing the aircraft, ... I think, speaks positively about the health of the program and where we are right now,” he asserted.

MORE, MORE, MORE

The Marines will have a basic air-to-air and air-to-ground capability with the F-35B in the 2B configuration. Later software builds will add additional capabilities such as more weapons, more sensor fusion, and more electronic warfare options.

“Any fighter pilot, any service, ... you always want more,” Allen said, and he expects that flight testing of software updates and upgrades will probably go on “for decades.”

The F-35s—there are nine test aircraft at Edwards, supported by more

than 1,000 people—rub shoulders at the base with just four F-22s, which continue to prove out updates and improvements to that system.

Steve Rainey, Lockheed Martin’s chief F-22 test pilot at Edwards, offered caution about the pace of F-35 testing in a recent interview. A longtime veteran of the aircraft, Rainey was the first USAF pilot to fly the Raptor, headed the test program while in the Air Force, and was Boeing’s chief F-22 test pilot before coming over to Lockheed Martin.

Recalling when the F-22 program was under the congressional microscope and under pressure from Pentagon leaders to speed up flight test, Rainey warned that F-35 testers “have to start worrying about ‘the push.’” In the surge to get the F-22 on track, he said, USAF leadership put the test force on a seven-day-a-week flying schedule, working 12-hour shifts, without enough people. Predictably, they got tired and made some mistakes, Rainey asserted.



An F-22 releases an AIM-9X from its weapons bay in a recent test. The AIM-9X and AIM-120D are two key elements of the Increment 3.2 Raptor upgrade.

In one test hop, “we almost put a guy in the dirt” because the simulator didn’t predict the forces the jet would encounter under a specific negative-G maneuver, and neither pilots nor engineers anticipated the situation, resulting in a close call.

Although the workweek was later reduced to six days, Rainey said there was a significant exodus of experienced flight and ground crews after 15 months of the F-22 testing surge, hurting the program and causing further delays.

With “people pushing really hard, you can do that for a while, but you have to recognize the repercussions,” Rainey said. “If you keep doing it forever, you’re going to lose people. We did. Good people decided to leave

the [Combined Test Force] when it got really tough.” He said the same problem could affect the F-35. “Ops tempo is always the killer.”

Allen did not complain about the pace of F-35 testing, saying he has the needed manpower, facilities, and aircraft to do the job, but he did urge patience, noting numerous times that an enormous amount of flight sciences and mission systems testing remains to be done.

“In 2014 we overflowed our goal of testing sorties,” he said, flying 704 hops when 666 were planned, “so getting the aircraft to work and get airborne is not a limiting factor at all. We have a fully trained and qualified team that is very much capable of operating at max capacity for long periods of time,

and our throughput and our capability is definitely not a hindrance to ... accomplishing the test program.”

The overflying wasn’t necessarily a good thing, though, Allen noted. The extra sorties had to be flown because there were more software drops than anticipated, requiring extra tests to maintain the schedule.

The mix of aircraft in Allen’s test force includes six F-35As, two F-35Bs, and one F-35C: respectively, the conventional takeoff version, the short takeoff/vertical landing model, and the carrier-capable version. Although there are differences in how they fly, their mission systems are identical, and a mission systems test can be flown with whatever jet is ready to go next.

Lockheed Martin photo by Chad Bellay



A British Royal Air Force joint terminal attack controller stands in front of BF-17, a Marine Corps F-35B, during a ground test of close air support communication.

Every conceivable contingency and configuration must be anticipated and evaluated. Here, the Marine Corps BF-4 makes a short takeoff during a wet runway and crosswind test.



Flight sciences is the bread and butter of flight test: It defines the aircraft's performance envelope, its ability to handle stress and loads, vibration and flutter, and how it behaves under unusual circumstances or in odd configurations and in air refueling. While flight sciences on the F-35B with 2B software is done, Allen said there's still a lot to do with the F-35A and C models and quite a bit more testing to do on mission systems. Much of the flight sciences work being done now concentrates on carrying external loads with a variety of weapons, in different and asymmetric combinations, to explore as many conceivable contingencies as possible.

Allen said the F-35 is "incredibly stable," and "I don't know if I want to admit this, ... but it's incredibly easy to fly. It's not necessarily easy to employ, but it is easy to fly."

He said pilots don't spin-test the F-35 because it won't spin. "We do departure [from controlled flight] resistance, and then recovery from intentional departures," he said. "We try to put it out of control and see how it behaves," but for the most part, pilots don't have to do anything to recover the airplane; it largely rights itself. Even at very high angles of attack—extreme nose-up attitudes while the jet is moving straight ahead—"the jet's stable," Allen said.

The F-35 has a dizzying number of capabilities, he said, and they all have to be tested and refined.

"There's probably buttons on your [TV] remote, and you ... probably have no idea what they do, right? It's the same concept. There's just so many

things that this aircraft will eventually be able to do."

A typical day adds up to about three test flights, but they require a phenomenal amount of planning, coordination, assets, and conditions—such as tankers, controllers, chase aircraft, ranges, and weather, to name just a few—that must all line up to make a successful mission.

In addition to envelope expansion, the F-35 is actually put through its paces, dropping ordnance, exercising its electronic warfare, and even flying "against" F-16s, though the Vipers are usually targets and not dogfight adversaries. Even live shots are made, against subscale target drones. Weapons drops are performed both to make sure the ordnance separates safely from the jet and also to ensure the F-35's accuracy. This constitutes an "end-to-end check" that "the kill chain can be completed, from a weapons perspective," Allen explained.

ABILITY TO EXECUTE

The F-35 has been flown in concert with E-3 AWACS, F-15Es, Navy F/A-18s and E-2Cs, and in interoperability testing with the British Typhoon and ground-based tactical air controllers. However, these are all systems and compatibility tests. Tactics are developed at Nellis AFB, Nev.

Delays to testing are usually associated with things not being in a software drop that were expected, Allen said. "Our ability to execute is very dependent on the product that we received."

In the case of the extra missions flown last year, the software "either didn't perform to the level it was supposed to, or [as] advertised, ... so we were a little less efficient on the amount of test we could accomplish on each sortie." But the ability to fly those extra missions means that "our maintenance effectiveness and the sustainability of the aircraft here at Edwards have greatly improved." Edwards has the most experienced maintainers of any unit flying the F-35, he said, and many have been with the program since its inception. The CTF has had the first look at every software version.

Two years ago, when Allen came to the job, F-35s were available for test about 50 percent of the time, and now "it's improved to where it stays on the schedule and we fly an effective sortie ... between 60 and 70 percent" of the time. "So it's much improved, and that's nothing to make light of." Besides the skills of the maintainers, "the supply chain is always going to continue to improve and grow." Moreover, test maintainers have direct access to the engineers and experts who designed the systems. "We have a little more at our fingertips, ... more expertise, here," to make sure flight tests happen on schedule.

Broadly, Allen said the F-35s are meeting contract specifications, although "expectations may be a different discussion." In its stability, ability to fly at high angle of attack, and departure resistance, it does very well and has performed "better than expected," Allen said. The F-35 does



“exceptionally well” at instrument approaches and as a stable communication-navigation platform, without the need to reset the computers.

The software pieces are tested individually to make sure they work alone—radar, electronic warfare, sensors, targeting system—and then “we start to add things together,” such as how the radar works with the software fusion engine, with electronic warfare, and the Distributed Aperture System that allows the pilot to see 360 degrees in darkness.

“We go out and in a repeatable manner ... try to employ the aircraft in the way that we think it will be employed in the near future. And we make assessments on how well it does in each individual mission,” such as offensive or defensive counterair or interdiction.

Ultimately, they “roll everything up in a ball and do more integrated, big-system-level testing. But that’s all after we’ve done all the building-block tests up ... to that graduation-type exercise.”

One of the challenges of flight testing the F-35 is that it will be used by three different services, whose pilots grew up in different communities and have different ideas of “how something should be displayed,” Allen observed. Display and data management preferences will be different for a pilot coming from an air-to-air system, like the F-15C, versus a mainly air-to-ground system, like the Harrier, and there will be differences in how suitable the pilots think the presentation is. But “we’re not going to develop three different versions of the mission system software,” Allen stated.

Allen, who was also an F-22 test pilot, said the software stability is far more advanced than it was on the F-22 at a similar stage.

TESTING THE F-22

The F-22 program, which produced 187 combat-capable jets, remains a high-profile presence on the Edwards flight line. Test director Rainey said that although the F-22 program wrapped up development a few months before the jet became operational in late 2005, flight testing has continued since then and will carry on for the foreseeable future.

Two kinds of changes are tested on the F-22: updates—which are corrections of problems—and increments, which are increases in capability, usually in the form of new weapons, sensor changes, or electronic warfare enhancements.



At top: A pair of F-22s in the Edwards pattern. The next big round of Raptor testing will evaluate ways for the F-22 and F-35 to talk to each other while remaining stealthy. Here: A USAF F-35 tests braking on a wet runway. While each F-35 variant has unique handling qualities, mission systems are identical for all three, and any one can test them.



A Raptor poses over the Edwards compass rose. Edwards is still inventing the process of testing fifth generation jets, but is getting more proficient at it by the day.

The F-22s that flew missions into Syria last year “were Increment 2 jets,” Rainey said. “That’s so long ago I barely remember doing the testing. That’s how long it takes to get these things fielded and supported.”

The biggest increment so far has been 3.1. It “allowed us to use sensors that were previously passive ... in an active way. By coupling that with multiple Raptors, it helps us identify where a threat is.”

Increment 3.1 added a synthetic aperture radar to the F-22, allowing it to perform almost as a mini-JSTARS, but behind enemy lines. It also added the Small Diameter Bomb, giving the F-22 more of an air-to-ground capability besides its initial Joint Direct Attack Munitions. So the F-22 now has even more “knock the door down” capability to penetrate, suppress enemy air defenses, perform surveillance, and escort attacking aircraft “through that hole we just knocked down,” Rainey said.

“In a way ... we’re replacing 12 airplanes with a four-ship of Raptors,” he said.

Now the force is testing Increment 3.2, broken up into A and B installments. It adds the new AIM-120D AMRAAM radar missile, the AIM-9X heat-seeking missile, data transfer improvements, and “some other air-to-air capabilities I can’t talk about,” Rainey noted.

The CTF also tests unprogrammed improvements. One example is a sliding panel that covers holes in the wing

when fuel tanks and their pylons are jettisoned, restoring the Raptor’s stealth. It works, but Air Combat Command has yet to decide whether to acquire the improvement for the fleet.

A mandated upgrade is an automatic Ground Collision Avoidance System, directed after an accident that killed an F-22 pilot. The system uses a “line in the sky” method that commands a fly-up of the airplane if it’s getting too close to a selected altitude. Flight testing showed that if a pilot forgot to reset the fly-up altitude after coming from a higher altitude terrain to a lower one, it could cause problems. “What if you’re in formation” when that happened, Rainey asked.

Now, if the jet is diving at less than 10 degrees and 60 degrees of bank, the GCAS will warn the pilot of an impending fly-up six seconds before it happens. The line in the sky is not ideal, but using a terrain-based model—Rainey called it preferable—was deemed too difficult to manage on the F-22’s computer arrangement.

The F-35 program has already learned from the experience and went with a terrain system.

After update 3.2B, future F-22 improvements will be called tactical mandates, Rainey said. Some of these are already in the pipeline: methods for the F-22 to talk stealthily with the F-35 and also with fourth generation fighters such as the F-15 and F-16.

The CTF has four airplanes, one of them in “flyable storage” at Edwards

and used as a maintenance trainer. There are 330 people in the test force; eight are pilots. Rainey said he plans about two sorties a day, but they are not necessarily all test flights. Some are proficiency hops for the pilots.

Even though some maintainers have been reassigned, Rainey said “we still probably have more expertise and longevity than ... the fielded units.”

Why were those cuts made?

“Cost. Everything is about money. The more money we can save at the CTF, that’s more money the [system program office] has, to spend on operating the airplane.”

The F-35 is often mischaracterized by people who simply see it as a replacement for the F-16, AV-8B, or F-18, Allen said. “That’s selling this aircraft short.” The F-35, he said, will be applicable “across the full spectrum of combat,” from a “Day One” attack against a heavily defended target to “Day 365 of doing an urban close air support mission.” Allen asserted that “I don’t know another aircraft out there that can be [as] effective across the full spectrum of operations.”

Although the F-35 is not there yet, he said, “I fully believe” the program will deliver on its promises. “We can have a common platform that can operate in a language we can speak among the services and between partner nations, which is a huge capability to have, ... no matter what the mission.”

On the spectrum of “crawl, walk, run, ... we’re starting to run,” he said. ★

The Air Force's intelligence, surveillance, and reconnaissance portfolio is undergoing a shift from a force structured to support the demands of the Afghanistan and Iraq wars to one tailored for more challenging environments. This will impact USAF's "big wing" ISR aircraft, a numerically small but critical component of the combat air forces. These large, manned platforms boast a great deal of specialized capability—from gathering sensitive electronic intelligence to air battle management to secure command and control links.

As part of this effort, USAF is undertaking a series of large and small initiatives to keep these aircraft viable for decades to come. The service is eyeing successor platforms to the E-8 JSTARS and refining the capabilities of the E-3 AWACS air battle management and command and control fleet and the special-mission RC-135 fleet.

The RC-135 fleet, built on the same airframes utilized for the Air Force's KC-135 Stratotanker, include the RC-135S Cobra Ball, used for measurement and signature intelligence gathering on ballistic missile launches and the WC-135 Constant Phoenix, used to collect atmospheric air samples to verify nuclear test ban compliance. The fleet encompasses the RC-135V/W Rivet Joint, used to gather real-time electronic and signals intelligence to disseminate

from tactical commanders all the way up to National Command Authorities. Also part of this diverse inventory: the RC-135U Combat Sent, specifically tailored to gather technical intelligence on radar and air defense systems.

Deployed worldwide under the auspices of the 55th Wing at Offutt AFB, Neb., RC-135s are frequently called into service.

Though a relatively small slice of USAF's combat airpower—taken together, the three RC-135, E-8, and E-3 fleets add up to just under 80 aircraft—their capabilities are unmatched and much sought after by the joint force by combatant commanders from the Asia-Pacific to Europe.

SMALL AND EXPENSIVE

This is why USAF leaders have stressed that their No. 4 modernization priority (after the KC-46 tanker, the F-35 fighter, and the Long-Range Strike Bomber) is replacing the E-8 JSTARS battle management and ISR aircraft. It has grown increasingly expensive to maintain due to its age and the small fleet size.

USAF must also modernize its E-3 AWACS fleet in the coming years. Both JSTARS and AWACS are critical to maintaining control of any battlespace the US could be flying into in a future conflict, particularly ones where enemies would try to disrupt US space assets. The ground target tracking and

command control offered by JSTARS and the powerful aerial radar of AWACS are critical for distributed control of air assets in contested environments.

The third leg of USAF's ISR wide-body aircraft, the RC-135, is vital to gathering highly sensitive electronic intelligence around the world, information that assets such as satellites or high-altitude ISR aircraft often cannot obtain. The RC-135U Combat Sent, for example, is equipped with specialized sensors to detect, analyze, and gather technical information on radar systems and integrated air defense networks. Even today, the mission, often flown by unaccompanied aircraft far from friendly skies, sometimes leads to tense aerial standoffs reminiscent of the Cold War.

RC-135s have been in the headlines several times in the last few years, as they have had close encounters in both the Asia-Pacific and Europe while conducting reconnaissance missions. In April 2014, a Russian Su-27 Flanker flew dangerously close to an RC-135U aircraft conducting a mission north of Japan in the Sea of Okhotsk, flying within 100 feet of the aircraft's cockpit and turning its wing to brandish air-to-air missiles.

In April of this year, another Russian Su-27 performed an "unsafe and unprofessional" intercept of an RC-135U in international airspace over the Baltic Sea, according to Pentagon officials. It prompted a US diplomatic protest. The

ISR's Iron Triad

By Marc V. Schanz, Senior Editor



USAF photo by Ed Aspera

Russians claimed the aircraft was “making steady progress” toward its borders and was not using its transponder. US European Command officials refuted these charges, declaring the aircraft was operating in accordance with international civil aviation flight rules.

ISR is critical to nearly every contingency or evolving crisis around the globe. Across all combatant commands, ISR demands are driving the Air Force to move money from other areas in an attempt to meet demands.

The calls for ISR continue to grow, despite a drawdown from Afghanistan, Chief of Staff Gen. Mark A. Welsh III told the House Appropriations panel on defense in February. The anti-ISIS air campaign that began last summer has driven demand up again.

“When [combatant commanders] tell us that their No. 1 priority is ISR, ... we ... ask, ... ‘Would you prefer for us to invest in more ISR, or in maintaining things like close air support?’” Welsh told the House panel. It has become “the coin of the realm” and the Air Force provides quite a bit of it, Welsh said. This resulted in a plus up in ISR funding.

The large ISR aircraft offer large crews of analysts and sensor operators and secure data links to pass information where it is needed, and they are air refuelable. Despite advances in putting high-tech sensors on unmanned aircraft such as the RQ-4 Global Hawk, big wing ISR assets are often called on to carry

out specialized ISR tasks in some of the most sensitive combatant commands. According to officials with Offutt’s 55th Wing, twice in the past year RC-135s supported urgent missions for five combatant commands within 24 hours.

Because of the way RC-135s fly and how their specialized sensors pick up signals and electronic intelligence, “we have access to targets that other capabilities don’t,” said Col. Mohan Krishna, commander of the 55th Operations Group at Offutt. “Compared to what a non-air breather could do, we have the benefit of physics and distance. I can get closer to a target than an overhead [asset]. ... I can get close but be far enough and still get information on targets.” A large crew of analysts and sensor operators help process the intelligence quickly, and aerial refueling capability gives the RC-135 long legs for global taskings.

INTEGRATING THE RC-135

Despite its reputation as a shadowy Cold War aircraft that flew missions “alone and unafraid,” the RC-135 is now more integrated into the USAF combat force than ever before. The aircraft are often on the leading edge of testing ISR concepts and tactics, analysis and dissemination, target tracking, and information sharing, Krishna noted.

“A lot of what we do [today] is work together, in what we call ‘the Iron Triad,’” said Krishna, when asked about

how the three specialized aircraft contribute to the Air Force’s air-breathing ISR capabilities.

E-3 AWACS and E-8 JSTARS use their powerful airborne radars to detect targets in the air and on the ground, and an RC-135 can then fill in missing pieces of information. Using data links such as Link 16, RC-135s share information for situational awareness that would not be possible without the trio working in combination. Airmen “amplify each other’s tracks,” Krishna said. Simply put, JSTARS and AWACS help identify where a target is located and its identity, “and on top of that I’ll be able to tell you what he’s thinking and what he’s intending to do,” using the RC-135s potent sensor suites, Krishna claimed.

Part of USAF’s ISR plan is to not only improve on the unique capabilities resident in the RC-135, E-3, and E-8, but to link those capabilities to the rest of the force, through high-fidelity training and exercising, while developing new distributed intelligence analysis tools. The service is tweaking its ISR portfolio to operate in high-end threat environments, improve data sharing, and invest in cultivating its intelligence analysts—be they on board aircraft or back in a combined air and space operations center (CAOC).

Krishna, a veteran RC-135 navigator, oversees some 3,000 airmen spread across 12 squadrons and two detachments around the globe, at RAF Mildenhall,

USAF is reorienting its ISR investments, but its “big wing” fleet isn’t going anywhere.



The “Iron Triad” on the flight line at Robins AFB, Ga. L-r: E-3 AWACS, E-8C JSTARS, and the RC-135 Rivet Joint.



USAF photo by Delanie Stafford

SrA. Riley Neads (l) and SrA. Kyle Kindig use air cannons to deice an OC-135 at Offutt AFB, Neb.

UK, and Kadena AB, Japan. He said that since the end of the 1991 Gulf War, the RC-135 fleet has steadily integrated into the combat air forces that need its powerful ISR tools.

“We have more capabilities to get information, and to bring that information on the aircraft, than any other platform,” he said. Today, analysts can participate in RC-135 sorties in real time as never before, he noted, even if they are not on the aircraft. This is possible thanks to a new broadband capability using the Wideband Global SATCOM (WGS) Satellite constellation. “I can have analysts here at Offutt or Kadena or Mildenhall participate on the mission as if they are on the airplane,” Krishna said, and while the RC-135 fleet is “leading” the maturation of this capability, it has promise across the ISR mission.

“We’ve had this capability, but for a while, the bandwidth wasn’t there to fully enable it,” Krishna said. “It is truly an enabling concept.”

RC-135, E-3, and E-8 crews take advantage of modern simulators at events like Red Flag, where ISR airmen can conduct distributed mission operations

that push the limits of integration without actually burning up flight hours on the aircraft. Simulators “help us keep [tactics, techniques, and procedures] sharp, even better than we could in the real world,” Krishna said.

JSTARS has proved to be one of the most in-demand platforms in the ISR

portfolio since its combat debut in the Gulf War and continues to rack up deployments. In 2014, the E-8C fleet hit 100,000 flight hours in support of all combatant commands.

In late May, E-8s deployed just in support of US Central Command taskings marked 100,000 flight hours in

SrA. Mindy Scott (l) and A1C Caleb Calaway track, analyze, and communicate information from their operator workstations on an E-8C JSTARS during last year’s Carolina Thunder exercise at Robins Air Force Base.



ANG photo by SMSgt. Roger Parsons



USAF photo by Josh Plueger

SSgt. Nathaniel Young, a crew chief with the 55th Aircraft Maintenance Squadron, scrubs the bottom of a Rivet Joint aircraft at Offutt.



more than 13 years of operations, after flying a sortie from Al Udeid AB, Qatar. The streak stretches back to Operation Southern Watch.

With its unique blend of ISR and C2 tools, the JSTARS fleet is extremely effective at melding the “operational and tactical level of war,” Col. Henry Cyr, then commander of the 461st Air Control Wing at Robins AFB, Ga., told reporters in September 2014.

The next generation program is in its early concept development stage, but already it is shaping up to look much different from the widebody E-8, as the Air Force wants to develop and deploy a “business class jet”—a smaller aircraft ranging in size from a Gulfstream 550 to a Boeing 737. It would carry a smaller crew and utilize more modern electronics that would need less intensive maintenance.

KEEPING COMPETENCY

Air Combat Command boss Gen. Herbert J. “Hawk” Carlisle, speaking in early June at an Air Force Association event in Arlington, Va., said the recap program is proceeding well but the “speed to ramp” progress is important

to USAF, because of its plans to get to the new aircraft. USAF is cutting the size of the existing JSTARS fleet and using the savings to pay for replacements ready to operate by 2023. The new aircraft will have the current capabilities and tools onboard, with the ability to add spiral improvements as technology matures. This could keep the fleet combat relevant for several more decades.

The E-3 fleet is in the midst of its most significant upgrade to date. Most of its legacy avionics and systems are being swapped out. The Block 40/45 upgrade program is scheduled to run through Fiscal 2020. USAF proposed retiring seven of the E-3s from the 31-airframe fleet in 2015 in order to generate savings to modernize the rest of the fleet, but Congress has thus far not agreed to the plan.

The upgrade completely replaces the E-3’s mission computer systems—dating to the 1970s—adding a new open network-based mission system,



USAF photo by SSgt. Christopher Boitz

better threat-tracking tools, and more processing power. The upgrade will improve the aircraft's data link infrastructure and sensor fusion—both key to keeping the fleet viable in contested future conflicts.

Last July, Air Combat Command declared initial operational capability for the E-3G, the upgraded Block 40/45 assigned to the 552nd Air Control Wing at Tinker AFB, Okla., when the sixth low rate production E-3G was delivered. Full-rate production is now underway, with the seventh modified airframe delivered to Tinker in April.

The RC-135 fleet is composed of some of the youngest aircraft from the now-shuttered C-135 line, Krishna said. Airframes were delivered in the early 1960s and received new engines after the KC-135 fleet went through its own re-engining. The RC-135 fleet is in no hurry to re-platform, as a result. "But that's just the airframe," he noted. Every four years, the Big Safari rapid-prototyping program delivers a new baseline via a spiral upgrade process. "So the insides of these are brand-new. ... Even after four years, you start to see vanishing vendors, and obsolescence comes into play."

He continued, "We have to be relevant in many different scenarios," and this requires quick reaction capabilities,

often going from conception to fielding in as little as a few months.

Because of this rapid response fielding, the RC-135 fleet can serve as the showcase for key tools and technologies that can then migrate to the rest of the ISR fleet and the combat air force. An example of this was the early use and maturation of Network-centric Collaborative Targeting, or NCCT, an effort that enabled better real-time coordination of ISR against targets and disseminating that data quickly to other places in the Air Force's network, Krishna said. It's another network where the CAOC "can integrate sensors and get things very quickly to where they are needed," he said, from troops involved in a firefight up to the President.

Much like the rest of the ISR enterprise, the Iron Triad is grappling with how to adapt the layered and powerful global USAF network to be effective in numerous scenarios and to utilize a vast amount of data from many sources and platforms. As manpower is strained on the analytical side, the service is rethinking how it disseminates and analyzes information, examining concepts such as data tagging and secure "cloud computing."

Speaking at AFA's Air & Space Conference last September, Assistant Deputy Chief of Staff for ISR Maj. Gen.

A WC-135 is given the "thumbs down" by airmen from the 55th Wing. This means the aircraft carried above-acceptable levels of radiation after collecting air samples in international airspace and needed to be decontaminated.

Linda R. Urrutia-Varhall said USAF will have fewer assets than ever to carry out ISR tasks, so the service has to get better at using and manipulating the information it already has. It will need to produce "multi-INT analysis" rather than just pull from individual platforms and sensors.

"The biggest challenge is knowing what that next critical target will be and having that right analyst available to build intel on that target," Krishna observed. Today, ISR commanders are making decisions on not just what sensors and tools are needed, but what skills will be necessary for their analysts to use this information.

"We build based on what we've seen, but we also know the world is always changing," Krishna said. This is why reachback tools and concepts are so important, as they allow the sensors and tools on a given aircraft to be utilized back in a CAOC or operations center. Demand for USAF's ISR products will never be met, he noted, "but we are doing the best we can to meet ... needs around the world." ★

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The Sequestration



When House lawmakers seized on the idea of tapping the relatively unconstrained war accounts to bridge the expansive gap between the Pentagon's spending request and budgetary reality, Senate Armed Services Chairman John S. McCain was among the first

to adhere to the new levels prescribed in the budget resolution.

the Pentagon's Fiscal 2015 blueprint, thanks to stringent caps on spending. "I don't like OCOs. I think they should have gone away some time ago," McCain told reporters in March. "But if that's the only way to get the required level of defense spending, I would support what the House did."

McCain's quick change of heart on using war spending to pay base-budget bills is perhaps the strongest indication yet of just how difficult it will be for Congress by the end of the year to come to a budget deal that provides the Penta-

to adhere to the new levels prescribed in the budget resolution.

If Congress doesn't act, sequestration comes back to life.

to criticize the maneuver as nothing more than a gimmick.

Within two days, however, the Arizona Republican had done a complete about-face, publicly—but reluctantly—endorsing the House GOP proposal to use the overseas contingency operations accounts as an overflow valve for some \$38 billion that would otherwise need to be trimmed from

McCain not only supported the House's action, contained in its non-binding budget resolution, he actively and successfully advocated for the Senate to follow suit. In the end, the Senate agreed to the significant and unprecedented boost to OCO for nonwar spending, and McCain's bill, the annual defense authorization measure, was the first Senate legislation

gon with relief from the spending caps, commonly referred to as sequestration.

Even if there is some sort of an agreement, it will likely be modest and short-lived. Previous efforts to revise the caps have resulted in temporary deals—the most recent expiring at the end of this year—that provide some relief but fall short of doing away completely with the Budget Control Act.

Zombie

By Megan Scully



F-16s on the flight line at Hill AFB, Utah. In 2013, one F-16 squadron at Hill stood down entirely for three months due to sequestration.

That means tough budget decisions—such as the Pentagon’s request for another round of base closures and the Air Force’s money-saving plan to retire its fleet of A-10 Warthog aircraft—will continue to be the order of the day within the Defense Department.

Still, even a modest deal could spare the Air Force and the other military services some of the most difficult decisions.

“The Budget Control Act is essentially forcing us to choose between readiness, force structure, and modernization,” Air Force Chief of Staff Gen. Mark A. Welsh III told the Senate Armed Services Committee in March. “If we choose to sacrifice readiness in order to modernize, we risk failure in today’s fight.”

During that same hearing, Welsh addressed issues with using war funds for base-budget needs—the most pre-

dominant being the uncertainty surrounding an account that fluctuates dramatically from year to year.

For a department that plans its budgets in five-year increments, that could be problematic, particularly for modernization programs that can span decades.

“When you’re looking at a one-year budget cycle, it’s not guaranteed over time,” Welsh said, adding that war money was better than no money at all, if that is what it ultimately came down to. “At some point in time, if it’s green and it smells pretty and it’s not your St. Patrick’s Day tie, it’s OK,” he told the panel.

McCain, who leads the hawkish wing of his own party, wants more money for the Pentagon and believes a budget agreement—which would involve a new deal with Democrats over both defense and nondefense

spending—is probably an elusive goal by year’s end, when a two-year budget agreement expires.

While he doesn’t love the idea of increasing reliance on the war accounts, McCain sees no other way out of the Pentagon’s budget jam. And he frequently points to a wide and growing array of threats, ranging from ISIS to Iran, to underscore his fervent belief that the nation’s security depends on robust spending for defense.

For McCain, the issue of whether to use the OCO accounts, which are not subject to the caps prescribed in the 2011 Budget Control Act, transcends the ongoing and divisive debate over federal discretionary spending.

“This is [about] the defense of the nation,” he said in late May as Democrats on his committee attempted to rein in the use of the war accounts during its closed-door consideration of the



L-r: Army Chief of Staff Gen. Raymond Odierno, Army Secretary John McHugh, Air Force Secretary Deborah Lee James, and USAF Chief of Staff Gen. Mark Welsh testify before the Senate Armed Services Committee on their budget proposals in March.

authorization bill, setting Pentagon policy and prescribes spending levels.

However, Democrats on Capitol Hill disagree. If the defense spending bills sail through Congress with the additional money tucked into the war accounts, Republicans will have no incentive to strike a deal to boost domestic spending, traditionally a Democratic priority.

In short, defense spending is the one card Democrats can play to force a debate on the broader budget issue. Even defense boosters within the Democratic Party are rallying to the cause.

McCain's Democratic counterpart on the armed services panel, Jack Reed of Rhode Island, voted against the typically bipartisan measure during the committee's work on the bill primarily because of his objections to the use of war accounts for base-budget funding.

A retired Army officer, Reed and other Democrats see the reliance on the OCO funds as an end run around the spending caps enacted in 2011. Domestic spending does not have any such uncapped fund to tap to pay for excess expenses that do not make the budget cut.

NEEDS, NOT SPENDING CAPS

But Democrats have also raised concerns about the long-term consequences of the artificially bloated war accounts, many of them reiterated by senior defense officials.

If Republicans proceed with their budget plans, they argue that war accounts that should be decreasing as operations overseas wind down, will only continue to grow, creating a permanent slush fund for the department. Meanwhile, reliance on the war accounts, varying in size from year to

year, will hinder the Defense Department's ability to do the necessary long-term budget planning.

"Our national defense decisions should be based on actual needs, not on spending caps" or budget gimmicks, Reed said in a Senate floor speech in June.

At the same time, a similar scenario was playing out this spring across the Capitol, with Rep. Adam Smith of Washington, the top Democrat on the House Armed Services Committee, leading his party's opposition to the defense authorization bill during floor debate on that chamber's version of the measure. It was the first time in Smith's 18 years in Congress that he voted against the measure.

In speaking against the bill on the House floor in May, Smith pointed to recent comments by Defense Secretary Ashton B. Carter that the use of war funding for base budget accounts is "managerially unsound" and "unfairly dispiriting to our force."

"Clearly, this desperate attempt to get around the budget caps put in place by Congress will have a significant negative effect on our military," Smith said. "This is unfair and unnecessary and we should be working to fix the problem, not working to get around it."

In the end, Smith, with the backing of party leadership, rallied 142 more Democrats to vote against the measure that typically receives strong bipartisan support in both chambers.

Combined with the eight Republicans who also voted in opposition to the bill, there could be enough votes in the House to block any GOP efforts to override a presidential veto of the authorization bill over the use of war funds.

The debate on the defense authorization measure in both the House and

Senate has served as the precursor to the broader battle over the budget caps. It will play out on a spate of appropriations bills over the next several months.

Even though the bill does not actually allocate money, the White House has threatened to veto the authorization bill over a host of objections, including its reliance on the war funds to bridge the defense budget gap even as domestic programs struggle to squeeze their priorities into the stringent limits.

"The President has been very clear about the core principle that he will not support a budget that locks in sequestration, and he will not fix defense without fixing nondefense spending," according to the Administration's statement on the Senate's version of the defense authorization bill. "Sequestration levels will damage our ability to restore readiness, advance badly needed technological modernization, and keep faith with our troops and their families."

Senate Minority Leader Harry Reid (D-Nev.) said in early June the authorization bill had "no chance of becoming law," as it stands now.

The White House, meanwhile, has issued a blanket veto threat on appropriations bills that lock in sequestration spending levels, an attempt to force a bipartisan compromise on defense and nondefense discretionary caps by the end of the year.

At the same time, Senate Democrats, who held onto enough seats in the last election to stall legislation in a chamber that requires 60 votes to do almost anything remotely controversial, have said they will block appropriations bills until there is a deal that addresses both defense and domestic spending.

"We will not vote to proceed to the defense appropriations bill or any appropriations bill until Republicans



An F-16 from the 388th Fighter Wing takes off from Hill, after being brought back to combat-ready status, following three months of downtime due to sequestration.

have sat down at the table and figured out with us how we're going to properly fund the Defense Department and key priorities that help families, fuel economic growth, and keep us safe and strong at home," New York Sen. Charles Schumer, a member of Democratic leadership, told reporters at a June press conference.

Republicans are also divided over how to address the budget dilemma and have so far been unwilling to compromise with Democrats on a deal to lift or alter the budget caps.

Republicans' preference for now is to stick to the spending levels outlined in the budget resolution, allowing them to circumvent the politically dicey topics of revenue and domestic spending while still funding defense at levels that match the Administration's own cap-busting request.

"The political reality is that the Budget Control Act, which the President signed, remains the law of the land," McCain said on the Senate floor at the outset of the chamber's deliberations on the authorization measure in June.

Democrats, however, are hoping that their plans to block spending bills—and the President's promise to veto them, if they do make it through Congress—will force a dialogue that ultimately changes that, at least for next year.

"If they want increases on the non-defense side, which they absolutely do, their only bargaining chip is the increase on the defense side," said Todd Harrison, an analyst at the Center for Strategic and Budgetary Assessments.

THE CLOCK TICKS

As Congress became more serious about shifting money from DOD's base budget—and as the White House

became more opposed to the idea—defense and military leaders began to speak out more firmly against that approach.

Testifying before Senate appropriators in May, Carter said using OCO funds takes the department on a "road to nowhere." Carter also stressed the OCO plan takes a narrow look at funding national security. It does nothing to make up for shortfalls in other departments, including the departments of State, Justice, Treasury, and Homeland Security.

"President Obama has already made clear that he won't accept a budget that locks in sequestration going forward, as this approach does," Carter said. "And he won't accept a budget that severs the link between our national security and our economic security."

As the political debate over spending levels swirls, the clock continues to tick down to Oct. 1, the start of the new fiscal year. That's a firm deadline—and one Congress may not be able to meet if the parties are unable to find a compromise.

There are so many possibilities for the last months of the year that it reads almost like a *Choose Your Own Adventure* book. The most optimistic—and potentially least likely—possibility is some sort of a grand compromise that would pave the way for yearlong spending bills for the Defense Department and other agencies.

"It doesn't look hopeful right now," Harrison said. "I don't see any real movement towards a compromise deal."

On the other end of the spectrum looms the possibility of the second government shutdown since 2013, politically devastating for both the Administration and Congress.

In recent years, Congress has typically failed to complete its work on appropriations bills by Oct. 1, requiring stopgap continuing resolutions to hold DOD and other federal agencies over for several months until spending bills can be completed.

Congress always manages to pass a Pentagon spending bill, albeit late. In the meantime, defense officials say the uncertainty generated by a CR—typically providing funding at the previous year's levels and prohibiting the department from awarding contracts for new programs—throws Pentagon planning into a tailspin.

It's unclear this year whether the two sides can come to an agreement long enough to pass even a short-term CR. If not, that sets the stage for a painful, and potentially prolonged, shutdown.

There are a number of options between a full-scale deal and a shutdown, including scaling back the size of the OCO plus-up on the defense side while also adding a similar amount of money on the domestic side to appease Democrats.

"There is some negotiating room here," Harrison said. In the end, Carter, who is widely regarded for his budget acumen and well-liked in both parties, may be the Administration's best ambassador for a deal.

"I hope we can come together for a longer-term multiyear agreement that provides the budget stability we need by locking in defense and nondefense budget levels consistent with the President's request," he told Senate appropriators. "I pledge my personal support to this effort, as well as the support of the entire staff of the Department of Defense." ❖

Megan Scully is a reporter for CQ Roll Call.

Volcanic Observatory

By Amy McCullough, News Editor



The Maui Space Surveillance Complex atop Haleakala in Hawaii is one of the best astronomical viewing sites in the world. Because it sits 10,000 feet above sea level, there is little light pollution, allowing researchers to take clear pictures of satellites and other man-made objects, such as the Hubble Space Telescope and the International Space Station.

The drive up or down Haleakala goes through different ecosystems, past palms trees, refreshing fields of lavender, eucalyptus trees, through a small town, and then free-range sheep and cattle farms. The cloud cover hovers between 7,000 and 8,000 feet, but when the clouds lift it looks as if you've arrived on another planet. One almost expects the Mars Rover to round the corner, crossing over the barren beds of red volcanic rocks.

Temperatures on top of the volcano, which last erupted in the late 1700s, also vary drastically from hour to hour, easily dropping from 70 degrees to below freezing in the same day. The weather changes so frequently, the control room has a rack of Air Force-issued cold weather parkas for workers to wear outside after sunset.

"I'm still in awe every time I drive up here. I haven't gotten used to this at all," Stacie Williams, site technical advisor, said during an *Air Force Magazine* visit to MSSC in April. "You forget how beautiful it is when you are inside working and then you walk outside and it takes your breath away."

The complex was originally built by the Advanced Research Projects Agency, the predecessor to DARPA, in the 1960s to observe missile launches from the Pacific Missile Range Facility, said Lt. Col. James Phillips, then commander of Air Force Research Laboratory's Det. 15 atop the Hawaiian mountain.

MSSC is now a state-of-the-art electro-optical facility used to track satellites and other man-made objects in space with a mission of increasing importance as the Air Force grows ever more concerned about on-orbit crowding, debris, and threats to expensive, complex satellite systems.

AFRL took ownership of the facility in 2000 and shares the location with the University of Hawaii, a collaborative of other space agencies, and Air Force Space Command, operator of three Ground-Based Electro-Optical Deep-Space Surveillance (GEODSS) systems there.

AFSPC and AFRL track objects in the skies from a 10,000-foot dormant volcano on Maui.

The Maui Space Surveillance Complex, run by the Air Force Research Laboratory, is located on the summit of Haleakala on Maui, Hawaii, some 10,000 feet above sea level, making it one of the best astronomical viewing locations in the world.

AFRL Commander Maj. Gen. Thomas J. Masiello said the facility provides “space situational awareness from the ground” and “cutting-edge research in terms of being able to identify, categorize, and understand what is going on in space.”

The Maui center also can use lasers to illuminate satellites, then use “extremely advanced data analytics to process the images,” even during the daytime, said Masiello.

LOOKING DEEP INTO THE SKY

“Space is becoming more congested and more contested and in order to really decide a course of action if something were to happen in space, we need to see it today,” said Stacie Williams.

That’s not an easy task because the objects AFRL observes are extremely far away and often clouded by atmospheric turbulence.

Imagers, however, can use adaptive optics taking advantage of a deformable mirror attached to the 120-ton, 3.67-meter

Advanced Electro-Optical System (AEOS) telescope—the largest telescope in the Department of Defense—to remove those distorting effects, said Chief Engineer Skip Williams.

Despite its massive size, AEOS moves fairly fast, said Phillips, allowing it to accurately track objects both in low Earth orbit and geosynchronous Earth orbit (GEO).

“If I were an adversary I would attack when my enemy couldn’t see me. Well, they don’t have that advantage now, because we can track objects day or night,” said Stacie Williams.

MSSC also uses a 1.6-meter closed tube telescope. It is more conducive to daylight imaging because there is not as much stray light that comes in, said Phillips. In addition, there is a 0.6-meter laser beam director, some other smaller telescopes, and a variety of sensor systems, including imaging systems, infrared radiometers, low-light video, and acquisition telescopes.

Capt. Robert Copley, 21st Operations Group Det. 3 commander, looks to the horizon from the complex. Copley is the sole Air Force Space Command airman on Maui.



Photo courtesy of Capt. Robert Copley

The first is used to determine the position of satellites and is invisible to the naked eye. The Air Force is adding to the complex a new laser that creates a “sodium guide star,” allowing researchers to get “really clean pictures” of man-made objects in space, Skip Williams said. The laser will be used “very infrequently” for short periods of time at sunrise and sunset. It will be visible only from the 10,000-foot summit.

That point is critical for native Hawaiians who consider Haleakala

a sacred site. As legend goes, the demi-god Maui, who is said to have thrown his fishing hook into the ocean and pulled out the Hawaiian islands, climbed to the top of Haleakala and snared the sun, pulling off some of its tentacles to slow it down.

LIGHT UP THE SKY

That’s why AFRL is so careful to educate the community about any new developments at the site—especially lasers—in an effort to respect and honor local Hawaiian beliefs and

traditions, engineer Williams added.

Workers will be able to shoot the laser into the atmosphere and create an artificial star, known as a guide star, next to an object of interest. The light from the artificial star then travels back to the AEOS telescope, enabling researchers to use adaptive optics that compensate for the turbulence in the atmosphere, getting a clearer image of space objects.

AFRL expects to use the new technology sometime this year, said Williams.

The largest telescope in the Defense Department, a 120-ton, 3.67-meter Advanced Electro-Optical System telescope. It is operated by the Air Force Research Laboratory.



Staff photo by Amy McCullough

Unlike the scientists and technicians from AFRL, Capt. Robert Copley, commander of the 21st Operations Group's Det. 3, operator of the three GEODSS systems at the site, doesn't care what an object actually looks like. He is there to watch out for stray space junk and give warnings when it could be a problem.

Copley, the lone AFSPC airman on Maui, and his team of civilian contractors are responsible for executing combat-relevant warning, intelligence, surveillance, and reconnaissance, and counterspace operations to ensure space superiority.

Haleakala is one of three GEODSS sites across the globe. The other two are in Socorro, N.M., and on the British island of Diego Garcia in the Indian Ocean. The telescopes only operate at night and track man-made objects, such as satellites, rocket bodies, and even tools lost during the early days of space exploration, all orbiting mostly in GEO. GEODSS sites are also capable of tracking objects in highly elliptical orbit, or HEO.

"We're not interested in what an object looks like. We're interested in where an object is," said Copley. "We provide time, elevation, and azimuth"—a specific compass point—to the Joint Space Operations Center at Vandenberg AFB, Calif., maintainers of a catalog of space objects, and to the National Air and Space Intelligence Center at Wright-Patterson AFB, Ohio. If there is a potential problem such as possible incoming collisions, those centers will respond.

The three GEODSS telescopes are each one meter, the smallest domes on Haleakala. Despite their size, Copley



Photo courtesy of Capt. Robert Copley

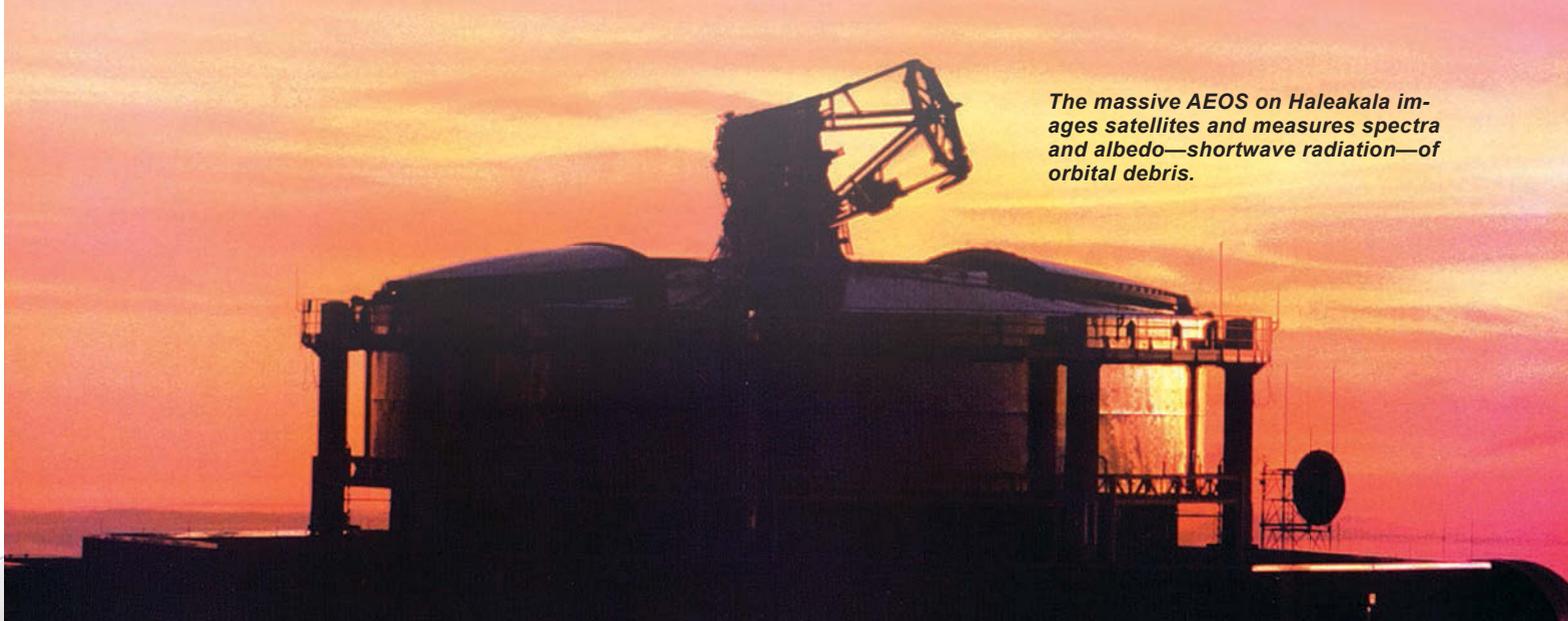
A Ground-Based Electro-Optical Deep-Space Surveillance telescope at the complex tracks an object in space.

referred to them as the "B-52s of space situational awareness" because of their ruggedness.

Because they are a compact system, they don't have huge motors needed to run significantly larger telescope domes. There is less materiel to sustain and less of a wind cross-section, adding to their durability, said Copley. However, the telescopes are highly capable, allowing users to see objects

10,000 times dimmer than the human eye can detect.

"There are definitely more man-made objects in orbit today because space is lucrative and there are a lot of nations wanting to become space-faring nations," said Copley. "As they do so, more and more objects end up in orbit. We hope all those objects play nice with each other, but failures do happen and we want to know what's going on in space." ★



The massive AEOS on Haleakala images satellites and measures spectra and albedo—shortwave radiation—of orbital debris.

The View From Langley

By John A. Tirpak, Editorial Director

Airpower isn't getting enough credit for what it's achieving in the anti-ISIS fight being waged in Iraq and Syria. Airpower is in fact inflicting mortal damage on the terror group, according to Gen. Herbert J. "Hawk" Carlisle, head of Air Combat Command. This air campaign, however, is the most challenging ever conducted, demanding extreme care in distinguishing among friends, noncombatants, and enemies in the extremely factionalized Levant, he said.

Speaking at an Air Force Association-sponsored Air Force event in June, Carlisle offered a progress report on Operation Inherent Resolve and his perspective on some key modernization programs the Air Force is undertaking with its combat air forces.

Airpower in the Anti-ISIS Fight

Though it's "not highly publicized," Carlisle said, coalition airpower has "taken out [ISIS'] cash cows. Their best way to make money was oil collection and refining capacity, and we've taken out about 90 percent of that." Airpower alone has done "significant work" in destroying ISIS' "ability to finance what they're trying to do."

taken to err on the side of safety, and Carlisle acknowledged that many missions return to base without releasing munitions. (Lt. Gen. John W. Hesterman III, the combined force air component commander for US Central Command, said in a June 5 press conference that this happens as much as 75 percent of the time.)

The air campaign is simply the most precise and accounts for the lowest number of civilian casualties in history, Carlisle asserted. Though there has been a drumbeat of impatience from some in Congress and elsewhere to step up the effort, "we can't afford to do anything different," he insisted. Given factors "within our control, ... our airpower is doing everything we can do, and [the coalition air partners are] being amazingly successful."

He emphasized the care being taken in selecting targets—sometimes requiring pilots to wait a while for approval before weapons release—saying "about 50 percent of the time" initial reports identifying a potential enemy have been wrong, "and think what would have happened if we had acted on those reports."

In the siege of Kobane, the coalition "had airplanes overhead continuously for three-and-a-half months, every minute of every day. Pretty impressive," Carlisle said.

The air campaign has forced ISIS to change its tactics and methods of fighting. The terror group doesn't "march down the

The ACC commander presented unvarnished thoughts on war and the future at a recent Air Force Association-sponsored event.

Carlisle said airpower has taken "a serious toll on their morale and capability," having racked up 4,200 strikes and 14,000 weapons dropped by the beginning of June.

"We've taken about 13,000 enemy fighters off the battlefield since the September/October time frame, and despite what has been [reported], we have regained territory, about 25 percent" of what ISIS had seized by the end of last summer, Carlisle asserted. Some 1,000 enemy combat vehicles have been destroyed, "to include tanks, armored personnel carriers," and other military vehicles.

The Air Force and its partners have delivered 1.4 million tons of aid to refugees and supplies to Iraqi forces for distribution. This action "prevented what would have been a horrendous human disaster," he said.

Carlisle characterized the battlefield as "incredibly complex," posing grave difficulties in determining "who's fighting who, who's a good guy, and who's a bad guy." Part of this is due to the fact that ISIS wears captured Iraqi army uniforms and operates captured Iraqi equipment—the same kinds of gear in the hands of Kurdish Peshmerga fighters, who are allies. The battlefield also includes forces from other factions and nearby nations, such as "Shia, ... moderates, Iranians, ... tribal, militia, Sunni extremists," and more.

"We can't afford" to cause deadly collateral damage, Carlisle said, because that would undermine support for the Iraqi army and the coalition among those under siege. "Our ability to prevent civilian casualties and not do unintended harm is critical to our success," he said. Consequently, every precaution is being

middle of ... any towns, anymore," and the air campaign has eliminated ISIS' ability to mass forces. It has also "changed their hierarchy" by killing key leaders, including a top financier, he said.

Airpower has its limitations, though, and the Iraqi army has its hands full on the ground. "Remember what it was like for the Americans" in Anbar province of Iraq seven years ago, he said.

Despite the level of effort, which Carlisle said is about as much as can be sustained, he offered his personal opinion that "this is a five-to-seven-year conflict."

One of the suggestions routinely made is that the US should send in joint terminal attack controllers to speed up air strikes and make them more efficient. Carlisle said the decision to send in such troops—in actual combat, as opposed to serving as advisors—is "a great discussion" to have, but he's not sure JTACs would make a huge difference.

"What we've discovered, even when we do have confident, capable folks on the ground, [is] it's hard to tell who's who," he said.

A Pentagon spokesman said later that Carlisle was referring to indigenous forces trained to call in air strikes.

To put US ground troops into the mix means "you have to protect them, you have to support them, ... and then the question is, what's next?" In his opinion, "you start putting American soldiers back on the ground, you own it. Are we ready for that?"

Carlisle said "we need to think long and hard" about deploying US ground troops in the middle of such a "complex, challenging environment." Doing so will require "a big discussion" nationally.

An F-22 takes on fuel from a KC-10 before strike operations in Syria.

Those pushing for a US-led ground offensive “need to understand what it looks like on the ground today.”

The Air Force is pouring a tremendous effort into intelligence, surveillance, and reconnaissance in the anti-ISIS fight, Carlisle said, and it pays off in sometimes unconventional ways. Combing through Facebook posts, Air Force analysts found an ISIS operative “bragging about command and control capabilities” for ISIS and posting a photo of himself in front of the command building. “So they do some work.

Long story short, about 22 hours later, through that very building, three JDAMS take that entire building out.” From the social media post of the “moron” to “bombs on target” was less than one day, Carlisle said.

“It was incredible work, and incredible airmen are doing this sort of thing.”

F-22s in the Fight

The F-22 continues to demonstrate its value in Operation Inherent Resolve, often swinging from one crucial mission to another on the same sortie. Carlisle praised the F-22’s “ability to enhance everybody else” because of its situational awareness, its “ability to get there, its sensor suite, its ability to pass information [and] lead the entire fight.” He gave an example of one F-22 mission where the pilot flew for more than 12 hours. “He re-rolled about five times, went to the tanker about seven times, did strikes, escort, ... he did redirect, did ISR and passed data. I mean, it’s amazing what that airplane can do.”

The Need for More F-35s

The Senate has tasked the Pentagon to re-evaluate its target F-35 inventory, as the number was set 20 years ago. Since then, the Middle East, Eastern Europe, and South Asia have all seen increasing conflict or tensions.

Though “we’re looking at it hard,” Carlisle said the 1,763 figure the Air Force has stuck to since the F-35 program’s inception is probably right. It’s “a number that’s got rigor behind it,” he said,

and the only thing that would change it is if there’s a shift in national strategy.

The 1,763 figure supports “the potential to be in conflict in potentially two theaters, and then there is a rotational demand” to have some at rest and in repair while others are on the front lines. He allowed, however, that demand for airpower was supposed to decline after the wars in Iraq and Afghanistan were over, but “it has stayed high and in some cases it has gone up.” The F-35 buy objective will also be affected by how many Long-Range Strike Bombers the Air Force gets to buy, since they both deliver “capacity in global attack.”

LRS-B Secrets

When the Air Force announces the company or team that has won the contract to build the Long-Range Strike Bomber, the service will probably reveal “more information” about the classified aircraft and its role in the long-range strike “family of systems,” Carlisle said. So far, the service has kept largely mum about the capabilities for the airplane, but he revealed that it does indeed play a role in the Pentagon’s overall electronic warfare strategy, particularly because of its “penetrating capability.”

More details will probably follow “over time,” he said, but he cautioned reporters not to expect a fulsome description of the bomber’s full capabilities “all at the same time.”

Not One Less CRH

While ACC sees merit in the idea of buying CV-22s for the combat search and rescue mission, the bigger priority is capacity, and that’s why buying 112 Combat Rescue Helicopters is an “absolute minimum,” Carlisle said. “I could not see” trading away any CRHs to buy more CV-22s, he insisted,

Right: B-1B bombers were part of a large coalition strike package that engaged ISIS targets in Syria last fall. Below: Gen. Hawk Carlisle answers questions at the AFA-sponsored event.



USAF photo by SSgt. Ciara Wymbis



USAF photo by SrA. Hailey Haux

might work.” However, “we have to get” 112 CRHs, he said, because, since the end of the war in Afghanistan, the demand for pararescue forces “has not gone down at all. In fact, it’s gone up.”

Cluster Bomb Closeout

The Pentagon has agreed, by international treaty, to phase out cluster bombs by 2018, but Carlisle said there is still a need for similar weapons on the Korean Peninsula.

The Air Force has a “pretty good plan” to replace the weapons, he said, explaining “we’re making advances and I don’t think we’ll have any problem” closing out the inventory by 2018. In Korea, “we need volume,” he acknowledged, but the inventory of cluster bombs is already well-diminished.

He said a new fragment-firing weapon that can cover a wide area is in the pipeline. Despite their utility against massive formations of troops and against targets like radars, old-style cluster bombs are being retired because those that don’t explode stay live for long periods of time, and can be stepped on, long after a battle is over, by noncombatants—often with tragic result.

Replacing JSTARS

The Air Force is trying to prod the Pentagon acquisition system to be “more reactive” to its plan to rapidly replace the E-8C JSTARS fleet. “Speed to ramp is incredibly important to us,” Carlisle said, so USAF is looking at mature technologies only, with a technology readiness level of 6 or better. “We want, ... basically, current capabilities on a sustainable platform that has ... growth potential” and the means to add in new capabilities in the future.

“We just have to get it through the acquisition process,” Carlisle said. The Air Force wants the first JSTARS replacement aircraft in service by 2023.

Son of CALCM

“We’re down to very few CALCMs,” the conventionally armed version of the AGM-86B Air-Launched Cruise Missile, Carlisle noted, and DOD has decided that this mission will be filled with the AGM-158B JASSM-ER, the Joint Air-to-Surface Standoff Missile-Extended Range.

As the Lockheed Martin-built weapon “comes online and we finish the testing,” the Air Force will acquire “an appropriate number” to replace the CALCM, which saw its first combat use in Desert Storm in 1991. ★

because there must be enough rescue helicopters to recapitalize today’s aged fleet and go around to all the regional commands.

If there is more money made available later, Carlisle said the CV-22 would be a good add to the CSAR mix, particularly in Africa and other places characterized by long-haul distances beyond the CRH’s range. He said ACC is “looking hard” at places where a CRH/CV-22 “mixed fleet

USAF photo by SrA. Matthew Bruch

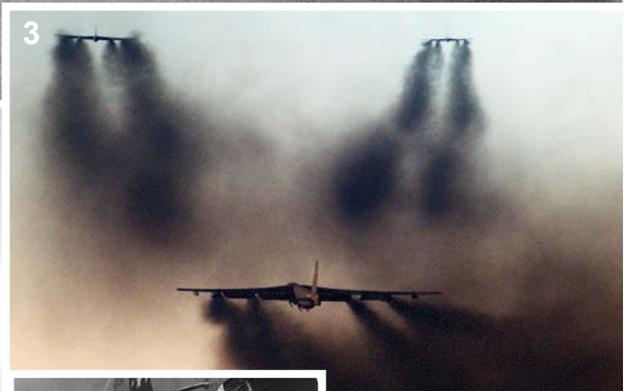


An F-15E flies over Iraq in September 2014 after conducting air strikes on ISIS targets in Syria.

Scramble



USAF photos



1: B-52 alert exercise at Fairchild AFB, Wash.

2: B-58 crew scrambles.

3: BUFFs, in an alert exercise, get airborne.

4: B-47 alert crew boards its bomber.

It was an iconic Cold War scene: With klaxons blaring, USAF's "alert" aircrews dash madly—scramble, really—out of "mole holes" to their bombers, which roar into the air in close succession. In the mid-1950s, the US worried about a Soviet surprise attack on "sitting duck" aircraft. Strategic Air Command responded by putting many bombers and tankers on ground alert. The alert began on Oct. 1, 1957. A month later, the US announced SAC had aircraft at the end of runways, bombs loaded, and crews ready to "flush" all alert aircraft within 15 minutes. Eleven percent of SAC's 1,528 bombers and 766 tankers were on alert that year; by 1960, the figure was 33 percent. The alert continued for 34 years. In September 1991, with the Cold War at an end, President George H. W. Bush ordered the alert force to stand down.

The Year of the Kamikaze

By John T. Correll

The suicide pilots were sent to die for the emperor—regardless of what the emperor thought about it.

Smoke engulfs USS Bunker Hill, hit by two kamikazes off Okinawa May 11, 1945. Losses included 400 US seamen killed or missing, 164 wounded, and 70 aircraft destroyed.

As Japan entered the final year of World War II in the fall of 1944, its once-fearsome air forces were severely diminished, especially the carriers and aircraft of the imperial Japanese navy.

The Japanese had at first extended their perimeter in a big loop that encompassed Southeast Asia, the Dutch East Indies, Wake Island, and the tip of the Aleutian chain in the Bering Sea. The reversal began in 1942 with the loss of four aircraft carriers at Midway and continued to the “Marianas Turkey Shoot” in June 1944, where US forces gutted what was left of Japanese naval airpower and secured bases from which B-29 bombers could strike the Japanese home islands.

The A6M Zero fighter had lost its quality edge to the US Navy’s FGF Hellcat and F4U Corsair and the Army Air Force’s P-38 Lightning. Experience and training levels fell as Japan’s best pilots were killed in action.

The US was steadily rolling back the perimeter, with Gen. Douglas MacArthur moving northward from New Guinea and Adm. Chester W. Nimitz “island hopping” across the central Pacific. In October 1944, they were converging on the Philippines, where invasion of the island of Leyte was to be a big step on the road to Japan.

Japan hoped desperately to stop the invasion fleet in Leyte Gulf, but it could not do so by conventional military means. Its battleships and cruisers were vulnerable without air support. The remaining carriers were so depleted of aircraft and crews that they could do little more than serve as bait to draw away the US carriers.

The chosen solution—and a standard tactic for the last 10 months of the war—was suicide attacks in which land-based

Seamen on USS Belleau Wood in October 1944 shot down a kamikaze pilot near the Philippine island of Leyte, but the Zero crashed on the ship's aft deck, causing fires that ignited ammunition.



Photo from Robert L. Lawson Photograph Collection, USN National Museum of Naval Aviation

Japanese aircraft crash-dived into American ships. The attacks and the airmen who flew them are known to history as kamikaze, named after the “Divine Wind” typhoons that dispersed the Mongolian invasion fleet of Kublai Khan in the 13th century.

In Kanji, the logographic characters of the written Japanese language, “Divine Wind” can be read either as “kamikaze”—the term used by the Japanese navy—or “shimpu,” preferred by Japanese army airmen. The imperial navy flew 64 percent of the suicide attacks and the army air forces 36 percent.

An alternate term, “tokkotai,” or special attack unit, was often used in deference to the emperor’s ambivalent attitude toward the suicide missions. According to the kamikaze mystique, pilots went forth willingly to die for the emperor. What the emperor actually thought about it was another question, and not all of the pilots were as eager as the propagandists claimed.

Despite the kamikaze’s legend, the results were not strategically significant

in the long run. The kamikaze sank a total of 33 ships, none of them full-sized carriers or battleships, and damaged 286. The Americans just kept coming. Nevertheless, the kamikaze had great symbolic importance and the pilots were revered by the Japanese public.

Seventy years later, a resurgence of that esteem and glory is underway in Japan.

THE SAMURAI TRADITION

Acts of self-sacrifice are not unusual in war, but Japan was a special case, steeped in the legendary traditions of the samurai and their code of conduct, called “bushido,” or the way of the warrior. The samurai were a warrior class employed since medieval times to fight for feudal warlords.

Their badge of office was the sword, which they used freely on anyone who gave them offense. Surrender was unthinkable. In instances of disgrace, their custom was to commit “seppuku,” the suicide ritual known popularly in the

West as “hara kiri.” The greatest honor was to die in the service of one’s lord.

The samurai were disbanded in the 1860s, but officers of the imperial Japanese army kept the traditions alive and imposed them on the armed forces with more radical intensity than ever existed in the heyday of the samurai. They brought back the sword and other trappings. The 1872 military code for the army and navy prescribed death as the punishment for surrender.

The militaristic fervor spread to the general population. “Almost all Japanese boys were brought up—mentally at least—as warriors,” said historian Syohgo Hattori. “Self-sacrifice to the emperor was thought to be a highly honorable deed.”

By the 20th century, these beliefs were firmly implanted in the national culture. Public opinion tolerated and usually supported the excesses and atrocities of the Japanese army in China and elsewhere. The customs were carefully observed. “Japanese pilots in China were issued

L-r: Rear Adm. Tamon Yamaguchi, Vice Adm. Shiro Takatsu, and Rear Adm. Takijiro Onishi after being awarded the Order of the Rising Sun medal in 1940. Onishi was the founder of the Kamikaze Corps and later argued that Japan could win the war with the sacrifice of 20 million lives in a special attack effort.

revolvers and swords but no parachutes,” said Edwin P. Hoyt in *Japan’s War*.

In January 1941, War Minister Gen. Hideki Tojo issued the senjinkun military code, “Instructions for the Battlefield,” which told soldiers they should “never live to experience shame as a prisoner,” and that “a sublime sense of self-sacrifice must guide you through life and death.”

THE FIRST KAMIKAZE

There had been instances dating back to Pearl Harbor of pilots deliberately crashing into American ships, but these were individual efforts, unrelated to each other. What set the kamikaze attacks apart was that they were planned and organized by higher authority as regular, continuing operations.

The first kamikaze unit was formed Oct. 20, 1944, by Vice Adm. Takijiro Onishi, commander of the First Air Fleet, which owned all of the land-based fighters in the Philippines. As the invasion force approached, Onishi’s command had fewer than 100 aircraft still in operational condition.

Meeting with officers at Mabalacat, adjacent to Clark Field northwest of Manila, Onishi announced his conclusion that Japanese air strength was so meager that the only way to meet the invasion was with suicide attacks. All hands agreed heartily and there were more volunteers than Onishi could use.

Twenty-six ordinary A6M Zero fighters were assigned to the special attack unit, half of them to the crash-dive mission and half as escorts for the suicide planes. The strike fighters were stripped of all unnecessary weight, including self-defense capability, and armed with 550-pound [250 kilogram] bombs.

“Our small Zero fighters were unable to carry the great weight of a torpedo, so that weapon was not considered,” said Commander Tadashi Nakajima, the unit’s flight operations officer. “They could, however, with slight alteration be fitted with a 250-kilogram bomb.”

Lt. Yukio Seki, a Japanese naval academy graduate and one of the best pilots in the fleet, was chosen to command the kamikaze unit. Seki had been married only a few months before but he embraced his new assignment without hesitation.



A few days later, Onishi sent Nakajima to form a second kamikaze unit at Cebu, 400 miles south of Mabalacat and the most forward special attack base in the Philippines. Additional units were set up at other fields, but the principal bases were Mabalacat and Cebu.

The first successful suicide attack came Oct. 25, with Seki leading the Zeros out of Mabalacat. Among the American ships moving through Leyte Gulf that morning was USS *St. Lo*, an escort or jeep carrier, which was about half the size of a fleet carrier.

The Zeros found the ships, climbed to 5,000 feet, and dived into the attack. Several of them were shot down, but the last one—flown by Seki—crashed into *St. Lo*, broke through the flight deck, and exploded its bomb. *St. Lo* sank 20 minutes later.

Emperor Hirohito’s reaction to the kamikaze attacks was ambiguous. “Was it necessary to go to this extreme?” he asked the Navy chief of staff, but then added, “They certainly did a magnificent job.”



Corporal Yukio Araki, holding a puppy, and four other kamikaze pilots in May 1945. The day after this picture was taken Araki, age 17, died in a kamikaze attack on US ships near Okinawa.

PHILIPPINE FALLBACK

There was no chance the Japanese could hold the Philippines. In the Battle of Leyte Gulf in October, they sustained “catastrophic losses: four carriers, three battleships, six heavy cruisers, three light cruisers, and 10 destroyers,” said historian

John Toland. “Never again would the imperial Navy play more than a minor role in the defense of the homeland.”

The Japanese army air forces continued with conventional operations until November, but formed their own suicide units when it became apparent that the navy’s kamikaze tactics worked better.

Not enough Zeros were available for the expanding mission, but the army and navy still had thousands of airplanes at various locations around the Asian rim. Many of them could be converted for kamikaze use.

All kinds of aircraft were thrown into action: fighters, trainers, dive bombers, wood and fabric biplanes—anything that would fly. There was some new production. A few navy Zeros were built to carry a larger 1,100-pound bomb.

The kamikaze could not stop the invasion of the Philippines, but they enforced serious losses, sinking 16 US ships and damaging many more. One kamikaze hit the cruiser

own doctors to prevent their capture by the Americans.

The Japanese lost more than 500 aircraft on kamikaze missions in the Philippines. Even with an all-out effort to replace their losses, the Japanese were unable to mount a full kamikaze effort when the battle for Iwo Jima began in February 1945.

Most of the veteran pilots motivated and available for kamikaze missions had been killed. After the Philippines, the policy of relying on volunteers was quietly dropped and training was cut back. Some suicide pilots had no more than 30 hours of flying time, sufficient for them to take off, stay in formation, and hit the target.

TACTICS AND TRADITIONS

Myths about the kamikaze abound. One of the most enduring is that they drank a cup of sake at planeside before the last mission. In fact, they avoided sake and all other alcohol before flying lest it impair

However, depictions of kamikaze pilots wearing white headbands imprinted with a red rising sun are correct. The headbands, called “hachimaki,” were a custom borrowed from the samurai and symbolized courage and pre-battle composure.

The original formations for the first kamikaze attacks consisted of three suicide planes and two escorts. The escorts remained close by the strike aircraft, no matter what happened. They could not break away to attack enemy fighters or change course to defend themselves. Their sole duty was to protect the suicide aircraft all the way to the target. Later on, the kamikaze switched from small formations to mass attacks, concentrating all of their aircraft into a single wave to saturate defenses.

The preferred target was a US carrier. “Against carriers the best point of aim is the central elevator—or about one-third the length of the ship from the bow,” said Capt. Rikihei Inoguchi, senior staff officer



Nashville, flagship of the invasion, killing 137. MacArthur had planned to be aboard but his staff talked him out of it.

Among the ships taking heavy damage was the fleet carrier *Bunker Hill*, hit by two kamikazes with almost 400 US seamen killed or missing, 264 wounded, and 70 aircraft lost.

The no-surrender rules were enforced harshly in the fallback from the Philippines. Some wounded or bedridden Japanese soldiers were killed by their

their sharpness and abilities. It was water they drank for the ritual farewell toast.

Another story is that the kamikaze were given only enough fuel for a one-way flight, making it impossible for them to turn back. The truth is that the fuel tanks were filled completely. If the pilot was unable to find a target, he was to return and preserve the aircraft and himself for another attempt. In addition, the maximum fuel load caused a bigger explosion and fire when the airplane plowed into a ship.

Schoolgirls from Chiran, Japan, wave cherry blossoms in farewell to a kamikaze pilot in April 1945. The aircraft is a Hayabusa III fighter, carrying a 250-kilogram bomb.

to Onishi. “Next best is either the fore or aft elevator—both being vulnerable locations since the destruction of these sections destroys the operational effectiveness of the ship. Against other types of ships the base of the bridge, where the ship’s nerve center is located, is the most desirable target.”



US Navy personnel inspect an Okha two-seat trainer aircraft. The rocket-propelled aircraft was constructed around a 2,645-pound warhead, carried into battle by a bomber, and released to fly at 600 mph toward its target.

Pilots were to arm their bombs only when the target was sighted. Inexperienced pilots sometimes forgot, so the escort crews checked and reminded them if necessary. Pilots were instructed to release their bombs before impact, hoping to damage the ship at two separate points.

“Kamikaze pilots were taught not to close their eyes until the last instant before they collided with their target,” said historian Hattori. “High-ranking Japanese officers believed that kamikaze pilots who overshot their targets had closed their eyes well before that last instant. Despite this instruction, reports of kamikazes overshooting continued.”

OKINAWA

Suicide attacks reached their peak in the battle of Okinawa, April-June 1945, as the war closed in on the Japanese home islands. The principal kamikaze bases were Kanoya and Chiran on opposite sides of Kagoshima Bay at the southern tip of Kyushu. The pilots were the greatest heroes of the nation.

Small formations were a thing of the past. Kamikaze attacks in the Okinawa campaign were conducted mainly in 10 massed waves. Seventeen US ships were sunk in the Okinawa campaign, one of them an escort carrier. Nearly a quarter of the American ships engaged were hit by a suicide airplane.

Hardest hit were the destroyers and smaller ships, deployed around the carrier task forces as the first line of defense and as a picket line for early warning. Sailors

on one radar picket destroyer had enough of it. They put up a big sign with an arrow pointing to the rear reading, “Carriers This Way.”

On April 15, a suicide pilot crashed his Zero through the starboard side below the main deck of the battleship *Missouri*. It started fires but the bomb did not explode and no Americans were killed. The next day, despite protests from some of the crew, the battleship’s captain gave the kamikaze pilot a military funeral at sea. This event would be remembered in a different context 70 years later.

About half of the kamikaze aircraft were shot down by gunners on US ships or by Navy interceptors. The best defense was by the “Big Blue Blanket,” as the Navy fighters were called.

Okinawa also saw the introduction of the piloted glide bomb called Okha, or Cherry Blossom. The Okha was a single-seat craft, 20 feet long, built around a huge 2,645-lb armor-piercing warhead carried into battle by a bomber. An Okha sped to its target at 600 mph, propelled by rocket engines. A total of 77 Okhas were launched, sinking a US destroyer and damaging three other ships.

The Japanese employed other kinds of suicide forces as well, including manned torpedoes, midget submarines, crash boats, and kamikaze frogmen. These programs were not very successful. Neither was the effort of suicide fighters to destroy B-29 bombers by aerial ramming. By US count, nine B-29s were lost to ramming and another 13 were damaged

THE LAST STAND

The emperor, touring firebombed areas of Tokyo in March and weighing reports from elsewhere, reached the conclusion that the war was lost and had to be ended as soon as possible. The emperor supposedly “lived beyond the clouds” and almost never interfered directly in the affairs of government. Not until the atomic bombs fell on Hiroshima and Nagasaki in August was he able to advance the case for surrender.

Although devastated, Japan still had considerable military forces left, including almost five million regular army troops and assorted paramilitary reserves. Between them, the army and navy could scrape together 10,700 aircraft from all corners of the war front, about 7,500 of them, which could be adapted for suicide missions.

Hardliners insisted that Japan must keep fighting. Hearing the news of the atomic bombs, Onishi—founder of the kamikazes and now vice chief of the naval general staff—said, “If we are prepared to sacrifice 20 million Japanese lives in a ‘special attack’ effort, victory will be ours.”

Army rebels surrounded the palace and tried to seize the emperor’s recorded rescript of surrender before it could be delivered for broadcast by NHK national radio. They attacked members of the imperial household and burned the home of the prime minister, declaring that “our intention is to protect the emperor.”

Within hours of the surrender announcement Aug. 15, Onishi and War Minister Korechika Anami killed themselves in the ancient disembowelment ritual of



“seppuku.” Later, former Prime Minister Tojo unsuccessfully attempted suicide, choosing a .32 cal. Colt pistol rather than seppuku. Tojo lived to be tried and hanged as a war criminal.

Moderate air base commanders removed the propellers and fuel from airplanes to prevent unauthorized suicide missions. The last kamikaze was Vice Adm. Matome Ugaki, commander of the Fifth Air Fleet, to which naval suicide aircraft were assigned. Late in the day on Aug. 15, Ugaki took off, accompanied by 10 other aircraft, and headed toward Okinawa. About 7:30 p.m., a static-riddled radio transmission reported that they were attacking, but there is no US report of a kamikaze action on that date. Ugaki was not heard from again.

Statistical records for the 10 months of the kamikaze operations vary considerably and the numbers are difficult to reconcile. A reasonable estimate is that the Japanese flew 2,550 suicide sorties, not counting escorts and observers.

They sank 33 US ships and damaged 286, killing 4,900 American sailors and wounding 4,800. Some ships were hit by more than one suicide attacker. The largest of the American ships sunk were three escort carriers and 13 destroyers. Smaller ships took most of the losses and damage.

Almost 4,000 Japanese airmen died in various aspects of the kamikaze effort.

HEROES AGAIN

Japan posthumously promoted the deceased kamikazes by two ranks and provided generous pensions for their families.

After the war, however, the public image of the kamikaze changed. Adoration for them declined and so did interest in what they had done.

“Over the decades since the end of the American occupation in 1952, kamikaze pilots gradually have regained the status of national heroes that they once enjoyed during the final stages of the war,” says Bill Gordon, who operates a website about the kamikaze. “Much of the turnaround in public opinion came about through the efforts of the Chiran Peace Museum for Kamikaze Pilots, which opened in 1975 on the site of the former Chiran Air Base.”

Chiran and several other such museums “portray the pilots as brave young men who voluntarily sacrificed their lives to defend their country and families,” Gordon says. The museums “generally remain silent on responsibility for the war other than brief explanations, such as western nations cutting off imports of oil,” he says. Chiran draws visitors by the tens of thousands.

The Yasukuni Shrine in Tokyo has a heroic statue of a kamikaze pilot. The city of Minamikyushu, home of the Chiran museum, has asked the United Nations to add letters from the kamikaze pilots to its Memory of the World register, which recognizes such documents as the Magna Carta.

A moment after this picture was taken, the incoming Zero crashed through the starboard side of USS Missouri. The bomb did not go off and no Americans were killed. The battleship captain ordered a military funeral for the pilot.

Veneration of the kamikaze gained major momentum with the release of a new movie, “The Eternal Zero,” in December 2013, the Zero in the title being the classic A6M. The pilot hero of the story joins a suicide unit in the last days of the war. He wants to survive but accepts his responsibility and dies in a blaze of glory. It is already one of the 10 top-grossing Japanese films of all time. Prime Minister Shinzo Abe described himself as “deeply moved” by the film.

The film is based on a novel by Naoki Hyakuta, governor of the NHK public broadcasting system. In a political speech in 2014, Hyakuta said that the notorious massacre of Chinese civilians by Japanese soldiers at Nanjing in 1937-1938 “never happened.”

The most recent recognition of the kamikaze was April 11, 2015, when the Battleship Missouri Memorial, now anchored at Pearl Harbor, remembered the 70th anniversary of the attack on the battleship in 1945. Concurrently, an exhibit opened onboard with artifacts lent by the museum at Chiran. The exhibit was scheduled to continue through Veterans Day. ✪

John T. Correll was editor in chief of Air Force Magazine for 18 years and is now a contributor. His most recent article, “Their Finest Hour,” appeared in the July issue.

World War II in Europe was only just over—VE Day was two days prior—when a group of senior Army and Army Air Forces officers convened on May 10, 1945, to interrogate Reich Marshal Hermann W. Goering in Augsburg, Germany.

The two-hour questioning, led by Gen. Carl A. “Tooe” Spaatz, commander of US Strategic Air Forces in Europe, was freighted with queries that might prove useful in prosecuting the still-active war with Japan. The questions also belied US concerns about possible German technological breakthroughs.

Some of Goering’s recorded responses are disarmingly candid, whether out of a desire to tell the truth or whether to curry favor with his captors.

Spaatz forwarded a copy of the interrogation transcript to Gen. Henry H. “Hap” Arnold, the AAF commanding general, with a note saying: “Believe you will find this most interesting.”

The Goering Interrogation

By Frederick A. Johnsen

The captured Luftwaffe head was surprisingly open when questioned by Spaatz, Vandenberg, and other Air Force leaders just after VE Day.

Goering was described in the interrogation papers as “wearing grayish wool, no medals but epaulets of a field marshal (that is, a large eagle, a small Swastika, and crossed batons). He had a silver ring on the third finger of his right hand. Blue eyes, ruddy not unpleasant face, big thighs, tan boots.”

In addition to Spaatz, Goering’s questioners that day included Lt. Gen. Hoyt S. Vandenberg, Ninth Air Force commander; Brig. Gen. Edward P. Curtis, USSTAF chief of staff; Alexander P. de Seversky, special consultant to the Secretary of War; Bruce Hopper, USSTAF historian; and US Army officers including Lt. Gen. Alexander M. Patch, commanding general of Seventh Army; plus a Seventh Army interpreter.

What follows is a transcript of the interrogation of the vanquished Nazi by the airpower victors, as it happened.

Goering quickly spun a tale of mixed aims hobbling the Luftwaffe when Spaatz asked: “Would you tell us something of the organization of the Luftwaffe and the plans, especially the factors which went into the nonfulfillment of those plans?”

Goering: In the early years when I had supreme command of the Luftwaffe, I had definite plans, but in 1940 Hitler began to interfere, taking air fleets away from our planned operations. That was the beginning of the breakdown of the Luftwaffe efficiency.

Spaatz: In the Battle of Britain why did you maintain such rigid formations of fighters and bombers?

Goering: It was necessary to cover the bombers because their fire power was low (not like your bombers). It was also necessary for our fighters to closely cover each other. You see, it was a question of equipment.

Spaatz: Was the Ju 88 designed for the Battle of Britain?

Goering: The Ju 88 was primarily a commercial airplane which had to be adapted for the Battle of Britain along with the He 111 because we had nothing else. I was not in favor of engaging in the Battle of Britain at that time. It was too early. The He 177 was late in development. The He 177 was a development from the original Stuka with two propellers on four motors. It was a failure; it wasted two years. That is why we had no large bombers in the Battle of Britain.

Spaatz: When did you know that the Luftwaffe was losing control of the air?

Goering: When the American long-range fighters were able to escort the bombers as far as Hanover, and it was not long until they got to Berlin. We then knew we must develop the jet planes. Our plan for the early development of the jet was unsuccessful only because of your bombing attacks.

Spaatz: Did our attacks affect your training program?

Goering: Yes, for instance the attacks on oil retarded the training because our new pilots could not get sufficient training before they were put in the air where they were no match for your fliers.

Patch: Did the Luftwaffe have priority in the distribution of manpower?



Nazi airman Hermann Goering speaks to members of the press and Army representatives in May 1945. His interpreter is to his left.

National Archives and Records Administration photo via Stan Piet

Goering: Yes, the Luftwaffe had first priority and thus had the cream of Germany, the U-boats were second, and the panzers third. Even at the end, the best of German youth went into the Luftwaffe. Only the Waffen SS sometimes held back personnel. All other organizations surrendered personnel to the Luftwaffe on application.

Spaatz: Did the jet airplane really have a chance to win against us?

Goering: Yes, I am still convinced, if we had only four to five months more time. Our underground installations were practically all ready. The factory at Kahla had a capacity of 1,000 to 1,200 jet airplanes a month. Now with 5,000 to 6,000 jets, the outcome would have been different.

Vandenberg: But could you train sufficient jet pilots, considering your shortage of oil?

Goering: Yes, we would have had underground factories for oil, producing a sufficient quantity for the jets. The transition to jets was very easy in training. The jet pilot output was always ahead of the jet aircraft production.

Spaatz: Could Germany have been defeated by airpower alone, using England as a base, without invasion?

Goering: No, because German industry was going underground, and our countermeasures could have kept pace with your bombing. But the point is, that if Germany were attacked in her weakened condition as now, then the air could do it alone. That is, the land invasion meant that so many workers had to be withdrawn from factories' production and even from the Luftwaffe.

Patch: Was that also true of England?

Goering: To me, this is a difficult question. Germany was prepared for war and England wasn't. I was forced by Hitler to divert air forces to the East, which I always opposed. Only the diversion of the Luftwaffe to the Russian front saved England. She was unable to save herself and unable to bomb Germany.

Spaatz: When you conquered France in 1940, why didn't you go on through to Spain and Gibraltar?

Goering: Germany had saved Spain from the Bolsheviks. Spain was in the German camp. I insisted on going to Spain but to no avail. We could have bottled the British Fleet in the Mediterranean, but no—the Fuehrer wanted to go to Russia. My idea was to close both ends of the Mediterranean, "und dann die sache ist in ordnung" ["and then things are fine"]. I am positive we could have taken Gibraltar. The Luftwaffe was ready and we had two divisions of parachutists ready and trained, but Mussolini objected. Part of our pain—the Italians. Also there was the complication of the relations between France and Spain.

Spaatz: Did you know anything of our movement to Africa as to time and place?

Goering: Well, I presumed it, but if the Germans had only held Morocco and the Canaries as I wanted, the going would have been difficult for you.

Spaatz: Your best attack on us was at Poltava, at the airfield. Why was that so successful? [Poltava was a Russian airfield used briefly by the AAF in long-range shuttle bombing missions.]

Goering: Those were wonderful times. We had an observation ship flying with you. You did not know it. It was a 177 which fortunately developed motor trouble and indicated it couldn't land on the field with only one motor. So it was able to return to give the information on your landing at Poltava. As we had an attack planned on a railway nearby we merely diverted it to your airfield.

Vandenberg: Will you tell me why you bombed cities in England instead of concentrating on aircraft and engine factories?

Goering: My intention at first was to attack only military targets and factories, but after the British attacked Hamburg the people were angry and I was ordered to attack indiscriminately.

Spaatz: Which had the more effect in the defeat of Germany, the area bombing or the precision bombing?



Goering felt Hitler's interference and obsession with Russia ruined the Luftwaffe.

Lessons in the Archives

American archival holdings include papers like the Goering interrogation that offer a nuanced and sometimes quirky window on World War II. The Air Force executed a war plan that is well-documented through the histories that followed.

Less well-known are the speculations, brainstorming, wrong-headed notions, and the occasional dead-end plan the service had to contemplate while staying on track to win the war.

New weapons with huge impact—such as the B-29 bomber and the atomic bomb—were used as they became available to prosecute the Pacific war in 1945.

Col. Paul W. Tibbets Jr., pilot of the B-29 *Enola Gay* over Hiroshima, Japan, in 1970 acknowledged last-minute discussions about the possibility of using a third bomb if surrender negotiations slowed in August 1945.

According to interview notes preserved in the Air Force Academy library's special collections, Tibbets was asked by Gen. Curtis E. LeMay and Gen. William H. Blanchard on Guam: "Have you got another unit?"

Tibbets is quoted as saying the two components of the third bomb could have been airlifted to the Pacific for assembly in about 25 hours. Other sources say the intended target would likely have been Tokyo at night, when the flash from the blast would have been especially brilliant.

Ultimately, bomb No. 3 was expended in 1946 during the Operation Crossroads Bikini Atoll tests.

Goering: The precision bombing, because it was decisive. Destroyed cities could be evacuated, but destroyed industry was difficult to replace.

Spaatz: Did the Germans realize that the American air forces by intention did only precision bombing?

Goering: Yes. I planned to do only precision bombing myself at the beginning. I wanted to build a wall of contact mines around Britain and close the ports but again I was forced to do otherwise by political diktat.

Curtis: Was our selection of targets good, particularly oil?

Goering: Yes, excellent. As soon as we started to repair an oil installation you always bombed it again before we could produce one ton.

Vandenberg: Why didn't you attempt to cut us off in Africa and send the Luftwaffe, which was then superior in the air, against our shipping and the concentration of our airplanes at Gibraltar?

Goering: We had too few long-range airplanes and then, later, when you got to Algiers, the airfields in Italy were inadequate. You have no idea what a bad time we had in Italy. If they had only been our enemies instead of our allies we might have won the war.

Spaatz: Why did you use your bombers to haul gas to Rommel instead of bombing the line of communications from Algiers to Constantine to Tunisia?

Goering: Higher HQ orders.

Vandenberg: Why did you attack our airdromes on 1 January 1945?

Goering: Because every airdrome was loaded with airplanes.

Vandenberg: Well, why didn't you come back?

Goering: Orders from higher headquarters. Hitler said it was no good to bomb American planes because more of them would come like bees.

Vandenberg: But why did you concentrate on RAF airfields more than on ours?

Goering: Because the RAF airfields were closer and otherwise more inviting targets. We used 2,300 planes for that attack; what we did not allow for was the intense concentration of AA guns placed there against the V-1.

Vandenberg: Would you contrast the air forces of the Allies?

Goering: Well, the Russians are no good, except on undefended targets. You need only three or four Luftwaffe airplanes to drive off a 20-plane Russian attack. The Americans are su-

perior technically and in production. As for the personnel, the English, German, and American are equal as fighters in the air.

Spaatz: Have you any knowledge of a proximity fuse?

Goering: Yes, in three or four months there would have been production.

Spaatz: Has Japan the designs of this fuse?

Goering: I do not think so because it was not yet in production and we never gave them anything unless it was in production. The Japanese have had the designs of the Me 262 for some time.

[Goering then talked for several minutes, the gist of which emphasized America's successful use of radar and counter-radar measures, to which he attributes much of the success of our air operations.]

Spaatz: If you had to design the Luftwaffe again, what would be the first airplane you would develop?

Goering: The jet fighter and then the jet bomber. The problem of speed has been solved. It is now a question of fuel. The jet fighter takes too much. The jet bomber, Me 264, designed to go to America and back, awaited only the final solution of the fuel consumption problem. I might add that according to my view the future airplane is one without fuselage (flying wing) equipped with turbine in combination with the jet and propeller.

Seversky: In view of your diminishing manufacturing resources, who made the decision to divert a large portion of your national effort to manufacture of V-1 and V-2 weapons instead of building up the Luftwaffe?

Goering: Well, there was great confusion of thought in Germany. Prior to the invasion the V-1 would have been effective. After the invasion our effort should have been concentrated on the Me 262. The decision on the V-2 project was made at higher headquarters.

Vandenberg: In the tactical operations of our Air Force, what attacks on what targets were most damaging to you?

Goering: Before D-Day it was the attacks in Northern France which hurt the most because we were not able to rebuild in France as quickly as in Germany. The attacks on marshaling yards were most effective, next came the low-level attacks on troops, and then the attacks on bridges. The low flying airplanes had a terror effect and caused great damage to our communications. Also demoralizing were the umbrella fighters, which after escorting the bombers, would swoop down and hit everything including the jet planes in process of landing.

Spaatz: Did you have a three-inch gun for the jet?

Goering: The 5.5-centimeter machine gun, only now going into production, would have made a great difference in the jet. While waiting for that we used the 5.5-centimeter rocket. You

might find around Germany some jet airplanes equipped with anti-tank guns. Don't blame me for such monstrosities. This was done on the explicit orders of the Fuehrer. Hitler knew nothing about the air. He may have known something about the Army or Navy, but absolutely nothing about the air. He even considered the Me 262 to be a bomber; and he insisted it should be called a bomber.

Seversky: I know that four-engine Focke-Wulf planes were in production in 1939. When you found out after the Battle of Britain that your planes did not have sufficient fire power and bombing power, why didn't you concentrate on these four-engine planes as a heavy bomber?

Goering: Instead of that, we were developing the He 177 and tried to develop the Me 264 which was designed to go to America and return. We did use the Focke-Wulf against shipping from Norway. Because our production capacity was not so great as that of America we could not produce quickly everything we needed. Moreover, our plants were subject to constant bombing so that it was difficult to carry out our plans for heavy bomber production.

Seversky: The reason why I asked the previous question was because I wanted to establish whether you failed to build the big bombers because you did not believe in strategic airpower or because your productive capacity was restricted to the production of tactical aircraft for the Russian campaign.

Goering: No, I always believed in strategic use of airpower. I built the Luftwaffe as the finest bomber fleet, only to see it wasted on Stalingrad. My beautiful bomber fleet was used up in transporting munitions and supplies to the army of 200,000 at Stalingrad. I always was against the Russian campaign.

American contributions to the defeat of Nazi Germany included a reasoned and adaptable rationale for AAF targeting that was based on denying Germany the resources for waging war, ranging from machines to petroleum. Goering's interrogation at war's end provided US leadership a preliminary reference point on American bombing efficacy and limitations and valuable insight into German air strategy failures.

Particularly telling is Spaatz's questioning about German progress on proximity fuses.

Spaatz's boss and colleague, Arnold, more than once expressed concern that German fielding of a proximity fuse could wreak havoc on bomber formations. The potential for Japanese forces to deploy such a fuse remained a viable concern for Pacific planners.

Goering was found guilty of war crimes and crimes against humanity at the Nuremberg trials in 1946. He committed suicide in his cell the day before he was to have been executed. ✪

Frederick A. Johnsen is a frequent contributor to Air Force Magazine. This article is adapted from his book, Captured Eagles—Secrets of the Luftwaffe.



2015-16

AFA NOMINEES

The Air Force Association Nominating Committee met on May 9 and selected candidates to send forward for national officer positions and National Director positions on the Board of Directors. The committee comprises three past Chairmen of the Board, one person selected by each of the two Vice Chairmen of the Board, two persons representing each geographic area, and one person each representing the Total Air Force, Air Force veterans, and aerospace industry constituencies. The slate of candidates will be presented to the delegates at the AFA National Convention in National Harbor, Md., in September.

Chairman of the Board

Scott P. Van Cleef, Fincastle, Va., nominated for his second one-year term. He is a Life Member and has served as Chairman of the Board for the past year. He was previously the AFA Vice Chairman of the Board for Field Operations for two years. While President of Virginia's Roanoke Chapter, it was named AFA Medium-size Chapter of the Year for 2005. He was the State President when Virginia was named the Outstanding State Organization of the Year for 2008. He was an AFA National Director from 2008 to 2011 and the Central East Region President the following year. He served on the afa21 Internal Review Group in 2005 and the afa21 Field Structure Team in 2006. He has been a member and Chairman of the Field Council and Strategic Planning Committee. Van Cleef was Virginia's Member of the Year in 2004 and 2010 and is recipient of the Central East Region President's Award, AFA's Medal of Merit, Exceptional Service Award, and Chairman's Citation. Van Cleef served for more than 29 years in the Air Force. He commanded an F-16 squadron, was Vice Commander of an F-16 training wing, and Commander of a fighter wing. He is a self-employed maker of fine furniture, a chapter officer in MOAA, and a Civil Air Patrol senior member. He serves on the Board of Directors for the Virginia Museum of Transportation and on the Board of Visitors for the Virginia Women's Institute for Leadership at Mary Baldwin College. He earned a bachelor's degree in business economics from Purdue University and a master's degree in political science from Auburn University.



Van Cleef



Dietsch

Vice Chairman, Field Operations

David A. Dietsch, Arlington, Texas, nominated as Vice Chairman of the Board for Field Operations for a second one-year term. He has been an AFA National Director, Central Area; a Chairman's appointee to the Executive Committee; and AFA Texas Vice President for Industrial Relations and Government Relations. A Life Member active in AFA since 1992, he has served as Executive Vice President of the Lubbock Chapter, President of the Fort Worth Chapter, Texas State President, and Texoma Region President. He co-founded and became the first Board Chairman for the AFA Texas Aerospace Education Foundation. Dietsch has served at the national level on the Constitution, Membership, and the Nominating Committees and on the Field Council. He has been AFA Texas Member of the Year twice and received the AFA Texas Claire Chennault Patriotism Award. He also received the AFA Medal of Merit and three AFA Exceptional Service awards. Dietsch served for 27 years in the Air Force in aircraft maintenance and logistics. Afterward, he managed the aircraft maintenance contract workforce at two flying training wings. He has a bachelor's degree in American diplomacy and foreign affairs from Miami University in Ohio and a master's degree in public administration from Golden Gate University. He serves on the local Salvation Army Management Committee and is a consultant.



Bundy

Vice Chairman, Aerospace Education

Richard B. Bundy, Spotsylvania, Va., nominated for Vice Chairman of the Board for Aerospace Education for a first one-year term. An active AFA member since 1971, he is a member of the Executive Committee of the Richmond Chapter and previously served as Delaware State President for nine years. At the national level, he has been on the Nominating Committee and the Aerospace Education Council. AFA awards include the Medal of Merit, Exceptional Service Award, and Presidential Citation. Bundy served in the Air Force for 33 years as an airlift pilot and as a staff officer at major command, Air Staff, Joint Staff, and DOD levels. He commanded a squadron, group, and wing. He later served as the Executive Director of Arnold Air Society and Silver Wings for 10 years as the direct liaison with senior officers and the staff of AFA and AFROTC. During this period, he convinced the Silver Wings members to join their Arnold Air counterparts as full members of AFA. Due to his efforts, all members of Arnold Air and Silver Wings are AFA members. He received a bachelor's degree in transportation and logistics management from San Francisco State University and a master's degree in personnel management from Webster's University.

David B. Warner, Monument, Colo., nominated for Vice Chairman of the Board for Aerospace Education for a first one-year term. An AFA Life Member since 1980, Warner is currently serving as a National Director at Large and has been a member of the Aerospace Education Council since 2013. Warner, the son of a chief master sergeant, grew up Air Force before embarking on his own 30-year career. He now serves as the Executive Director for the Officers' Christian Fellowship, is a Board Member for Christian Service Charities, and sits on the Advisory Board for Faith Comes by Hearing. Through AFA's AEC, Warner has been heavily involved in Cyber-



Warner

Patriot and the emerging Stellar Xplorers Space Competition. Warner received his bachelor's of business administration degree from Southwest Texas State and a master of business administration degree from Oklahoma's Central State University, and he completed all levels of Air Force professional military education and the Harvard Management Course for Senior Executives.

Secretary

John T. "Tim" Brock, Oviedo, Fla., nominated for a first one-year term as National Secretary. He is a retired space systems officer/aerospace engineer. He has been an AFA Life Member since 1996 and has held Chapter, State, and Region Presidencies. He is currently serving as the Chapter Treasurer and State Membership Chairman. At the national level, Brock has held the office of National Director, served on the Audit, Nominating, Strategic Planning, Membership, and Field Council committees and has received the 2013 AFA Member of the Year and the Storz Individual Award. Brock served in the Air Force for 24 years in space operations. He is involved with the Lion's Club, National Space Society, and National Air and Space Society. He received his bachelor's degree in mathematics at the University of Georgia and his master's degree in space operations from the Air Force Institute of Technology.

Treasurer

Nora Ruebrook, Honolulu, is nomi-

nated for a second one-year term. She is an AFA Life Member and served as National Director, West Area, and Chairwoman of the National Audit Committee. She has received the AFA Medal of Merit and the Exceptional Service Award. Ruebrook has served on the AFA Finance, Strategic, and ad hoc Congressional Committees; was VP, Far West Region for Leadership Development; was AFA Hawaii President; and is an AFA National Mentor. Ruebrook is a member of the Thunderbird Society, Legacy Society, and Gold Wings. She serves on international and national boards, including that of the Navy League of the United States, as a National Director, and of the Association of the United States Army, on its Resolution Committee. Ruebrook is a National Contracting Management Association Fellow. She has been involved with governance of numerous organizations, such as the American Society of Military Comptrollers. Ruebrook is the CEO-Director of a company supporting the ISR, R&D, and cyber communities. Her industry client list includes Fortune 500 companies.

National Director at Large

The Nominating Committee submits three names for National Director at Large. Two will be elected for a three-year term.

Michael R. "Boe" Boera, of St. George, Utah, nominated for National Director at Large. Boera is an executive in the intelligence, information, and services business sector for a company in Dulles, Va. He has been an AFA member since 1985 and became a Life Member in 2015. He retired from the Air Force in 2014 after just under 33 years serving as a fighter pilot and in numerous command and senior executive staff positions. He is on the Board of Advisors and is a speaker for Patriot Mission, Inc., and is a Corporator for Lyndon Institute high school in Vermont. He is also a member of Daedalians, Red River Rats, and the National Association



Brock



Ruebrook

AFA NOMINEES



Boera



Heflebower



Santarelli

of Corporate Directors, as well as an honorary member of the Wild Weasel Association and the Honorable Order of Saint Barbara. He earned his bachelor's degree in architectural engineering from the University of Colorado, his master's degree in management and supervision from Central Michigan University, and a second master's degree, in strategic studies, from the Air War College.

Charles R. Heflebower, Fairfax Station, Va., nominated for National Director at Large. He is the Air Force Strategic Account Executive for a defense contracting company. Heflebower is an AFA Life Member and served the Air Force for more than 34 years in staff, command, and operational flying positions. After he retired from Active Duty, he was selected by the Chief of Staff of the Air Force and served for nearly nine years as an Air Force Senior Mentor with the Air Force Operational Command Training program. He is involved with US Air Force Academy Association of Graduates and is the Outside Director for a software company. He received a bachelor's degree in aeronautical engineering from the academy, a master's degree in international relations from the University of Arkansas, and completed the program at National War College.

Eugene D. Santarelli, Tucson, Ariz., nominated for National Director at Large. He is self-employed as the President of his own consulting company. He has been a member of AFA since 1966 and is a Life Member. Santarelli served in the Air Force for 32 years, as a pilot and in command, operations staff, and personnel positions. He currently works with the Davis-Monthan 50 and Southern Arizona Defense Alliance and is a Board Director at a credit union. Santarelli received his bachelor of business administration degree in management accounting at Notre Dame and his master's of business administration in administration and management from Troy State University. He has completed Army Command and General Staff College, the Air War College, and the Government Security Studies program at Harvard.

National Director, Central Area

The Nominating Committee submits one name for National Director, Central Area.

Thomas W. Gwaltney, Montgomery, Ala., nominated for National Director, Central Area, for a one-year term. Gwaltney holds the position of National Director, Central Area, appointed to a one-year term, and is seeking election to the position. He has been an AFA member since 1977 and has served in many roles at the field level, including Chapter, State, and Region President. He is a member of the AFA Field Council and is Chairman of the Wounded Airman Program Committee. He has received the AFA Medal of Merit, Exceptional Service Award, and Chairman's Citation. Gwaltney served in the Air Force for 32 years. His assignments took him around the globe, from presidential airlift at Andrews AFB, Md., to Thailand during the Vietnam War, to Korea, to name a few. He last served as Command Chief, Computer Systems Division, at Maxwell AFB-Gunter Annex, Ala. On his retirement, he served in



Gwaltney



Sell

leadership and managerial positions in the IT field. He received his bachelor's degree in material management from Troy State University and completed the GTE Project Management and Project Leadership course and numerous professional development courses.

National Director, West Area

The Nominating Committee submits one name for National Director, West Area.

Joan Sell, Littleton, Colo., nominated for National Director, West Area, for a three-year term. Sell holds the position of National Director, West Area, appointed to a one-year term by Chairman of the Board Scott P. Van Cleef, and is seeking election to the position. She is a Concierge Travel Agent for a cruise travel company. Sell joined AFA in 1986, became an active member in 1993, and became a Life Member in 2007. She has served the Sijan Chapter and Colorado State in multiple positions, including Chapter President and State President. She also served as the Rocky Mountain Region President. Sell held the position of AFA National Secretary from 2009 to 2011. She has received the AFA National Medal of Merit, is a two-time recipient of the National Exceptional Service award and twice the recipient of the Presidential Citation. Sell was Lance P. Sijan Chapter President in 2001 when it received the Donald W. Steele Sr. Memorial Unit of the Year award. ★

AFA National Report

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By Frances McKenney, Assistant Managing Editor

Training for CyberPatriot: A Saturday in Vermont

Teaming with Champlain College in Burlington, Vt., the **Green Mountain Chapter** sponsored a cybersecurity training day in May for CyberPatriot students.

Nineteen high-schoolers from the public high school and Civil Air Patrol teams that took part in CyberPatriot VII season—school year 2014-15—turned out for the all-day Saturday session.

Associate Professor Jim Hoag, from the college's Division of Information Technology and Sciences, and Duane Dunston, assistant professor of cybersecurity, hosted the training. Chapter Membership VP Richard F. Lorenz reported that the professors enlisted a couple of their top-notch IT students to help teach Windows security and Linux security. The CP students received beginner-level and advanced training. In the afternoon, Hoag oversaw a session where they built a Cisco router network and learned about its security and vulnerabilities.

Champlain College even provided pizza for lunch in addition to giving the students use of two IT labs.

Hoag became interested in teaching the younger generation about cybersecurity after hearing a pitch from longtime CyberPatriot supporter Daniel Manson, a professor who has organized training sessions at Cal Poly Pomona for participants in the Los Angeles area. Hoag contacted Vermont high school CP teams, offering Champlain's expertise. He saw it as a matter of "our students helping their students."

Hoag said his college will continue its CyberPatriot training this fall. At the May session, chapter officers used the gathering to present the Vermont CyberPatriot state champion trophy to Champlain Valley Union High School of Hinesburg. First-time CP participant South Burlington High School received a trophy for its first-place win at the Silver Tier level in the Northeast Region. All other teams received state or participation certificates.

"No one left empty-handed," wrote Lorenz in an email.



Photo by Richard Lorenz

Assistant Professor Duane Dunston (standing) instructs CyberPatriot participants during a training class at Champlain College in Vermont. The Green Mountain Chapter coordinated the sessions. Dunston is a lead CP mentor in the area.



Photo via Howard Leach

On D-Day + 71 years, Shooting Star Chapter VP Cole Kleitsch (center) spoke to a New Jersey AFA meeting on the Spirit of '45. Through events nationwide, the project commemorates World War II's "Greatest Generation." Hangar One Chapter's James Young and Ted Barnas flank Kleitsch, along with posters of those who served in World War II.

Norwich University cadet Timothy Smeddal (right) received an AFA ROTC Outstanding Cadet of the Year award in Vermont. Richard Lorenz (left) from the Green Mountain Chapter made the presentation.



Photo by J. Bergen



At the University of Minnesota Duluth spring commissioning ceremony for Det. 420, retired Col. Raymond Schwartz (right) of the Scott Berkeley Chapter, N.C., did triple duty: The Vietnam War vet—with 116 F-105 missions—was guest speaker, he commissioned grandson Grant Schwartz (left), and he presented the new second lieutenant with an AFA membership.

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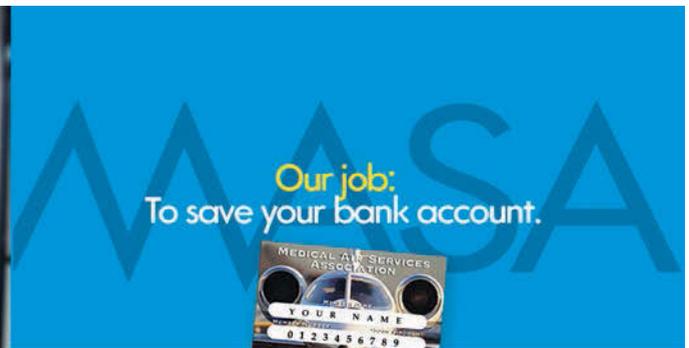
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Keep 'em Busy

Wright Memorial Chapter Secretary Vita Eonta and Veterans Affairs Director George W. Simons were checking out the Department of Veterans Affairs' website for the VA Medical Center in Dayton, Ohio. They were looking for a project to help vets.

That's when they came across the request for Kids Keep-Busy Packs, toys to keep children entertained while they visited family members being treated at a VA facility.

Eonta and Simons led a drive for donations of crayons, coloring books, puzzles, and word-game books for these packages.



USAF photo by MSgt. Jerry Harlan

Col. Jessica Meyeraan, from Tennessee's Gen. Bruce K. Holloway Chapter, presents Ron Waite with the I. G. Brown Civilian of the Quarter award. The chapter sponsors the award for this incentive program at the I. G. Brown Training and Education Center at McGhee Tyson Airport. Meyeraan is the center commander.

"We collected more than \$400 worth of items in a single meeting," said Simons. "The response from our members exceeded expectations."

Organizations such as Arnold Air Society, Silver Wings, Miami Valley Military Affairs Association, and Marriott Corp. stepped up to gather the donations, and Simons delivered them to the VA.

The chapter plans to collect more for the VA clients in coming months. "Personal care items, bus tokens, and coffee are always needed," Eonta said "This is just one of the ways we support our Air Force family." ✪

Photo via William Noyes



In Missouri, Whiteman Chapter's Aerospace Education VP TSgt. Steven Brevelle, VP MSgt. Lafoundra Thompson, and President MSgt. John De La Rosa presented the Chapter Teacher of the Year award to Clint Coffey at Macon High School's Science Olympiad and Scholar Quiz Bowl awards program. The surprise presentation caught biology teacher Coffey dressed in character for the evening's "Star Trek" theme.

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Photos by Lynn Morley



In Georgia, the Carl Vinson Memorial Chapter awards luncheon honored Teacher of the Year Rebecca Oakley (right). Chapter President Daniel Penny (left) and Para Vinson, made the presentation.



Defense Logistics Agency Director Lt. Gen. Andrew Busch addressed the Vinson Chapter in July. L-r: Penny; Randy Toms, mayor of Warner Robins; Busch; and Brig. Gen. Walter Lindsley, Warner Robins Air Logistics Complex commander.

Reunions

reunions@afa.org

1st Flight Det., Nha Trang AB, South Vietnam (1964-72). Oct. 19-22 in Dayton, OH. **Contact:** Rob Locker (614-738-9670) (relockerjr@cs.com).

7th Airlift Sq. Oct. 9, Boeing Museum of Flight, Seattle. **Contact:** Gabriel Taylor (253-982-2080) (gabriel.taylor@us.af.mil).

12th Tactical Fighter Wg/Fighter Escort Wg/Strategic Fighter Wg, and supporting units, Bergstrom AFB, TX, and Korea. April 20-24, 2016, in Charleston, SC. **Contact:** E. J. Sherwood (480-396-4681) (ej12tffw@cox.net).

19th Air Refueling Sq (SAC). All personnel from Homestead AFB, FL, and Otis AFB, MA. Oct. 4-7 at Fort Walton Beach, FL. **Contact:** Frank Szemere, 711 Sunset Blvd, E, Fort Walton Beach, FL 32547 (850-862-4279) (fiszemere@cox.net).

39th, 40th, & 41st Fighter Sqs, 35th Fighter Gp, 5th AF (WWII to Vietnam); 39th Flying Tng Sq; and any 39th Sq in between. Sept. 23-27 at the Lodge on the Desert in Tucson, AZ. **Contact:** Linne Haddock (719-687-6425) (comm@mac.com).

303rd Bomb Wg, Oct. 30-31 in Tucson, AZ. **Contact:** Bill Dettmer (505-294-0564) (billdettmer@comcast.net).

Phan Con F4 Phantom II Society, all welcome. Oct. 12-15 in Tucson AZ. **Contact:** Bill Crean (609-932-5158).

Spectre Assn. Oct. 8-11 at Sheraton Four Points at Fort Walton Beach, FL. All welcome. **Contact:** Bill Walter (bill-walter@embarqmail.co) (www.spectre-association.org).

USAF Combat Camera, and all who served in combat camera in **AAVS, 600th Photo Sq, 601st Photo Flight,** and present AD. Oct. 15-18 at the DoubleTree by Hilton Hotel San Antonio Downtown, in San Antonio. **Contact:** www.USAFcombatcamera.org by Sept. 1.

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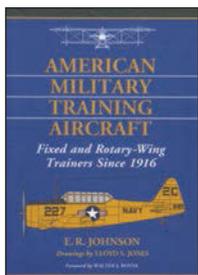
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Books

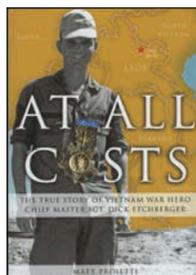
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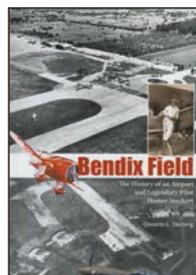
Airpower Reborn: The Strategic Concepts of John Warden and John Boyd. John Andreas Olsen, ed. Naval Institute Press, Annapolis, MD (800-233-8764). 235 pages. \$49.95.



American Military Training Aircraft: Fixed and Rotary-Wing Trainers Since 1916. E. R. Johnson. McFarland, Jefferson, NC (800-253-2187). 471 pages. \$45.00.



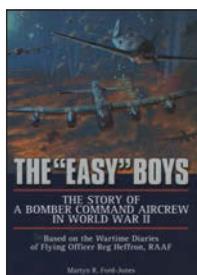
At All Costs: The True Story of Vietnam War Hero Chief Master Sgt. Dick Etchberger. Matt Proietti. Order from: www.atall-costs.org/order.html. 160 pages. \$32.94.



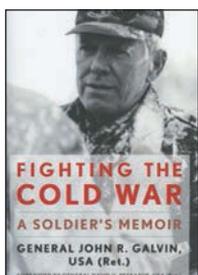
Bendix Field: The History of an Airport and Legendary Pilot Homer Stockert. Quentin L. Hartwig. Schiffer Publishing, Atglen, PA (610-593-1777). 96 pages. \$19.99.



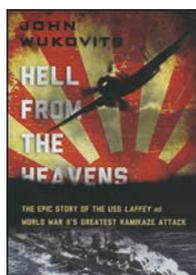
Captured Eagles: Secrets of the Luftwaffe. Frederick A. Johnsen. Osprey Publishing, New York (866-620-6941). 255 pages. \$25.95.



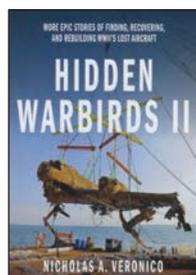
The "Easy" Boys: The Story of a Bomber Command Aircrew in World War II. Martyn R. Ford-Jones. Schiffer Publishing, Atglen, PA (610-593-1777). 224 pages. \$34.99.



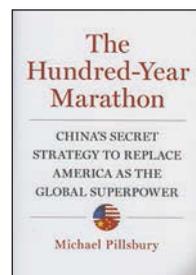
Fighting the Cold War: A Soldier's Memoir. Gen. John R. Galvin, USA (Ret.). University Press of Kentucky. Order from: Hopkins Fulfillment Service, Baltimore (800-537-5487). 517 pages. \$39.95.



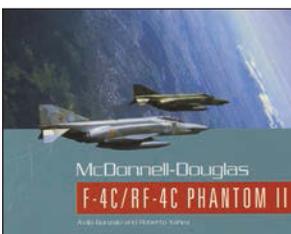
Hell From the Heavens: The Epic Story of the USS Laffey and World War II's Greatest Kamikaze Attack. John Wukovits. Da Capo Press, Boston (800-343-4499). 296 pages. \$25.99.



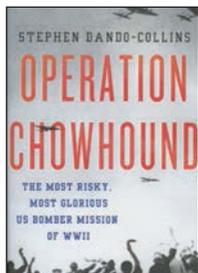
Hidden Warbirds II: More Epic Stories of Finding, Recovering, and Rebuilding WWII's Lost Aircraft. Nicholas A. Veronico. Zenith Press, Minneapolis (800-458-0454). 256 pages. \$30.00.



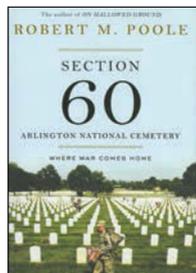
The Hundred-Year Marathon: China's Secret Strategy to Replace America as the Global Superpower. Michael Pillsbury. Henry Holt & Co., New York (888-330-8477). 319 pages. \$30.00.



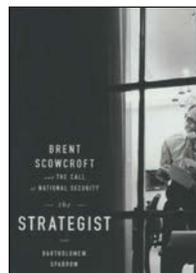
McDonnell-Douglas F-4C/RF-4C Phantom II. Ávila Gonzalo and Roberto Yáñez. Schiffer Publishing, Atglen, PA (610-593-1777). 48 pages. \$14.99.



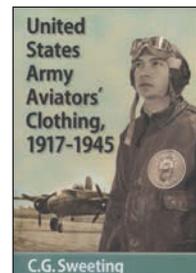
Operation Chowhound: The Most Risky, Most Glorious US Bomber Mission of WWII. Stephen Dando-Collins. Palgrave Macmillan, New York (646-307-5151). 248 pages. \$28.00.



Section 60: Arlington National Cemetery: Where War Comes Home. Robert M. Poole. Bloomsbury Publishing, New York (888-330-8477). 242 pages. \$27.00.

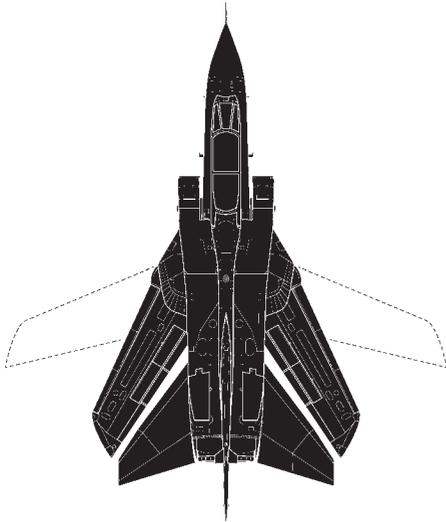


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Tornado



The Tornado stands as a top all-weather, day-night, supersonic fighter-attack aircraft. It was developed and built by the tri-nation Panavia consortium created by Britain, Germany, and Italy. It was, at its outset, one of the few tactical aircraft able to attack at very low level, at any time, in any kind of weather. However, this fighter has done more than strike alone. Tornado variants also have been optimized for electronic combat and air interception, plus maritime missions.

The Tornado has two engines. Its variable-sweep wings offer great operational flexibility—maneuverability and efficient cruise in the spread configuration, high speed in the swept configuration. It was built in three main variants: the IDS (interdiction-strike) fighter bomber, the ECR (electronic combat/reconnaissance) defense suppressor, and the ADV (air defense variant)

interceptor. It has advanced navigation and flight computers, fly-by-wire controls, a sophisticated cockpit, and a retractable refueling probe. Designed to excel at low-level air attack against Warsaw Pact forces, the Tornado has been extensively modified by the RAF to perform medium-level strike and other missions.

The fighter first saw combat in the 1991 Gulf War, when RAF and Italian air force Tornados were heavily engaged, especially in the earliest days. Since the early 1990s, the Tornados of all four owning nations—Britain, Italy, Germany, and Saudi Arabia—have seen action in many conflicts, from Bosnia to Serbia, from Iraq to Afghanistan and Libya. Tornado operators have carried out various upgrades and life extensions that will keep the fighter in frontline service for years.

—Robert S. Dudley with Walter J. Boyne

This aircraft: Royal Air Force Tornado GR1—#ZA447, *MiG Eater*—as it looked in January 1991 when deployed to Tabuk, Saudi Arabia.



In Brief

Designed, built by Panavia Aircraft GmbH ★ first flight Aug. 14, 1974 ★ number built 992 ★ crew of two (pilot, nav/weapons officer) **Specific to RAF GR4:** two Turbo-Union RB199-34R turbofan engines ★ defensive armament AIM-9 or AIM-132 air-to-air missiles ★ guns two 27 mm Mauser BK-27 cannon ★ load up to 19,800 lb of bombs and other munitions, including Maverick, Brimstone, Paveway, Storm Shadow, ALARM, BL755 cluster bombs, WE.177 nuclear weapon ★ max speed 1,490 mph ★ max sea level speed 921 mph ★ max range 870 mi ★ weight (loaded) 44,620 lb ★ span 45 ft 7 in spread, 28 ft 3 in swept ★ length 54 ft 10 in ★ height 19 ft 6 in ★ ceiling 50,000 ft.

Famous Fliers

Notables: RAF officers R. M. Collier, T. N. C. Elsdon, S. M. Hicks, G. K. S. Lennox, Adrian “Kev” Weeks (all KIA in Gulf War). **Other Notables:** Ulrike Flender, first female German air force jet fighter pilot; Prince Khaled bin Salman, son of Saudi crown prince; Nikki Thomas, first woman commander of RAF jet squadron; John Nichol, RAF, author of *Tornado Down*. **Test Pilots:** Paul Millett, David Eagles, Pietro Trevisan, Tim Ferguson.

Interesting Facts

Named, in beginning, Panavia 200 and Panavia Panther ★ flown in Luftwaffe’s first combat operation since World War II (Bosnian War, 1995) ★ nicknamed “Tonka” by RAF crews ★ shot down, accidentally, by US Patriot missile, in 2003 Iraq War, with both aircrew killed ★ can fly automatically at low level using terrain-following radar ★ cleared to carry most air-launched weapons in NATO service ★ features cannon later adopted by Dassault/Dornier Alpha Jet, Saab Gripen, Eurofighter Typhoon.

USN Photographer's Mate 2nd Class Michael Sandberg



A German Panavia Tornado IDS during the annual maritime exercise Baltic Operations 2003 (BALTOPS).



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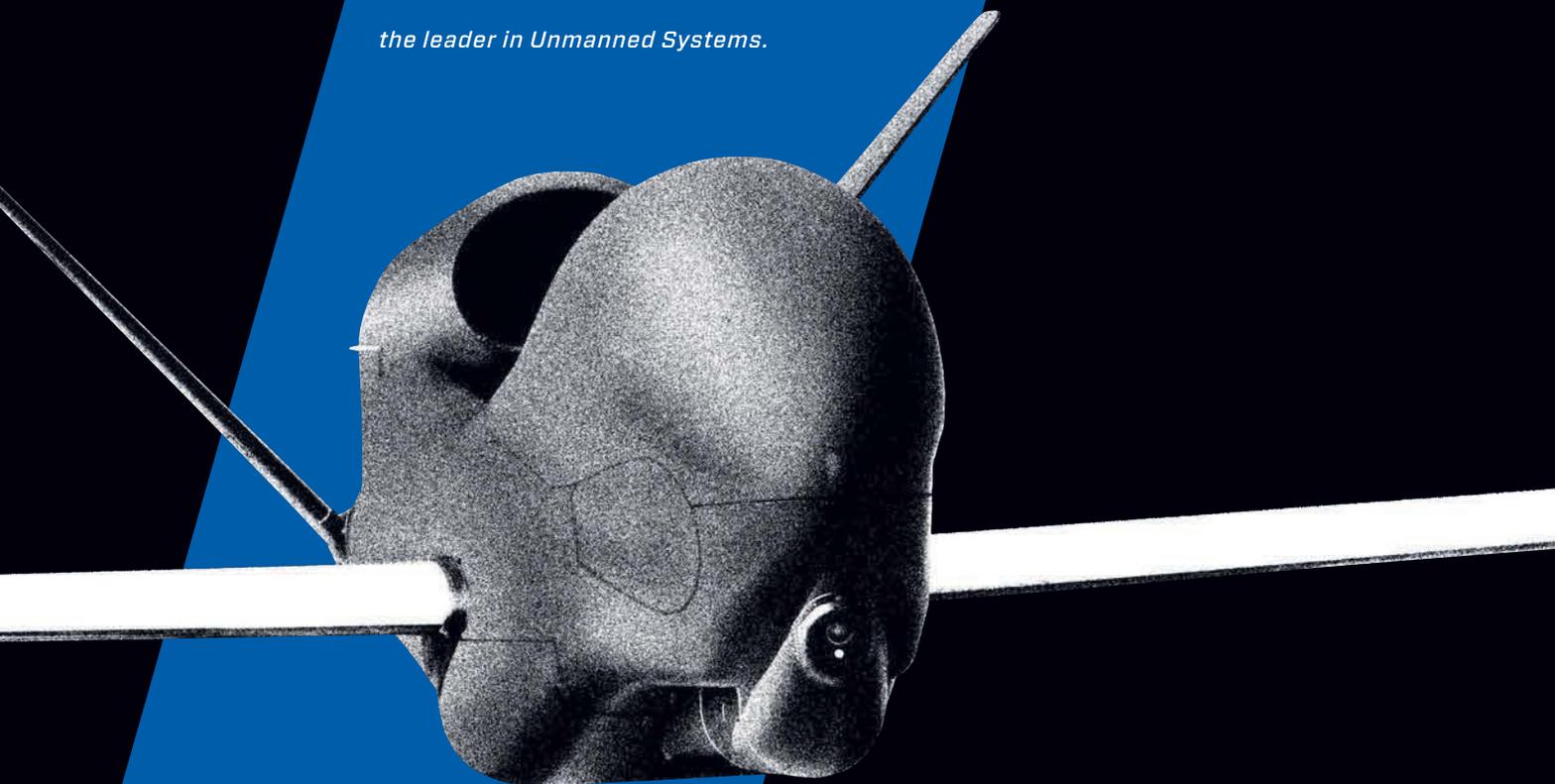
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